PACIFIC WHITING HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES FOR 2009

The Pacific whiting fishery management process is unlike that for other Federally-managed west coast groundfish for 2009 fisheries, for which catch specifications and management measures were adopted by the Council at the June 2008 Council meeting for the two-year period 2009-2010. The Council deferred a decision on setting harvest specifications and management measures for the 2009 Pacific whiting fisheries pending the development and review of a new stock assessment to occur during February 2009. A new Pacific whiting assessment was prepared this winter (Agenda Item G.1.a, Attachment 1) and reviewed by a joint U.S.-Canadian assessment review panel during February 2008 (Agenda Item G.1.a, Attachment 2). The executive summary of the assessment is included in the briefing book and the assessment in its entirety is found in the CD copy of meeting materials, along with other materials that will be reviewed by the Scientific and Statistical Committee (SSC). The Council should consider the advice of the assessment review panel, the SSC, and other advisors before adopting an assessment for use in management decision-making. The assessment, once approved, will be used to set 2009 Pacific whiting harvest specifications and management measures.

In 2004-2008, this transboundary stock was managed jointly with the Department of Fisheries and Oceans, Canada, in the spirit of a new process described in a treaty that has been signed and ratified, but awaits final rulemaking. The primary tenets of the treaty include a joint U.S.-Canada annual assessment and management process (which will presumably be implemented next year), a research commitment, and a harvest sharing agreement providing 73.88 percent of the coastwide optimum yield (OY) for U.S. fisheries and 26.12 percent for Canadian fisheries.

The Council is tasked with setting an acceptable biological catch (ABC) and OY for Pacific whiting that will be used to manage 2009 fisheries and management measures to properly prosecute the fishery. Considerations for this decision include the stock's current and projected status with respect to the overfished threshold, the international agreement with Canada, and overfished species' bycatch concerns. Unless there is a change in the research, non-whiting fishery bycatch, and tribal set-asides, once the OY is set, the apportionment within the non-tribal fisheries is set automatically via the existing intersector allocation (i.e., 42 percent for the shoreside whiting sector, 24 percent for the at-sea mothership whiting sector, and 34 percent for the at-sea catcher-processor whiting sector).

The Council is also tasked with deciding management measures for 2009 Pacific whiting fisheries. The Council adopted some management measures for the 2009 whiting fishery last June when deciding management measures for 2009 and 2010 fisheries. While the Council decided there would be sector-specific bycatch limits specified for the 2009 whiting fishery that would be apportioned according to the pro-rata whiting allocations, final sector bycatch limits will be decided at this meeting as part of the inseason action under agenda items G.2 and G.7 so that bycatch amounts can be allocated in the context of the needs of all groundfish fisheries.

The Council also set aside 50,000 mt of whiting for 2009 tribal whiting fisheries at the June 2008 Council meeting, with 42,000 mt set aside for the Makah Tribe and 8,000 mt set aside for the

Quileute Indian Tribe. A letter from Mr. Mel Moon, Jr., of the Quileute Indian Tribe is provided that takes issue with this decision (Agenda Item G.1.b, Tribal Report).

Council Action:

1. **Adopt the 2009 Pacific whiting stock assessment.**
2. **Adopt a 2009 ABC and OY for Pacific whiting.**
3. **Adopt 2009 Pacific whiting management measures.**

Reference Materials:

1. Agenda Item G.1.a, Attachment 1: Executive Summary of Stock Assessment of Pacific Hake, Merluccius productus, (a.k.a. Whiting) in U.S. and Canadian Waters in 2009.
2. Agenda Item G.1.a, Attachment 2: Pacific Whiting – The Joint U.S.-Canada STAR Panel Report.
3. Agenda Item G.1.b, NMFS Report: January 14 letter from Frank Lockhart to Don Hansen regarding the NMFS plan to prosecute the 2009 shoreside whiting fishery under an EFP.
4. Agenda Item G.1.b, Tribal Report: November 3, 2008 letter from Mr. Mel Moon, Jr. of the Quileute Indian Tribe to the Pacific Fishery Management Council regarding the 2009 tribal whiting set-asides.

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Reports and Comments of Agencies and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Final 2009 Stock Assessment, Allowable Biological Catch, Optimum Yield, and Management Measures

PFMC
02/19/09

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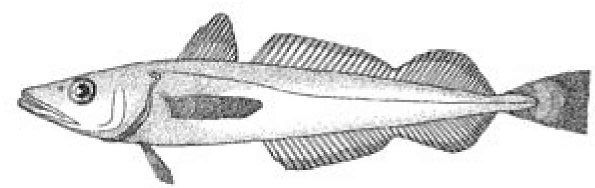
DRAFT **Stock Assessment of Pacific Hake, *Merluccius productus*, (a.k.a. Whiting) in U.S. and Canadian Waters in 2009**



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Executive Summary

Stock

This assessment reports the status of the coastal Pacific hake (or Pacific whiting, *Merluccius productus*) resource off the west coast of the United States and Canada. The coastal stock of Pacific hake is currently the most abundant groundfish in the California Current system. Smaller populations of hake occur in the major inlets of the northeast Pacific Ocean, including the Strait of Georgia, Puget Sound, and the Gulf of California. However, the coastal stock is distinguished from the inshore populations by larger body size and seasonal migratory behavior. The coastal population is modeled as a single stock, but the United States and Canadian fishing fleets are treated separately in order to capture some of the spatial variability in Pacific hake distribution, size- and age-structure, as well as fishery selectivity.

Catches

Coast-wide fishery landings of Pacific hake averaged 222 thousand mt from 1966 to 2008, with a low of 90 thousand mt in 1980 and a peak of 361 thousand mt in 2006. Recent coast-wide landings have continued to be above the long term average, at approximately 297 and 322 thousand mt in 2007 and 2008, respectively. Landings were predominately comprised of fish from the large 1999 year class in 2007, and from that year class along with the emergent 2005 year class in 2008. The United States has averaged 166 thousand mt, or 74.7% of the total landings over the time series, with Canadian catch averaging 56 thousand mt. The 2007 and 2008 landings had similar national distributions, with 75.6% and 77.0%, respectively, harvested by the United States fishery. The current model ignores discarding of Pacific hake outside of the target fishery, where discard has been included in landings estimates; the terms catch and landings are therefore used interchangeably; total discard is estimated to be less than 1% of landings and therefore is likely to be negligible.

Table a. Recent commercial fishery landings (1000s mt).

Year	US at-sea	US shore-based	US Tribal	US total	Canadian foreign and JV	Canadian shore-based	Canadian total	Total
1999	115	83	26	225	17	70	87	312
2000	116	86	7	208	16	6	22	231
2001	102	73	7	182	22	32	54	236
2002	63	46	23	132	0	51	51	183
2003	67	51	25	143	0	62	62	206
2004	90	89	31	210	59	65	124	335
2005	150	74	35	259	15	85	100	360
2006	134	97	35	267	14	80	94	361
2007	121	73	30	225	7	66	73[1]	297
2008	166	50	32	248	4	70	74	322

[1] This value for 2007 Canadian catch was reported to us after the STAR panel and too late to be included in the MCMC analysis. The value used in the assessment is 86 thousand mt. This small difference (13 thousand mt = ~4% of total estimated catch in 2007) should have very little effect in the results.

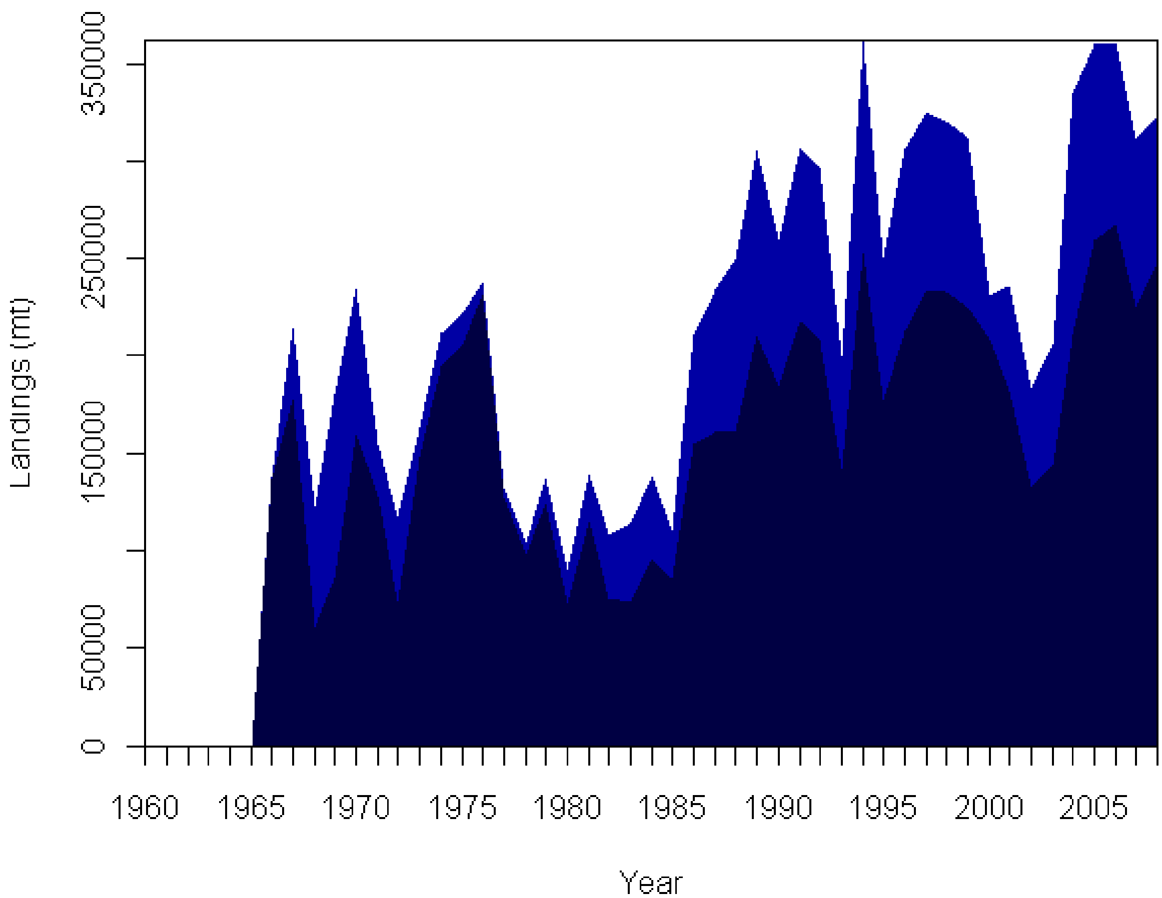

Figure a. Total Pacific hake landings used in the assessment by nation, 1960-2008 (Canadian landings are represented by the lighter region above the darker U.S. values).

Data and assessment

Age-structured assessment models of various forms have been used to assess Pacific hake since the early 1980's, using total fishery landings, fishery length and age compositions and survey abundance indices. The acoustic survey catchability coefficient (*q*) has been, and continues to be, one of the major sources of uncertainty in the model. From 2004 to 2007, assessments presented two models (which were assumed to be equally likely) in an attempt to bracket the range of uncertainty in *q*. In 2008, an effort was made to include the uncertainty in *q* as well as additional uncertainty regarding the acoustic survey selectivity and the natural mortality rate of older fish within a single model. This 2009 assessment model incorporates further uncertainty in the degree of recruitment variability as well as more flexible time-varying fishery selectivity. Uncertainty in acoustic survey catchability remains large, and is included in the base case model.

In 2006, the hake assessment model was converted from an ADMB model developed by Dorn (Dorn et al. 1998) to Stock Synthesis 2 (SS2, Methot, 2005). In the current (2009) model, conducted in SS v3.02b (Methot 2009), we have built upon the most recent model (Helser et al. 2008), adding new data and refining the modeling of ageing imprecision. New data in the 2009 assessment includes: Historical length data from Santa Barbara, California (1963-1970); 2008 catches from the U.S. and Canada; 2008 length and conditional age-at-length compositions from the U.S. and Canadian fisheries; and the 2008 juvenile index.

Stock biomass

The base model indicates that the Pacific hake female spawning biomass declined rapidly after a peak in 1984 (4.02 million mt) until 2000 (0.58 million mt). This long period of decline was followed by a brief increase to a peak of 1.39 million mt in 2003 as the large 1999 year class matured. In 2009 (beginning of year), spawning biomass is estimated to be the lowest in the time-series, 0.43 million mt, however this estimate is quite uncertain, with asymptotic 95% confidence intervals ranging from 0.20 to 0.67 million mt. This level equates to approximately 32% of the estimated unfished spawning biomass (SB_{zero}). Estimates of uncertainty in current relative depletion range from 15%-49% of unfished biomass. The estimate of spawning biomass for 2008 is 0.56 million mt, considerably lower than the estimate of 1.10 million mt from the 2008 assessment, reflecting a downward revision in the estimated absolute scale of the hake stock. However, the estimated 2008 depletion level of 41% is slightly higher than the 38% estimated by the 2008 assessment, reflecting a downward revision of the unexploited equilibrium conditions as well. The recent peak of spawning biomass in 2003 generated by the 1999 year class is now estimated to have reached 102% of the unexploited equilibrium whereas the estimate from the 2008 assessment was only 66% of that equilibrium level. These changes in the scale of the problem are mainly a function of increased flexibility in time-varying fishery selectivity and the improved ageing imprecision matrices, leading to revised year-class strengths for dominant cohorts. Unexploited equilibrium spawning biomass (SB_{zero}) is estimated to be 1.37 million mt (~95% confidence interval: 1.22-1.51).

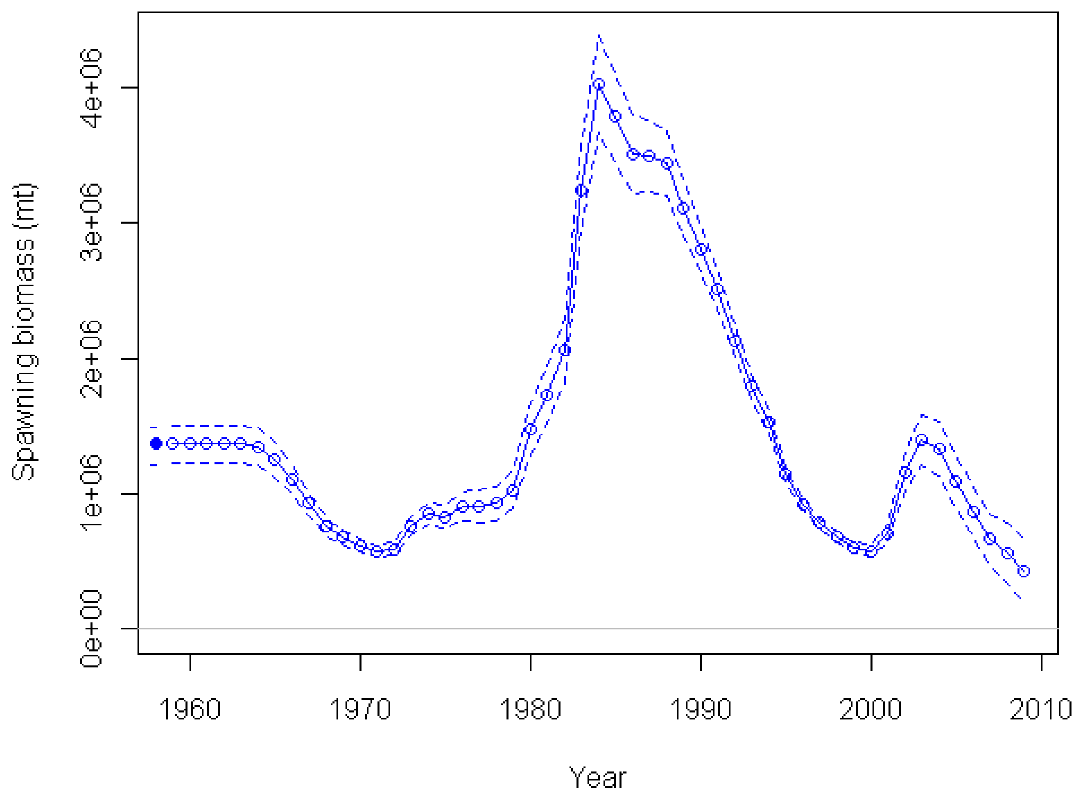

Figure b. Estimated female spawning biomass time-series with approximate asymptotic 95% confidence intervals.

Table b. Recent trend in estimated Pacific hake biomass and depletion level.

Year	Total biomass (million mt)	Age 3+ biomass (million mt)	Female spawning biomass (million mt)	~95% confidence interval	Estimated depletion	~95% confidence interval
2000	2.12	1.22	0.58	0.53 - 0.62	42%	37% - 47%
2001	2.98	1.37	0.71	0.64 - 0.78	52%	45% - 59%
2002	3.23	3.12	1.16	1.02 - 1.31	85%	73% - 98%
2003	3.19	3.05	1.39	1.21 - 1.58	102%	86% - 118%
2004	2.89	2.82	1.33	1.14 - 1.53	98%	82% - 114%
2005	2.45	2.21	1.10	0.91 - 1.28	80%	65% - 95%
2006	2.00	1.85	0.87	0.68 - 1.06	64%	49% - 78%
2007	1.67	1.34	0.66	0.47 - 0.86	49%	34% - 63%
2008	1.37	1.27	0.56	0.33 - 0.78	41%	25% - 57%
2009	1.14	0.92	0.43	0.20 - 0.67	32%	15% - 49%

Recruitment

Estimates of historical Pacific hake recruitment indicate a very large year class in 1980. Secondary large recruitment events occurred in 1977, 1984 and 1999, with 1970, 1973, 1987, 1990 and 2005 being substantially larger than adjacent years. The 1999 year class was estimated to be the largest in 15 years (12.32 billion, 95% interval: 10.79 - 14.07 billion) and has supported fishery catches since 2002. Uncertainty in estimated recruitments is substantial, especially for recent years, as indicated by the asymptotic 95% confidence intervals. Recruitment to age 0 before 1962 is assumed to be equal to the long-term mean recruitment. Age-0 recruitment in 2005 appears promising but its magnitude is still very uncertain, as the 2005 year class has only been observed in the fishery for two seasons (2007-2008) and the acoustic survey for one season (2007). The fishery catch included some fish from the 2006 year class during the 2008 fishing season, but this recruitment has yet to be observed in the acoustic survey. Recruitments subsequent to 2007 are drawn exclusively from the stock-recruit curve, with correspondingly high levels of uncertainty.

Table c. Recent estimated trend in Pacific hake recruitment.

Year	Estimated recruitment (billions age-0)	~95% confidence interval
2000	0.46	0.38 - 0.56
2001	0.98	0.80 - 1.21
2002	0.01	<0.01 - 0.03
2003	1.64	1.20 - 2.23
2004	0.33	0.22 - 0.50
2005	2.39	1.50 - 3.81
2006	0.38	0.21 - 0.69
2007	1.03	0.15 - 6.94
2008	1.90	0.29 - 12.35
2009	1.86	0.29 - 12.10

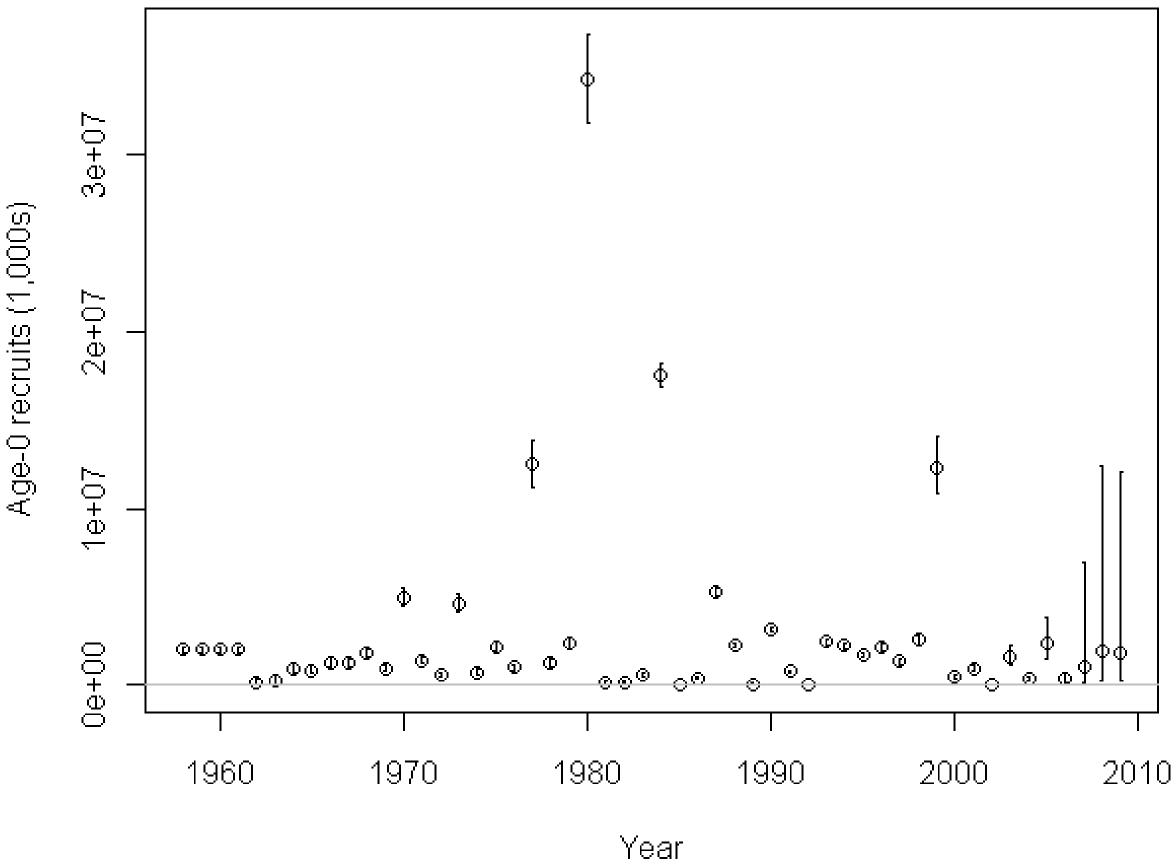

Figure c. Estimated recruitment time-series with approximate asymptotic 95% confidence intervals.

Reference points

Two types of reference points are reported in this assessment: those based on the population parameters at the beginning of the modeled time period and those based on the most recent time period in a 'forward projection' mode of calculation. This distinction is important since temporal variability in growth and other parameters can result in different biological reference point calculations across alternative chronological periods. All strictly biological reference points (e.g., unexploited spawning biomass) are calculated based on the unexploited conditions at the start of the model, whereas management quantities (MSY, SB_{msy}, etc.) are based on the current growth and maturity schedules and are marked throughout this document with an asterisk (*).

Unexploited equilibrium Pacific hake spawning biomass (SB_{zero}) is estimated to be 1.37 million mt (~ 95% confidence interval: 1.22-1.51 million mt), with a mean expected recruitment of 1.99 billion age-0 hake (~ 95% confidence interval: 1.80-2.21). Associated management reference points for target and critical biomass levels based on $SB_{40\%}$ proxy are 0.55 million mt (B40%) and 0.34 million mt (B25%), respectively. MSY is estimated to be 287,805* mt, produced by a female spawning biomass of 296,241* mt, and reflecting the high value (0.88) estimated for steepness of the stock-recruit curve. The equilibrium $F_{MSY\text{-}proxy}$ harvest rate (F40%) yield under the base model is estimated to be 270,563* mt, occurring at a spawning biomass of

466,466* mt. The biomass-based target ($SB_{40\%}$) equilibrium yield is estimated to be 254,359* mt, occurring at a spawning biomass of 546,335* mt given current life history parameters.

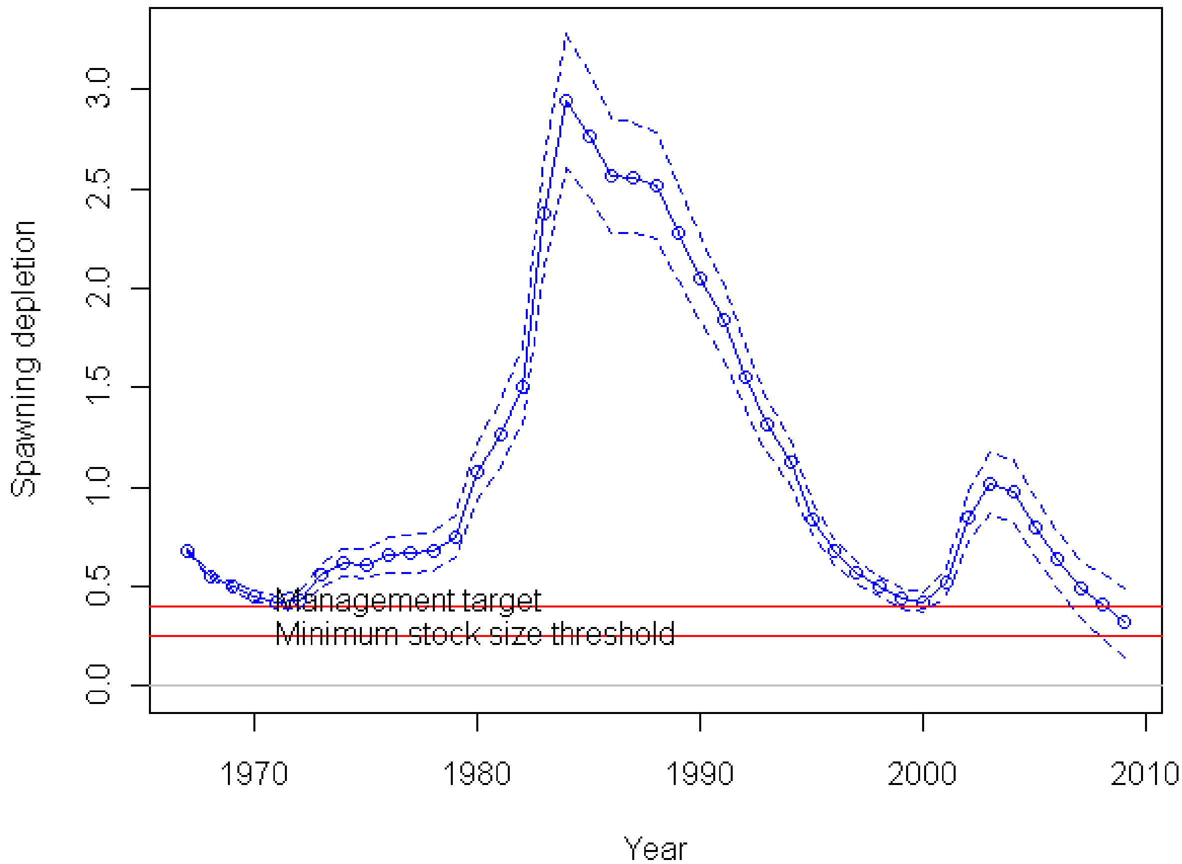

Figure d. Time-series of estimated depletion, 1967-2009.

Exploitation status

The relative spawning potential ratio (1-SPR) for Pacific hake has been below the proxy target of 40% for the history of this fishery, but the ratio is uncertain and approaching 1.0 in recent years. Pacific hake are presently in the precautionary zone with regard to biomass level (32% unfished biomass in 2009) and slightly below, at 95% of (in 2008), the target SPR rate. The full exploitation history in terms of both the biomass and F targets is portrayed graphically via a phase-plot.

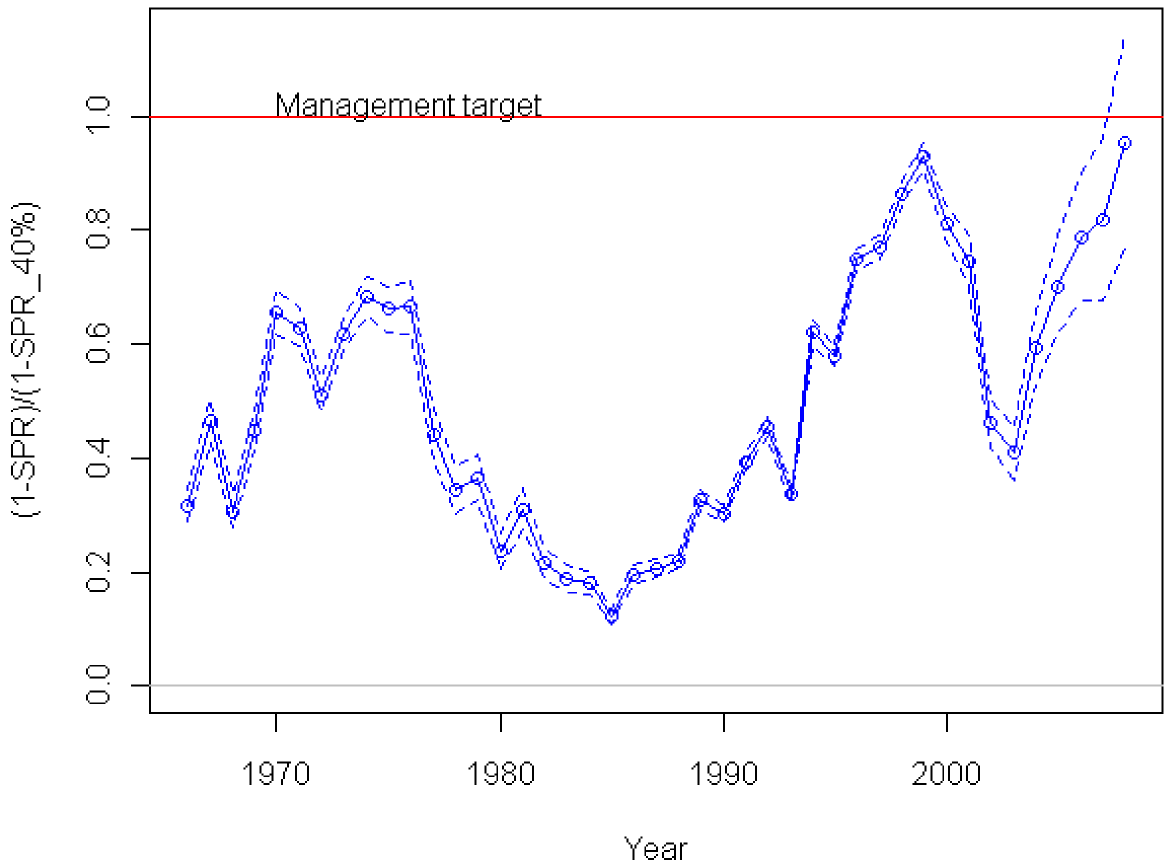

Figure e. Recent trend in relative spawning potential ratio ($1\text{-SPR}/1\text{-SPR}_{Target=0.4}$).

Table d. Recent trend in relative spawning potential ratio ($1\text{-SPR}/1\text{-SPR}_{Target=0.4}$) and exploitation fraction (catch/3+biomass). Values for 2009 are part of the forecast results.

Year	Relative SPR ratio	~95% confidence interval	Exploitation fraction	~95% confidence interval
1999	0.93	0.91 - 0.96	0.23	0.21 - 0.24
2000	0.81	0.78 - 0.84	0.19	0.17 - 0.20
2001	0.75	0.70 - 0.79	0.17	0.16 - 0.19
2002	0.46	0.42 - 0.50	0.06	0.05 - 0.07
2003	0.41	0.36 - 0.46	0.07	0.06 - 0.08
2004	0.59	0.53 - 0.66	0.12	0.10 - 0.14
2005	0.70	0.62 - 0.79	0.16	0.13 - 0.19
2006	0.79	0.68 - 0.90	0.19	0.15 - 0.24
2007	0.82	0.68 - 0.96	0.23	0.17 - 0.30
2008	0.95	0.77 - 1.14	0.25	0.15 - 0.36

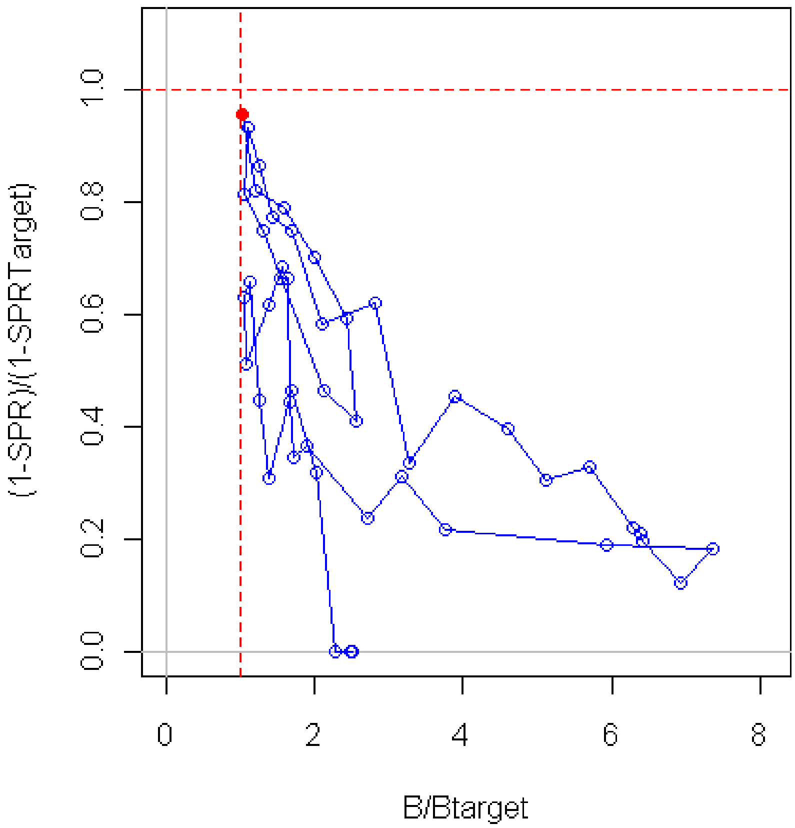

Figure f. Temporal pattern (phase plot) of relative spawning potential ratio (1-SPR/1-SPR$_{Target=0.4}$) vs. estimated spawning biomass relative to the proxy 40% level, 1960-2008. The filled circle denotes 2008 and the line connects years through the time-series.

Management performance

Since implementation of the Magnuson-Stevens Fishery Conservation and Management Act in the U.S. and the declaration of a 200 mile fishery conservation zone in Canada in the late 1970's, annual quotas have been the primary management tool used to limit the catch of Pacific hake in both zones by foreign and domestic fisheries. Scientists from both countries have collaborated through the Technical Subcommittee of the Canada-US Groundfish Committee (TSC), and there has been informal agreement on the adoption of an annual fishing policy. During the 1990s, however, disagreement between the U.S. and Canada on the division of the acceptable biological catch (ABC) between the two countries led to quota overruns; 1991-1992 quotas summed to 128% of the ABC and quota overruns averaged 114% from 1991-1999. Since 2000, total catches have been below coast-wide ABCs. A recent treaty between the United States and Canada (2003), which has not yet been fully implemented, establishes U.S. and Canadian shares of the coast-wide allowable biological catch at 73.88% and 26.12%, respectively.

In recent years, failure to extract the entire OY available to the fishery in U.S. waters has been a result of extremely restrictive bycatch limits on overfished rockfish species, particularly widow and canary rockfishes. In 2008, there was a voluntary ‘stand-down’ during the season as the fleet approached the bycatch limit, and the fishery was subsequently shut down when the limit was reached. Reallocation of quota in the fall, when bycatch levels tend to be lower, allowed for the U.S. fishery to achieve 92% of its OY.

Table e. Recent trend in Pacific hake management performance.

Year	Total landings (mt)	Coast-wide (U.S. + Canada) OY (mt)	Coast-wide (U.S. + Canada) ABC (mt)
1999	311,855	290,000	290,000
2000	230,820	290,000	290,000
2001	235,962	238,000	238,000
2002	182,911	162,000	208,000
2003	205,582	228,000	235,000
2004	334,672	501,073	514,441
2005	359,661	364,197	531,124
2006	360,683	364,842	661,680
2007	297,098	328,358	612,068
2008	322,017	364,842	400,000

Unresolved problems and major uncertainties

The acoustic survey catchability, *q*, and selectivity remain uncertain and the model results are quite sensitive to estimated values. This is largely driven by an inconsistency in the acoustic survey biomass time series and age compositions. Age-composition data suggest a large build up of stock biomass in the mid-1980s, however the acoustic survey biomass time series is relatively flat since 1977. Efforts are underway to reanalyze the historical acoustic survey time-series and provide annual variance estimates, and evaluate target-strength relationships, the sum of which could provide more information for the 2010 assessment.

Forecasts

Forecasts are generated applying the 40:10 control rule and coast-wide catch allocation of 73.88% and 26.12% to the U.S. and Canada, respectively to maximum likelihood results. Extremely wide confidence intervals for forecast quantities reflect uncertainty in recent and future year-class strengths as well as current biomass levels. Alternative management actions are presented in a decision table based on MCMC integration of the posterior distribution for model quantities.

Table f. Three-year projections of maximum likelihood-based Pacific hake ABC, OY, spawning biomass and depletion for the base case model based on the 40:10 harvest control rule and the $F_{40\%}$ overfishing limit/target.

Year	ABC (mt)	OY (mt)	Female spawning biomass (millions mt)	~95% confidence interval	Estimated depletion	~95% confidence interval
2009	291,965	253,582	0.43	0.20 - 0.67	32%	15% - 49%
2010	238,866	193,109	0.36	0.10 – 0.62	26%	7% - 45%
2011	227,178	189,054	0.36	<0.01 – 0.74	27%	<1% - 53%

Table g. Decision table with three year projections of posterior distributions for Pacific hake female spawning biomass, depletion and relative spawning potential ratio (1-SPR/1-$SPR_{Target=0.4}$; values greater than 1.0 denote overfishing). Catch alternatives are based on: 1) the values estimated via the 40:10 harvest control rule and the $F_{40\%}$ overfishing limit/target for the base case model (from table f above), 2) arbitrary constant catch levels of 50,000, 100,000, 150,000 and 200,000 mt.

Management Action		States of nature: Female spawning biomass (millions mt) posterior interval					Estimated depletion posterior interval					Relative spawning potential ratio posterior interval				
Year	Coast-wide catch (mt)	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th
2009	253,582	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.79	0.91	1.00	1.09	1.22
2010	193,109	0.14	0.24	0.32	0.41	0.60	10%	17%	23%	29%	43%	0.69	0.86	0.98	1.10	1.29
2011	189,054	0.10	0.19	0.28	0.42	0.76	7%	14%	21%	30%	54%	0.65	0.86	1.01	1.18	1.40
2009	50,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.24	0.31	0.36	0.42	0.52
2010	50,000	0.23	0.33	0.41	0.50	0.69	17%	24%	29%	36%	49%	0.22	0.29	0.34	0.41	0.52
2011	50,000	0.24	0.33	0.43	0.56	0.90	17%	24%	31%	40%	64%	0.19	0.27	0.33	0.40	0.51
2009	100,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.43	0.52	0.60	0.68	0.81
2010	100,000	0.21	0.31	0.38	0.48	0.66	15%	22%	28%	34%	47%	0.40	0.52	0.60	0.70	0.86
2011	100,000	0.20	0.29	0.39	0.52	0.86	14%	21%	28%	37%	61%	0.37	0.50	0.60	0.72	0.89
2009	150,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.57	0.69	0.77	0.86	1.00
2010	150,000	0.19	0.28	0.36	0.45	0.64	14%	21%	26%	33%	46%	0.56	0.70	0.80	0.91	1.09
2011	150,000	0.16	0.25	0.34	0.48	0.82	11%	18%	25%	34%	58%	0.52	0.70	0.82	0.97	1.16
2009	200,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.69	0.81	0.90	0.98	1.12
2010	200,000	0.17	0.26	0.34	0.43	0.62	12%	19%	24%	31%	44%	0.69	0.85	0.96	1.07	1.25
2011	200,000	0.12	0.21	0.30	0.43	0.78	8%	15%	22%	31%	56%	0.66	0.86	1.00	1.16	1.37

Research and data needs

1) Reanalyze the historical acoustic survey time-series and calculate annual variance estimates incorporating uncertainties in spatial variability, sampling variability and target strength uncertainty.
2) Evaluate a sex-specific model and use of split-sex selectivity for the survey and the U.S. and Canadian fisheries.
3) Evaluate whether modeling the distinct at-sea and shore-based fisheries in the U.S. and Canada resolves some lack of fit in the compositional data.
4) Investigate aspects of the life history characteristics for Pacific hake and their possible effects on the interrelationship of growth rates and maturity at age. This should include additional data collection of maturity states and fecundity, as current information is limited.
5) Evaluate the quantity and quality of biological data prior to 1988 from the Canadian fishery for use in developing length and conditional age-at-length compositions.
6) Compare spatial distributions of hake across all years and between bottom trawl and acoustic surveys to estimate changes in catchability/availability across years. The two primary issues are related to the changing spatial distribution of the survey as well as the environmental factors that may be responsible for changes in the spatial distribution of hake and their influences on survey catchability and selectivity.
7) Develop an informed prior for the acoustic q. This could be done either with empirical experiments (particularly in off-years for the survey) or in a workshop format with technical experts. There is also the potential to explore putting the target strength estimation in the model directly. This prior should be used in the model when estimating the q parameter.
8) Conduct further exploration of ageing imprecision and the effects of large cohorts via simulation and blind source age-reading of samples with differing underlying age distributions – with and without dominant year classes.
9) Investigate alternative methods of parameterizing as well as alternative time blocking and/or restricted annual changes for fishery selectivity. Investigate reasons for changes in selectivity over time to validate estimated selectivity patterns.

Table h. Summary of recent trends in Pacific hake exploitation and stock levels; all values reported at the beginning of the year.

Quantity	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coast-wide landings (mt)	230,820	235,962	182,911	205,582	334,672	359,661	360,683	297,098	322,017	NA
ABC (mt)	290,000	238,000	208,000	235,000	514,441	531,124	661,680	612,068	400,000	NA
OY (1000s mt)	290,000	238,000	162,000	228,000	501,073	364,197	364,842	328,358	364,842	NA
Relative SPR: (1-SPR/1-SPR$_{Target=0.4}$)	0.81	0.75	0.46	0.41	0.59	0.7	0.79	0.82	0.95	NA
~95% interval	0.78 - 0.84	0.70 - 0.79	0.42 - 0.50	0.36 - 0.46	0.53 - 0.66	0.62 - 0.79	0.68 - 0.90	0.68 - 0.96	0.77 - 1.14	NA
Total biomass (millions mt)	2.12	2.98	3.23	3.19	2.89	2.45	2.00	1.67	1.37	1.14
3+ biomass (millions mt)	1.22	1.37	3.12	3.05	2.82	2.21	1.85	1.34	1.27	0.92
Spawning biomass (millions mt)	0.58	0.71	1.16	1.39	1.33	1.10	0.87	0.66	0.56	0.43
~95% interval	0.53 - 0.62	0.64 - 0.78	1.02 - 1.31	1.21 - 1.58	1.14 - 1.53	0.91 - 1.28	0.68 - 1.06	0.47 - 0.86	0.33 - 0.78	0.20 - 0.67
Recruitment (billions age-0)	0.46	0.98	0.01	1.64	0.33	2.39	0.38	1.03	1.9	1.86
~95% interval	0.38 - 0.56	0.80 - 1.21	<0.01 - 0.03	1.20 - 2.23	0.22 - 0.50	1.50 - 3.81	0.21 - 0.69	0.15 - 6.94	0.29 - 12.35	0.29 - 12.10
Depletion	42%	52%	85%	102%	98%	80%	64%	49%	41%	32%
~95% interval	37% - 47%	45% - 59%	73% - 98%	86% - 118%	82% - 114%	65% - 95%	49% - 78%	34% - 63%	25% - 57%	15% - 49%

Table i. Summary of Pacific hake reference points. *MSY related values reflect current growth patterns.

Quantity	Estimate	~95% Confidence interval
Unfished female spawning biomass (SB_0, millions mt)	1.37	1.22-1.51
Unfished total biomass (millions mt)	3.23	NA
Unfished 3+ biomass (millions mt)	2.87	NA
Unfished recruitment (R_0, billions)	1.99	1.80-2.21
Reference points based on $SB_{40\%}$		
MSY Proxy female spawning biomass ($SB_{40\%}$ mt)	546,335	489,456 – 603,214
SPR resulting in $SB_{40\%}$ ($SPR_{SB40\%}$)	0.46	0.43 – 0.50
Exploitation fraction resulting in $SB_{40\%}$	0.21	0.18 – 0.23
Yield with $SPR_{SB40\%}$ at $SB_{40\%}$ (mt)	254,359	212,930 – 295,788
Reference points based on SPR proxy for MSY		
Female spawning biomass at SPR (SB_{SPR} mt)	466,466	396,733 – 536,198
$SPR_{MSY\text{-}proxy}$	0.40	NA
Exploitation fraction corresponding to SPR	0.26	NA
Yield with $SPR_{MSY\text{-}proxy}$ at SB_{SPR} (mt)	270,563	229,717 – 311,409
Reference points based on estimated MSY values		
Female spawning biomass at *MSY* (SB_{MSY} mt)	296,241	185,212 – 407,269
SPR_{MSY}	0.27	0.14 – 0.40
Exploitation fraction corresponding to SPR_{MSY}	0.42	0.20 – 0.64
MSY (mt)	287,805	222,140 – 353,470

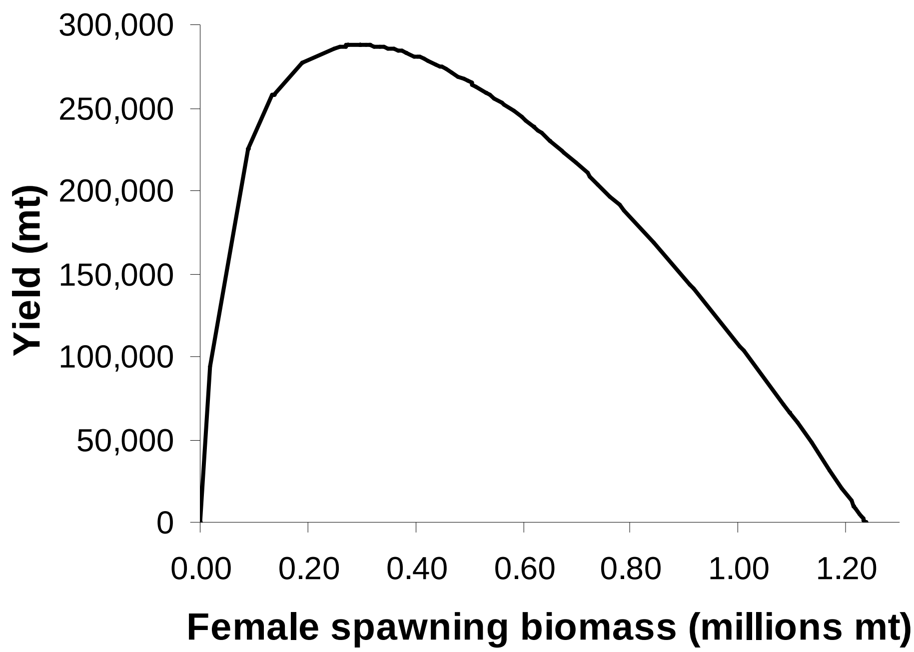

Figure h. Equilibrium yield curve for the base case model. Note that values will differ from table h above where iteration was performed to ensure that the U.S.-Canadian catch allocation was maintained.

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INTRODUCTION

The Joint US-Canada treaty on Pacific Hake was formally ratified by the United States as part of the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act. As of this writing the treaty has not been fully implemented. Under this treaty Pacific hake (a.k.a. Pacific whiting) stock assessments are to be prepared by the Hake Technical Working Group comprised of U.S. and Canadian scientists and reviewed by a Scientific Review Group (SRG), with memberships as appointed by both parties to the agreement. While these entities have not been formally established by either nation, the 2008 assessment was cooperatively prepared by an ad hoc Technical Committee. The US and Canadian scientists met three times for the purposes of data exchange and discussion of major issues and modeling activity in preparation for the final review. The current (2009) assessment, which represents the work of a U.S. technical team, retains the basic structure of the 2008 assessment, while a number of issues were examined more deeply than had been possible in 2008. A more extensive exploration of the assessment model and data is anticipated as part of the 2010 assessment.

Prior to 1997, separate Canadian and U.S. assessments were submitted to each nation's assessment review process. This practice resulted in differing yield options being forwarded to each country's managers for this shared trans-boundary fish stock. Multiple interpretations of Pacific hake status made it difficult to coordinate an overall management policy. To address this problem, the working group agreed in 1997 to present scientific advice in a single collaborative assessment, with agreement officially formalized in 2003. To further advance the coordination of scientific advice on Pacific hake, the current assessment report was submitted to the Pacific Council's Stock Assessment review process for technical review in fulfillment of the agreement and to satisfy the management responsibilities of the U.S. Pacific Fisheries Management Council (PFMC). The Review Group meeting was held in Seattle, WA at the Hotel Deca, Feb 3 - 6, 2009.

Stock Structure and Life History

Pacific hake (*Merluccius productus*), also referred to as Pacific whiting, is a semi-pelagic schooling species distributed along the west coast of North America generally ranging from 25^0 N. to 51^0 N. latitude. It is among 13 species of hake from the genus, *Merluccidae*, which are distributed worldwide in both hemispheres of the Atlantic and Pacific Oceans and collectively have constituted nearly two million mt of catch annually (Alheit and Pitcher 1995). The coastal stock of Pacific hake is currently the most abundant groundfish population in the California Current system. Smaller populations of this species occur in the major inlets of the North Pacific Ocean, including the Strait of Georgia, Puget Sound, and the Gulf of California. Electrophoretic studies indicate that Strait of Georgia and the Puget Sound populations are genetically distinct from the coastal population (Utter 1971). Genetic differences have also been found between the coastal population and hake off the west coast of Baja California (Vrooman and Paloma 1977). The coastal stock is also distinguished from the inshore populations by larger body size and seasonal migratory behavior.

The coastal stock of Pacific hake typically ranges from the waters off southern California to Queen Charlotte Sound. Distributions of eggs, larvae, and infrequent observations of spawning aggregations indicate that Pacific hake spawning occurs off south-central California during January-March. Due to the difficulty of locating major offshore spawning concentrations, details of spawning behavior of hake remains poorly understood (Saunders and McFarlane 1997). In spring, adult Pacific hake migrate onshore and to the north to feed along the continental shelf and slope from northern California to Vancouver Island. In summer, Pacific hake form extensive midwater aggregations in association with the continental shelf break, with highest densities located over bottom depths of 200-300 m (Dorn 1991, 1992). Pacific hake feed on euphausiids, pandalid shrimp, and pelagic schooling fish (such as eulachon and Pacific herring) (Livingston and Bailey 1985). Larger Pacific hake become increasingly piscivorous, and Pacific herring are commonly a large component of hake diet off Vancouver Island. Although Pacific hake are cannibalistic, the geographic separation of juveniles and adults usually prevents cannibalism from being an important factor in their population dynamics (Buckley and Livingston 1997).

Older (age 5+), larger, and predominantly female hake exhibit the greatest northern migration each season. During El Niño events, a larger proportion of the stock migrates into Canadian waters, apparently due to intensified northward transport during the period of active migration (Dorn 1995, Agostini et al. 2006). El Niño conditions also result in range extensions to the north, as evidenced by reports of hake off of southeast Alaska during these warm water years. Throughout the warm period experienced in 1990s, there were changes in typical patterns of hake distribution. Spawning activity was recorded north of California. Frequent reports of unusual numbers of juveniles off of Oregon to British Columbia suggest that juvenile settlement patterns also shifted northwards in the late 1990s (Benson et al. 2002, Phillips et al. 2007). Because of this shift, juveniles may have been subjected to increased cannibalistic predation and fishing mortality. Subsequently, La Nina conditions in 2001 resulted in a southward shift in the stock's distribution, with a much smaller proportion of the population found in Canadian waters in the 2001 survey. Hake were distributed across the entire range of the survey in 2003, 2005 and 2007 (Figure 1) although absolute numbers decreased across those years.

Ecosystem Considerations

Pacific hake are an important contributor to ecosystem dynamics in the Eastern Pacific due to their relatively large total biomass and predatory behavior. The role of hake predation in the regulation of other groundfish species is likely to be important (Harvey et al. 2008), although difficult to measure. Hake migrate farther north during the summer during relatively warm water years and their local ecosystem role therefore differs year-to-year depending on environmental conditions. Recent research indicates that hake distributions may be growing more responsive to temperature, and that spawning and juvenile hake may be occurring farther north (Phillips et al. 2007; Ressler et al. 2007). Given long-term climate-change projections and changing distributional patterns, considerable uncertainty exists in any forward projections of stationary stock productivity and dynamics.

Hake are also important prey items for many piscivorous species including lingcod and jumbo flying squid. In recent years, the lingcod stock has rebuilt rapidly from an overfished level and jumbo flying squid appear to have substantially extended their range northward from more tropical waters to the west coast of North America. Although the relative biomass of these squid and the cause of this range extension are unknown, squid predation on pacific hake is likely to have increased substantially. There is evidence from the Chilean hake (a similar gadid species) fishery that squid may have a large and adverse impact on abuhndance, due to direct predation of individuals of all sizes.

Fisheries

The fishery for the coastal population of Pacific hake occurs primarily during April-November along the coasts of northern California, Oregon, Washington, and British Columbia. The fishery is conducted almost exclusively with midwater trawls. Most fishing activity occurs over bottom depths of 100-500 m, while offshore extensions of fishing activity have occurred in recent years to prevent bycatch of depleted rockfish and salmon. The history of the coastal hake fishery is characterized by rapid changes brought about by the development of substantial foreign fisheries in 1966, joint-venture fisheries by the early 1980's, and domestic fisheries in 1990's (Table 1).

Large-scale harvesting of Pacific hake in the U.S. zone began in 1966 when factory trawlers from the Soviet Union began targeting Pacific hake. During the mid 1970's, factory trawlers from Poland, Federal Republic of Germany, the German Democratic Republic and Bulgaria also participated in the fishery. During 1966-1979, the catch in U.S. waters is estimated to have averaged 137,000 t per year (Table 1, Figure 2). A joint-venture fishery was initiated in 1978 between two U.S. trawlers and Soviet factory trawlers acting as mother ships (the practice where the catch from several boats is brought back to the larger, slower ship for processing and storage until the return to land). By 1982, the joint-venture catch surpassed the foreign catch, and by 1989, the U.S. fleet capacity had grown to a level sufficient to harvest the entire quota, and no foreign fishing was allowed, although joint-venture fisheries continued for another two years. In the late 1980's, joint ventures involved fishing companies from Poland, Japan, former Soviet Union, Republic of Korea and the People’s Republic of China.

Historically, the foreign and joint-venture fisheries produced fillets and headed and gutted products. In 1989, Japanese mother ships began producing surimi from Pacific hake, using a newly developed process to inhibit myxozoan-induced proteolysis. In 1990, domestic catcher-processors and mother ships entered the Pacific hake fishery in the U.S. zone. Previously, these vessels had engaged primarily in Alaskan pollock fisheries. The development of surimi production techniques for walleye pollock was expanded to include Pacific hake as a viable alternative. Similarly, shore-based processors of Pacific hake had been constrained by a limited domestic market for Pacific hake fillets and headed and gutted products. The construction of surimi plants in Newport and Astoria, Oregon, led to a rapid expansion of shore-based landings in the U.S. fishery in the early 1990's. In 1991, the joint-venture fishery for Pacific hake in the U.S. zone ended because of the increased level of participation by domestic catcher-processors and mother ships, and the growth of shore-based processing capacity. In contrast, Canada allocates a portion of the Pacific hake catch to joint-venture operations once shore-side capacity is filled.

The sectors involved in the Pacific hake fishery in Canada exhibit a similar historical pattern, although phasing out of the foreign and joint-venture fisheries has lagged a few years relative to the U.S.   Since 1968, more Pacific hake have been landed than any other species in the groundfish fishery on Canada's west coast (Table 1). Prior to 1977, the fishing vessels from the former Soviet Union caught the majority of Pacific hake in the Canadian zone, with Poland and Japan accounting for much smaller landings. After declaration of the 200-mile extended fishing zone in 1977, the Canadian fishery was divided among shore-based, joint-venture, and foreign fisheries. In 1992, the foreign fishery ended, but the demand of Canadian shore-based processors remained below the available yield, thus the joint-venture fishery continues today, although no joint-venture fishery took place in 2002 or 2003. The majority of the shore-based landings of the coastal hake stock is processed into surimi, fillets, or mince by processing plants at Ucluelet, Port Alberni, and Delta, British Columbia. Although significant aggregations of hake are found as far north as Queen Charlotte Sound, in most years the fishery has been concentrated below 49° N. latitude off the south coast of Vancouver Island, where there are sufficient quantities of fish in proximity to processing plants.

Management of Pacific hake

Since implementation of the Magnuson-Stevens Fishery Conservation and Management Act in the U.S. and the declaration of a 200-mile fishery conservation zone in Canada in the late 1970's, annual harvest quotas have been the primary management tool used to limit the catch of Pacific hake. Scientists from both countries have historically collaborated through the Technical Subcommittee of the Canada-U.S. Groundfish Committee (TSC), and there have been informal agreements on the adoption of annual fishing policies. During the 1990s, however, disagreements between the U.S. and Canada on the allotment of the acceptable biological catch (ABC) between U.S. and Canadian fisheries led to quota overruns; 1991-1992 quotas summed to 128% of the ABC, while the 1993-1999 combined quotas were 107% of the ABC on average. However, in 2002 and 2003 an average of only 87% of the quota was used. In the Pacific hake agreement between the United States and Canada, 73.88% and 26.12%, respectively, of the coast-wide allowable biological catch are to be allocated between the two countries. Furthermore, the agreement establishes a Joint Technical Committee to exchange data and conduct stock assessments, which will be reviewed by a Scientific Review Group.

United States

Prior to 1989, catches in the U.S. zone were substantially below the harvest guideline, but since 1989 have caught up to the harvest guideline with exceptions in 2000, 2001 and 2003 when 90%, 96% and 96% of the quota were taken, respectively, and 2007 and 2008, when bycatch-related closures (though followed by later re-openings) limited total U.S. catch. U.S. catch has not substantially exceeded the harvest guideline for the U.S. zone in any year, indicating that in-season management procedures have been effective.

In the U.S. zone, participants in the directed fishery are required to use pelagic trawls with a codend mesh that is at least 7.5 cm (3 inches). Regulations also restrict the area and season of fishing to reduce the bycatch of Chinook salmon and several depleted rockfish stocks. More recently, yields in the U.S. zone have been restricted to levels below optimum yields due to bycatch of overfished rockfish species, primarily widow and canary rockfishes, in the Pacific hake fishery. At-sea processing and night fishing (midnight to one hour after official sunrise) are prohibited south of 42° N. latitude. Fishing is prohibited in the Klamath and Columbia River Conservation zones, and a trip limit of 10,000 pounds is established for Pacific hake caught inside the 100-fathom contour in the Eureka INPFC area. During 1992-1995, the U.S. fishery opened on April 15; however in 1996 the opening date was changed to May 15. Shore-based fishing is allowed after April 1 south of 42° N. latitude, but is limited to 5% of the shore-based allocation being taken prior to the opening of the main shore-based fishery. The main shore-based fishery opens on June 15. Prior to 1997, at-sea processing was prohibited by regulation when 60 percent of the harvest guideline was reached. The current allocation agreement, effective since 1997, divides the U.S. non-tribal harvest guideline among factory trawlers (34%), vessels delivering to at-sea processors (24%), and vessels delivering to shore-based processing plants (42%). Since 1996, the Makah Indian Tribe has conducted a separate fishery with a specified allocation in its "usual and accustomed fishing area."

Shortly after the 1997 allocation agreement was approved by the PFMC, fishing companies owning factory trawlers with west coast groundfish permits established the Pacific Whiting Conservation Cooperative (PWCC). The primary role of the PWCC is to allocate the factory trawler quota among its members. Anticipated benefits of the PWCC include more efficient allocation of resources by fishing companies, improvements in processing efficiency and product quality, and a reduction in waste and bycatch rates relative to the former "derby" fishery in which all vessels competed for a fleet-wide quota. The PWCC also initiated recruitment research to support hake stock assessment. As part of this effort, PWCC sponsored a juvenile recruit survey in the summers of 1998 and 2001, which since 2002 has become an ongoing collaboration with NMFS.

Overview of Recent Fishery and Management

United States

For the years 2004-2007, the coast-wide ABC was set based upon the Fmsy proxy harvest rate of F40% applied to the output of a base model with acoustic survey catchability (q) equal to 1.0. Based on this algorithm, the ABC was set at 514,441 mt in 2004 (Helser et. al. 2004). While this ABC was larger than seen over the previous decade, reflecting substantial increases in biomass due to the strong 1999 year-class, constraints imposed by bycatch of canary and widow rockfishes limited the commercial U.S. OY to 250,000 mt. In 2005, the coast-wide OY was set at 364,197 mt. The coast-wide 2006 ABC was estimated to be 661,680 mt, with a coast-wide OY set at 364,842 mt. In 2005 and 2006 the coast-wide OY was essentially fully utilized. For the 2007 fishing season the PFMC adopted the 612,068 mt ABC and coast-wide OY of 328,358 mt. The coast-wide OY continued to be considerably below the ABC based on bycatch considerations. These same bycatch constraints caused a mid-season closure in the U.S. and resulted in final landings being considerably below the OY.

2008 Fishery

Based on the 2008 whiting assessment, the Pacific council adopted a U.S.-Canada coast-wide ABC of 400,000 mt, and a U.S. ABC of 295,520 mt. The council adopted a U.S.-Canada coast-wide OY of 364,842 mt and a U.S. OY of 269,545 mt, reflecting the agreed-upon 73.88 percent of the OY apportioned to U.S. fisheries and 26.12 percent to Canadian fisheries. Within the U.S. fishery, the 232,545 mt of the OY was divided among the target whiting sectors while the Makah tribal allocation was 35,000 mt, with the remaining 2,000 mt set aside for research catch along with bycatch in non-hake fisheries. Among U.S. sectors, at-sea catcher/processors received 34 percent (79,065 mt), motherships received 24 percent (55,811 mt), and the shore-based fishery received 42 percent (97,669 mt) of the target (non-tribal) whiting sector share. Bycatch limits for the combined non-tribal Pacific whiting sectors in 2008 were as follows: 275 mt of widow rockfish, 4.7 mt of canary rockfish, and 40 mt of darkblotched rockfish.

The official dates of fishing included a standard spring start, a mid-season closure, and continued fishing opportunity through the end of 2008. By sector, seasons were: Catcher/processor and mothership sectors, May 15 to August 19; reopening on October 12, 2008 until the end of the year; Shore-based sector: June 15 to August 19 and reopening on October 12, 2008 until the end of the year north of 42° N. latitude; April 1 to May 21, June 15 to August 19, and reopening on October 12 until the end of the year between 42°-40°30’ N. latitude; April 15 to May 21, June 15 to August 19 and reopening on October 12 until the end of the year south of 40°30’ N. latitude.

Fishermen generally reported that fishing was difficult during the spring, with aggregations of hake diffuse relative to recent years when large schools of the 1999 year class were more common. Difficulty in locating schools of hake, which produce high catch rates, coupled with very high fuel costs led to exploratory fishing in depths, areas and during times of day uncommon to the recent fishery. This change in behavior led, in turn, to an increase in bycatch rates for rockfish, particularly canary rockfish, including more than 1.5 mt of canary caught on a single day in June.

Due to high fuel costs, difficult fishing, and high bycatch levels, all U.S. fishing sectors agreed to a voluntary stand down starting about June 17, with an original end date of July 5. Participation was near complete, and the stand down continued until August 1. Much of the fishing in August was off Southern Oregon. Real-time reporting of bycatch rates and locations was made possible due to the voluntary adoption of SeaState, a program for summarizing observer data for use by the fishing fleet. The shore-based sector used this system for the first time in 2008 and it was particularly important in maintaining fishing opportunity during the period from August 1 to August 18 when the fleet was very close to bycatch limits.

The fishery was officially closed by NOAA on August 19, when it was estimated that the canary rockfish bycatch limit would be reached. When the fisheries were closed the shore-based sector had taken only 35.5 percent of its Pacific whiting allocation, the catcher/processor sector had taken 62.3 percent of its allocation, and the mothership sector had taken 84.0 percent of its allocation.

In September, the Council decided to reopen the fishery on October 12, while increasing the widow rockfish bycatch limit by 12 metric tons (to 287 mt) and the canary rockfish bycatch limit by 1.7 mt (to 6.4 mt) upon reopening and by an additional 0.3 mt (to 6.7 mt) two weeks following the re-opening, but no later than October 26, 2008. These bycatch limit increases were facilitated by lower-than-expected catches in other groundfish fisheries and research activities.

Fishermen reported good fishing during October and November, with relatively high catch per unit effort (CPUE) on schools of mixed sized fish including the 1999 year class, the 2005 year class and some smaller fish from the 2006 year class. Bycatch rates were, as is generally the case, much lower in the fall than the spring and summer fisheries. This allowed greater flexibility for fishermen to fish both at night and closer to bottom where hake aggregations may be more dense.

During November, the Pacific Council reallocated 39,000 metric tons (mt) of the 97,669 mt shore-based sector allocation to the catcher/processor (+36,724) and mothership (+2,276) sectors. This action reflected decreasing fishing effort by the shore-based sector and, at the end of November, the mothership sector as well, such that a substantial portion of the OY was projected to be left uncaught without reallocation. Bycatch rates tend to increase again toward the end of the calendar year as the hake aggregations disperse, and the few vessels still participating in the fishery near the end of 2008 reported more difficult fishing.

The shore-based sector caught 50,422 mt, or 85.9% of its remaining quota after in-season reallocations. The at-sea mothership sector caught 57,432 mt, or 98.9% of its remaining quota after in-season reallocations. The at-sea catcher/processor sector caught approximately 106,500 mt, or 92.0% of its remaining quota after in-season reallocations. Tribal catches totaled 31,829 mt, or 90.9% of the quota allocated. In total, the 2008 U.S. fishery caught approximately 246,183mt, or 92.0% of the OY.

Canada

DFO managers allow a 15% discrepancy between the quota and total catch. The quota may be exceeded by up to 15% in any given year, which is then deducted from the quota for the subsequent year. Conversely, if less than the quota is taken, up to 15% can be carried over into the next year. For instance, an apparent overage in 1998 was due to carry-over from 1997 when 9% of the quota was not taken this policy has not resulted in catch exceeding the coast-wide OY in the past 6 years (Table 2). During 1999-2001 the PSARC groundfish subcommittee recommended to DFO managers yields based on F40% (40-10) option and Canadian managers adopted allowable catches prescribed at 30% of the coast-wide ABC.

The all-nation catch in Canadian waters was 53,585 mt in 2001, up from only 22,401 mt in 2000 (Table 1). In 2000, the shore-based landings in the Canadian zone hit reached the lowest level since 1990 due to a decrease in availability. Catches in 2001 increased substantially over those of 2000 for both the joint-venture and shore-based sectors but were still below recommended Total Allowable Catch (TAC). Total Canadian catches in 2002 and 2003 were

50,769 mt and 62,090 mt, respectively, and were harvested exclusively by the shore-side sector; constituting nearly 87% of the total allocation of that country. In 2004, the allowable catch in Canada was 26.14% of the coast-wide ABC, approximately 134,000 mt. Catches were nearly split equally between the shore-based and joint venture sectors, totaling 124,000 mt. Canadian Pacific hake catches were fully utilized in the 2005 fishing season with 85,284 mt and 15,178 mt taken by the domestic and joint venture fisheries, respectively. In 2006, the joint-venture and domestic fisheries harvested 13,700 mt and 80,000 mt, respectively. During the 2007 fishing season, Canadian fisheries harvested 85% of the 85,373 mt national allocation. In 2008, Canadian fisheries harvested 78% of the 95,297 mt national allocation with joint-venture and domestic sectors catching 4,000 mt and 70,000 mt, respectively.

ASSESSMENT

Modeling Approaches

Age-structured assessment models of various forms have been used to assess Pacific hake since the early 1980s, using total fishery landings, fishery length and age compositions, and abundance indices. Modeling approaches have evolved as new analytical techniques have been developed. Initially, a cohort analysis tuned to fishery CPUE was used (Francis et al. 1982). Later, the cohort analysis was tuned to NMFS triennial acoustic survey estimates of absolute abundance at age (Francis and Hollowed 1985, Hollowed et al. 1988a). In 1989, the hake population was modeled using a statistical catch-at-age model (Stock Synthesis) that utilized fishery catch-at-age data and survey estimates of population biomass and age-composition data (Dorn and Methot, 1991). The model was then converted to AD Model Builder (ADMB) in 1999 by Dorn et al. (1999), using the same basic population dynamics equations. This allowed the assessment to take advantage of ADMB's post-convergence routines to calculate standard errors (or likelihood profiles) for any quantity of interest. Beginning in 2001, Helser et al. (2001, 2003, 2004) used the same ADMB modeling platform to assess the hake stock and examine important assessment modifications and assumptions, including the time varying nature of the acoustic survey selectivity and catchability. The acoustic survey catchability coefficient (q) has been, and continues to be, one of the major sources of uncertainty in the model. Due to the lengthened acoustic survey biomass trends, the assessment model in 2004 was able to freely estimate the acoustic survey q. These estimates were substantially below the assumed value of q=1.0 from earlier assessments. The 2004 and 2005 assessments presented uncertainty in the final model result as a range of biomass. The lower end of the biomass range was based upon the conventional assumption that the acoustic survey q was equal to 1.0, while the higher end of the range represented a q=0.6 assumption.

In 2006, the coastal hake stock was modeled using the Stock Synthesis modeling framework (SS2 Version 1.21, December, 2006) written by Dr. Richard Methot (Northwest Fisheries Science Center) in AD Model Builder. Conversion of the previous hake model into SS2 was guided by three principles: 1) incorporate less *derived* data, favoring the inclusion of unprocessed data where possible, 2) explicitly model the underlying hake growth dynamics, and

3) achieve parsimony[2] in terms of model complexity. "Incorporating less *derived* data" entailed fitting observed data in their most elemental form. For instance, no pre-processing to convert length data to age compositional data was performed. Also, incorporating conditional age-at-length data, through age-length keys for each fishery and survey, allowed explicit estimation of expected growth, dispersion about that expectation, and its temporal variability, all conditioned on selectivity. In 2006 and 2007, as in 2004 and 2005, assessments presented two models (which were assumed equally likely) in an attempt to bracket the range of uncertainty in the acoustic survey catchability coefficient, *q*. The lower end of the biomass range was again based upon the conventional assumption that the acoustic survey *q* was equal to 1.0, while the higher end of the range allowed estimation of q with a fairly tight prior about q = 1.0 (effective q = 0.6 - 0.7). In the 2008 assessment, also conducted in SS2 (Version 2.00n), an effort was made to include the uncertainty in *q*, as well as additional uncertainty regarding the acoustic survey selectivity and the natural mortality rate (*M*) of older fish (ages 14 and 15+) within a single model. As a result, a broader range of uncertainty is presented via probability distributions and risk profiles using Markov Chain Monte Carlo simulation. Further refinements included, for the first time, incorporation of age-reading error matrices.

In the current model, conducted in SS v3.02b (Methot 2009), we have built upon the 2008 model, adding new data and refining the modeling of ageing imprecision. New data in the 2009 assessment includes: Historical length data from Santa Barbara, California (1963-1970); 2008 catches from the U.S. and Canada; 2008 length and conditional age-at-length compositions from the U.S.; and the 2008 juvenile index. The 2009 assessment model incorporates further uncertainty in the degree of recruitment variability (σ_r) as well as more flexible time-varying fishery selectivity. Additionally, the current assessment incorporates further refinements to the ageing-error matrices, including both updated data and cohort-specific reductions in ageing error to reflect "lumping" effects due to strong year classes. The current model continues to integrate uncertainty in acoustic survey *q* and selectivity and in *M* for older fish.

Data Sources

The data used in the stock assessment model includes:

- Total catch from the U.S. and Canadian fisheries (1966-2008).

- Length compositions from the U.S. fishery (1975-2008) and Canadian fishery (1988-2007).

- Age compositions from the U.S. fishery (1973-1974) and Canadian fishery (1977-1987). These are the traditional age compositional data generated by applying fishery length compositions to an age-length key. Use of this approached was necessary to fill in gaps for those years in which biological samples could not be re-acquired from standard procedures.

[2] Parsimony is defined as a balance between the number of parameters needed to represent a complex state of nature and data quality/quantity to support accurate and precise estimation of those parameters.

- Conditional age-at-length compositions from the U.S. fishery (1975-2008) and Canadian fishery (1988-2008).

- Biomass indices, length compositions and conditional age-at-length composition data from the Joint US-Canadian acoustic/midwater trawl surveys (1977, 1980, 1983, 1986, 1989, 1992, 1995, 1998, 2001, 2003, 2005, and 2007). It should be noted that this year's assessment, as in the 2008 assessment, incorporates the 1986 acoustic survey biomass estimate and compositional data which was previously removed upon recommendation by 2004 STAR review (the STAT argued that this was one of the few survey biomass estimates that provided contrast in the time series).

- NWFSC-PWCC midwater juvenile hake and rockfish surveys (2001-2008). A coast-wide index of hake recruitment was generated based on data from both the SWFSC and NWFSC-PWCC surveys to account for recent northerly extension of hake recruitment along the coast. This data was quite contradictory to the composition data and thus was effectively tuned out of the model.

- Aging error matrices based on cross-read otoliths. These included changes by ageing lab and with reduced ageing error for strong cohorts due to a “lumping” effect, the extent of which as estimated outside of the assessment model.

- Length data collected in Santa Barbara for the years 1963-1970, by season (January-Mar, April – June, etc.). 4550 lengths were recorded at Santa Barbara during this period, while only a total of 1357 were collected at three other California ports during the same period (Jow, 1973), thus only the Santa Barbara data was used.

As in the previous hake model, the U.S. and Canadian fisheries were modeled separately. The model also used biological parameters to estimate spawning and population biomass to obtain predictions of fishery and survey biomass from the parameters estimated by the model. These parameters were:

- Proportion mature at length (not estimated in model).

- Population allometric growth relationship, as estimated from the acoustic survey (not estimated in model).

- Initial estimates of growth including CVs of length at age for the youngest and oldest fish (the latter estimated in model).

- Natural mortality (*M*, not estimated in model for ages 2-13, but estimated for ages 14 and 15+).

Some sources were not included, but had been explored during the course of the 2008 assessment, including:

- CalCOFI larval hake production index, 1951-2006. The data source was previously explored and rejected as a potential index of hake spawning stock biomass, but was not revisited this year. For details see the 2008 assessment.

Total catch

The catch of Pacific hake for 1966-2008 by nation and fishery is shown in Table 1. Catches in U.S. waters for 1966-1980 are from Bailey et al. (1982). Prior to 1977, the at-sea catch was reported by foreign nationals without independent verification by observers. Bailey et al. (1982) suggest that the catch from 1968 to 1976 may have been under-reported because the apparent catch per vessel-day for the foreign fleet increased after observers were placed on foreign vessels in the late 1970's. A sensitivity to this assumption was produced for the 2008 assessment. For 1981-2008, the shore-based landings are from Pacific Fishery Information Network (PacFIN). Foreign and joint-venture catches for 1981-1990 and domestic at-sea catches for 1991-2008 are estimated from the AFSC's and, subsequently, the NWFSC's At-Sea Hake Observer Programs.

At-sea discards are included in the foreign, joint-venture, at-sea domestic landings estimates in the U.S. zone. Discards have been recently estimated for the shore-based non-whiting fishery but are nominal relative to the total fishery catch. The majority of vessels in the U.S. shore-based fishery have operated under experimental fishing permits that required them to retain all catch and bycatch for sampling by plant observers. Canadian joint-venture catches are monitored by at-sea observers, which are placed on all processing vessels. Observers use volume/density methods to estimate total catch. Domestic Canadian landings are recorded by dockside monitors using total catch weights provided by processing plants. Catch data from Canadian JV and domestic fisheries were provided by Greg Workman and Chris Grandin (DFO, Pacific Biological Station, Nanaimo, B.C.).

Fishery-dependent Data

Biological information from the U.S. at-sea commercial Pacific hake fishery was extracted from the NORPAC database. This yielded length, weight and age information from the foreign and joint venture fisheries from 1975-1990, and from the domestic at sea fishery from 1991-2008. Specifically these data included sex-specific length and age data which observers collect by selecting fish randomly from each haul for biological data collection and otolith extraction. Detailed sampling information including the numbers of hauls sampled, lengths collected, and otoliths aged in the foreign, joint-venture and domestic at-sea fisheries are presented in Table 3.

Biological samples from the U.S. shore-based fishery were collected by port samplers where there are substantial landings of Pacific hake: primarily Newport, Astoria, Crescent City, and Westport, from 1991-2008. Port samplers routinely take one sample per offload (or trip) consisting of 100 randomly selected fish for individual length and weight and 20 randomly selected fish for otolith extraction. The sampling unit for the shore-based fishery is the trip, while the haul is used for the at-sea fishery. Since detailed haul-level information is not recorded on trip landings documentation in the shore-based fishery, and hauls sampled in the at-sea fishery can not be aggregated to a comparable trip level, there is no least common denominator for aggregating at-sea and shore-based fishery samples. As a result, samples sizes are simply summed over hauls and trips for U.S. fishery length- and age-compositions, and each fishery is weighted according to the proportion of its catch.

Length data (4550 lengths) recorded at recorded at Santa Barbara between 1963 and 1970 (Jow, 1973) were included as seasonal length compositions in this assessment. As there was no information on the number of trips or hauls sampled, initial input sample sizes were set at one-tenth the number of length samples in each year and season.

The Canadian shore-based fishery is subject to 10% observer coverage. On observed trips, an both otoliths (for ageing) and lengths are sampled from Pacific hake caught in the first haul of the trip, with length samples taken on subsequent hauls. Sampled weight from which biological information is collected must be inferred from year-specific length-weight relationships. For unobserved trips, port samplers obtain biological data from the landed catch. Observed domestic haul-level information is then aggregated to the trip level to be consistent with the unobserved trips that are sampled in ports. Canadian domestic fishery biological samples are available from 1996-2007, and detailed sampling information is presented in Table 4.

For the Canadian at-sea joint-venture fishery, an observer aboard the factory ship records the codend weight for each codend transferred from a companion catcher boat. Length samples are collected every second day of fishing operations, and otoliths are collected once a week. Length and age samples are taken randomly from a given codend. Since the weight of the sample from which biological information is taken is not recorded, sample weight must be inferred from a weight-length relationship applied to all lengths taken and summed over haul. Length and age information is available from the joint-venture fishery from 1988-2007. As in the case with the U.S. at-sea fishery, the basic sampling unit in the Canadian joint-venture fishery is the haul. Detailed sampling information for the Canadian joint-venture fishery is also presented in Table 3.

Length and age data were analyzed based on the sampling protocols used to collect them, and expanded to estimate the corresponding statistic from entire landed catch by fishery and year when sampling occurred. In general, the analytical steps can be summarized as follows:

1) Count lengths (or ages) in each size (or age) bin for each haul in the at-sea fishery and for each trip in the shore-based fishery, generating "raw" frequency data.

2) Expand the raw frequencies from the haul or trip level to account for the catch weight and weight sampled in each trip.
3) Expand the summed frequencies by fishery sector to account for the total landings.
4) Calculate sample sizes (number of samples) and normalize to proportions that sum to unity within each year.

To complete step (2), it was necessary to derive a multiplicative expansion factor for the observed raw length frequencies of the sample. This expansion factor was calculated for each sample corresponding to the ratio of the total catch weight in a haul or trip divided by the total sampled weight from which biological samples were taken within the haul or trip. In cases where there was not an estimated sample weight (more common in the Canadian domestic shore-based trips), a predicted weight of the sample was computed by applying a year-specific length-weight relationship to each length in the sample, then summing these weights. Anomalies that could emerge when very small numbers of fish lengths are collected from very large landings were avoided by constraining expansion factors to not exceed the 95th percentile of all expansion factors calculated for each year and fishery. The expanded lengths (N at each length times the expansion factor for the sample) were then summed within each fishery sector, and then weighted a second time by the relative proportion of catches by fishery within each year and nation. Finally, the year-specific length frequencies were summed over fishery sector and normalized so that the sum of all lengths in a single year and nation was equal to unity.

Tables 3 and 4 provide a detailed sampling summary, by fishery and nation, including the number of unique samples (hauls in the joint-venture and at-sea fisheries and trips in the shore-based fisheries) by year and other sampling metrics of sample effort. The total sample size (# samples) from all sectors by year is used as the multinomial sample size input to the stock assessment model. In recent U.S. fisheries, between 9% and 19% of all shore-based landings has been sampled, compared to between 41% and 95% of the at-sea catch (Table 5). In both sectors, the fraction sampled has generally increased over time. The percentage of sampled harvest has been more variable in the Canadian fisheries over the same time period (Table 6). All recent age data have been included in the model as conditional age-at-length compositions. Eighteen (out of more than 2600) individual conditional age-at-length compositions were not used due to unrealistic age-at-size compositions (Pearson residuals > 50). These generally represented small samples sizes and purported very old but small or very young but large hake. Sample sizes for conditional age-at-length compositions for the U.S. and Canadian fisheries are given in Tables 7 and 8, respectively.

U.S. fishery length and implied age compositions representing fish caught in both the at-sea and shore-based fisheries are shown in Figures 3-4 and Figure 5-6, respectively. Implied age compositions are the proportions at age arrived at after collapsing the conditional age at length compositions over the length margin (appropriately weighted). There are differences between the length compositions of the at-sea and shore-based domestic fisheries, suggesting that, in the future, an attempt should be made to model them separately. In general, the composite U.S. fishery length and age compositions confirm the well known pattern of year-class strengths, including the extra-dominant 1980, dominant 1977, 1984 and 1999, and secondary 1970, 1973, 1987 and 1990 year classes moving through the size structure (Figure 6). The most recent length and age compositional data from the 2008 U.S. fishery also indicate the presence of a relatively strong 2005 year class. Conditional age-at-length compositions suggest that the sizes of hake caught in the U.S. fishery have changed over time, possibly due to growth, selectivity or both. This is particularly evident with the appearance of larger fish before 1990 and a shift to smaller fish between 1995 and 2000. These features are explored in the population dynamics model.

As with the U.S. fleet sectors, differences in length compositions between the Canadian joint-venture and domestic fleets among some of the years warrant future exploration of fitting the fisheries separately. The composite Canadian fishery length compositions (Figures 7 and 8) and age compositions (Figures 9 and 10) indicate that the Canadian fleets exploit larger and older hake. A particularly interesting feature of these length compositions is that the Canadian fleet prosecuted a seemingly fast growing 1994 year class of hake in 1995 (age 1), 1996 (age 2) and subsequent years. It is unclear whether this is due to size- vs. age-based selectivity; however, it is well known that larger (and older) hake migrate further northward annually (Dorn, 1995). The 2001 and 2002 Canadian length compositions appear to be anomalies. In recent years the 1999 year class has dominated the catch of the Canadian fleets, although there is anecdotal evidence of a relatively strong presence of the 2005 year class in the Canadian fisheries in 2008. As in the U.S. fishery, Canadian age and length compositions show some temporal pattern in the range of fish exploited by the fishery (Figures 7-10).

U.S. and Canadian fishery length and conditional age-at-length compositions constitute the bulk of compositional data in this assessment and provide information on recruitment strength, growth and growth variability. As such, the model is actually fitting the conditional age-at-length compositions, but fits are shown to the "implied" age compositions (fits are simply collapsed in the margin of proportions at age) for convenience. Since age-composition data used in the old hake assessment extended further back in time than the conditional age-at-length data generated here, the older age data are also included in the assessment model to augment information on recruitment earlier in the time series (U.S. fishery = 1973-1974, Canadian fishery = 1977-1987).

Triennial Shelf Trawl Survey

The Alaska Fisheries Science Center conducted a triennial bottom trawl survey along the west coast of North America from 1977 to 2001 (Wilkins et al. 1998). This survey was repeated for a final time by the Northwest Fisheries Science Center in 2004. In 1999, the Northwest Fisheries Science Center began to take responsibility for bottom trawl surveys off of the West Coast, and, in 2003, the Northwest Fisheries Science Center survey was extended shoreward to a depth of 30 fathoms to match the shallow limit of the triennial survey. Despite similar seasonal timing of the two surveys, the 2003 and subsequent annual surveys differ from the triennial survey in size/horsepower of the chartered fishing vessels and bottom trawl gear used. As such, the two were determined (at a workshop on the matter in 2006) to be separate surveys which cannot be combined into one. In addition, the presence of significant densities of hake both offshore and to the north of the area covered by the trawl survey, coupled with the questionable effectiveness of bottom trawls in catching mid-water schooling hake, limits the usefulness of this survey to assess the hake population. For these reasons, the neither the triennial nor the Northwest Fisheries Science Center shelf trawl survey are used in the assessment. However, age-composition data from the triennial survey are used, in conjunction with age-composition data from the acoustic survey, to evaluate the selectivity pattern associated with the acoustic survey external to the SS2 model. Results of this analysis are described below.

Acoustic Survey (Biomass, length and age composition)

Integrated acoustic and trawl surveys are used to assess the distribution, abundance and biology of coastal Pacific hake, *Merluccius productus*, along the west coasts of the United States and Canada (Fleischer et al. 2005). From 1977-1992, surveys in U.S. waters were conducted every three years by the Alaska Fisheries Science Center (AFSC). The 1995, 1998, and 2001 coast-wide surveys were carried out jointly by AFSC and the Pacific Biological Station (PBS) of the Canadian Department of Fisheries and Oceans (DFO). Following 2001, the responsibility for the U.S. portion of the survey was transferred to the Fishery Resource Analysis and Monitoring (FRAM) Division of NOAA's Northwest Fisheries Science Center (NWFSC). Following the transfer, the survey was scheduled on a biennial basis, with joint acoustic surveys conducted by FRAM and PBS in 2003, 2005 and 2007. The acoustic survey biomass estimates (age 2+) and confidence intervals for 1977-2007 are shown in Figure 11.

The 2007 survey was conducted aboard the NOAA vessel *Miller Freeman* from 20 June to 19 August, spanning the continental slope and shelf areas along the West Coast from south of Monterey California (35.7º N.) to the Dixon Entrance area (54.8º N). A total of 96 line transects, generally oriented east-west and spaced at 10 or 20 nm intervals, were completed (Figure 1). During the 2007 acoustic survey, aggregations of coastal Pacific hake were detected as far south as 37º N. (Monterey Bay) and nearly continuously from there to the furthest northerly area surveyed at Dixon Entrance. Areas of prominent concentrations of hake included the waters off Point Arena (ca. 39º N.) and north of Cape Mendocino, California (ca. 41º N.), in the area south of Heceta Bank, Oregon (ca. 44º N.). Pacific hake were relatively sparse off of Vancouver Island during the 2007 acoustic survey. Diffuse concentrations were found north of Vancouver Island within waters of the Queen Charlotte Sound (ca. 51º N.) and north to Dixon Strait. Mid-water and bottom trawls are deployed throughout the survey to verify size and species composition and collect biological information (i.e., age composition, sex). This sampling revealed that smaller individuals (age-2 fish, representing the 2005 year class) were prevalent in the southern portion of their range during the survey season. Throughout the remainder of its range the coastal Pacific hake stock continued to be dominated by the 1999 year-class (age 8), with the exception of the northernmost areas where even larger and older Pacific hake dominated.

The distribution of Pacific hake can vary greatly between acoustic surveys. It appears that northward migration patterns are related to the strength of subsurface flow of the California Current (Agostini et al. 2006) and upwelling conditions (Benson et al. 2002). Distributions of hake backscatter plotted for each acoustic survey since 1995 illustrate the variable spatial patterns (Figure 1). The 1998 acoustic survey stands out and shows an extremely northward occurrence that is thought to be tied to the strong 1997-1998 El Nino. In contrast, the distribution of hake during the 2001 survey was very compressed into the lower latitudes off the coast of Oregon and Northern California. In 2003, 2005 and 2007 the distributions generally followed the “normal” coast-wide pattern.

As with the fishery data, acoustic survey length and conditional age-at-length compositions were used to reconstruct the age structure of the hake population. In general, biological samples taken by midwater trawls were post-stratified based on geographic proximity and similarity in size composition. Estimates of numbers (or biomass) of hake at length (or age) for individual cells were summed for each transect to derive a coast-wide estimate. Details of this procedure can be found in Fleischer et al. (2005). Each sample was given equal weight without regard to the total catch weight. The composite length frequency was used to characterize the hake size distribution along each transect and predict the expected backscattering cross section for Pacific hake based on the fish size-target strength (TS) relationship TS_{db} = 20logL-68 (Traynor 1996). New target strength work (Henderson and Horne 2007), based on in-situ and ex-situ measurements, suggests a regression intercept of 4-6 dB lower than that of Traynor. A lower intercept to the TS-to-length regression suggests that an individual hake reflects 2.5-4 times less acoustic energy, implying considerably more biomass than that of Traynor's equation. Both estimates of the TS-to-length regression use night time in-situ measurements. Hake may have different behavior characteristics at night than during the daytime when the acoustic survey is conducted. The biomass estimates continue to be based on Traynor's TS-to-length regression, which has been used historically to interpret the acoustic survey data. Additional *in situ* measurements on hake TS need to be collected *during daytime*, and the depth dependence of the hake TS needs to be investigated. The uncertainty in the TS regression is not accounted for in the survey biomass uncertainty estimates.

Acoustic survey sampling information including the number of hauls, lengths taken, and hake aged are provided in Tables 9 and 10. The 2007 acoustic survey size composition shows a dominant peak at 48 cm indicating the persistence of the 1999 year class in the population, and a secondary peak around 33 cm suggests the potential of an above-average 2005 year class (Figures 12-13). Age compositions shown in Figure 14-15 confirm the presence of the strong 1999 year class and potentially a moderate to strong 2005 year class. Size and age compositions from the previous acoustic surveys also confirm the dominant 1980 and 1984 year classes present in the mid-1980s to early 1990s. Conditional age-at-length proportions are shown in Figure 16.

Based on the acoustic survey index, while not accounting for selectivity or year-to-year variability in survey *q*, Pacific hake biomass declined by 31% between 2003 and 2005, and 51% between 2003 and 2007 (from 1.84 to 1.27 to 0.88 million mt, Table 11). In general, acoustic survey indices of biomass indicate that the hake population has varied with little trend over the three decades of the survey. Estimates of variability have been calculated since the 2003 survey based on the Jolly-Hampton estimator (1989) with CVs on the order of 25%. This takes spatial variability of the acoustic backscatter into account but leaves other sources of observation error, including sampling variability (haul to haul variation in size/age) and target strength unaccounted for. Error bars shown around point estimates of biomass are not estimated but rather assumed based on reliability of the survey in a given year and are used as input in SS2 (CV=0.5 1977-1989, CV=0.25 1992-2005).

Assessment uncertainty continues to center on the acoustic survey: primarily in terms of the catchability coefficient, *q*, although the extent to which selectivity is dome-shaped provides a secondary area of uncertainty. Dome-shaped selectivity implies a greater proportion of older hake in the population than observed in the survey. Reasons for dome-shaped selectivity could be due to a number of factors including net avoidance by older hake and differential distribution of older fish near the bottom or at deeper depths. This was investigated by comparing the numbers at age in both the acoustic and bottom trawl surveys between 1977-2001, as data for these two surveys overlapped spatially and temporally. Hake catches (in number) from the triennial bottom trawl survey were summed at each age, and assumed to be representative of the underlying population age structure. These were then compared to the catch in numbers at age taken from hauls in the acoustic survey. Results indicate empirical support for a dome-shaped acoustic survey selectivity (Figure 17). A comparison of the ratio of acoustic survey numbers at age to the sum of the acoustic and triennial bottom trawl survey numbers at age (normalized to have a peak of unity), indicate that only 2 out of the nine years had asymptotic-like selectivity patterns. The remaining nine years show curves that peak at about ages 5-7, decline between 0.2-0.9 at ages 11-13, and further decline between <0.1-0.7 at ages 14-15+. For ages 14-15+ , the mean is about 0.5 (when normalized) for all years. The weight of evidence suggests dome-shaped selectivity, although the results are not definitive, as the shape of the selectivity curve for the triennial survey is not precisely known.

The acoustic survey catchability coefficient, *q*, has historically been quite uncertain. This parameter globally scales population biomass higher if *q* is lower and lower if *q* is higher, and thus uncertainty in *q* reflects the uncertainty in the absolute scale of the hake population. Early assessments that used the acoustic survey in age-structured assessments (Dorn et al. 1999) asserted *q*=1.0 and treated the parameter as a fixed quantity (In fact ABCs and OYs until 2003 were predicated upon that assumption). Helser et al. (2004) conducted a likelihood profile over the value of *q* as well as estimated it freely in the model, and found values of *q* in the range of 0.38 to 0.6, depending on model structure. In general, the best fit to the data is achieved when *q* is estimated to be low; however, allowing *q*'s for an acoustic survey to be substantially lower than 1.0 (whether through estimation or specification) has been met with some resistance. The 2004-2007 assessments presented two models with differing *q*'s in order to bracket the range of uncertainty in the acoustic survey catchability coefficient, *q*. In 2008, an attempt was made to integrate out the uncertainty in *q* while incorporating uncertainty in the shape of the acoustic survey selectivity curve. In the current assessment, a single value for *q* is assumed, with the uncertainty in the assessment focused on the degree of recruitment variability (σ_r), coupled with more flexible time-varying fishery selectivity

Aging Error

With the transfer of Pacific hake ageing to the Northwest Fisheries Science Center in 2001, an effort was made to evaluate age reader agreement and calibrate readers at the Cooperative Aging Project (CAP, Northwest Fisheries Science Center, NWFSC) and Department of Fisheries and Oceans (DFO). A total of 991 ages from otoliths collected between 2001-2007 were compared between the Cooperative Aging Project (CAP, Northwest Fisheries Science Center, NWFSC) and Department of Fisheries and Oceans (DFO) or read more than once by one lab. As expected, agreement was greater for younger fish than for older fish. This exchange was used to estimate the ageing imprecision matrix applied in the 2008 assessment. AFSC ageing prior to 2001 relied on similar protocols, but roughly 20% of the otoliths that were difficult to read were 'reconciled', or read by multiple readers and discussed before final age determination was assigned. Because no comparisons between AFSC and more recent ageing, nor duplicate reconciled ages from the AFSC were available in 2008, the level of ageing imprecision for that lab was assigned 50% of the imprecision estimated for CAP and the topic flagged for further investigation.

Subsequent to the 2008 assessment, 1,773 age estimates were compared between the CAP and AFSC for otoliths collected throughout the time-series but prior to 2001. These estimates allowed estimation of the degree of ageing imprecision for the AFSC reconciled ages. Ageing imprecision was quantified for use in the stock assessment model according to the maximum likelihood method of Punt et al. (2008), as was done in the 2008 assessment. This method estimates bias and precision of the observed age from the "true" age, assuming an unbiased sample in the observed data. There were insufficient samples to estimate bias; however, precision was estimated and quantified as the standard deviation of observed age from true age. Figure 18 shows the relationship for samples (those used in the 2008 assessment and new double-reads) from (CAP + DFO) which was applied to the model for 2001-2007. A similar relationship was estimated, with similar results, for individual age reads by AFSC, based on the new sample of historically aged otoliths re-read by CAP (Figure 18). New information this year resulted in a change to the basic ageing-error matrix used for age compositions prior to 2000 (during the AFSC ageing era). Values of imprecision at age estimated directly were found to be of similar magnitude to those from the CAP, and substantially larger then the 50% values used in the 2008 assessment.

With a much larger available data set, the current assessment includes an additional process influencing the ageing of hake: cohort-specific ageing error related to the relative strength of a year-class. This process reflects a tendency for uncertain age determinations to be assigned to predominant year classes. The result is a tendency towards reduced mis-ageing of strong year classes, and perhaps increased mis-ageing of neighbor year-classes. To account for this process in the model, we simply created year-specific ageing-error matrices (or vectors of standard deviations), where the standard deviations of strong year classes were reduced by a constant proportion. In the current assessment, this proportion was determined empirically by comparing double read error rates for strong year classes with rates for other year classes (Figure 19). The result suggested that strong year classes only had 55% the standard deviation in ageing as other year classes (Figure 20). In each year, that proportion (0.55) was applied to the standard ageing error vectors for the strong year classes for ages 3-15. For relatively strong but not dominant year classes, a proportion of 0.80 was applied.

Pre-recruit surveys

NOAA's Southwest Fisheries Science Center (SWFSC) has conducted an annual survey since 1983 to estimate the relative abundance of pelagic juvenile rockfish off central California coast (36.50°–38.33° N.). The survey was designed to measure the annual relative abundance of pelagic juvenile rockfishes (*Sebastes* spp.), but also captures YOY Pacific hake (Sakuma et al. 2006). Standardized 15 minute midwater trawls with the headrope set at a depth of 30 m were conducted at a series of standard stations with a 9.5 mm mesh liner. The survey was expanded substantially in 2004 to cover a much larger spatial area (i.e., from San Diego to Point Delgada: 32.75°–40.00° N.). Since 1999, the NWFSC and Pacific Whiting Conservation Cooperative (PWCC), in coordination with the SWFSC Rockfish survey have conducted an expanded survey to improve targeting of juvenile hake and rockfish. The NWFSC-PWCC pre-recruit survey uses a midwater trawl with an 86' headrope and ½" codend with a 1/4" liner to obtain samples of juvenile hake and rockfish (identical to that used in the SWFSC Juvenile Rockfish Survey). Trawling was done at night with the head rope at 30 m at a speed of 2.7 kt. Some trawls were made before dusk to compare day/night differences in catch. Trawl tows of 15 minutes duration at target depth were conducted along transects at 30 nm intervals along the coast. Stations were located along each transect, at bottom depths of 50, 100, 200, 300, and 500 m. Since 2001, side-by-side comparisons were made between the vessels used for the NWFSC-PWCC and SWFSC survey.

In 2008 a Delta-GLM was applied to catch data from both the SWFSC and PWCC-NWFSC midwater trawl data. The Delta-GLM approach is a type of mixture distribution analysis which models zero and non-zero information from catch data separately (Pennington 1983, Stefansson 1996). However, during tuning of the model, the resultant time series was essentially tuned out of the assessment model. This year we chose to use an ANOVA as recommended by Ralston (2007). The ANOVA accounts for the year × latitude interaction, as well as depth, vessel (or survey), and period effects. The delta-GLM used last year accounted for year, depth, and latitude × survey.

The survey effect in both models accounts for potential differences between the NWFSC-PWCC survey and SWFSC survey catch data while the latitudinal effect attempts to capture changes in relative abundance of young-of-year hake. In particular, between 2001 and 2004, peak relative abundance shifted from approximately 38 to 42 degrees latitude.

Trends in the coast-wide index and associated 95% intervals are shown in Figure 21 and Table 12. While the coast-wide index does include SWFSC data, the trends in hake recruitment between the coast-wide and SWFSC index are comparable for the years of overlap, from 2001 to 2006. Specifically, both indices show large values in 2004 compared to the surrounding years, followed by very low values in 2005 through 2008. This is in stark contrast to the fishery and survey data which suggest a strong 2005 year class and a weak 2004 year class. Given the brevity of the coast-wide time series it is difficult to judge how the magnitude of the values taken from 2001 to 2008 compare on a historical basis. Details of the data used for this analysis are given in Table 11b.

Biological Parameters

Growth

There is considerable variability in length-at-age data among the 12 acoustic surveys conducted since 1977. The processes governing variation in observed length-at-age may include changes in size-selectivity over time, effects on the population due to size-selective fishing, and variation in growth rates over time. In order to explore this latter effect within a stock synthesis framework, alternative growth models were fit during the 2006 assessment to the length-at-age data collected in the acoustic surveys through 2005 (assuming size-selectivity in the acoustic surveys has been constant over time). The first of these models was a simple time-varying growth model, where the growth coefficient (K) was allowed to vary over time. This assumed that all extant cohorts are subject to the same time varying changes in metabolic rates (presumably associated with changes in available food). Two other growth models assumed that growth is density-dependent within cohort. In the second model, asymptotic size (and thus overall growth rate) was cohort specific. In the third model, K was cohort specific. Of the three alternative growth models, the model with cohort-specific L_∞ (asymptotic size) values explained more of the variation in the length-age data than the time varying K model and cohort K model (Figure 22). In particular, cohort-based L_∞ begins relatively high (> 55 cm) prior to 1980 and then appears to decline rapidly as the very large 1980 and 1984 year class grow. Expected size at age, based on the cohort based L_∞ parameter, is above the expected size for the other models in the 1977, 1980, and 1983 survey data. Likewise, cohort based K declines rapidly between the mid 1970s and mid 1980s. These cohort-based models did not assume any cumulative affects of size-selective fisheries.

A similar exploratory growth analysis was conducted on other sources of age data including the acoustic survey (1977-2007), AFSC triennial bottom trawl survey (1977-2003), and the U.S. at sea hake fishery (1973-2006). In particular, a hierarchical von Bertalanffy growth model was fit separately to each data source, which treated cohort as a random linear effect with the growth coefficients, L_∞ and K. The scale parameter, t_0, was estimated as the mean fixed effect. Markov Chain Monte Carlo simulation in WinBUGs (Bayesian inference Using Gibbs Sampling, Thomas et al. 1992; Spiegelhalter et al. 1999) was used to estimate the marginal posterior density of the cohort specific L_∞ and K parameters, which were plotted sequentially by cohort (Figure 23). The results illustrate striking consistency in the change in L_∞ and K parameters over time (by cohort) from each data source and confirm the observations described above. In the current assessment we implement time varying K and asymptotic size, but allow each to assume only two or three distinct values across the timeframe of the model to match the observed changes. In order to stabilize modeling of growth, size at age 2 is constant throughout.

A final analysis was conducted, using the same hierarchical model, to investigate differences in sex-specific growth of hake. A plot of the bivariate posterior density of 1,000 MCMC samples of L_∞ and k reveal that female hake grow to a significantly larger asymptotic size (L_∞) but at a slower rate (k) than males (Figure 24). While the present model does not model hake by sex, it is expected that the next assessment (in 2010) will be based upon a separate-sex model that will be able to account for differential fishery selectivity by sex. To properly represent the cumulative effects of size-selective fisheries in this approach, the cohort-based growth model should be integrated into the assessment model itself. This would provide a fruitful area of research for improving SS. Since this feature is not currently implemented in SS, blocks were created aggregating various years in which it was anticipated the cohort affects on growth would be manifested (See *Model Selection and Evaluation* below).

Maturity

The fraction mature by size was estimated using data from Dorn and Saunders (1997) with a logistic regression. These data consisted of 782 individual ovary collections based on visual maturity determinations by observers. The highest variability in the percentage of each length bin that was mature within an age group occurred at ages 3 and 4, with virtually all age-one fish immature and age 4+ hake mature. Within ages 3 and 4, the proportion of mature hake increased with larger sizes such that only 25% were mature at 31 cm while 100% were mature at 41 cm. Maturity in hake probably varies both as a function of length and age, however, for the purposes of SS , the logistic regression model was fit as a function of length. Maturity proportions by length are shown in Figure 25. Less then 10% of the fish smaller than 32 cm are mature, while 100% maturity is achieved by 45 cm.

Natural mortality

The natural mortality currently used for Pacific hake stock assessment and population modeling is 0.23 per year to age 13, with estimated increases in M at age 14 and 15+. The value of 0.23 was obtained by tracking the decline in abundance of a year class from one acoustic survey to the next (Dorn et. al 1994). Pacific hake longevity data, natural mortality rates reported for Merluciids in general, and previously published estimates for Pacific hake natural mortality indicate that natural morality rates in the range 0.20-0.30 could be considered plausible for Pacific hake (Dorn 1996). In the 2008 assessment, we also considered Hoenig's (1983) method for estimating natural mortality (M), assuming a maximum age of 22 (attributing a single observation at age 25 to ageing error or anomaly), The relationship between maximum age and M was recalculated using data available in Hoenig (1982) and assuming a log-log relationship (Hoenig, 1983), while forcing the exponent on maximum age to be -1. The recalculation was done so that uncertainty about the relationship could be evaluated, and the exponent was forced to be -1 because theoretically, given any proportional survival, the age at which that proportion is reached is inversely related to M (when free, the exponent is estimated to be -1.03). The median value of M via this method was 0.193. Two measures of uncertainty about the regression at the point estimate were calculated. The standard error, which one would use assuming that all error about the regression is due to observation error (and no bias occurred) and the standard deviation, which one would use assuming that the variation about the regression line was entirely due to actual variation in the relationship (and no bias occurred). The truth is undoubtedly somewhere in between these two extremes (the issue of bias not withstanding). The value of the standard error in log space was 0.094, translating to a standard error in normal space of about 0.02. The value of the standard deviation in log space was 0.571, translating to a standard deviation in normal space of about 0.1. Thus Hoenig's method suggests that a prior distribution for M with mean of 0.193 and standard deviation between 0.02 and 0.1 would be appropriate if it were possible to accurately estimate M from the data, all other parameters and priors were correctly specified, and all correlation structure was accounted for (note that SS2 does not currently allow for priors in log-normal space). The fixed value of M (through age 13) which is used in the current model (0.23) is about two standard errors from Hoenig's point estimate (0.193).

Response to 2008 STAR Recommendations

1. The Panel recommends that a Management Strategy Evaluation approach be used to evaluate whether the current 40-10 harvest control rule is sufficient to produce the management advice necessary to ensure the sustainable use of the Pacific hake stock with its dramatically episodic recruitment. The 40-10 rule assumes that simply reducing catches in a linear fashion as stock biomass declines will be sufficient to guide the fishery back towards the target spawning biomass level. However, with the fishery being dependent upon a single declining cohort just reducing the catch may achieve the status quo but it rebuilding will not occur without new recruitment.

Although the STAT agrees with this recommendation, due to changes in assessment duties and the ongoing incomplete treaty agreement this extensive analysis will be best addressed by a joint U.S.-Canadian STAT under the treaty terms of reference.

2. Related to Recommendation 1, the operating model developed for the Management Strategy Evaluation should evaluate how well the different assessment models recapture true population dynamics. At issue is whether a simpler model such as ADAPT / VPA performs better or worse than a more complex model such as SS2.

As above.

3. Female Pacific hake grow differently than male Pacific hake and many of the more influential dynamic processes that operate in the fishery are length-based but are currently considered from an age-based perspective (for example selectivity). The Panel recommends that future assessment models explore the need for including both gender- and length-based selection into the dynamics.

This goal was beyond the scope of available resources for the 2009 assessment.

4. The inclusion of ageing error was found to be influential on the model fit in the SS2 model. However, issues with ageing still remain. Further ageing error analyses are required, especially focused on estimating any bias in the ageing. It will be important to conduct a cross-validation of ageing error from the different laboratories conducting the ageing. It is especially important to include otoliths that were read by AFSC staff.

Much progress was made on this topic in 2008, see ageing error section of document.

5. In light of current acoustic survey information, re-evaluate treatment / adjustment of pre-1995 acoustic survey data and index values. For example, compare the biomass index implied by the area covered by the pre-1995 surveys with the total biomass from the full area covered by the post-1995 surveys. The difference between these two indices has implications for the magnitude of the survey catchability coefficient prior to 1995.

Acquisition of historical survey data and re-analysis of these data with regard to sampling design and variance estimates, the target strength relationship, and selection of trawl sets is ongoing and much new information is expected to be available for the 2010 assessment. Specifically, the following efforts are ongoing by the Acoustics Team at NWFSC:

1. In situ hake daytime target strength (TS) data collection using Drop Acoustic Information SYstem (DAISY). Preliminary analysis indicated that the in situ hake daytime TS data followed the regression formula (38 kHz) originally suggested by Traynor (1992) better than that suggested by Henderson and Horne (2007). However, we feel that more work is needed to make a definitive conclusion on what is the most appropriate regression formula to use for hake biomass estimate.
2. With the help from colleagues at the AFSC, we have historical acoustic data in digital form and are capable of applying the TS formula we have been used for the recent hake surveys (Traynor, 1992) to the data that used old TS formula (-35 dB per kilogram). Although we are not able to provide the re-processed historical hake biomass estimates for this years STAR panel, we should be able to provide alternative historical hake biomass estimates for the 2010 assessment.
3. It is also expected that by next year we should be able to provide the variance analysis for hake biomass estimates using Objective Mapping technique (Kriging) for both historical and recent hake acoustic data.

6. There should be further exploration of geographical variations in fish densities and relationships with average age and the different fisheries, possibly by including spatial-structure into future assessment models.

This goal was beyond the scope of available resources for the 2009 assessment.

7. There should be exploration of possible environmental effects on recruitment and the acoustic survey.

This goal was beyond the scope of available resources for the 2009 assessment.

8. There should be further investigation and resolution of possible under-reporting of foreign catch.

No progress was made on this recommendation in 2008.

Model Description

This assessment used the Stock Synthesis modeling framework written by Dr. Richard Methot at the NWFSC. The Stock Synthesis application provides a general framework for modeling fish stocks that permits the complexity of population dynamics to vary in response to the quantity and quality of available data. In the current assessment model, the Pacific hake population is assumed to be a single coast-wide stock along the Pacific coast of the United States and Canada. Sexes are combined within all data sources, including fishery and survey size/age compositions, as well as in the model structure. The accumulator age for the internal dynamics of the population is set at 15 years, well beyond the expectation of asymptotic growth. The length structure is explicitly modeled in one cm increments between 9 cm (the minus group) and 70 cm (the plus group) in the population, however the data are aggregated at a minimum value of 20 cm. The modeled period includes the years 1960-2008 (last year of available data), with forecasts extending to 2011. The population was assumed to be in equilibrium with no fishing mortality prior to the first year of the model. There were no large-scale commercial fisheries for hake until the arrival of foreign fleets in the mid to late 1960s, however the exact level of hake removals prior to 1966 (the first catches included in the assessment) is unknown.

The model structure, including parameter specifications, bounds and prior distributions (where applicable) is summarized Table 13. The assessment model includes two national fisheries: the U.S. and Canadian trawl fisheries. Although the U.S. at-sea and shore-based fisheries, as well as the Canadian JV and domestic fisheries could be modeled separately for reasons mentioned above, there was insufficient time to explore this topic for the current assessment. Therefore, in this assessment (as has been done in all recent assessments) sectors within each nation's fleets were combined; estimated selectivity changes over time will therefore reflect changes in the distribution of catch among sectors as well as fishing behavior within sectors. The selectivity curves for the acoustic survey and the U.S. and Canadian fisheries were modeled as functions of age using the double normal function (option 20 in SS). This is a change from the 2008 model which used the double logistic formulation for the fisheries; the double normal parameterization has the same number of parameters and has been found to be more stable over a range of assessment applications for U.S. west coast groundfish. Selectivity curves for all fleets are allowed to be dome-shaped (as in previous assessments) and fishery selectivity curves were allowed to vary over time to account for temporal changes in fishery operations (distant water fleets, domestic fleets, etc.) as well as shifts in selectivity as the fishery focused exploitation on abundant cohorts.

Growth is modeled as a von Bertalanffy function in this assessment. Although model misspecification is present due to sexually dimorphic growth patterns (Figure 24), there was insufficient time to develop a sex-specific model formulation for 2009. External analyses conducted as part of recent assessments (2006, 2007), as well as evaluation of model fits to conditional age-at-length data has shown strong evidence of changes in hake growth curves over time. The 2008 model allowed the size at age 12 and the von Bertalanffy *K* parameter to vary among two discrete time blocks. Specifying time-invariant growth has, and continues to result in, a decline of several hundred units in the negative log likelihood as well as marked degradation of the model residual pattern over all data sources. In this assessment, we extend the block structure used in 2008 to accommodate faster observed growth for the 1999 year class. Two blocks were used for the parameter defining length at age 12, 1960-1983 and 1984-2008, which allowed the model to account for the larger asymptotic fish size and the general prevalence of larger fish observed during the early period. Four blocks of years were used to partition the growth parameter k: a common k-value was estimated for the periods 1960-1979 and 1987-1998, with distinct k-values estimated for the periods 1980-1986 and 1999-2008. The 1980-1986 period was intended to allow the model to accommodate the slightly smaller body size of age 4-6 year old fish during those years (Figure 23). The blocks were constrained, via a relatively tight prior distribution on the temporal change in growth, so that estimated values would be time-invariant unless a strong signal was present in the data. Size at age 2 and the parameters describing the distribution of length at each age were fixed at values estimated directly from the data. These choices improved the stability of growth estimation while still allowing the model to accommodate major patterns in growth. A more rich characterization of growth will be possible only with a split-sex formulation. The temporal structure of hake growth in terms of the expected size at age is characterized as an early period from 1960 to the early 1980s where expected maximum size (i.e., length at age 12) is high relative to the subsequent period from the mid 1980s to 2008, with a decline in growth rates (i.e., smaller expected size at age for ages 4-6) during the early-to-mid 1980s. In the most recent block, 1999-2009, growth increases above baseline rates but the expected maximum size continues to be lower.

In modeling temporal changes in fishery selectivity, we employed the same approach used in recent assessments and developed a block structure consistent with the empirical data, but attempted to retain parsimony by allowing blocks only for those parameters and time periods where they made an appreciable improvement in model fit. Specifically, the U.S. fishery was allowed more flexibility, as it has been observed to target specific cohorts and have variable access to the oldest fish in the population, which frequently migrate the farthest north during the fishing season. For the U.S. fishery, both the peak and ascending width parameters were allowed to vary among 8 periods: 1960-1980, 1981-1984, 1985-1988, 1989-1992, 1993-1996, 1997-2000, 2001-2004, and 2005-2008. Final selectivity was allowed to vary among 3 periods: 1960-1983, 1984-2000, and 2001-2008. The Canadian fishery selectivity was slightly less flexible than the U.S. (as has been the case in recent assessments), given that targeting of large cohorts does not occur until the fish are several years older. The Canadian fishery ascending width parameter was allowed to vary among 5 periods: 1960-1984, 1985-1988, 1989-2000, 2001-2004 and 2005-2008. The Canadian fishery peak parameter was allowed to vary among 7 periods: 1966-1980, 1981-1984, 1985-1988, 1989-1992, 1993-2000, 2001-2004 and 2005-2008.

For the base model, the instantaneous rate of natural mortality (*M*) is assumed to be time-independent and equal to 0.23 y^{-1} for ages 2-13, and then allowed to increase linearly to a freely estimated value at age 15+. The stock-recruitment function was a Beverton-Holt parameterization, with the log of the mean unexploited recruitment freely estimated. This assessment used a beta prior for stock-recruit steepness (*h*) applied to previous assessments. This prior is based on the median (0.79), 20th (0.67) and 80th (0.87) percentiles from Myers et al. (1999) meta-analysis of the family Gadidae. Year-specific recruitment deviations were estimated from 1962-2007. This structure was based upon inspection of year-specific standard deviations relative to the estimated value of σ_R. The constraint and bias-correction standard deviation, σ_R, for recruitment variability is estimated in this assessment. Maturity and fecundity relationships are assumed to be time-invariant and fixed values remain unchanged from recent assessments (Figure 26).

Multinomial sample sizes for the length composition and conditional age-at-length data used in this assessment are based on the number of hauls or trips sampled for the commercial at-sea and shore-based fisheries, respectively, and the number of tows in the research surveys. Input sample sizes were iterated by examining the relationship between effective sample size estimated in the model and the observed input sample sizes. This process was performed prior to final model selection, but ratios of effective to input sample size remained close to, and slightly larger than 1.0, indicating the final model was fitting the data about as well, or slightly better than the input values implied. Because acoustic survey catchability was fixed, the standard deviations for the survey index were not iterated, although the RMSE from preliminary model runs was largely consistent with the mean of the input standard deviations. The base case model employed equal emphasis factors (lambdas=1.0) for all likelihood components.

Modeling Results

Model Transition

This assessment transitioned to the newest version of Stock Synthesis (SS v.3.02b) and therefore, a comparison was performed to evaluate differences in model results, if any, from the last assessment (Helser et al. 2008) using SS2 v.2.00n. The exact same model structure and data through 2007 produced no visible change in time-series of expected quantities, indicating all changes in the 2009 results were to be a function of newly included data or changes to model structure. The model using SS v.3 was then updated with data from the 2008 U.S. fishery. Again, the trend in spawning biomass and relative depletion were quite similar, except that unfished spawning biomass was slightly lower. Model runs comparing the double normal selectivity curve for the fishing fleets and the double logistic form used in the last assessment showed this to be a minor change as well.

Major changes in scale observed in this assessment were largely a result of including the improved ageing-imprecision matrix accounting for cohort effects and additional flexibility allowed for time-varying fishery selectivity. These changes resulted in large differences in scaling, as major recruitment strengths were substantially revised. Further change occurred when the modeled time period was extended to accommodate the historical California fishery data.

Model selection and evaluation

Acoustic survey catchability (q) has been viewed as the principal axis of uncertainty in the hake assessment for a number of years. This choice reflects that lack of clear signal for catchability in the data sets currently available to hake and the situation where very small changes in model fit and likelihood result in very dramatic changes in management advice (see sensitivity analyses below) as a function of the estimate or assumed value for q.

Extensive evaluation of fishery selectivity time-period blocking structure was performed. With simple time-period structures the model was found to be very sensitive to the choice of which parameters were allowed to vary over time and when the changes were allowed to occur. A general pattern emerged over hundreds of model runs that the sensitivity to these choices was reduced as more flexibility (in parameters and time-periods) was introduced. For this reason, the blocking structure in this model is somewhat more complex than in the last several assessment models (however it is more similar to the approach of smoothed annual variations in selectivity used in assessments prior to 2006).

Arbitrary constraint on the degree of recruitment variability was found to be especially important to the scale of the problem when the revised ageing-imprecision matrix was applied. For this reason, and after many model runs exploring the stability of the parameter, it was decided to freely estimate σ_R. This allowed use of the value most consist with the model time series of estimated recruitments. This choice is stable in a maximum likelihood framework only when there is sufficient signal in the data to avoid the true global minima for the parameter, zero. In the case of hake this is not a relevant concern, as the data clearly indicate the largest variability in year-class strength observed for west coast groundfish. Further, when Bayesian integration is performed, this parameter can be considered merely a hierarchical variance parameter, the integration of which incorporates uncertainty present in the data set.

Sensitivity to these major sources of uncertainty is reported below.

Assessment Model Results

The fit of the modeled time series to the acoustic survey biomass index is shown in Figure 29. Selectivity at age is estimated for the U.S. and Canadian fisheries by time block (Figures 30-31), for the Santa Barbara data by season (Figure 32), and for the acoustic survey (Figure 33).

Model fits to all length-composition data are shown via observed and predicted length frequency distributions, effective vs. input sample sizes (after tuning), and Pearson residual plots. Figures are divided by fleet: the U.S. fishery (Figures 34-36), Canadian fishery (Figures 37-39) and acoustic survey (Figures 40-42) and historical California fishery by quarter (Figures 43-46).

In general, model predictions are consistent with the observed length compositions in terms of hitting the modes of the distribution and range of sizes exploited.

The model fit the U.S. length composition data reasonably well throughout, though less well between 1997 and 2001 when the hake biomass was relatively small. Consistent patterns are present in the residuals to this fit however, and these are may be due to two (or more) factors: selectivity specifications that assume a smooth selectivity function across age, when cohort targeting is known to occur; and mis-specification of growth/sex-ratio as the assessment model is single-sex, but significant dimorphic growth is known to occur. It will be important to re-evaluate these patterns when growth is revisited in future assessments. The model also underestimated the proportion of the most frequent length classes from the 1999 year class in 2004-2007, perhaps due to its inability to model the growth process for that cohort independently from the surrounding cohorts. The historical California data tended to fit poorly, as expected by the low (and consistent) input and effective sample sizes applied.

The model fit the Canadian fishery length composition data very poorly in 2001-2002, (check years). These two anomalous observations have been the source of considerable discussion during past assessments and remain a mystery. The model was also not able to accommodate well the catches of smaller hake in 1995-1998. This suggests that hake spawned in Canadian waters in 1994 and were exploited by the Canadian fleet as young fish. Benson et al. (2002) confirm this pattern of spawning in Canadian waters. This pattern has not been observed in the Canadian fishery during any other period.

Predicted lengths for the acoustic survey were also generally on the modes with the observed size compositions. But in a number of years (1980, 1995, and 2005) the model was unable to effectively reproduce the observed bi-modal structure (Figure 40). Comparison of effective vs. input sample sizes suggest that the model fit these data as well as expected, given the observed data and input sample sizes (Figure 42). The 1999 year class in 2007 is fully selected and thus the model fits the modal structure of the size composition well. In contrast, the 2005 year class, evident as 31 cm fish in the 2007 size compositions, is not fit particularly well as these fish are not fully selected to the survey, and the model appears to be splitting the difference in an attempt to fit both the 2003 and 2005 year classes.

Given the volume of conditional age-at-length data being fit in this assessment, it is efficient to evaluate these fits via the implied fit to the aggregated marginal age compositions. In addition to being easier to inspect by eye, these plots are more familiar for those accustomed to diagnosing model fit from a variety of modeling platforms. For this reason, we plot the implied marginal fits for each data source: the U.S. fishery (Figure 47), Canadian fishery (Figures 48-50) and acoustic survey (Figure 51).

The very large dominant cohorts present in the data from all sources are tracked closely by model predictions throughout. The ability of the assessment model to match the peak observed age-frequency of the largest cohorts was substantially improved in this assessment when compared to previous hake assessments. This change is largely attributable to the accommodation of the cohort ageing effect as described above.

Sample sizes for all compositional data were iterated during early model fitting and the results reported in table 14.

The 2009 assessment model fit to the acoustic survey biomass time series is quite reasonable, given the variability assigned to each point. The RMSE was only slightly larger than the input SD (Table 14). During all survey years, the predicted biomasses are within asymptotic 95% confidence intervals, and recent residuals show no strong pattern in sign.

The acoustic survey selectivity was estimated but constrained to be time invariant (Figure 33). Although shifted somewhat toward older fish, the current dominant cohort, 1999 is fully selected. The selectivity patterns for both the U.S. and Canadian fisheries appear reasonable, tracking the entry of dominant cohorts in the late 1980s and especially the 1999 year class. U.S. fishery selectivity increased for younger aged fish as the dominant 1980 and 1984 year classes became vulnerable to exploitation during the late 1980s and early 1990s. As these cohorts grew into the older age structure and persisted in the fishable stock U.S. fishery selectivity increased on the older ages, seen as an increase in the descending limb. Canadian fishery selectivity curves also show targeting of stronger cohorts through time, the most pronounced being the 1999 year class which entered the fishery at a time of low overall biomass.

Figures 52-58 show the base model output time trajectories of total, 3+ biomass, recruitment, numbers-at-age, spawning biomass, relative depletion, relative spawning potential ratio (SPR) and exploitation fraction (see tables 15-16 as well). Summary Pacific hake biomass (age 3+) before the beginning of the model or fishing (< 1960) is estimated to be 2.9 million mt (Table 15). Summary biomass decreased to 1.2 million mt in 1972 due to poor recruitment in the early 1960s and moderate fishing from 1966-1972. It then increased to over 8.8 million mt in 1983 as the very large 1977 and 1980 classes entered the population (Figure 52, Table 15, 17). The hake population then experienced a long period of decline to a low of 1.2 million mt in 2000 as fishing intensity increased and no large and few moderate recruitment events occurred between 1985 and 1998. Age 3+ biomass more than doubled between 2001 and 2002 due to recruitment of the 1999 year class, but has subsequently declined as that year class has declined due to fishing and natural mortality.

The trend in spawning biomass is similar to that for summary biomass (Figure 54, Table 15). Spawning biomass in 1960 (SB_{zero}) is estimated to have been 1.37 million mt. Spawning biomass declined rapidly after peaking in 1984 (4.0 million mt) to the lowest point in the time series in 2000 (0.58 million mt), followed by a brief increase to 1.4 million mt in 2003. In 2009 (beginning of the year), spawning biomass is estimated to be the lowest in the time-series, 0.43 million mt, and is at 32% (~95% CI range from 15% to 49%; Figure 55, Table 16) of the unfished level. Approximate asymptotic intervals about the MLE for spawning biomass and recruitment for the entire times series are given in Table 16.

The estimated time series of hake recruitments, as well as recruitment uncertainty, recruitment deviations from the S-R curve, and yearly estimates of variability are shown in Figures 53 and 59-60. The model estimates an extra-dominant recruitment in 1980, dominant recruitment events in 1977, 1984, and 1999, and secondary recruitment events in 1970, 1973, 1987, 1990 and 2005. The 1999 year class was the single most dominant cohort since 1984. The evidence for an above-average 2005 year class is present in the 2007 and 2008 U.S. fishery compositions, as well as the 2007 acoustic survey composition, however its relative magnitude is subject to greater uncertainty than estimates for earlier year classes, due to the limited opportunities for observing it, and the reduced and uncertain selectivity on 2 and 3 year old hake. Uncertainty in recruitment can be substantial as shown by asymptotic 95% confidence intervals (Figure 54). Except for the actual magnitude of estimated recruitments, the patterns in recruitment deviations and uncertainty are qualitatively the same under the base and alternative models.

The estimate of spawning biomass for 2008 is 0.56 million mt, considerably lower than the estimate of 1.10 million mt from the 2008 assessment, reflecting a downward revision in the estimated absolute scale of the hake stock (Figure 61). However, the estimated 2008 depletion level of 32% is was not revised as much from the 38% estimated by the 2008 assessment, reflecting a downward revision of the unexploited equilibrium conditions as well. These changes in the scale of the problem are mainly a function of the improved ageing imprecision matrices, the additional flexibility allowed in time-varying fishery selectivity, and the extenstion of recruitment estimation back to 1962, all of which leads to revised year-class strengths.

Model Uncertainty

Uncertainty is reported via asymptotic intervals for the maximum likelihood estimates, sensitivity and retrospective analyses. Further quantification of uncertainty is provided via MCMC integration of the base case assessment model for use in the decision table of forecast projections under alternative management actions. These methods still provide an underestimate of the true uncertainty in stock size and reference points because they cannot accommodate uncertainty in structural choices or the relative weighting of data sets in addition to other known contributors to assessment uncertainty.

Reference points (biomass and exploitation rate)

Because of temporal changes in growth, there are two types of reference points reported in this assessment: those based on the assumed population parameters at the beginning of the modeled time period and those based on the most recent time period in a ‘forward projection’ mode of calculation. All strictly biological reference points (e.g., unexploited spawning biomass) are calculated based on the unexploited conditions at the start of the model, whereas management quantities (MSY, SB_{msy}, etc.) are based on the current growth and maturity schedules and are marked throughout this document with an asterisk (*).

Given the current life history parameters and long term exploitation patterns, the fishing mortality that reduces the spawning potential of the stock to 40% of the unfished level is referred to as F40%, which is the default Pacific Fishery Management Council proxy for F_{MSY} for Pacific hake. Similarly, the proxy for B_{MSY} is represented by the spawning biomass corresponding to 40% of the unfished stock size (B40%). Unexploited equilibrium Pacific hake spawning biomass (SB_{zero}) from the base model was estimated to be 1.37 million mt (~ 95% confidence interval: 1.22 - 1.51 million mt), with a mean expected recruitment of 1.99 billion age-0 hake (~ 95% confidence interval: 1.80 - 2.21). Associated management reference points for target and critical biomass levels for the base model based on $SB_{40\%}$ proxy are 0.55 million mt (B40%) and 0.34 million mt (B25%), respectively. MSY is estimated to be 287,805* mt, produced by a female spawning biomass of 296,241* mt, and reflecting the high value (0.88) estimated for steepness of the stock-recruit curve. The equilibrium $F_{MSY\text{-}proxy}$ harvest rate (F40%) yield under the base model was estimated to be 270,563* mt occurring at a spawning biomass of 466,466* mt. The biomass-based target ($SB_{40\%}$) equilibrium yield is estimated to be 254,359* mt, occurring at a spawning biomass of 546,335* mt given current life-history parameters.

The full exploitation history under the base and alternative models is portrayed graphically in Figure 58, which shows for each year (1966-2008) the calculated spawning potential ratio (1-SPR) and spawning biomass level (B) relative to their corresponding targets, F40% and B40%, respectively. As indicated in Figure 57, the estimated relative spawning potential ratio for Pacific hake has been below the target/limit value for all of the assessed years, but is now very close to this level (95%). The current spawning biomass is estimated to have dropped below the $SB_{40\%}$ reference target in 2009 as the 1999 year-class declines.

<u>Harvest projections</u>

Forecasts are generated applying the 40:10 control rule and coast-wide catch allocation of 73.88% and 26.12% to the U.S. and Canada, respectively to maximum likelihood results (Table 18). Stock biomass is projected to decline under the current harvest control rule as the 1999 year class declines and the smaller 2005 year class replaces it. Extremely wide confidence intervals for forecast quantities reflect uncertainty in recent and future year-class strengths as well as current biomass levels.

Alternative management actions are presented in a decision table based on MCMC integration of the posterior distribution for model quantities. Preliminary MCMC chains run on the base case model identified during the STAR panel identified a single selectivity parameter (the ascending width of U.S. fishery selectivity in 1989-1992) that was not being reliably estimated, due to a very small selectivity peak parameter estimate (making the ascending width irrelevant to the model fit). The ascending width parameter was therefore fixed at a reasonable value (this would have been done at the STAR panel had the behavior been identified) which resulted in no change to the MLE anywhere near the significant digits reported throughout this analysis. The final MCMC chain was run for 10,000,000 iterations and the first 1,000,000 were removed to eliminate ‘burn-in’ effects of initial conditions. Every 9,000th subsequent value was retained from the remaining iterations, resulting in 1000 samples from the posterior distributions for model parameters and derived quantities.

Stationarity of the posterior distribution for model parameters and quantities of interest was assessed via a suite of standard diagnostic tests. All derived time-series quantities, including spawning biomass, recruitment, depletion and relative SPR had maximum autocorrelation at lag-1 values < 9%, and correlation-corrected effective sample sizes ranged from 705-1000, indicating that Monte-Carlo error in posterior interval estimates should be minimal. Neither the Geweke nor the Hiedelberger and Welch statistics for derived quantities exceeded critical values more frequently than expected via random chance. The objective function, as well as growth, mortality, stock-recruit (including recruitment deviations) and catchability parameters all had maximum autocorrelation at lag-1 values < 7%, and correlation-corrected effective sample sizes ranged from 844-1000. Neither the Geweke nor the Hiedelberger and Welch statistics for these parameters exceeded critical values more frequently than expected via random chance (Figure 62). Selectivity parameters showed mixed results, with 3 parameters (3^{rd} quarter historical California ascending width, U.S. peak fishery selectivity in 2001 and U.S. ascending width of fishery selectivity in 2001) exhibiting autocorrelation > 8% (37%, 59%, 73%) and correspondingly low correlation-corrected effective sample sizes (Figure 63). Trace plots of thinned samples from the posterior revealed that longer MCMC chains with additional thinning would correct these issues (Figure 64). This behavior is attributable to: 1) the very small likelihood contribution of the 3^{rd} quarter historical California data making the parameter largely uncorrelated with all other model quantities, 2) the high degree of correlation between the ascending limb and peak value for U.S. fishery selectivity during the 2001 block, when either parameter could be sufficient to represent strong targeting of very young fish. In leiu of a longer MCMC chain, subsets of the existing chain were evaluated to explore the effect of these three parameters on management results; this exercise revealed no substantive change to model results at the level of significant digits reported throughout.

Time-series plots of the posterior distributions for female spawning biomass, age-0 recruitment, relative depletion and relative SPR are shown in Figures 65-68. Interval widths are generally quite similar to those based on the MLE values, although there is no imposed constraint on symmetry and so quantities like female spawning biomass tend to have a larger upper interval than lower. The median of the posterior distribution for current (2009) reference points is slightly more pessimistic than the MLE values; the median value of the 2009 relative depletion is 29%, compared to 32% from the MLE. The ~95% credibility interval for current depletion, 18-46%, is also quite close to the confidence interval based on the Hessian matrix of 15%-49%. Table 19 presents 3-year stochastic projections using the MLE-based OY catch-stream (40:10 correction applied to the $SPR_{Target=0.4}$ harvest rate accounting for the U.S. to Canadian catch allocation, 73.88%/26.12%) from the base model along with arbitrary constant catch levels of 50,000 to 200,000 mt. The results of the MCMC posterior sample were combined with the 2009-2011 catch streams and results summarized as posterior intervals of spawning biomass, relative depletion, and relative spawning potential ratio, $1\text{-SPR}/1\text{-SPR}_{Target=0.4}$, where values greater than 1.0 denote overfishing. Spawning biomass has a 50% chance of decreasing slightly over the next three years if coast-wide catches are roughly 100,000 per year or more. When the projected OY is removed, forecasted spawning biomass has a 50% chance of declining from 0.40 million mt in 2009 to 0.32 million mt in 2011. This corresponds to spawning depletion declining, with a 50% probability, to 23%, just below the 25% minimum spawning biomass threshold relative to unfished conditions. The 50% probability of achieving values for relative spawning potential ratio very close to 1.0 reflect that the posterior interval for spawning biomass is slightly more pessimistic than the MLE estimate on which the OY is based.

Sensitivity and retrospective analyses

A number of sensitivity analyses and likelihood profiles were conducted to test the effect of select assumptions on the model results. Two of these: survey catchability and natural mortality as well as retrospective analyses (within and among assessments) are presented below.

The current biomass estimates were found to be extremely sensitive to the value estimated for survey catchability (0.85) when compared with alternate values (0.4 and 1.0; Figure 69). There was very little information in the available data to inform the estimation of q over a range of reasonable values (Figure 70). However, there are very large management ramifications among those values (Figure 71). By estimating the parameter, and integrating over it during MCMC, this source of uncertainty is captured in the model results, however, given the relatively flat likelihood surface it should not be surprising if the estimated value is substantially updated in future assessments as model structure changes and the acoustic survey time-series becomes longer.

The profile over M (through age 13) shows a flat likelihood surface between $M = 0.17$ and $M = 0.26$, with less than a 6-point change in log-likelihood over that range (Figure 72). For that range, estimates of current spawning biomass range from 0.28 to 0.56 million mt, depletion estimates range from 0.25 to 0.34, and estimates of q range from 1.06 to 0.73. Expansion of the range of M up to 0.27 results in a change of nearly 100 points in log-likelihood. When (early) M is estimated freely in the current assessment model, it converges to 0.200. When using the tighter or wider prior described above, M converges to 0.197 and 0.200, respectively.

The retrospective analysis was conducted by systematically removing the terminal years' data sequentially for eight years. Results of this analysis do not show consistent trends in the estimate of 2009 spawning stock biomass (Figure 73), although the current model estimate is among the lowest. As has been observed in previous assessments, the strength of the 1999 year class appears somewhat revised downward through time by sequentially adding new data and this has an appreciable effect on spawning biomass estimates for recent years.

A comparison of the models put forward for management since 1995 clearly shows that there has been considerable uncertainty in the Pacific hake stock biomass and status (Figure 74). Model-to-model variability (especially in the early portion of the time-series) is larger than the uncertainty reported in any single model, and this pattern does not appear to dampen as subsequent assessments are developed.

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Table 1. Annual catches of Pacific hake (1000s mt) in U.S. and Canadian waters by foreign, joint venture (JV), and domestic at-sea, shore-based and tribal fisheries, 1966-2008.

	U.S						Canada				
Year	Foreign	JV	At-sea	Shore-based	Tribal	Total U.S.	Foreign	JV	Domestic	Total Canada	Total
1966	137.00	0.00	0.00	0.00	0.00	137.00	0.70	0.00	0.00	0.70	137.70
1967	168.70	0.00	0.00	8.96	0.00	177.66	36.71	0.00	0.00	36.71	214.38
1968	60.66	0.00	0.00	0.16	0.00	60.82	61.36	0.00	0.00	61.36	122.18
1969	86.19	0.00	0.00	0.09	0.00	86.28	93.85	0.00	0.00	93.85	180.13
1970	159.51	0.00	0.00	0.07	0.00	159.58	75.01	0.00	0.00	75.01	234.58
1971	126.49	0.00	0.00	1.43	0.00	127.91	26.70	0.00	0.00	26.70	154.61
1972	74.09	0.00	0.00	0.04	0.00	74.13	43.41	0.00	0.00	43.41	117.55
1973	147.44	0.00	0.00	0.07	0.00	147.51	15.13	0.00	0.00	15.13	162.64
1974	194.11	0.00	0.00	0.00	0.00	194.11	17.15	0.00	0.00	17.15	211.26
1975	205.65	0.00	0.00	0.00	0.00	205.66	15.70	0.00	0.00	15.70	221.36
1976	231.33	0.00	0.00	0.22	0.00	231.55	5.97	0.00	0.00	5.97	237.52
1977	127.01	0.00	0.00	0.49	0.00	127.50	5.19	0.00	0.00	5.19	132.69
1978	96.83	0.86	0.00	0.69	0.00	98.37	3.45	1.81	0.00	5.27	103.64
1979	114.91	8.83	0.00	0.94	0.00	124.68	7.90	4.23	0.30	12.44	137.12
1980	44.02	27.54	0.00	0.79	0.00	72.35	5.27	12.21	0.10	17.58	89.94
1981	70.37	43.56	0.00	0.84	0.00	114.76	3.92	17.16	3.28	24.36	139.12
1982	7.09	67.46	0.00	1.02	0.00	75.58	12.48	19.68	0.00	32.16	107.73
1983	0.00	72.10	0.00	1.05	0.00	73.15	13.12	27.66	0.00	40.77	113.92
1984	14.72	78.89	0.00	2.72	0.00	96.33	13.20	28.91	0.00	42.11	138.44
1985	49.85	31.69	0.00	3.89	0.00	85.44	10.53	13.24	1.19	24.96	110.40
1986	69.86	81.64	0.00	3.46	0.00	154.96	23.74	30.14	1.77	55.65	210.62
1987	49.66	106.00	0.00	4.80	0.00	160.45	21.45	48.08	4.17	73.70	234.15
1988	18.04	135.78	0.00	6.88	0.00	160.70	38.08	49.24	0.83	88.16	248.86
1989	0.00	203.58	0.00	7.42	0.00	211.00	29.75	62.62	2.56	94.93	305.93
1990	0.00	170.97	4.71	8.12	0.00	183.80	3.81	68.31	4.02	76.15	259.95
1991	0.00	0.00	196.91	20.60	0.00	217.51	5.61	68.13	16.18	89.92	307.42
1992	0.00	0.00	152.45	56.13	0.00	208.58	0.00	68.78	20.05	88.83	297.40
1993	0.00	0.00	99.10	42.12	0.00	141.22	0.00	46.42	12.36	58.78	200.00
1994	0.00	0.00	179.07	73.66	0.00	252.73	0.00	85.16	23.78	108.94	361.67
1995	0.00	0.00	102.62	74.97	0.00	177.59	0.00	26.19	46.19	72.38	249.97
1996	0.00	0.00	112.78	85.13	15.00	212.90	0.00	66.78	26.40	93.17	306.08
1997	0.00	0.00	121.17	87.41	24.84	233.42	0.00	42.57	49.23	91.79	325.22
1998	0.00	0.00	120.45	87.86	24.51	232.82	0.00	39.73	48.07	87.80	320.62
1999	0.00	0.00	115.26	83.42	25.84	224.52	0.00	17.20	70.13	87.33	311.86
2000	0.00	0.00	116.09	85.83	6.5	208.42	0.96	15.06	6.38	22.4	230.82
2001	0.00	0.00	102.13	73.47	6.77	182.38	0.00	21.65	31.94	53.59	235.96
2002	0.00	0.00	63.26	45.71	23.15	132.11	0.00	0.00	50.77	50.77	182.91
2003	0.00	0.00	67.47	51.26	24.76	143.49	0.00	0.00	62.09	62.09	205.58
2004	0.00	0.00	90.26	89.38	30.85	210.48	0.00	58.89	65.35	124.24	334.67
2005	0.00	0.00	150.4	74.15	35.3	259.84	0.00	15.18	85.28	100.46	360.68
2006	0.00	0.00	134	97.23	35.47	267	0.00	13.71	80.01	93.76	361
2007	0.00	0.00	121	73	29.85	225	0.00	7	66	73	297
2008	0.00	0.00	166	50	32	248	0.00	3.59	70.15	73.74	320.22
Average:						166				56	222

Table 2. Recent trend in Pacific hake management performance.

Year	Total landings (mt)	Coast-wide (U.S. + Canada) OY (mt)	Coast-wide (U.S. + Canada) ABC (mt)
1999	311,855	290,000	290,000
2000	230,820	290,000	290,000
2001	235,962	238,000	238,000
2002	182,911	162,000	208,000
2003	205,582	228,000	235,000
2004	334,672	501,073	514,441
2005	359,661	364,197	531,124
2006	360,683	364,842	661,680
2007	297,098	328,358	612,068
2008	322,017	364,842	400,000

Table 3. U.S. fishery sampling information by sector showing the number of hauls or trips, lengths and ages sampled each year. Note that only the 2008 values have been updated for this assessment.

	At-sea			Shore-based		
Year	Number of hauls with lengths	Number of lengths	Number of ages	Number of trips with lengths	Number of lengths	Number of ages
1975	13	486	332	NA	NA	NA
1976	249	48,433	4,077	NA	NA	NA
1977	1,071	140,338	7,693	NA	NA	NA
1978	1,135	122,531	5,926	NA	NA	NA
1979	1,539	170,951	3,132	NA	NA	NA
1980	811	101,528	4,442	NA	NA	NA
1981	1,093	135,333	4,273	NA	NA	NA
1982	1,142	169,525	4,601	NA	NA	NA
1983	1,069	163,992	3,219	NA	NA	NA
1984	2,035	237,004	3,300	NA	NA	NA
1985	2,061	259,583	2,450	NA	NA	NA
1986	3,878	467,932	3,136	NA	NA	NA
1987	3,406	428,732	3,185	NA	NA	NA
1988	3,035	412,277	3,214	NA	NA	NA
1989	2,581	354,890	3,041	NA	NA	NA
1990	2,039	260,998	3,112	NA	NA	NA
1991	817	94,685	1,333	17	1,273	934
1992	836	72,294	2,175	49	3,152	1,062
1993	442	31,887	1,196	36	1,919	845
1994	649	41,143	1,775	80	4,939	1,457
1995	470	29,035	690	57	3,388	1,441
1996	557	32,133	1,333	47	3,330	1,123
1997	681	47,863	1,147	67	4,272	1,759
1998	803	47,511	1,158	63	3,979	2,021
1999	2,268	49,192	1,047	92	4,280	1,452
2000	2,199	48,153	1,257	81	2,490	1,314
2001	2,239	48,426	2,111	106	4,290	1,983
2002	1,821	39,485	1,695	94	3,890	1,582
2003	1,915	37,772	1,761	101	3,866	1,561
2004	2,797	57,014	1,875	129	7,170	1,440
2005	3,064	62,944	2,451	108	6,166	1,160
2006	2,824	58,094	2,058	156	8,974	1,547
2007	2,810	57,817	2,094	126	7,035	1,398
2008	3,403	55,330	1,779	99	4,924	1,009

Table 4. Canadian fishery sampling information by sector showing the number of hauls or trips, lengths and ages sampled each year. Note that 2008 values represent the sum of sampling for both sectors.

	Joint-venture			Domestic		
Year	Number of hauls with lengths	Number of lengths	Number of ages	Number of trips with lengths	Number of lengths	Number of ages
1988	129	75,767	1,557	NA	NA	NA
1989	157	56,202	1,353	NA	NA	NA
1990	152	33,312	1,024	NA	NA	NA
1991	567	97,205	1,057	NA	NA	NA
1992	429	60,391	1,786	NA	NA	NA
1993	500	70,522	1,228	NA	NA	NA
1994	875	122,871	2,196	NA	NA	NA
1995	183	20,552	1,747	NA	NA	NA
1996	813	99,228	1,526	10	449	0
1997	414	16,957	1,430	297	42,296	150
1998	468	45,117	1,113	265	29,850	454
1999	66	8,663	812	314	42,119	1,568
2000	352	45,946	1,536	23	2,151	0
2001	284	26,817	1,424	126	14,937	111
2002	NA	NA	NA	1890	13,611	1,831
2003	NA	NA	NA	338	24,898	1,386
2004	595	60,025	1,102	124	7,716	1,581
2005	58	5,206	292	267	17,252	1,415
2006	126	9,417	334	212	15,576	1,170
2007	47	4,050	0	172	8,991	965
2008				188	12,281	1,950

Table 5. U.S. fishery sampling information by sector showing the sampled catch weight, total fishery catch weight each year. Note that only 2008 values have been updated for this assessment.

	At-sea			Shore-based		
Year	Sampled weight (mt)	Total weight (mt)	Percent sampled	Sampled weight (mt)	Total weight (mt)	Percent sampled
1975	47	205,654	<0.1%	NA	NA	NA
1976	4,165	231,331	1.8%	NA	NA	NA
1977	4,239	127,013	3.3%	NA	NA	NA
1978	4,769	97,683	4.9%	NA	NA	NA
1979	6,797	123,743	5.5%	NA	NA	NA
1980	10,074	71,560	14.1%	NA	NA	NA
1981	9,846	113,921	8.6%	NA	NA	NA
1982	23,956	74,553	32.1%	NA	NA	NA
1983	27,110	72,100	37.6%	NA	NA	NA
1984	13,603	93,611	14.5%	NA	NA	NA
1985	11,842	81,545	14.5%	NA	NA	NA
1986	24,602	151,501	16.2%	NA	NA	NA
1987	22,349	155,653	14.4%	NA	NA	NA
1988	21,499	153,822	14.0%	NA	NA	NA
1989	20,560	203,578	10.1%	NA	NA	NA
1990	16,264	175,685	9.3%	NA	NA	NA
1991	15,833	196,905	8.0%	683	20,600	3.3%
1992	17,781	152,449	11.7%	1,964	56,127	3.5%
1993	11,306	99,103	11.4%	1,619	42,119	3.8%
1994	13,959	179,073	7.8%	4,461	73,656	6.1%
1995	9,833	102,624	9.6%	3,224	74,965	4.3%
1996	13,813	112,776	12.2%	3,036	85,127	3.6%
1997	17,264	121,173	14.2%	4,670	87,410	5.3%
1998	17,370	120,452	14.4%	4,231	87,856	4.8%
1999	47,541	115,259	41.2%	6,740	83,419	8.1%
2000	48,482	116,090	41.8%	7,735	85,828	9.0%
2001	43,459	102,129	42.6%	8,524	73,474	11.6%
2002	37,252	63,258	58.9%	7,089	45,708	15.5%
2003	38,067	67,473	56.4%	7,676	55,335	13.9%
2004	53,411	90,258	59.2%	10,918	96,229	11.3%
2005	66,356	150,400	44.1%	8,997	85,914	10.5%
2006	60,435	97,403	62.0%	13,646	115,980	11.8%
2007	64,230	107,489	59.8%	12,231	72,663	16.8%
2008	155,617	166,000	93.7%	9,488	50,000	19.0%

Table 6. Canadian fishery sampling information by sector showing the sampled catch weight, total fishery catch weight each year. Table from 2008 assessment.

	Joint-venture			Domestic		
Year	Sampled weight (mt)	Total weight (mt)	Percent sampled	Sampled weight (mt)	Total weight (mt)	Percent sampled
1988	2,210	49,243	4.5%	NA	NA	NA
1989	2,767	62,618	4.4%	NA	NA	NA
1990	3,078	68,313	4.5%	NA	NA	NA
1991	11,840	68,133	17.4%	NA	NA	NA
1992	8,901	68,779	12.9%	NA	NA	NA
1993	8,929	46,422	19.2%	NA	NA	NA
1994	15,387	85,162	18.1%	NA	NA	NA
1995	3,770	26,191	14.4%	NA	NA	NA
1996	14,863	66,779	22.3%	388	26,395	1.5%
1997	8,325	42,565	19.6%	267	49,227	0.5%
1998	9,638	39,728	24.3%	337	48,074	0.7%
1999	1,970	17,201	11.5%	462	70,132	0.7%
2000	5,762	15,059	38.3%	298	6,382	4.7%
2001	6,072	21,650	28.0%	5,961	31,935	18.7%
2002	NA	NA	NA	9,353	50,769	18.4%
2003	NA	NA	NA	14,474	62,090	23.3%
2004	14,620	58,892	24.8%	3,605	65,345	5.52%
2005	1,630	15,178	10.7%	7,650	85,284	9.0%
2006	2,702	13,715	19.7%	8,005	80,011	10.0%
2007	1,043	14,980	7.0%	4,972	79,535	6.23%
2008	636	3,592	17.7%	2,784	70,150	4.0%

Table 7. U.S. fishery sample sizes for conditional age-at-length data. Values represent the number of hauls contributing from the at-sea sector and the number of trips from the shore-based fishery. Note: only the 2008 values have been updated for this assessment.

Length (cm)	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
20			1		1	1	5				
21			1	2		3	9				
22		1		2		2	13				
23	1	1		4		1	23				
24	1	1		4		2	25	2			
25	1	3		10	1	1	29	5			
26	2	1		10	2		40	11	1		1
27	2	4		9	2	1	34	9		1	
28	1	5		14	4	1	22	12			1
29	3	4		7	10	1	21	18	6		2
30	5	4		4	21	1	16	37	10		1
31	3	6	2	2	27		12	38	11	3	3
32	5	8			30	3	6	52	23	1	3
33	2	9	4		46	4	9	62	23	2	3
34	4	10	5		33	9	12	66	35	6	2
35	4	7	12		24	19	16	62	39	12	1
36	5	13	28	3	17	38	28	55	51	25	1
37	5	23	56	7	19	66	49	59	55	41	2
38	3	26	71	17	12	74	59	48	62	72	7
39	2	45	99	51	11	84	78	50	58	112	16
40	6	58	114	88	17	89	94	62	62	121	43
41	10	53	146	129	25	83	84	66	69	135	78
42	9	55	141	176	36	93	85	86	77	125	107
43	9	56	160	171	44	88	88	94	72	112	121
44	10	54	160	158	65	100	101	99	69	93	124
45	8	47	147	165	72	111	101	100	69	82	115
46	9	47	142	148	74	114	107	99	75	83	101
47	7	39	132	144	84	96	114	103	74	74	79
48	10	42	128	154	83	90	122	111	70	67	63
49	8	44	136	143	76	85	122	116	69	66	58
50	4	57	123	147	83	90	105	101	71	50	52
51	5	62	135	156	89	87	113	112	59	49	25
52	6	60	140	184	85	92	107	100	66	43	24
53		69	146	178	86	94	116	106	66	28	17
54	2	64	147	186	78	105	96	104	61	20	15
55	4	58	161	176	70	102	80	86	57	11	11
56		67	139	156	66	102	65	85	44	5	3
57	1	65	131	115	58	102	56	81	32	5	4
58	1	62	94	103	41	88	39	48	32	4	3
59	2	57	95	60	47	52	34	53	17	7	
60	1	56	73	60	22	60	36	37	22	2	1
61		48	60	45	26	39	30	28	15		1
62		45	52	41	16	27	20	17	9	4	
63		30	46	27	12	25	20	21	12	4	
64		36	42	26	8	26	16	21	6	2	
65		33	23	18	13	19	8	18	6	1	
66		33	17	14	11	12	10	9	4		
67		33	15	18	6	11	10	10	4	1	
68	1	28	18	13	8	9	5	6	5	2	1
69	1	25	17	10	4	7	7	6	1	3	
70		71	62	60	16	14	15	14	12	9	

Table 7. Continued.

Length (cm)	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
20						2				1	
21						2					
22						1					
23						1					
24	1										
25											
26			1								
27							1				
28					2		2				
29	1		1	2	6		5				
30	5			3	5	1	6		1		1
31	8		1	9	15	2	8	4			6
32	19		2	15	22	5	5	1		1	9
33	22	3	2	15	24	13	3	5	1		17
34	49	6	3	8	45	23	4	5		1	23
35	41	16	3	10	51	32	3	17	3		30
36	42	29	3	13	76	33	6	31	9		30
37	40	60	15	9	84	39	22	42	19	2	23
38	39	79	56	17	94	37	23	45	42	4	27
39	36	88	101	40	98	46	58	49	64	2	33
40	51	97	129	79	104	50	66	44	70	6	38
41	85	104	141	120	95	55	78	38	66	18	35
42	114	112	141	129	96	59	84	50	73	31	36
43	119	121	145	125	93	58	82	57	81	33	50
44	110	117	153	127	91	54	81	64	99	38	65
45	113	113	152	125	82	53	81	65	99	37	73
46	105	106	150	130	88	53	81	63	98	36	74
47	100	102	137	133	82	47	84	58	95	39	72
48	83	92	123	118	84	48	84	62	90	38	64
49	67	83	81	98	73	44	82	46	91	37	59
50	77	59	68	74	72	36	73	30	63	33	47
51	59	40	45	49	74	18	59	22	34	25	30
52	51	31	34	40	58	9	39	9	25	23	29
53	52	18	22	35	43	6	35	4	15	13	10
54	44	14	15	27	34	6	26	7	13	10	12
55	27	8	14	14	20	7	20	6	8	8	7
56	31	5	8	15	15	2	15	1	4	6	4
57	24	5	13	8	14	3	15	2	5	4	1
58	11	3	11	8	14	2	9		6	6	3
59	11	2	4	7	11	3	9	1	2	3	3
60	7	5	6	3	14		7		3	1	1
61	8	3	5	6	15	3	5	2	1	1	2
62	7	6	1		9	3	5		1	2	2
63	3	1		3	9	3	2		1	1	1
64	6	2	4	1	8		3		1		1
65	5	3	3	1	8	2	2		2		1
66	6	1	4	2	8	5	2				
67	4	2			6	2			1		1
68	3	3	2	4	6	2	2		1		
69	4	1	3		7	1		1	1		
70	25	5	12	4	20	8	6	1	3	1	2

Table 7. Continued.

Length (cm)	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
20										1	4	
21										1		
22										1	1	
23										2	1	1
24										4		3
25										6		2
26										7	1	6
27					1					11	3	7
28				2						11	6	6
29			2	2						10	8	7
30			8	3	6					9	11	3
31			8	3	7	1		1		7	17	11
32		2	9	2	15					14	39	11
33		4	19	1	19				1	28	41	11
34	1	1	29	2	28	1			2	51	41	20
35	1	5	41	2	32	2			4	96	57	23
36	7	13	38	6	50	11	2			107	45	28
37	16	17	41	18	55	19	2	1	2	128	49	48
38	32	30	54	16	61	45	6	7	3	187	60	78
39	47	36	60	24	56	80	25	23	6	275	42	72
40	59	50	53	36	61	113	61	45	25	298	46	77
41	77	56	59	43	97	128	133	90	49	328	72	84
42	83	73	49	56	100	117	199	133	125	248	126	56
43	84	97	77	85	100	100	227	216	242	187	155	62
44	70	102	70	86	112	85	203	227	309	112	235	95
45	71	90	84	89	121	63	156	225	318	72	319	121
46	57	77	63	106	136	53	106	177	267	45	332	155
47	53	51	63	120	136	61	67	105	199	18	315	183
48	41	43	47	100	153	65	49	79	114	8	259	165
49	28	25	31	95	118	74	33	39	72	2	173	181
50	27	17	17	75	86	76	33	26	46	8	124	132
51	21	7	13	55	59	68	17	8	31	3	74	112
52	11	3	9	34	50	55	15	12	9	6	53	85
53	11	3	6	17	37	48	5	5	11	4	31	64
54	5	2	3	17	34	38	7	3	6	1	19	36
55	1	4		9	10	27	4	2	3	2	14	30
56	3	1		12	8	17	3	2	4	1	9	21
57	1		3	4	11	13		2	3	1	16	13
58	1	1	2	3	1	7		2	1	2	4	10
59	1	1		5	2	4	1	1	2	1	6	6
60	1		1	4	4	4		2		3	6	6
61	1		2	2	1	2			1	2	2	4
62		1	1	4		3		1		5	1	4
63	1			1		1					5	2
64						2					1	
65		1		2	1	1	1				1	1
66	1					1			1		1	2
67								1				
68									1			1
69												
70	2					1					4	

Table 8. Canadian fishery sample sizes for conditional age-at-length data. Values represent the number of hauls contributing from the joint-venture sector and the number of trips from the domestic fishery. Table from 2008 assessment.

Length (cm)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
20										
21										
22										
23								1		
24								2		
25								2		
26								1		
27								1		
28								1		
29										
30										
31									2	
32									2	
33							1	1	3	
34						1			3	
35	1						1		4	
36						1	1		8	
37	1				1		1		9	
38	1		2		1				12	1
39	3		3	1	2				7	7
40	4	2	3	1	3	5			8	10
41	4	5	4	1	9	10	6	1	6	17
42	4	6	5	3	15	14	10	6	14	21
43	5	6	6	6	22	17	20	11	15	22
44	5	6	4	14	27	17	24	18	22	22
45	5	6	4	16	29	18	28	21	24	23
46	5	6	4	16	29	18	29	21	24	23
47	5	6	4	16	29	18	30	21	24	23
48	5	6	4	16	29	18	31	21	24	23
49	5	6	4	16	29	18	30	21	23	22
50	5	6	5	16	27	17	28	21	23	22
51	5	6	5	16	28	13	28	21	22	18
52	5	6	6	13	16	12	27	17	17	18
53	5	6	4	13	15	4	23	17	11	14
54	5	4	5	8	12	5	18	14	12	9
55	4	5	3	4	7	1	21	11	4	5
56	4	4	4	8	4		12	7	7	2
57	4	4	4	3	4		9	5	7	3
58	4	3	3	5	4	5	6	9	6	
59	3	2	4	3	1		8	6	1	1
60	3	2	3	2	3		6	4	4	1
61	2	1	2	2			5	4	4	
62	1	3	4	2	1		3	1	1	
63	1	3	4		2		2	2		
64	1	2	2	1			3	3		1
65	1	1	2				5	1	2	
66		1	1	1			1	1	1	
67		2	2					1		
68				1					1	1
69			1	1				1		
70	1	4	1	1	1		2	1		

Table 8. Continued.

Length (cm)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
20	1									1	
21		1									
22		1									
23		2									1
24											1
25											1
26		2									1
27											2
28	1										2
29		1					1				2
30		1					1				2
31		3	1	1							4
32		5				2	1				6
33		10				2	1				7
34	1	7	1				2			1	7
35		10	3				1			2	8
36	4	16	4			1	1				7
37	8	17	5		1		2				7
38	10	19	6				2	2		1	8
39	17	26	5				3		1	1	12
40	18	27	9			1	11	1	2	4	7
41	19	30	13	1		3	20	3	5	7	12
42	25	35	14	3		11	26	12	13	13	11
43	24	36	14	4	8	14	31	17	16	15	20
44	25	35	17	6	3	14	32	19	41	19	27
45	25	37	16	11	5	15	32	20	51	24	36
46	25	38	18	15	11	15	32	20	73	26	41
47	25	38	19	18	15	15	32	20	82	29	42
48	23	34	19	20	22	15	31	19	81	30	40
49	21	35	19	20	24	15	31	17	71	33	45
50	22	31	20	20	25	15	31	12	70	31	40
51	17	27	18	20	26	13	27	12	59	23	42
52	8	22	16	20	26	13	18	2	45	23	34
53	8	14	17	19	26	11	17	5	24	17	29
54	6	11	15	18	26	11	13	7	26	21	21
55	2	9	9	19	26	9	11	6	10	10	22
56	2	6	10	17	25	7	5	4	12	12	13
57	3	2	6	17	25	6	7	2	6	9	17
58	2	4	6	17	21	8	3	2	6	12	7
59	1	4	8	12	13	5	1	1	7	8	8
60		1	4	9	18	5	5		7	6	3
61		1	4	7	12	3	2	1	6	2	7
62		1		4	12	1	1			4	3
63	1		2	2	7	1	2		1	2	1
64		1	1	2	2	1		1	2	3	2
65				3	1	1	1	1	2	2	
66		2	1	1	2		1		1	2	
67			1	2	1						1
68					1	1	1			3	
69							1			1	
70			1						1	2	

Table 9. Acoustic survey sampling information, 1977-2007. Table from 2008 assessment.

Year	Number of hauls	Number of lengths	Number of ages
1977	85	11,695	4,262
1980	49	8,296	2,952
1983	35	8,614	1,327
1986	43	12,702	2,074
1989	22	5,606	1,730
1992	43	15,852	2,184
1995	69	22,896	2,118
1998	84	33,347	2,417
2001	49	16,442	2,536
2003	71	19,357	3,007
2005	49	13,644	1,905
2007	130	15,756	2,915

Table 10. Acoustic survey sample sizes for conditional age-at-length data. Values represent the number of hauls. Table from 2008 assessment.

Length (cm)	1977	1980	1983	1986	1989	1992	1995	1998	2001	2003	2005	2007
20												
21												
22												
23												
24						2		1				3
25						2		3		1		2
26	1					2		2				4
27					1	4		4	2			7
28	1					2	2	10		1	1	8
29	1	1		2		5	1	13			1	15
30	1			3		7	2	16	3	2	4	17
31	2			6		7	4	20	8	2	6	18
32	3			8		8	9	23	14	4	7	17
33	4		2	8	1	8	13	23	17	4	10	20
34	3	4	4	9	3	8	15	31	20	8	8	20
35	9	7	3	9	4	7	21	31	20	8	10	16
36	14	9	5	11	6	6	20	30	20	8	9	15
37	16	10	7	8	8	6	17	36	17	9	10	13
38	14	12	8	10	7	5	14	39	13	14	8	11
39	17	10	9	5	9	8	6	50	10	14	10	10
40	20	12	13	6	10	7	11	44	17	29	6	16
41	22	11	11	12	15	10	15	55	14	43	22	14
42	24	10	11	21	20	24	26	62	18	56	28	27
43	29	12	9	21	20	28	40	66	22	55	36	36
44	34	13	13	20	20	36	45	64	17	59	41	38
45	40	16	12	21	20	38	49	57	29	61	42	43
46	41	18	13	21	20	39	53	49	29	53	41	44
47	45	19	12	17	18	37	50	51	30	55	39	54
48	48	21	13	18	16	34	47	46	30	43	32	49
49	48	24	12	16	16	30	38	31	28	41	27	46
50	45	22	12	16	10	22	27	22	27	32	23	37
51	47	22	11	16	8	18	17	9	25	28	12	30
52	46	21	10	11	9	14	14	5	26	24	12	22
53	44	19	9	13	6	6	10	6	24	19	9	22
54	40	18	8	8	5	3	7	4	25	12	5	12
55	38	17	6	9	2	4	5	2	18	12	3	12
56	31	19	5	4	2	5	6	2	13	7	5	6
57	33	16	7	4		4	3	3	10	6	2	6
58	27	11	2	3	3	3	5	5	10	5	1	7
59	19	14	3	3	2	1	2		7	3	1	5
60	18	7	1	4	2	1	2	1	8	6		6
61	16	4	2	3		1	1	2	5	2		3
62	11	3	2	2		2	4		3	5		
63	11	2	1		1	3	2		2			
64	10	2		3	1		1		4	2	1	4
65	8	3	1	1	1		2		3	2	1	
66	8	2	1				2		2	2		2
67	8	2		1			2		1	2		
68	7	4		1					2		1	
69	4	3	1	1	1		1	1	4	2	1	
70	7	3		1	2		3		4	6	6	2

Table 11. Acoustic survey biomass estimates (excluding fish of age-0 and age-1, and including all post-survey spatial expansion correction factors) and assumed SDs of the log-index, 1977-2007. Values are unchanged from 2008 assessment.

Year	Biomass estimate (1000s mt)	SD ln(value)
1977	1,915	0.50
1980	2,115	0.50
1983	1,647	0.50
1986	2,857	0.50
1989	1,238	0.50
1992	2,169	0.25
1995	1,385	0.25
1998	1,185	0.25
2001	737	0.25
2003	1,840	0.25
2005	1,265	0.25
2007	879	0.25

Table 12. Pre-recruit survey relative estimates of numbers at age-0 and SDs of the log-index based on a jackknife variance estimation precedure.

Year	Numbers age-0	SD ln(value)
2001	820.81	0.42
2002	357.08	0.23
2003	791.57	0.31
2004	1,659.21	0.28
2005	383.40	0.27
2006	208.59	0.18
2007	68.38	0.13
2008	138.36	0.17

Table 13. Summary of key model parameters in the base case assessment model (excluding forecasts).

Parameter	Number estimated	Bounds (low, high)	Prior (Mean, SD)
Stock and recruitment			
Ln(R_0)	1	(11,21)	uniform
Steepness (*h*)	1	(0.2,1.0)	~Beta(0.777,0.113)
σ_r	1	(1.0,2.0)	uniform
Ln(Recruitment deviations): 1962-2006	45	(-7, 7)	~Ln(N(0, σ_r))
Ln(Forecast recruitment deviations): 2007-2008	2	(-7,7)	~Ln(N(0, σ_r))
Individual growth and mortality			
Natural mortality (*M*, to age 13)	-	NA	Fixed at 0.23
Natural mortality (*M*, ramp to value at age 15)	1	(0.2,0.8)	uniform
Length at age 2 (cm)	-	NA	Fixed at 32
von Bertalanffy *K*	1	(0.1,0.7)	uniform
Exponential offset to *K*, 1980-1986	1	(-2,2)	~N(0,0.01)
Exponential offset to *K*, 1999-2008	1	(-2,2)	~N(0,0.01)
Length at age 12 (cm)	1	(30,70)	uniform
Exponential offset to length at age 12, 1984-2008	1	(-2,2)	~N(0,0.01)
CV of length at age 2	-	NA	0.066
CV of length at age 12	-	NA	0.062
Weight-length slope	-	NA	0.000007
Weight-length exponent	-	NA	2.9624
Length at 50% maturity (cm)	-	NA	36.89
Logistic maturity slope	-	NA	-0.48
Eggs produced per gram intercept	-	NA	1.0
Eggs produced per gram slope	-	NA	0.0
Catchability and selectivity (double normal)			
Acoustic survey:			
Ln(*Q*) - catchability	1	(-5,0.5)	uniform
Time-invariant age-based selectivity	3	varied	uniform
U.S. Fishery:			
Time-invariant age-based selectivity	3	varied	uniform
Additive offsets to ascending, peak and final parameters	16	(-10,10)	uniform
Canadian Fishery:			
Time-invariant age-based selectivity	3	varied	uniform
Additive offsets to ascending, and peak parameters	10	(-10,10)	uniform
Historical California fishery (4 separate seasons):			
Time-invariant age-based selectivities	3	varied	uniform
Total: 53 + 47 recruitment deviations = 97 estimated parameters			

Table 14. Model tuning specifications by source.

Type of data	Source	Input adjustment	Average input after adjustment	Average effective N or RMSE
Survey	Acoustic	+0.0	0.35	0.52
	Pre-recruit (*removed from base*)	+1.5	1.75	>1.75
Length	Acoustic	x 1.41	78.5	83.3
	U.S. fishery	x 0.09	155.8	158.5
	Canadian fishery	x 1.04	90.4	96.3
	Historical California fishery 1st qtr.	x 1.40	24.0	28.7
	Historical California fishery 2nd qtr.	x 1.40	14.7	19.8
	Historical California fishery 3rd qtr.	x 1.40	32.2	48.8
	Historical California fishery 4th qtr.	x 1.40	31.8	34.8
Age	Acoustic	x 3.27	47.0	51.1
	U.S. fishery	x 1.70	75.6	98.6
	Canadian fishery	x 1.78	21.0	27.4

Table 15. Time-series of population estimates from the base case model.

Year	Total biomass (millions mt)	Age 3+ biomass (millions mt)	Female spawning biomass (millions mt)	Depletion	Age-0 recruits (billions)	1-SPR	Exploitation fraction
1960	3.23	2.87	1.37	100%	1.99	0.00	0.00
1961	3.23	2.87	1.37	100%	1.99	0.00	0.00
1962	3.22	2.87	1.37	100%	0.10	0.00	0.00
1963	3.14	2.87	1.37	100%	0.23	0.00	0.00
1964	2.90	2.87	1.35	99%	0.98	0.00	0.00
1965	2.63	2.56	1.25	91%	0.88	0.00	0.00
1966	2.40	2.23	1.11	81%	1.30	0.19	0.06
1967	2.09	1.91	0.93	68%	1.28	0.28	0.11
1968	1.80	1.57	0.76	55%	1.83	0.18	0.08
1969	1.69	1.44	0.68	50%	0.96	0.27	0.12
1970	1.62	1.31	0.62	45%	4.92	0.39	0.18
1971	1.62	1.27	0.57	42%	1.41	0.38	0.12
1972	1.90	1.20	0.59	44%	0.55	0.31	0.10
1973	2.05	1.82	0.76	56%	4.63	0.37	0.09
1974	2.15	1.87	0.85	62%	0.75	0.41	0.11
1975	2.31	1.67	0.83	61%	2.21	0.40	0.13
1976	2.29	2.09	0.90	66%	1.02	0.40	0.11
1977	2.31	1.91	0.91	67%	12.45	0.26	0.07
1978	2.70	2.02	0.93	68%	1.23	0.21	0.05
1979	3.62	1.95	1.03	75%	2.36	0.22	0.07
1980	4.18	3.73	1.47	108%	34.16	0.14	0.02
1981	5.54	3.77	1.73	127%	0.10	0.19	0.04
1982	8.18	3.77	2.06	151%	0.17	0.13	0.03
1983	8.90	8.87	3.24	238%	0.58	0.11	0.01
1984	8.99	8.84	4.02	294%	17.55	0.11	0.02
1985	8.71	7.88	3.78	277%	0.01	0.07	0.01
1986	9.14	6.88	3.50	256%	0.40	0.12	0.03
1987	8.41	8.36	3.49	256%	5.30	0.12	0.03
1988	7.70	7.41	3.44	252%	2.23	0.13	0.03
1989	7.14	6.36	3.11	228%	0.08	0.20	0.05
1990	6.33	6.02	2.80	205%	3.19	0.18	0.04
1991	5.50	5.35	2.51	184%	0.79	0.24	0.06
1992	4.76	4.31	2.12	155%	0.02	0.27	0.07
1993	3.96	3.84	1.79	131%	2.45	0.20	0.05
1994	3.34	3.22	1.53	112%	2.24	0.37	0.11
1995	2.73	2.31	1.15	84%	1.67	0.35	0.11
1996	2.36	1.99	0.92	67%	2.16	0.45	0.15
1997	2.07	1.76	0.78	57%	1.34	0.46	0.19
1998	1.86	1.51	0.68	50%	2.58	0.52	0.21
1999	1.74	1.38	0.60	44%	12.32	0.56	0.23
2000	2.12	1.22	0.58	42%	0.46	0.49	0.19
2001	2.98	1.37	0.71	52%	0.98	0.45	0.17
2002	3.23	3.12	1.16	85%	0.01	0.28	0.06
2003	3.19	3.05	1.39	102%	1.64	0.25	0.07
2004	2.89	2.82	1.33	98%	0.33	0.36	0.12
2005	2.45	2.21	1.10	80%	2.39	0.42	0.16
2006	2.00	1.85	0.87	64%	0.38	0.47	0.19
2007	1.67	1.34	0.66	49%	1.03	0.49	0.23
2008	1.37	1.27	0.56	41%	1.90	0.57	0.25
2009	1.14	0.92	0.43	32%	1.86	NA	NA

Table 16. Time-series of ~95% confidence intervals for female spawning biomass, relative depletion estimates, age-0 recruits, relative spawning potential ratio (1-SPR/1-SPR$_{Target=0.4}$) and exploitation fraction (catch/3+biomass) from the base case model.

Year	Female spawning biomass (millions mt)	Depletion	Age-0 recruits (billions)	(1-SPR) / (1-SPR$_{target}$)	Exploitation fraction
1960	1.22 - 1.51	NA	1.80 - 2.21	NA	NA
1961	1.22 - 1.51	NA	1.80 - 2.21	NA	NA
1962	1.22 - 1.51	NA	0.03 - 0.36	NA	NA
1963	1.22 - 1.51	NA	0.09 - 0.61	NA	NA
1964	1.21 - 1.49	NA	0.74 - 1.30	NA	NA
1965	1.12 - 1.38	NA	0.66 - 1.17	NA	NA
1966	1.00 - 1.22	NA	1.10 - 1.55	0.29 - 0.34	0.06 - 0.07
1967	0.84 - 1.01	0.66 - 0.69	1.09 - 1.50	0.43 - 0.50	0.10 - 0.12
1968	0.69 - 0.82	0.54 - 0.57	1.63 - 2.07	0.28 - 0.34	0.07 - 0.08
1969	0.63 - 0.73	0.48 - 0.52	0.82 - 1.13	0.41 - 0.48	0.12 - 0.13
1970	0.58 - 0.66	0.43 - 0.48	4.45 - 5.45	0.62 - 0.70	0.17 - 0.19
1971	0.53 - 0.61	0.39 - 0.45	1.24 - 1.60	0.60 - 0.66	0.11 - 0.13
1972	0.55 - 0.64	0.40 - 0.48	0.46 - 0.66	0.48 - 0.54	0.09 - 0.11
1973	0.69 - 0.82	0.50 - 0.61	4.12 - 5.20	0.59 - 0.65	0.08 - 0.10
1974	0.77 - 0.93	0.55 - 0.69	0.64 - 0.88	0.65 - 0.72	0.10 - 0.12
1975	0.75 - 0.92	0.54 - 0.69	1.95 - 2.51	0.62 - 0.70	0.12 - 0.15
1976	0.79 - 1.01	0.57 - 0.75	0.87 - 1.20	0.62 - 0.71	0.10 - 0.13
1977	0.79 - 1.03	0.57 - 0.76	11.2 - 13.84	0.39 - 0.49	0.06 - 0.08
1978	0.80 - 1.06	0.58 - 0.78	1.05 - 1.45	0.30 - 0.39	0.04 - 0.06
1979	0.89 - 1.17	0.65 - 0.86	2.07 - 2.68	0.33 - 0.41	0.06 - 0.08
1980	1.29 - 1.66	0.93 - 1.23	31.77 - 36.72	0.21 - 0.27	0.02 - 0.03
1981	1.52 - 1.94	1.10 - 1.44	0.04 - 0.24	0.27 - 0.35	0.03 - 0.04
1982	1.82 - 2.29	1.31 - 1.70	0.11 - 0.25	0.19 - 0.24	0.03 - 0.03
1983	2.93 - 3.55	2.10 - 2.65	0.48 - 0.69	0.16 - 0.21	0.01 - 0.01
1984	3.66 - 4.37	2.61 - 3.28	16.89 - 18.22	0.16 - 0.20	0.01 - 0.02
1985	3.45 - 4.11	2.45 - 3.08	<0.01 - 0.04	0.11 - 0.13	0.01 - 0.02
1986	3.21 - 3.80	2.28 - 2.85	0.34 - 0.46	0.18 - 0.21	0.03 - 0.03
1987	3.23 - 3.76	2.28 - 2.84	5.11 - 5.51	0.19 - 0.22	0.03 - 0.03
1988	3.20 - 3.67	2.25 - 2.78	2.11 - 2.36	0.20 - 0.23	0.03 - 0.04
1989	2.91 - 3.32	2.04 - 2.52	0.05 - 0.12	0.31 - 0.34	0.04 - 0.05
1990	2.62 - 2.97	1.84 - 2.26	3.07 - 3.32	0.29 - 0.32	0.04 - 0.05
1991	2.36 - 2.66	1.65 - 2.03	0.73 - 0.87	0.38 - 0.41	0.05 - 0.06
1992	2.00 - 2.24	1.39 - 1.71	0.01 - 0.05	0.44 - 0.47	0.07 - 0.07
1993	1.70 - 1.89	1.18 - 1.45	2.32 - 2.58	0.32 - 0.35	0.05 - 0.05
1994	1.46 - 1.61	1.01 - 1.23	2.10 - 2.39	0.60 - 0.64	0.11 - 0.12
1995	1.09 - 1.20	0.76 - 0.93	1.55 - 1.81	0.56 - 0.60	0.10 - 0.11
1996	0.88 - 0.96	0.61 - 0.74	1.98 - 2.35	0.73 - 0.77	0.15 - 0.16
1997	0.75 - 0.82	0.52 - 0.63	1.20 - 1.49	0.75 - 0.79	0.18 - 0.19
1998	0.65 - 0.71	0.45 - 0.55	2.31 - 2.88	0.84 - 0.88	0.20 - 0.22
1999	0.56 - 0.64	0.39 - 0.49	10.79 - 14.07	0.91 - 0.96	0.21 - 0.24
2000	0.53 - 0.62	0.37 - 0.47	0.38 - 0.56	0.78 - 0.84	0.17 - 0.20
2001	0.64 - 0.78	0.45 - 0.59	0.80 - 1.21	0.70 - 0.79	0.16 - 0.19
2002	1.02 - 1.31	0.73 - 0.98	<0.01 - 0.03	0.42 - 0.50	0.05 - 0.07
2003	1.21 - 1.58	0.86 - 1.18	1.20 - 2.23	0.36 - 0.46	0.06 - 0.08
2004	1.14 - 1.53	0.82 - 1.14	0.22 - 0.50	0.53 - 0.66	0.10 - 0.14
2005	0.91 - 1.28	0.65 - 0.95	1.50 - 3.81	0.62 - 0.79	0.13 - 0.19
2006	0.68 - 1.06	0.49 - 0.78	0.21 - 0.69	0.68 - 0.90	0.15 - 0.24
2007	0.47 - 0.86	0.34 - 0.63	0.15 - 6.94	0.68 - 0.96	0.17 - 0.30
2008	0.33 - 0.78	0.25 - 0.57	0.29 - 12.35	0.77 - 1.14	0.15 - 0.36
2009	0.20 - 0.67	0.15 - 0.49	0.29 - 12.10	NA	NA

Table 17. Estimated numbers at age (millions).

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1960	1,994	1,585	1,259	1,000	795	632	502	399	317	252	200	159	126	100	80	112
1961	1,994	1,585	1,259	1,000	795	632	502	399	317	252	200	159	126	100	80	112
1962	99	1,585	1,259	1,000	795	632	502	399	317	252	200	159	126	100	80	112
1963	229	79	1,259	1,000	795	632	502	399	317	252	200	159	126	100	80	112
1964	982	182	63	1,000	795	632	502	399	317	252	200	159	126	100	80	112
1965	876	781	144	50	795	632	502	399	317	252	200	159	126	100	80	112
1966	1,304	696	620	115	40	632	502	399	317	252	200	159	126	100	80	112
1967	1,280	1,036	553	488	90	31	483	378	296	231	182	143	114	90	73	109
1968	1,834	1,017	823	433	378	68	23	353	268	203	154	118	92	72	58	97
1969	964	1,457	808	650	340	295	53	17	264	196	144	106	78	60	47	81
1970	4,924	766	1,158	635	507	263	224	39	13	181	127	87	60	43	33	61
1971	1,406	3,913	609	898	484	378	189	154	25	8	99	63	40	26	19	43
1972	549	1,117	3,109	472	686	361	273	131	101	16	4	55	33	20	14	30
1973	4,631	436	887	2,438	367	526	272	199	92	67	10	2	28	16	10	20
1974	754	3,679	347	689	1,864	274	381	189	132	57	39	5	1	14	9	15
1975	2,212	599	2,923	268	523	1,375	195	258	120	78	32	20	3	1	7	11
1976	1,024	1,757	476	2,263	204	387	983	133	166	73	44	17	10	1	0	9
1977	12,452	814	1,396	368	1,716	150	275	667	86	101	42	25	9	6	1	5
1978	1,231	9,894	646	1,093	285	1,312	113	202	477	60	69	28	16	6	4	3
1979	2,357	978	7,861	508	854	220	1,000	85	149	345	42	48	20	11	4	4
1980	34,157	1,873	777	6,179	397	659	168	749	62	107	242	29	33	13	8	5
1981	102	27,139	1,488	614	4,864	311	512	129	569	46	78	175	21	23	9	7
1982	169	81	21,563	1,178	484	3,804	240	389	96	411	33	54	120	14	16	9
1983	575	134	64	17,096	931	381	2,974	186	296	72	302	24	39	86	10	15
1984	17,546	457	107	51	13,535	735	299	2,312	142	224	53	221	17	28	63	14
1985	13	13,941	363	84	40	10,679	576	232	1,776	108	167	39	162	13	21	46
1986	395	10	11,076	287	67	32	8,383	451	181	1,378	83	129	30	125	10	37
1987	5,302	314	8	8,726	225	52	25	6,484	346	138	1,049	64	98	23	96	26
1988	2,233	4,212	250	6	6,852	176	41	19	4,962	263	105	795	48	74	18	74
1989	78	1,774	3,347	196	5	5,352	137	31	15	3,753	199	79	599	36	56	49
1990	3,193	62	1,409	2,635	150	4	4,045	103	23	11	2,822	149	60	453	28	61
1991	794	2,537	50	1,111	2,012	114	3	3,061	78	18	8	2,135	113	45	346	49
1992	17	631	2,016	39	835	1,508	85	2	2,269	58	13	6	1,590	85	34	240
1993	2,446	13	501	1,580	29	619	1,111	62	2	1,657	42	10	4	1,174	63	143
1994	2,239	1,944	10	392	1,223	22	468	830	46	1	1,227	31	7	3	879	113
1995	1,673	1,779	1,544	8	293	892	16	323	562	31	1	826	21	5	2	564
1996	2,157	1,329	1,413	1,186	6	216	639	11	222	385	21	1	567	15	3	279
1997	1,337	1,714	1,056	1,067	870	4	147	418	7	140	243	13	0	365	10	133
1998	2,577	1,062	1,362	810	796	623	3	93	249	4	76	130	7	0	205	62
1999	12,321	2,047	844	1,034	594	554	404	2	51	124	2	35	61	3	0	114
2000	463	9,790	1,627	636	747	403	345	226	1	22	51	1	14	25	2	42
2001	980	368	7,778	1,241	470	526	265	209	124	0	11	23	0	7	12	17
2002	10	779	293	6,072	881	316	340	172	135	80	0	7	16	0	4	15
2003	1,636	8	619	231	4,621	648	226	243	123	97	58	0	5	11	0	10
2004	333	1,300	6	488	175	3,431	473	165	178	90	71	42	0	4	8	5
2005	2,387	264	1,033	5	360	125	2,372	327	114	123	62	49	30	0	3	8
2006	376	1,897	210	784	4	258	86	1,577	210	71	75	37	29	18	0	5
2007	1,029	299	1,507	158	570	3	172	55	967	125	41	42	21	16	10	2
2008	1,903	817	237	1,126	114	393	2	108	33	562	71	23	23	11	9	6
2009	1,994	1,585	1,259	1,000	795	632	502	399	317	252	200	159	126	100	80	112

Table 18. Three-year projections of maximum likelihood-based Pacific hake ABC, OY, spawning biomass and depletion for the base case model based on the 40:10 harvest control rule and the $F_{40\%}$ overfishing limit/target.

Year	ABC (mt)	OY (mt)	Female spawning biomass (millions mt)	~95% confidence interval	Estimated depletion	~95% confidence interval
2009	291,965	253,582	0.43	0.20 - 0.67	32%	15% - 49%
2010	238,866	193,109	0.36	0.10 – 0.62	26%	7% - 45%
2011	227,178	189,054	0.36	<0.01 – 0.74	27%	<1% - 53%

Table g. Decision table with three year projections of posterior distributions for Pacific hake female spawning biomass, depletion and relative spawning potential ratio (1-SPR/1-$SPR_{Target=0.4}$; values greater than 1.0 denote overfishing). Catch alternatives are based on: 1) the values estimated via the 40:10 harvest control rule and the $F_{40\%}$ overfishing limit/target for the base case model (from table 18 above), 2) arbitrary constant catch levels of 50,000, 100,000, 150,000 and 200,000 mt.

Management Action		States of nature														
		Female spawning biomass (millions mt) posterior interval					Estimated depletion posterior interval					Relative spawning potential ratio posterior interval				
Year	Coast-wide catch (mt)	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th
2009	253,582	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.79	0.91	1.00	1.09	1.22
2010	193,109	0.14	0.24	0.32	0.41	0.60	10%	17%	23%	29%	43%	0.69	0.86	0.98	1.10	1.29
2011	189,054	0.10	0.19	0.28	0.42	0.76	7%	14%	21%	30%	54%	0.65	0.86	1.01	1.18	1.40
2009	50,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.24	0.31	0.36	0.42	0.52
2010	50,000	0.23	0.33	0.41	0.50	0.69	17%	24%	29%	36%	49%	0.22	0.29	0.34	0.41	0.52
2011	50,000	0.24	0.33	0.43	0.56	0.90	17%	24%	31%	40%	64%	0.19	0.27	0.33	0.40	0.51
2009	100,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.43	0.52	0.60	0.68	0.81
2010	100,000	0.21	0.31	0.38	0.48	0.66	15%	22%	28%	34%	47%	0.40	0.52	0.60	0.70	0.86
2011	100,000	0.20	0.29	0.39	0.52	0.86	14%	21%	28%	37%	61%	0.37	0.50	0.60	0.72	0.89
2009	150,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.57	0.69	0.77	0.86	1.00
2010	150,000	0.19	0.28	0.36	0.45	0.64	14%	21%	26%	33%	46%	0.56	0.70	0.80	0.91	1.09
2011	150,000	0.16	0.25	0.34	0.48	0.82	11%	18%	25%	34%	58%	0.52	0.70	0.82	0.97	1.16
2009	200,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.69	0.81	0.90	0.98	1.12
2010	200,000	0.17	0.26	0.34	0.43	0.62	12%	19%	24%	31%	44%	0.69	0.85	0.96	1.07	1.25
2011	200,000	0.12	0.21	0.30	0.43	0.78	8%	15%	22%	31%	56%	0.66	0.86	1.00	1.16	1.37

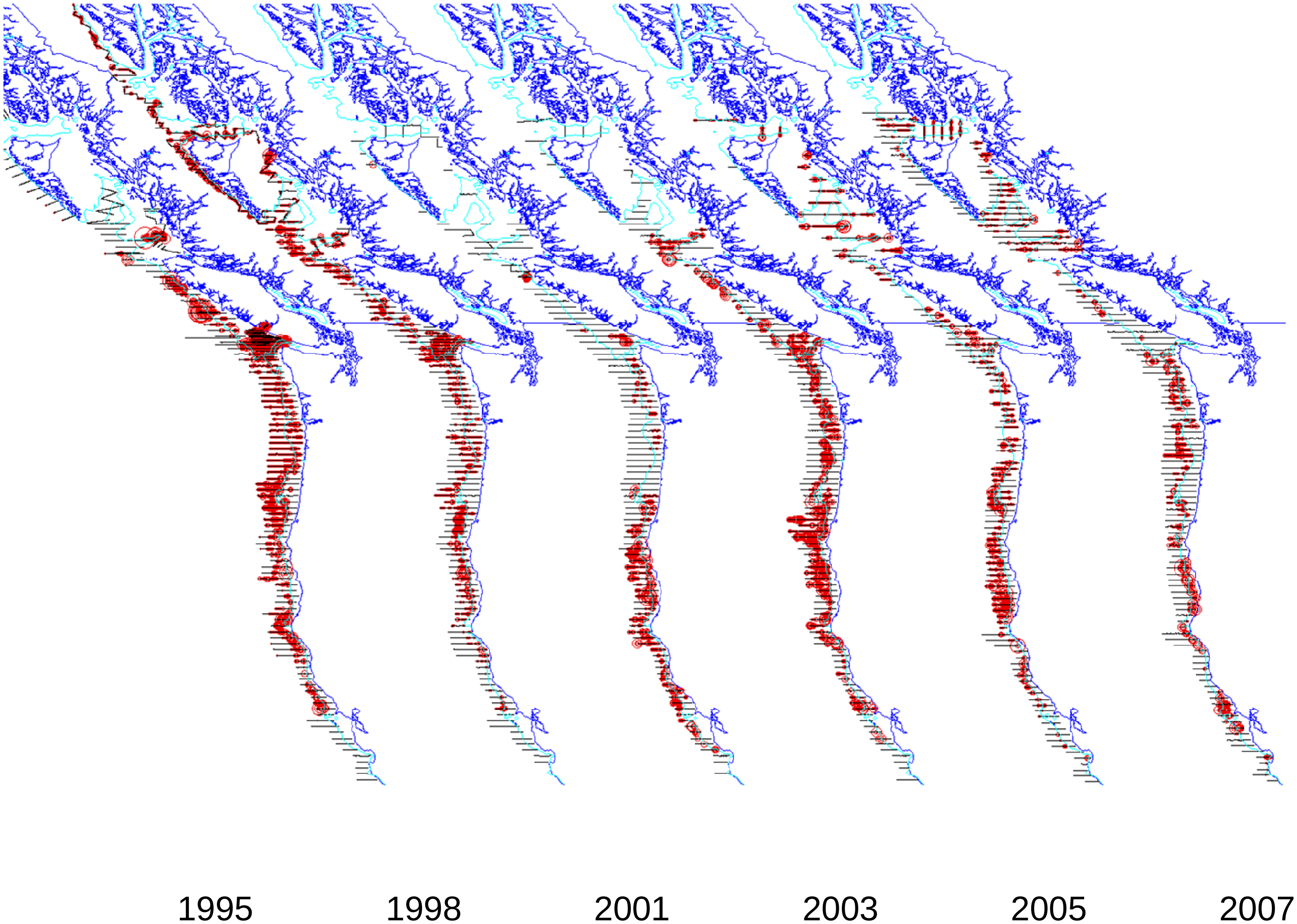

Figure 1. Occurrence of acoustic area backscattering attributable to Pacific hake in the last six (1995-2007) joint US-Canada acoustic surveys. Diameter of circles is proportional to measured backscatter levels.

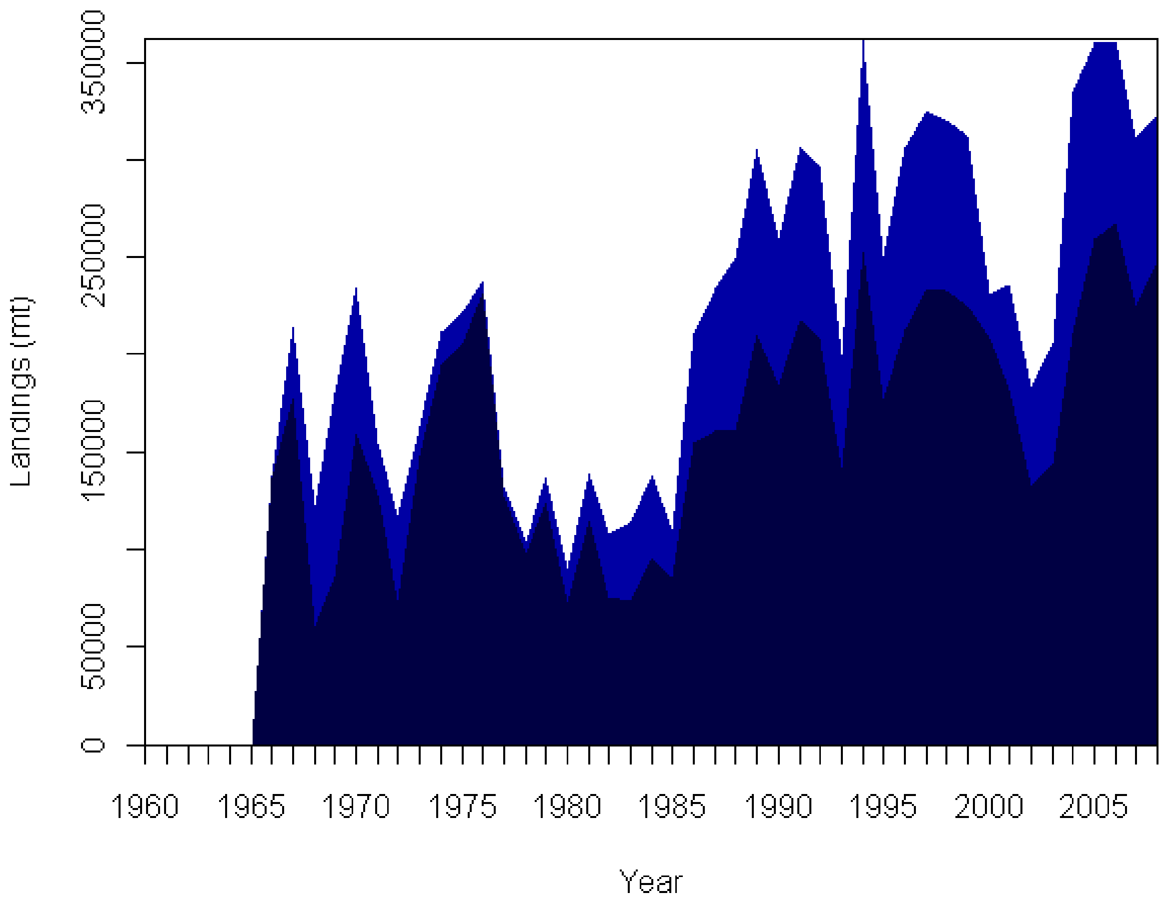

Figure 2. Total Pacific hake landings used in the assessment by nation, 1960-2008 (Canadian landings are represented by the lighter region above the darker U.S. values).

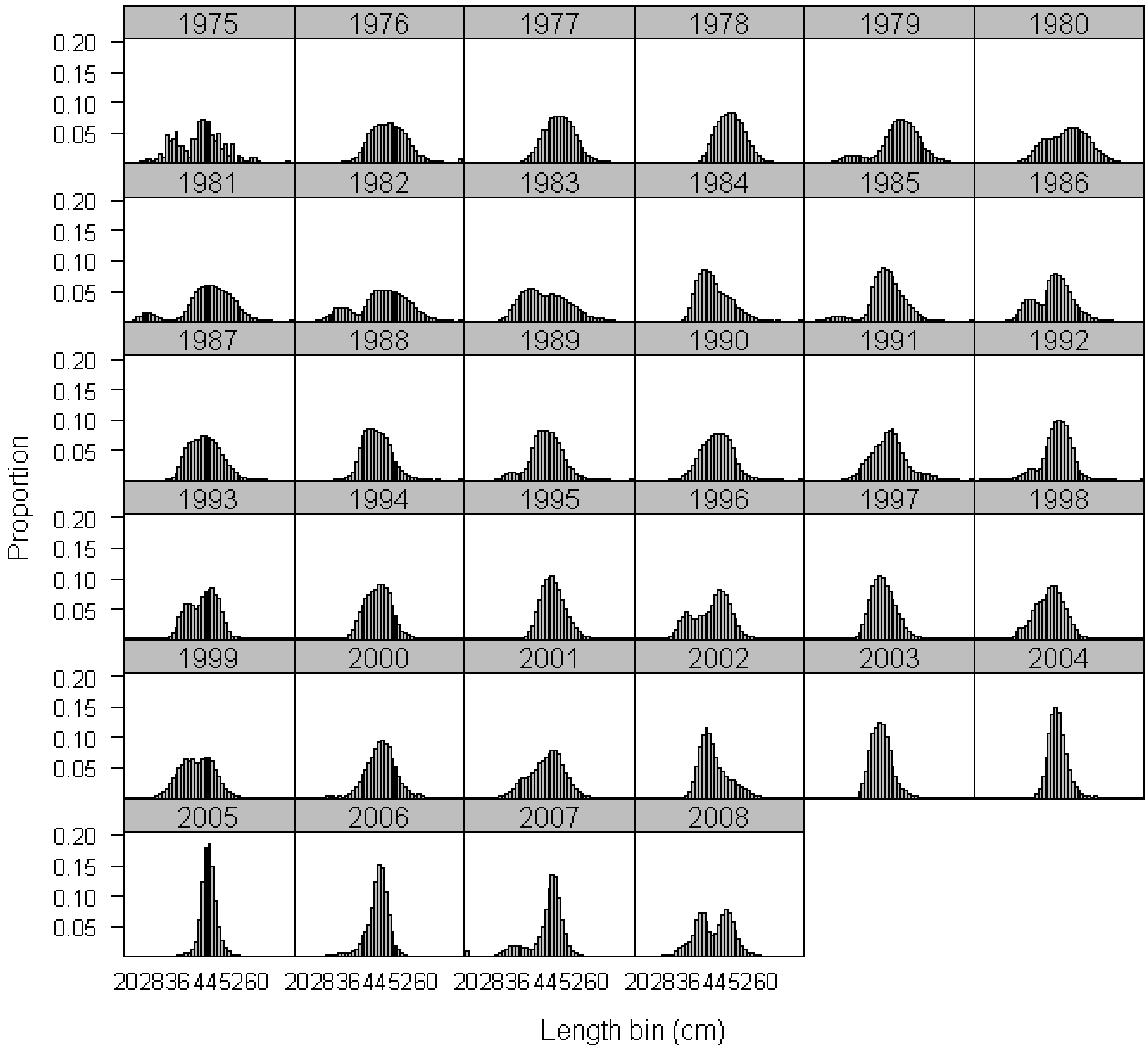

Figure 3. Plot of U.S. fishery (at-sea and shore-based combined) length compositions, 1975-2008.

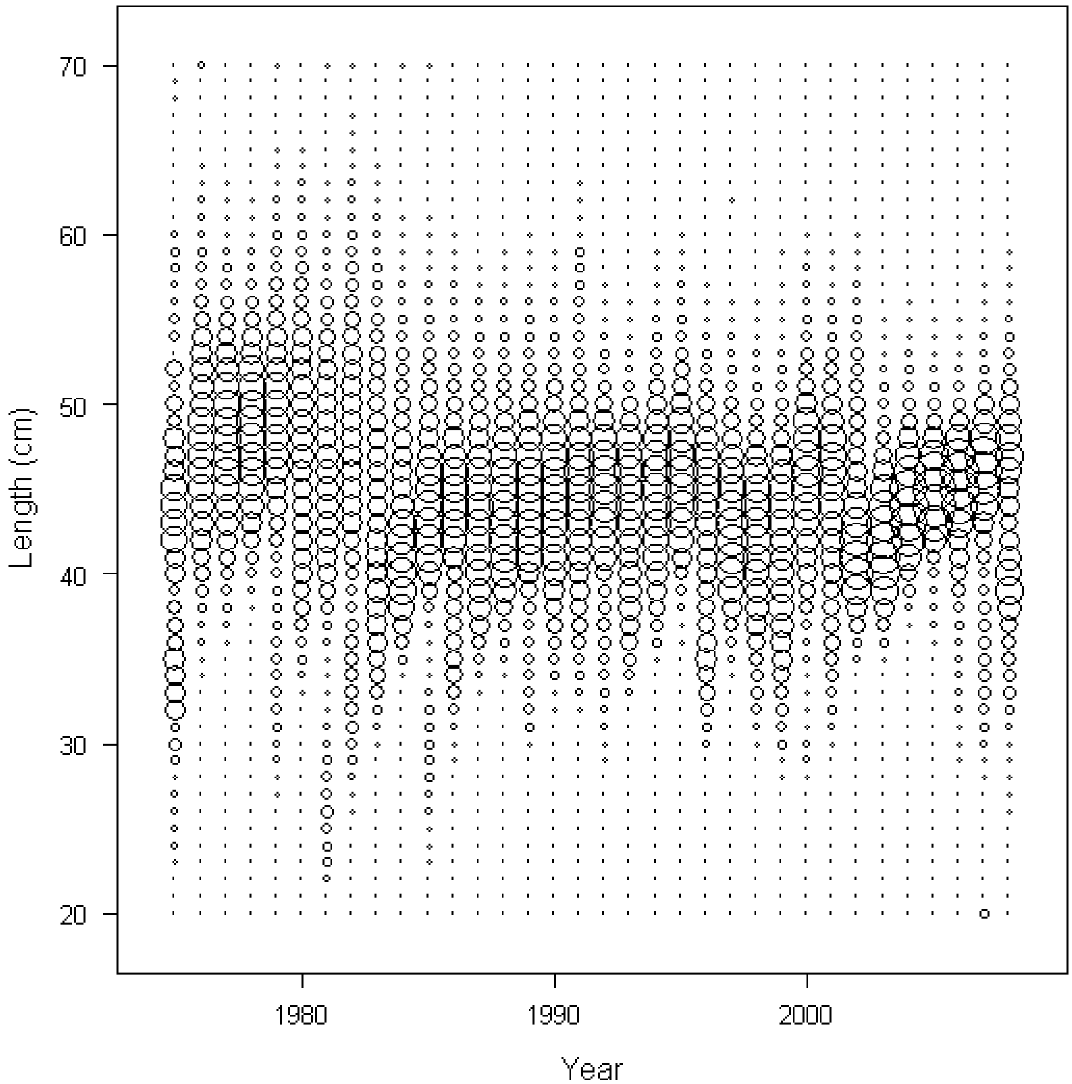

Figure 4. Plot of U.S. fishery (at-sea and shore-based combined) length compositions, 1975-2008. Diameter of circles is scaled to a maximum proportion of 0.19 and proportions sum to 1.0 in each year.

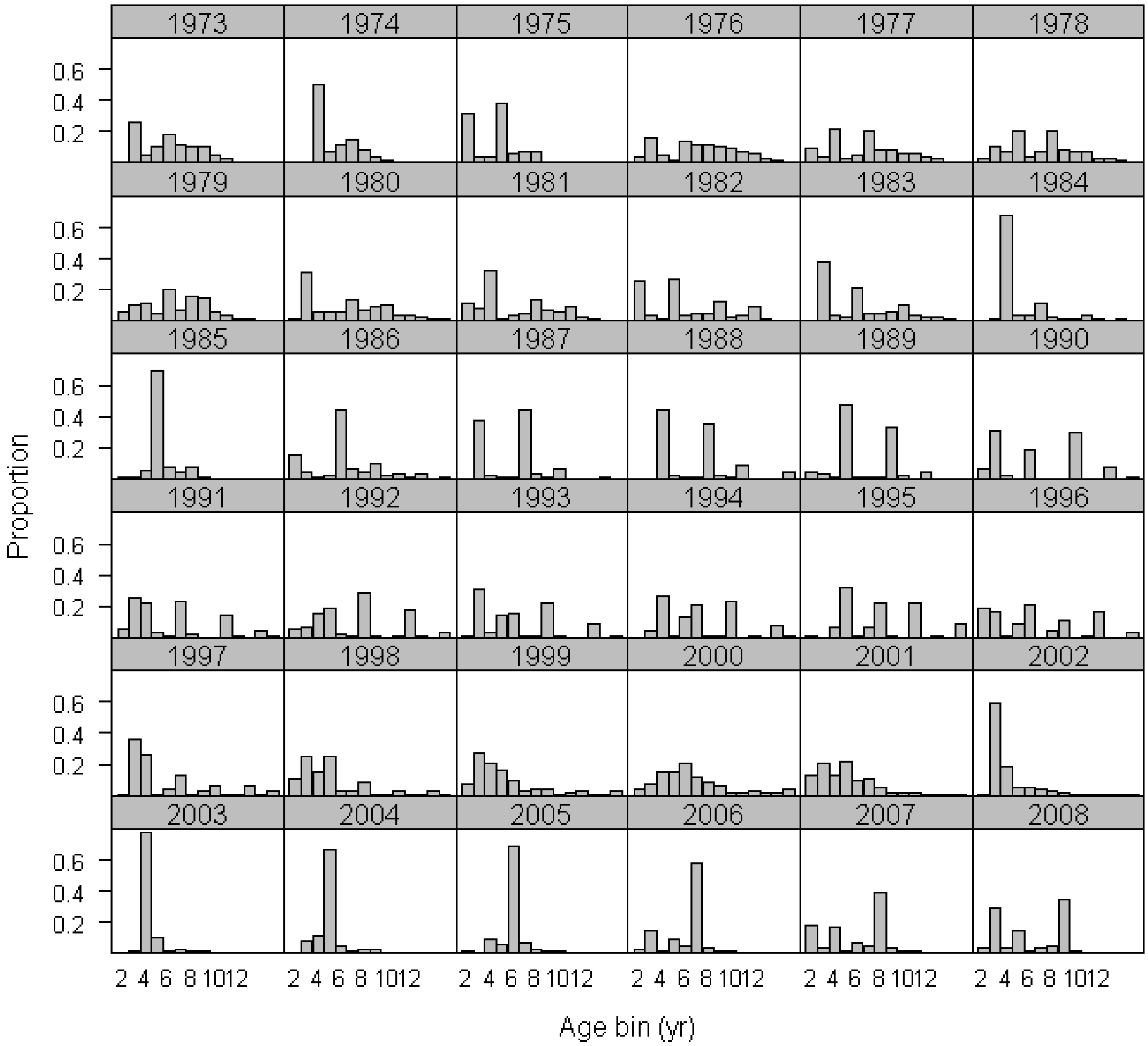

Figure 5. Plot of U.S. fishery (at-sea and shore-based combined) age compositions, 1973-2008.

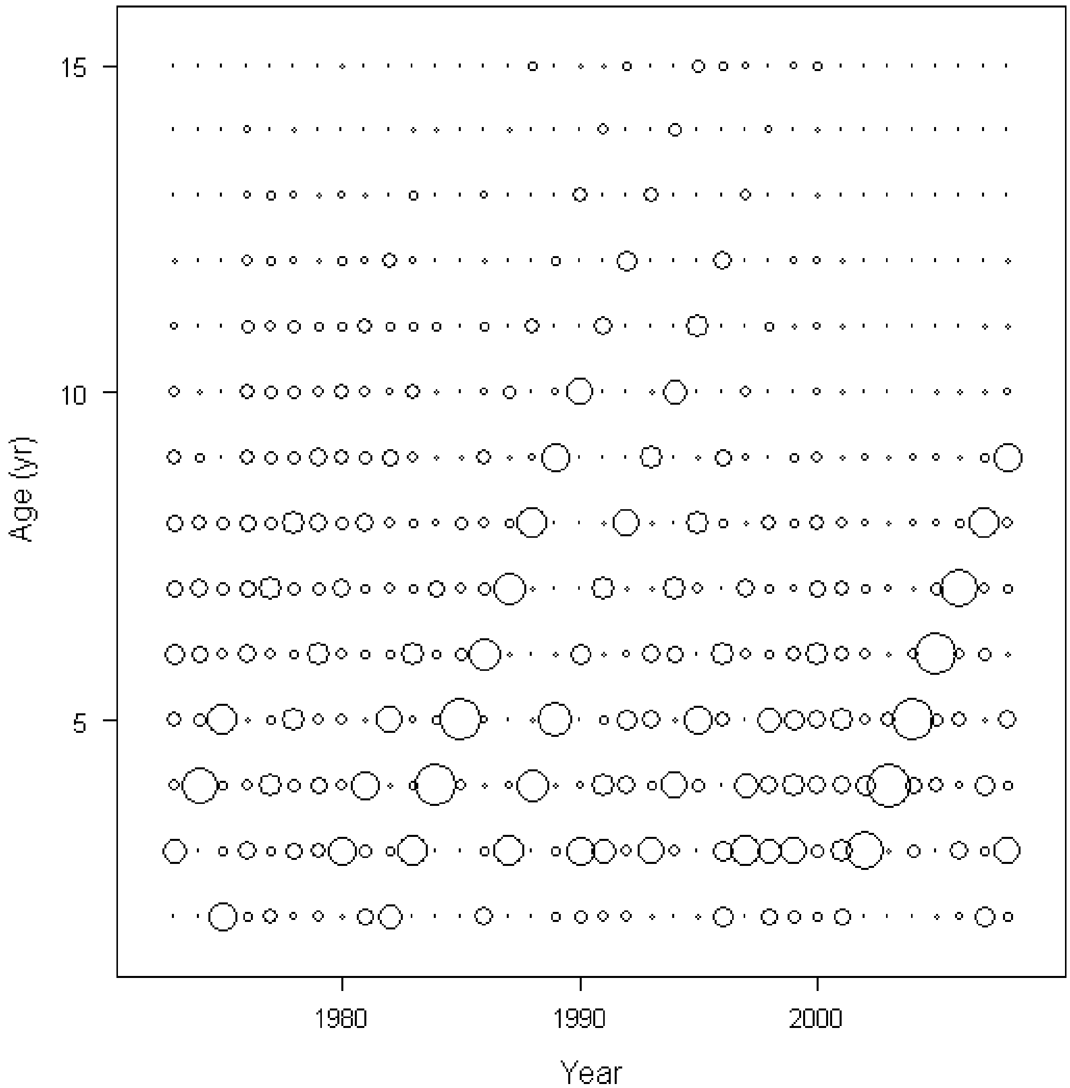

Figure 6. Plot of U.S. fishery (at-sea and shore-based combined) age compositions, 1973-2008. Diameter of circles is scaled to a maximum proportion of 0.78 and proportions sum to 1.0 in each year.

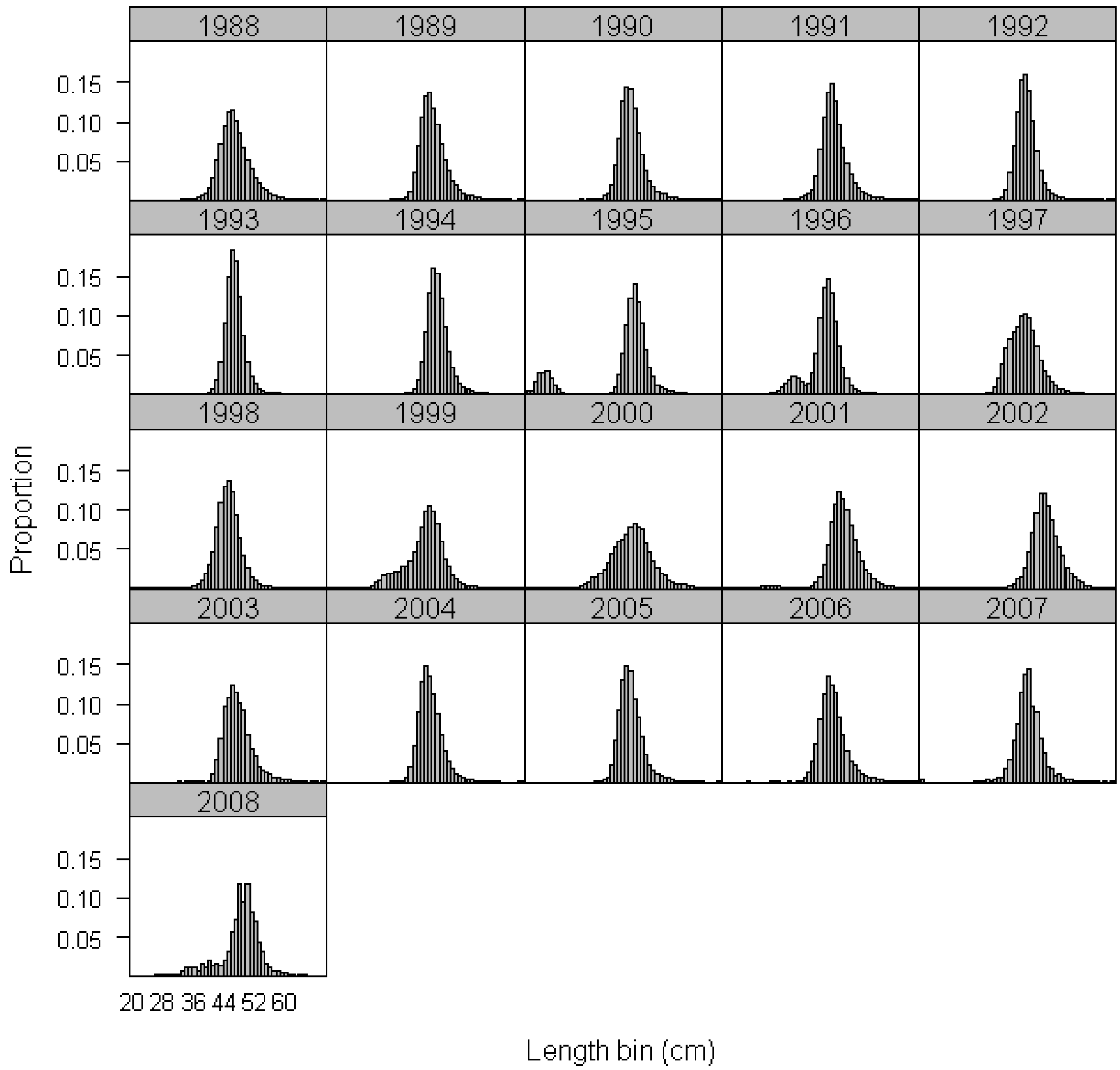

Figure 7. Plot of Canadian fishery (joint-venture and domestic combined) length compositions, 1988-2008.

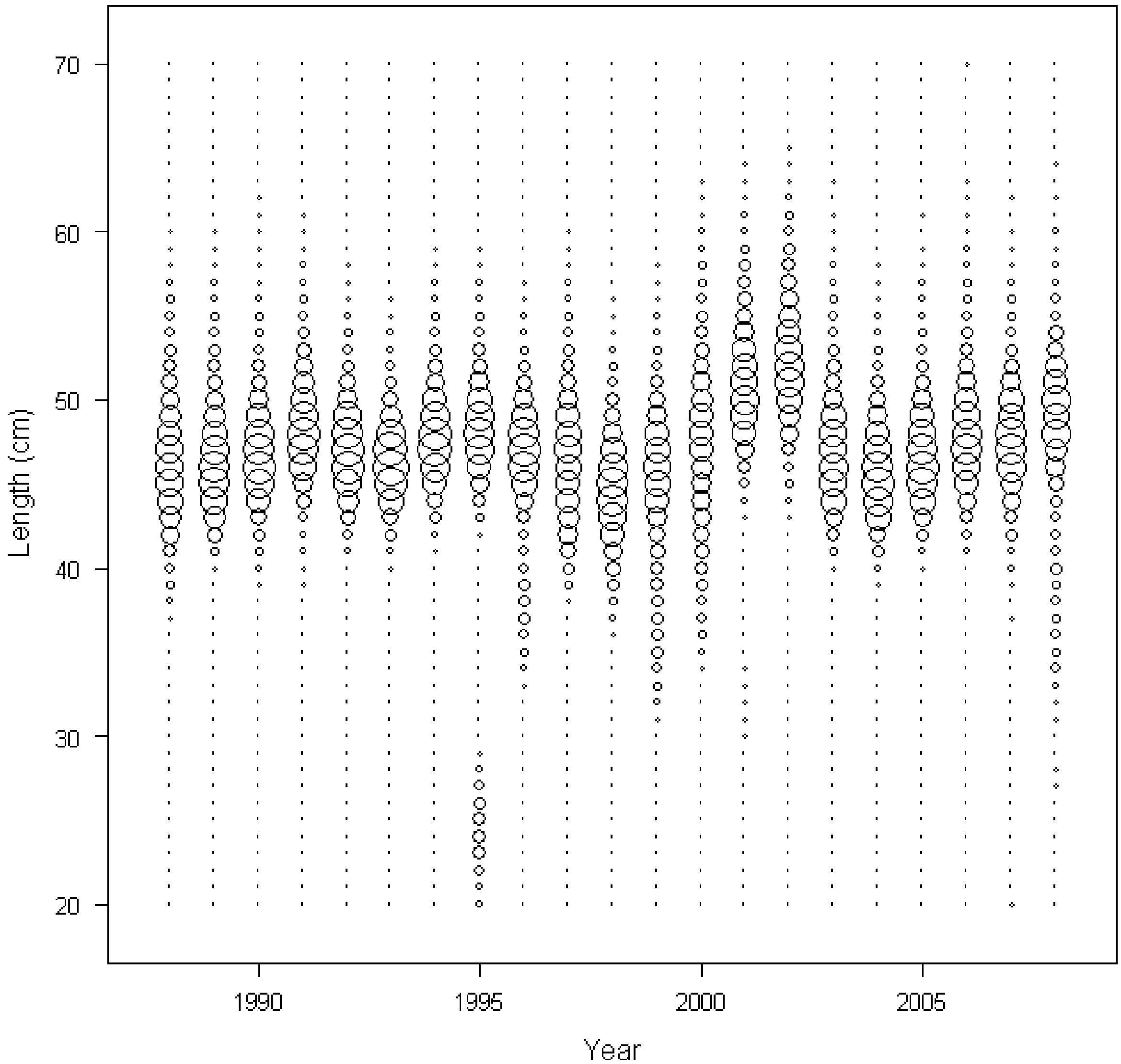

Figure 8. Plot of Canadian fishery (joint-venture and domestic combined) length compositions, 1988-2008. Diameter of circles is scaled to a maximum proportion of 0.18 and proportions sum to 1.0 in each year.

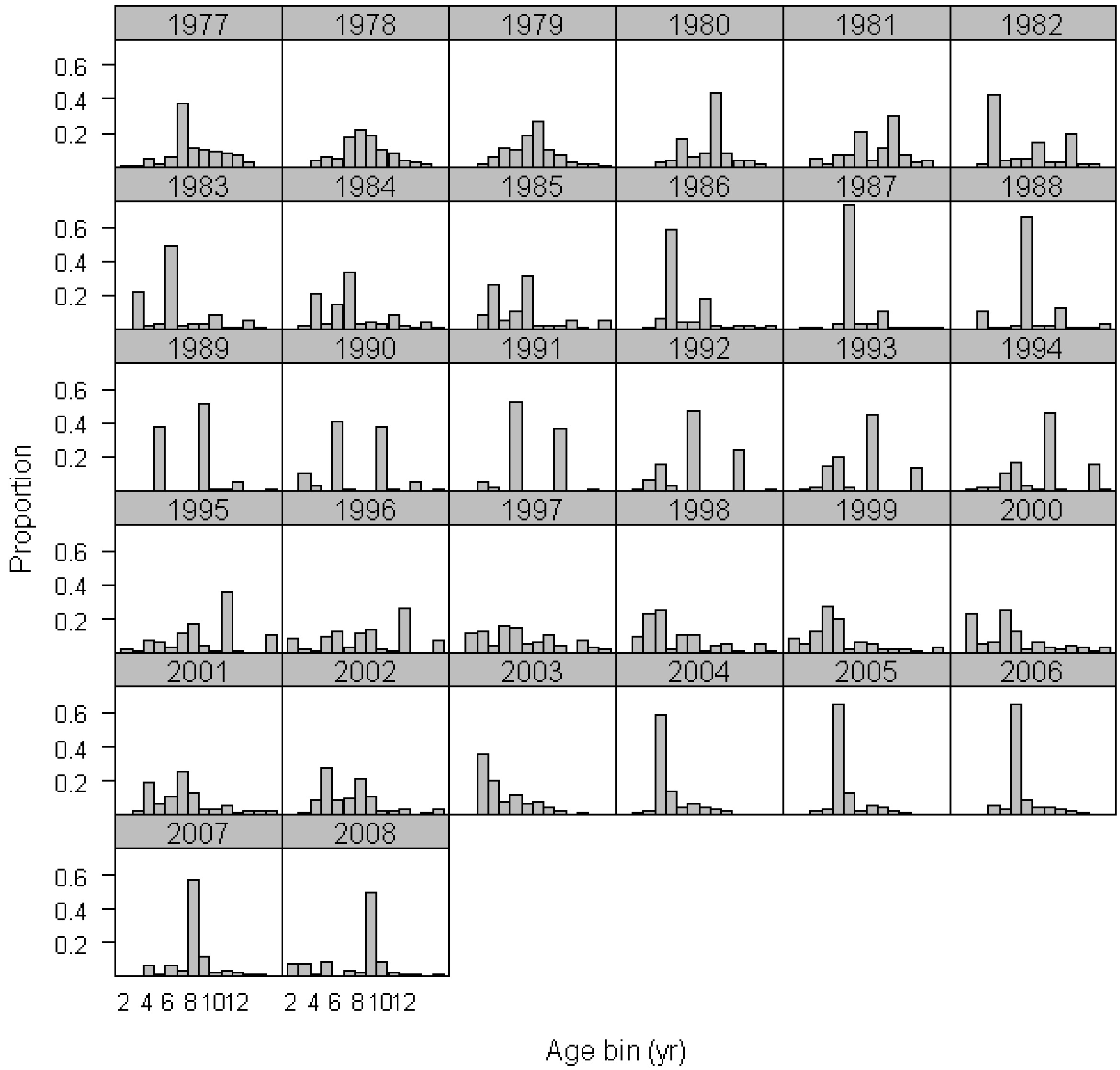

Figure 9. Plot of Canadian fishery (joint-venture and domestic combined) age compositions, 1988-2008.

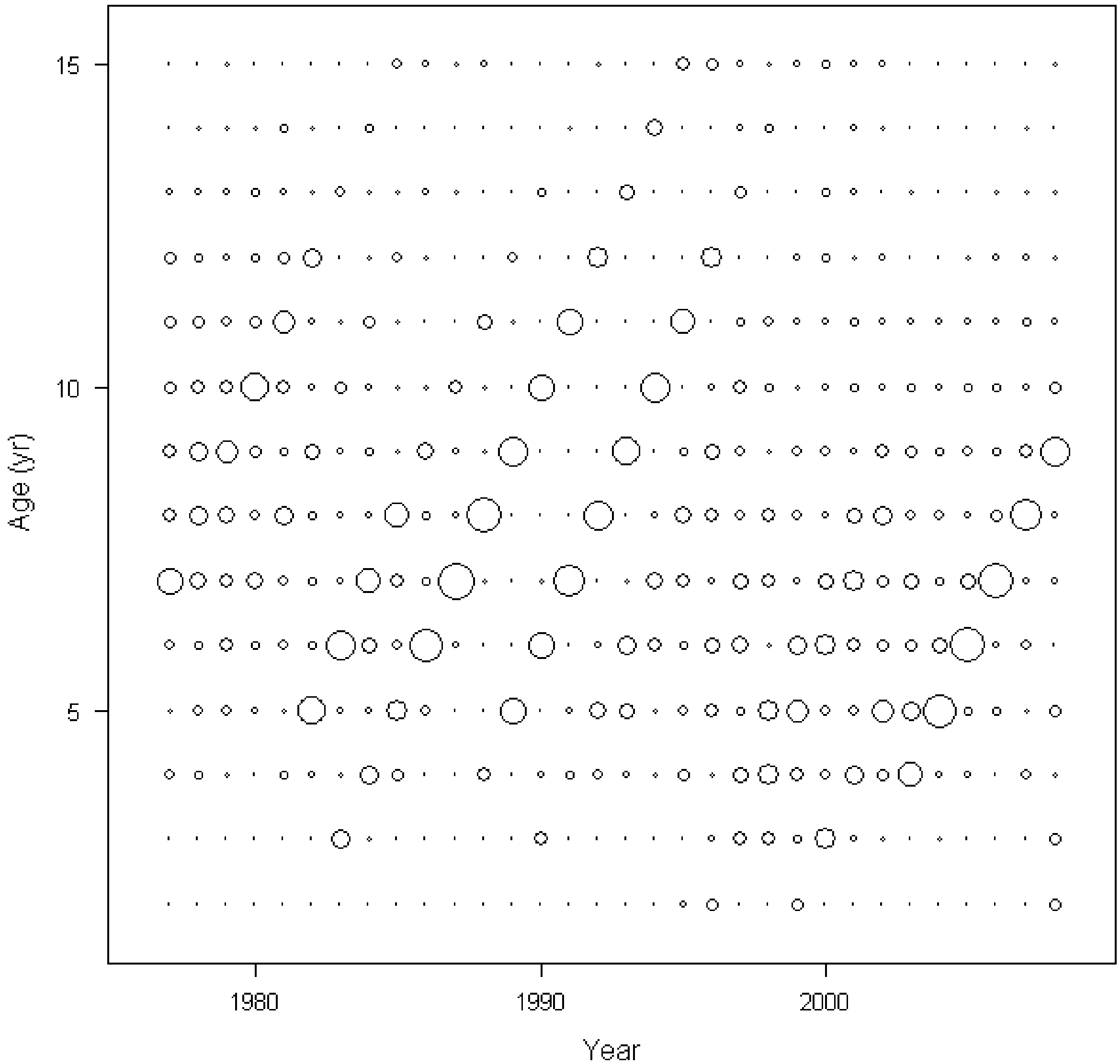

Figure 10. Plot of Canadian fishery (joint-venture and domestic combined) age compositions, 1988-2008. Diameter of circles is scaled to a maximum proportion of 0.73 and proportions sum to 1.0 in each year.

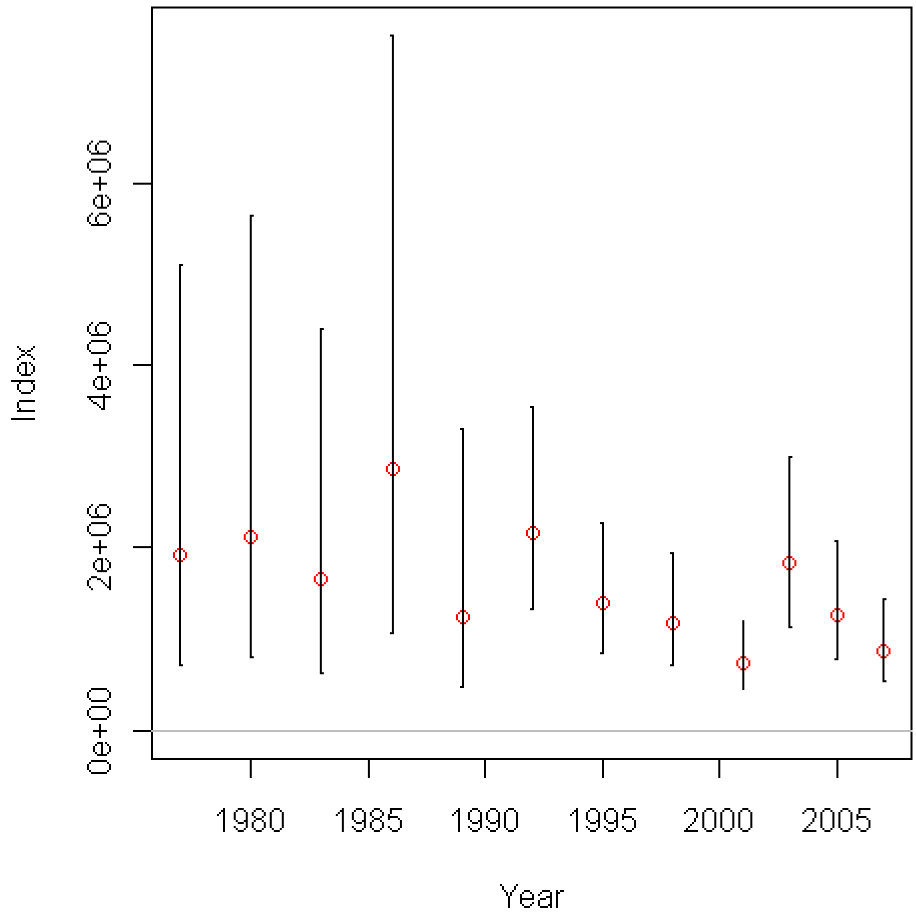

Figure 11. Time series of acoustic survey age 2+ biomass estimates, 1977-2007. Confidence intervals are based on assumed SE log(value) = 0.50: 1977-1989 and SE log(value) = 0.25: 1992-2007.

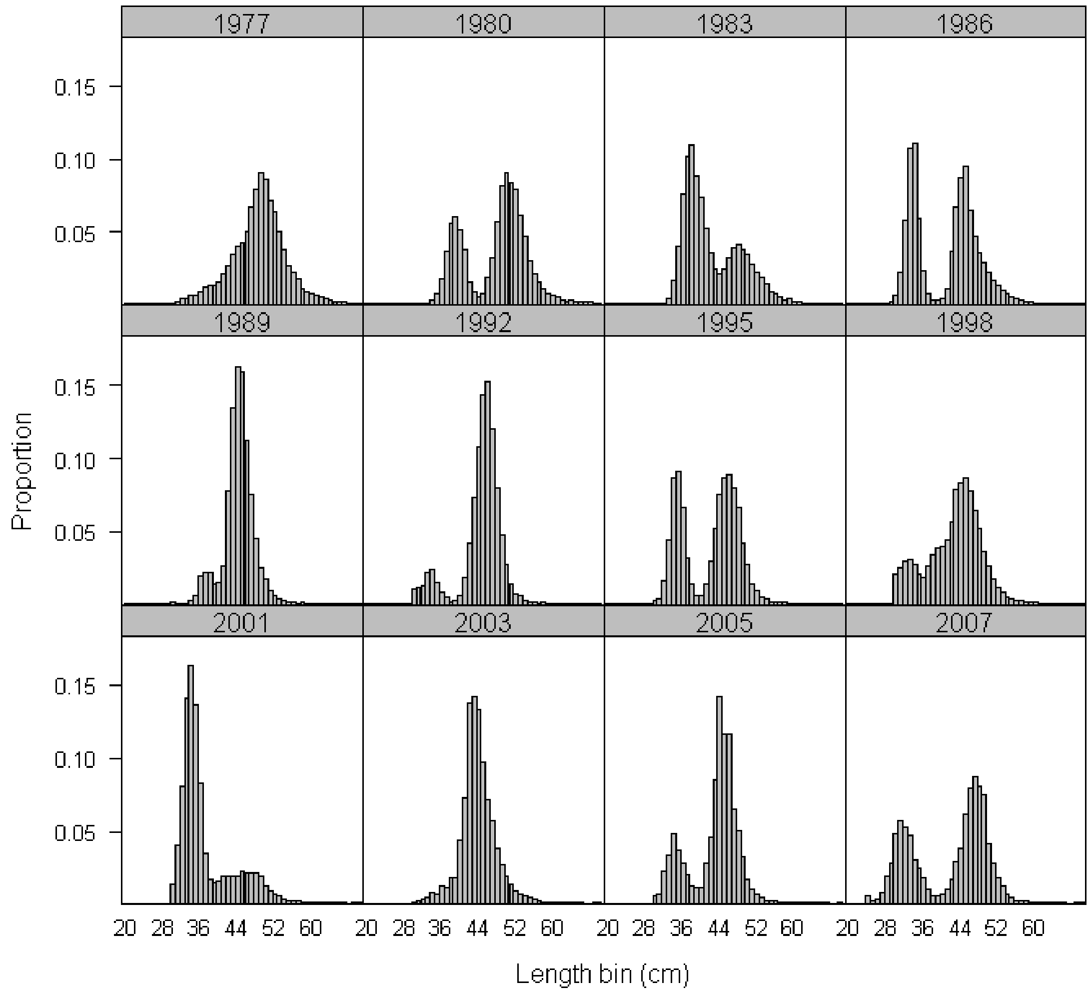

Figure 12. Plot of acoustic survey size compositions of coastal Pacific hake off the west coast of the U.S. and Canada, 1977-2007.

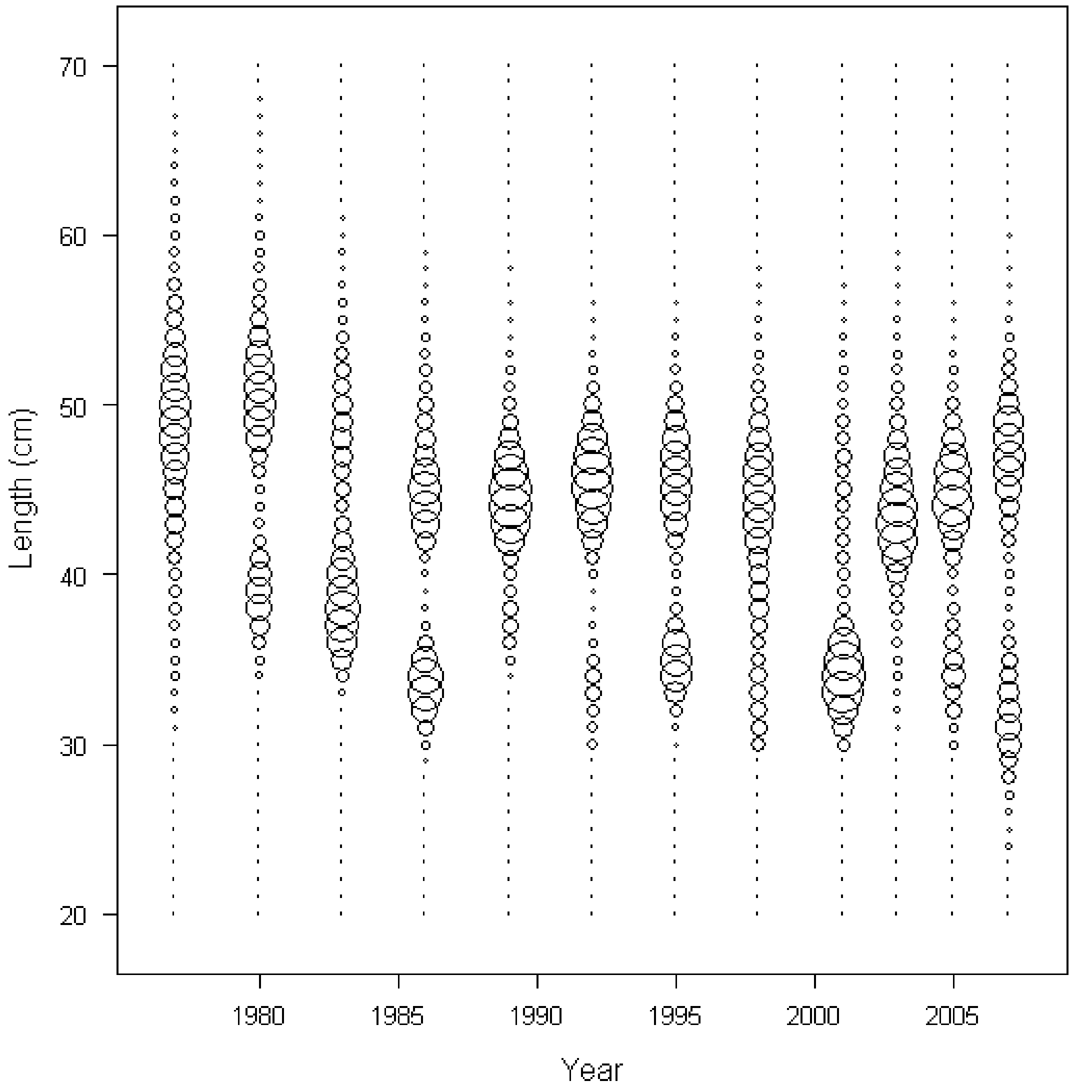

Figure 13. Plot of acoustic survey size compositions of coastal Pacific hake off the west coast of the U.S. and Canada, 1977-2007. Diameter of circles is scaled to a maximum proportion of 0.16 and proportions sum to 1.0 in each year.

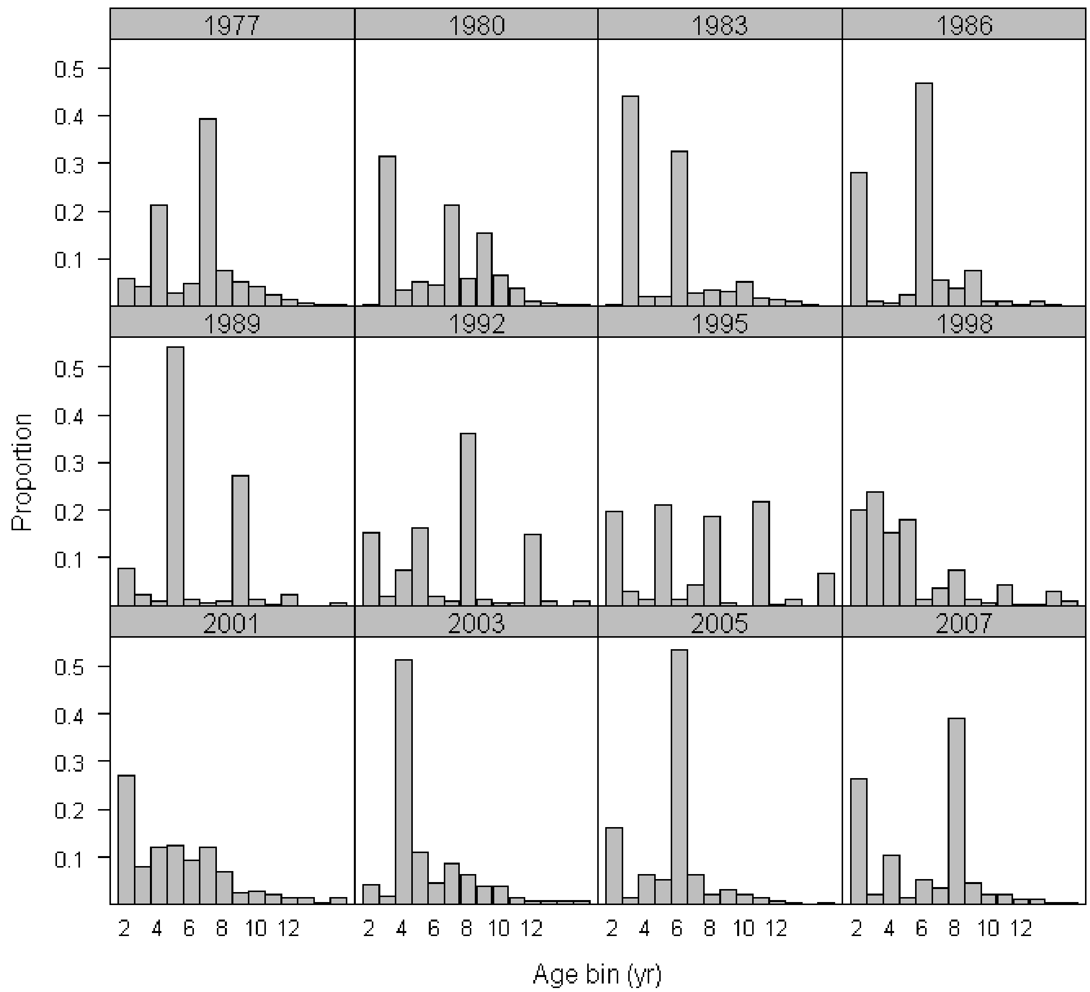

Figure 14. Plot of acoustic survey age compositions of Pacific hake off the west coast of the U.S and Canada, 1977-2007.

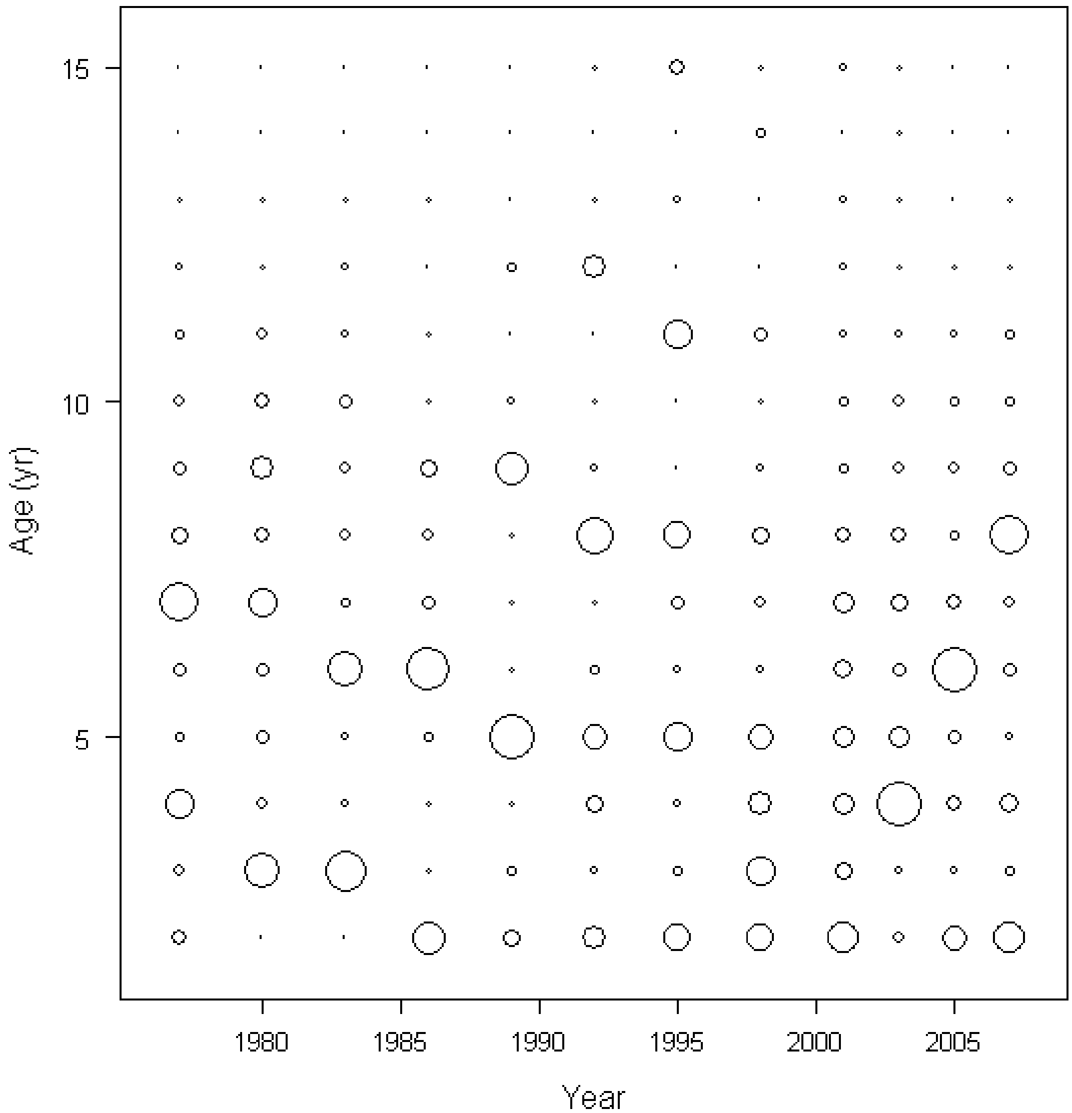

Figure 15. Plot of acoustic survey age compositions of coastal Pacific hake off the west coast of the U.S. and Canada, 1977-2007. Diameter of circles is scaled to a maximum proportion of 0.54 and proportions sum to 1.0 in each year.

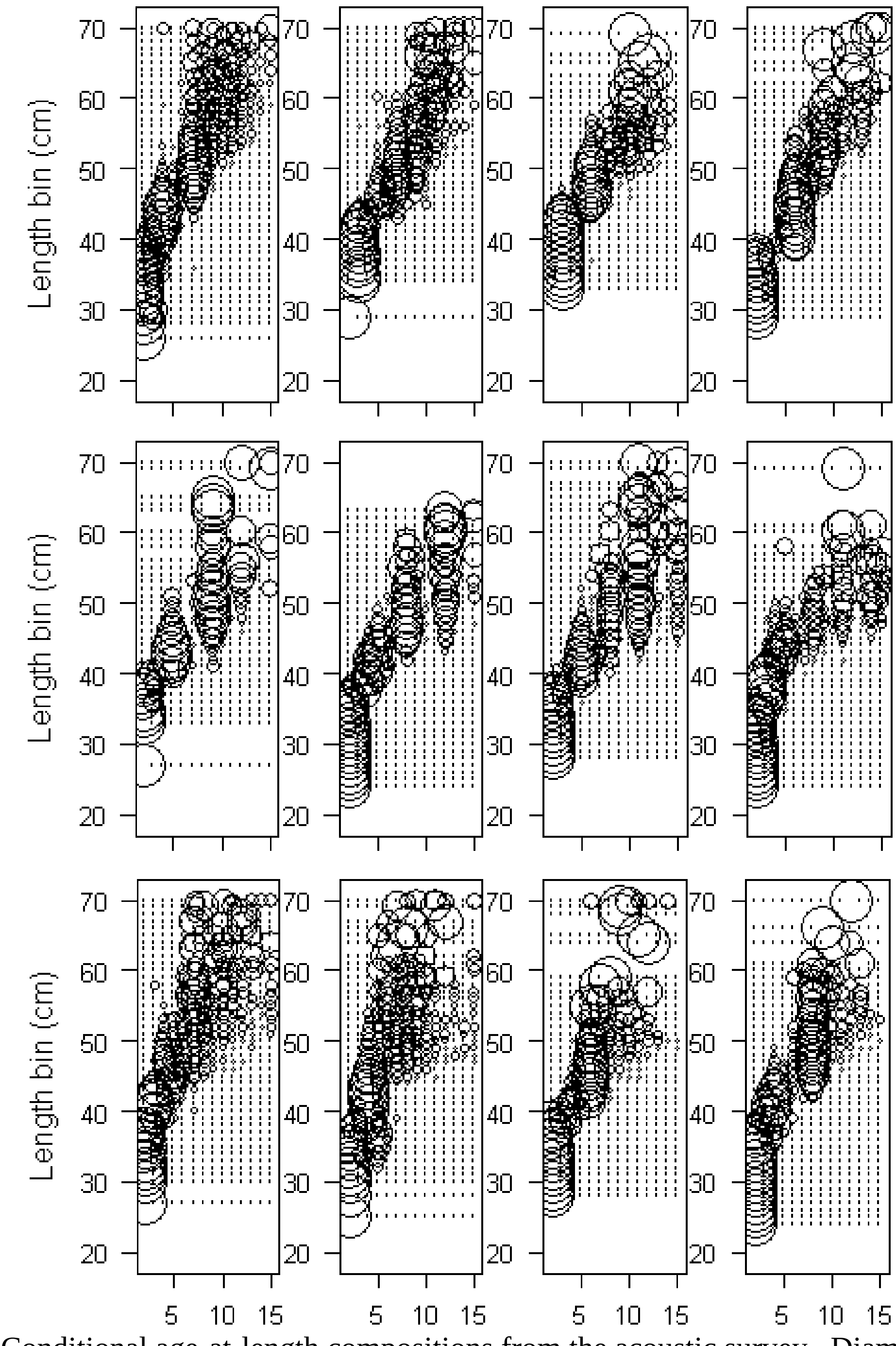

Figure 16. Conditional age-at-length compositions from the acoustic survey. Diameter of circles is scaled to a maximum proportion of 0.99 and proportions sum to 1.0 in each length. Top row: 1977, 1980, 1983, 1986; Middle row: 1989, 1992, 1995, 1998; Bottom row: 2001, 2003, 2005, 2007.

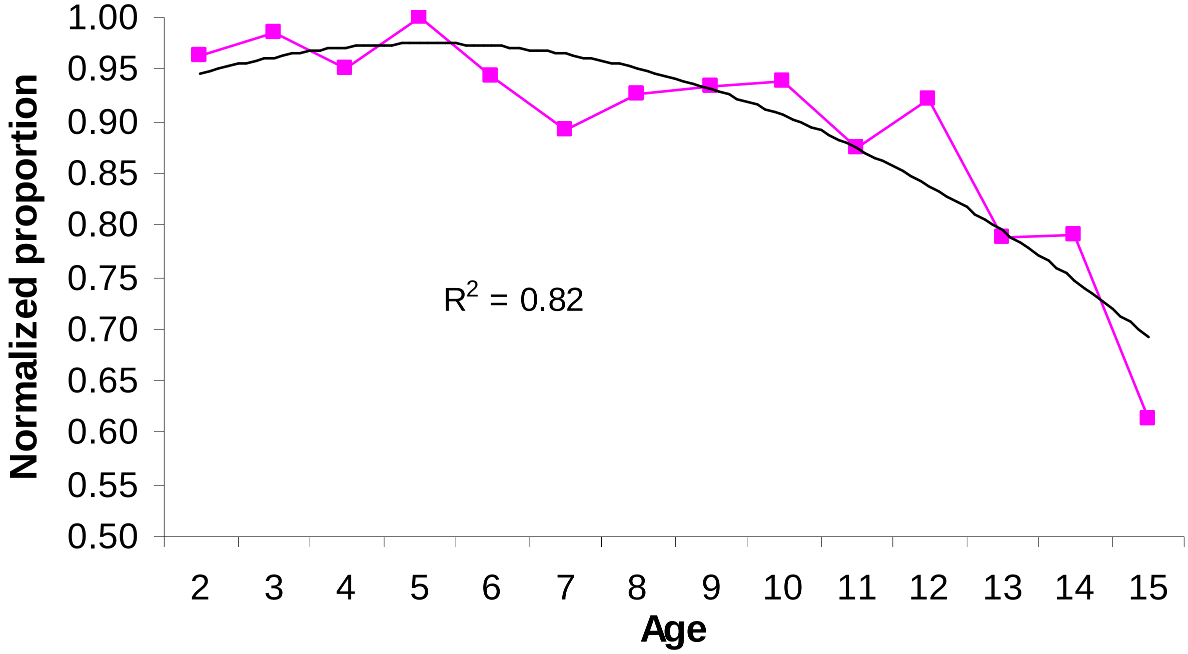

Figure 17. Plot of normalized (divided by maximum value) average (1977-2001) ratio of expanded acoustic survey numbers at age to the sum of acoustic survey and triennial bottom trawl survey expanded numbers at age. This analysis was conducted to explore empirical evidence for dome-shaped selectivity in the acoustic survey.

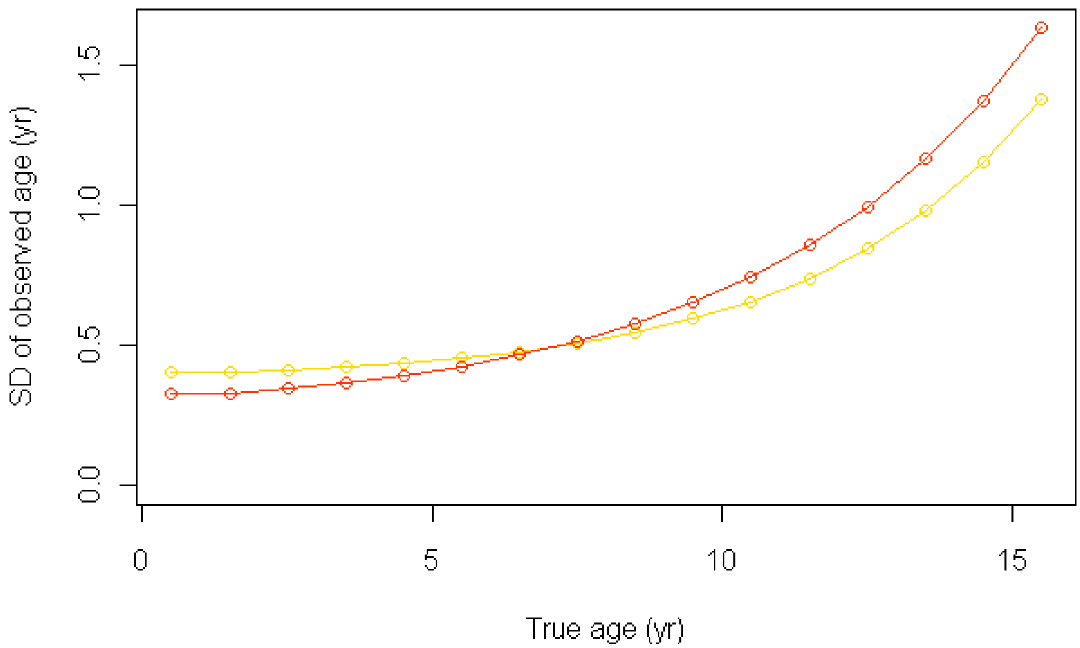

Figure 18. The estimated standard deviation of observed age as a function of true age for the pre-2001 AFSC ageing lab (upper line for younger ages and lower line for older ages) and the Cooperative Ageing Program and Department of Fisheries and Oceans Canada which have read all ages since 2001.

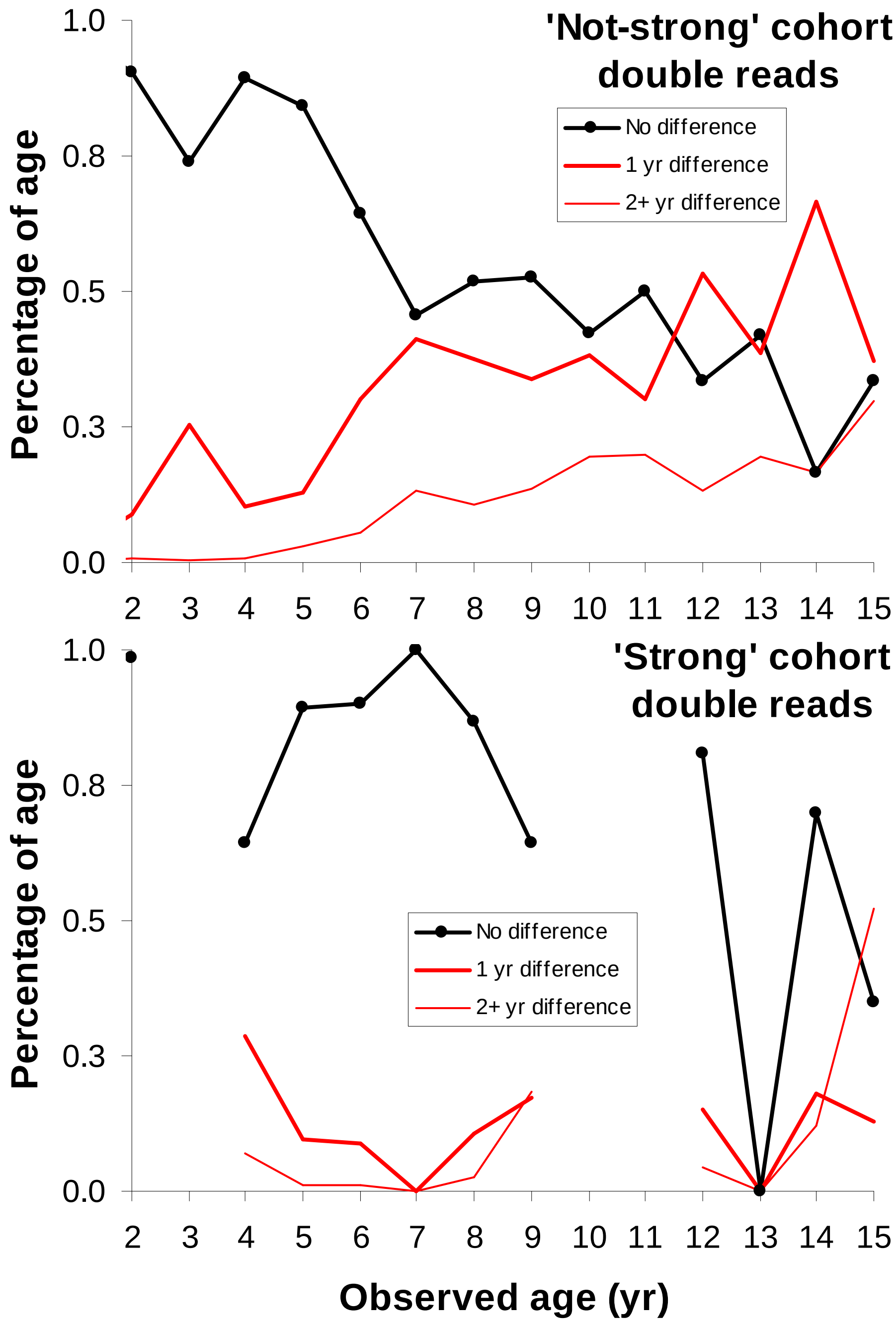

Figure 19. Comparison of age-reading agreement from 2,820 double-read otoliths collected between 1986 and 2008. 'Strong' cohorts included 1977, 1980, 1984 and 1999.

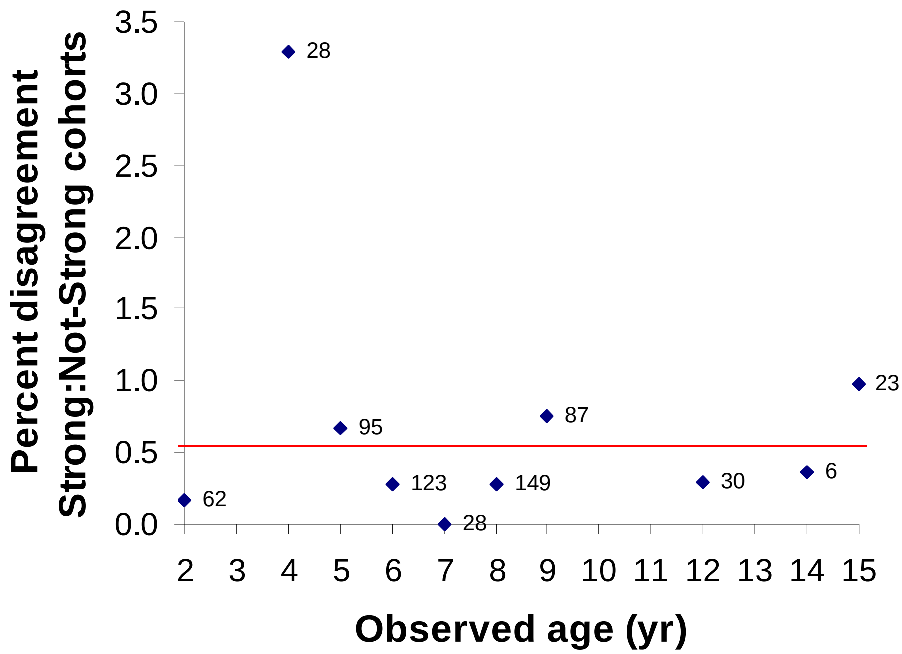

Figure 20. Comparison of age-reading percent disagreement for 'strong' cohorts (1977, 1980, 1984 and 1999) and weaker cohorts. Horizontal line indicates the weighted regression estimated using the minimum sample size (shown next to the points) between the two types of cohorts for each age.

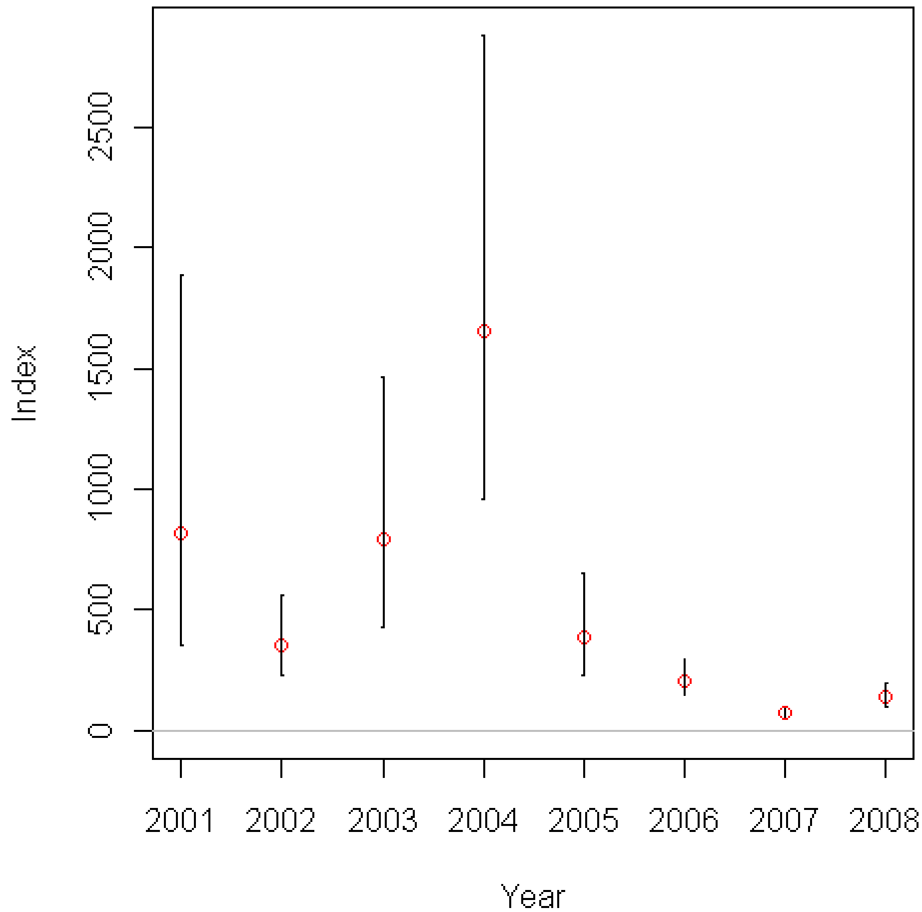

Figure 21. Time-series of the coast-wide Pacific hake pre-recruit survey indices based on data collected from SWFSC Santa Cruz and the joint PWCC-NMFS surveys.

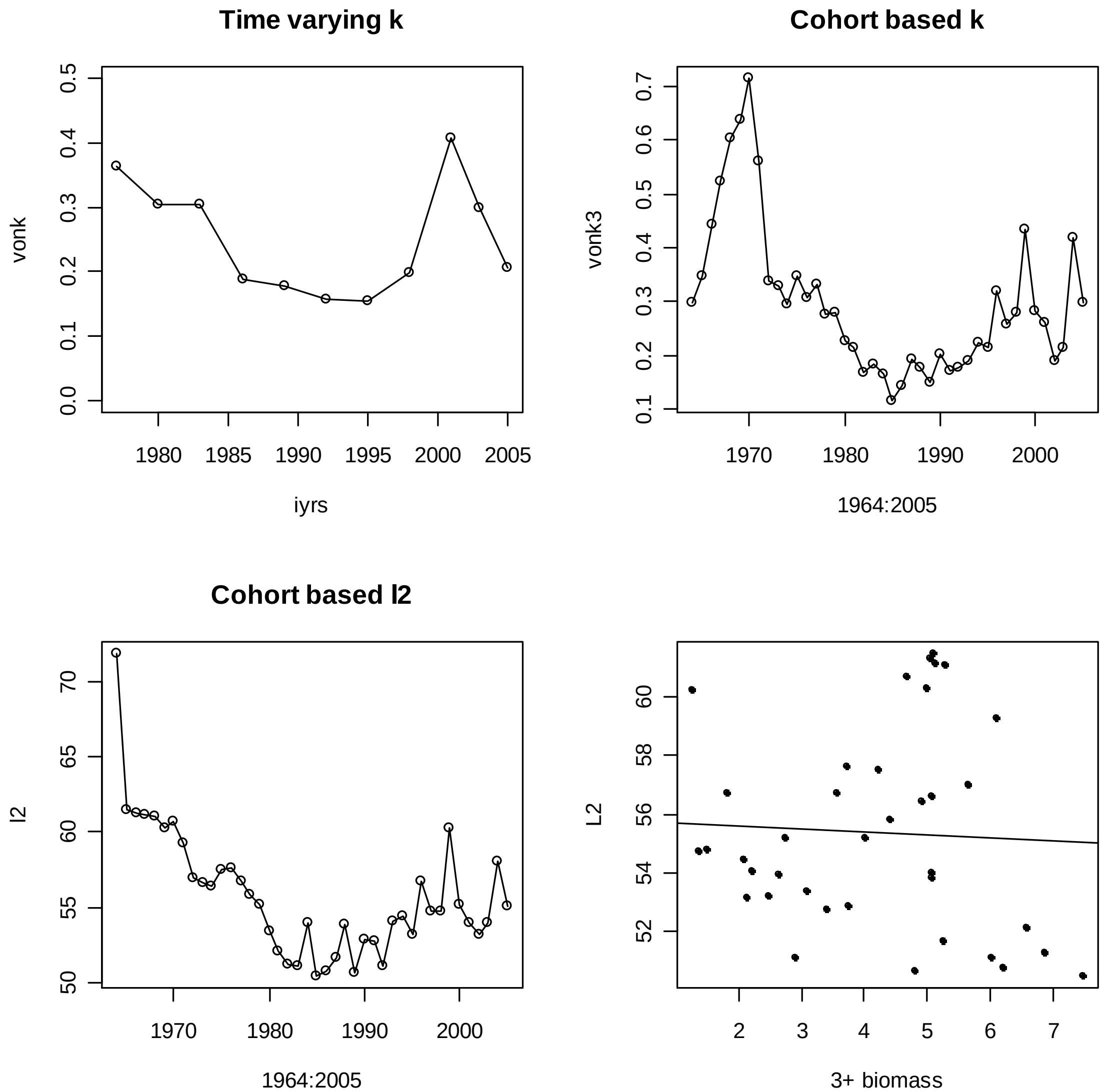

Figure 22. Time varying and cohort based fits (external to the assessment model) of the von Bertalanffy growth model to Pacific hake age data from the acoustic survey, 1977-2005. Analyses were conducted as part of the 2006 assessment.

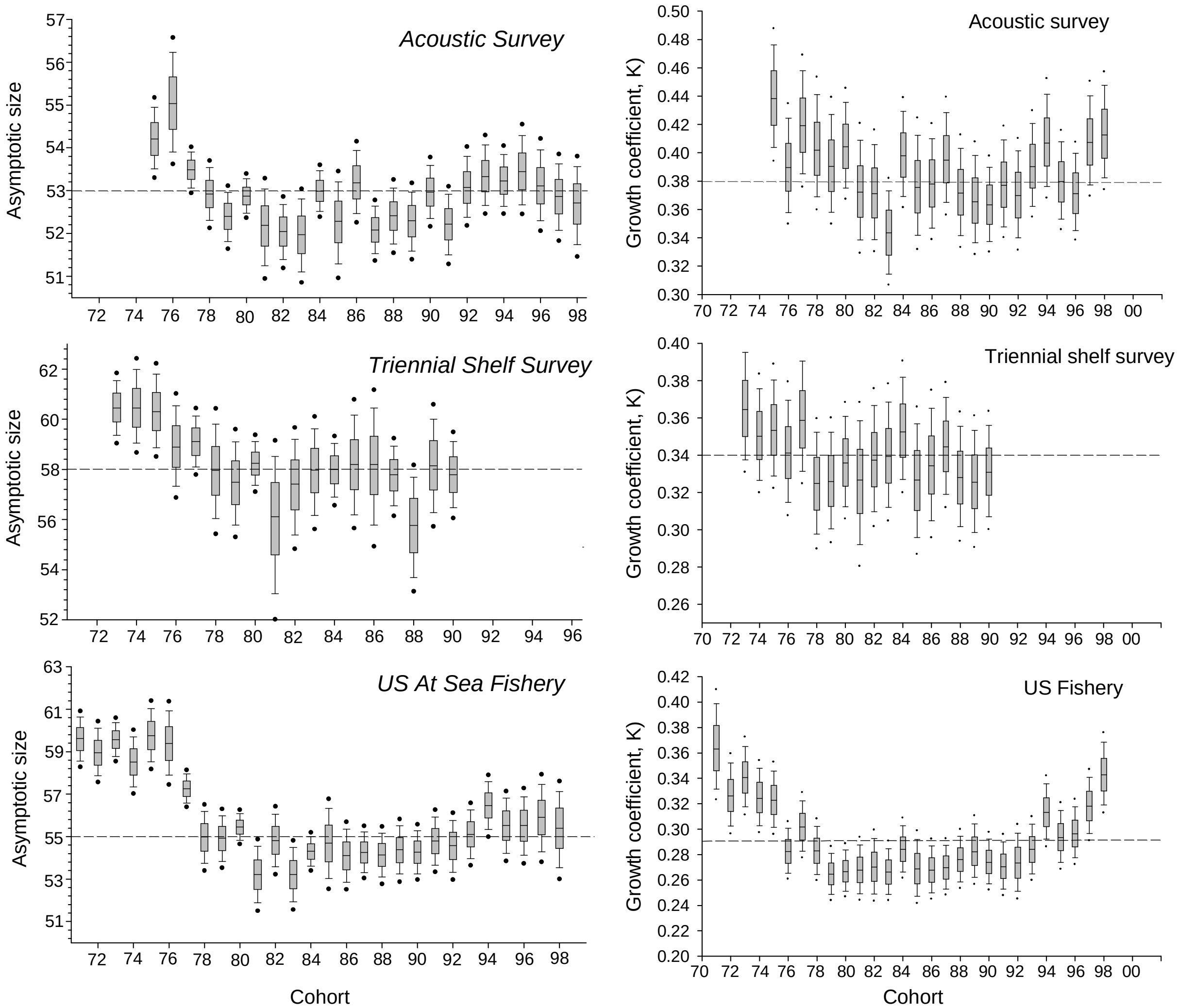

Figure 23. Results of a hierarchical von Bertalanffy growth model fit to three difference sources of Pacific hake growth data. A von Bertalanffy growth model was fit to each of the three data sources with age at length data combined and cohort treated as a random variable. The results show an early consistent decline in asymptotic size and instantaneous growth coefficient, k, in the early 1980s. Box whisker plots show the marginal posterior density of growth parameters, Lmax and K, for each cohort and the dotted line gives the overall mean parameter estimate.

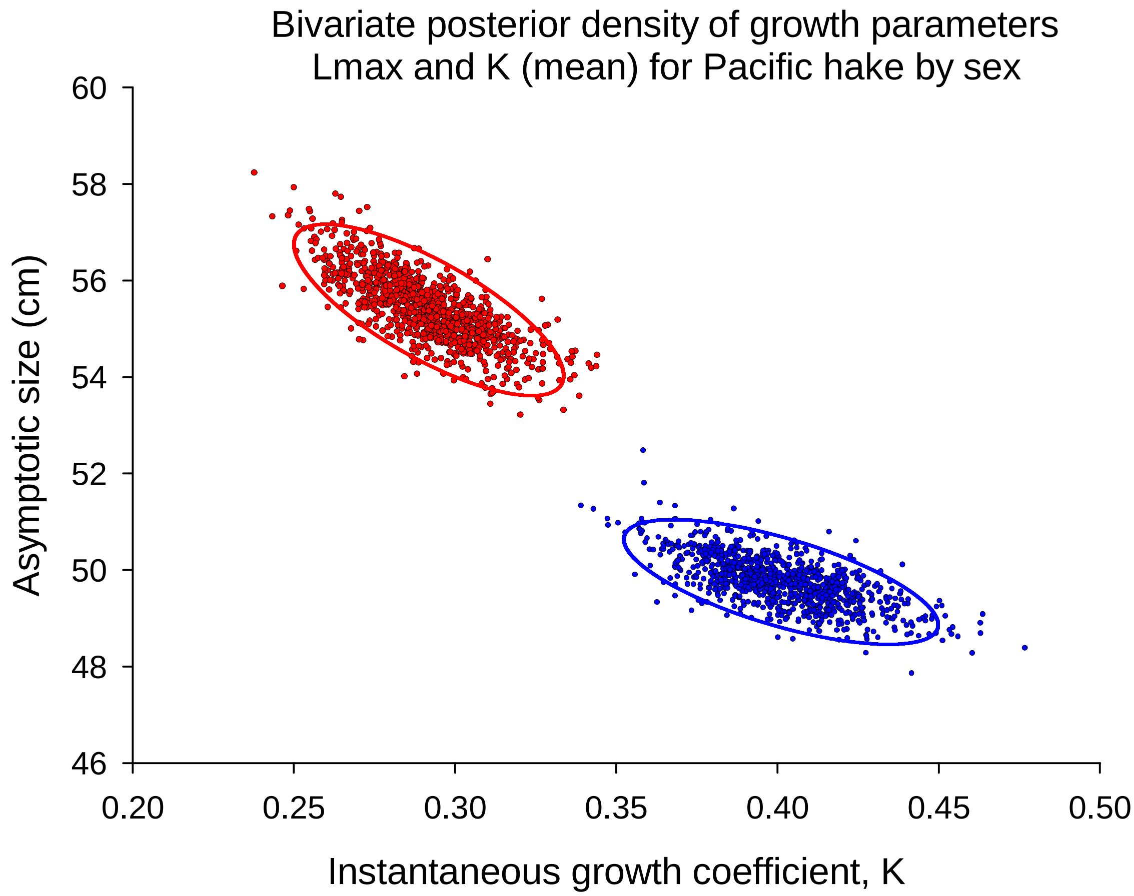

Figure 24. Results of a hierarchical von Bertalanffy growth model fit to Pacific hake growth data from the acoustic survey (all years, 1977-2007). A von Bertalanffy growth model was fit separately to each sex and cohort treated as a random variable. The results show that female pacific hake achieve a significantly larger size the males, but also growth at a slower rate. The dots show the bivariate distribution of Lmax and K from a sample of 1,000 draws from the joint posterior density and the solid ellipses give the 95% posterior interval.

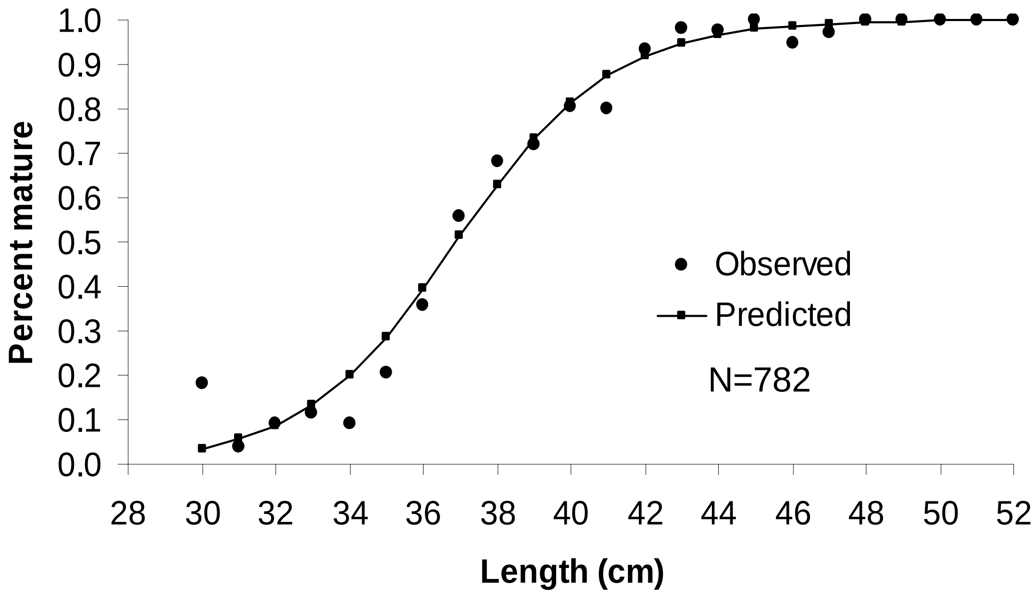

Figure 25. Observed and fitted values for percent mature at length.

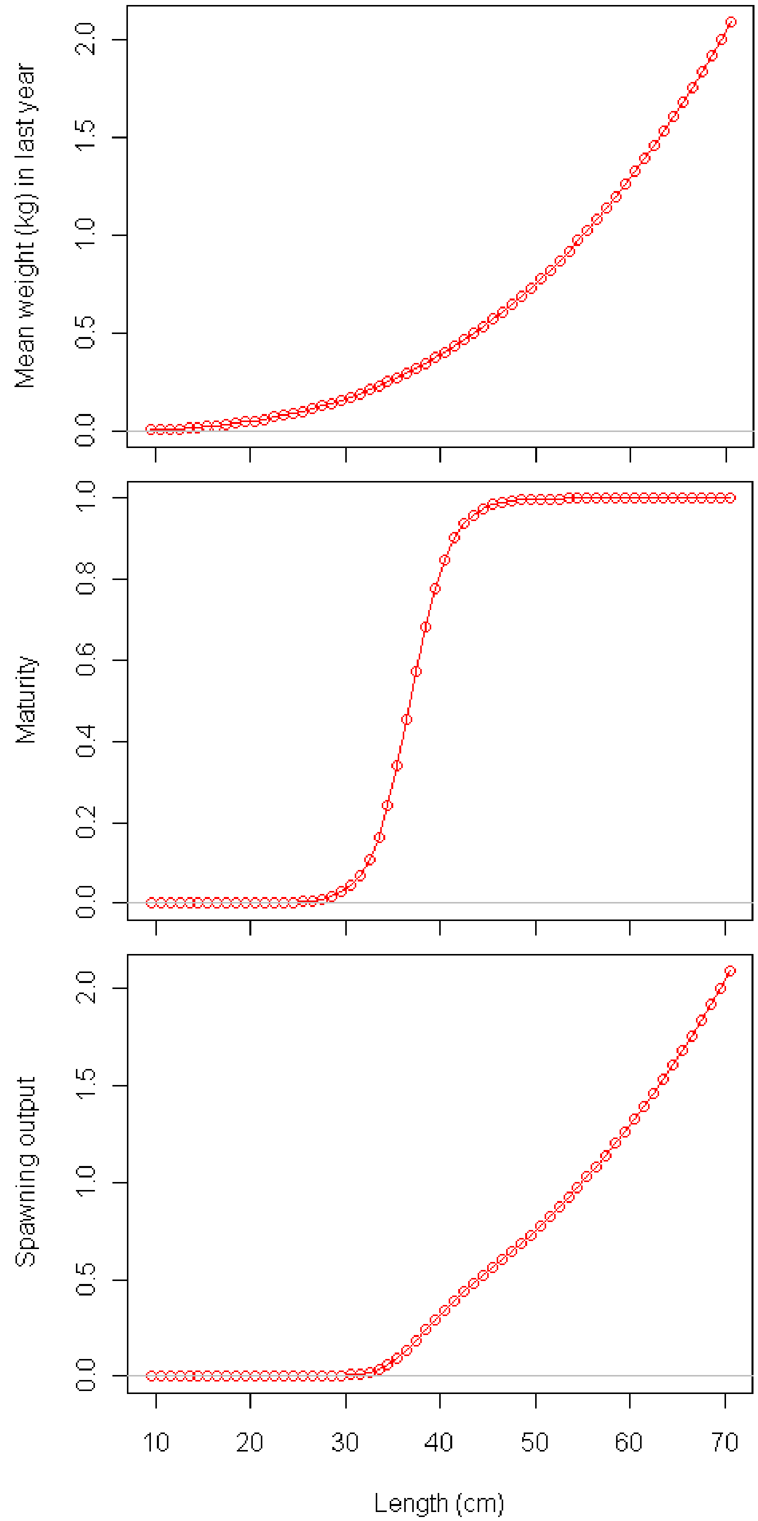

Figure 26. Biological relationships assumed in the hake model.

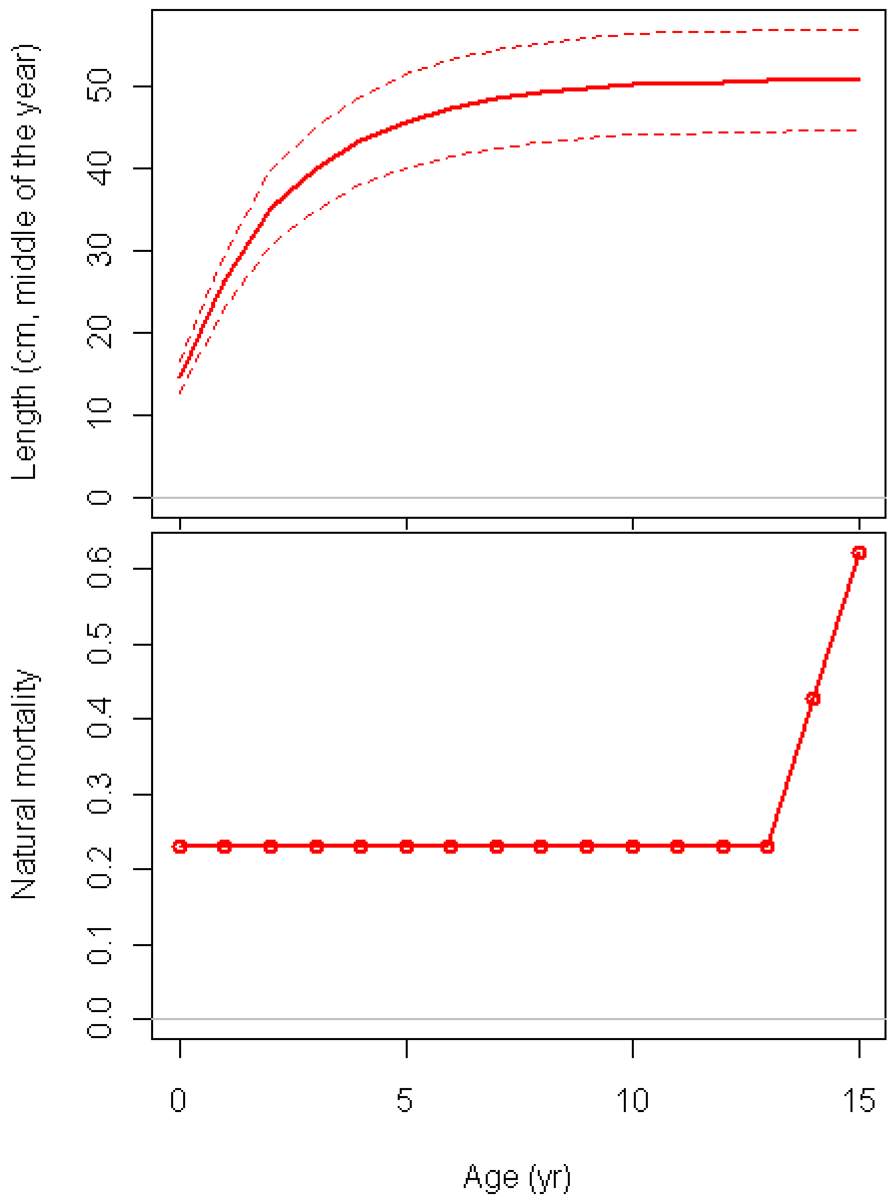

Figure 27. Current growth (2008) and mortality (time-invariant) relationships estimated in the hake model.

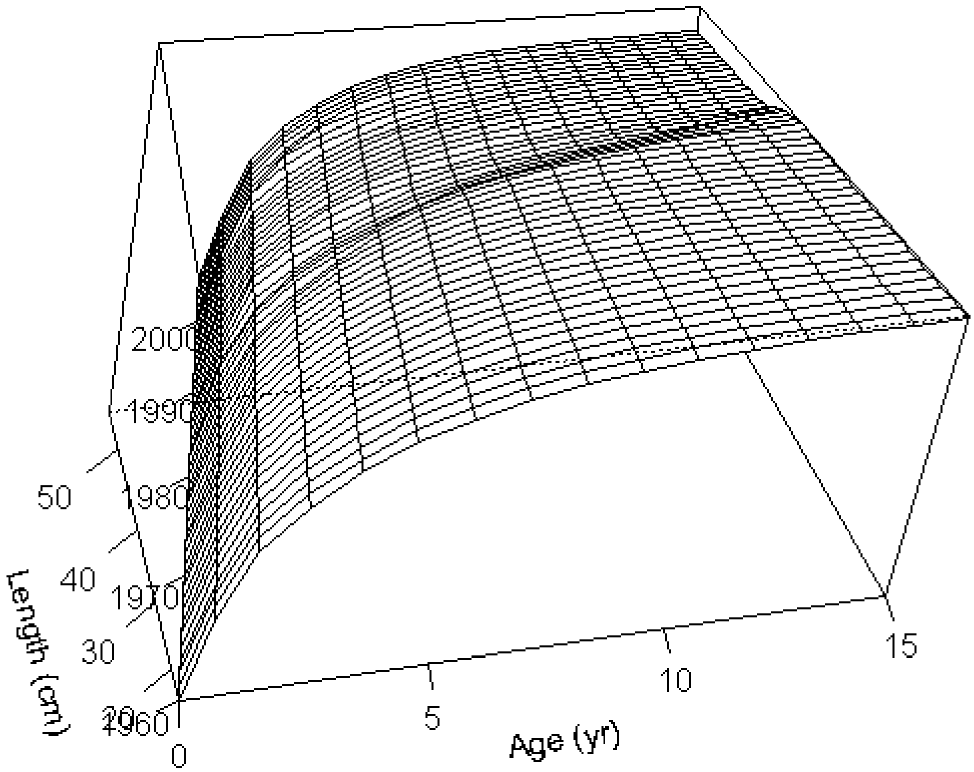

Figure 28. Time-varying growth estimated in the hake model.

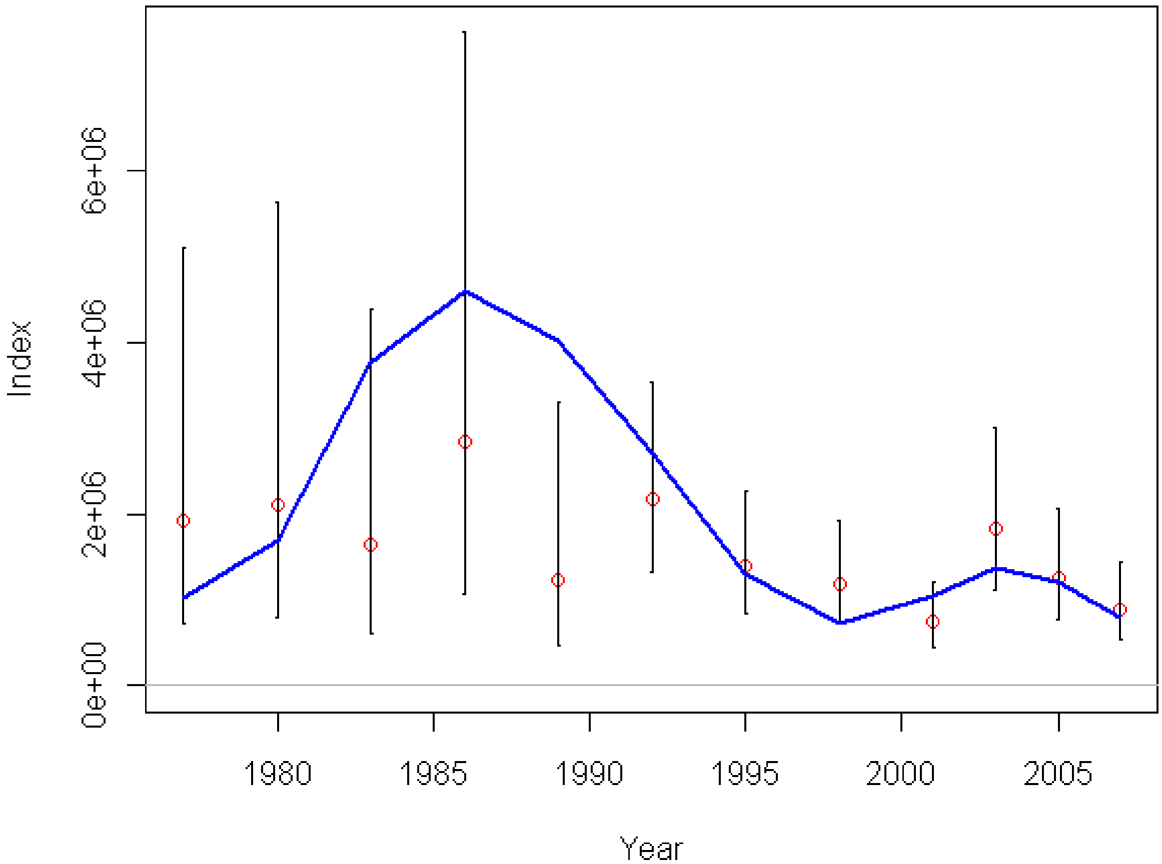

Figure 29. Predicted fit of acoustic survey biomass to the modeled time series.

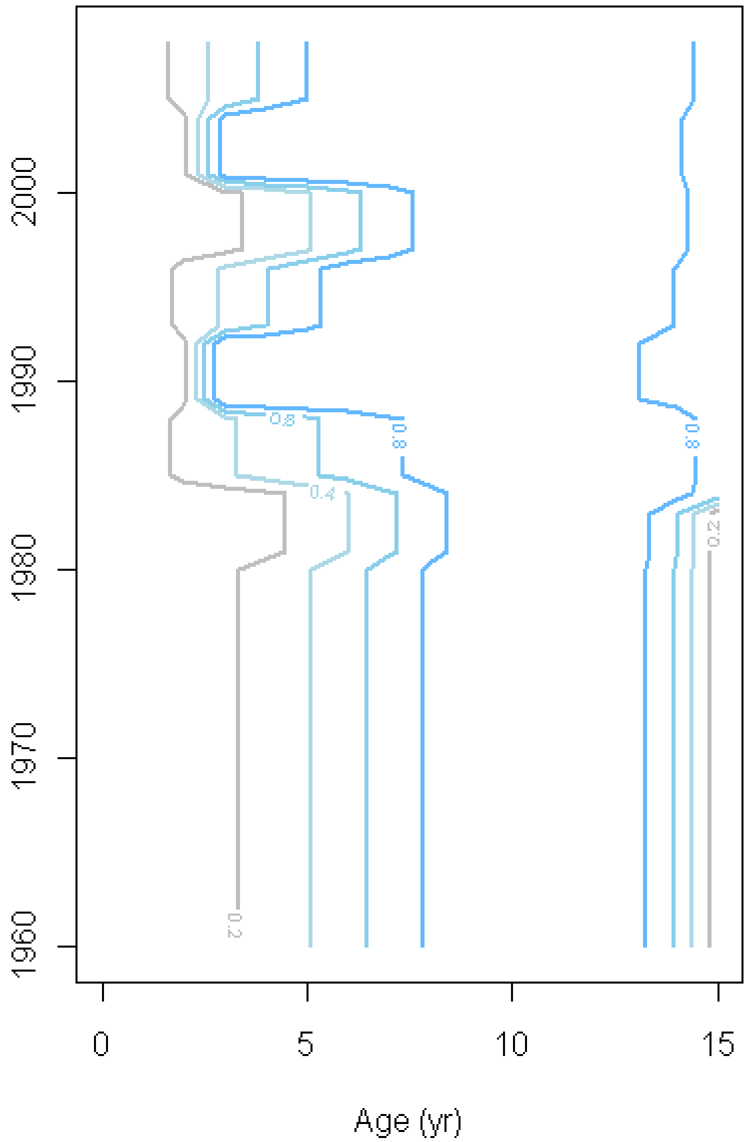

Figure 30. Estimated selectivity curves (contours indicate relative selectivity at age and year, each year has at least one age that is fully selected) for different time blocks in the U.S. fishery. Ascending width, peak, and final parameters were estimated, and ascending width, peak, and final parameters were allowed to vary among time-blocks.

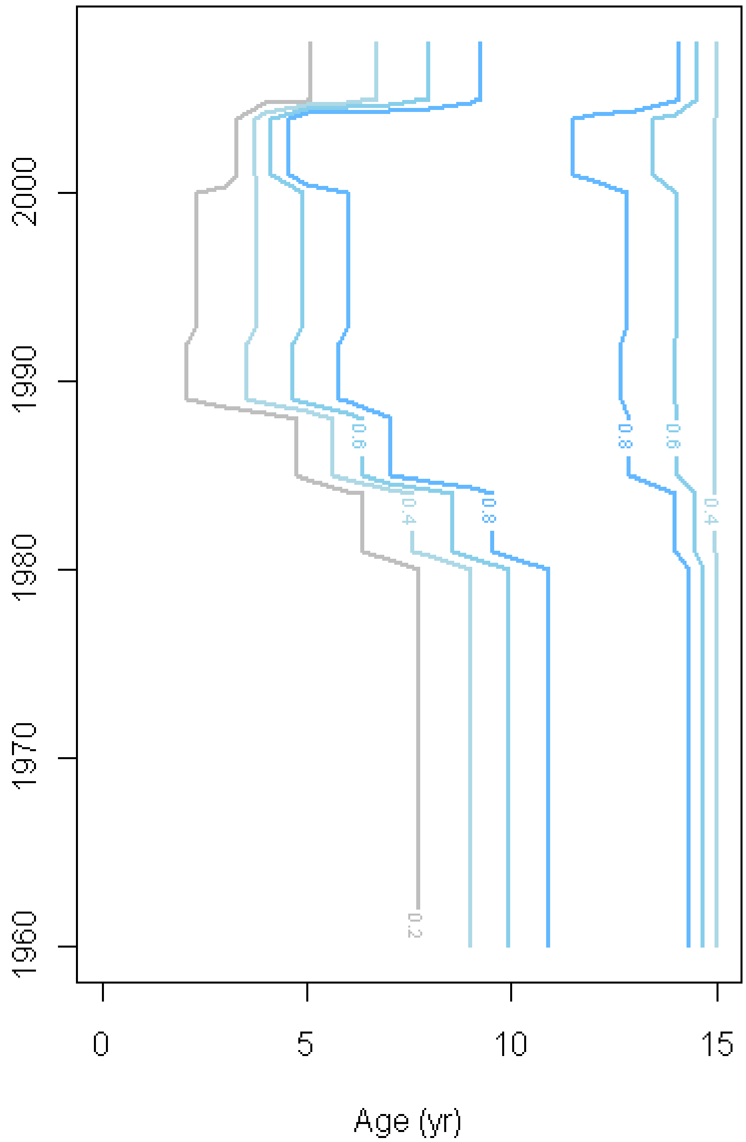

Figure 31. Estimated selectivity curves (contours indicate relative selectivity at age and year, each year has at least one age that is fully selected) for different time blocks in the Canadian fishery. Ascending width, peak, and final parameters were estimated, and ascending width, and peak parameters were allowed to vary among time-blocks.

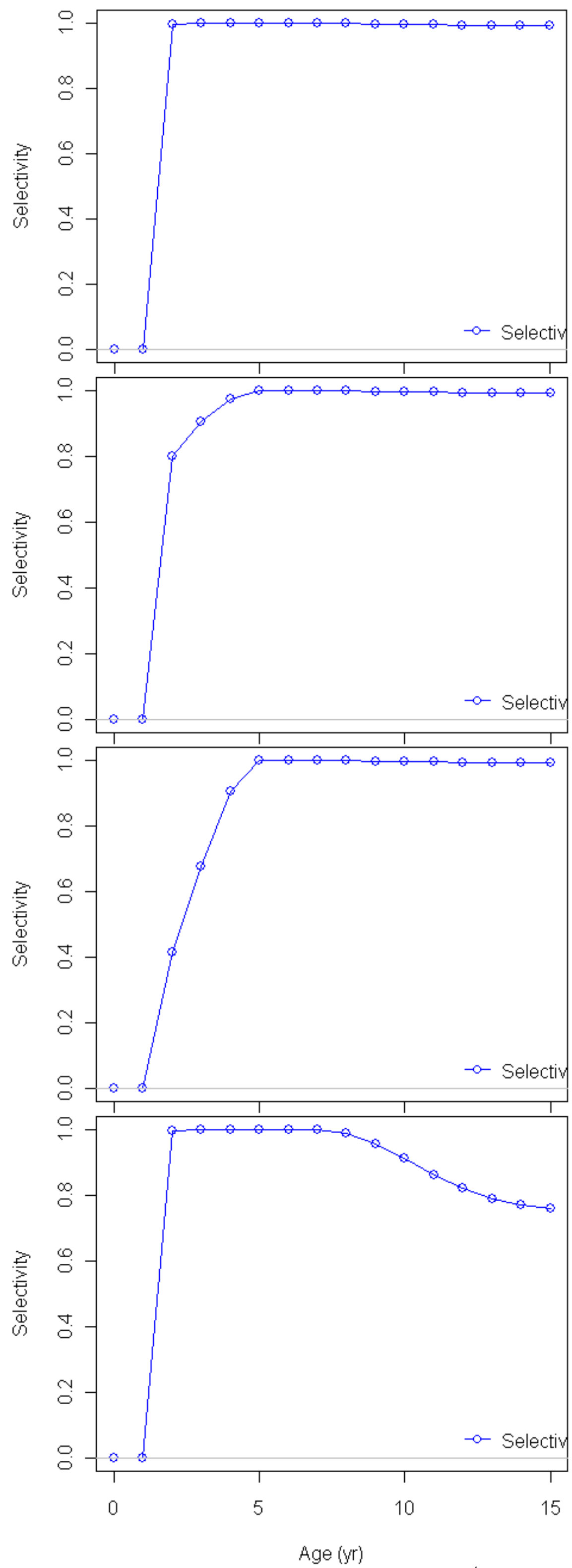

Figure 32. Estimated time-invariant selectivity curves for the 1st quarter (top), 2nd quarter (second row), 3rd quarter (third row) and 4th quarter (bottom) historical California fisheries.

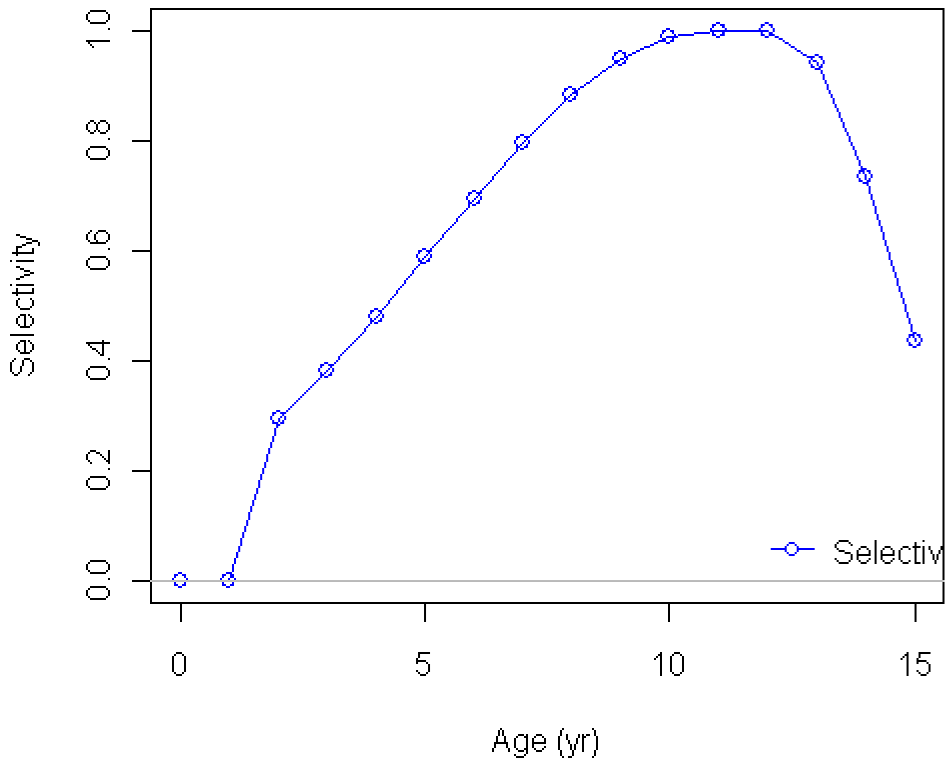

Figure 33. Estimated time-invariant selectivity curve for the acoustic survey. The ascending width, location of the peak and selectivity at age 15 were freely estimated.

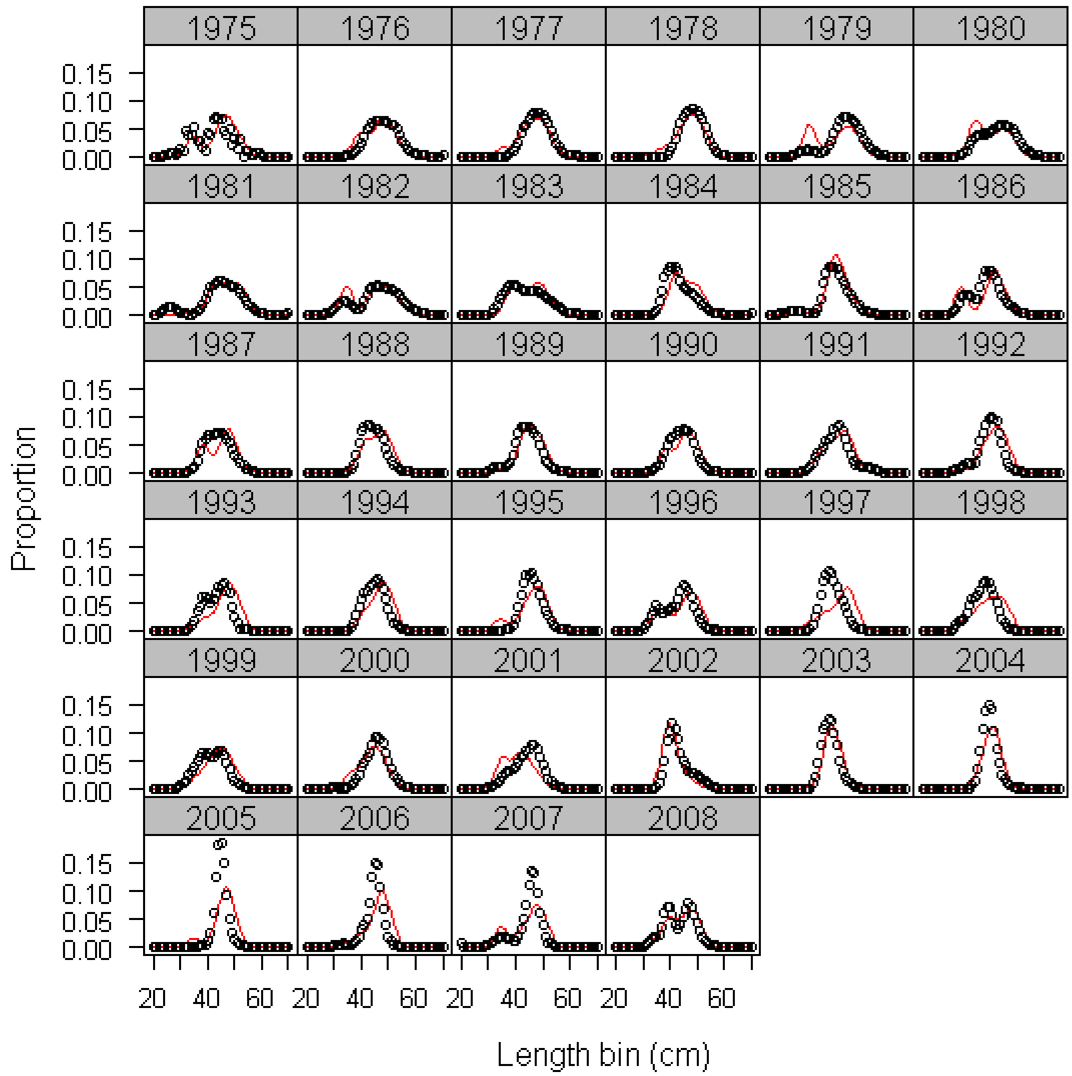

Figure 34. Predicted fits to the observed U.S. fishery length composition data.

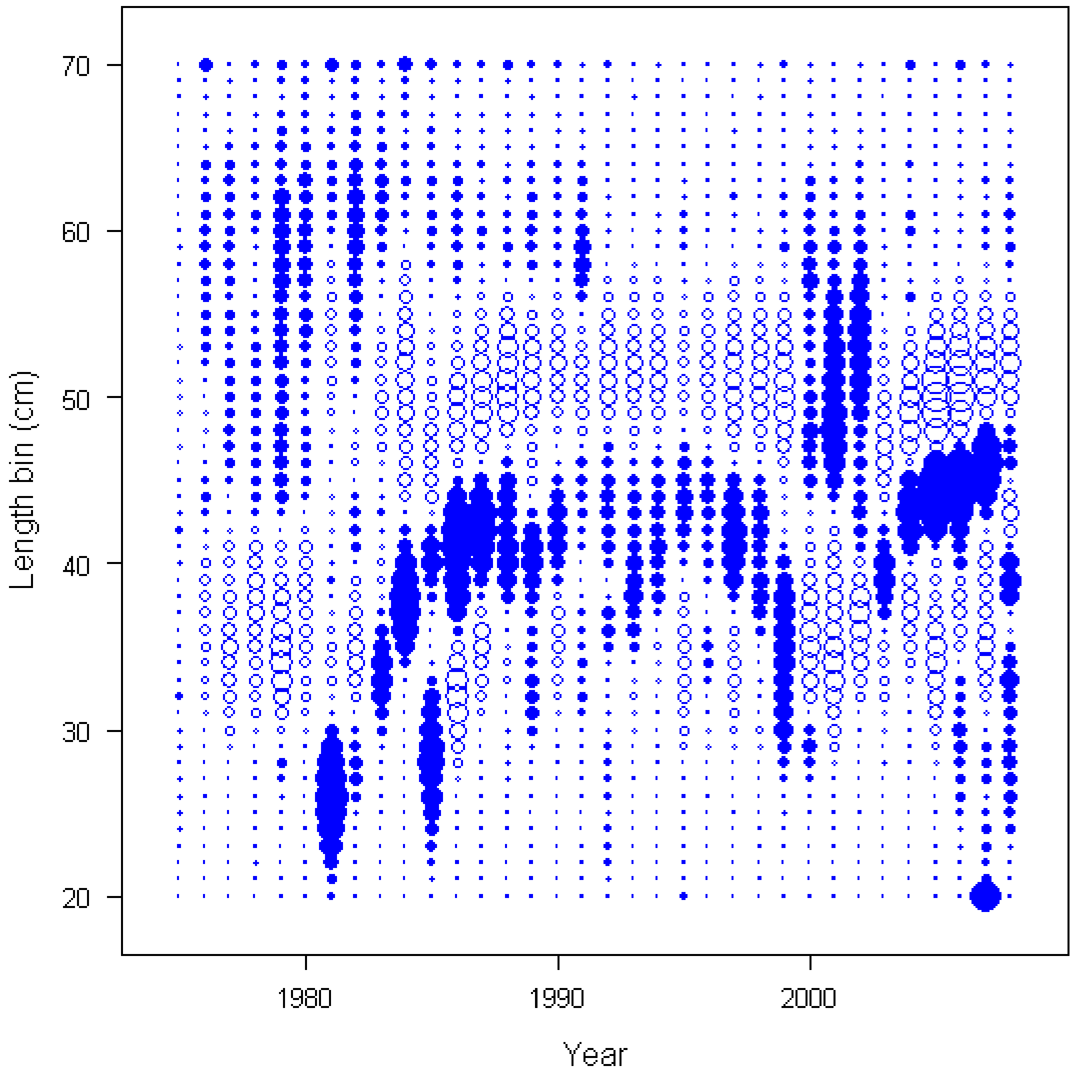

Figure 35. Pearson standardized residuals (observed - predicted) for model fits to the U.S. fishery length composition data. Maximum bubble size = 7.05; filled circles represent positive values.

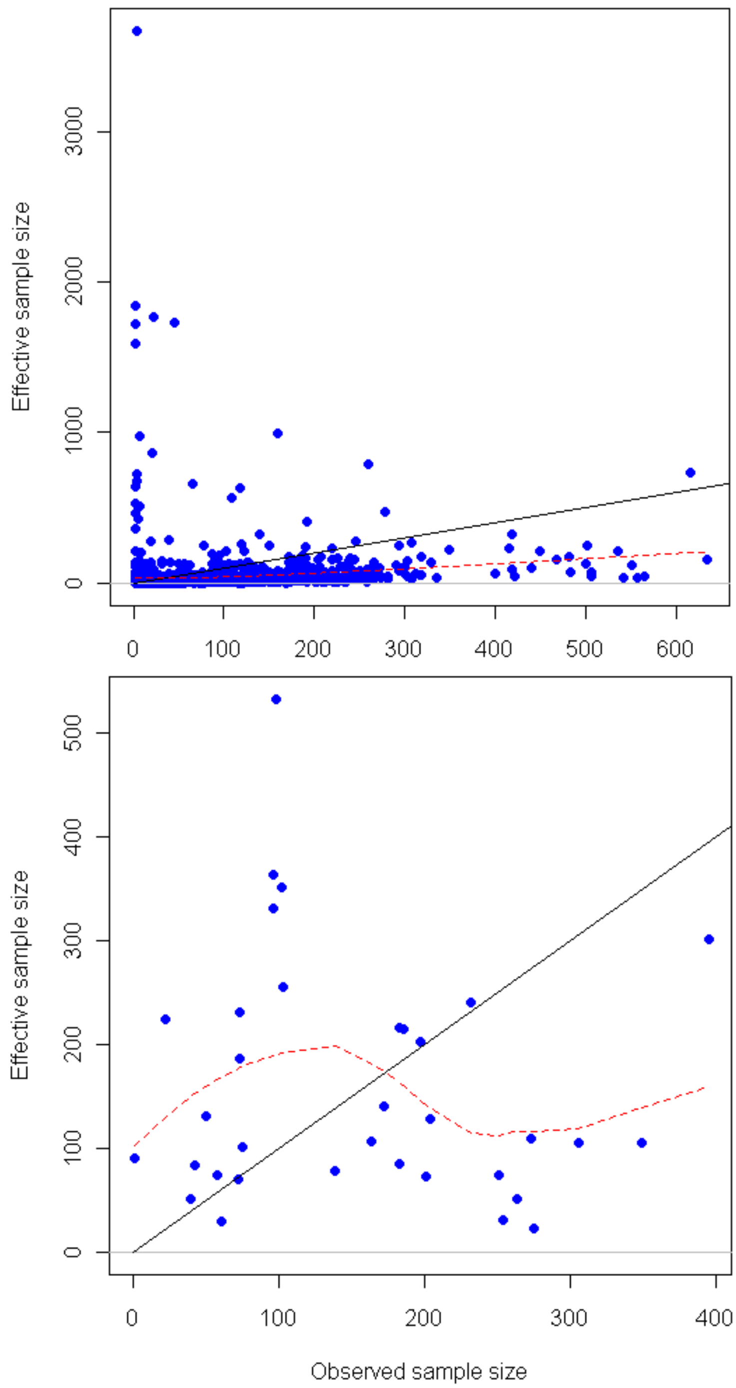

Figure 36. Plot of effective vs. observed input sample sizes for the U.S. fishery conditional age at length compositions (top) and length compositions (bottom). Solid line indicates a 1:1 relationship, dashed line is a loess smoother.

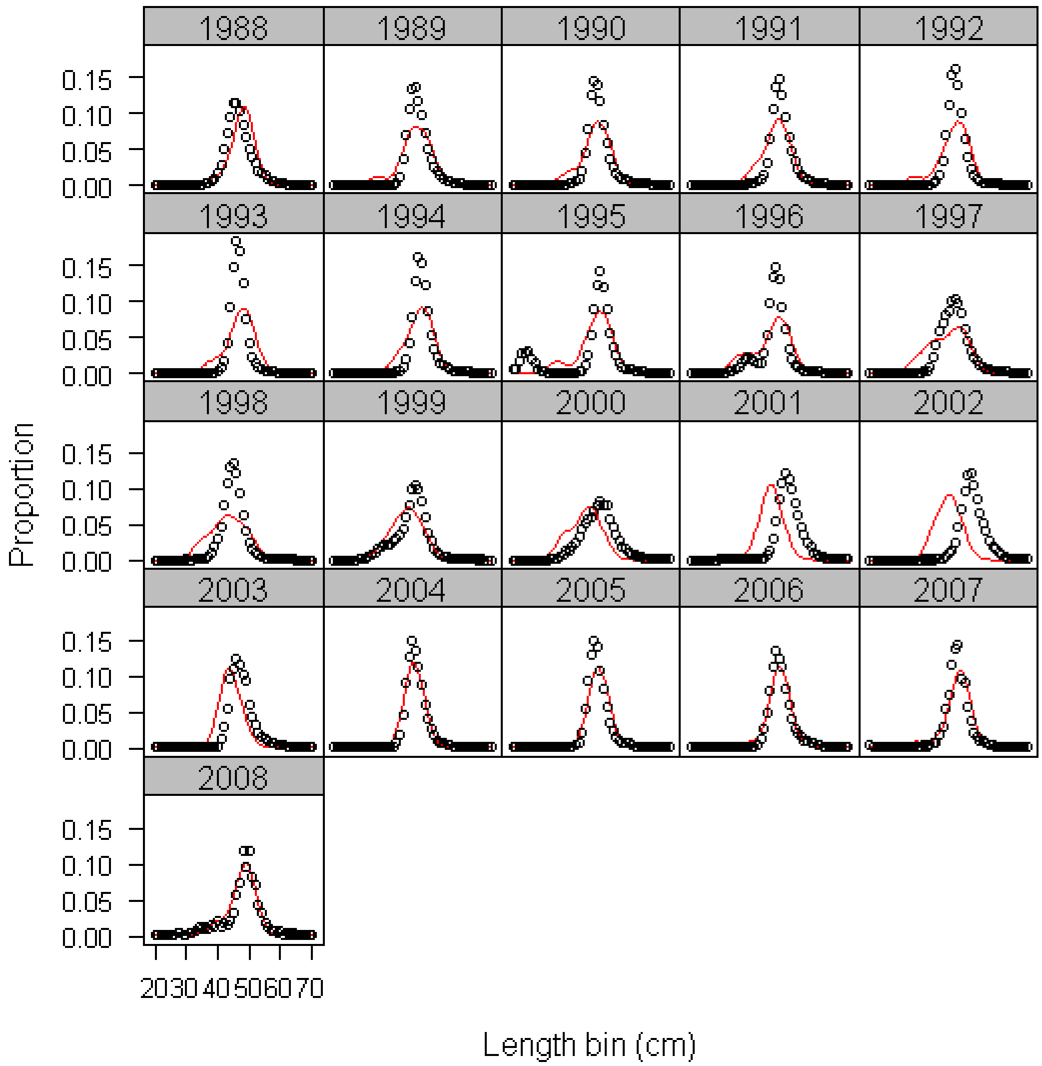

Figure 37. Predicted fits to the observed Canadian fishery length composition data.

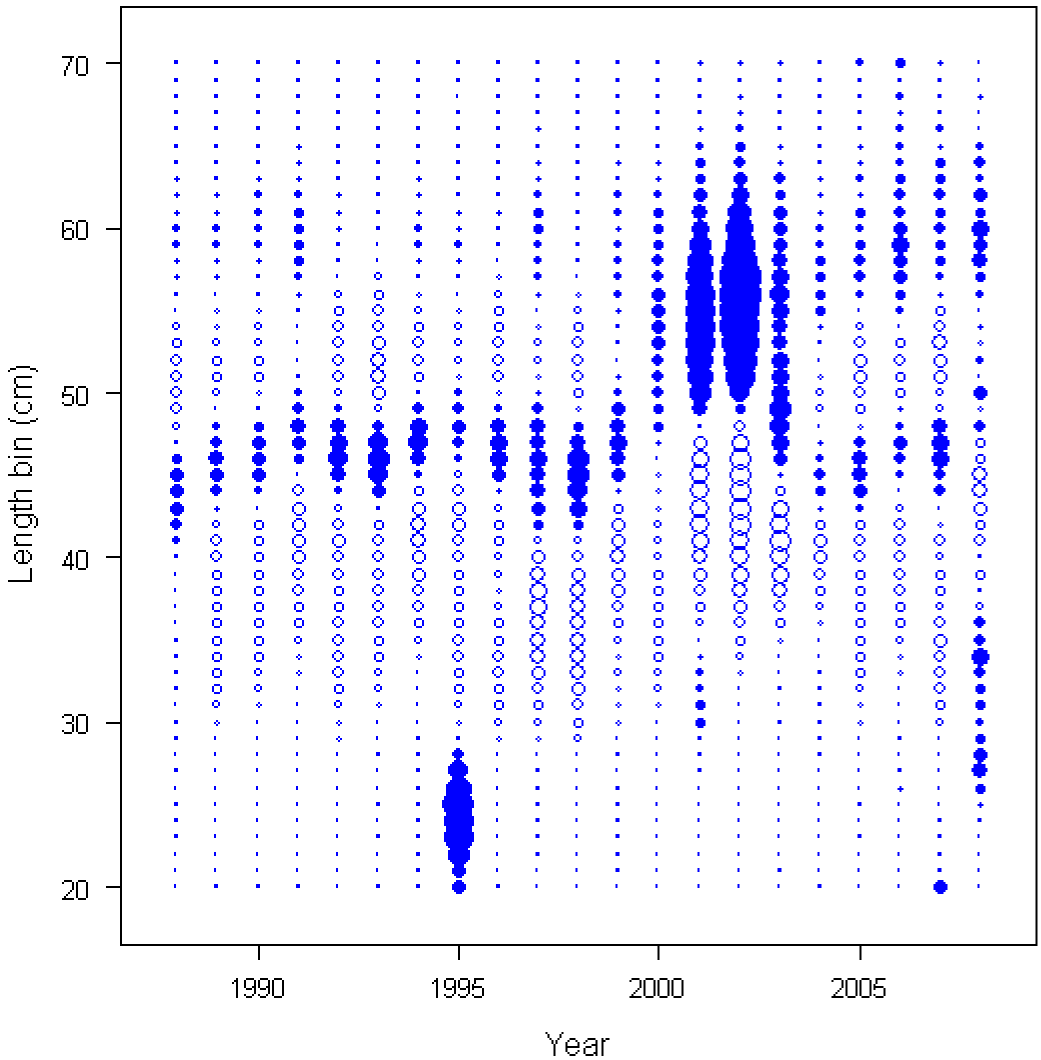

Figure 38. Pearson standardized residuals (observed - predicted) for model fits to the Canadian fishery length composition data. Maximum bubble size = 10.74; filled circles represent positive values.

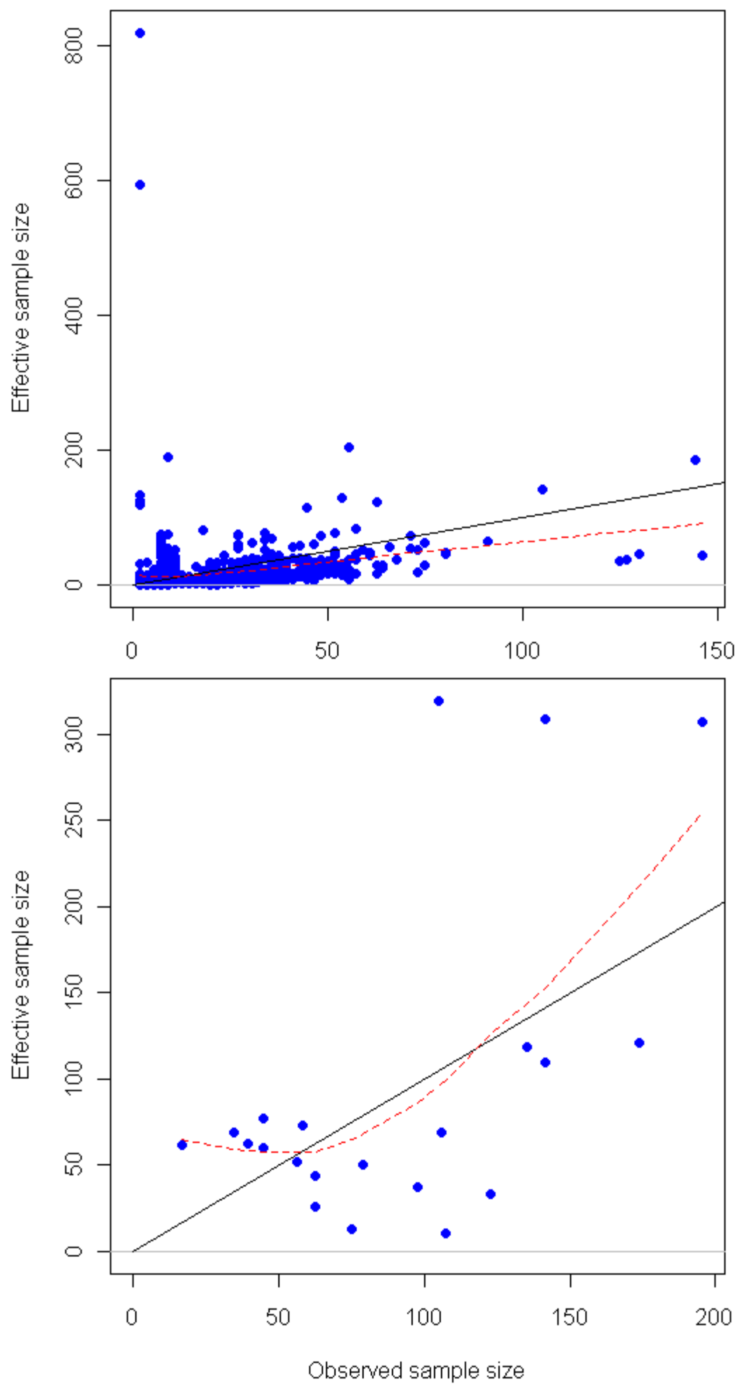

Figure 39. Plot of effective vs. observed input sample sizes for the Canadian fishery conditional age at length compositions (top) and length compositions (bottom). Solid line indicates a 1:1 relationship, dashed line is a loess smoother.

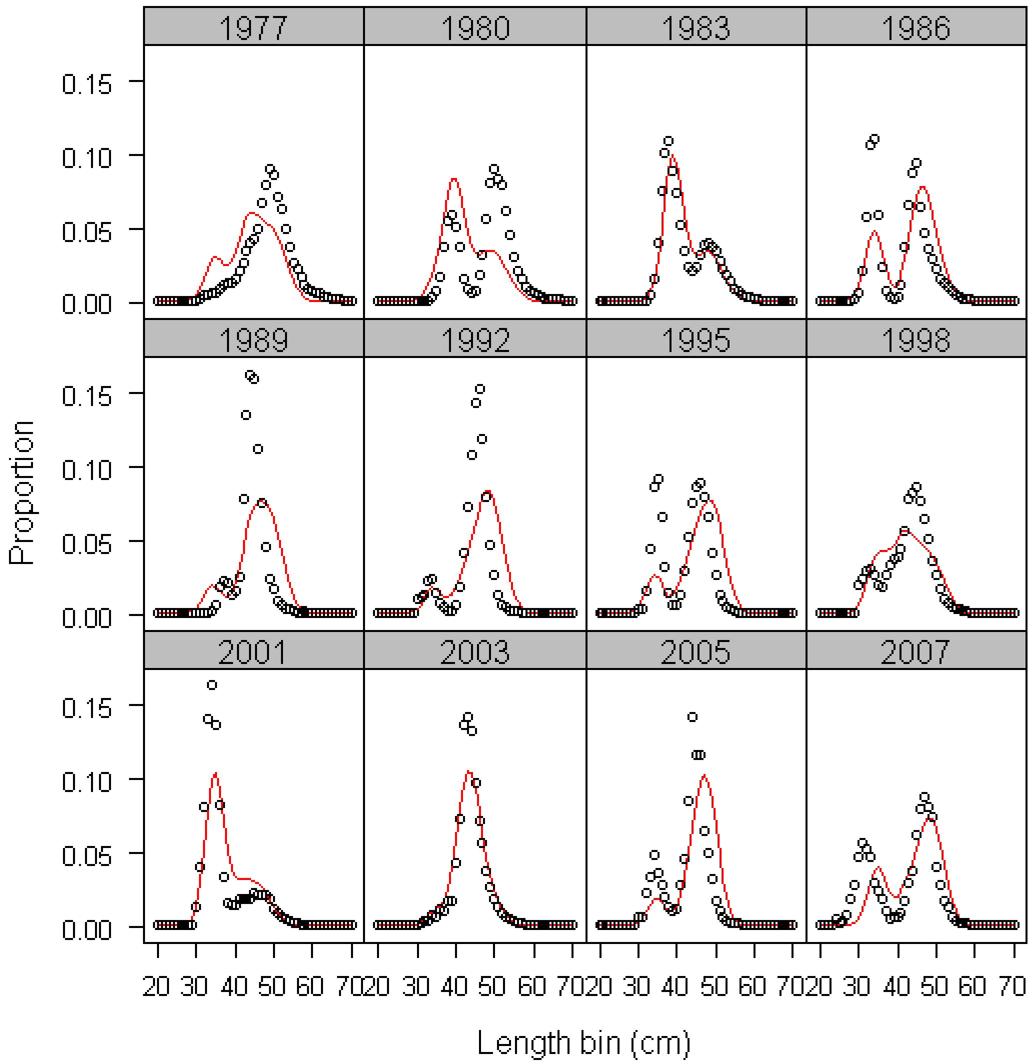

Figure 40. Predicted fits to the observed acoustic survey length composition data.

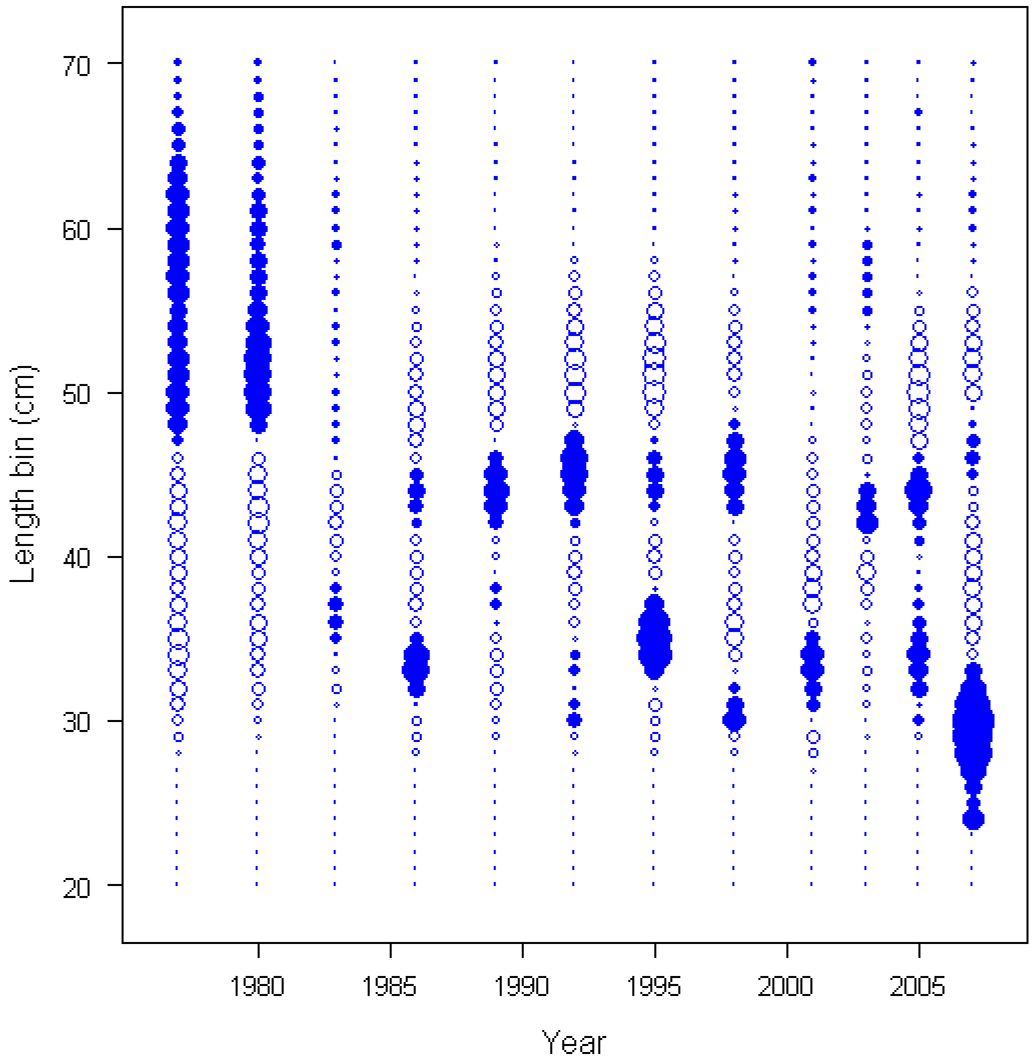

Figure 41. Pearson standardized residuals (observed - predicted) for model fits to the acoustic survey length composition data. Maximum bubble size = 5.43; filled circles represent positive values.

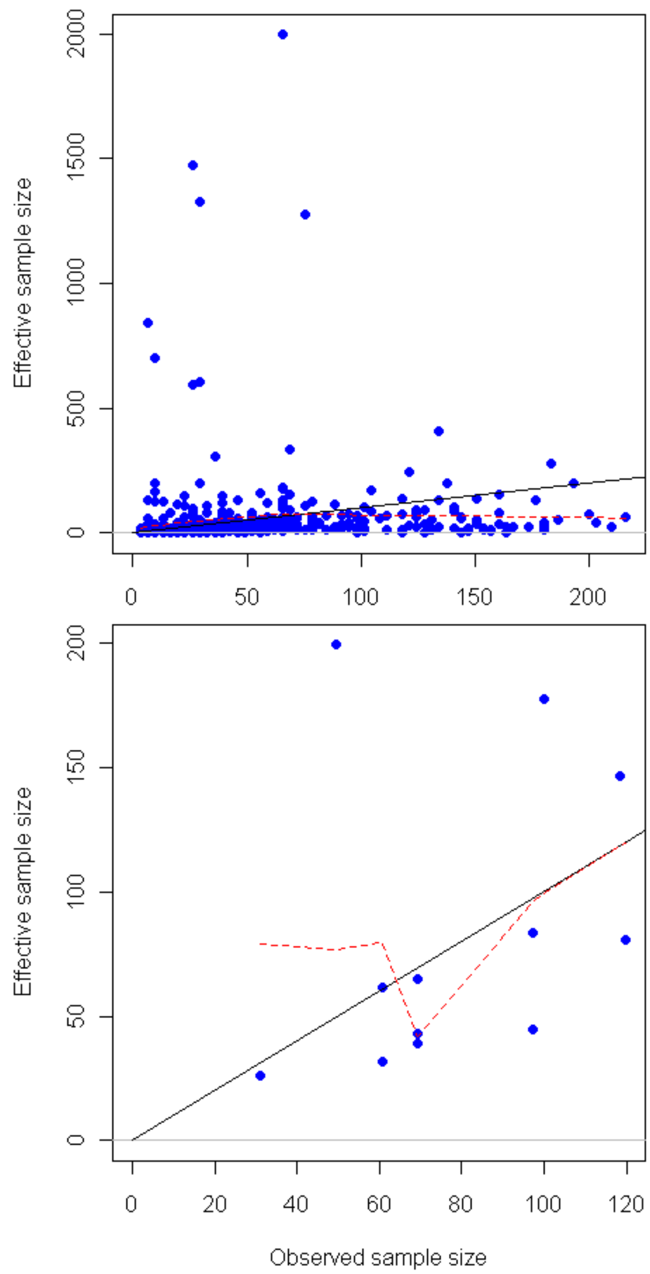

Figure 42. Plot of effective vs. observed input sample sizes for the acoustic survey conditional age at length compositions (top) and length compositions (bottom). Solid line indicates a 1:1 relationship, dashed line is a loess smoother.

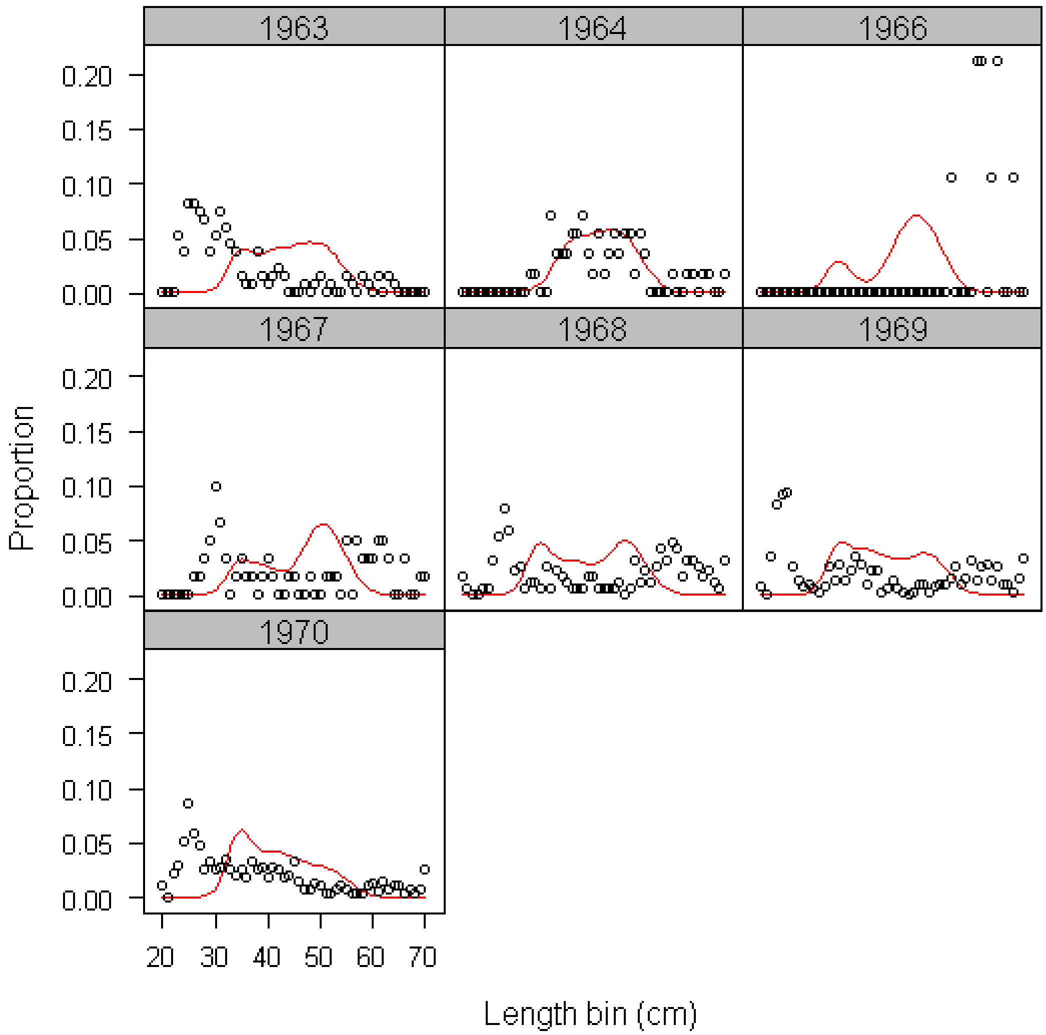

Figure 43. Predicted fits to the observed historical 1st quarter California fishery length composition data.

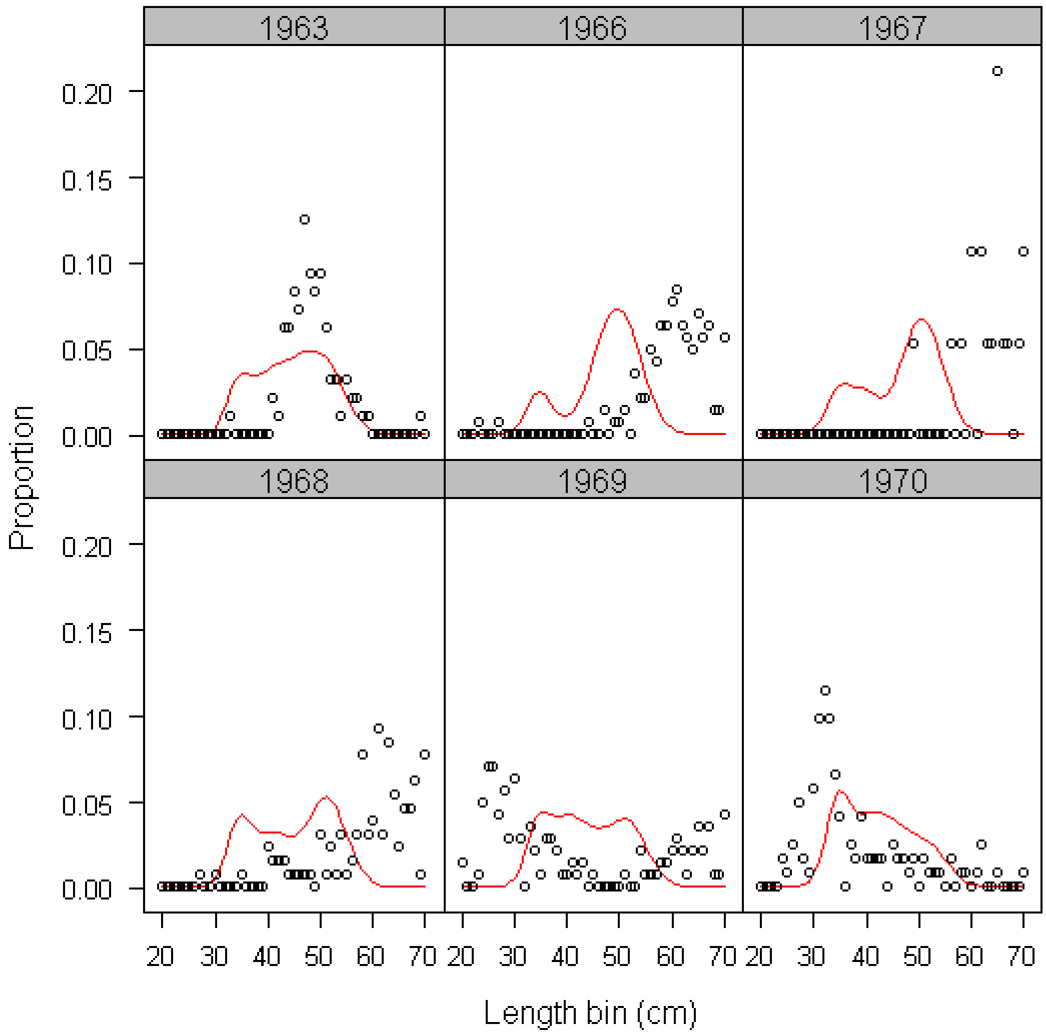

Figure 44. Predicted fits to the observed historical 2nd quarter California fishery length composition data.

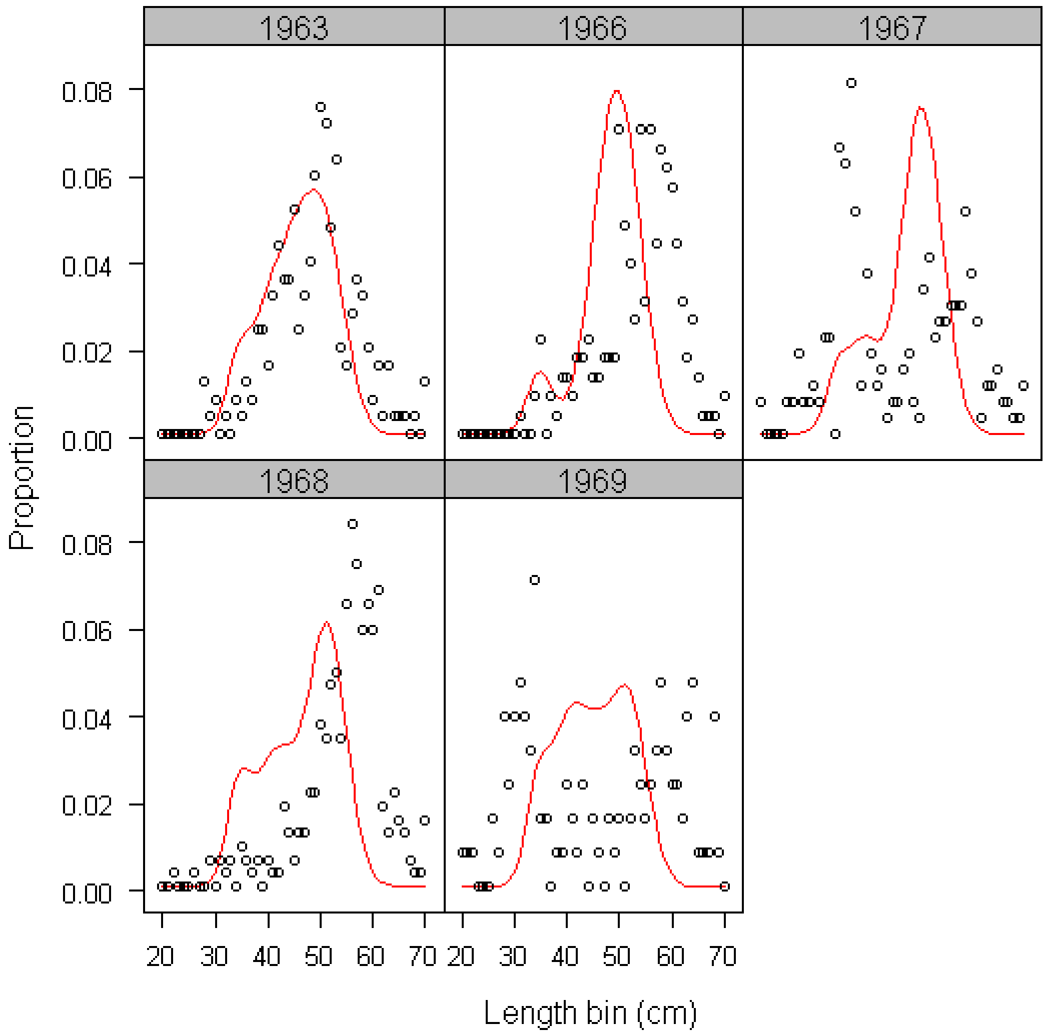

Figure 45. Predicted fits to the observed historical 3rd quarter California fishery length composition data.

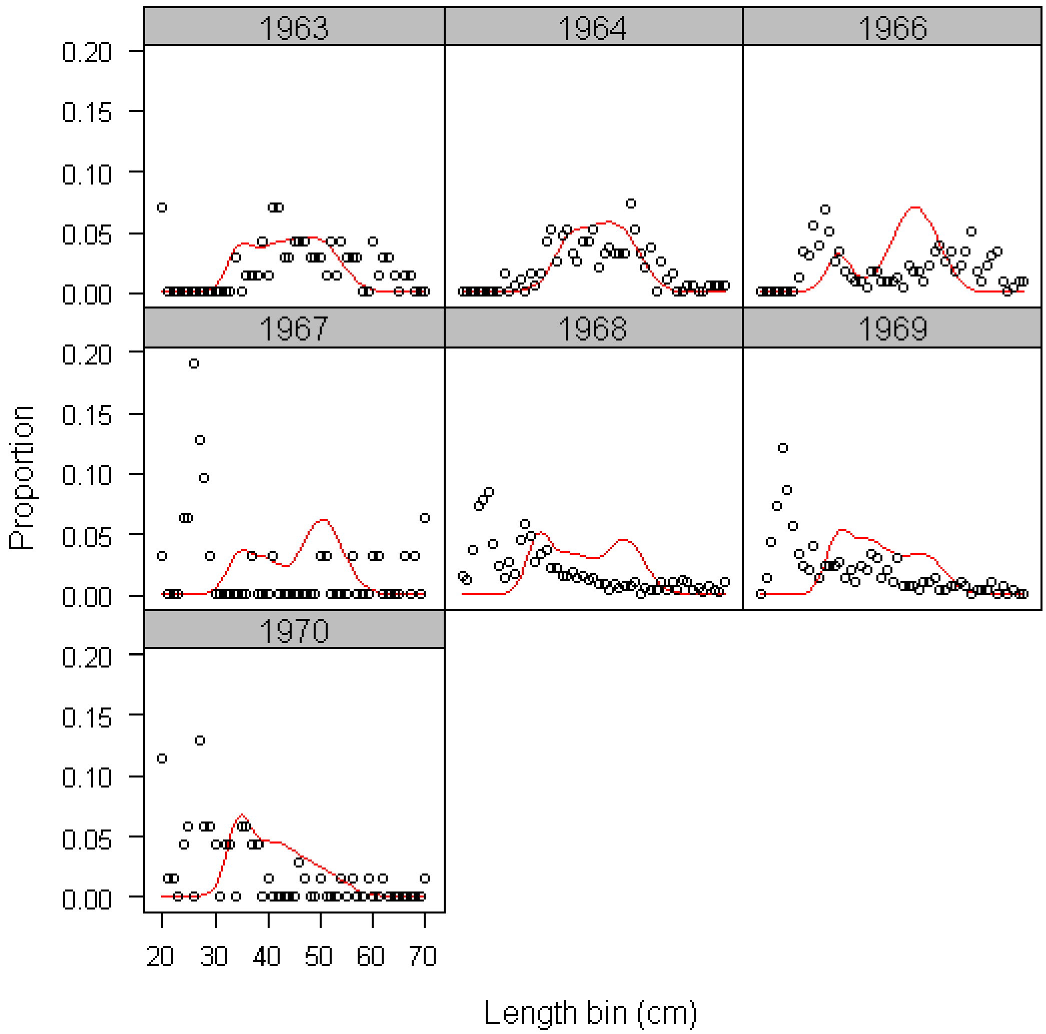

Figure 46. Predicted fits to the observed historical 4th quarter California fishery length composition data.

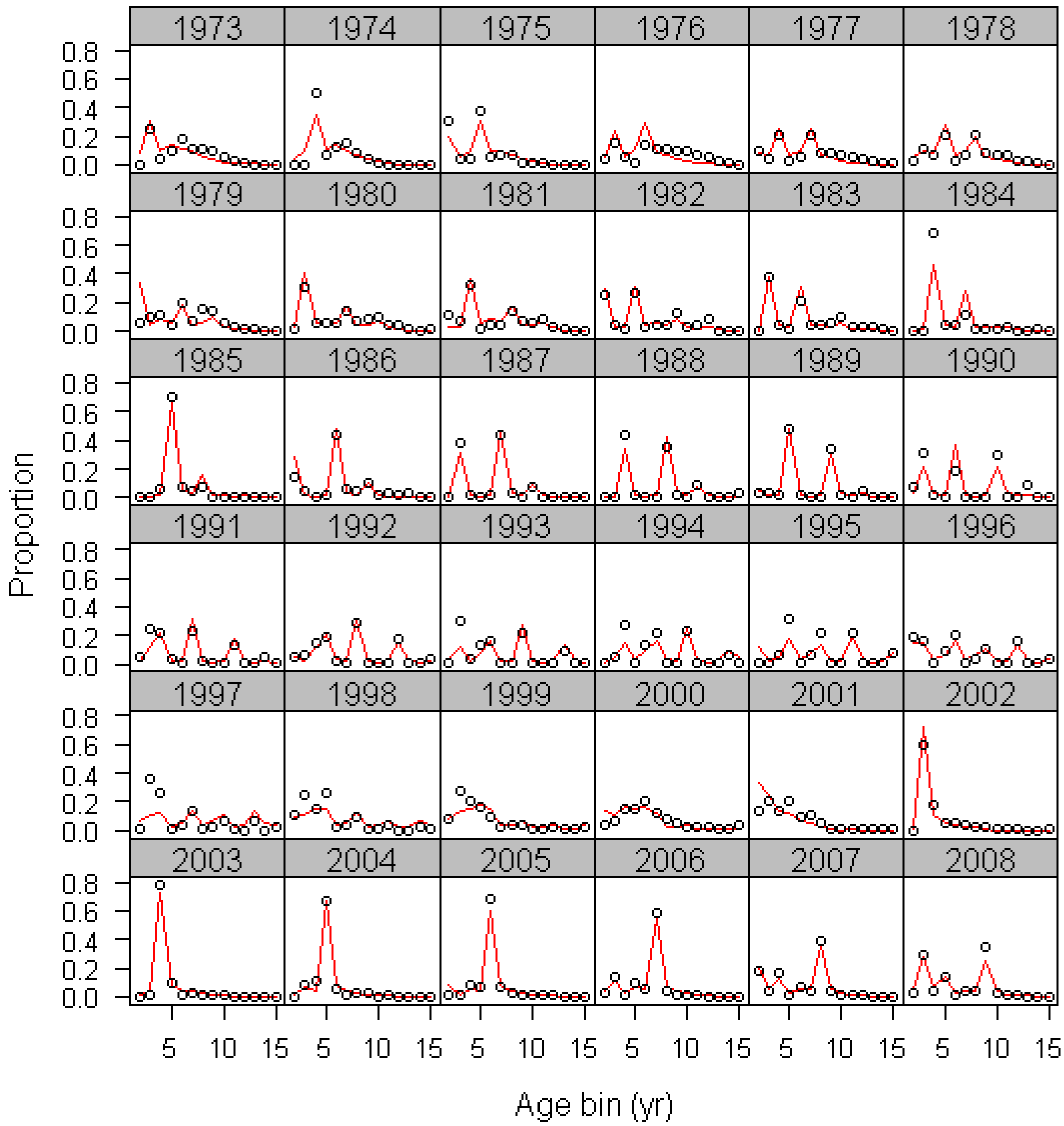

Figure 47. Predicted (implied) fits to the observed U.S. fishery age composition data.

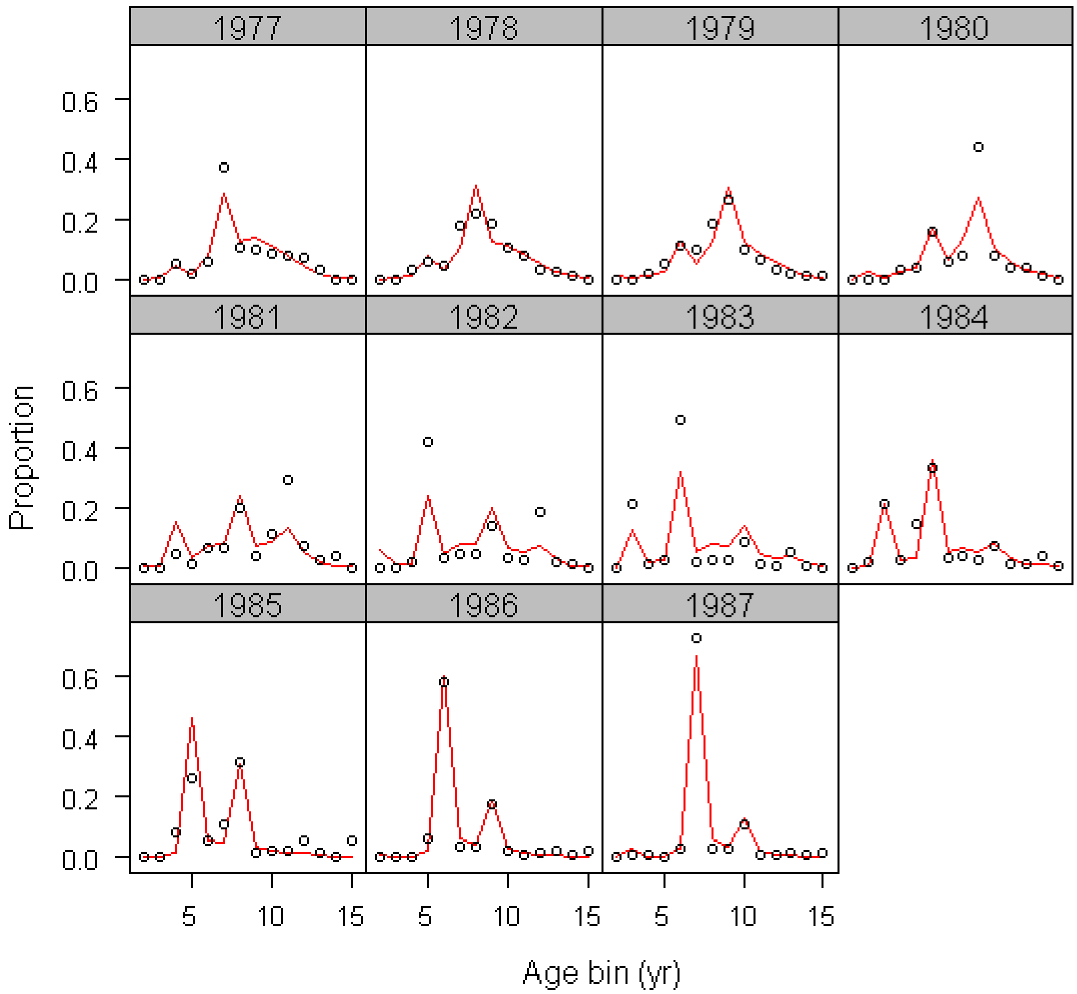

Figure 48. Predicted fits to the early observed Canadian fishery age composition data, where conditional age-at-length could not be calculated.

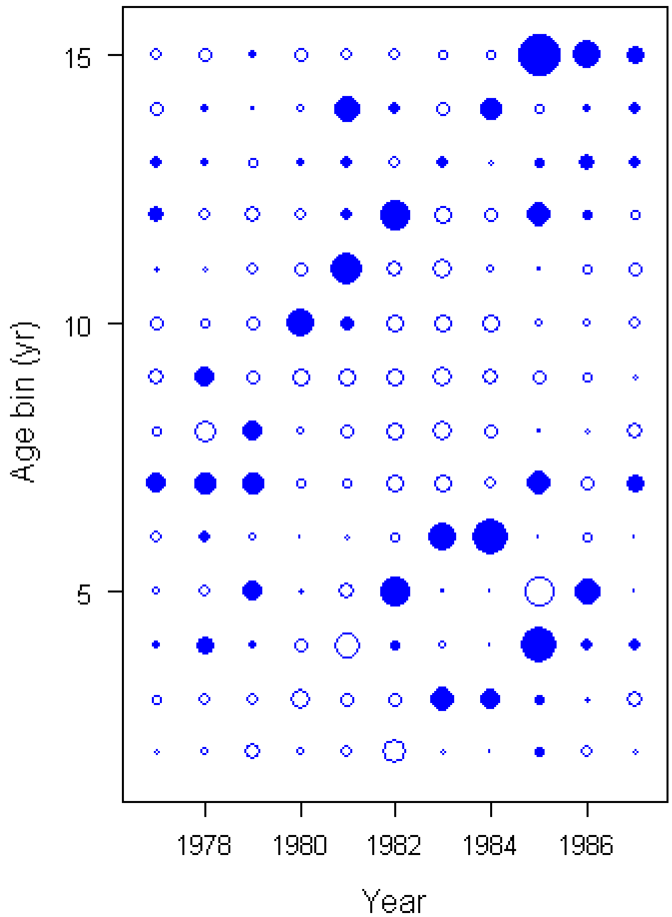

Figure 49. Pearson standardized residuals (observed - predicted) for model fits to the early observed Canadian fishery age composition data. Maximum bubble size = 8.33; filled circles represent positive values.

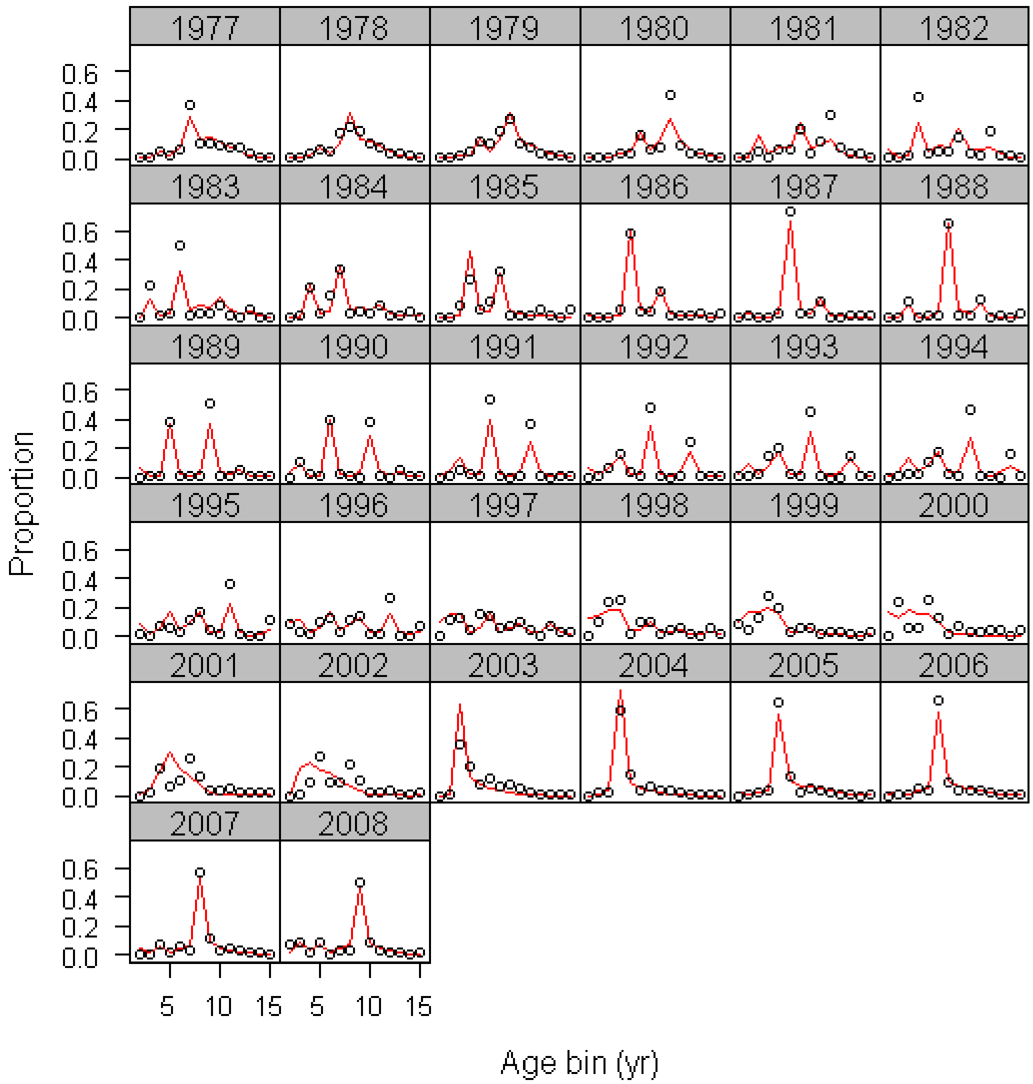

Figure 50. Predicted fits (implied) to the observed Canadian fishery age composition data.

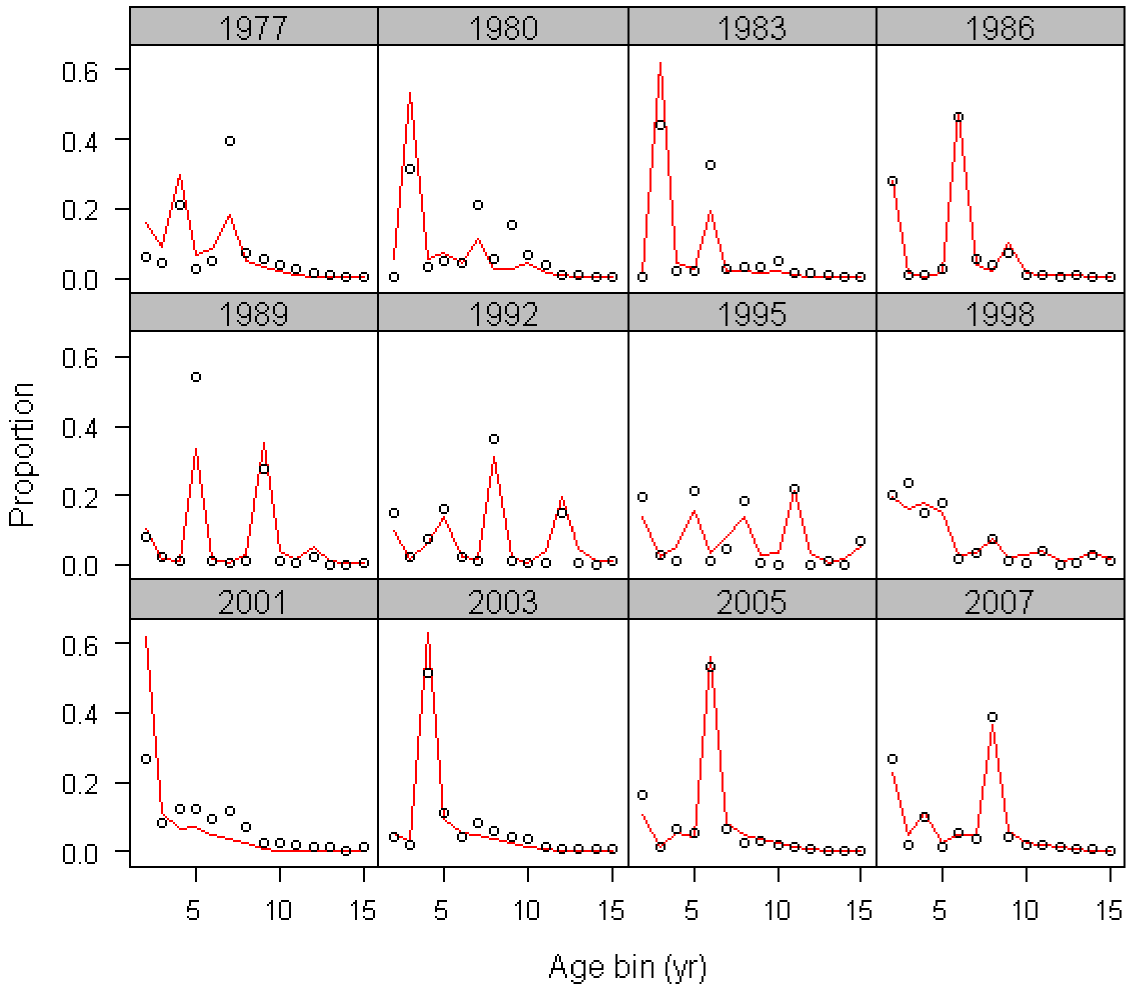

Figure 51. Predicted (implied) fits to the observed acoustic survey age composition data.

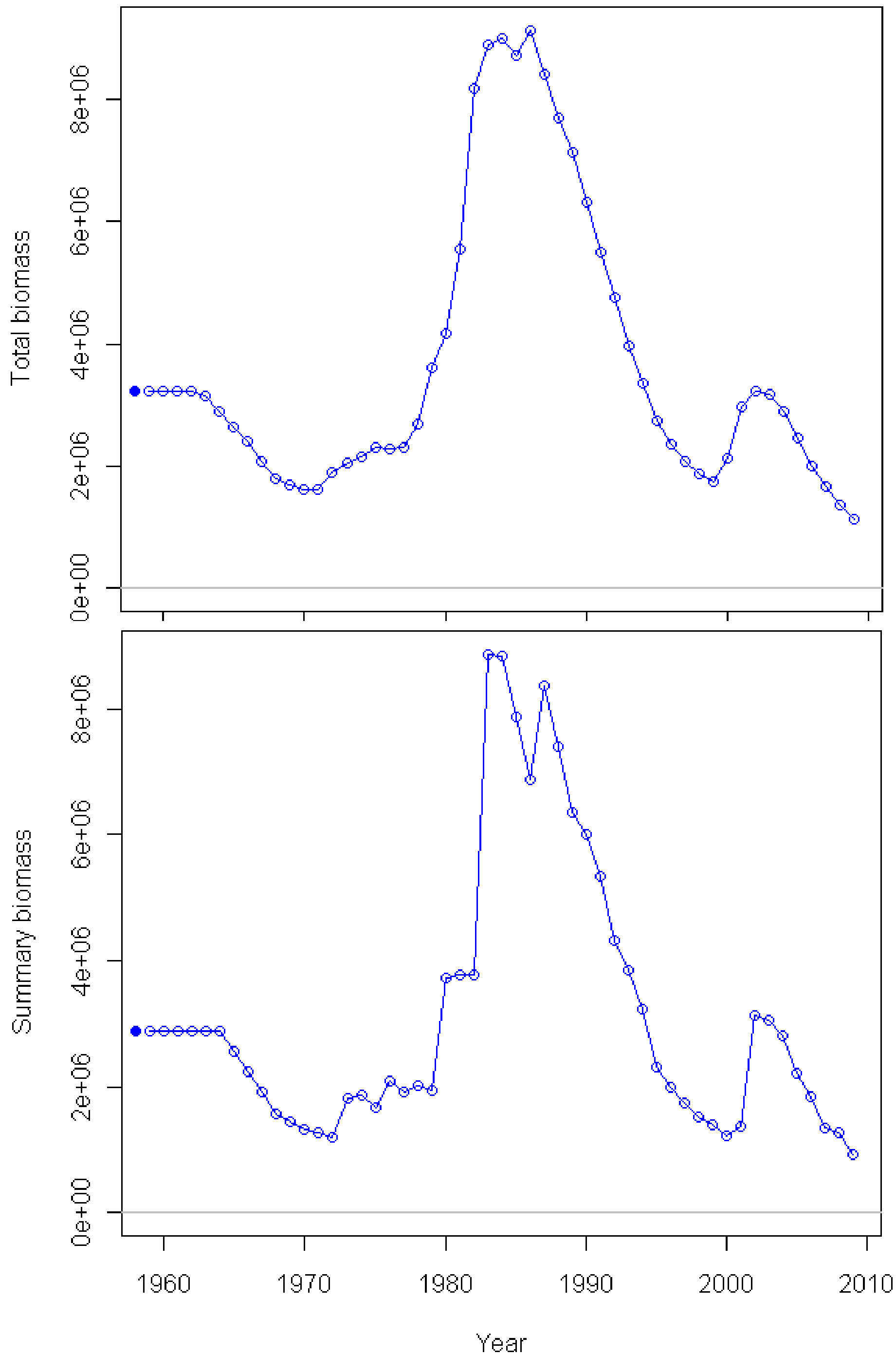

Figure 52. Estimated time-series of Pacific hake total (top panel) and summary biomass (age 3+; bottom panel).

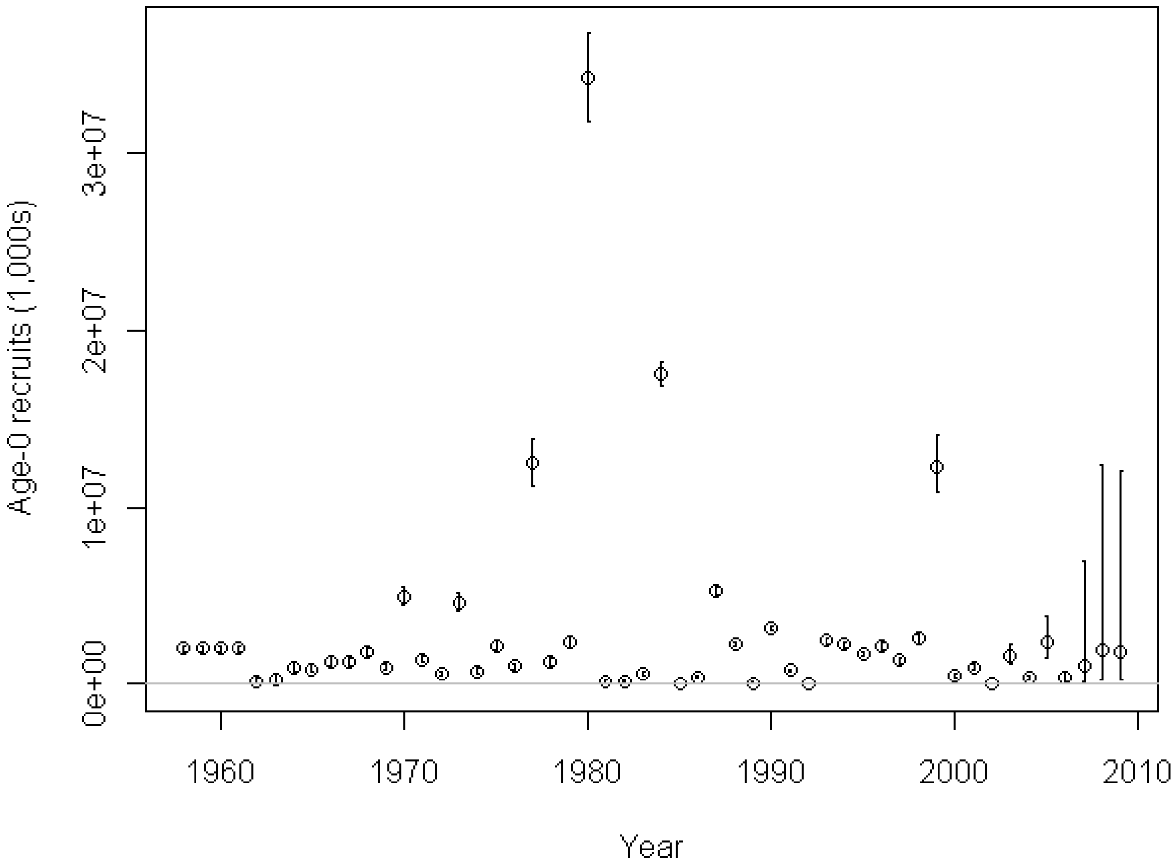

Figure 53. Estimated recruitment time-series with approximate asymptotic 95% confidence intervals.

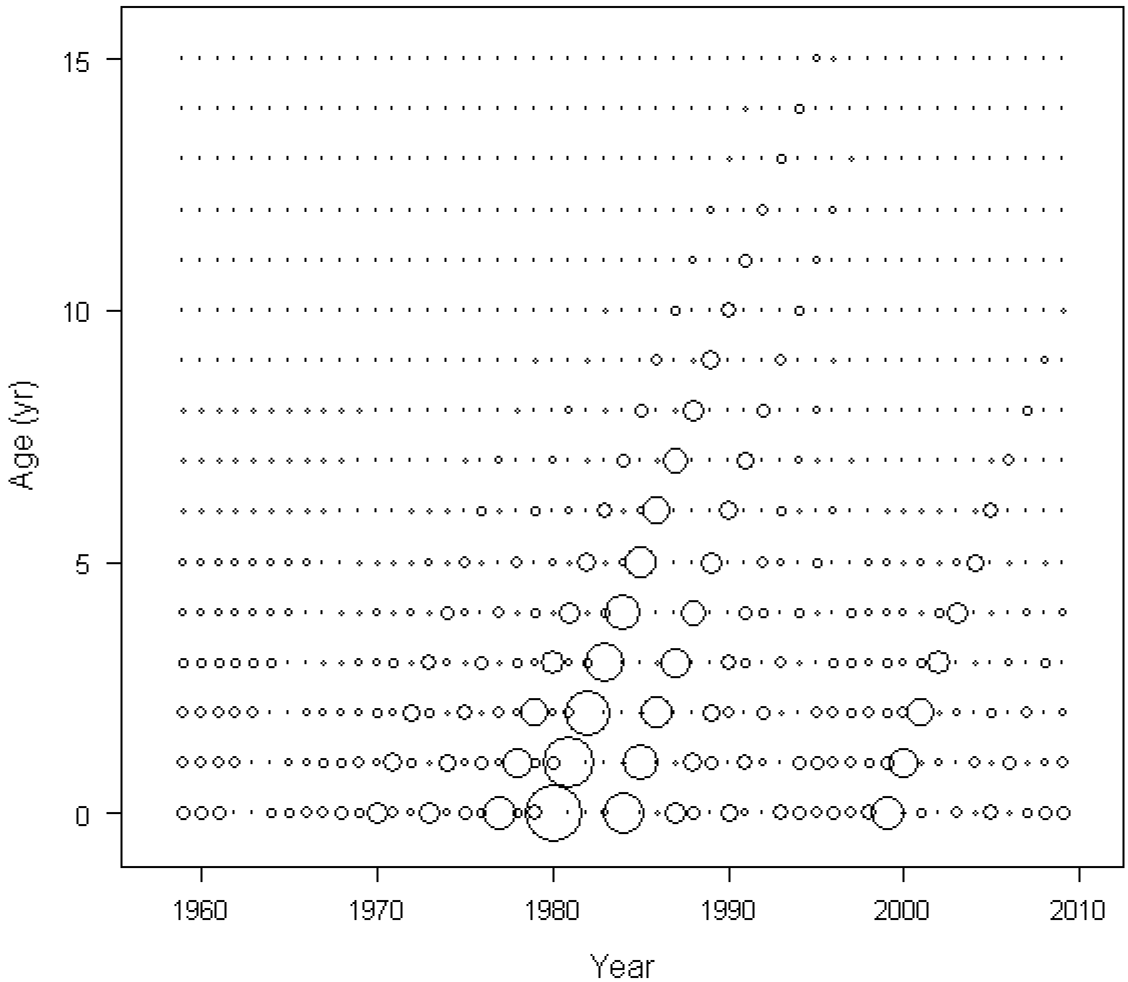

Figure 54. Estimated numbers at age time-series in the base case model.

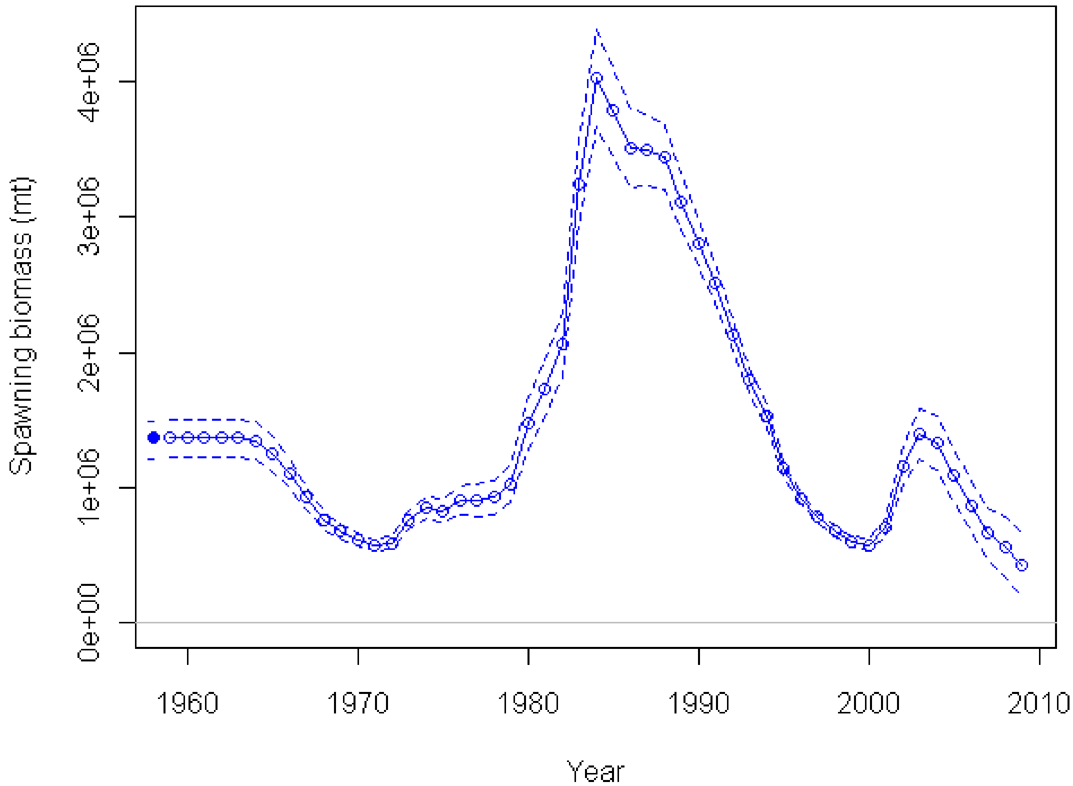

Figure 55. Estimated female spawning biomass time-series with approximate asymptotic 95% confidence intervals.

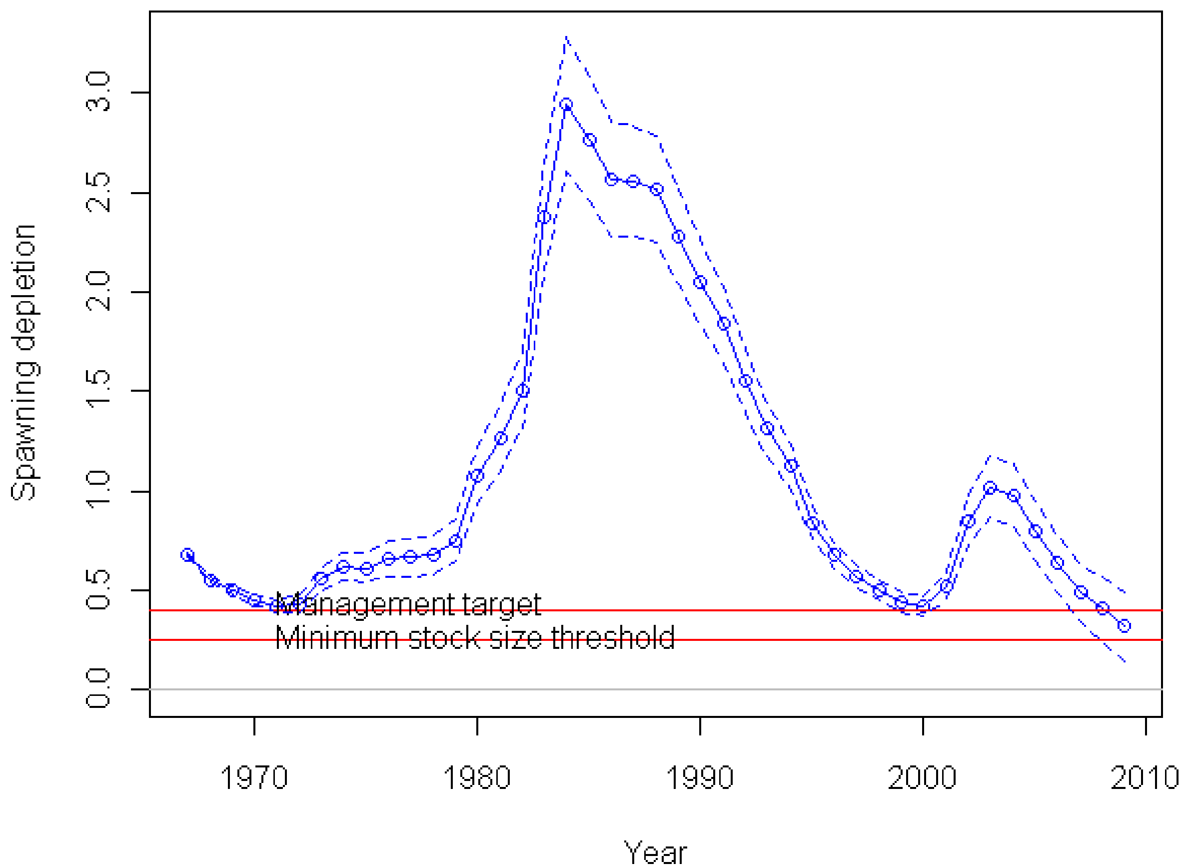

Figure 56. Time-series of estimated depletion, 1967-2009.

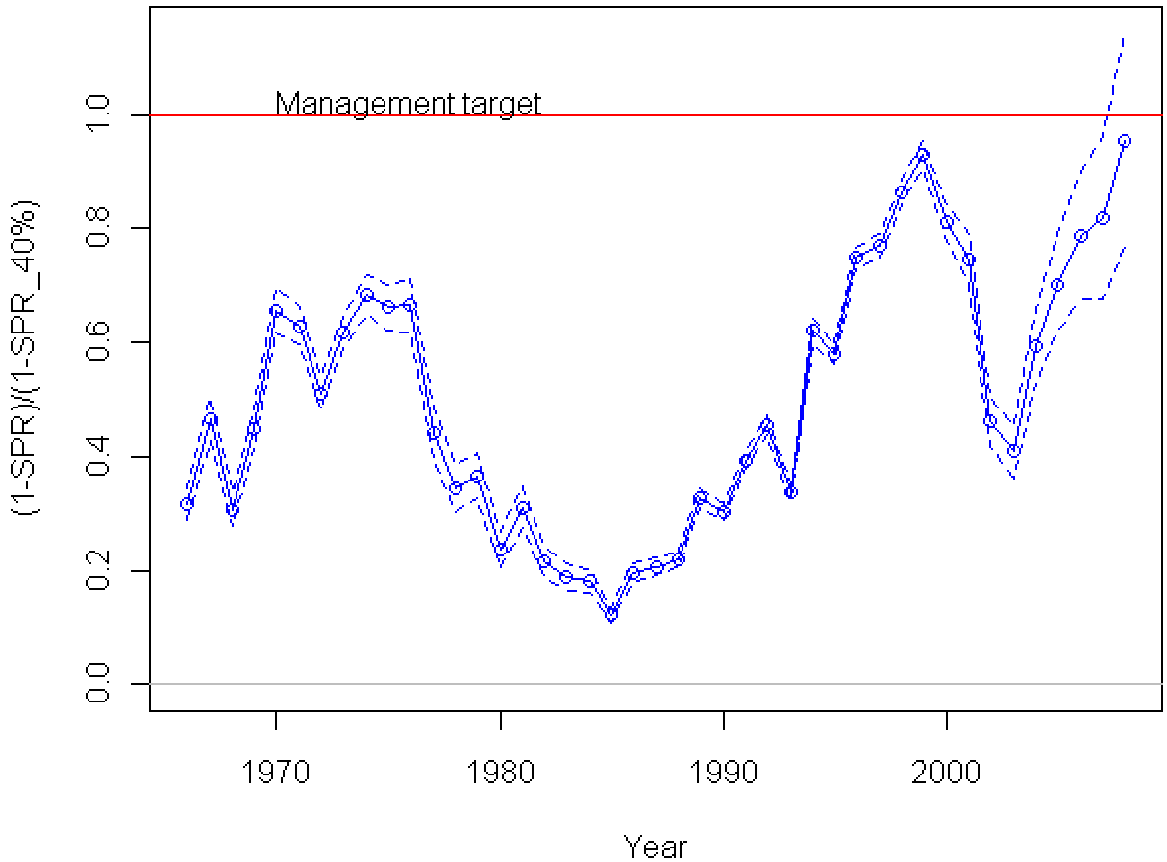

Figure 57. Time-series of relative spawning potential ratio (1-SPR/1-SPR$_{Target=0.4}$).

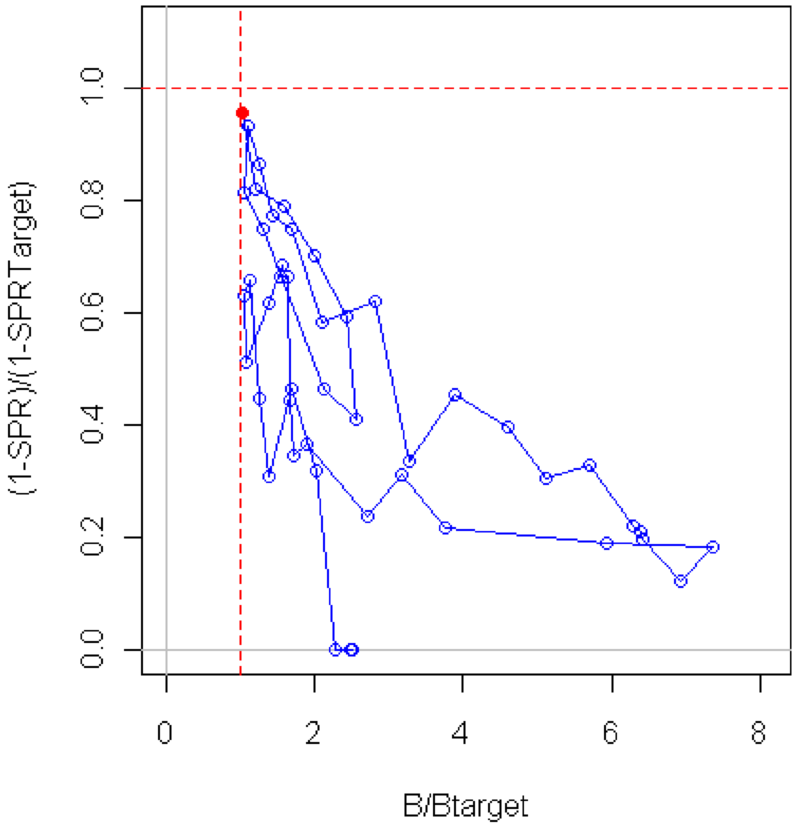

Figure 58. Temporal pattern (phase plot) of relative spawning potential ratio (1-SPR/1-SPR$_{Target=0.4}$) vs. estimated spawning biomass relative to the proxy 40% level, 1960-2008. Current (2008) performance relative to targets is shown as solid dot.

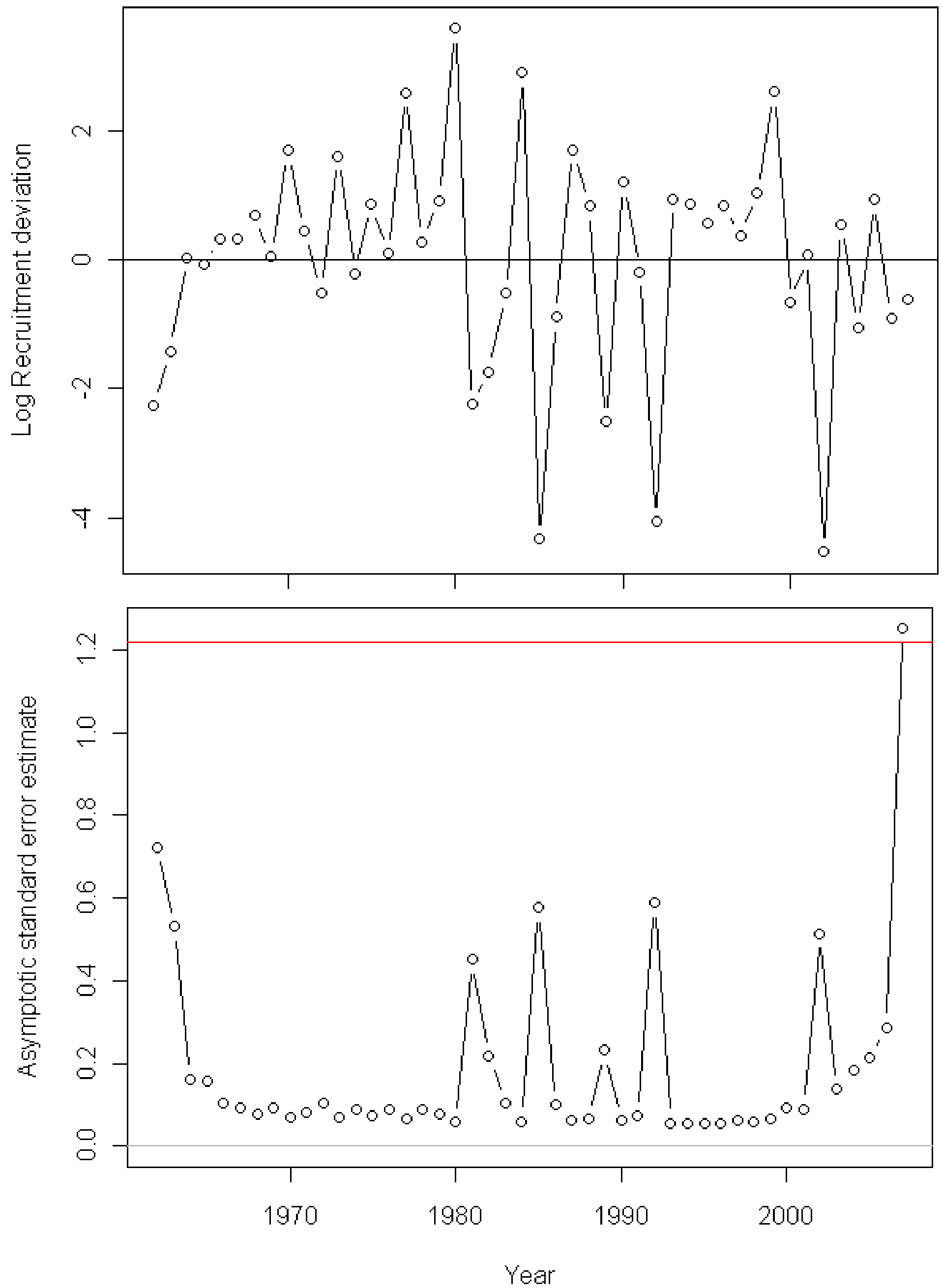

Figure 59. Estimates of Pacific hake recruitment deviations (top panel), and asymptotic standard errors for the deviations (bottom panel). Horizontal line in bottom panel indicates the estimate of the standard deviation of log recruitment deviations (σ_r).

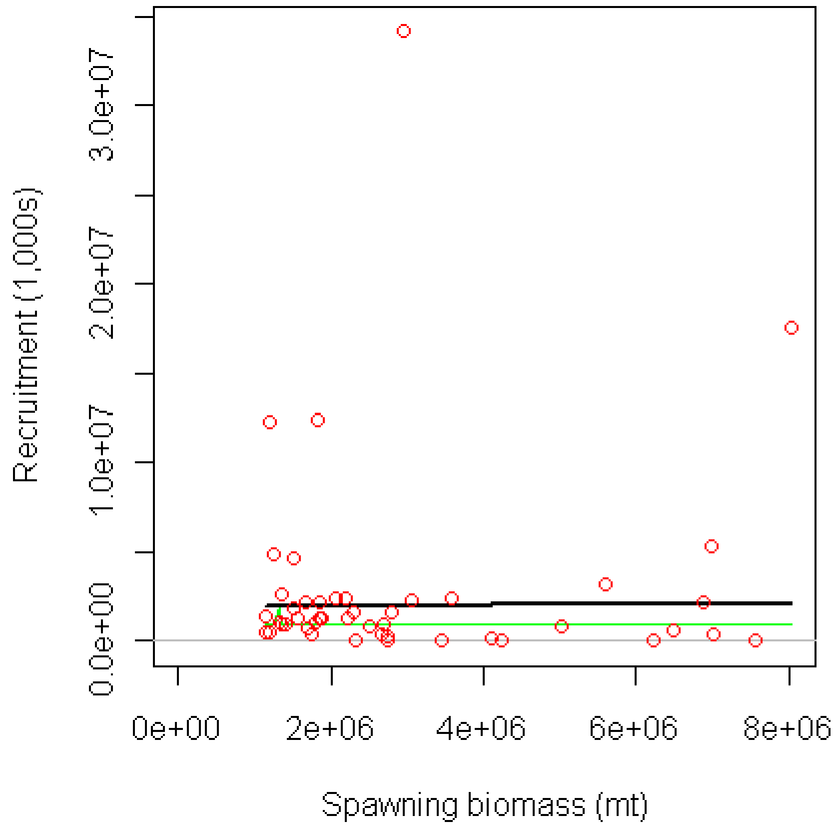

Figure 60. Estimated stock-recruit relationship. Lines represent the bias-corrected expectation (upper line) and median (lower line).

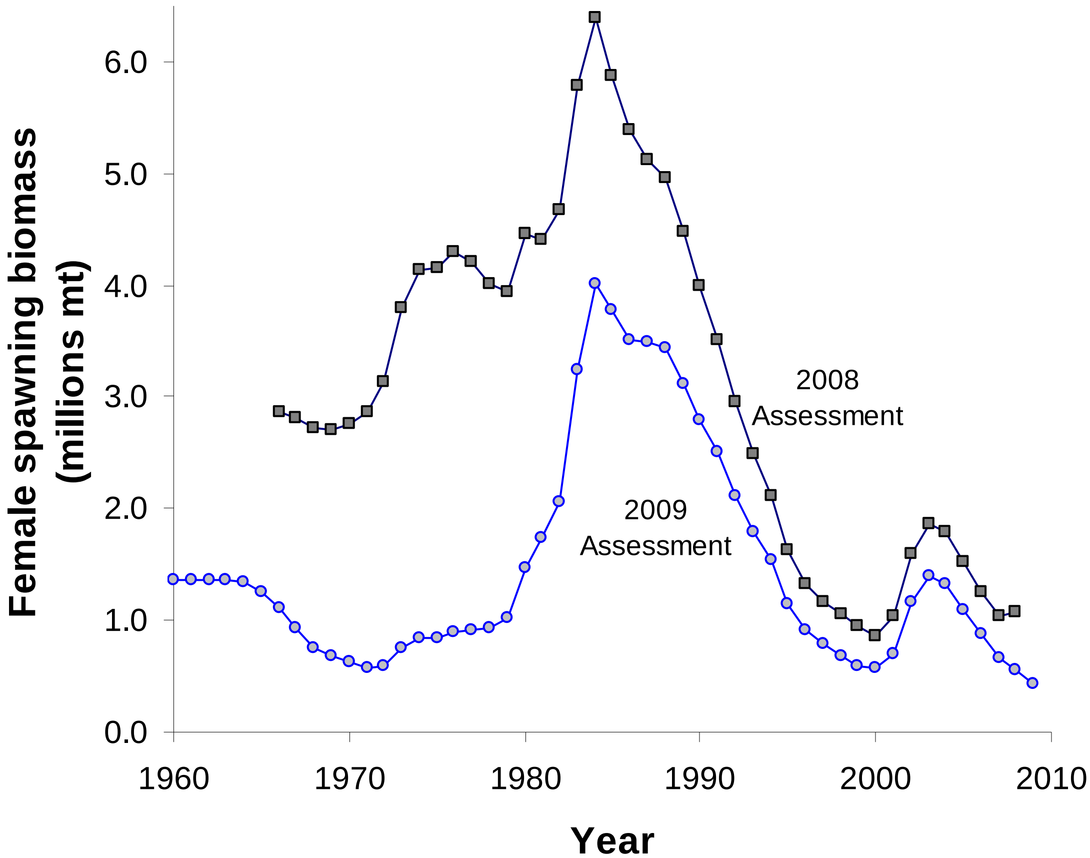

Figure 61. Comparison of 2008 and current model results.

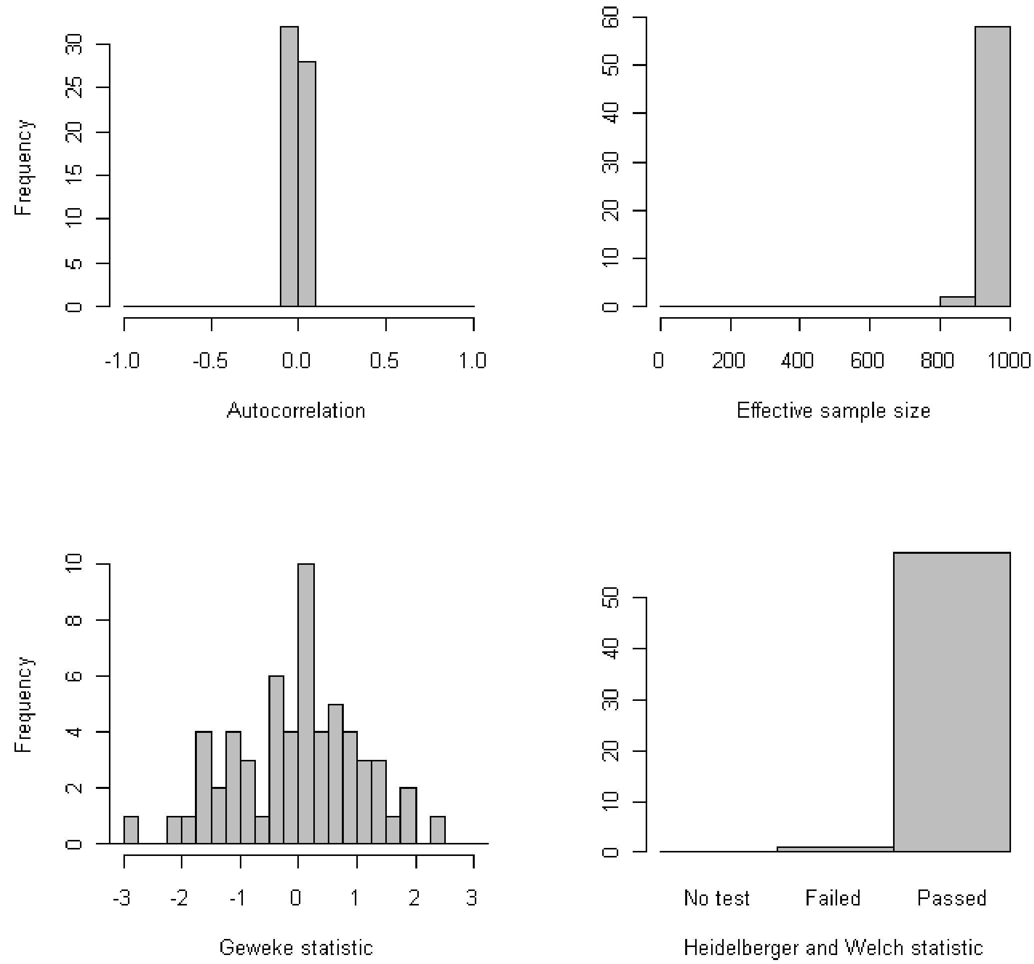

Figure 62. Summary of MCMC diagnostics for the objective function, as well as growth, mortality, stock-recruit (including recruitment deviations) and catchability parameters.

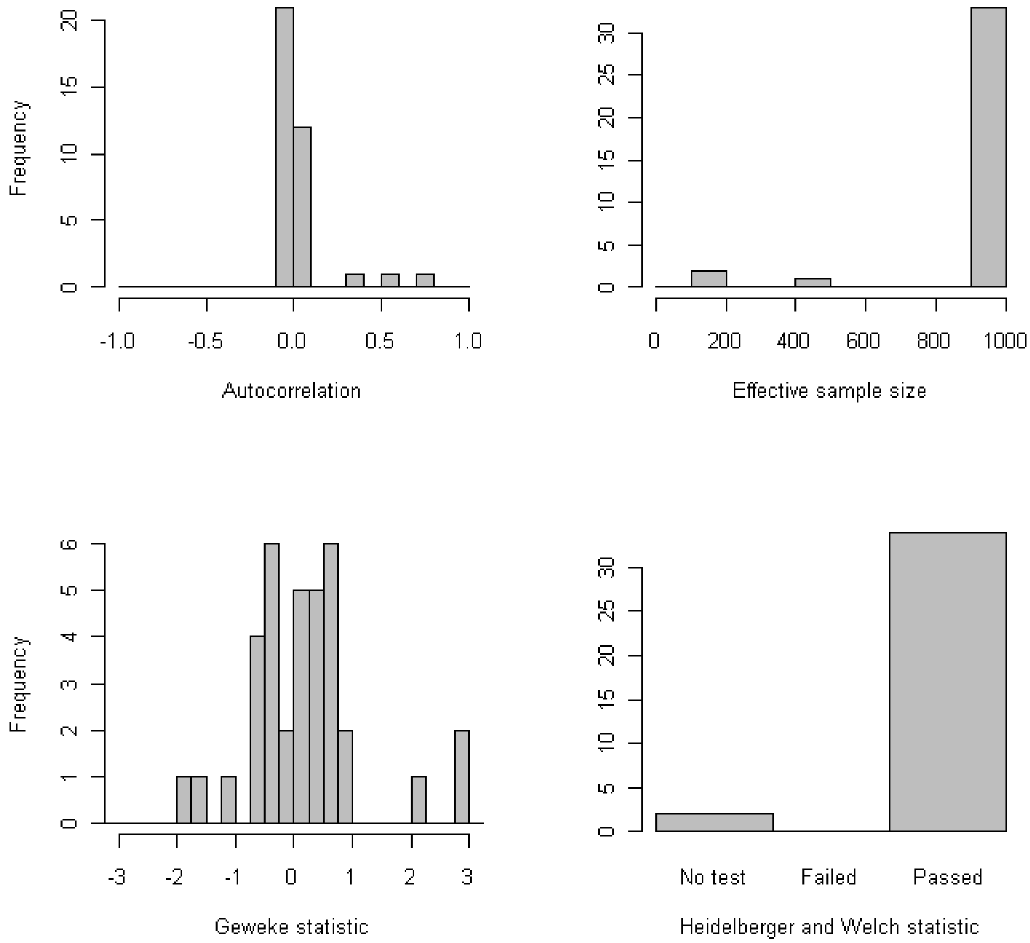

Figure 63. Summary of MCMC diagnostics for all estimated selectivity parameters.

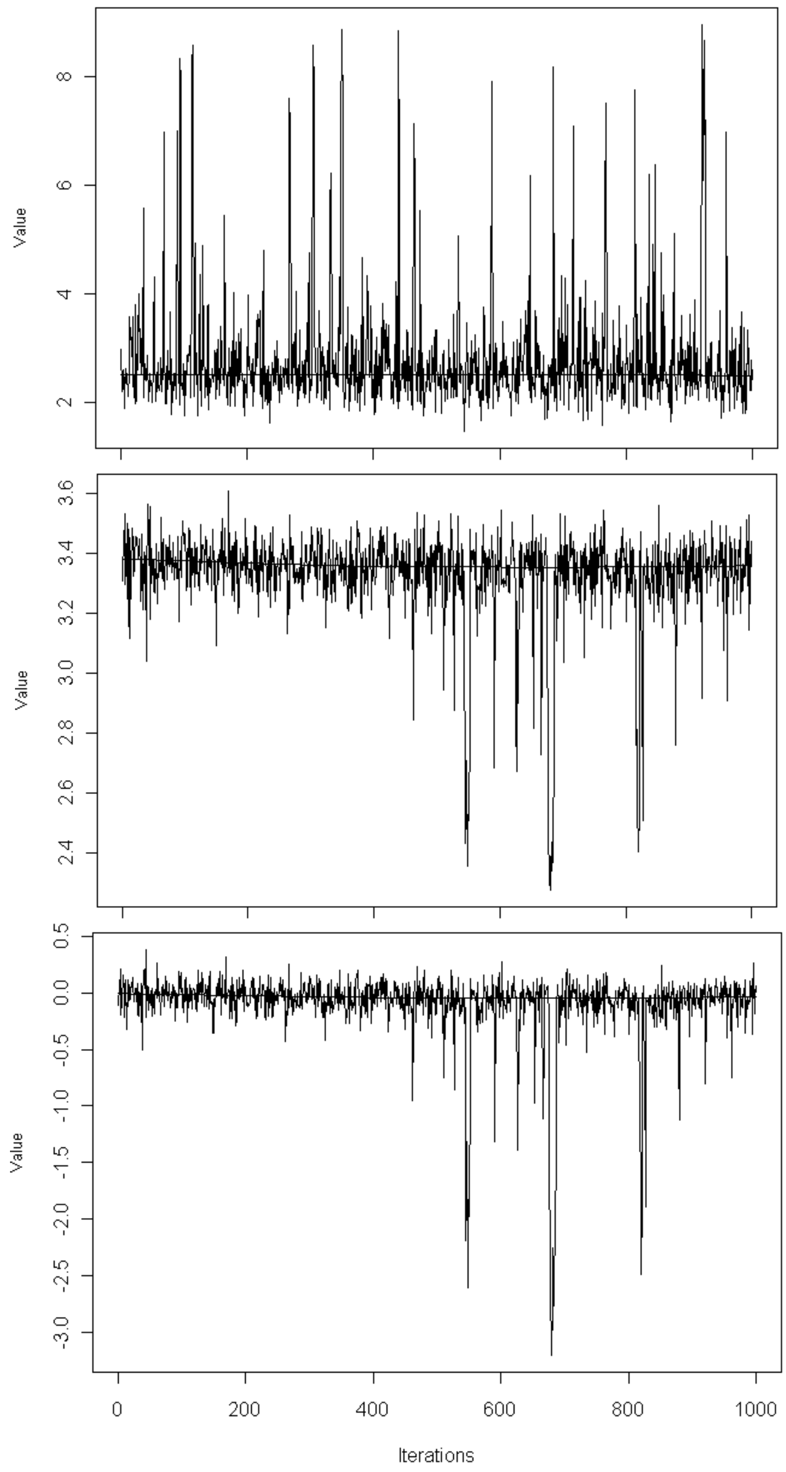

Figure 64. Trace of thinned samples from the posterior distribution for the three atypical selectivity parameters: 3rd quarter historical California ascending width (top), U.S. peak fishery selectivity in 2001 (middle) and U.S. ascending width of fishery selectivity in 2001 (bottom).

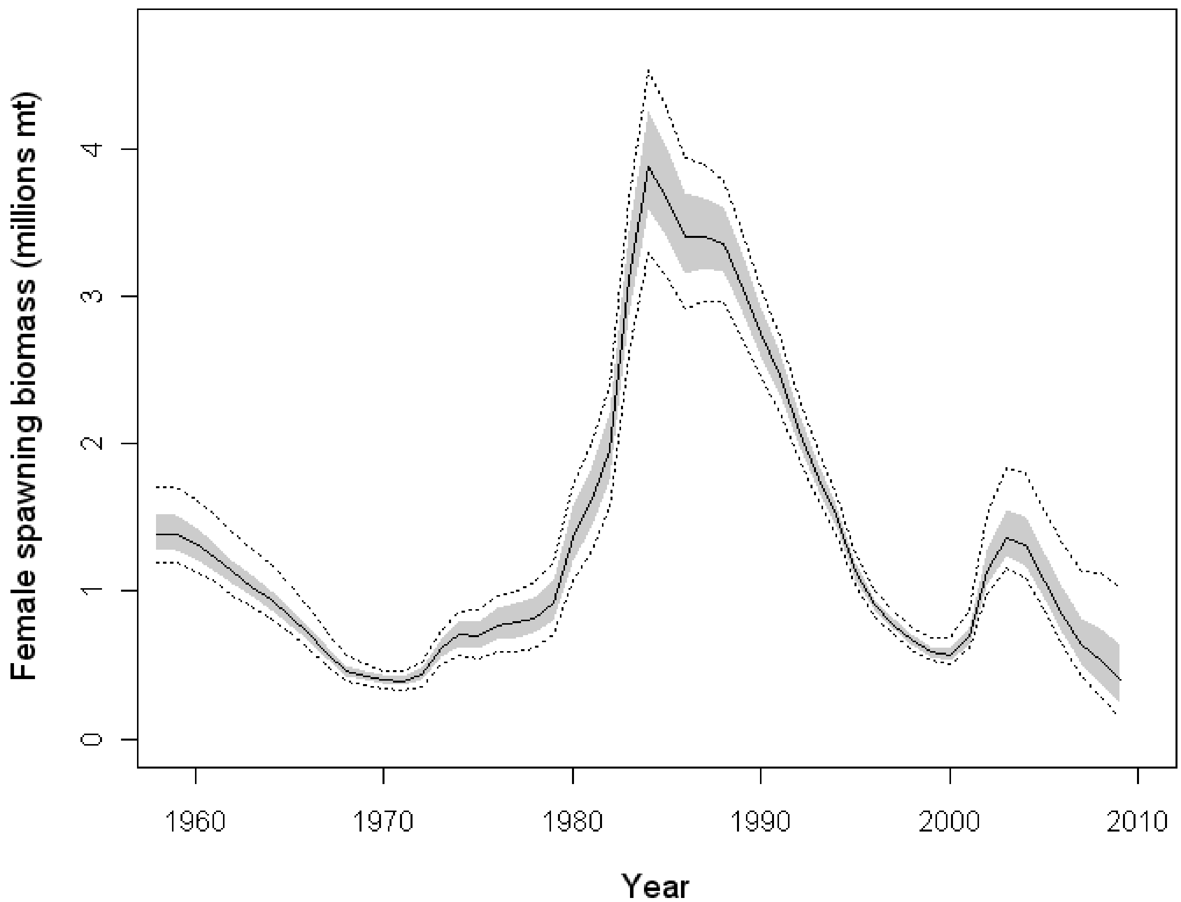

Figure 65. Time-series of posterior intervals for female spawning biomass; dark line indicates the median value, shaded region the ~95% credibility interval and dashed lines the minimum and maximum values present in the posterior distribution.

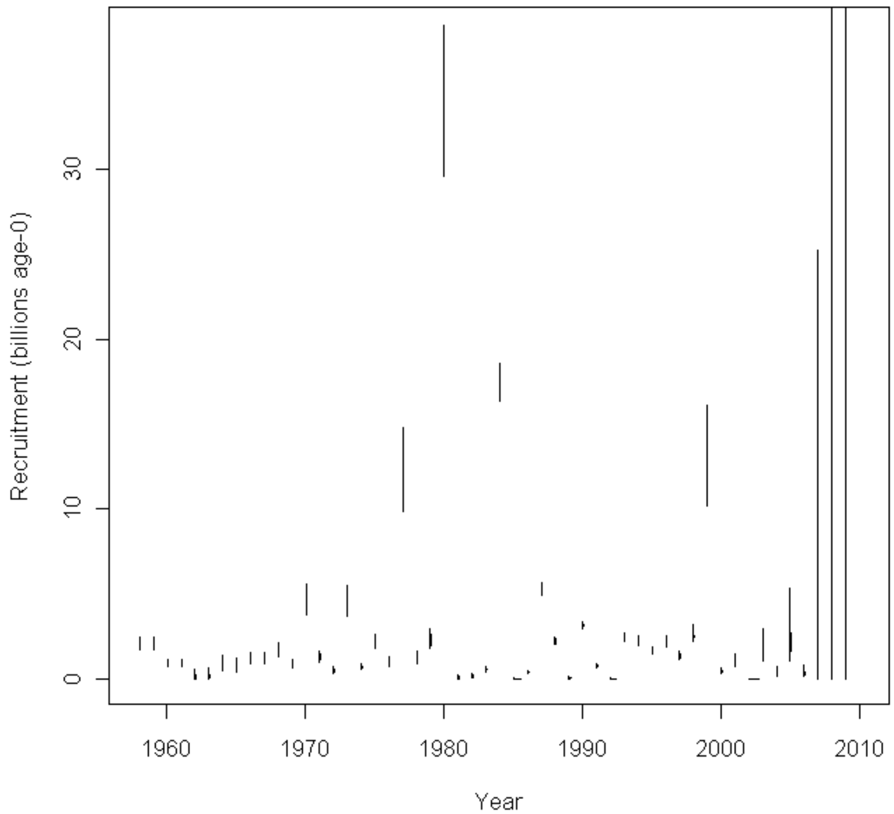

Figure 66. Time-series of posterior intervals (posterior density, minimum and maximum values visible) for age-0 recruitment.

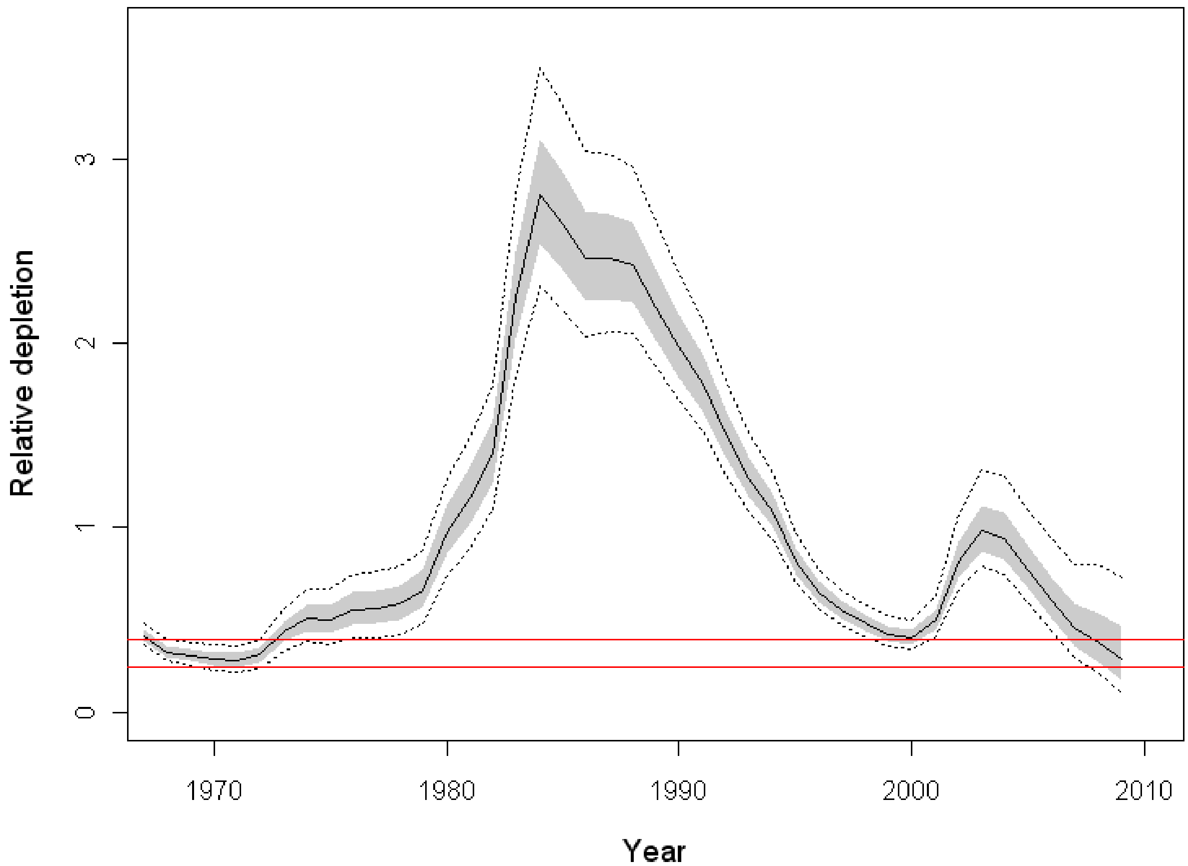

Figure 67. Time-series of posterior intervals for relative depletion; dark line indicates the median value, shaded region the ~95% credibility interval and dashed lines the minimum and maximum values present in the posterior distribution. Horizontal lines indicates the SB40% biomass target and SB25% biomass limit levels.

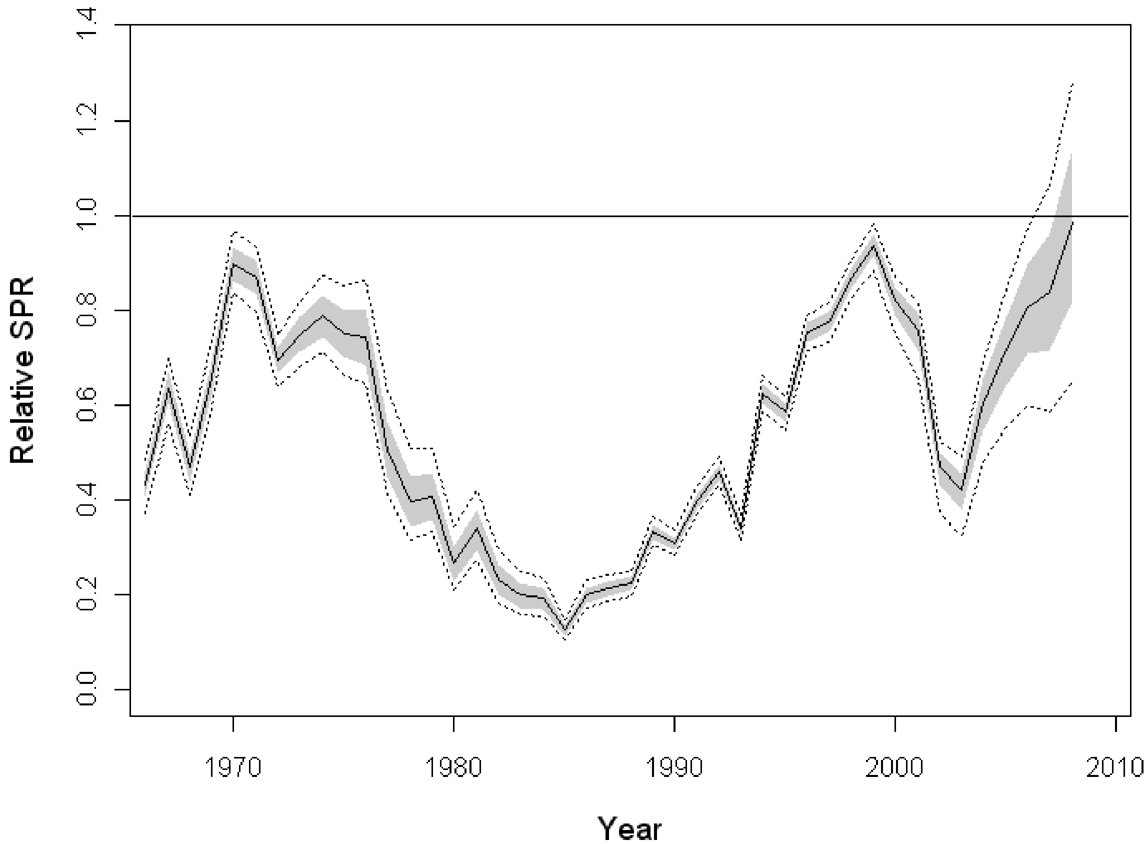

Figure 68. Time-series of posterior intervals for relative SPR, (1-SPR/1-$SPR_{Target=0.4}$); dark line indicates the median value, shaded region the ~95% credibility interval and dashed lines the minimum and maximum values present in the posterior distribution. Horizontal line indicates the overfishing threshold.

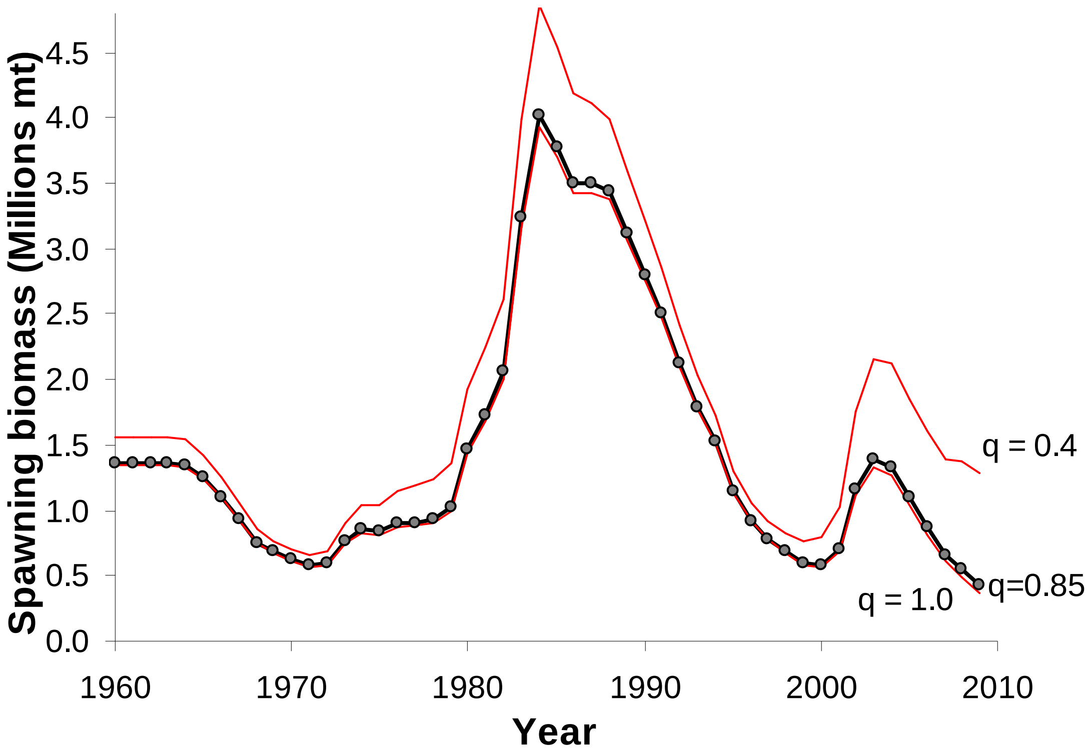

Figure 69. Results of sensitivity analysis to the estimated value for acoustic survey catchability (estimated value = 0.85).

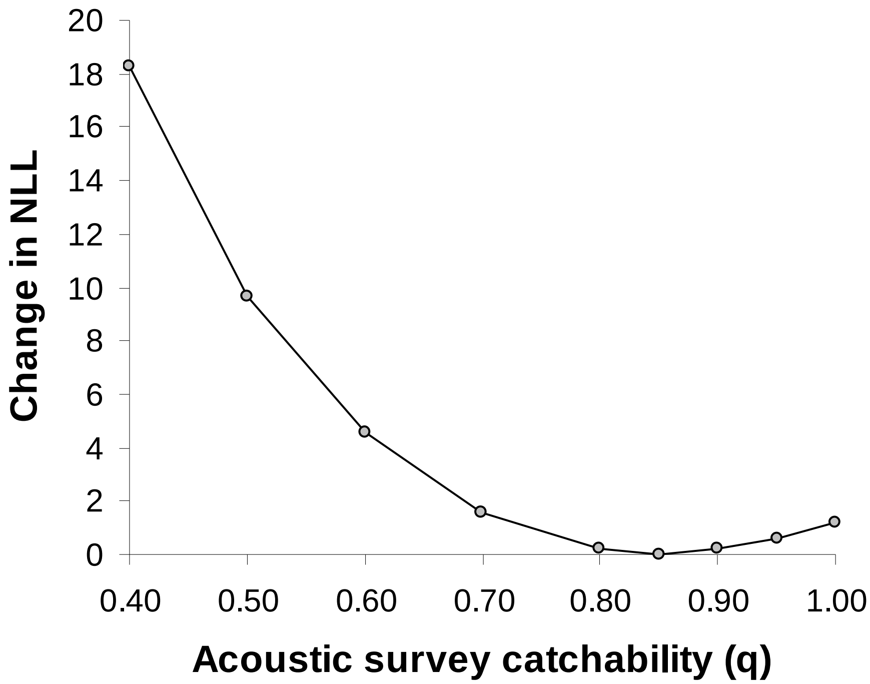

Figure 70. Likelihood profile for alternate values for acoustic survey catchability.

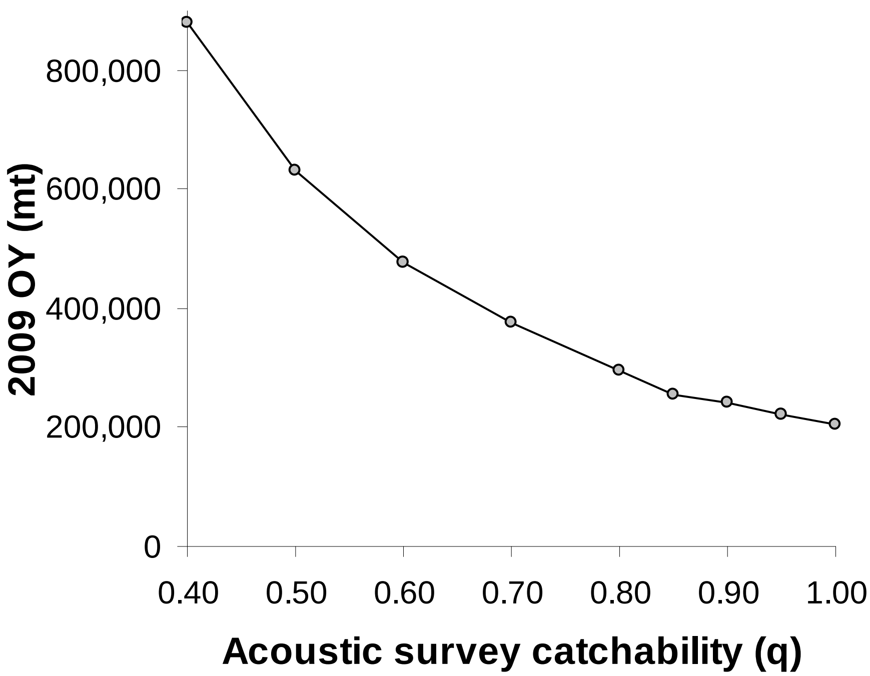

Figure 71. Management implication for alternate values for acoustic survey catchability.

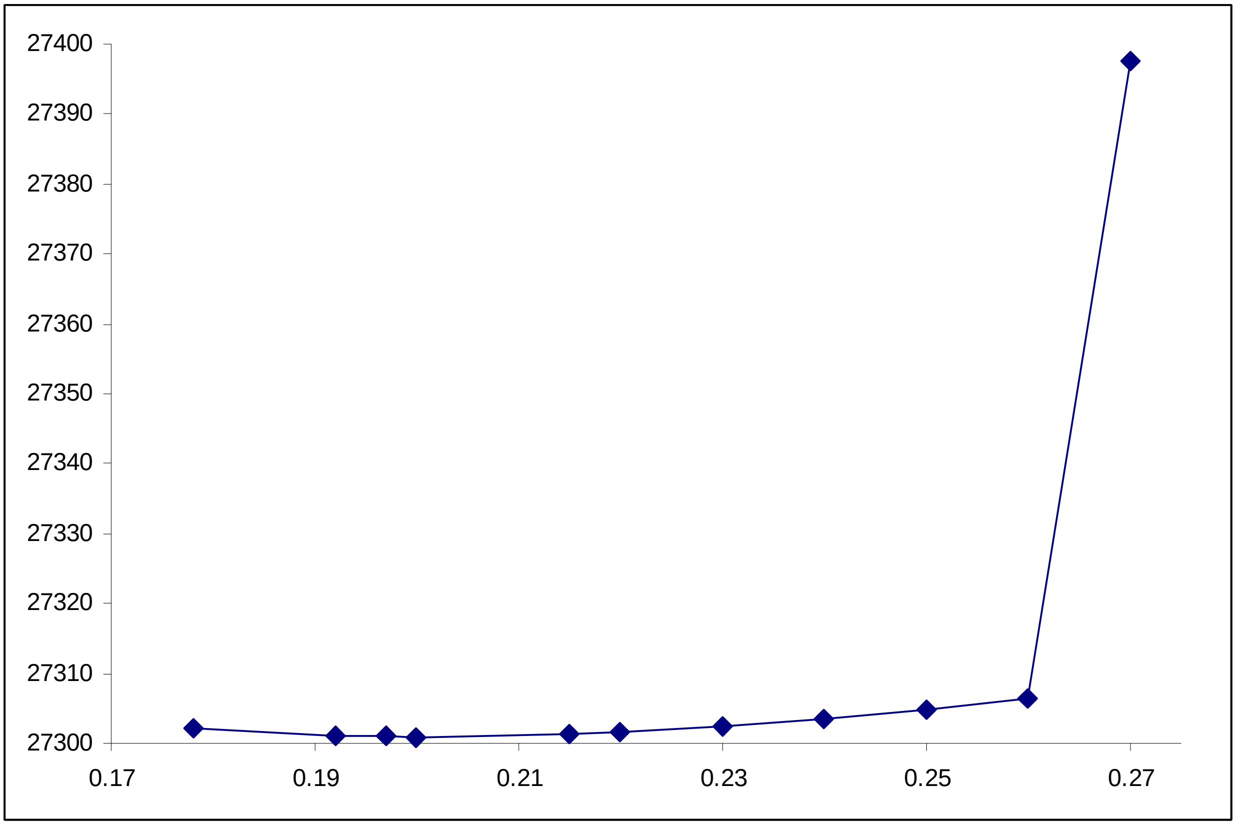

Figure 72. Likelihood profile for the natural mortality rate (*M*) through age 13.

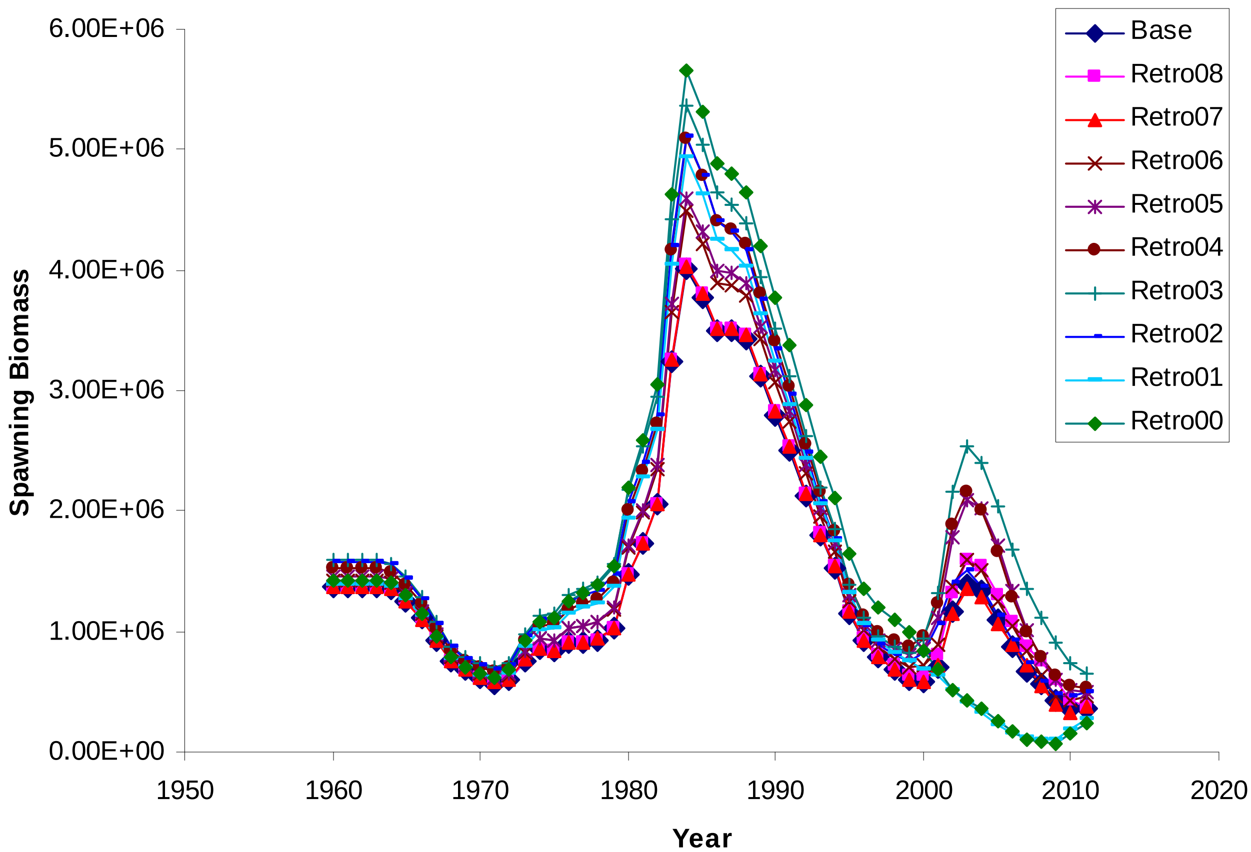

Figure 73. Retrospective pattern over the terminal years 2008 to 2002 as data from each terminal year are sequentially removed from the model.

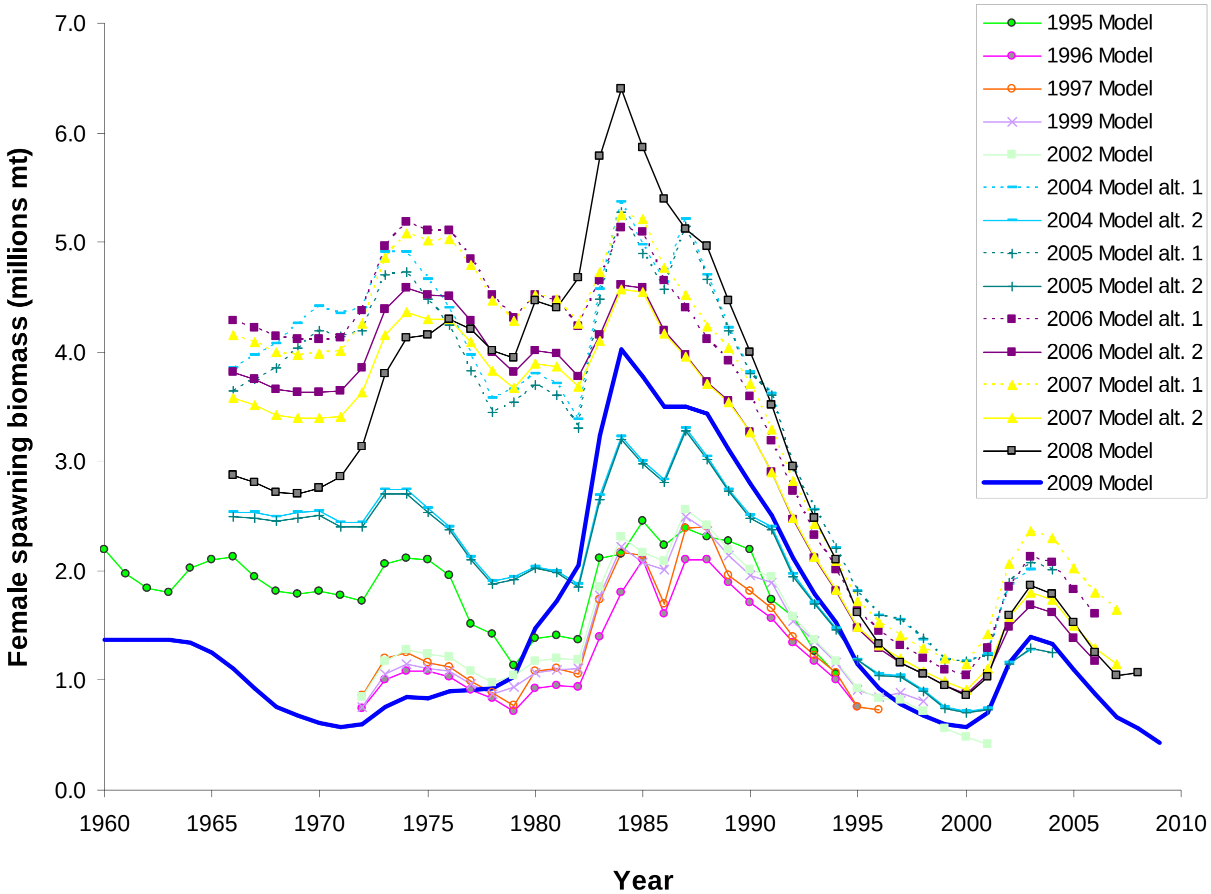

Figure 74. Retrospective of current model results compared with the 10 previous stock assessments 1995-2008 (1998, 2000, 2001, 2003 not included).

Appendix A. Stock synthesis model input files generating the base case assessment reported in this document.

```
#########################################################################
# 2009 base case hake starter file

hake_data.SS          # Data file
hake_control.SS       # Control file

0           # Read initial values from .par file: 0=no,1=yes
1           # DOS display detail: 0,1,2
2           # Report file detail: 0,1,2
0           # Detailed checkup.sso file (0,1)
0           # Write parameter iteration trace file during minimization
0           # Write cumulative report: 0=skip,1=short,2=full
0           # Include prior likelihood for non-estimated parameters
0           # Use Soft Boundaries to aid convergence (0,1) (recommended)
0           # N bootstrap datafiles to create
25          # Last phase for estimation
1           # MCMC burn-in
1           # MCMC thinning interval
0           # Jitter initial parameter values by this fraction
-1          # Min year for spbio sd_report (neg val = styr-2, virgin state)
-2          # Max year for spbio sd_report (neg val = endyr+1)
0           # N individual SD years
0.0000001 # Ending convergence criteria
0           # Retrospective year relative to end year
3           # Min age for summary biomass
1           # Depletion basis: denom is: 0=skip; 1=rel X*B0; 2=rel X*Bmsy; 3=rel X*B_styr
1.0         # Fraction (X) for Depletion denominator (e.g. 0.4)
1           # (1-SPR) reporting:  0=skip; 1=rel(1-SPR); 2=rel(1-SPR_MSY); 3=rel(1-SPR_Btarget); 4=notrel
1           # F_std reporting: 0=skip; 1=exploit(Bio); 2=exploit(Num); 3=sum(frates)
0           # F_report_basis: 0=raw; 1=rel Fspr; 2=rel Fmsy ; 3=rel Fbtgt

999 # end of file marker

#########################################################################

# 2009 Base case hake forecast controls

1           # Forecast: 0=none; 1=F(SPR); 2=F(MSY) 3=F(Btgt); 4=F(endyr); 5=Ave F (enter yrs); 6=read Fmult
2008        # First year for averaging selex to use in forecast (e.g. 2004; or use -x to be rel endyr)
2008        # Last year for averaging selex to use in forecast
1           # Benchmarks:0=skip, 1=calc Fspr, Fbtgt, Fmsy
2           # MSY: 0=none,1=F(SPR),2=calc F(MSY),3=F(Btgt),4=set to F(endyr)
0.4         # SPR target (e.g. 0.40)
0.4         # Biomass target (e.g. 0.40)
3           # Number of forecast years
1     # Read advanced options add indents below if 1
0           # Puntalyzer output: 0=no,1=yes
-1          # Rebuilder:  first year catch could have been set to zero (Ydecl)
-1          # Rebuilder:  year for current age structure (Yinit)
1           # Control rule method (1=west coast adjust catch; 2=adjust F)
0.4         # Control rule Biomass level for constant F (as frac of Bzero, e.g. 0.40)
0.1         # Control rule Biomass level for no F (as frac of Bzero, e.g. 0.10)
1           # Control rule fraction of Flimit (e.g. 0.75)
-1          # Placeholder: maximum annual catch during forecast (not coded yet)
0           # Implementation error: 0=none, 1=add error to forecast (not coded yet)
0.1         # Placeholder: SD of log(realized F/target F) in forecast (not coded yet)
2           # fleet allocation (in terms of F) (1=use endyr pattern, no read; 2=read below)
0.4663      0.5337 # relative F for forecast when using F;  seasons; fleets within season
0           # Number of manual forecast catches to input

999 # End forecast file

#########################################################################
```

```
# 2009 base case hake control file

# Morphs
1	# N growth patterns
1	# N sub morphs within patterns

# Time block setup
7	# Number of block designs for time varying parameters
1	# Blocks in design 1: Length at age 12
2	# Blocks in design 2: VBK
7	# Blocks in design 3: US peak
7	# Blocks in design 4: US ascending width
2	# Blocks in design 5: US final
6	# Blocks in design 6: CAN peak
4	# Blocks in design 7: CAN ascending width
1984 2008 # Block design 1: Length at age 12
1980 1986 # Block design 2: VBK
1999 2008
1981 1984 # Block design 3: US peak
1985 1988
1989 1992
1993 1996
1997 2000
2001 2004
2005 2008
1960 1980 # Block design 4: US ascending width
1981 1984
1985 1988
1989 1992
1997 2000
2001 2004
2005 2008
1984 2000 # Block design 5: US final
2001 2008
1981 1984 # Block design 6: CAN peak
1985 1988
1989 1992
1993 2000
2001 2004
2005 2008
1960 1984 # Block design 7: CAN ascending width
1989 2000
2001 2004
2005 2008

# Mortality and growth specifications
0.5	# Fraction female (birth)
1	# M setup: 0=single parameter,1=breakpoints,2=Lorenzen,3=age-specific;4=age-specific,seasonal interpolation
2	# Number of M breakpoints
13 15	# Ages at M breakpoints
1	# Growth model: 1=VB with L1 and L2, 2=VB with A0 and Linf, 3=Richards, 4=Read vector of L@A
2	# Age for growth Lmin
12	# Age for growth Lmax
0.0	# Constant added to SD of LAA (0.1 mimics SS2v1 for compatibility only)
0	# Variability of growth: 0=CV~f(LAA), 1=CV~f(A), 2=SD~f(LAA), 3=SD~f(A)
1	# Maturity option: 1=length logistic, 2=age logistic, 3=read vector of age-maturity
1	# First age allowed to mature
1 # Fecundity option
1	# MG parm offset option: 1=none, 2= M,G,CV_G as offset from GP1, 3=like SS2v1
1	# MG parm adjust method 1=do V1.23 approach, 2=use logistic transform between bounds approach

# Lo	Hi	Init	Prior	Prior	Prior	Param	Env	Use	Dev	Dev	Dev	Block
	block
# bnd	bnd	value	mean	type	SD	phase	var	dev	minyr	maxyr	SD	design
	switch
```

```
0.05	0.6	0.23	0.23	-1	99	-5	0	0	0	0	0	0
	0	# M to age 13
0.2	0.8	0.63	0.23	-1	99	4	0	0	0	0	0	0
	0	# M at age 15
10	40	32.0	32	-1	99	-5	0	0	0	0	0	0
	0	# Length at age 2
30	70	53.0	50	-1	99	4	0	0	0	0	0	1
	0	# Length at age 12
0.1	0.7	0.33	0.3	-1	99	4	0	0	0	0	0	2
	0	# VBK
0.03	0.16	0.066	0.1	-1	99	-5	0	0	0	0	0	0
	0	# CV of length at age 2
0.03	0.16	0.062	0.1	-1	99	-5	0	0	0	0	0	0
	0	# CV of length at age 12

# Add 2+2*gender lines to read the wt-Len and mat-Len parameters
-3	3	7.0E-06	7.0E-06	-1	99	-50	0	0	0	0	0	0
	0	# W-L slope
-3	3	2.9624	2.9624	-1	99	-50	0	0	0	0	0	0
	0	# W-L exponent
-3	43	36.89	36.89	-1	99	-50	0	0	0	0	0	0
	0	# L at 50% maturity
-3	3	-0.48	-0.48	-1	99	-50	0	0	0	0	0	0
	0	# Logistic maturity slope
-3	3	1.0	1.0	-1	99	-50	0	0	0	0	0	0
	0	# Eggs/gm intercept
-3	3	0.0	0.0	-1	99	-50	0	0	0	0	0	0
	0	# Eggs/gm slope
# pop lines For the proportion assigned to each area
0	2	1	1	-1	99	-50	0	0	0	0	0	0
	0	# placeholder only
0	2	1	1	-1	99	-50	0	0	0	0	0	0
	0	# placeholder only
0	2	1	1	-1	99	-50	0	0	0	0	0	0
	0	# placeholder only
0	2	1	1	-1	99	-50	0	0	0	0	0	0
	0	# placeholder only

# Block parameter setup
1 # 0=one par for all; 1= one par for each

# Lo	Hi	Init	Prior	Prior	Prior	Param
# bnd	bnd	value	mean	type	SD	phase
# Length at age 12
 -2	2	-0.05	0	0	0.01	4
# VBK
 -2	2	-0.14	0	0	0.01	4
 -2	2	0.10	0	0	0.01	4

# Seasonal effects on biology parameters
 0 0 0 0 0 0 0 0 0 0 # placeholder only

# Spawner-recruit parameters
3	# S-R function: 1=B-H w/flat top, 2=Ricker, 3=standard B-H, 4=no steepness or bias adjustment
# Lo	Hi	Init	Prior	Prior	Prior	Param
# bnd	bnd	value	mean	type	SD	phase
11	21	15.4	15	-1	99	4	# Ln(R0)
0.2	1	0.85	0.777	2	0.113	4	# Steepness with Myers' prior
1.0	2.0	1.1	1.1	-1	99	6	# Sigma-R
-5	5	0	0	-1	99	-50	# Env link coefficient
-5	5	0	0	-1	99	-50	# Initial eqilibrium recruitment offset
 0	2	0	1	-1	99	-50	# Autocorrelation in rec devs
0 # index of environmental variable to be used
0 # env target
1 # rec dev type

# Recruitment deviations
```

```
1962       # Start year standard recruitment devs
2007       # End year standard recruitment devs
1          # Rec Dev phase

1 # Read 11 advanced recruitment options: 0=no, 1=yes
-5         # Start year for early rec devs
-9         # Phase for early rec devs
6          # Phase for forecast recruit deviations
1          # Lambda for forecast recr devs before endyr+1
1961       # Last recruit dev with no bias_adjustment
1962       # First year of full bias correction (linear ramp from year above)
2006       # Last year for full bias correction in_MPD
2007       # First_recent_yr_nobias_adj_in_MPD
-7         # Lower bound rec devs
7          # Upper bound rec devs
0          # Read init values for rec devs

# Fishing mortality setup
0.1        # F ballpark for tuning early phases
1999       # F ballpark year
1          # F method:  1=Pope's; 2=Instan. F; 3=Hybrid
0.9        # Max F or harvest rate (depends on F_Method)
# Init F parameters by fleet
#LO        HI        INIT      PRIOR     PR_type   SD        PHASE
0          1         0.0       0.01      -1        99        -50
0          1         0.0       0.01      -1        99        -50

# Catchability setup
# A=do power: 0=skip, survey is prop. to abundance, 1= add par for non-linearity
# B=env. link: 0=skip, 1= add par for env. effect on Q
# C=extra SD: 0=skip, 1= add par. for additive constant to input SE (in ln space)
# D=type: <0=mirror lower abs(#) fleet, 0=no par Q is median unbiased, 1=no par Q is mean unbiased, 2=estimate par for ln(Q)
#          3=ln(Q) + set of devs about ln(Q) for all years. 4=ln(Q) + set of devs about Q for indexyr-1
# E=Units: 0=numbers, 1=biomass
# F=err_type 0=lognormal, >0=T-dist. DF=input value
# A B C D E F
# Create one par for each entry > 0 by row in cols A-D
0          0         0         0         1         0  # US fishery
0          0         0         0         1         0  # Can Fishery
0          0         0         2         1         0  # Acoustic survey
0          0         0         2         0         0  # Juv survey
0          0         0         0         1         0  # Ghost Acoustic Survey
0          0         0         0         1         0  # Ghost US Fishery
0          0         0         0         1         0  # Ghost Can Fishery
0          0         0         0         1         0  # CA 1
0          0         0         0         1         0  # CA 2
0          0         0         0         1         0  # CA 3
0          0         0         0         1         0  # CA 4

#LO        HI        INIT        PRIOR PR_type SD PHASE
-5         0.5       -0.3566749 0        -1        0.4       5    # Acoustic survey
-15        0         -8.0        0       -1        99        -5   # Pre-recruit survey

#_SELEX_&_RETENTION_PARAMETERS
# Size-based setup
# A=Selex option: 1-24
# B=Do_retention: 0=no, 1=yes
# C=Male offset to female: 0=no, 1=yes
# D=Mirror selex (#)
# A B C D
# Size selectivity
0          0         0         0         # US Fishery
0          0         0         0         # CAN Fishery
0          0         0         0         # Acoustic survey
32         0         0         0         # Pre-recruit survey - index density independent recruitment
0          0         0         0         # Ghost acoustic
0          0         0         0         # Ghost US Fishery
```

```
0	0	0	0	# Ghost Can Fishery
0	0	0	0	# Hist CA fishery 1st quarter
0	0	0	0	# Hist CA fishery 2nd quarter
0	0	0	0	# Hist CA fishery 3rd quarter
0	0	0	0	# Hist CA fishery 4th quarter
# Age selectivity
20	0	0	0	# US Fishery
20	0	0	0	# CAN Fishery
20	0	0	0	# Acoustic survey
10	0	0	0	# Pre-recruit survey - index density independent recruitment
15	0	0	3	# Ghost acoustic
15	0	0	1	# Ghost US Fishery
15	0	0	2	# Ghost Can Fishery
20	0	0	0	# Hist CA fishery 1st quarter
20	0	0	0	# Hist CA fishery 2nd quarter
20	0	0	0	# Hist CA fishery 3rd quarter
20	0	0	0	# Hist CA fishery 4th quarter

# Selectivity parameters
# Lo	Hi	Init	Prior	Prior	Prior	Param	Env	Use	Dev	Dev	Dev	Block
	block
# bnd	bnd	value	mean	type	SD	phase	var	dev	minyr	maxyr	SD	design
	switch
# US Fishery Age-based double Normal selectivity
2.0	15	6.0	8.0	-1	99	2	0	0	0	0	0	3
	1	# Peak age
-9.0	3.0	-2.0	-1.5	-1	99	-5	0	0	0	0	0	0	0
	# Top (logistic)
-9.0	15.0	3.0	3.0	-1	99	2	0	0	0	0	0	4
	1	# Asc. width (exp)
-9.0	15.0	8.0	2.0	-1	99	-2	0	0	0	0	0	0	1	# Desc.
width (exp)
-2000	5.0	-1002	-1.0	-1	99	-50	0	0	0	0	0	0	0
	# Initial = 0.0 < age 2
-5.0	5.0	-1.0	.45	-1	99	2	0	0	0	0	0	5
	1	# Final (logistic)
# Canadian Fishery Age-based double Normal selectivity
2.0	15	8.0	8.0	-1	99	2	0	0	0	0	0	6
	1	# Peak age
-9.0	3.0	-2.0	-1.5	-1	99	-5	0	0	0	0	0	0
	0	# Top (logistic)
-9.0	15.0	3.0	3.0	-1	99	2	0	0	0	0	0	7
	1	# Asc. width (exp)
-9.0	15.0	8.0	2.0	-1	99	-2	0	0	0	0	0	0	1	# Desc.
width (exp)
-2000	5.0	-1002	-1.0	-1	99	-50	0	0	0	0	0	0	0
	# Initial = 0.0 < age 2
-5.0	10.0	-1.0	.45	-1	99	2	0	0	0	0	0	0
	1	# Final (logistic)
# Acoustic Survey Age-based double Normal selectivity
2.0	15	6.0	8.0	-1	99	2	0	0	0	0	0	0
	0	# Peak age
-9.0	3.0	-2.0	-1.5	-1	99	-5	0	0	0	0	0	0
	0	# Top (logistic)
-9.0	9.0	4.0	3.0	-1	99	2	0	0	0	0	0	0
	0	# Asc. width (exp)
-9.0	9.0	3.0	2.0	-1	99	-2	0	0	0	0	0	0	0
	#DESC WIDTH exp
-2000	5.0	-1002	-1.0	-1	99	-50	0	0	0	0	0	0
	0	# Initial = 0.0 < age 2
-5.0	5.0	-0.0	.45	-1	99	2	0	0	0	0	0	0
	0	# Final (logistic)
# Hist CA fishery 1st quarter Age-based Double Normal selectivity
0.0	15	5.0	8.0	-1	99	-5	0	0	0	0	0	0
	0	# Peak age
-9.0	3.0	-2.0	-1.5	-1	99	-5	0	0	0	0	0	0
	0	# Top (logistic)
```

```
-9.0    9.0     8.99    3.0     -1      99      -5      0       0       0       0       0       0
        0       # Asc. width (exp)
-9.0    9.0  3.0 2.0    -1      99      -5      0       0       0       0       0       0       0
        # Desc. width (exp)
-2000   5.0     -1002   -1.0    -1      99   -50 0      0       0       0       0       0       0
        # Initial = 0.0 < age 2
-5      5       4.99    0.45    -1      99   -5  0      0       0       0       0       0       0
        # Final (logistic)
# Hist CA fishery 2nd quarter Age-based Double Normal selectivity
2.0     15      5.0     8.0     -1      99      -5      0       0       0       0       0       0
        0       # Peak age
-9.0    3.0     -2.0    -1.5    -1      99      -5      0       0       0       0       0       0
        0       # Top (logistic)
-9.0    9.0     3.0     3.0     -1      99      5       0       0       0       0       0       0
        0       # Asc. width (exp)
-9.0    9.0  3.0 2.0    -1      99      -5      0       0       0       0       0       0       0
        # Desc. width (exp)
-2000   5.0     -1002   -1.0    -1      99   -50 0      0       0       0       0       0       0
        # Initial = 0.0 < age 2
-5      5       4.99    0.45    -1      99   -5  0      0       0       0       0       0       0
        # Final (logistic)
# Hist CA fishery 3rd quarter Age-based Double Normal selectivity
2.0     15      5.0     8.0     -1      99      -5      0       0       0       0       0       0
        0       # Peak age
-9.0    3.0     -2.0    -1.5    -1      99      -5      0       0       0       0       0       0
        0       # Top (logistic)
-9.0    9.0     3.0     3.0     -1      99      5       0       0       0       0       0       0
        0       # Asc. width (exp)
-9.0    9.0  2.75       2.0     -1      99      -5      0       0       0       0       0       0
        0       # Desc. width (exp)
-2000   5.0     -1002   -1.0    -1      99   -50 0      0       0       0       0       0       0
        # Initial = 0.0 < age 2
-5      5       4.99    0.45    -1      99   -5  0      0       0       0       0       0       0
        # Final (logistic)
# Hist CA fishery 4th quarter Age-based Double Normal selectivity
2.0     15      5.0     8.0     -1      99   -5  0      0       0       0       0       0       0
        # Peak age
-9.0    3.0     -2.0    -1.5    -1      99   -5  0      0       0       0       0       0       0
        # Top (logistic)
-9.0    9.0     8.99    3.0     -1      99      -5      0       0       0       0       0       0
        0       # Asc. width (exp)
-9.0    9.0  3.0 2.0    -1      99   -5  0      0       0       0       0       0       0       # Desc.
width (exp)
-2000   5.0     -1002   -1.0    -1      99   -50 0      0       0       0       0       0       0
        # Initial = 0.0 < age 2
-5      5       -1.5    0.45    -1      99   5   0      0       0       0       0       0       0
        # Final (logistic)

# Selectivity block parameter setup
0 # 0=one parameter for all; 1=one parameter for each
# Lo    Hi      Init    Prior   Prior   Prior   Param
# bnd   bnd     value   mean    type    SD      phase
  -10   10      0       0       -1      99      3

1 # Block adjust method: 1=standard; 2=logistic trans to keep in base parm bounds
0 # Tagging flag: 0=no tagging parameters,1=read tagging parameters

### Likelihood related quantities ###
1 # Do variance/sample size adjustments by fleet (1)
#US   CAN  Ac   Pre G G G CA1  CA2  CA3  CA4  # Component
 0    0    0    0   0 0 0 0    0    0    0    # Constant added to acoustic survey CV
 0    0    0    0   0 0 0 0    0    0    0    # Constant added to discard SD
 0    0    0    0   0 0 0 0    0    0    0    # Constant added to body weight SD
 0.09 1.04 1.41 0   0 0 0 1.40 1.40 1.40 1.40 # multiplicative scalar for length comps
 1.70 1.78 3.27 0   0 0 0 0    0    0    0    # multiplicative scalar for agecomps
 0    0    0    0   0 0 0 0    0    0    0    # multiplicative scalar for length at age obs
```

```
30          # Discard df
30          # Mean weight df
1           # Lambda phasing: 1=none, 2+=change beginning in phase 1
1           # Growth offset likelihood constant for Log(s): 1=include, 2=not

4 # N changes to default Lambdas = 1.0
# Component codes:
#  1=Survey, 2=discard, 3=mean body weight
#  4=length frequency, 5=age frequency, 6=Weight frequency
#  7=size at age, 8=catch, 9=initial equilibrium catch
#  10=rec devs, 11=parameter priors, 12=parameter devs
#  13=Crash penalty
# Component fleet/survey  phase  value  wtfreq_method
 1 4 1 0.0 1 # Pre-recruit survey data fleet 4
 5 5 1 0.0 1 # Ghost Age data Acoustic fleet 5
 5 6 1 0.0 1 # Ghost Age data US fleet 6
 5 7 1 0.0 1 # Ghost Age data CAN fleet 7

0 # SD reporting switch
999 # End control file

###########################################################################

# 2009 hake base case data file

### Global model specifications ###
1960        # Start year
2008        # End year
1           # Number of seasons/year
12          # Number of months/season
1           # Spawning occurs at beginning of season
2           # Number of fishing fleets
9           # Number of surveys
1           # Number of areas
US_Fishery%CAN_Fishery%Acoustic_Survey%Prerec_Survey%Ghost_acoustic%Ghost_US%Ghost_CAN%Hist_CA1%Hist_CA2%Hist_CA3
%Hist_CA4
0.5 0.5 0.5 0.0001 0.5 0.5 0.5 0.125 0.375 0.625 0.875 #_surveytiming_in_season
1 1 1 1 1 1 1 1 1 1 1    # Area of each fleet
1 1         # Units for catch by fishing fleet: 1=Biomass(mt),2=Numbers(1000s)
0.01 0.01 # SE of log(catch) by fleet for equilibrium and continuous options
1           #_Ngenders
15          #_Nages

### Catch section ###
# Initial equilibrium catch (landings + discard) by fishing fleet
0 0  #_init_equil_catch_for_each_fishery

43 # Number of lines catch data
# Landed catch (only) time series by fleet
# Catch(by fleet) YearSeason
# US        CAN
137000      700         1966    1
177662      36713       1967    1
60819       61361       1968    1
86280       93851       1969    1
159575      75009       1970    1
127913      26699       1971    1
74133       43413       1972    1
147513      15126       1973    1
194109      17150       1974    1
205656      15704       1975    1
231549      5972        1976    1
127502      5191        1977    1
98372       5267        1978    1
124680      12435       1979    1
72352       17584       1980    1
114760      24361       1981    1
```

```
75577	32157	1982	1
73150	40774	1983	1
96332	42109	1984	1
85439	24962	1985	1
154964	55653	1986	1
160448	73699	1987	1
160698	88106	1988	1
210996	94920	1989	1
183800	75992	1990	1
217505	89753	1991	1
208576	88334	1992	1
141222	58213	1993	1
252729	108800	1994	1
177589	72181	1995	1
212901	93174	1996	1
233423	91792	1997	1
232817	87802	1998	1
224522	87333	1999	1
208418	22402	2000	1
182377	53585	2001	1
132115	50796	2002	1
143492	62090	2003	1
210487	124185	2004	1
259199 100462	2005	1
266957 93726	2006 1
224529 86315	2007 1
247797 74220	2008 1

20 #_N_cpue_and_surveyabundance_observations
#_year seas index obs se(log)
# Acoustic survey
1977 1 3 1915000 0.5
1980 1 3 2115000 0.5
1983 1 3 1647000 0.5
1986 1 3 2857000 0.5
1989 1 3 1238000 0.5
1992 1 3 2169000 0.25
1995 1 3 1385000 0.25
1998 1 3 1185000 0.25
2001 1 3 737000 0.25
2003 1 3 1840000 0.25
2005 1	3 1265000 0.25
2007 1 3 879000 0.25
# Pre-recruit index
2001 1	4 820.81 0.4245
2002 1	4 357.08 0.2298
2003 1	4 791.57 0.3142
2004 1	4 1659.21 0.2816
2005 1	4 383.40 0.2691
2006 1	4 208.59 0.1757
2007 1	4 68.38 0.1317
2008 1	4 138.36 0.1713

2 #_discard_type
0 #_N_discard_obs
0 #_N_meanbodywt_obs

## Population size structure
3 # Length bin method: 1=Use data bins,
 # 2=generate from min/max/width read below
 # 3=Read count and vector below
62 # Count of population bins
# Lower edge of bins
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
56 57 58 59 60 61 62 63 64 65 66 67 68 69 70

-1	# Minimum proportion for compressing tails of observed compositional data
```

0.001 # Constant added to expected frequencies
0 # Combine males and females at and below this bin number

51 #_N_LengthBins
Lower edge of bins
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70

92 #_N_Length_obs
#Yr Seas Flt/Svy Gender Part Nsamp datavector(female-male)
US fishery

1975	1	1	0	0	13	0.0000	0.0000	0.0000	0.1310	0.4138	0.4138	0.6101
	0.6101	0.3291	0.7411	1.5447	0.9566	4.6455	4.0107	4.1898	5.3717	3.0869	2.8926	2.0167
	1.0373	4.3164	4.0849	7.0859	7.4219	7.1653	7.1658	4.9095	4.0224	5.0698	2.3889	3.2625
	1.2916	3.4063	0.0000	1.1843	1.0342	0.3465	0.4138	0.8734	0.9032	0.3465	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.1310	0.1742	0.0000				
1976	1	1	0	0	249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016
	0.0000	0.0056	0.0033	0.0383	0.0461	0.0619	0.0983	0.2605	0.2710	0.4635	0.5851	0.9688
	1.7104	2.6494	3.7108	5.1325	5.6852	6.3574	6.5997	6.6614	6.7014	6.7809	6.7467	6.3412
	6.0203	5.7434	5.0318	4.0850	2.9869	2.1415	1.3175	1.1743	0.7971	0.5916	0.4178	0.3714
	0.2021	0.3217	0.1198	0.0626	0.1229	0.0766	0.0428	0.4921				
1977	1	1	0	0	1071	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0018	0.0134	0.0376	0.0706	0.1661	0.4152	0.6903
	1.1624	1.8450	2.7529	4.3062	5.5899	5.8003	7.0414	7.6587	8.0144	8.2014	8.0120	7.8118
	7.2003	6.2315	4.7967	3.7873	2.7235	1.7045	1.2366	0.8199	0.5163	0.3222	0.2985	0.1799
	0.1885	0.1195	0.0886	0.0573	0.0324	0.0296	0.0462	0.0296				
1978	1	1	0	0	1135	0.0000	0.0137	0.0335	0.0204	0.0187	0.0129	0.0269
	0.0195	0.0268	0.0177	0.0119	0.0196	0.0000	0.0052	0.0068	0.0000	0.0232	0.0374	0.1341
	0.4019	1.1005	1.8736	3.2463	4.8921	6.2182	7.2486	8.1810	8.5122	8.8032	8.7842	8.3771
	7.6130	6.8721	5.5053	3.9908	2.9505	1.7999	1.1040	0.6053	0.4234	0.2603	0.2115	0.1333
	0.0826	0.1005	0.0837	0.0252	0.0539	0.0204	0.0118	0.0858				
1979	1	1	0	0	1539	0.0037	0.0097	0.0000	0.0000	0.0045	0.0116	0.0377
	0.1272	0.2419	0.3627	0.6064	0.9330	1.0785	1.2116	1.3609	1.1767	1.0738	0.9737	0.8697
	0.7638	1.0134	1.2884	2.1901	3.1243	4.4482	5.5505	6.5905	7.3083	7.4803	7.3508	7.1915
	6.8207	6.1776	5.2697	4.4570	3.4610	2.5085	1.9857	1.3847	1.0024	0.6851	0.4921	0.3971
	0.2037	0.1600	0.1547	0.1172	0.0869	0.0479	0.0772	0.1275				
1980	1	1	0	0	811	0.0091	0.0023	0.0015	0.0000	0.0073	0.0000	0.0000
	0.0087	0.0126	0.0458	0.0204	0.0433	0.1149	0.2228	0.5250	0.7315	1.2779	2.1458	3.0350
	3.7493	4.1531	4.0760	4.3104	4.0557	4.3473	4.6273	5.0774	5.6263	5.8858	6.0686	5.8665
	5.5856	5.4307	5.0389	4.3970	3.5729	2.4554	2.0179	1.4813	1.1084	0.7881	0.5016	0.3861
	0.4173	0.1653	0.1672	0.1005	0.0862	0.0783	0.0779	0.0960				
1981	1	1	0	0	1093	0.0800	0.1084	0.3599	0.7080	0.9938	1.3236	1.4714
	1.4205	1.1953	0.9210	0.5505	0.3604	0.3151	0.1801	0.1889	0.2756	0.5729	0.9527	1.7359
	2.9281	4.0255	5.0184	5.6197	6.0028	6.2402	6.2228	6.0960	5.8936	5.4876	5.3678	5.1780
	4.8316	4.1992	3.4228	2.5465	1.9163	1.4854	1.0655	0.5759	0.4974	0.3794	0.2661	0.1841
	0.1667	0.1191	0.0804	0.0909	0.0528	0.0518	0.0368	0.2368				
1982	1	1	0	0	1142	0.0012	0.0006	0.0006	0.0069	0.0278	0.0623	0.1581
	0.3195	0.4785	0.7517	1.1521	1.7236	2.2861	2.4465	2.4854	2.2689	2.0172	1.5572	1.1535
	1.1139	1.6668	2.6606	3.7590	4.8387	5.2255	5.3355	5.4254	5.3001	5.2641	5.1765	5.0040
	4.8301	4.5324	4.1043	3.5769	3.1039	2.2985	1.8991	1.4468	1.2094	0.8385	0.6099	0.4744
	0.3877	0.2877	0.1802	0.1433	0.1309	0.0730	0.0768	0.1282				
1983	1	1	0	0	1069	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0039
	0.0049	0.0079	0.0489	0.1747	0.4093	0.9641	1.9860	3.0671	3.7988	4.5641	5.0988	5.4378
	5.5811	5.4899	5.2058	4.8753	4.4715	4.3545	4.5081	4.6308	4.5736	4.3279	4.1003	3.7933
	3.3540	3.0048	2.5516	2.1759	1.7089	1.3795	0.9958	0.7211	0.5140	0.4447	0.4355	0.3254
	0.2806	0.1772	0.1214	0.0937	0.0720	0.0499	0.0400	0.0738				
1984	1	1	0	0	2035	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0105	0.0637	0.2676	0.8974	2.4412	4.6053	7.0343
	8.2610	8.8066	8.8926	8.7328	8.0202	6.4816	5.1629	4.8620	4.4832	4.1105	3.7143	3.0779
	2.4524	1.9414	1.4921	1.0246	0.7090	0.4861	0.3571	0.2395	0.2084	0.1822	0.1480	0.1098
	0.1142	0.0654	0.0783	0.0392	0.0748	0.0613	0.0518	0.2390				
1985	1	1	0	0	2061	0.0087	0.0274	0.0648	0.1319	0.2167	0.3147	0.4723
	0.5712	0.7749	0.8416	0.8311	0.7368	0.6614	0.4257	0.2871	0.2003	0.2466	0.5571	1.2729
	2.9829	5.8356	7.8579	8.7403	9.0648	8.9656	8.5779	7.5892	6.4114	5.4273	4.5509	3.8589
	2.9729	2.3139	1.7167	1.2206	0.8974	0.6230	0.3798	0.2779	0.1994	0.1635	0.1281	0.0756
	0.1044	0.0668	0.0528	0.0551	0.0356	0.0388	0.0281	0.1439				

1986	1	1	0	0	3878	0.0000	0.0016	0.0013	0.0000	0.0013	0.0028	0.0096
	0.0200	0.0693	0.1515	0.3138	0.5911	1.1404	2.1111	3.2822	3.7332	3.8731	3.7860	3.3537
	2.7946	3.0905	5.3259	7.2056	8.0638	8.2040	8.0180	7.5393	6.3690	4.9986	3.8386	3.0525
	2.3423	1.8172	1.3727	1.0227	0.6270	0.4857	0.3479	0.2423	0.1877	0.1401	0.1158	0.0973
	0.0599	0.0422	0.0187	0.0227	0.0287	0.0125	0.0215	0.0526				
1987	1	1	0	0	3406	0.0007	0.0003	0.0003	0.0034	0.0017	0.0011	0.0010
	0.0046	0.0057	0.0063	0.0188	0.0204	0.0694	0.2387	0.6284	1.1515	2.2635	4.1013	5.6298
	6.4771	6.8780	6.9840	7.1824	7.5291	7.5888	7.4579	7.1477	6.4886	5.4910	4.4749	3.4480
	2.5218	1.8452	1.3414	0.9380	0.5999	0.3987	0.3065	0.1802	0.1242	0.0990	0.0605	0.0629
	0.0346	0.0404	0.0319	0.0267	0.0229	0.0186	0.0088	0.0434				
1988	1	1	0	0	3035	0.0007	0.0000	0.0000	0.0000	0.0017	0.0093	0.0120
	0.0258	0.0340	0.0449	0.0486	0.0299	0.0550	0.0644	0.1627	0.3887	0.8553	1.5375	3.2362
	5.6799	7.6535	8.5678	8.8030	8.8150	8.6617	8.3324	8.0693	7.2917	6.1416	4.5565	3.2785
	2.2118	1.6226	1.0448	0.8112	0.4643	0.3538	0.2647	0.2094	0.1601	0.0876	0.0695	0.0400
	0.0650	0.0289	0.0369	0.0335	0.0233	0.0179	0.0229	0.0740				
1989	1	1	0	0	2581	0.0005	0.0067	0.0011	0.0040	0.0045	0.0000	0.0043
	0.0110	0.0275	0.1121	0.3024	0.6741	1.0166	1.2433	1.2873	1.1719	1.1842	1.3513	1.8609
	3.2026	5.4862	7.6096	8.4166	8.5480	8.5158	8.3558	8.1199	7.4837	6.5009	5.1206	3.5657
	2.4235	1.8394	1.2021	0.9268	0.6719	0.4551	0.2600	0.2193	0.2046	0.1429	0.0997	0.0843
	0.0574	0.0486	0.0286	0.0164	0.0259	0.0302	0.0163	0.0577				
1990	1	1	0	0	2039	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0011	0.0165	0.0335	0.0560	0.1147	0.2150	0.3131	0.6847	1.0370	1.6040	2.5415	3.9025
	5.3464	6.1623	6.6671	7.1218	7.7462	7.9435	8.0196	7.9224	7.6186	6.9470	5.6783	3.7969
	2.7834	1.6893	1.1798	0.7962	0.5256	0.3690	0.2677	0.2133	0.1416	0.0824	0.0778	0.0709
	0.0621	0.0564	0.0224	0.0350	0.0320	0.0178	0.0174	0.0702				
1991	1	1	0	0	817	0.0253	0.0066	0.0046	0.0095	0.0000	0.0000	0.0037
	0.0188	0.0188	0.0064	0.0447	0.1253	0.2715	0.4231	0.8148	1.2033	2.0136	2.9728	3.5959
	4.2063	4.7795	5.9500	6.1653	6.8269	8.1632	8.4062	8.7522	7.8287	6.3656	4.8131	3.4933
	2.4196	1.6501	1.3979	1.2589	1.1846	1.1067	0.9981	0.8329	0.6915	0.3356	0.2210	0.1430
	0.1272	0.0789	0.0680	0.0615	0.0107	0.0326	0.0170	0.0554				
1992	1	1	0	0	836	0.0281	0.0667	0.0757	0.0833	0.0847	0.0681	0.0818
	0.0962	0.1170	0.1903	0.2537	0.4457	0.6030	0.7764	1.1068	1.3336	1.8384	2.0298	1.6095
	1.8875	3.7787	5.8426	7.3393	8.9692	10.0915	10.2542	9.9512	9.4832	7.3533	5.4802	3.2085
	1.8284	1.2047	0.7084	0.4253	0.3018	0.2260	0.1613	0.1262	0.0848	0.0840	0.0563	0.0546
	0.0267	0.0317	0.0166	0.0102	0.0082	0.0162	0.0065	0.0938				
1993	1	1	0	0	442	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0070	0.0000	0.0000	0.0082	0.1118	0.0949	0.4661	1.0299	1.9220	3.7253	4.5722	6.2424
	6.2361	5.8973	5.3501	5.8937	7.2187	8.3169	8.6226	8.8043	7.5067	7.1225	4.6537	2.7273
	1.3580	0.5706	0.4606	0.3049	0.2458	0.1720	0.1125	0.0270	0.0518	0.0266	0.0349	0.0235
	0.0061	0.0025	0.0025	0.0047	0.0000	0.0576	0.0000	0.0085				
1994	1	1	0	0	649	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0015	0.0141	0.0015	0.0170	0.0052	0.0191	0.0819	0.1821	0.6538	1.5734	3.1216
	4.4610	5.8132	6.9431	7.4792	8.1627	8.4792	9.3948	9.4855	8.9230	7.8291	5.9172	4.1409
	2.6141	1.4632	1.0154	0.6571	0.4624	0.2675	0.1930	0.1728	0.1298	0.1028	0.0608	0.0196
	0.0257	0.0226	0.0176	0.0132	0.0044	0.0019	0.0104	0.0457				
1995	1	1	0	0	470	0.1038	0.0228	0.0198	0.0284	0.0357	0.0357	0.0357
	0.0198	0.0000	0.0000	0.0091	0.0078	0.0571	0.0912	0.1238	0.1013	0.2443	0.2585	0.5044
	1.1955	2.3724	4.4641	6.6707	9.0914	10.4171	10.4798	10.8746	9.6864	8.4629	6.6830	5.2642
	3.6818	2.8972	1.8339	1.2249	0.8681	0.5701	0.5399	0.2679	0.2461	0.1648	0.1209	0.0787
	0.0556	0.0218	0.0338	0.0073	0.0208	0.0036	0.0000	0.0018				
1996	1	1	0	0	557	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0151
	0.0148	0.0575	0.0624	0.3453	0.9726	1.5831	3.0203	3.8219	4.7231	4.1074	3.4972	3.3323
	3.8879	4.0162	4.3223	4.5049	5.8851	7.4956	8.5752	8.2382	7.4850	6.1778	4.4124	3.4555
	2.1185	1.4007	0.7752	0.5304	0.3100	0.2074	0.2374	0.1246	0.0495	0.0525	0.0369	0.0385
	0.0192	0.0183	0.0234	0.0000	0.0000	0.0104	0.0000	0.0381				
1997	1	1	0	0	681	0.0000	0.0000	0.0000	0.0000	0.0000	0.0054	0.0000
	0.0000	0.0000	0.0000	0.0004	0.0129	0.0242	0.0621	0.1670	0.5697	1.1618	2.5034	4.2684
	6.5930	9.1337	10.3301	10.9611	10.6951	9.1385	8.2452	6.7816	5.6553	4.4197	3.4122	2.0201
	1.2148	0.7188	0.4538	0.3833	0.2249	0.2018	0.0783	0.1077	0.0375	0.0815	0.0931	0.1300
	0.0086	0.0097	0.0081	0.0552	0.0051	0.0000	0.0129	0.0138				
1998	1	1	0	0	803	0.0000	0.0019	0.0000	0.0356	0.0312	0.0000	0.0000
	0.0018	0.0050	0.0307	0.1578	0.5719	1.1926	1.8658	1.8962	2.1940	3.1873	4.9169	5.9828
	6.3878	6.7259	7.5506	8.9308	9.1918	8.9787	7.9720	6.5252	5.1066	3.8389	2.3801	1.5499
	0.8679	0.5270	0.3689	0.2026	0.1499	0.1612	0.1050	0.0570	0.0861	0.0879	0.0039	0.0120
	0.0034	0.0132	0.0171	0.0161	0.0014	0.0454	0.0000	0.0642				
1999	1	1	0	0	2268	0.0028	0.0000	0.0000	0.0030	0.0088	0.0298	0.0088
	0.0562	0.1532	0.3180	0.7684	1.1024	1.6890	2.4598	3.4549	4.0658	5.0615	5.8249	6.6752

	6.3233	6.6134	6.1512	6.1289	6.7057	6.9914	7.0649	6.3137	4.8892	3.6905	2.3132	1.5526
	1.0083	0.7842	0.4498	0.3077	0.1635	0.1629	0.1472	0.0544	0.1511	0.0529	0.0800	0.0497
	0.0106	0.0125	0.0187	0.0165	0.0089	0.0198	0.0152	0.0657				
2000	1	1	0	0	2199	0.0008	0.0000	0.0000	0.0000	0.0000	0.0049	0.0230
	0.0779	0.1520	0.3576	0.3585	0.3253	0.2198	0.2314	0.2139	0.3953	0.6127	1.1692	1.9467
	2.6461	4.1004	4.7630	5.8897	6.8340	8.3000	9.5471	9.8429	9.2381	8.5885	6.6670	5.2995
	3.7409	2.5171	1.7399	1.2479	0.7236	0.4943	0.5228	0.3619	0.2084	0.1557	0.1254	0.0844
	0.0832	0.0432	0.0291	0.0261	0.0251	0.0104	0.0289	0.0260				
2001	1	1	0	0	2239	0.0040	0.0047	0.0000	0.0142	0.0049	0.0144	0.0049
	0.0450	0.0368	0.1065	0.2524	0.5181	0.7379	1.0920	1.5401	2.4071	3.1572	3.3718	3.3389
	3.6980	4.1295	4.9045	5.9444	6.3796	6.9969	7.3855	8.0234	8.2212	7.5621	5.8676	4.3308
	3.3034	2.0719	1.5149	0.9362	0.6821	0.4124	0.2491	0.1603	0.1745	0.1023	0.0504	0.0731
	0.0517	0.0206	0.0268	0.0330	0.0073	0.0166	0.0030	0.0161				
2002	1	1	0	0	1821	0.0000	0.0000	0.0000	0.0000	0.0000	0.0153	0.0000
	0.0005	0.0005	0.0009	0.0349	0.0455	0.0237	0.0205	0.1192	0.3983	0.9800	2.6734	5.4078
	8.8163	10.7909	12.1021	11.2284	9.1867	6.7869	5.1606	4.4545	3.5139	3.1230	2.9931	2.6154
	2.2683	1.8634	1.5485	1.1389	0.7967	0.4894	0.3872	0.2213	0.1985	0.1627	0.1216	0.0636
	0.0584	0.0544	0.0301	0.0271	0.0061	0.0231	0.0117	0.0366				
2003	1	1	0	0	1915	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0300	0.0000	0.0000	0.0387	0.0022	0.0769	0.0808	0.1733	0.9888	2.3873	4.6812
	8.0242	11.1703	11.9985	12.9450	12.6406	10.5481	8.0278	5.3379	3.5339	2.3350	1.6809	1.1599
	0.7129	0.4354	0.2866	0.2158	0.1281	0.1050	0.0474	0.0597	0.0310	0.0171	0.0142	0.0162
	0.0138	0.0066	0.0076	0.0093	0.0099	0.0000	0.0080	0.0143				
2004	1	1	0	0	2797	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0007	0.0016	0.0038	0.0089	0.0000	0.0000	0.0081	0.0131	0.0296	0.1831	0.6135
	1.4590	3.7500	7.0232	11.1220	14.3372	15.4579	14.7871	10.8375	7.4020	4.8577	2.7464	1.7989
	1.2653	0.6564	0.3878	0.2692	0.2233	0.2484	0.0934	0.0338	0.0283	0.0757	0.0703	0.0158
	0.0102	0.0581	0.0045	0.0151	0.0173	0.0045	0.0044	0.0767				
2005	1	1	0	0	3064	0.0039	0.0031	0.0026	0.0020	0.0000	0.0023	0.0000
	0.0000	0.0000	0.0030	0.0024	0.0063	0.0239	0.0509	0.0915	0.1204	0.1841	0.4387	0.5751
	0.6107	1.1091	2.4939	6.2652	12.8750	18.8037	19.4426	15.5383	9.6723	5.1798	2.7770	1.4521
	0.8477	0.4493	0.3130	0.1687	0.1364	0.0896	0.0711	0.0473	0.0281	0.0267	0.0180	0.0129
	0.0096	0.0076	0.0067	0.0072	0.0038	0.0045	0.0044	0.0175				
2006	1	1	0	0	2824	0.0080	0.0112	0.0136	0.0303	0.0380	0.0436	0.0995
	0.0849	0.1161	0.1820	0.3199	0.3412	0.4424	0.6127	0.5952	0.4830	0.5777	0.8092	1.1048
	1.9977	3.4644	4.1244	5.3737	8.2206	12.9583	15.6928	15.2216	11.1138	7.0618	4.1189	1.9392
	1.1155	0.5196	0.2754	0.1379	0.1278	0.0776	0.1017	0.0682	0.0344	0.0414	0.0425	0.0251
	0.0278	0.0354	0.0148	0.0260	0.0123	0.0161	0.0074	0.0926				
2007	1	1	0	0	2936	0.7915	0.0932	0.0502	0.0665	0.0725	0.0426	0.0384
	0.0898	0.1579	0.3023	0.4876	0.9153	1.3500	1.6763	1.7752	1.7866	1.8838	1.6279	1.4620
	1.1528	1.2516	1.9565	3.2215	5.2290	7.9868	11.5435	14.1474	13.7874	10.0416	6.2371	3.9688
	1.8856	0.9790	0.6219	0.3572	0.2097	0.1553	0.1589	0.0589	0.0893	0.0639	0.0571	0.0220
	0.0483	0.0184	0.0114	0.0112	0.0051	0.0046	0.0018	0.0469				
2008	1	1	0	0	4393	0.0066	0.0071	0.0059	0.0261	0.0611	0.0906	0.1415
	0.1279	0.2075	0.2284	0.2358	0.4577	0.8917	1.4951	1.7772	2.0294	2.3977	3.6479	6.2008
	7.5883	7.4040	5.8294	4.2896	3.5710	4.0102	5.5131	7.2468	8.0764	7.4739	5.9879	4.3737
	2.9931	1.8650	1.2504	0.7588	0.5447	0.3135	0.2519	0.1554	0.1293	0.0514	0.0910	0.0474
	0.0364	0.0248	0.0126	0.0247	0.0149	0.0036	0.0121	0.0189				
# Canadian fishery												
1988	1	2	0	0	38	0.0000	0.0000	0.0000	0.0015	0.0042	0.0013	0.0000
	0.0012	0.0000	0.0026	0.0047	0.0016	0.0109	0.0287	0.0347	0.1011	0.1622	0.2725	0.4999
	0.8217	1.6591	3.0254	5.2973	7.5743	9.8487	11.8018	11.9507	10.6459	8.8695	6.9198	5.2416
	4.0676	3.0620	2.1469	1.6566	1.2806	0.8882	0.6213	0.4338	0.3289	0.2480	0.1422	0.0926
	0.0926	0.0635	0.0281	0.0175	0.0131	0.0143	0.0048	0.0143				
1989	1	2	0	0	43	0.0040	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0079	0.0039	0.0013	0.0116	0.0234	0.0729
	0.1029	0.3302	1.1841	3.6208	7.3076	11.0626	13.9101	14.3775	12.2475	10.0729	7.4976	5.3460
	3.8031	2.5146	1.9580	1.3638	0.8697	0.6090	0.4848	0.2969	0.2583	0.2076	0.1215	0.0985
	0.0644	0.0415	0.0313	0.0347	0.0133	0.0026	0.0093	0.0314				
1990	1	2	0	0	33	0.0025	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0146	0.0089	0.0665	0.0878	0.1169
	0.2445	0.6916	0.8924	1.9520	4.6396	8.2469	13.1450	15.1195	14.6946	12.1628	8.7682	6.0184
	3.8082	2.6119	1.7409	1.1643	0.8935	0.7293	0.4191	0.3702	0.2793	0.2472	0.1841	0.1927
	0.1571	0.0847	0.0648	0.0653	0.0228	0.0194	0.0370	0.0351				
1991	1	2	0	0	56	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0031	0.0100	0.0000	0.0033	0.0073	0.0033	0.0288	0.0615	0.1335
	0.1961	0.2554	0.5079	0.7854	1.3650	3.2862	6.6629	11.0345	14.2636	15.4089	13.1927	9.9821

	7.0393	4.8797	3.3430	2.1798	1.4970	1.0171	0.7579	0.5609	0.3871	0.3152	0.2666	0.1598
	0.1119	0.0769	0.0668	0.0524	0.0185	0.0272	0.0168	0.0327				
1992	1	2	0	0	60	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0015	0.0000	0.0000	0.0000	0.0017	0.0017	0.0070	0.0113
	0.0170	0.1428	0.4641	1.4115	3.5680	7.2311	11.7795	16.0994	16.7776	14.5902	10.6207	6.6180
	3.9245	2.3324	1.3938	0.8834	0.5575	0.3640	0.2610	0.2263	0.1462	0.1277	0.1166	0.0871
	0.0495	0.0532	0.0353	0.0125	0.0261	0.0057	0.0117	0.0424				
1993	1	2	0	0	60	0.0102	0.0000	0.0000	0.0017	0.0000	0.0014	0.0000
	0.0014	0.0103	0.0061	0.0079	0.0053	0.0019	0.0014	0.0039	0.0054	0.0045	0.0070	0.0187
	0.0581	0.2378	0.6761	1.7934	4.2474	9.5096	15.5218	19.1337	17.8105	12.9661	7.8210	4.2887
	2.2775	1.3447	0.7572	0.4675	0.3220	0.2047	0.1464	0.1057	0.0596	0.0460	0.0213	0.0202
	0.0200	0.0028	0.0151	0.0076	0.0100	0.0072	0.0031	0.0103				
1994	1	2	0	0	76	0.0391	0.0037	0.0033	0.0034	0.0025	0.0051	0.0019
	0.0009	0.0027	0.0026	0.0015	0.0000	0.0017	0.0023	0.0013	0.0090	0.0121	0.0202	0.0211
	0.0403	0.1377	0.3263	0.7286	1.8425	4.1592	8.2000	13.3817	16.8869	16.0807	12.8616	9.0190
	5.6153	3.4957	2.2325	1.5106	0.9776	0.6701	0.4595	0.3314	0.2424	0.1778	0.1279	0.0899
	0.0687	0.0405	0.0392	0.0236	0.0318	0.0200	0.0084	0.0378				
1995	1	2	0	0	43	0.5433	0.5663	1.5444	2.8853	2.8406	3.0367	2.0194
	1.2639	0.6258	0.1966	0.0873	0.0440	0.0292	0.0483	0.0254	0.0278	0.0167	0.0000	0.0000
	0.0034	0.0068	0.0722	0.2495	0.9728	2.6665	5.3574	9.1578	12.8613	14.7039	12.3917	9.3775
	5.8628	3.5750	2.4331	1.2689	0.9287	0.6043	0.4867	0.3577	0.3214	0.1383	0.1170	0.0715
	0.0482	0.0518	0.0412	0.0355	0.0100	0.0000	0.0113	0.0151				
1996	1	2	0	0	54	0.0024	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0069	0.0168	0.0622	0.1235	0.2794	0.4614	0.8566	1.3516	1.9391	2.2300
	2.0055	1.5635	1.2560	1.4221	2.7105	5.4517	10.2072	14.0882	15.4694	13.5617	9.5714	6.3589
	3.5570	2.0126	1.1256	0.7121	0.4531	0.2665	0.2264	0.1552	0.0981	0.0831	0.0799	0.0618
	0.0397	0.0297	0.0245	0.0246	0.0090	0.0115	0.0090	0.0244				
1997	1	2	0	0	102	0.0000	0.0000	0.0045	0.0045	0.0175	0.0095	0.0180
	0.0283	0.0240	0.0361	0.0300	0.0346	0.0303	0.0320	0.0191	0.0136	0.0307	0.1000	0.2532
	0.9009	2.1714	3.9752	6.0868	7.3180	8.2774	8.8846	10.3676	10.7128	10.2442	8.6087	6.4056
	4.5583	3.0897	2.2322	1.5336	1.0943	0.7586	0.6056	0.3728	0.2314	0.2456	0.1737	0.1118
	0.0810	0.0760	0.0483	0.0550	0.0183	0.0299	0.0052	0.0394				
1998	1	2	0	0	94	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0291	0.0055	0.0152	0.0201	0.0309	0.0786	0.2148	0.4806	0.9896
	1.9114	3.1067	4.6458	7.7507	10.9445	13.0675	13.7215	12.3742	9.4706	6.3908	4.2349	2.5262
	1.4915	0.9287	0.5946	0.3971	0.2716	0.2143	0.1214	0.1003	0.0878	0.0475	0.0406	0.0232
	0.0258	0.0235	0.0122	0.0057	0.0036	0.0029	0.0049	0.0093				
1999	1	2	0	0	136	0.0000	0.0140	0.0037	0.0090	0.0010	0.0034	0.0066
	0.0057	0.0316	0.0521	0.1189	0.3614	0.7028	1.1060	1.7214	1.9452	2.0639	2.0924	2.2368
	2.8403	3.0093	3.6328	4.6785	6.2507	8.1427	10.3291	10.9685	10.3095	8.5619	6.2326	3.9248
	2.8442	1.7230	1.1824	0.7861	0.5753	0.4115	0.2814	0.1936	0.1657	0.0846	0.1275	0.0871
	0.0396	0.0642	0.0204	0.0157	0.0201	0.0028	0.0078	0.0104				
2000	1	2	0	0	16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0002	0.0115	0.0269	0.0783	0.2229	0.5715	0.8796	1.3716	1.4679
	1.9613	2.4665	3.4212	4.4835	5.4263	6.1167	6.3849	7.2244	8.1919	8.6751	8.1729	7.9389
	6.0299	4.6940	3.5788	2.7613	1.9144	1.6095	1.1091	0.8607	0.6031	0.4619	0.4388	0.2513
	0.2007	0.1381	0.0794	0.0489	0.0472	0.0230	0.0196	0.0364				
2001	1	2	0	0	72	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0095	0.0067	0.0587	0.2057	0.2672	0.2541	0.2360	0.2768	0.1680	0.1071	0.0729	0.0268
	0.0359	0.0413	0.0228	0.1328	0.3029	0.7079	1.4757	3.0338	5.7325	8.9079	11.2086	12.8480
	11.8996	10.4744	8.4391	6.5580	4.7269	3.5529	2.5374	1.8422	1.1844	0.7793	0.5817	0.3953
	0.2782	0.2220	0.1321	0.1047	0.0273	0.0319	0.0287	0.0642				
2002	1	2	0	0	103	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0116	0.0168	0.0046	0.0046	0.0049	0.0295	0.0076
	0.0620	0.0081	0.0366	0.1599	0.2942	0.4882	1.1396	1.3920	2.5956	4.8810	7.4663	10.1087
	12.5335	12.7077	11.0521	8.9671	6.8943	5.5104	4.3519	2.7694	1.8741	1.5376	1.1212	0.6999
	0.4071	0.2684	0.1780	0.1428	0.0868	0.0675	0.0483	0.0700				
2003	1	2	0	0	118	0.0000	0.0078	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0091	0.0000	0.0376	0.0168	0.0530	0.0391	0.0327	0.0427	0.0346
	0.0000	0.2505	1.1718	2.9946	5.7363	9.9890	11.3838	12.8838	11.9749	10.6071	9.6759	6.2904
	4.3829	3.3957	2.1501	1.5351	1.2581	1.0889	0.6767	0.5597	0.3709	0.3422	0.3288	0.1696
	0.2269	0.0750	0.0465	0.0194	0.0403	0.0334	0.0069	0.0614				
2004	1	2	0	0	101	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0022	0.0021	0.0056	0.0015	0.0062	0.0079	0.0102	0.0059	0.0287	0.0284	0.0883
	0.2258	0.6649	1.9245	4.8011	9.4218	13.3395	15.5264	14.0944	11.8361	9.0958	6.2083	4.1077
	2.6686	1.7630	1.1389	0.7698	0.6081	0.4042	0.3224	0.2523	0.1392	0.1278	0.0905	0.0712
	0.0548	0.0269	0.0236	0.0117	0.0218	0.0183	0.0096	0.0419				

2005	1	2	0	0	130	0.0000	0.0000	0.0000	0.0010	0.0000	0.0030	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0043	0.0021	0.0072	0.0201	0.0402
	0.0701	0.2991	0.5674	2.2474	5.5402	9.6405	13.5221	15.5204	14.7159	11.1222	8.5734	6.1017
	3.7296	2.3164	1.4919	1.1319	0.7689	0.6852	0.5564	0.3588	0.2161	0.1146	0.2099	0.0687
	0.0986	0.0455	0.0433	0.0322	0.0013	0.0181	0.0074	0.1072				
2006	1	2	0	0	136	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0430
	0.0006	0.0000	0.0204	0.0011	0.0000	0.0273	0.0364	0.0360	0.0025	0.0017	0.0435	0.0119
	0.1024	0.1601	0.5107	1.2618	2.7040	5.0533	8.4006	11.8521	14.1337	13.0027	11.9276	8.6126
	6.3217	4.1324	2.7241	2.1604	1.5860	1.0035	0.9456	0.6311	0.7092	0.4058	0.2925	0.2235
	0.1914	0.1281	0.1315	0.1141	0.0468	0.0870	0.0301	0.1892				
2007	1	2	0	0	167	0.0034	0.0002	0.0002	0.0002	0.0001	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0005	0.0005	0.0017	0.0038	0.0017
	0.0034	0.0063	0.0072	0.0181	0.0308	0.0567	0.0763	0.1203	0.1430	0.1501	0.1002	0.0946
	0.0594	0.0386	0.0210	0.0170	0.0097	0.0101	0.0059	0.0041	0.0029	0.0024	0.0016	0.0022
	0.0017	0.0017	0.0005	0.0009	0.0002	0.0003	0.0001	0.0005				
2008	1	2	0	0	188	0.0000	0.0000	0.0000	0.0000	0.0002	0.0004	0.0015
	0.0034	0.0030	0.0016	0.0011	0.0022	0.0032	0.0059	0.0127	0.0108	0.0129	0.0081	0.0153
	0.0120	0.0212	0.0131	0.0172	0.0144	0.0217	0.0329	0.0602	0.0764	0.1226	0.1003	0.1239
	0.0854	0.0737	0.0451	0.0334	0.0168	0.0126	0.0075	0.0080	0.0042	0.0054	0.0017	0.0033
	0.0010	0.0022	0.0011	0.0000	0.0000	0.0004	0.0000	0.0000				
# Acoustic survey												
1977	1	3	0	0	85	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0762	0.1870	0.4156	0.4018	0.6304	0.6719	0.8313	1.2122	1.3716
	1.3716	1.5932	2.1543	2.7847	3.6021	4.1009	4.3918	5.1676	6.9825	8.2433	9.4417	8.9983
	7.4397	6.5738	5.2092	3.8930	2.7847	2.2582	1.7872	1.1153	0.8728	0.7551	0.5819	0.5611
	0.3671	0.3117	0.1940	0.2078	0.1316	0.0485	0.0554	0.0554				
1980	1	3	0	0	49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0241	0.0000	0.0241	0.0723	0.3135	0.6872	1.7483	3.7618	5.6909
	6.1249	5.2689	3.8582	1.5192	0.8922	0.5426	0.7596	1.9050	3.2433	5.8235	8.3193	9.2838
	8.5483	8.1022	6.2937	4.7263	3.0625	2.0979	1.5915	1.0851	0.6872	0.6028	0.4943	0.2773
	0.1688	0.2411	0.1206	0.1326	0.1206	0.1085	0.0603	0.0603				
1983	1	3	0	0	35	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0232	0.0116	0.0348	0.4295	1.6369	4.1560	7.8941	10.5410	11.4465
	9.2408	7.7084	5.4678	3.6568	2.4611	2.1477	2.4611	3.3666	4.0051	4.2141	3.8542	3.5407
	2.8326	2.2638	1.8923	1.4511	0.8591	0.7198	0.4644	0.2786	0.3367	0.1741	0.1393	0.0929
	0.0580	0.0116	0.0116	0.0580	0.0116	0.0116	0.0232	0.0000				
1986	1	3	0	0	43	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
	0.0003	0.0003	0.0020	0.0064	0.0223	0.0598	0.1116	0.1155	0.0614	0.0239	0.0072	0.0033
	0.0023	0.0039	0.0113	0.0382	0.0693	0.0909	0.0990	0.0670	0.0486	0.0372	0.0298	0.0229
	0.0166	0.0139	0.0103	0.0072	0.0049	0.0035	0.0022	0.0021	0.0012	0.0007	0.0006	0.0005
	0.0006	0.0004	0.0002	0.0002	0.0001	0.0003	0.0001	0.0002				
1989	1	3	0	0	22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0534	0.0356	0.0000	0.0356	0.1956	0.5513	1.9029	2.2230	2.1697
	1.3694	1.5472	2.6143	7.9673	13.8182	16.6993	16.3258	11.4885	7.7361	4.6239	2.4898	1.6895
	0.9248	0.5513	0.3557	0.2668	0.1601	0.1067	0.0178	0.1423	0.0000	0.0178	0.0000	0.0000
	0.0178	0.0178	0.0356	0.0000	0.0000	0.0000	0.0000	0.0178				
1992	1	3	0	0	43	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.9966	1.0747	1.1451	2.0523	2.2678	1.3747	0.7046	0.4705	0.1384
	0.2064	0.5554	1.7227	3.9070	6.9265	10.1668	13.5941	14.4537	11.2977	7.4794	4.4176	2.5313
	1.2286	0.5984	0.4789	0.2226	0.1257	0.1510	0.0318	0.0608	0.0354	0.0260	0.0126	0.0029
	0.0043	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
1995	1	3	0	0	69	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.2414	0.3534	1.4379	4.0874	8.1213	8.5327	6.1473	2.9749	1.2684
	0.5451	0.5222	1.2059	2.6843	4.8278	6.9954	8.0774	8.3294	7.4855	6.1477	3.8777	2.5148
	1.2530	0.8335	0.3644	0.2652	0.1357	0.0966	0.0656	0.0532	0.0414	0.0348	0.0181	0.0073
	0.0056	0.0032	0.0024	0.0091	0.0226	0.0176	0.0037	0.0037				
1998	1	3	0	0	84	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	1.9111	2.3583	2.7987	2.9771	2.6344	1.9192	1.7780	2.5431	3.2512
	3.6925	3.7927	4.3047	5.4560	7.6075	8.0688	8.4396	7.5478	6.2551	4.9928	3.5322	2.5057
	1.6519	1.0415	0.7464	0.4515	0.3132	0.2538	0.1641	0.1156	0.0562	0.0557	0.0423	0.0236
	0.0210	0.0125	0.0035	0.0053	0.0059	0.0084	0.0061	0.0135				
2001	1	3	0	0	49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	1.3525	4.1216	8.3658	14.6019	16.9774	14.2018	8.5876	3.5231	1.6717
	1.4485	1.5298	1.9460	1.9285	1.9610	1.8787	2.2680	2.1509	2.2040	2.1926	1.9429	1.1800
	0.8779	0.6301	0.4768	0.3006	0.2136	0.1543	0.1206	0.0551	0.0789	0.0185	0.0621	0.0381
	0.0841	0.0565	0.0314	0.0243	0.0261	0.0014	0.0354	0.0687				

2003	1	3	0	0	71	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0944	0.1537	0.3314	0.4047	0.7614	0.6356	1.1926	1.0760	1.7630
	1.7640	4.4833	7.5862	14.3289	14.8713	13.9081	10.0821	7.4014	5.8903	3.9399	2.7178	1.9627
	1.3133	0.9244	0.6519	0.4871	0.3781	0.2422	0.1693	0.1103	0.1016	0.0309	0.0101	0.0184
	0.0231	0.0085	0.0160	0.0057	0.0028	0.0028	0.0046	0.0249				
2005	1	3	0	0	49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.5764	0.6518	2.2930	3.3930	4.9816	3.7852	2.8587	2.0472	1.2751
	1.0973	1.1591	2.8742	4.7100	8.8084	14.7650	12.1110	12.1030	6.6716	5.1654	3.3105	1.6901
	1.0512	0.6182	0.3690	0.1856	0.1908	0.1801	0.0734	0.0314	0.0457	0.0478	0.0314	0.0335
	0.0175	0.0161	0.0124	0.0118	0.0879	0.0000	0.0000	0.0131				
2007	1	3	0	0	69	0.0000	0.0000	0.0000	0.0000	0.0053	0.0021	0.0031
	0.0074	0.0194	0.0291	0.0496	0.0587	0.0550	0.0488	0.0311	0.0250	0.0187	0.0101	0.0048
	0.0056	0.0068	0.0096	0.0172	0.0300	0.0390	0.0641	0.0831	0.0914	0.0843	0.0781	0.0423
	0.0289	0.0183	0.0127	0.0068	0.0039	0.0018	0.0019	0.0015	0.0007	0.0010	0.0007	0.0007
	0.0003	0.0003	0.0004	0.0002	0.0000	0.0000	0.0001	0.0003				
# Historical CA fisheries												
1963	1	8	0	0	13	0.0000	0.0000	0.0000	7.0000	5.0000	11.0000	11.0000
	10.0000	9.0000	5.0000	7.0000	10.0000	8.0000	6.0000	5.0000	2.0000	1.0000	1.0000	5.0000
	2.0000	1.0000	2.0000	3.0000	2.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	2.0000
	0.0000	1.0000	0.0000	0.0000	2.0000	1.0000	0.0000	2.0000	1.0000	0.0000	2.0000	0.0000
	2.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
1964	1	8	0	0	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	4.0000	2.0000
	2.0000	2.0000	3.0000	3.0000	4.0000	2.0000	1.0000	3.0000	1.0000	2.0000	3.0000	2.0000
	3.0000	3.0000	1.0000	3.0000	2.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000				
1966	1	8	0	0	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	2.0000	2.0000
	0.0000	1.0000	2.0000	0.0000	0.0000	1.0000	0.0000	0.0000				
1967	1	8	0	0	6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000
	1.0000	2.0000	3.0000	6.0000	4.0000	2.0000	0.0000	1.0000	2.0000	1.0000	1.0000	0.0000
	1.0000	2.0000	1.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000
	1.0000	1.0000	1.0000	0.0000	3.0000	0.0000	3.0000	2.0000	2.0000	2.0000	3.0000	3.0000
	2.0000	0.0000	0.0000	2.0000	0.0000	0.0000	1.0000	1.0000				
1968	1	8	0	0	18	3.0000	1.0000	0.0000	0.0000	1.0000	1.0000	6.0000
	10.0000	15.0000	11.0000	4.0000	5.0000	1.0000	2.0000	2.0000	1.0000	5.0000	1.0000	4.0000
	3.0000	2.0000	1.0000	1.0000	1.0000	3.0000	3.0000	1.0000	1.0000	1.0000	1.0000	2.0000
	0.0000	1.0000	6.0000	2.0000	4.0000	2.0000	5.0000	8.0000	6.0000	9.0000	8.0000	3.0000
	6.0000	6.0000	5.0000	3.0000	4.0000	2.0000	1.0000	6.0000				
1969	1	8	0	0	38	3.0000	0.0000	14.0000	33.0000	36.0000	37.0000	10.0000
	5.0000	3.0000	4.0000	2.0000	1.0000	3.0000	10.0000	5.0000	11.0000	5.0000	9.0000	14.0000
	11.0000	4.0000	9.0000	9.0000	1.0000	2.0000	5.0000	2.0000	1.0000	0.0000	1.0000	4.0000
	4.0000	1.0000	3.0000	4.0000	4.0000	6.0000	10.0000	4.0000	6.0000	12.0000	5.0000	10.0000
	11.0000	5.0000	10.0000	4.0000	4.0000	1.0000	6.0000	13.0000				
1970	1	8	0	0	39	4.0000	0.0000	9.0000	12.0000	21.0000	35.0000	24.0000
	19.0000	10.0000	13.0000	10.0000	11.0000	14.0000	10.0000	8.0000	10.0000	7.0000	13.0000	10.0000
	11.0000	7.0000	11.0000	10.0000	7.0000	8.0000	13.0000	6.0000	3.0000	3.0000	5.0000	4.0000
	1.0000	1.0000	3.0000	4.0000	3.0000	1.0000	1.0000	1.0000	4.0000	5.0000	2.0000	6.0000
	3.0000	4.0000	4.0000	1.0000	3.0000	1.0000	3.0000	10.0000				
1963	1	9	0	0	9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	2.0000	1.0000	6.0000	6.0000	8.0000	7.0000	12.0000	9.0000	8.0000	9.0000
	6.0000	3.0000	3.0000	1.0000	3.0000	2.0000	2.0000	1.0000	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000				
1966	1	9	0	0	14	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	2.0000	0.0000	1.0000	1.0000
	2.0000	0.0000	5.0000	3.0000	3.0000	7.0000	6.0000	9.0000	9.0000	11.0000	12.0000	9.0000
	8.0000	7.0000	10.0000	8.0000	9.0000	2.000	2.0000	8.0000				
1967	1	9	0	0	2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	0.0000	2.0000	0.0000	2.0000
	1.0000	1.0000	4.0000	1.0000	1.0000	0.0000	1.0000	2.0000				

1968	1	9	0	0	12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
	0.0000	3.0000	2.0000	2.0000	2.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	4.0000
	1.0000	3.0000	1.0000	4.0000	1.0000	2.0000	4.0000	10.0000	4.0000	5.0000	12.0000	4.0000
	11.0000	7.0000	3.0000	6.0000	6.0000	8.0000	1.0000	10.0000				
1969	1	9	0	0	14	2.0000	0.0000	0.0000	1.0000	7.0000	10.0000	10.0000
	6.0000	8.0000	4.0000	9.0000	4.0000	0.0000	5.0000	3.0000	1.0000	4.0000	4.0000	3.0000
	1.0000	1.0000	2.0000	1.0000	2.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	1.0000	0.0000	0.0000	3.0000	1.0000	1.0000	1.0000	2.0000	2.0000	3.0000	4.0000	3.0000
	1.0000	3.0000	5.0000	3.0000	5.0000	1.0000	1.0000	6.0000				
1970	1	9	0	0	12	0.0000	0.0000	0.0000	0.0000	2.0000	1.0000	3.0000
	6.0000	2.0000	1.0000	7.0000	12.0000	14.0000	12.0000	8.0000	5.0000	0.0000	3.0000	2.0000
	5.0000	2.0000	2.0000	2.0000	2.0000	0.0000	3.0000	2.0000	2.0000	1.0000	2.0000	0.0000
	2.0000	1.0000	1.0000	1.0000	0.0000	2.0000	0.0000	1.0000	1.0000	0.0000	1.0000	3.0000
	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000				
1963	1	10	0	0	24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	3.0000	1.0000	2.0000	0.0000	1.0000	0.0000	2.0000	1.0000	3.0000	2.0000	6.0000
	6.0000	4.0000	8.0000	11.0000	9.0000	9.0000	13.0000	6.0000	8.0000	10.0000	15.0000	19.0000
	18.0000	12.0000	16.0000	5.0000	4.0000	7.0000	9.0000	8.0000	5.0000	2.0000	4.0000	1.0000
	4.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	3.0000				
1966	1	10	0	0	22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	2.0000	5.0000	0.0000	2.0000	1.0000
	3.0000	3.0000	2.0000	4.0000	4.0000	5.0000	3.0000	3.0000	4.0000	4.0000	4.0000	16.0000
	11.0000	9.0000	6.0000	16.0000	7.0000	16.0000	10.0000	15.0000	14.0000	13.0000	10.0000	7.0000
	4.0000	6.0000	3.0000	1.0000	1.0000	1.0000	0.0000	2.0000				
1967	1	10	0	0	26	2.0000	0.0000	0.0000	0.0000	0.0000	2.0000	2.0000
	5.0000	2.0000	2.0000	3.0000	2.0000	6.0000	6.0000	0.0000	18.0000	17.0000	22.0000	14.0000
	3.0000	10.0000	5.0000	3.0000	4.0000	1.0000	2.0000	2.0000	4.0000	5.0000	2.0000	1.0000
	9.0000	11.0000	6.0000	7.0000	7.0000	8.0000	8.0000	8.0000	14.0000	10.0000	7.0000	1.0000
	3.0000	3.0000	4.0000	2.0000	2.0000	1.0000	1.0000	3.0000				
1968	1	10	0	0	31	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000
	0.0000	0.0000	2.0000	0.0000	2.0000	1.0000	2.0000	0.0000	3.0000	2.0000	1.0000	2.0000
	0.0000	2.0000	1.0000	1.0000	6.0000	4.0000	2.0000	4.0000	4.0000	7.0000	7.0000	12.0000
	11.0000	15.0000	16.0000	11.0000	21.0000	27.0000	24.0000	19.0000	21.0000	19.0000	22.0000	6.0000
	4.0000	7.0000	5.0000	4.0000	2.0000	1.0000	1.0000	5.0000				
1969	1	10	0	0	12	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	2.0000
	1.0000	5.0000	3.0000	5.0000	6.0000	5.0000	4.0000	9.0000	2.0000	2.0000	0.0000	1.0000
	1.0000	3.0000	2.0000	1.0000	3.0000	0.0000	2.0000	1.0000	0.0000	2.0000	1.0000	2.0000
	0.0000	2.0000	4.0000	3.0000	2.0000	3.0000	4.0000	6.0000	4.0000	3.0000	3.0000	2.0000
	5.0000	6.0000	1.0000	1.0000	1.0000	5.0000	1.0000	0.0000				
1963	1	11	0	0	7	5.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000	0.0000	1.0000	1.0000	1.0000
	3.0000	1.0000	5.0000	5.0000	2.0000	2.0000	3.0000	3.0000	3.0000	2.0000	2.0000	2.0000
	1.0000	3.0000	1.0000	3.0000	2.0000	2.0000	2.0000	0.0000	0.0000	3.0000	1.0000	2.0000
	2.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000				
1964	1	11	0	0	18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	3.0000	0.0000	1.0000	2.0000	0.0000	3.0000	1.0000	3.0000	8.0000	10.0000	5.0000
	9.0000	10.0000	6.0000	5.0000	8.0000	8.0000	10.0000	4.0000	6.0000	7.0000	6.0000	6.0000
	6.0000	14.0000	10.0000	6.0000	4.0000	7.0000	0.0000	5.0000	2.0000	3.0000	0.0000	0.0000
	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000				
1966	1	11	0	0	23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	3.0000	8.0000	7.0000	13.0000	9.0000	16.0000	12.0000	6.0000	8.0000	4.0000	3.0000	2.0000
	2.0000	1.0000	4.0000	4.0000	2.0000	2.0000	2.0000	3.0000	1.0000	5.0000	4.0000	4.0000
	2.0000	5.0000	8.0000	9.0000	6.0000	8.0000	4.0000	5.0000	8.0000	12.0000	4.0000	2.0000
	5.0000	7.0000	8.0000	2.0000	0.0000	1.0000	2.0000	2.0000				
1967	1	11	0	0	3	1.0000	0.0000	0.0000	0.0000	2.0000	2.0000	6.0000
	4.0000	3.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000
	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000
	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	0.0000	2.0000				
1968	1	11	0	0	72	11.0000	9.0000	28.0000	55.0000	58.0000	63.0000	31.0000
	17.0000	10.0000	20.0000	12.0000	33.0000	44.0000	36.0000	20.0000	25.0000	27.0000	16.0000	16.0000
	11.0000	11.0000	14.0000	10.0000	11.0000	9.0000	10.0000	6.0000	6.0000	3.0000	6.0000	4.0000
	5.0000	5.0000	8.0000	0.0000	4.0000	3.0000	2.0000	8.0000	3.0000	8.0000	2.0000	9.0000
	7.0000	2.0000	4.0000	1.0000	5.0000	2.0000	1.0000	7.0000				
1969	1	11	0	0	29	0.0000	4.0000	13.0000	22.0000	37.0000	26.0000	17.0000
	10.0000	7.0000	6.0000	12.0000	4.0000	7.0000	7.0000	7.0000	8.0000	4.0000	6.0000	3.0000

7.0000 6.0000 10.0000 9.0000 4.0000 6.0000 3.0000 9.0000 2.0000 2.0000 2.0000 1.0000
3.0000 3.0000 4.0000 1.0000 1.0000 2.0000 2.0000 3.0000 2.0000 0.0000 1.0000 1.0000
1.0000 3.0000 0.0000 2.0000 0.0000 1.0000 0.0000 0.0000
1970 1 11 0 0 7 8.0000 1.0000 1.0000 0.0000 3.0000 4.0000 0.0000
9.0000 4.0000 4.0000 3.0000 0.0000 3.0000 3.0000 0.0000 4.0000 4.0000 3.0000 3.0000
0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 2.0000 1.0000 0.0000 0.0000 1.0000
0.0000 0.0000 0.0000 1.0000 0.0000 1.0000 0.0000 0.0000 1.0000 0.0000 0.0000 1.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 1.0000

14 #_N_age_bins
Age bins
2 3 4 5 6 7 8 9 10 11 12 13 14 15

36 #_N_ageerror_definitions
Cohort and lab-specific tuned to 1.0 for normal, 0.55 for strong cohorts (77,80,84,99) and 0.80 for moderate cohorts (70,73,87,90).
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.412684 0.3387032 0.437168 0.454948 0.477873 0.507433 0.545548 0.594694 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.323512 0.412684 0.423379 0.3497344 0.454948 0.477873 0.507433 0.545548 0.594694 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.3301472 0.423379 0.437168 0.3639584 0.477873 0.507433 0.545548 0.594694 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.412684 0.3387032 0.437168 0.454948 0.3822984 0.507433 0.545548 0.594694 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.412684 0.423379 0.3497344 0.454948 0.477873 0.4059464 0.545548 0.594694 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.2224145 0.412684 0.423379 0.437168 0.3639584 0.477873 0.507433 0.4364384 0.594694 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.2269762 0.423379 0.437168 0.454948 0.3822984 0.507433 0.545548 0.4757552 0.658063 0.739771 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.412684 0.23285845 0.437168 0.454948 0.477873 0.4059464 0.545548 0.594694 0.5264504 0.739771
0.845126 0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.2224145 0.412684 0.423379 0.2404424 0.454948 0.477873 0.507433 0.4364384 0.594694 0.658063 0.5918168 0.845126
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.2269762 0.423379 0.437168 0.2502214 0.477873 0.507433 0.545548 0.4757552 0.658063 0.739771 0.6761008
0.980971 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.412684 0.23285845 0.437168 0.454948 0.26283015 0.507433 0.545548 0.594694 0.5264504
0.739771 0.845126 0.7847768 1.15613 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.40439 0.412684 0.423379 0.2404424 0.454948 0.477873 0.27908815 0.545548 0.594694 0.658063 0.5918168
0.845126 0.980971 0.924904 1.38198
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5
13.5 14.5 15.5
0.40439 0.2224145 0.412684 0.423379 0.437168 0.2502214 0.477873 0.507433 0.3000514 0.594694 0.658063 0.739771 0.6761008
0.980971 1.15613 1.105584

0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.2269762	0.423379	0.437168	0.454948	0.26283015	0.507433	0.545548	0.3270817	0.658063	0.739771	0.845126	0.7847768	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.23285845	0.437168	0.454948	0.477873	0.27908815	0.545548	0.594694	0.36193465	0.739771	0.845126	0.980971	0.924904	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.323512	0.412684	0.423379	0.2404424	0.454948	0.477873	0.507433	0.3000514	0.594694	0.658063	0.40687405	0.845126	0.980971	1.15613	1.105584
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.3301472	0.423379	0.437168	0.2502214	0.477873	0.507433	0.545548	0.3270817	0.658063	0.739771	0.4648193	0.980971	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.3387032	0.437168	0.454948	0.26283015	0.507433	0.545548	0.594694	0.36193465	0.739771	0.845126	0.53953405	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.323512	0.412684	0.423379	0.3497344	0.454948	0.477873	0.27908815	0.545548	0.594694	0.658063	0.40687405	0.845126	0.980971	0.6358715	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.3301472	0.423379	0.437168	0.3639584	0.477873	0.507433	0.3000514	0.594694	0.658063	0.739771	0.4648193	0.980971	1.15613	0.760089
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.3387032	0.437168	0.454948	0.3822984	0.507433	0.545548	0.3270817	0.658063	0.739771	0.845126	0.53953405	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.423379	0.3497344	0.454948	0.477873	0.4059464	0.545548	0.594694	0.36193465	0.739771	0.845126	0.980971	0.6358715	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.423379	0.437168	0.3639584	0.477873	0.507433	0.4364384	0.594694	0.658063	0.40687405	0.845126	0.980971	1.15613	0.760089
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.423379	0.437168	0.454948	0.3822984	0.507433	0.545548	0.4757552	0.658063	0.739771	0.4648193	0.980971	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.423379	0.437168	0.454948	0.477873	0.4059464	0.545548	0.594694	0.5264504	0.739771	0.845126	0.53953405	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.423379	0.437168	0.454948	0.477873	0.507433	0.4364384	0.594694	0.658063	0.5918168	0.845126	0.980971	0.6358715	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.40439	0.412684	0.423379	0.437168	0.454948	0.477873	0.507433	0.545548	0.4757552	0.658063	0.739771	0.6761008	0.980971	1.15613	0.760089
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.40439	0.2224145	0.412684	0.423379	0.437168	0.454948	0.477873	0.507433	0.545548	0.594694	0.5264504	0.739771	0.845126	0.7847768	1.15613	1.38198
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5
0.329242	0.329242	0.19080435	0.368632	0.395312	0.42809	0.468362	0.517841	0.57863	0.653316	0.745076	0.6862504	0.996322	1.1665	1.100456	1.305952
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5

0.329242	0.329242	0.346917	0.2027476	0.395312	0.42809	0.468362	0.517841	0.57863	0.653316	0.745076	0.857813	0.7970576
	1.1665	1.37557	1.63244									
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
	13.5	14.5	15.5									
0.329242	0.329242	0.346917	0.368632	0.2174216	0.42809	0.468362	0.517841	0.57863	0.653316	0.745076	0.857813	0.996322
	0.9332	1.37557	1.63244									
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
	13.5	14.5	15.5									
0.329242	0.329242	0.346917	0.368632	0.395312	0.2354495	0.468362	0.517841	0.57863	0.653316	0.745076	0.857813	0.996322
	1.1665	1.100456	1.305952									
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
	13.5	14.5	15.5									
0.329242	0.329242	0.346917	0.368632	0.395312	0.42809	0.2575991	0.517841	0.57863	0.653316	0.745076	0.857813	0.996322
	1.1665	1.37557	1.63244									
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
	13.5	14.5	15.5									
0.329242	0.2633936	0.346917	0.368632	0.395312	0.42809	0.468362	0.28481255		0.57863	0.653316	0.745076	0.857813
	0.996322	1.1665	1.37557	1.63244								
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
	13.5	14.5	15.5									
0.329242	0.329242	0.2775336	0.368632	0.395312	0.42809	0.468362	0.517841	0.3182465	0.653316	0.745076	0.857813	0.996322
	1.1665	1.37557	1.63244									
0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5
	13.5	14.5	15.5									
0.329242	0.329242	0.346917	0.2949056	0.395312	0.42809	0.468362	0.517841	0.57863	0.3593238	0.745076	0.857813	0.996322
	1.1665	1.37557	1.63244									

2553 # Number of age comp observations using restricted length ranges
2 # Length bin refers to: 1=population length bin indices; 2=data length bin indices
0 #_combine males into females at or below this bin number

Yr Seas Flt/Svy Gender Part Ageerr Lbin_lo Lbin_hi Nsamp datavector(female-male)
US fishery

1973	1	1	0	0	1	1	51	60	0	0.26	0.045	0.101
	0.187	0.117	0.107	0.1	0.048	0.021	0.009	0.005	0	0		
1974	1	1	0	0	2	1	51	60	0.0044	0.0033	0.5066	0.0692
	0.1198	0.1494	0.0868	0.0385	0.0121	0.0055	0.0033	0.0011	0	0		
1975	1	1	0	0	3	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	5	5	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	7	7	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	8	8	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	10	10	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	11	11	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	12	12	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	13	13	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	14	14	2	0.9405	0.0595	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	15	15	4	0.9591	0.0409	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	16	16	4	0.9333	0.0667	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	17	17	5	0.7037	0.2963	0	0
	0	0	0	0	0	0	0	0	0	0		

1975	1	1	0	0	3	18	18	5	0.683	0.317	0	0
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	19	19	3	0.2805	0.1569	0	0.5626
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	20	20	2	0	0.372	0	0.5
	0	0.128	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	21	21	6	0	0	0.2381	0.7447
	0.0172	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	22	22	10	0	0	0	0.9467
	0.0533	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	23	23	9	0	0	0.1932	0.8068
	0	0	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	24	24	9	0	0	0.0928	0.8553
	0	0.0519	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	25	25	10	0	0	0.07	0.8487
	0.07	0	0.0112	0	0	0	0	0	0	0		
1975	1	1	0	0	3	26	26	8	0	0	0	0.7783
	0.1682	0.0268	0.0268	0	0	0	0	0	0	0		
1975	1	1	0	0	3	27	27	9	0	0	0.0701	0.7221
	0	0.0284	0.1094	0.0701	0	0	0	0	0	0		
1975	1	1	0	0	3	28	28	7	0	0	0	0.2813
	0.5318	0.0255	0.1614	0	0	0	0	0	0	0		
1975	1	1	0	0	3	29	29	10	0	0	0	0.3104
	0	0.4162	0.2145	0.0589	0	0	0	0	0	0		
1975	1	1	0	0	3	30	30	8	0	0	0	0.0482
	0.7822	0.1336	0	0	0.0361	0	0	0	0	0		
1975	1	1	0	0	3	31	31	4	0	0	0	0.0999
	0	0.7015	0.1987	0	0	0	0	0	0	0		
1975	1	1	0	0	3	32	32	5	0	0	0	0.2871
	0	0.0536	0.5823	0.077	0	0	0	0	0	0		
1975	1	1	0	0	3	33	33	6	0	0	0	0
	0	0.2769	0.4642	0.0426	0.1603	0.056	0	0	0	0		
1975	1	1	0	0	3	35	35	2	0	0	0	0
	0	0.7354	0.2646	0	0	0	0	0	0	0		
1975	1	1	0	0	3	36	36	4	0	0	0	0
	0	0.107	0.893	0	0	0	0	0	0	0		
1975	1	1	0	0	3	38	38	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
1975	1	1	0	0	3	39	39	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1975	1	1	0	0	3	40	40	2	0	0	0	0
	0	0	0.2149	0	0	0.7851	0	0	0	0		
1975	1	1	0	0	3	41	41	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1975	1	1	0	0	3	49	49	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1975	1	1	0	0	3	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1976	1	1	0	0	4	3	3	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	5	5	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	6	6	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	8	8	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	9	9	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	10	10	4	0.978	0.022	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	11	11	4	0.4381	0.5619	0	0
	0	0	0	0	0	0	0	0	0	0		

1976	1	1	0	0	4	12	12	6	0.9558	0.0442	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	13	13	8	0.7676	0.1848	0.0476	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	14	14	9	0.8393	0.1607	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	15	15	10	0.4683	0.5317	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	16	16	7	0.2113	0.7887	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	17	17	13	0.2865	0.7135	0	0
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	18	18	23	0.0739	0.6708	0.2445	0.0108
	0	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	19	19	26	0.0438	0.6345	0.3195	0
	0.0022	0	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	20	20	45	0.0606	0.7007	0.2234	0.011
	0.0017	0.0026	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	21	21	58	0.0574	0.7345	0.164	0.0225
	0.0202	0.0014	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	22	22	53	0.0024	0.6833	0.2001	0.0474
	0.0558	0.011	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	23	23	55	0.0032	0.7128	0.1398	0.0135
	0.1086	0.0221	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	24	24	56	0.0057	0.5527	0.221	0.0464
	0.1456	0.0213	0.0074	0	0	0	0	0	0	0		
1976	1	1	0	0	4	25	25	54	0	0.3929	0.1663	0.0789
	0.2949	0.067	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	26	26	47	0.0098	0.2632	0.122	0.056
	0.4639	0.0851	0	0	0	0	0	0	0	0		
1976	1	1	0	0	4	27	27	47	0	0.1093	0.2956	0.0532
	0.4177	0.1132	0.0111	0	0	0	0	0	0	0		
1976	1	1	0	0	4	28	28	39	0	0.0219	0.0193	0.0511
	0.7372	0.115	0.0415	0.0141	0	0	0	0	0	0		
1976	1	1	0	0	4	29	29	42	0	0.0203	0.0314	0.0486
	0.5862	0.2588	0.0348	0.008	0.0062	0	0.0029	0.0029	0	0		
1976	1	1	0	0	4	30	30	44	0	0	0.0107	0.0115
	0.638	0.2305	0.0698	0.0369	0.0026	0	0	0	0	0		
1976	1	1	0	0	4	31	31	57	0	0	0	0.0339
	0.5675	0.2176	0.0229	0.0597	0.0319	0.0148	0.0065	0	0.0452	0		
1976	1	1	0	0	4	32	32	62	0	0.0038	0	0.0206
	0.3736	0.2764	0.1116	0.1706	0.014	0.0001	0.0083	0.002	0.019	0		
1976	1	1	0	0	4	33	33	60	0	0	0.0077	0.0094
	0.2628	0.3862	0.1089	0.055	0.0827	0.0558	0.0024	0.0291	0	0		
1976	1	1	0	0	4	34	34	69	0	0	0	0.0339
	0.1473	0.1962	0.2986	0.1038	0.1643	0.0013	0.0547	0	0	0		
1976	1	1	0	0	4	35	35	64	0	0	0.0034	0
	0.1102	0.2184	0.2629	0.1766	0.0764	0.0424	0.0419	0.065	0.0029	0		
1976	1	1	0	0	4	36	36	58	0	0	0	0.0027
	0.13	0.3916	0.1777	0.1439	0.0839	0.0514	0.0152	0.0035	0	0		
1976	1	1	0	0	4	37	37	67	0	0	0	0.007
	0.1063	0.1894	0.1757	0.1725	0.1264	0.2008	0.0124	0.0048	0	0.0048		
1976	1	1	0	0	4	38	38	65	0	0	0	0
	0.0539	0.155	0.2507	0.1231	0.3253	0.0384	0.0305	0.0232	0	0		
1976	1	1	0	0	4	39	39	62	0	0	0	0
	0.0792	0.2445	0.2162	0.242	0.1218	0.0376	0.0079	0.0422	0.0085	0		
1976	1	1	0	0	4	40	40	57	0	0	0	0
	0.1455	0.1615	0.2425	0.1723	0.1519	0.056	0.0244	0.0273	0	0.0186		
1976	1	1	0	0	4	41	41	56	0	0	0	0.0037
	0.1479	0.1153	0.1514	0.3359	0.0721	0.0963	0.0707	0	0.0067	0		
1976	1	1	0	0	4	42	42	48	0	0	0	0
	0.0181	0.1664	0.2579	0.2624	0.1268	0.0807	0.0579	0.0027	0.0272	0		
1976	1	1	0	0	4	43	43	45	0	0	0	0
	0.0585	0.0121	0.3462	0.204	0.0525	0.1589	0.1108	0.0443	0.0126	0		
1976	1	1	0	0	4	44	44	30	0	0	0	0
	0.0468	0.0397	0.1537	0.2533	0.1572	0.0822	0.0756	0.1014	0.0901	0		

1976	1	1	0	0	4	45	45	36	0	0	0	0
	0	0.0591	0.2812	0.209	0.2408	0.1097	0.0811	0.0177	0.0014	0		
1976	1	1	0	0	4	46	46	33	0	0	0	0
	0	0.0379	0.0677	0.1629	0.2168	0.2329	0.1623	0.1106	0.0088	0		
1976	1	1	0	0	4	47	47	33	0	0	0	0
	0	0.0491	0.3136	0.0988	0.18	0.1342	0.1857	0.0385	0	0		
1976	1	1	0	0	4	48	48	33	0	0	0	0
	0	0.02	0.2074	0.0845	0.2476	0.2728	0.1106	0.0425	0.0085	0.006		
1976	1	1	0	0	4	49	49	28	0	0	0	0
	0	0.0137	0.1389	0.2733	0.2016	0.1612	0.0161	0.1125	0.0325	0.0503		
1976	1	1	0	0	4	50	50	25	0	0	0	0
	0	0	0.122	0.1008	0.153	0.1807	0.3805	0.0295	0.0336	0		
1976	1	1	0	0	4	51	51	71	0	0	0	0
	0.0061	0.001	0.0301	0.1087	0.2296	0.1739	0.2187	0.0755	0.1333	0.023		
1977	1	1	0	0	5	1	1	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	2	2	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	12	12	2	0.8299	0	0	0
	0	0	0.1701	0	0	0	0	0	0	0		
1977	1	1	0	0	5	14	14	4	0.4537	0.0691	0.4773	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	15	15	5	0.5662	0.4338	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	16	16	12	0.9224	0.0776	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	17	17	28	0.8125	0.1193	0.066	0
	0	0	0.0023	0	0	0	0	0	0	0		
1977	1	1	0	0	5	18	18	56	0.7772	0.1286	0.0941	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	19	19	71	0.8142	0.0567	0.1247	0
	0	0.0015	0.0029	0	0	0	0	0	0	0		
1977	1	1	0	0	5	20	20	99	0.7333	0.1031	0.1617	0.0011
	0.0007	0	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	21	21	114	0.1644	0.2215	0.5934	0.0173
	0	0.0016	0	0.0018	0	0	0	0	0	0		
1977	1	1	0	0	5	22	22	146	0.0923	0.159	0.6948	0.0264
	0.0077	0.0191	0.0007	0	0	0	0	0	0	0		
1977	1	1	0	0	5	23	23	141	0.0062	0.1476	0.7218	0.0577
	0.0316	0.035	0	0	0	0	0	0	0	0		
1977	1	1	0	0	5	24	24	160	0.0032	0.0716	0.7254	0.0942
	0.049	0.0501	0.0057	0	0	0.0008	0	0	0	0		
1977	1	1	0	0	5	25	25	160	0	0.0327	0.6877	0.1254
	0.0543	0.0915	0.0085	0	0	0	0	0	0	0		
1977	1	1	0	0	5	26	26	147	0	0.0484	0.5472	0.0594
	0.1153	0.2175	0.0086	0.0036	0	0	0	0	0	0		
1977	1	1	0	0	5	27	27	142	0	0.0025	0.4435	0.1097
	0.1106	0.2577	0.0615	0.0082	0.0064	0	0	0	0	0		
1977	1	1	0	0	5	28	28	132	0	0.006	0.314	0.0613
	0.1098	0.4411	0.0473	0.006	0.0032	0.0114	0	0	0	0		
1977	1	1	0	0	5	29	29	128	0	0.0023	0.142	0.0543
	0.1526	0.5996	0.0393	0.0043	0.0038	0.0017	0	0	0	0		
1977	1	1	0	0	5	30	30	136	0	0	0.0793	0.0593
	0.2159	0.4992	0.0777	0.0358	0.0273	0.0055	0	0	0	0		
1977	1	1	0	0	5	31	31	123	0	0	0.0414	0.0399
	0.1582	0.5998	0.0951	0.0486	0.0014	0.0081	0.0059	0.0016	0	0		
1977	1	1	0	0	5	32	32	135	0	0.0012	0.0281	0.0149
	0.1329	0.5877	0.1012	0.0655	0.0608	0.0035	0.0007	0.0033	0	0		
1977	1	1	0	0	5	33	33	140	0	0	0.0026	0.0275
	0.1081	0.4946	0.1841	0.1026	0.0622	0.0157	0.0011	0.0015	0	0		
1977	1	1	0	0	5	34	34	146	0	0	0.0099	0.0043
	0.07	0.478	0.2452	0.0972	0.0697	0.0189	0.0046	0.0021	0	0		
1977	1	1	0	0	5	35	35	147	0	0	0	0.0012
	0.0243	0.3832	0.1788	0.2209	0.1037	0.0553	0.0325	0	0	0		
1977	1	1	0	0	5	36	36	161	0.0019	0	0.0039	0.0022
	0.0421	0.2342	0.1925	0.2045	0.1375	0.1001	0.0465	0.0246	0.0101	0		

1977	1	1	0	0	5	37	37	139	0	0	0	0
	0.0303	0.2215	0.1949	0.2289	0.1368	0.1083	0.0669	0.0124	0	0		
1977	1	1	0	0	5	38	38	131	0	0	0	0
	0.0105	0.1675	0.21	0.1919	0.1204	0.2065	0.0814	0.0105	0	0.0014		
1977	1	1	0	0	5	39	39	94	0	0	0	0
	0.0127	0.0573	0.3377	0.1953	0.1128	0.1185	0.1161	0.0435	0.003	0.0031		
1977	1	1	0	0	5	40	40	95	0	0	0	0
	0.0027	0.1283	0.1146	0.2983	0.138	0.1317	0.1481	0.0287	0.0063	0.0033		
1977	1	1	0	0	5	41	41	73	0	0	0	0.0055
	0.0055	0.1773	0.0236	0.1405	0.1973	0.2013	0.1986	0.0418	0.0087	0		
1977	1	1	0	0	5	42	42	60	0	0	0	0
	0.0055	0.0499	0.0594	0.1587	0.2694	0.3643	0.0224	0.0492	0.0105	0.0106		
1977	1	1	0	0	5	43	43	52	0	0	0	0
	0	0.0242	0.0512	0.1418	0.2557	0.3208	0.0729	0.1249	0.0086	0		
1977	1	1	0	0	5	44	44	46	0	0	0	0
	0.0073	0.0537	0.0821	0.2441	0.2116	0.2037	0.1287	0.0615	0	0.0073		
1977	1	1	0	0	5	45	45	42	0	0	0	0
	0	0.0824	0.0222	0.0767	0.2262	0.3032	0.1929	0.0606	0.0359	0		
1977	1	1	0	0	5	46	46	23	0	0	0	0
	0	0.0105	0.1508	0.1211	0.0848	0.1563	0.3663	0.1102	0	0		
1977	1	1	0	0	5	47	47	17	0	0	0	0
	0	0	0.0114	0.237	0.0963	0.1037	0.3749	0.1767	0	0		
1977	1	1	0	0	5	48	48	15	0	0	0	0
	0	0	0.0365	0.2538	0.0771	0.1398	0.1929	0.2188	0.081	0		
1977	1	1	0	0	5	49	49	18	0	0	0.0025	0
	0	0	0	0.1157	0.2068	0.023	0	0.0788	0.1044	0.4688		
1977	1	1	0	0	5	50	50	17	0	0	0	0
	0	0.0159	0.0824	0.2843	0.1584	0.0198	0.3424	0.0968	0	0		
1977	1	1	0	0	5	51	51	62	0	0	0	0
	0	0	0	0.001	0.1218	0.1033	0.1904	0.3855	0.1219	0.0761		
1978	1	1	0	0	6	2	2	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	3	3	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	4	4	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	5	5	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	6	6	10	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	7	7	10	0.9898	0.0103	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	8	8	9	0.9835	0.0165	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	9	9	14	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	10	10	7	0.5882	0.4118	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	11	11	4	0.8627	0.1373	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	12	12	2	0.976	0.024	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	17	17	3	0.7052	0.2948	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	18	18	7	0.4619	0.5381	0	0
	0	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	19	19	17	0	0.7421	0.2307	0.0196
	0	0	0.0077	0	0	0	0	0	0	0		
1978	1	1	0	0	6	20	20	51	0	0.6089	0.2035	0.1859
	0.0016	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	21	21	88	0	0.5128	0.2425	0.2367
	0.008	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	22	22	129	0	0.4106	0.1932	0.341
	0.0551	0	0	0	0	0	0	0	0	0		
1978	1	1	0	0	6	23	23	176	0	0.3421	0.2019	0.4112
	0.0428	0.002	0	0	0	0	0	0	0	0		

1978	1	1	0	0	6	24	24	171	0	0.2003	0.2269	0.5104
	0.0451	0.006	0.0112	0	0	0	0	0	0	0		
1978	1	1	0	0	6	25	25	158	0	0.1438	0.1929	0.5646
	0.062	0.0236	0.0071	0	0	0.006	0	0	0	0		
1978	1	1	0	0	6	26	26	165	0	0.0429	0.1257	0.6614
	0.1228	0.0281	0.0192	0	0	0	0	0	0	0		
1978	1	1	0	0	6	27	27	148	0	0.0133	0.0857	0.623
	0.082	0.0933	0.0882	0.0042	0.0102	0	0	0	0	0		
1978	1	1	0	0	6	28	28	144	0	0.0064	0.0591	0.5178
	0.1041	0.122	0.1837	0.0068	0	0	0	0	0	0		
1978	1	1	0	0	6	29	29	154	0	0	0.0143	0.4216
	0.0813	0.2157	0.2633	0.0003	0.0017	0.0019	0	0	0	0		
1978	1	1	0	0	6	30	30	143	0	0	0.0074	0.3001
	0.0663	0.2068	0.3783	0.034	0.0071	0	0	0	0	0		
1978	1	1	0	0	6	31	31	147	0	0	0.0002	0.1778
	0.0518	0.2469	0.4317	0.0613	0.0302	0	0	0	0	0		
1978	1	1	0	0	6	32	32	156	0	0	0.0052	0.067
	0.0496	0.2608	0.5014	0.0854	0.0147	0.0104	0.0042	0.0013	0	0		
1978	1	1	0	0	6	33	33	184	0	0	0	0.0844
	0.0372	0.1948	0.4926	0.1311	0.0261	0.0275	0.0063	0	0	0		
1978	1	1	0	0	6	34	34	178	0	0	0	0.0211
	0.0124	0.1427	0.5319	0.127	0.0972	0.055	0.0105	0.0022	0	0		
1978	1	1	0	0	6	35	35	186	0	0	0	0.0065
	0.0124	0.1068	0.4222	0.1921	0.1965	0.0504	0.0122	0.0011	0	0		
1978	1	1	0	0	6	36	36	176	0	0	0	0
	0.0041	0.0583	0.4449	0.1516	0.1747	0.0774	0.0427	0.0461	0	0		
1978	1	1	0	0	6	37	37	156	0	0	0	0.001
	0.0074	0.0341	0.3783	0.2106	0.1838	0.1191	0.0224	0.0121	0.0312	0		
1978	1	1	0	0	6	38	38	115	0	0	0	0.0024
	0.008	0.0577	0.2728	0.228	0.1737	0.1715	0.0731	0.0016	0.0113	0		
1978	1	1	0	0	6	39	39	103	0	0	0	0
	0	0.0131	0.2922	0.253	0.1152	0.183	0.0585	0.0666	0.0024	0.0161		
1978	1	1	0	0	6	40	40	60	0	0	0	0
	0	0.1187	0.2963	0.2178	0.1354	0.0516	0.1689	0.0084	0.003	0		
1978	1	1	0	0	6	41	41	60	0	0	0	0
	0	0.0115	0.1997	0.1645	0.2698	0.2498	0.0265	0.0052	0.0677	0.0052		
1978	1	1	0	0	6	42	42	45	0	0	0	0
	0	0	0.3197	0.1521	0.14	0.1821	0.1273	0.0608	0.0179	0		
1978	1	1	0	0	6	43	43	41	0	0	0	0
	0	0	0.172	0.2205	0.1766	0.183	0.0247	0.1895	0.0336	0		
1978	1	1	0	0	6	44	44	27	0	0	0	0
	0	0	0.1623	0.2126	0.2836	0.1779	0.0319	0.0835	0.0482	0		
1978	1	1	0	0	6	45	45	26	0	0	0	0
	0	0	0.2144	0.0597	0.3865	0.1814	0.1132	0.0448	0	0		
1978	1	1	0	0	6	46	46	18	0	0	0	0
	0	0	0.3853	0.0306	0.0605	0.2906	0.1201	0.0175	0.007	0.0884		
1978	1	1	0	0	6	47	47	14	0	0	0	0
	0	0	0.2756	0.2195	0.0207	0.1161	0.1284	0.0956	0	0.1441		
1978	1	1	0	0	6	48	48	18	0	0	0	0
	0	0	0.1204	0.0599	0.1588	0.5282	0.1024	0	0.0302	0		
1978	1	1	0	0	6	49	49	13	0	0	0	0
	0	0	0.1328	0	0	0.7673	0.0098	0.0183	0.0313	0.0405		
1978	1	1	0	0	6	50	50	10	0	0	0	0
	0	0	0	0.0247	0.1125	0.0921	0.01	0.5684	0.1623	0.03		
1978	1	1	0	0	6	51	51	60	0	0	0	0
	0	0	0.011	0.0331	0.1176	0.3275	0.1213	0.1602	0.1593	0.0699		
1979	1	1	0	0	7	1	1	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	7	7	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	8	8	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	9	9	4	0.3745	0.6255	0	0
	0	0	0	0	0	0	0	0	0	0		

1979	1	1	0	0	7	10	10	10	0.5643	0.4357	0	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	11	11	21	0.3772	0.6228	0	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	12	12	27	0.5091	0.4805	0.0104	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	13	13	30	0.4863	0.503	0.0107	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	14	14	46	0.431	0.5633	0.0057	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	15	15	33	0.5063	0.4176	0.0761	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	16	16	24	0.2205	0.7455	0.034	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	17	17	17	0.0173	0.6694	0.3133	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	18	18	19	0.0986	0.7796	0.1218	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	19	19	12	0.2266	0.4975	0.2605	0.0154
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	20	20	11	0.0366	0.8589	0.1045	0
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	21	21	17	0.045	0.5406	0.4105	0.0039
	0	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	22	22	25	0	0.1521	0.8417	0
	0.0061	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	23	23	36	0	0.0681	0.8183	0.0487
	0.065	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	24	24	44	0	0.0389	0.695	0.085
	0.1811	0	0	0	0	0	0	0	0	0		
1979	1	1	0	0	7	25	25	65	0	0.0553	0.3856	0.2848
	0.2408	0.0133	0.0183	0	0	0.0018	0	0	0	0		
1979	1	1	0	0	7	26	26	72	0	0	0.264	0.2038
	0.4724	0.02	0.0398	0	0	0	0	0	0	0		
1979	1	1	0	0	7	27	27	74	0	0	0.147	0.1139
	0.6377	0.0373	0.0534	0.0108	0	0	0	0	0	0		
1979	1	1	0	0	7	28	28	84	0	0	0.1915	0.1386
	0.5158	0.0251	0.0968	0.0321	0	0	0	0	0	0		
1979	1	1	0	0	7	29	29	83	0	0	0.0447	0.1057
	0.5245	0.1043	0.1597	0.0595	0.0016	0	0	0	0	0		
1979	1	1	0	0	7	30	30	76	0	0	0.0406	0.0734
	0.5083	0.0754	0.2347	0.0647	0.003	0	0	0	0	0		
1979	1	1	0	0	7	31	31	83	0	0	0.0181	0.0046
	0.3197	0.2092	0.2893	0.1345	0.0247	0	0	0	0	0		
1979	1	1	0	0	7	32	32	89	0	0	0.0173	0.0004
	0.2528	0.1714	0.3883	0.1548	0.0103	0.0049	0	0	0	0		
1979	1	1	0	0	7	33	33	85	0	0	0	0.0147
	0.1925	0.1214	0.3134	0.2427	0.0975	0.0037	0.0141	0	0	0		
1979	1	1	0	0	7	34	34	86	0	0	0	0.0185
	0.245	0.1422	0.2931	0.2313	0.0531	0.0152	0.0015	0	0	0		
1979	1	1	0	0	7	35	35	78	0	0	0	0.0005
	0.0558	0.1054	0.3829	0.329	0.0372	0.0741	0.0016	0.0136	0	0		
1979	1	1	0	0	7	36	36	70	0	0	0	0
	0.064	0.1172	0.2945	0.4124	0.0622	0.0435	0	0.0062	0	0		
1979	1	1	0	0	7	37	37	66	0	0	0	0
	0.0741	0.0832	0.2487	0.2875	0.1394	0.1146	0.0307	0.0004	0.0213	0		
1979	1	1	0	0	7	38	38	58	0	0	0	0
	0.0263	0.1152	0.1075	0.4844	0.1269	0.0937	0.0214	0.0017	0	0.023		
1979	1	1	0	0	7	39	39	41	0	0	0	0
	0.0293	0.0639	0.0949	0.4903	0.2103	0.0288	0.0208	0.0617	0	0		
1979	1	1	0	0	7	40	40	47	0	0	0	0.0339
	0.0374	0.021	0.2147	0.1839	0.1026	0.0663	0.2244	0.0463	0.0695	0		
1979	1	1	0	0	7	41	41	22	0	0	0	0
	0.013	0	0.1209	0.2671	0.1739	0.2761	0.1238	0.0251	0	0		
1979	1	1	0	0	7	42	42	26	0	0	0	0.0264
	0	0	0.0409	0.322	0.1474	0.3139	0.0885	0.0031	0	0.0579		

1979	1	1	0	0	7	43	43	16	0	0	0	0
	0	0	0.0773	0.1778	0.4542	0.1656	0.0036	0.1215	0	0		
1979	1	1	0	0	7	44	44	12	0	0	0	0
	0	0	0.1625	0.4001	0.1203	0.1988	0	0.1183	0	0		
1979	1	1	0	0	7	45	45	8	0	0	0.171	0
	0	0	0	0.1966	0.4113	0	0.0534	0	0.1655	0.0023		
1979	1	1	0	0	7	46	46	13	0	0	0.0537	0
	0	0	0.096	0.1347	0.2569	0.1848	0.1147	0.1045	0.0547	0		
1979	1	1	0	0	7	47	47	11	0	0	0	0.1364
	0	0	0	0.022	0.0241	0.5934	0.095	0.1291	0	0		
1979	1	1	0	0	7	48	48	6	0	0	0	0
	0	0	0	0.6702	0.1933	0	0	0	0	0.1364		
1979	1	1	0	0	7	49	49	8	0	0	0.0795	0
	0	0	0	0.0563	0.6569	0.1455	0	0	0.0438	0.0179		
1979	1	1	0	0	7	50	50	4	0	0	0	0
	0	0	0	0.5	0	0	0.378	0	0.122	0		
1979	1	1	0	0	7	51	51	16	0	0	0.0648	0
	0	0	0.0011	0	0.0812	0.2059	0.0406	0.1659	0.1556	0.285		
1980	1	1	0	0	8	1	1	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	2	2	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	3	3	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
#1980	1	1	0	0	8	5	5	2	0.4863	0	0	0
	0	0	0	0	0	0.5137	0	0	0	0		
1980	1	1	0	0	8	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
#1980	1	1	0	0	8	8	8	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
#1980	1	1	0	0	8	9	9	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
#1980	1	1	0	0	8	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
#1980	1	1	0	0	8	11	11	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	13	13	3	0	0.909	0	0
	0	0	0	0	0.091	0	0	0	0	0		
1980	1	1	0	0	8	14	14	4	0	0.8527	0	0.0317
	0.1155	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	15	15	9	0.0509	0.9463	0.0028	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	16	16	19	0.4221	0.5758	0.0021	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	17	17	38	0.0024	0.9192	0.0785	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	18	18	66	0	0.9863	0.0137	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	19	19	74	0.0744	0.8963	0.0293	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	20	20	84	0	0.9476	0.0447	0
	0	0	0	0	0	0	0.0077	0	0	0		
1980	1	1	0	0	8	21	21	89	0	0.8153	0.1396	0.0048
	0.0112	0.0291	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	22	22	83	0	0.8883	0.0728	0.0219
	0.0023	0.0147	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	23	23	93	0.0041	0.5766	0.3752	0.0313
	0.0016	0.0113	0	0	0	0	0	0	0	0		
1980	1	1	0	0	8	24	24	88	0	0.5549	0.161	0.0815
	0.0887	0.0759	0.0278	0	0.0104	0	0	0	0	0		
1980	1	1	0	0	8	25	25	100	0	0.445	0.1296	0.1898
	0.081	0.0991	0.0492	0.0035	0.0028	0	0	0	0	0		
1980	1	1	0	0	8	26	26	111	0	0.2791	0.0529	0.3384
	0.1374	0.1232	0.0335	0.0315	0.002	0.0018	0.0001	0	0	0		

1980	1	1	0	0	8	27	27	114	0	0.1255	0.0881	0.3068
	0.2127	0.1799	0.0541	0.0328	0	0	0	0	0	0		
1980	1	1	0	0	8	28	28	96	0	0.0184	0.0441	0.2277
	0.2229	0.364	0.036	0.0626	0.0237	0.0006	0	0	0	0		
1980	1	1	0	0	8	29	29	90	0	0	0.0344	0.0961
	0.1843	0.3925	0.1249	0.1054	0.0499	0.0098	0	0	0.0026	0		
1980	1	1	0	0	8	30	30	85	0	0.0046	0.0131	0.1713
	0.203	0.2465	0.1085	0.1814	0.0589	0.0125	0	0	0.0002	0		
1980	1	1	0	0	8	31	31	90	0	0	0	0.0591
	0.1336	0.3987	0.1223	0.1727	0.0894	0.0107	0.0027	0.0068	0.0039	0		
1980	1	1	0	0	8	32	32	87	0	0.0133	0	0.0288
	0.1104	0.2836	0.1182	0.2909	0.1176	0.0062	0.0188	0.0087	0.0035	0		
1980	1	1	0	0	8	33	33	92	0	0.0127	0.0142	0.0171
	0.0484	0.2109	0.2137	0.2668	0.1247	0.0518	0.0148	0.0204	0	0.0045		
1980	1	1	0	0	8	34	34	94	0	0.0083	0	0.0004
	0.038	0.4772	0.1363	0.1155	0.1517	0.0357	0.0092	0.0148	0	0.013		
1980	1	1	0	0	8	35	35	105	0	0	0	0.027
	0.0172	0.2123	0.1987	0.2037	0.2257	0.0585	0.0317	0.0106	0.005	0.0096		
1980	1	1	0	0	8	36	36	102	0	0	0	0.0127
	0.023	0.2748	0.0917	0.2384	0.213	0.0812	0.0316	0.0291	0.0012	0.0034		
1980	1	1	0	0	8	37	37	102	0	0	0	0
	0.0125	0.0754	0.097	0.3467	0.2105	0.1317	0.0288	0.0374	0.0235	0.0364		
1980	1	1	0	0	8	38	38	102	0	0	0	0
	0.0072	0.3501	0.1639	0.197	0.169	0.0124	0.032	0.0449	0.0102	0.0133		
1980	1	1	0	0	8	39	39	88	0	0	0	0
	0	0.0548	0.1385	0.0795	0.3968	0.1686	0.0737	0.0414	0.0208	0.0259		
1980	1	1	0	0	8	40	40	52	0	0	0	0
	0	0.0934	0.0695	0.1233	0.5689	0.0505	0.0286	0.0184	0.0222	0.0251		
1980	1	1	0	0	8	41	41	60	0	0	0	0
	0.0016	0.0083	0.0146	0.0673	0.346	0.2652	0.1995	0.0817	0	0.0158		
1980	1	1	0	0	8	42	42	39	0	0	0	0
	0	0.0001	0.0214	0.0188	0.2278	0.0762	0.5725	0.0817	0	0.0016		
1980	1	1	0	0	8	43	43	27	0	0	0	0
	0	0.015	0.059	0.0281	0.28	0.0801	0.0275	0.1861	0.1359	0.1883		
1980	1	1	0	0	8	44	44	25	0	0	0	0
	0	0	0.2895	0.0645	0.1704	0.209	0.1221	0.0382	0.0964	0.01		
1980	1	1	0	0	8	45	45	26	0	0	0	0
	0	0.0233	0.027	0.1892	0.191	0.2051	0.1251	0.1058	0.1015	0.0321		
1980	1	1	0	0	8	46	46	19	0	0	0	0
	0	0	0	0.4077	0.1657	0.0306	0.1422	0.2538	0	0		
1980	1	1	0	0	8	47	47	12	0	0	0	0
	0	0	0	0.024	0.5807	0	0.1564	0.2389	0	0		
1980	1	1	0	0	8	48	48	11	0	0	0	0
	0	0	0	0.1616	0.5095	0.0689	0.2206	0	0.0391	0.0003		
1980	1	1	0	0	8	49	49	9	0	0	0	0
	0	0.0508	0	0.1813	0.1811	0	0.1249	0.0301	0.4319	0		
1980	1	1	0	0	8	50	50	7	0	0	0	0
	0	0	0	0.0107	0.236	0.3512	0	0	0	0.4021		
1980	1	1	0	0	8	51	51	14	0	0	0	0
	0	0	0	0.0046	0	0.2813	0.5651	0	0.0274	0.1216		
1981	1	1	0	0	9	1	1	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	2	2	9	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	3	3	13	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	4	4	23	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	5	5	25	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	6	6	29	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	7	7	40	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	8	8	34	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		

1981	1	1	0	0	9	9	9	22	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	10	10	21	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	11	11	16	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	12	12	12	0.9415	0.0585	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	13	13	6	0.3822	0.6178	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	14	14	9	0.3386	0.6614	0	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	15	15	12	0.0173	0.9727	0.0099	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	16	16	16	0.2759	0.4697	0.2544	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	17	17	28	0.1289	0.5569	0.3109	0.0034
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	18	18	49	0.1088	0.2494	0.6418	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	19	19	59	0.0342	0.1586	0.8072	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	20	20	78	0.0089	0.1551	0.836	0
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	21	21	94	0.0012	0.0981	0.8935	0.0072
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	22	22	84	0	0.0364	0.9595	0.0041
	0	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	23	23	85	0	0.0108	0.9813	0.0063
	0.0016	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	24	24	88	0	0.007	0.9504	0.0193
	0.0233	0	0	0	0	0	0	0	0	0		
1981	1	1	0	0	9	25	25	101	0	0.009	0.9141	0.03
	0.0147	0.0127	0.0016	0.018	0	0	0	0	0	0		
1981	1	1	0	0	9	26	26	101	0	0	0.8382	0.0467
	0.0968	0.0014	0.017	0	0	0	0	0	0	0		
1981	1	1	0	0	9	27	27	107	0	0	0.616	0.0813
	0.0794	0.0325	0.1563	0.0027	0.0261	0.0057	0	0	0	0		
1981	1	1	0	0	9	28	28	114	0	0	0.3926	0.0444
	0.1459	0.1156	0.2385	0.0314	0.025	0.0067	0	0	0	0		
1981	1	1	0	0	9	29	29	122	0	0	0.2205	0.0658
	0.1481	0.1324	0.2675	0.0601	0.061	0.0416	0	0.003	0	0		
1981	1	1	0	0	9	30	30	122	0	0	0.1012	0.0637
	0.0808	0.1269	0.3446	0.1267	0.1041	0.052	0	0	0	0		
1981	1	1	0	0	9	31	31	105	0	0	0.0614	0.0033
	0.0963	0.1522	0.2796	0.1362	0.1635	0.1074	0	0	0	0		
1981	1	1	0	0	9	32	32	113	0	0	0.0019	0.0014
	0.1049	0.1483	0.4456	0.1015	0.1319	0.05	0.0137	0.0008	0	0		
1981	1	1	0	0	9	33	33	107	0	0	0	0.0052
	0.045	0.1154	0.4279	0.2109	0.0797	0.1071	0.0085	0.0004	0	0		
1981	1	1	0	0	9	34	34	116	0	0	0	0.0054
	0.0628	0.0783	0.3522	0.177	0.0699	0.2376	0.0044	0.0071	0.0054	0		
1981	1	1	0	0	9	35	35	96	0	0	0	0
	0.0105	0.1142	0.444	0.0989	0.139	0.1678	0.017	0	0.0012	0.0073		
1981	1	1	0	0	9	36	36	80	0	0	0	0
	0.0314	0.1338	0.1225	0.1555	0.1706	0.367	0.0072	0.0019	0.0102	0		
1981	1	1	0	0	9	37	37	65	0	0	0	0
	0.0915	0.0113	0.21	0.1806	0.3102	0.1563	0.0223	0.0022	0	0.0156		
1981	1	1	0	0	9	38	38	56	0	0	0	0
	0.1212	0	0.0622	0.0187	0.0703	0.49	0.1831	0.0435	0.0109	0.0002		
1981	1	1	0	0	9	39	39	39	0	0	0	0
	0.1161	0	0.1017	0.3391	0.0416	0.2684	0.0295	0.0651	0.036	0.0026		
1981	1	1	0	0	9	40	40	34	0	0	0	0
	0.0108	0.0061	0.2057	0.0974	0.0904	0.5382	0.0179	0.0292	0	0.0043		
1981	1	1	0	0	9	41	41	36	0	0	0	0
	0.0254	0	0.0471	0.0606	0.0253	0.1345	0.5426	0.09	0.0256	0.0488		

1981	1	1	0	0	9	42	42	30	0	0	0	0
	0	0	0.1345	0.0561	0.0886	0.5157	0.0676	0.0242	0.1118	0.0015		
1981	1	1	0	0	9	43	43	20	0	0	0	0
	0	0	0.0138	0.038	0.1907	0.2114	0.1532	0.3637	0	0.0291		
1981	1	1	0	0	9	44	44	20	0	0	0	0
	0	0	0.0299	0.0015	0	0.9054	0.0077	0.0241	0.0251	0.0063		
1981	1	1	0	0	9	45	45	16	0	0	0	0
	0	0	0.2465	0.3707	0.0996	0.1901	0.0778	0.0096	0	0.0057		
1981	1	1	0	0	9	46	46	8	0	0	0	0
	0	0	0.6455	0	0.0066	0.0268	0.3176	0.0002	0.0032	0		
1981	1	1	0	0	9	47	47	10	0	0	0	0
	0	0	0.0145	0.0137	0.4114	0.4966	0.0579	0.0059	0	0		
1981	1	1	0	0	9	48	48	10	0	0	0	0
	0	0	0	0	0.702	0.2296	0.031	0.0373	0	0		
1981	1	1	0	0	9	49	49	5	0	0	0	0
	0	0	0	0.2939	0	0.5966	0	0	0	0.1095		
1981	1	1	0	0	9	50	50	7	0	0	0	0
	0	0	0	0.9724	0	0.0041	0	0.0126	0.011	0		
1981	1	1	0	0	9	51	51	15	0	0	0	0
	0	0	0	0	0	0.1205	0.5252	0.2063	0.0537	0.0944		
1982	1	1	0	0	10	5	5	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	6	6	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	7	7	11	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	8	8	9	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	9	9	12	0.9799	0.0201	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	10	10	18	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	11	11	37	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	12	12	38	0.9899	0.0101	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	13	13	52	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	14	14	62	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	15	15	66	0.9857	0.0061	0.0082	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	16	16	62	0.984	0.0045	0.0115	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	17	17	55	0.9431	0.0569	0	0
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	18	18	59	0.7845	0.1801	0	0.0354
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	19	19	48	0.6234	0.3176	0.0201	0.0389
	0	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	20	20	50	0.4699	0.3738	0.0594	0.0801
	0.0168	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	21	21	62	0.0997	0.2371	0.0624	0.5878
	0.013	0	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	22	22	66	0.0223	0.2028	0.1748	0.556
	0.0377	0	0	0	0	0	0	0	0	0.0063		
1982	1	1	0	0	10	23	23	86	0.0058	0.0958	0.0551	0.787
	0.0495	0	0	0.0068	0	0	0	0	0	0		
1982	1	1	0	0	10	24	24	94	0	0.0524	0.0335	0.8529
	0.0393	0.0055	0	0.0164	0	0	0	0	0	0		
1982	1	1	0	0	10	25	25	99	0	0.0074	0.022	0.9265
	0.0381	0.006	0	0	0	0	0	0	0	0		
1982	1	1	0	0	10	26	26	100	0	0.0065	0.0322	0.8947
	0.0385	0.0082	0.0064	0.007	0	0.0038	0	0	0	0.0028		
1982	1	1	0	0	10	27	27	99	0	0	0.0075	0.8201
	0.0696	0.0255	0.0148	0.0456	0.0063	0	0.0039	0	0	0.0067		

1982	1	1	0	0	10	28	28	103	0	0	0.0038	0.7791
	0.0792	0.0368	0.0351	0.066	0	0	0	0	0	0		
1982	1	1	0	0	10	29	29	111	0	0	0	0.47
	0.1656	0.0825	0.0628	0.1689	0.0241	0.0262	0	0	0	0		
1982	1	1	0	0	10	30	30	116	0	0	0.0136	0.4788
	0.1026	0.0994	0.0955	0.1758	0.004	0.015	0.0092	0	0	0.0061		
1982	1	1	0	0	10	31	31	101	0	0	0	0.3477
	0.0746	0.1381	0.0766	0.234	0.0557	0.0124	0.061	0	0	0		
1982	1	1	0	0	10	32	32	112	0	0	0	0.1659
	0.0353	0.1522	0.1189	0.2767	0.0757	0.0545	0.1166	0.0041	0	0		
1982	1	1	0	0	10	33	33	100	0	0	0	0.1155
	0.0385	0.1061	0.137	0.2923	0.0601	0.0482	0.1845	0.0178	0	0		
1982	1	1	0	0	10	34	34	106	0	0	0	0.0441
	0.0055	0.1382	0.1737	0.3282	0.1074	0.0691	0.1056	0.0061	0.0053	0.0169		
1982	1	1	0	0	10	35	35	104	0	0	0	0.037
	0.0201	0.1159	0.0573	0.3434	0.1022	0.0803	0.2382	0	0	0.0057		
1982	1	1	0	0	10	36	36	86	0	0	0	0.0077
	0.0067	0.0507	0.2346	0.291	0.052	0.1404	0.196	0.017	0	0.004		
1982	1	1	0	0	10	37	37	85	0	0	0	0.0068
	0.013	0.0558	0.0809	0.2471	0.037	0.0572	0.4831	0.0086	0.0052	0.0053		
1982	1	1	0	0	10	38	38	81	0	0	0	0.006
	0.0359	0.1306	0.0427	0.2809	0.048	0.2033	0.1857	0.0508	0.0162	0		
1982	1	1	0	0	10	39	39	48	0	0	0	0
	0	0.0419	0.0534	0.257	0.0828	0.2633	0.2055	0.0528	0	0.0433		
1982	1	1	0	0	10	40	40	53	0	0	0	0
	0	0.0815	0.0872	0.3616	0.1213	0.0985	0.2189	0.0031	0.0162	0.0117		
1982	1	1	0	0	10	41	41	37	0	0	0	0
	0	0.1	0.0025	0.4418	0.0764	0.0496	0.2586	0	0.046	0.0253		
1982	1	1	0	0	10	42	42	28	0	0	0	0
	0	0.0156	0.0714	0.2493	0	0.1469	0.4179	0	0	0.099		
1982	1	1	0	0	10	43	43	17	0	0	0	0
	0	0	0	0.1702	0.0135	0.0298	0.6885	0.0979	0	0		
1982	1	1	0	0	10	44	44	21	0	0	0	0
	0	0.0159	0.023	0.6101	0.0312	0.0541	0.0758	0.1576	0.0323	0		
1982	1	1	0	0	10	45	45	21	0	0	0	0
	0	0.0178	0.0712	0.0926	0	0.0433	0.5293	0.046	0.1617	0.0381		
1982	1	1	0	0	10	46	46	18	0	0	0	0
	0	0.0665	0	0.3261	0	0.0454	0.4891	0.0729	0	0		
1982	1	1	0	0	10	47	47	9	0	0	0	0
	0	0	0	0.0228	0.0796	0.5035	0.3019	0.0922	0	0		
1982	1	1	0	0	10	48	48	10	0	0	0	0
	0	0	0	0.0624	0	0.4373	0.5003	0	0	0		
1982	1	1	0	0	10	49	49	6	0	0	0	0
	0	0	0	0.0162	0	0	0.8747	0	0	0.1091		
1982	1	1	0	0	10	50	50	6	0	0	0	0
	0	0	0	0	0	0.2581	0.5073	0	0.1633	0.0713		
1982	1	1	0	0	10	51	51	14	0.0568	0	0	0
	0	0	0	0	0.0122	0.0981	0.3928	0.0604	0.1741	0.2056		
1983	1	1	0	0	11	7	7	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	10	10	6	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	11	11	10	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	12	12	11	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	13	13	23	0	0.9755	0.0245	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	14	14	23	0	0.9599	0.0401	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	15	15	35	0	0.9482	0.0406	0
	0.0112	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	16	16	39	0	0.9928	0.0072	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	17	17	51	0	0.9579	0.0421	0
	0	0	0	0	0	0	0	0	0	0		

1983	1	1	0	0	11	18	18	55	0	0.9268	0.0732	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	19	19	62	0	0.9072	0.0841	0.0087
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	20	20	58	0	0.9052	0.082	0.0129
	0	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	21	21	62	0	0.8478	0.0971	0.029
	0.0261	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	22	22	69	0	0.764	0.12	0.0224
	0.0935	0	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	23	23	77	0	0.6015	0.1727	0.0122
	0.1938	0.016	0	0	0.0038	0	0	0	0	0		
1983	1	1	0	0	11	24	24	72	0	0.4101	0.1457	0.1051
	0.3239	0.0152	0	0	0	0	0	0	0	0		
1983	1	1	0	0	11	25	25	69	0	0.2321	0.0992	0.1061
	0.5097	0.0519	0	0.0004	0.0006	0	0	0	0	0		
1983	1	1	0	0	11	26	26	69	0	0.1105	0.0232	0.047
	0.7371	0.0326	0.043	0.0058	0.0003	0.0006	0	0	0	0		
1983	1	1	0	0	11	27	27	75	0	0.0154	0.0074	0.0333
	0.7902	0.047	0.0236	0.0322	0.042	0.0089	0	0	0	0		
1983	1	1	0	0	11	28	28	74	0	0.0255	0.0271	0.0414
	0.7211	0.097	0.023	0.0034	0.0418	0.0071	0.0073	0.0054	0	0		
1983	1	1	0	0	11	29	29	70	0	0.0278	0.0151	0.0359
	0.6431	0.1052	0.0377	0.0696	0.0379	0.012	0.0132	0.0026	0	0		
1983	1	1	0	0	11	30	30	69	0	0.0163	0	0.0186
	0.4169	0.0689	0.0581	0.1604	0.1637	0.0379	0.0284	0.0307	0	0		
1983	1	1	0	0	11	31	31	71	0	0	0	0.0118
	0.4593	0.0818	0.1149	0.1194	0.0982	0.0768	0.0351	0	0.0026	0		
1983	1	1	0	0	11	32	32	59	0	0	0	0.0038
	0.2531	0.1084	0.1153	0.1071	0.2304	0.0066	0.0082	0.1483	0.0047	0.0142		
1983	1	1	0	0	11	33	33	66	0	0	0	0.0068
	0.3616	0.1156	0.074	0.1563	0.1131	0.0559	0.0127	0.104	0	0		
1983	1	1	0	0	11	34	34	66	0	0	0	0.0087
	0.1687	0.2545	0.1399	0.1147	0.188	0.0744	0.0069	0.0441	0	0		
1983	1	1	0	0	11	35	35	61	0	0.0043	0	0.006
	0.058	0.0573	0.1012	0.1043	0.3515	0.0382	0.2221	0.0361	0.0208	0		
1983	1	1	0	0	11	36	36	57	0	0	0	0
	0.1278	0.0187	0.1506	0.0947	0.3021	0.0813	0.1135	0.0903	0	0.021		
1983	1	1	0	0	11	37	37	44	0	0	0	0
	0.0676	0.0133	0.1161	0.2286	0.3864	0.126	0.0547	0.0073	0	0		
1983	1	1	0	0	11	38	38	32	0	0	0	0
	0.053	0.0654	0.0446	0.1149	0.3563	0.1548	0.1043	0.0403	0.0438	0.0227		
1983	1	1	0	0	11	39	39	32	0	0	0	0
	0.0259	0.0354	0.1384	0.1751	0.2559	0.0719	0.0844	0.1292	0.0839	0		
1983	1	1	0	0	11	40	40	17	0	0	0	0
	0.0311	0	0.0868	0.2246	0.4008	0.0646	0.0309	0.0311	0.1302	0		
1983	1	1	0	0	11	41	41	22	0	0	0	0
	0.0181	0.0647	0.0877	0.2182	0.455	0.0473	0.0093	0.0988	0	0.0009		
1983	1	1	0	0	11	42	42	15	0	0	0	0
	0	0	0.073	0	0.1985	0.1158	0.0159	0.3428	0.2397	0.0143		
1983	1	1	0	0	11	43	43	9	0	0	0	0
	0.2783	0	0	0.04	0.2594	0.2181	0.1009	0.1034	0	0		
1983	1	1	0	0	11	44	44	12	0	0	0	0
	0	0	0	0	0.0769	0.0862	0.3018	0.4562	0.0789	0		
1983	1	1	0	0	11	45	45	6	0	0	0	0
	0	0	0.1094	0	0.3284	0.4994	0	0.0628	0	0		
1983	1	1	0	0	11	46	46	6	0	0	0	0
	0	0	0	0.0721	0.6149	0	0.3129	0	0	0		
1983	1	1	0	0	11	47	47	4	0	0	0	0
	0	0	0	0.0568	0	0.0662	0	0.7849	0	0.0922		
1983	1	1	0	0	11	48	48	4	0	0	0	0
	0	0	0	0	0.5491	0.2389	0.1051	0.1069	0	0		
1983	1	1	0	0	11	49	49	5	0	0	0	0
	0	0	0	0.1742	0.1527	0	0.3507	0.1929	0	0.1294		
1983	1	1	0	0	11	50	50	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		

1983	1	1	0	0	11	51	51	12	0	0	0	0
	0	0	0	0.0197	0.0998	0.3181	0.0397	0.0858	0.3651	0.0718		
1984	1	1	0	0	12	8	8	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	12	12	3	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	13	13	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	14	14	2	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	15	15	6	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	16	16	12	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	17	17	25	0	0.033	0.967	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	18	18	41	0	0.0196	0.9804	0
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	19	19	72	0	0.0161	0.9739	0.009
	0.001	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	20	20	112	0	0.0215	0.9565	0.022
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	21	21	121	0	0.0095	0.9473	0.0432
	0	0	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	22	22	135	0	0.0124	0.9366	0.0488
	0	0.0022	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	23	23	125	0	0	0.9463	0.0351
	0.0083	0.0102	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	24	24	112	0	0	0.8584	0.0882
	0.0217	0.0316	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	25	25	93	0	0	0.761	0.0755
	0.0802	0.0833	0	0	0	0	0	0	0	0		
1984	1	1	0	0	12	26	26	82	0	0	0.5885	0.0593
	0.0826	0.2473	0.0223	0	0	0	0	0	0	0		
1984	1	1	0	0	12	27	27	83	0	0	0.2856	0.1035
	0.1704	0.3995	0.0309	0	0.0102	0	0	0	0	0		
1984	1	1	0	0	12	28	28	74	0	0	0.1396	0.0978
	0.2141	0.4656	0.0289	0.0117	0	0.024	0	0	0.0183	0		
1984	1	1	0	0	12	29	29	67	0	0	0.0489	0.0248
	0.2297	0.5731	0.0728	0.014	0.0157	0.0211	0	0	0	0		
1984	1	1	0	0	12	30	30	66	0	0	0.0398	0.0014
	0.1021	0.7133	0.0641	0.0457	0.0114	0.0222	0	0	0	0		
1984	1	1	0	0	12	31	31	50	0	0	0.0219	0.0116
	0.137	0.4594	0.1591	0.0384	0.0623	0.0754	0	0.0348	0	0		
1984	1	1	0	0	12	32	32	49	0	0	0	0.0122
	0.0835	0.4197	0.0938	0.0734	0.0985	0.1193	0.0088	0.0194	0.0713	0		
1984	1	1	0	0	12	33	33	43	0	0	0	0.0051
	0.0421	0.4031	0.0911	0.0596	0.0495	0.1944	0	0.0989	0.0561	0		
1984	1	1	0	0	12	34	34	28	0	0	0	0
	0	0.2245	0.1708	0.1166	0.1265	0.1542	0	0	0.1134	0.094		
1984	1	1	0	0	12	35	35	20	0	0	0	0
	0	0.1729	0.0532	0.2592	0.0316	0.4179	0	0	0.0652	0		
1984	1	1	0	0	12	36	36	11	0	0	0	0
	0	0.0581	0.1757	0.2622	0.0108	0	0.2497	0.2436	0	0		
1984	1	1	0	0	12	37	37	5	0	0	0	0
	0	0	0.0865	0.0958	0.5069	0.0855	0.2253	0	0	0		
1984	1	1	0	0	12	38	38	5	0	0	0	0
	0	0.0729	0	0.0954	0.2953	0	0	0.5018	0.0346	0		
1984	1	1	0	0	12	39	39	4	0	0	0	0
	0	0.7069	0.1318	0	0.11	0	0.0512	0	0	0		
1984	1	1	0	0	12	40	40	7	0	0	0	0
	0	0	0.2563	0	0.0671	0.3585	0.124	0	0.1942	0		
1984	1	1	0	0	12	41	41	2	0	0	0	0
	0	0	0	0	0.1547	0.1547	0	0	0.6905	0		
1984	1	1	0	0	12	43	43	4	0	0	0	0
	0	0	0	0	0	0.9647	0	0.0353	0	0		

1984	1	1	0	0	12	44	44	4	0	0	0	0
	0	0	0	0	0	0.595	0.2895	0	0.1155	0		
1984	1	1	0	0	12	45	45	2	0	0	0	0
	0	0	0	0	0	0	0	0	0.4484	0.5516		
1984	1	1	0	0	12	46	46	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1984	1	1	0	0	12	48	48	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1984	1	1	0	0	12	49	49	2	0	0	0	0
	0	0	0	0	0	0.4713	0.5287	0	0	0		
1984	1	1	0	0	12	50	50	3	0	0	0	0
	0	0	0	0	0	0.7176	0	0	0.2824	0		
1984	1	1	0	0	12	51	51	9	0	0	0	0
	0	0	0.0739	0.1309	0	0.2935	0.0274	0.0346	0.3688	0.071		
1985	1	1	0	0	13	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	10	10	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	11	11	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	12	12	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	13	13	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	14	14	3	0.6433	0.3567	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	15	15	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	16	16	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	17	17	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	18	18	2	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	19	19	7	0.0491	0.3364	0	0.6145
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	20	20	16	0	0	0.2126	0.7874
	0	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	21	21	43	0.0063	0.0018	0.2711	0.6902
	0.0306	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	22	22	78	0	0	0.1444	0.7675
	0.0881	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	23	23	107	0	0	0.1295	0.8359
	0.0345	0	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	24	24	121	0	0	0.0855	0.886
	0.0257	0.0027	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	25	25	124	0	0	0.04	0.8974
	0.062	0.0007	0	0	0	0	0	0	0	0		
1985	1	1	0	0	13	26	26	115	0	0	0.0234	0.8869
	0.0646	0.0099	0.0152	0	0	0	0	0	0	0		
1985	1	1	0	0	13	27	27	101	0	0	0.0103	0.8008
	0.0993	0.0499	0.0397	0	0	0	0	0	0	0		
1985	1	1	0	0	13	28	28	79	0	0	0.0098	0.6165
	0.1039	0.1529	0.1169	0	0	0	0	0	0	0		
1985	1	1	0	0	13	29	29	63	0	0	0	0.415
	0.2415	0.1786	0.1615	0.0034	0	0	0	0	0	0		
1985	1	1	0	0	13	30	30	58	0	0	0	0.2954
	0.1652	0.1788	0.3415	0.0191	0	0	0	0	0	0		
1985	1	1	0	0	13	31	31	52	0	0	0	0.1511
	0.1357	0.1548	0.5076	0.047	0.0001	0	0.0036	0	0	0		
1985	1	1	0	0	13	32	32	25	0	0	0	0.0448
	0.2469	0.088	0.5438	0	0.0511	0	0.0255	0	0	0		
1985	1	1	0	0	13	33	33	24	0	0	0	0
	0	0.1586	0.6698	0.0131	0.0414	0.117	0	0	0	0		

1985	1	1	0	0	13	34	34	17	0	0	0	0
	0.1612	0.3	0.3874	0	0.0542	0.0973	0	0	0	0		
1985	1	1	0	0	13	35	35	15	0	0	0	0
	0	0.0902	0.5058	0.2053	0.1151	0	0.0836	0	0	0		
1985	1	1	0	0	13	36	36	11	0	0	0	0
	0	0	0.3983	0.3581	0.1833	0.0482	0.0122	0	0	0		
1985	1	1	0	0	13	37	37	3	0	0	0	0
	0	0	0.1405	0	0	0.6709	0.1885	0	0	0		
1985	1	1	0	0	13	38	38	4	0	0	0	0
	0	0	0.0668	0.9332	0	0	0	0	0	0		
1985	1	1	0	0	13	39	39	3	0	0	0	0
	0	0	0	0.1047	0	0.5112	0.3841	0	0	0		
1985	1	1	0	0	13	41	41	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1985	1	1	0	0	13	42	42	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1985	1	1	0	0	13	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1986	1	1	0	0	14	5	5	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	10	10	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	11	11	5	0.7986	0.2014	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	12	12	8	0.8369	0.0987	0	0
	0.0644	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	13	13	19	0.7475	0.2525	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	14	14	22	0.8952	0.1048	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	15	15	49	0.8924	0.1033	0	0
	0	0	0	0	0	0	0	0.0043	0	0		
1986	1	1	0	0	14	16	16	41	0.9315	0.0685	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	17	17	42	0.8993	0.1007	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	18	18	40	0.766	0.2022	0.0227	0
	0.0092	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	19	19	39	0.5346	0.3611	0.0434	0.0234
	0.0375	0	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	20	20	36	0.2168	0.2068	0.0794	0
	0.481	0.016	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	21	21	51	0.0967	0.1245	0	0.0415
	0.718	0.0192	0	0	0	0	0	0	0	0		
1986	1	1	0	0	14	22	22	85	0.0143	0.0569	0.0429	0.0963
	0.747	0.0408	0.002	0	0	0	0	0	0	0		
1986	1	1	0	0	14	23	23	114	0	0.0162	0.0138	0.0633
	0.8265	0.0746	0.0057	0	0	0	0	0	0	0		
1986	1	1	0	0	14	24	24	119	0	0	0.0132	0.0755
	0.8346	0.0737	0.003	0	0	0	0	0	0	0		
1986	1	1	0	0	14	25	25	110	0	0.0073	0	0.0385
	0.8688	0.0614	0.02	0.004	0	0	0	0	0	0		
1986	1	1	0	0	14	26	26	113	0	0	0.0064	0.0388
	0.7934	0.0999	0.0439	0.0176	0	0	0	0	0	0		
1986	1	1	0	0	14	27	27	105	0	0	0	0.0392
	0.7694	0.096	0.0467	0.0486	0	0	0	0	0	0		
1986	1	1	0	0	14	28	28	100	0	0	0	0.005
	0.6861	0.1173	0.0867	0.105	0	0	0	0	0	0		
1986	1	1	0	0	14	29	29	83	0	0	0.0087	0.0054
	0.5111	0.1732	0.1317	0.1536	0.007	0.0093	0	0	0	0		
1986	1	1	0	0	14	30	30	67	0	0	0	0
	0.4155	0.147	0.1706	0.2345	0.0185	0.0139	0	0	0	0		
1986	1	1	0	0	14	31	31	77	0	0	0	0
	0.2452	0.1266	0.1916	0.382	0.0345	0.013	0	0.0072	0	0		
1986	1	1	0	0	14	32	32	59	0	0	0	0
	0.2164	0.1501	0.0899	0.4173	0.0377	0.0364	0.0142	0.0246	0.0053	0.0083		

1986	1	1	0	0	14	33	33	51	0	0	0	0
	0.0868	0.064	0.1148	0.4276	0.1377	0.0808	0.0563	0.032	0	0		
1986	1	1	0	0	14	34	34	52	0	0	0	0
	0.1319	0.1375	0.1477	0.2997	0.0741	0.0378	0.0761	0.0952	0	0		
1986	1	1	0	0	14	35	35	44	0	0	0	0
	0.0563	0.032	0.0362	0.4116	0.1344	0.205	0.0359	0.0725	0	0.0161		
1986	1	1	0	0	14	36	36	27	0	0	0	0
	0.072	0.0969	0.1015	0.2885	0.1861	0.0792	0.0439	0.132	0	0		
1986	1	1	0	0	14	37	37	31	0	0	0	0
	0	0.0487	0.2645	0.0804	0.0804	0.2176	0.1997	0.0613	0.0474	0		
1986	1	1	0	0	14	38	38	24	0	0	0	0
	0.0332	0	0.1093	0.2359	0.1034	0.1553	0.0066	0.3261	0.0302	0		
1986	1	1	0	0	14	39	39	11	0	0	0	0
	0	0	0	0.1314	0.1022	0.5425	0.0448	0.1791	0	0		
1986	1	1	0	0	14	40	40	11	0	0	0	0
	0	0	0	0.1337	0.0675	0.2444	0	0.3673	0	0.1871		
1986	1	1	0	0	14	41	41	7	0	0	0	0
	0	0.1915	0	0	0.4505	0.3351	0	0	0.0228	0		
1986	1	1	0	0	14	42	42	8	0	0	0	0
	0	0	0	0.5975	0.0814	0	0	0.0984	0	0.2227		
1986	1	1	0	0	14	43	43	7	0	0	0	0
	0	0	0	0.1306	0.2845	0	0.2833	0.3017	0	0		
1986	1	1	0	0	14	44	44	3	0	0	0	0
	0	0	0	0	0.1447	0.3308	0	0.5245	0	0		
1986	1	1	0	0	14	45	45	6	0	0	0	0
	0	0	0.2829	0.1794	0.1415	0.2689	0	0.1273	0	0		
1986	1	1	0	0	14	46	46	5	0	0	0	0
	0	0	0	0	0	0.3841	0.0562	0.2535	0	0.3062		
1986	1	1	0	0	14	47	47	6	0	0	0	0
	0.0525	0	0	0	0.0525	0.1035	0.1563	0.5186	0	0.1167		
1986	1	1	0	0	14	48	48	4	0	0	0	0
	0	0	0	0	0.061	0.3475	0	0.1661	0.4254	0		
1986	1	1	0	0	14	49	49	3	0	0	0	0
	0	0	0.1424	0	0	0.1424	0	0.7153	0	0		
1986	1	1	0	0	14	50	50	4	0	0	0	0
	0	0	0	0	0	0	0	0.5429	0	0.4571		
1986	1	1	0	0	14	51	51	25	0	0	0	0
	0	0	0.0074	0.4041	0.0675	0.1412	0.1492	0.1325	0.0394	0.0587		
1987	1	1	0	0	15	14	14	3	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	15	15	6	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	16	16	16	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	17	17	29	0	0.9813	0.0187	0
	0	0	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	18	18	60	0	0.9612	0.0388	0
	0	0	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	19	19	79	0	0.9003	0.0737	0.0118
	0	0.0142	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	20	20	88	0	0.9119	0.0476	0
	0.0174	0.0231	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	21	21	97	0	0.8257	0.0207	0.0094
	0	0.1443	0	0	0	0	0	0	0	0		
1987	1	1	0	0	15	22	22	104	0	0.7603	0.0385	0
	0.0043	0.1829	0.0021	0.0119	0	0	0	0	0	0		
1987	1	1	0	0	15	23	23	112	0	0.5048	0.015	0.0082
	0.0319	0.4166	0.0235	0	0	0	0	0	0	0		
1987	1	1	0	0	15	24	24	121	0	0.2743	0.0201	0.0123
	0.0077	0.6558	0.0241	0	0.0058	0	0	0	0	0		
1987	1	1	0	0	15	25	25	117	0	0.0716	0.0417	0.0041
	0.0044	0.8268	0.0351	0	0.0163	0	0	0	0	0		
1987	1	1	0	0	15	26	26	113	0	0.0132	0.0031	0.0032
	0.0151	0.8578	0.0414	0.0247	0.0416	0	0	0	0	0		
1987	1	1	0	0	15	27	27	106	0	0.0014	0.0057	0.0127
	0.0733	0.7813	0.0718	0.0129	0.0398	0	0	0	0.001	0		

1987	1	1	0	0	15	28	28	102	0	0	0	0.0051
	0.0016	0.7359	0.1202	0.0172	0.12	0	0	0	0	0		
1987	1	1	0	0	15	29	29	92	0	0	0	0
	0.0021	0.7355	0.0337	0.0359	0.1823	0.0048	0	0	0	0.0057		
1987	1	1	0	0	15	30	30	83	0	0.004	0	0
	0.0121	0.6676	0.0823	0.0114	0.2101	0	0	0	0.0124	0		
1987	1	1	0	0	15	31	31	59	0	0	0	0
	0.0118	0.565	0.0427	0.0264	0.3118	0.0093	0	0	0.0331	0		
1987	1	1	0	0	15	32	32	40	0	0	0	0
	0	0.3497	0.0775	0.0662	0.3661	0.0357	0.0162	0	0.0886	0		
1987	1	1	0	0	15	33	33	31	0	0	0	0
	0	0.3648	0.0261	0.0091	0.505	0.0403	0	0	0.0546	0		
1987	1	1	0	0	15	34	34	18	0	0	0	0
	0	0.0779	0.0385	0.0169	0.6232	0	0.0454	0	0.1982	0		
1987	1	1	0	0	15	35	35	14	0	0	0	0
	0	0.3415	0	0	0.4553	0	0	0	0.2033	0		
1987	1	1	0	0	15	36	36	8	0	0	0	0
	0.1596	0.0351	0	0	0.5772	0	0	0.0924	0.1357	0		
1987	1	1	0	0	15	37	37	5	0	0	0	0
	0	0	0.0913	0	0.3026	0.1435	0	0.1373	0.1662	0.1591		
1987	1	1	0	0	15	38	38	5	0	0	0	0
	0.1127	0	0.6198	0	0.1729	0	0	0	0.0947	0		
1987	1	1	0	0	15	39	39	3	0	0	0	0
	0	0	0	0.2073	0.2023	0	0	0	0.2952	0.2952		
1987	1	1	0	0	15	40	40	2	0	0	0	0
	0	0	0	0	0.7793	0.2207	0	0	0	0		
1987	1	1	0	0	15	41	41	5	0	0	0	0
	0	0	0.1403	0	0.6712	0	0	0	0.1885	0		
1987	1	1	0	0	15	42	42	3	0	0	0	0
	0	0	0	0	0.2722	0	0	0	0.221	0.5069		
1987	1	1	0	0	15	43	43	6	0	0	0	0
	0	0	0	0	0.433	0.3544	0	0.0357	0.0869	0.0899		
1987	1	1	0	0	15	44	44	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1987	1	1	0	0	15	45	45	2	0	0	0	0
	0	0	0	0	0	0	0	0.243	0.757	0		
1987	1	1	0	0	15	46	46	3	0	0	0	0
	0	0.3506	0	0.3921	0	0	0	0	0.2574	0		
1987	1	1	0	0	15	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1987	1	1	0	0	15	48	48	2	0	0	0	0
	0	0	0	0	0.4349	0	0	0	0.5651	0		
1987	1	1	0	0	15	49	49	3	0	0	0	0
	0	0	0.2406	0.4317	0	0	0	0	0	0.3278		
1987	1	1	0	0	15	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1987	1	1	0	0	15	51	51	5	0	0	0	0
	0	0	0	0	0.1639	0	0	0.5995	0.2366	0		
1988	1	1	0	0	16	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	12	12	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	13	13	2	0.493	0.507	0	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	14	14	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	15	15	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	16	16	3	0.4793	0	0.5207	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	17	17	3	0.3398	0.3192	0.341	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	1	0	0	16	18	18	15	0.0679	0.0688	0.7531	0.1102
	0	0	0	0	0	0	0	0	0	0		

1988	1	1	0	0	16	19	19	56	0.0217	0.0239	0.9317	0
	0	0	0.0227	0	0	0	0	0	0	0		
1988	1	1	0	0	16	20	20	101	0.0042	0.0137	0.953	0.0232
	0	0	0.006	0	0	0	0	0	0	0		
1988	1	1	0	0	16	21	21	129	0	0.007	0.9307	0.0359
	0.0035	0.0044	0.0184	0	0	0	0	0	0	0		
1988	1	1	0	0	16	22	22	141	0	0.0038	0.9256	0.0419
	0.0064	0	0.0224	0	0	0	0	0	0	0		
1988	1	1	0	0	16	23	23	141	0	0.0017	0.9052	0.0287
	0.0019	0	0.057	0.0056	0	0	0	0	0	0		
1988	1	1	0	0	16	24	24	145	0	0	0.7042	0.0303
	0.004	0.0076	0.2446	0	0	0.0094	0	0	0	0		
1988	1	1	0	0	16	25	25	153	0	0	0.5065	0.0104
	0.0092	0.0084	0.4279	0.027	0	0.0106	0	0	0	0		
1988	1	1	0	0	16	26	26	152	0	0	0.1856	0.0125
	0.0041	0.0151	0.7179	0.0338	0.0035	0.0274	0	0	0	0		
1988	1	1	0	0	16	27	27	150	0	0	0.1435	0.0103
	0.0025	0.0274	0.7427	0.0301	0.0048	0.0387	0	0	0	0		
1988	1	1	0	0	16	28	28	137	0	0	0.0748	0.013
	0.0163	0.0132	0.7874	0.0347	0	0.0606	0	0	0	0		
1988	1	1	0	0	16	29	29	123	0	0	0.0476	0.0034
	0	0.0214	0.7797	0.0797	0.0117	0.0524	0	0.0041	0	0		
1988	1	1	0	0	16	30	30	81	0	0	0.0425	0
	0.0649	0.0038	0.556	0.0484	0.04	0.2235	0.0069	0	0	0.0142		
1988	1	1	0	0	16	31	31	68	0	0	0.0214	0
	0	0.0078	0.4008	0.0512	0.0244	0.477	0.0074	0	0	0.0101		
1988	1	1	0	0	16	32	32	45	0	0	0.0051	0
	0.0132	0.0234	0.455	0.0246	0	0.326	0	0	0	0.1527		
1988	1	1	0	0	16	33	33	34	0	0	0	0
	0	0	0.4361	0.0281	0.1075	0.3441	0	0	0	0.0842		
1988	1	1	0	0	16	34	34	22	0	0	0	0
	0	0	0.4126	0.0648	0	0.449	0.033	0	0	0.0405		
1988	1	1	0	0	16	35	35	15	0	0	0	0
	0	0	0.0713	0.1054	0	0.5877	0	0	0	0.2355		
1988	1	1	0	0	16	36	36	14	0	0	0	0
	0	0	0.0975	0.2658	0	0.3733	0	0	0	0.2635		
1988	1	1	0	0	16	37	37	8	0	0	0	0
	0	0	0.1291	0	0	0.1432	0	0	0	0.7277		
1988	1	1	0	0	16	38	38	13	0	0	0	0
	0	0	0.2178	0.097	0	0.5284	0	0	0	0.1568		
1988	1	1	0	0	16	39	39	11	0	0	0	0
	0	0	0.1278	0	0	0.3234	0	0.2868	0	0.262		
1988	1	1	0	0	16	40	40	4	0	0	0	0
	0	0	0	0	0	0.8301	0.1699	0	0	0		
1988	1	1	0	0	16	41	41	6	0	0	0	0
	0	0	0.3603	0	0	0.6397	0	0	0	0		
1988	1	1	0	0	16	42	42	5	0	0	0	0
	0	0	0.0971	0	0	0.7763	0	0	0	0.1266		
1988	1	1	0	0	16	43	43	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
1988	1	1	0	0	16	45	45	4	0	0	0	0
	0	0	0.3583	0	0	0.3987	0	0	0	0.243		
1988	1	1	0	0	16	46	46	3	0	0	0	0
	0	0	0.3319	0	0	0	0	0	0	0.6681		
1988	1	1	0	0	16	47	47	4	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1988	1	1	0	0	16	49	49	2	0	0	0	0
	0	0	0	0	0	0.3221	0	0	0	0.6779		
1988	1	1	0	0	16	50	50	3	0	0	0	0
	0	0	0	0	0	0.1183	0	0	0	0.8817		
1988	1	1	0	0	16	51	51	12	0	0	0	0
	0	0.0169	0.0123	0.0167	0	0.0927	0	0	0	0.8614		
1989	1	1	0	0	17	10	10	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	11	11	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		

1989	1	1	0	0	17	12	12	9	0.9742	0.0258	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	13	13	15	0.641	0.359	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	14	14	15	0.8114	0.1886	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	15	15	8	0.8279	0.1721	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	16	16	10	0.3828	0.3312	0.286	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	17	17	13	0.3559	0.6441	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	18	18	9	0.1751	0.4883	0.2796	0.057
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	19	19	17	0	0.2413	0.1695	0.5892
	0	0	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	20	20	40	0	0.2682	0.0786	0.6242
	0.0113	0.0176	0	0	0	0	0	0	0	0		
1989	1	1	0	0	17	21	21	79	0	0.0973	0.0606	0.7924
	0.0304	0	0	0.0193	0	0	0	0	0	0		
1989	1	1	0	0	17	22	22	120	0	0.0336	0.025	0.8962
	0.0269	0.004	0.0016	0.0105	0.0021	0	0	0	0	0		
1989	1	1	0	0	17	23	23	129	0	0.006	0.007	0.8945
	0.0383	0	0	0.0523	0	0.0019	0	0	0	0		
1989	1	1	0	0	17	24	24	125	0	0.0053	0.0107	0.8874
	0.0034	0	0	0.0932	0	0	0	0	0	0		
1989	1	1	0	0	17	25	25	127	0	0	0.0024	0.7444
	0.0065	0.0079	0	0.2234	0.0131	0	0.0023	0	0	0		
1989	1	1	0	0	17	26	26	125	0	0	0	0.5785
	0.0067	0.009	0.0185	0.3573	0.0265	0.0035	0	0	0	0		
1989	1	1	0	0	17	27	27	130	0	0	0	0.3755
	0.0157	0.0129	0.0116	0.542	0.0351	0.003	0.0043	0	0	0		
1989	1	1	0	0	17	28	28	133	0	0	0	0.2074
	0.0231	0.0028	0.0106	0.7298	0.0253	0	0.001	0	0	0		
1989	1	1	0	0	17	29	29	118	0	0	0.0038	0.1147
	0.0213	0.0035	0.0208	0.7404	0.0276	0.0172	0.0506	0	0	0		
1989	1	1	0	0	17	30	30	98	0	0	0	0.1194
	0	0.0117	0.0123	0.7787	0.0395	0	0.0358	0	0.0025	0		
1989	1	1	0	0	17	31	31	74	0	0	0	0.0511
	0.0248	0.0163	0.0248	0.6789	0.0419	0.0157	0.1465	0	0	0		
1989	1	1	0	0	17	32	32	49	0	0	0	0
	0	0.0095	0	0.6874	0.0537	0.0117	0.212	0	0	0.0257		
1989	1	1	0	0	17	33	33	40	0	0	0	0.0594
	0	0	0.0229	0.7036	0.0144	0	0.1998	0	0	0		
1989	1	1	0	0	17	34	34	35	0	0	0	0.0219
	0	0	0	0.5424	0.0668	0	0.2825	0.0161	0.0312	0.039		
1989	1	1	0	0	17	35	35	27	0	0	0	0.0178
	0.0307	0	0	0.4036	0.0202	0.0171	0.3939	0	0	0.1167		
1989	1	1	0	0	17	36	36	14	0	0	0	0
	0	0	0	0.3857	0.1103	0.1229	0.0763	0	0	0.3047		
1989	1	1	0	0	17	37	37	15	0	0	0	0
	0	0	0	0.1716	0.0484	0.033	0.7197	0	0	0.0273		
1989	1	1	0	0	17	38	38	8	0	0	0	0
	0	0	0	0.5079	0	0	0.4921	0	0	0		
1989	1	1	0	0	17	39	39	8	0	0	0	0
	0	0	0	0.1266	0	0	0.8412	0	0.0323	0		
1989	1	1	0	0	17	40	40	7	0	0	0	0
	0	0	0	0.575	0	0	0.3398	0	0.0851	0		
1989	1	1	0	0	17	41	41	3	0	0	0	0
	0	0	0	0	0.28	0	0.1715	0	0	0.5485		
1989	1	1	0	0	17	42	42	6	0	0	0	0
	0	0	0	0.2687	0	0	0.7313	0	0	0		
1989	1	1	0	0	17	44	44	3	0	0	0	0
	0	0	0	0	0	0	0.6146	0.3854	0	0		
1989	1	1	0	0	17	45	45	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		

1989	1	1	0	0	17	46	46	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1989	1	1	0	0	17	47	47	2	0	0	0	0
	0	0	0	0.8107	0	0	0.1893	0	0	0		
1989	1	1	0	0	17	49	49	4	0	0	0	0
	0	0	0	0.3549	0.1515	0	0.4937	0	0	0		
1989	1	1	0	0	17	51	51	4	0	0	0	0
	0	0	0	0	0.2364	0	0.7636	0	0	0		
1990	1	1	0	0	18	9	9	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	10	10	6	0.7445	0.2555	0	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	11	11	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	12	12	15	0.3977	0.6023	0	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	13	13	22	0.6987	0.3013	0	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	14	14	24	0.5851	0.4121	0	0
	0.0029	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	15	15	45	0.4253	0.543	0.0043	0
	0.0275	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	16	16	51	0.2285	0.7564	0.0151	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	17	17	76	0.2853	0.6603	0.0499	0
	0.0045	0	0	0	0	0	0	0	0	0		
1990	1	1	0	0	18	18	18	84	0.0664	0.876	0.0203	0
	0.0363	0	0	0	0.0009	0	0	0	0	0		
1990	1	1	0	0	18	19	19	94	0.0812	0.8065	0.0856	0
	0.0225	0	0	0	0.0042	0	0	0	0	0		
1990	1	1	0	0	18	20	20	98	0.0174	0.8915	0.0588	0.0018
	0.0286	0	0	0	0.0018	0	0	0	0	0		
1990	1	1	0	0	18	21	21	104	0.0074	0.8394	0.0534	0
	0.0938	0	0	0	0.0061	0	0	0	0	0		
1990	1	1	0	0	18	22	22	95	0	0.7097	0.084	0.0097
	0.1758	0	0	0.0049	0.016	0	0	0	0	0		
1990	1	1	0	0	18	23	23	96	0	0.4045	0.0507	0.0212
	0.4732	0.0053	0	0	0.0451	0	0	0	0	0		
1990	1	1	0	0	18	24	24	93	0	0.1055	0.04	0
	0.7633	0.0055	0	0	0.0819	0	0	0.0037	0	0		
1990	1	1	0	0	18	25	25	91	0	0.0266	0.0439	0
	0.6759	0	0.0111	0	0.2425	0	0	0	0	0		
1990	1	1	0	0	18	26	26	82	0	0.0121	0.0132	0.0116
	0.6018	0.0254	0.0065	0.0124	0.3083	0.0054	0	0.0033	0	0		
1990	1	1	0	0	18	27	27	88	0	0	0.005	0.0099
	0.5591	0.0062	0	0	0.4197	0	0	0	0	0		
1990	1	1	0	0	18	28	28	82	0	0	0	0.0204
	0.4363	0.0112	0	0.0061	0.5086	0	0	0.0174	0	0		
1990	1	1	0	0	18	29	29	84	0	0	0	0
	0.3034	0.0121	0.0135	0	0.6126	0	0	0.0585	0	0		
1990	1	1	0	0	18	30	30	73	0	0	0	0
	0.2749	0.0121	0	0.0163	0.5863	0.0111	0	0.0896	0	0.0097		
1990	1	1	0	0	18	31	31	72	0	0	0	0
	0.2638	0.0101	0	0	0.6243	0.0226	0	0.0793	0	0		
1990	1	1	0	0	18	32	32	74	0	0	0	0
	0.1179	0	0	0	0.7839	0	0	0.0906	0	0.0077		
1990	1	1	0	0	18	33	33	58	0	0	0	0
	0.0338	0	0	0	0.7978	0.0142	0	0.1542	0	0		
1990	1	1	0	0	18	34	34	43	0	0	0	0
	0.0073	0	0	0	0.6572	0	0	0.2934	0	0.0422		
1990	1	1	0	0	18	35	35	34	0	0	0	0
	0.0275	0	0	0	0.677	0	0	0.2699	0	0.0256		
1990	1	1	0	0	18	36	36	20	0	0	0	0
	0.0096	0	0	0	0.7408	0	0	0.2496	0	0		
1990	1	1	0	0	18	37	37	15	0	0	0	0
	0.0289	0	0	0	0.2609	0	0	0.581	0	0.1291		

1990	1	1	0	0	18	38	38	14	0	0	0	0
	0	0	0	0	0.618	0.0543	0	0.2958	0	0.0319		
1990	1	1	0	0	18	39	39	14	0	0	0	0
	0	0	0	0	0.6941	0.0483	0	0.0441	0	0.2136		
1990	1	1	0	0	18	40	40	11	0	0	0	0
	0	0	0	0	0.7701	0	0	0.2299	0	0		
1990	1	1	0	0	18	41	41	14	0	0	0	0
	0	0	0.0458	0	0.3996	0	0	0.4244	0	0.1302		
1990	1	1	0	0	18	42	42	15	0	0	0	0
	0	0	0	0	0.5968	0	0	0.3866	0	0.0166		
1990	1	1	0	0	18	43	43	9	0	0	0	0
	0	0	0	0	0.8455	0	0	0.0331	0	0.1214		
1990	1	1	0	0	18	44	44	9	0	0	0	0
	0	0	0	0	0.1571	0	0	0.7827	0	0.0602		
1990	1	1	0	0	18	45	45	8	0	0	0	0
	0	0	0	0	0.3222	0	0	0.6778	0	0		
1990	1	1	0	0	18	46	46	8	0	0	0	0
	0	0	0	0	0.3974	0	0	0.6026	0	0		
1990	1	1	0	0	18	47	47	8	0	0	0	0
	0	0	0	0	0.3214	0	0	0.3795	0	0.2991		
1990	1	1	0	0	18	48	48	6	0	0	0	0
	0	0	0	0	0.5001	0	0	0.5	0	0		
1990	1	1	0	0	18	49	49	6	0	0	0	0
	0	0	0	0	0.7289	0	0	0.2515	0	0.0196		
1990	1	1	0	0	18	50	50	7	0	0	0	0
	0	0	0	0	0.5397	0	0	0.4603	0	0		
1990	1	1	0	0	18	51	51	20	0	0	0	0
	0	0	0	0	0.352	0	0.0139	0.5689	0	0.0653		
1991	1	1	0	0	19	1	1	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	2	2	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	3	3	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	11	11	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	12	12	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	13	13	5	0.4588	0.5412	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	14	14	13	0.2271	0.7729	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	15	15	23	0.2385	0.6414	0.1201	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	16	16	32	0.1485	0.7042	0.1339	0.0134
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	17	17	33	0	0.7138	0.2801	0.0062
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	18	18	39	0	0.7747	0.2253	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	19	19	38	0	0.7006	0.2994	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	20	20	47	0	0.5373	0.4347	0.026
	0	0	0.002	0	0	0	0	0	0	0		
1991	1	1	0	0	19	21	21	54	0.002	0.3492	0.5473	0.1015
	0	0	0	0	0	0	0	0	0	0		
1991	1	1	0	0	19	22	22	63	0	0.2337	0.6324	0.0313
	0	0.0943	0	0	0	0.0083	0	0	0	0		
1991	1	1	0	0	19	23	23	66	0	0.0701	0.6015	0.0715
	0.0702	0.1225	0	0	0	0.0642	0	0	0	0		
1991	1	1	0	0	19	24	24	66	0	0.0431	0.4777	0.0914
	0.0246	0.3299	0.0131	0	0	0.0202	0	0	0	0		
1991	1	1	0	0	19	25	25	62	0	0.0056	0.3264	0.0685
	0.0018	0.4967	0.0161	0.0023	0.0078	0.0655	0.0083	0	0.001	0		

1991	1	1	0	0	19	26	26	61	0	0.0018	0.1424	0.0368
	0	0.6786	0.001	0	0.002	0.1258	0.0116	0	0	0		
1991	1	1	0	0	19	27	27	61	0	0	0.0804	0.0649
	0.0038	0.619	0.0702	0.0101	0	0.1425	0.0092	0	0	0		
1991	1	1	0	0	19	28	28	55	0	0	0.0084	0.0234
	0.0685	0.5863	0.0198	0.0062	0.0084	0.2331	0.0064	0	0.0395	0		
1991	1	1	0	0	19	29	29	56	0	0	0.0039	0
	0	0.5328	0.02	0.002	0	0.4281	0	0	0.0132	0		
1991	1	1	0	0	19	30	30	49	0	0	0	0.0184
	0.0032	0.463	0.0173	0	0	0.4602	0.0049	0	0.033	0		
1991	1	1	0	0	19	31	31	40	0	0	0	0
	0	0.184	0.0518	0	0	0.6606	0.0249	0	0.0787	0		
1991	1	1	0	0	19	32	32	20	0	0	0	0
	0	0.4162	0	0	0	0.3907	0.0291	0	0.164	0		
1991	1	1	0	0	19	33	33	9	0	0	0	0
	0	0	0.0808	0	0	0.5974	0	0	0.3219	0		
1991	1	1	0	0	19	34	34	6	0	0	0	0
	0	0.1254	0	0	0	0.1853	0	0	0.6894	0		
1991	1	1	0	0	19	35	35	6	0	0	0	0
	0	0.4802	0	0	0	0.194	0.1194	0	0	0.2064		
1991	1	1	0	0	19	36	36	7	0	0	0	0
	0	0.2149	0.1044	0	0	0.1178	0	0	0.5629	0		
1991	1	1	0	0	19	37	37	2	0	0	0	0
	0	0	0	0	0	0.1803	0	0	0	0.8197		
1991	1	1	0	0	19	38	38	3	0	0	0	0
	0	0.4074	0	0	0	0.0403	0	0	0.145	0.4074		
1991	1	1	0	0	19	39	39	2	0	0	0	0
	0	0	0	0	0	0.222	0	0	0.778	0		
1991	1	1	0	0	19	40	40	3	0	0	0	0
	0	0	0	0	0	0.5654	0	0	0.4346	0		
1991	1	1	0	0	19	42	42	3	0	0	0	0
	0	0	0.0744	0	0	0.8062	0	0	0.1195	0		
1991	1	1	0	0	19	43	43	3	0	0	0	0
	0	0	0	0	0	0.7328	0	0	0.2672	0		
1991	1	1	0	0	19	44	44	3	0	0	0	0
	0	0.3544	0	0	0	0.3769	0	0	0.2687	0		
1991	1	1	0	0	19	46	46	2	0	0	0	0
	0	0	0.5682	0	0.1439	0.1439	0	0	0	0.1439		
1991	1	1	0	0	19	47	47	5	0	0	0	0
	0	0	0.4589	0	0	0.0556	0	0	0.4855	0		
1991	1	1	0	0	19	48	48	2	0	0	0	0
	0	0	0	0	0	0.2273	0	0	0.7727	0		
1991	1	1	0	0	19	49	49	2	0	0	0	0
	0	0	0	0	0.6351	0	0	0	0.3649	0		
1991	1	1	0	0	19	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1991	1	1	0	0	19	51	51	9	0.1062	0	0	0
	0	0	0	0	0	0.3296	0	0	0.3821	0.182		
1992	1	1	0	0	20	8	8	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	9	9	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	10	10	5	0.8005	0.1995	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	11	11	6	0.7807	0.2193	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	12	12	8	0.8747	0.1253	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	13	13	6	0.6588	0.3412	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	14	14	6	0.6584	0.3416	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	15	15	7	0.9204	0.0796	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	16	16	7	0.7743	0.2257	0	0
	0	0	0	0	0	0	0	0	0	0		

1992	1	1	0	0	20	17	17	11	0.6443	0.3381	0.0177	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	18	18	28	0.2198	0.4744	0.2227	0.0832
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	19	19	26	0.1265	0.3456	0.4738	0.0541
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	20	20	61	0.0019	0.1689	0.5579	0.2713
	0	0	0	0	0	0	0	0	0	0		
1992	1	1	0	0	20	21	21	75	0.0049	0.1298	0.4127	0.4204
	0.0293	0	0	0	0	0	0.0029	0	0	0		
1992	1	1	0	0	20	22	22	89	0	0.1443	0.4557	0.3399
	0.022	0	0.0381	0	0	0	0	0	0	0		
1992	1	1	0	0	20	23	23	105	0	0.0349	0.4786	0.3775
	0.0099	0	0.0668	0.0049	0	0	0.0275	0	0	0		
1992	1	1	0	0	20	24	24	108	0	0.0076	0.2871	0.4958
	0.0387	0.013	0.1411	0	0	0	0.0151	0	0.0017	0		
1992	1	1	0	0	20	25	25	108	0	0.0103	0.2371	0.3882
	0.0322	0.0162	0.271	0.0055	0.0039	0	0.0355	0	0	0		
1992	1	1	0	0	20	26	26	107	0	0.0032	0.0802	0.3392
	0.0221	0.0319	0.4342	0.0077	0.0034	0.0059	0.0722	0	0	0		
1992	1	1	0	0	20	27	27	107	0	0.0022	0.0181	0.2246
	0.039	0.0367	0.4697	0.024	0.0036	0.0141	0.1612	0	0	0.0068		
1992	1	1	0	0	20	28	28	111	0	0	0.021	0.1682
	0.0313	0.0075	0.5439	0.0126	0	0	0.2121	0	0	0.0034		
1992	1	1	0	0	20	29	29	103	0	0	0.0168	0.0881
	0.0321	0.0434	0.5233	0.0206	0.0058	0	0.27	0	0	0		
1992	1	1	0	0	20	30	30	93	0	0	0	0.1031
	0.0041	0.0103	0.5841	0.0212	0.0034	0	0.2542	0.0042	0	0.0154		
1992	1	1	0	0	20	31	31	78	0	0	0	0.0632
	0.0316	0.0177	0.4915	0.0231	0	0	0.3232	0.0136	0	0.0361		
1992	1	1	0	0	20	32	32	61	0	0	0.0079	0.0096
	0.0103	0	0.4328	0.0033	0	0	0.4861	0.0199	0	0.0301		
1992	1	1	0	0	20	33	33	41	0	0	0	0.0112
	0.0063	0	0.3404	0	0	0	0.3277	0.0602	0	0.2542		
1992	1	1	0	0	20	34	34	35	0	0	0	0
	0.0083	0	0.4815	0.0288	0	0.0045	0.4237	0.0309	0	0.0223		
1992	1	1	0	0	20	35	35	28	0	0	0	0
	0	0	0.308	0	0	0	0.475	0.0069	0.009	0.2011		
1992	1	1	0	0	20	36	36	20	0	0	0	0
	0	0	0.572	0	0.0203	0	0.3014	0	0	0.1063		
1992	1	1	0	0	20	37	37	16	0	0	0	0
	0	0	0.2744	0	0	0.0091	0.4954	0	0	0.2211		
1992	1	1	0	0	20	38	38	15	0	0	0	0
	0	0	0.2486	0	0	0.2769	0.4326	0	0	0.0419		
1992	1	1	0	0	20	39	39	9	0	0	0	0
	0	0	0.0906	0	0	0	0.7983	0	0	0.1111		
1992	1	1	0	0	20	40	40	9	0	0	0	0
	0	0	0.3644	0	0	0	0.4283	0.0668	0	0.1405		
1992	1	1	0	0	20	41	41	7	0	0	0	0
	0	0	0.1555	0	0	0	0.5592	0.1448	0	0.1405		
1992	1	1	0	0	20	42	42	5	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	1	0	0	20	43	43	5	0	0	0	0
	0	0	0	0	0	0	0.6621	0	0	0.338		
1992	1	1	0	0	20	44	44	2	0	0	0	0
	0	0	0	0	0	0	0.8135	0	0	0.1865		
1992	1	1	0	0	20	45	45	3	0	0	0	0
	0	0	0.1273	0	0	0	0	0	0	0.8727		
1992	1	1	0	0	20	46	46	2	0	0	0	0
	0	0	0.4922	0	0	0	0.5078	0	0	0		
1992	1	1	0	0	20	47	47	2	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	1	0	0	20	49	49	2	0	0	0	0
	0	0	0	0	0	0	0.8995	0	0	0.1005		
1992	1	1	0	0	20	51	51	7	0	0	0	0
	0	0	0	0.0224	0	0	0.1277	0.0642	0	0.7857		

1993	1	1	0	0	21	12	12	5	0.9268	0.0732	0	0
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	13	13	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	14	14	5	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	15	15	6	0.1285	0.8715	0	0
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	16	16	20	0.0187	0.9551	0.0262	0
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	17	17	39	0.0233	0.9387	0.0042	0.0339
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	18	18	50	0.0204	0.84	0.1331	0.0066
	0	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	19	19	59	0	0.8782	0.0301	0.0873
	0	0	0	0.0044	0	0	0	0	0	0		
1993	1	1	0	0	21	20	20	63	0	0.9206	0.0488	0.0258
	0	0	0	0	0	0	0	0.0048	0	0		
1993	1	1	0	0	21	21	21	59	0	0.7371	0.0944	0.1582
	0.0103	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	22	22	49	0	0.4832	0.1108	0.2635
	0.1426	0	0	0	0	0	0	0	0	0		
1993	1	1	0	0	21	23	23	67	0	0.1128	0.1183	0.4917
	0.2299	0	0	0.0374	0	0	0	0.01	0	0		
1993	1	1	0	0	21	24	24	77	0	0.0383	0.0619	0.3681
	0.3359	0.0667	0.0485	0.077	0	0	0	0.0036	0	0		
1993	1	1	0	0	21	25	25	86	0	0.0052	0.0084	0.2767
	0.4484	0.0259	0.0045	0.1732	0	0	0	0.0542	0	0.0036		
1993	1	1	0	0	21	26	26	87	0	0.0041	0.0126	0.2388
	0.279	0.0171	0.044	0.3175	0.0028	0	0.0009	0.0762	0	0.007		
1993	1	1	0	0	21	27	27	85	0	0	0	0.1193
	0.2858	0.0055	0.0104	0.4429	0.015	0.0056	0	0.0973	0	0.0182		
1993	1	1	0	0	21	28	28	79	0	0	0	0.0387
	0.2262	0.0068	0.0038	0.5628	0.0739	0	0	0.0879	0	0		
1993	1	1	0	0	21	29	29	78	0	0	0	0.0178
	0.1868	0.0226	0.0102	0.5324	0	0	0	0.2118	0	0.0184		
1993	1	1	0	0	21	30	30	59	0	0	0	0.013
	0.0265	0.0502	0	0.535	0.0115	0	0	0.3638	0	0		
1993	1	1	0	0	21	31	31	37	0	0	0	0.0162
	0.1039	0	0	0.4935	0	0	0	0.3603	0	0.0261		
1993	1	1	0	0	21	32	32	26	0	0	0	0
	0	0.0104	0	0.4913	0.0813	0	0	0.4043	0	0.0128		
1993	1	1	0	0	21	33	33	9	0	0	0	0
	0	0	0	0.3578	0	0	0	0.5449	0	0.0973		
1993	1	1	0	0	21	34	34	4	0	0	0	0
	0	0	0	0.1487	0	0	0.1008	0	0.0814	0.6692		
1993	1	1	0	0	21	35	35	7	0	0	0	0
	0	0	0	0.3014	0	0	0	0.6986	0	0		
1993	1	1	0	0	21	36	36	7	0	0	0	0
	0	0	0	0.6571	0	0.0769	0	0.1045	0	0.1616		
1993	1	1	0	0	21	37	37	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1993	1	1	0	0	21	38	38	2	0	0	0	0
	0	0	0	0.7583	0	0	0	0.2417	0	0		
1993	1	1	0	0	21	40	40	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1993	1	1	0	0	21	42	42	2	0	0	0	0
	0	0	0	0.3821	0	0	0.309	0.309	0	0		
1993	1	1	0	0	21	50	50	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1993	1	1	0	0	21	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1994	1	1	0	0	22	11	11	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	14	14	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		

1994	1	1	0	0	22	16	16	3	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	17	17	9	0	0.6707	0.3293	0
	0	0	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	18	18	20	0	0.4908	0.5092	0
	0	0	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	19	19	50	0.0187	0.4867	0.4708	0.0238
	0	0	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	20	20	78	0	0.1519	0.8022	0.0179
	0.0244	0.0036	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	21	21	92	0	0.0747	0.8142	0.0248
	0.0675	0.0188	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	22	22	101	0	0.0227	0.7964	0.0323
	0.126	0.0226	0	0	0	0	0	0	0	0		
1994	1	1	0	0	22	23	23	110	0	0.0019	0.6752	0.0042
	0.1751	0.1206	0	0	0.012	0	0	0	0.011	0		
1994	1	1	0	0	22	24	24	119	0	0.0071	0.347	0.0113
	0.3325	0.222	0	0	0.06	0	0	0	0.0201	0		
1994	1	1	0	0	22	25	25	137	0	0	0.1731	0.0157
	0.2967	0.3328	0	0	0.1697	0	0.0032	0	0.0048	0.004		
1994	1	1	0	0	22	26	26	137	0	0.003	0.046	0.0107
	0.2309	0.3704	0.0019	0.0174	0.2894	0	0.0008	0	0.0282	0.0014		
1994	1	1	0	0	22	27	27	137	0	0	0.0127	0.006
	0.2113	0.3476	0.0063	0.0086	0.3058	0.0041	0.0063	0	0.0897	0.0015		
1994	1	1	0	0	22	28	28	132	0	0	0.0316	0
	0.1186	0.364	0.0069	0.0021	0.3847	0.0024	0	0	0.082	0.0078		
1994	1	1	0	0	22	29	29	129	0	0	0	0
	0.0571	0.2445	0.024	0.0036	0.5425	0	0.0106	0	0.097	0.0208		
1994	1	1	0	0	22	30	30	119	0	0	0	0
	0.0037	0.2268	0.0093	0	0.4508	0	0.0026	0	0.2772	0.0297		
1994	1	1	0	0	22	31	31	81	0	0	0.0095	0
	0.0264	0.2434	0.042	0.0116	0.4346	0	0.0347	0.0066	0.1662	0.025		
1994	1	1	0	0	22	32	32	47	0	0	0	0
	0.0114	0.1968	0	0	0.5614	0	0.0363	0	0.1905	0.0035		
1994	1	1	0	0	22	33	33	30	0	0	0	0
	0.0689	0.0537	0	0	0.4776	0	0	0	0.3236	0.0762		
1994	1	1	0	0	22	34	34	16	0	0	0	0
	0	0.0447	0	0	0.8001	0	0	0.0176	0.1376	0		
1994	1	1	0	0	22	35	35	14	0	0	0	0
	0	0.0648	0.165	0	0.7079	0	0	0	0.0623	0		
1994	1	1	0	0	22	36	36	9	0	0	0	0
	0	0	0	0	0.575	0	0.1251	0	0.295	0.0049		
1994	1	1	0	0	22	37	37	4	0	0	0	0
	0	0.1206	0	0	0.8794	0	0	0	0	0		
1994	1	1	0	0	22	38	38	7	0	0	0	0
	0	0.1525	0	0	0.7208	0	0	0	0.1267	0		
1994	1	1	0	0	22	39	39	6	0	0	0	0
	0	0.2823	0	0	0.1497	0	0	0	0.4116	0.1564		
1994	1	1	0	0	22	40	40	2	0	0	0	0
	0	0	0	0	0.8201	0	0	0	0.1799	0		
1994	1	1	0	0	22	41	41	3	0	0	0	0
	0	0	0	0	0.4079	0	0	0	0.5921	0		
1994	1	1	0	0	22	42	42	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1994	1	1	0	0	22	43	43	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1994	1	1	0	0	22	44	44	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1994	1	1	0	0	22	45	45	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1994	1	1	0	0	22	46	46	2	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1994	1	1	0	0	22	48	48	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1994	1	1	0	0	22	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		

1994	1	1	0	0	22	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0	
1994	1	1	0	0	22	51	51	5	0	0	0	0
	0	0	0	0	0	0	0	0	0.815	0.185	
1995	1	1	0	0	23	1	1	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	5	5	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	13	13	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	15	15	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	17	17	2	0.6345	0.3655	0	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	18	18	2	0.5539	0	0.4461	0
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	19	19	4	0	0	0.0595	0.9405
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	20	20	4	0	0	0.1828	0.8172
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	21	21	13	0	0	0.3854	0.6146
	0	0	0	0	0	0	0	0	0	0	
1995	1	1	0	0	23	22	22	35	0	0	0.448	0.5201
	0	0.0178	0.0055	0	0	0.0085	0	0	0	0	
1995	1	1	0	0	23	23	23	58	0	0	0.1944	0.6973
	0.01	0.0765	0.0159	0	0	0.0059	0	0	0	0	
1995	1	1	0	0	23	24	24	68	0	0	0.1602	0.689
	0.0058	0.0593	0.0792	0	0	0.0065	0	0	0	0	
1995	1	1	0	0	23	25	25	71	0	0	0.075	0.6708
	0.0073	0.1097	0.1006	0.0037	0	0.0298	0	0	0	0.0032	
1995	1	1	0	0	23	26	26	71	0	0	0.0121	0.4467
	0.0141	0.1186	0.2266	0.0189	0	0.1357	0	0	0	0.0275	
1995	1	1	0	0	23	27	27	71	0	0	0.0106	0.3652
	0.0141	0.0836	0.3069	0.0084	0	0.1752	0	0.0029	0	0.033	
1995	1	1	0	0	23	28	28	74	0	0	0.0047	0.1262
	0.0071	0.0692	0.2962	0.0043	0.0133	0.3627	0.0143	0.008	0	0.094	
1995	1	1	0	0	23	29	29	71	0.0016	0	0.0029	0.0441
	0	0.1049	0.4051	0.0354	0.0032	0.3418	0.0062	0	0	0.0547	
1995	1	1	0	0	23	30	30	64	0	0	0	0.051
	0	0.0252	0.2997	0.0027	0	0.4975	0	0.0035	0.005	0.1154	
1995	1	1	0	0	23	31	31	53	0.002	0	0	0.0038
	0	0.0844	0.2133	0.0587	0	0.3949	0.0078	0	0	0.2352	
1995	1	1	0	0	23	32	32	39	0	0	0	0
	0.004	0.0537	0.337	0.02	0	0.403	0	0	0	0.1822	
1995	1	1	0	0	23	33	33	28	0	0	0	0.0574
	0	0.0267	0.3903	0	0	0.2322	0	0.0195	0	0.2741	
1995	1	1	0	0	23	34	34	16	0	0	0	0
	0	0.0689	0.3139	0	0	0.1572	0	0.0218	0	0.4383	
1995	1	1	0	0	23	35	35	14	0	0	0	0
	0	0	0.2373	0	0	0.336	0	0	0	0.4267	
1995	1	1	0	0	23	36	36	10	0	0	0	0
	0	0	0.3489	0	0	0.4531	0	0	0	0.198	
1995	1	1	0	0	23	37	37	6	0	0	0	0
	0	0	0.5181	0	0	0.4819	0	0	0	0	
1995	1	1	0	0	23	38	38	5	0	0	0	0
	0	0.0587	0	0	0	0.8813	0	0	0	0.06	
1995	1	1	0	0	23	39	39	7	0	0	0	0
	0	0	0	0	0	0.799	0	0.1537	0	0.0473	
1995	1	1	0	0	23	40	40	4	0	0	0	0
	0	0	0	0	0	0.6533	0	0	0	0.3467	
1995	1	1	0	0	23	41	41	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0	

1995	1	1	0	0	23	42	42	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1995	1	1	0	0	23	43	43	3	0	0	0	0
	0	0	0	0	0	0.1247	0	0.807	0	0.0682		
1995	1	1	0	0	23	44	44	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1995	1	1	0	0	23	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1996	1	1	0	0	24	11	11	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	12	12	9	0.5951	0.4049	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	13	13	17	0.9462	0.0538	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	14	14	29	0.929	0.071	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	15	15	39	0.9436	0.0564	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	16	16	47	0.9228	0.0772	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	17	17	48	0.7796	0.2142	0.0063	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	18	18	40	0.4531	0.5469	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	19	19	43	0.4288	0.5264	0.008	0.0369
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	20	20	51	0.1549	0.794	0.0394	0.0117
	0	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	21	21	55	0.0125	0.8681	0.0324	0.0509
	0.0361	0	0	0	0	0	0	0	0	0		
1996	1	1	0	0	24	22	22	53	0	0.7291	0.0239	0.1053
	0.1361	0	0	0	0	0	0.0056	0	0	0		
1996	1	1	0	0	24	23	23	54	0.0032	0.4555	0.058	0.1888
	0.2654	0.0154	0.004	0.0098	0	0	0	0	0	0		
1996	1	1	0	0	24	24	24	71	0	0.167	0.0336	0.2595
	0.4036	0	0.0513	0.0685	0	0	0.0164	0	0	0		
1996	1	1	0	0	24	25	25	88	0	0.0627	0.0188	0.1977
	0.4801	0.0088	0.0516	0.0959	0.0018	0	0.0559	0	0	0.0266		
1996	1	1	0	0	24	26	26	95	0	0	0.0083	0.1608
	0.5233	0.0032	0.0946	0.1328	0.0035	0	0.0671	0	0	0.0063		
1996	1	1	0	0	24	27	27	96	0	0	0	0.1549
	0.4371	0.0016	0.0878	0.1325	0	0	0.1436	0	0	0.0424		
1996	1	1	0	0	24	28	28	92	0	0	0	0.0725
	0.2685	0	0.0601	0.2269	0.0059	0	0.3298	0	0	0.0363		
1996	1	1	0	0	24	29	29	86	0	0	0	0.0836
	0.1754	0.0033	0.093	0.2345	0	0	0.346	0	0	0.0642		
1996	1	1	0	0	24	30	30	71	0	0	0	0
	0.1901	0	0.0472	0.3405	0.0047	0	0.3139	0	0	0.1037		
1996	1	1	0	0	24	31	31	58	0	0	0	0.0096
	0.0168	0	0.0284	0.2778	0	0.0184	0.5201	0	0	0.129		
1996	1	1	0	0	24	32	32	35	0	0	0	0
	0.0898	0.011	0.0052	0.1424	0	0	0.6311	0	0.01	0.1105		
1996	1	1	0	0	24	33	33	32	0	0	0	0.0235
	0.1055	0	0.0364	0.1447	0	0.0127	0.4546	0	0.0155	0.207		
1996	1	1	0	0	24	34	34	11	0	0	0	0
	0.0577	0	0	0.4503	0	0	0.472	0	0	0.0199		
1996	1	1	0	0	24	35	35	12	0	0	0	0
	0	0	0	0.2533	0.0312	0	0.7154	0	0	0		
1996	1	1	0	0	24	36	36	7	0	0	0	0
	0	0.0484	0.0216	0.2223	0	0	0.7077	0	0	0		
1996	1	1	0	0	24	37	37	4	0	0	0	0
	0	0	0	0.776	0	0	0.224	0	0	0		
1996	1	1	0	0	24	38	38	3	0	0	0	0
	0	0	0	0.2731	0	0	0.3658	0	0.3611	0		
1996	1	1	0	0	24	39	39	3	0	0	0	0
	0	0	0	0.1303	0	0	0.8697	0	0	0		

1996	1	1	0	0	24	40	40	3	0	0	0	0
	0	0	0	0	0	0.5254	0.4746	0	0	0		
1996	1	1	0	0	24	41	41	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1996	1	1	0	0	24	42	42	2	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1996	1	1	0	0	24	43	43	2	0	0	0	0
	0	0	0	0	0	0	0.7645	0	0.2355	0		
1996	1	1	0	0	24	44	44	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1996	1	1	0	0	24	45	45	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1996	1	1	0	0	24	46	46	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1996	1	1	0	0	24	48	48	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1996	1	1	0	0	24	51	51	3	0	0	0	0
	0	0	0	0	0	0	0.1809	0	0.1809	0.6382		
1997	1	1	0	0	25	15	15	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	16	16	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	17	17	7	0	0.8878	0.1122	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	18	18	16	0.1757	0.7282	0.0961	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	19	19	32	0	0.9284	0.0716	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	20	20	47	0	0.8497	0.1503	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	21	21	59	0	0.7021	0.2832	0
	0.0148	0	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	22	22	77	0	0.6375	0.3157	0.0031
	0.0314	0	0.0123	0	0	0	0	0	0	0		
1997	1	1	0	0	25	23	23	83	0	0.5552	0.4197	0
	0.0149	0.0102	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	24	24	84	0	0.3006	0.6069	0
	0.0385	0.0433	0	0.0052	0	0	0	0.0055	0	0		
1997	1	1	0	0	25	25	25	70	0	0.3101	0.4229	0.0254
	0.0844	0.1039	0.0203	0.0258	0.0037	0	0	0.0036	0	0		
1997	1	1	0	0	25	26	26	71	0	0.035	0.346	0
	0.1126	0.3927	0.0158	0.0117	0.0756	0	0	0.0105	0	0		
1997	1	1	0	0	25	27	27	57	0	0	0.0657	0
	0.0898	0.473	0.0114	0.0476	0.2516	0	0	0.0425	0.0037	0.0148		
1997	1	1	0	0	25	28	28	53	0	0	0.0133	0.0064
	0.0732	0.4159	0.0251	0.0571	0.1446	0.0198	0.0034	0.2095	0	0.0317		
1997	1	1	0	0	25	29	29	41	0	0	0	0.0049
	0.0529	0.2773	0.0101	0.1113	0.1799	0	0	0.2138	0	0.1498		
1997	1	1	0	0	25	30	30	28	0	0	0	0
	0.091	0.0894	0	0.2568	0.0905	0	0	0.3434	0.0127	0.1163		
1997	1	1	0	0	25	31	31	27	0	0	0	0
	0.0121	0.418	0.0203	0.026	0.1185	0	0.042	0.2742	0	0.0889		
1997	1	1	0	0	25	32	32	21	0	0	0	0
	0	0.0109	0.0545	0.1783	0.4441	0	0.0147	0.2328	0	0.0647		
1997	1	1	0	0	25	33	33	11	0	0	0	0
	0	0.0763	0.1328	0	0.2552	0	0	0.3639	0	0.1718		
1997	1	1	0	0	25	34	34	11	0	0	0	0
	0	0.1681	0	0	0.2564	0.1565	0	0.194	0	0.225		
1997	1	1	0	0	25	35	35	5	0	0	0	0
	0	0.0768	0	0	0	0.1854	0	0.7378	0	0		
1997	1	1	0	0	25	36	36	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
1997	1	1	0	0	25	37	37	3	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1997	1	1	0	0	25	38	38	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		

1997	1	1	0	0	25	39	39	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1997	1	1	0	0	25	40	40	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1997	1	1	0	0	25	41	41	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1997	1	1	0	0	25	42	42	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1997	1	1	0	0	25	44	44	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1997	1	1	0	0	25	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1997	1	1	0	0	25	51	51	2	0	0	0	0
	0	0	0	0	0	0	0	0.5619	0	0.4381		
1998	1	1	0	0	26	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	5	5	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	11	11	3	0.8436	0.1564	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	12	12	5	0.8406	0.1594	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	13	13	11	0.9551	0.0449	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	14	14	18	0.8499	0.1501	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	15	15	11	0.8356	0.1471	0.0173	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	16	16	15	0.5409	0.3968	0.0623	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	17	17	28	0.176	0.6676	0.1376	0.0188
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	18	18	43	0.067	0.804	0.0998	0.0292
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	19	19	59	0.0003	0.8136	0.1323	0.0539
	0	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	20	20	62	0.0066	0.7215	0.2061	0.0469
	0.019	0	0	0	0	0	0	0	0	0		
1998	1	1	0	0	26	21	21	75	0	0.4705	0.3286	0.1907
	0	0	0.0102	0	0	0	0	0	0	0		
1998	1	1	0	0	26	22	22	87	0	0.1982	0.3269	0.4282
	0.0192	0.0133	0.0143	0	0	0	0	0	0	0		
1998	1	1	0	0	26	23	23	113	0	0.0398	0.2763	0.5346
	0.055	0.031	0.0572	0	0	0.0061	0	0	0	0		
1998	1	1	0	0	26	24	24	137	0	0.0165	0.194	0.5553
	0.0777	0.0557	0.0757	0.0065	0.0059	0.0128	0	0	0	0		
1998	1	1	0	0	26	25	25	142	0	0.0096	0.1635	0.4387
	0.0533	0.0516	0.1907	0.0179	0.011	0.0455	0.006	0	0.0098	0.0025		
1998	1	1	0	0	26	26	26	117	0	0.0001	0.0827	0.3781
	0.058	0.0919	0.2435	0.0252	0.0252	0.0668	0	0	0.0286	0		
1998	1	1	0	0	26	27	27	95	0	0.0019	0.0343	0.2349
	0.044	0.0862	0.3093	0.0329	0.013	0.1315	0.0124	0.0195	0.053	0.0272		
1998	1	1	0	0	26	28	28	63	0	0	0.0168	0.1554
	0.0236	0.0906	0.351	0.0275	0.0163	0.1796	0	0	0.1377	0.0015		
1998	1	1	0	0	26	29	29	50	0	0	0.0025	0.1039
	0.0354	0.0963	0.1955	0.0059	0.0315	0.1814	0.003	0.0008	0.2973	0.0465		
1998	1	1	0	0	26	30	30	27	0	0	0	0.0101
	0.011	0.1418	0.2622	0.0938	0.0837	0.2067	0.0082	0.0023	0.1027	0.0776		
1998	1	1	0	0	26	31	31	18	0	0	0	0
	0	0.0055	0.2643	0.0041	0	0.4444	0	0	0.2096	0.0722		
1998	1	1	0	0	26	32	32	8	0	0	0	0
	0	0	0.1199	0	0	0	0	0	0.8065	0.0737		
1998	1	1	0	0	26	33	33	4	0	0	0	0
	0	0	0.0374	0	0	0	0.3612	0	0.5663	0.0351		

1998	1	1	0	0	26	34	34	4	0	0	0	0
	0	0	0.1991	0.0162	0	0.2864	0	0	0.4983	0		
1998	1	1	0	0	26	35	35	3	0	0	0	0
	0	0	0.2512	0	0	0.1286	0	0	0.6202	0		
1998	1	1	0	0	26	36	36	5	0	0	0	0.0287
	0	0	0.0951	0	0	0	0	0	0.8762	0		
1998	1	1	0	0	26	37	37	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
1998	1	1	0	0	26	38	38	1	0	0	0	0
	0	0	0.3924	0	0	0	0	0	0.6076	0		
1998	1	1	0	0	26	39	39	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1998	1	1	0	0	26	40	40	2	0	0	0	0
	0	0	0.023	0	0	0	0.977	0	0	0		
1998	1	1	0	0	26	41	41	1	0	0	0	0
	0	0	0	0	0	0.6076	0	0	0.3924	0		
1998	1	1	0	0	26	43	43	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1998	1	1	0	0	26	46	46	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1998	1	1	0	0	26	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1998	1	1	0	0	26	51	51	1	0	0	0	0
	0	0	0	0	0.2708	0.2708	0	0	0.4583	0		
1999	1	1	0	0	27	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	9	9	1	0.6667	0.3333	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	10	10	3	0.1674	0.8326	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	11	11	10	0.7872	0.1497	0.0631	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	12	12	10	0.7382	0.2022	0.0595	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	13	13	12	0.5272	0.4728	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	14	14	25	0.6487	0.3513	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	15	15	40	0.4336	0.4679	0.0826	0.016
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	16	16	52	0.3422	0.581	0.0768	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	17	17	55	0.1512	0.6652	0.1836	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	18	18	59	0.0304	0.7128	0.2208	0.0361
	0	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	19	19	80	0.0144	0.6944	0.2345	0.0408
	0.0159	0	0	0	0	0	0	0	0	0		
1999	1	1	0	0	27	20	20	80	0	0.5813	0.3214	0.0627
	0.0141	0.0109	0.0096	0	0	0	0	0	0	0		
1999	1	1	0	0	27	21	21	73	0	0.2778	0.4704	0.1561
	0.0624	0.0169	0	0	0	0	0.0082	0.0082	0	0		
1999	1	1	0	0	27	22	22	78	0	0.1645	0.4986	0.2039
	0.0779	0.0188	0.0088	0.0175	0	0.0088	0.0012	0	0	0		
1999	1	1	0	0	27	23	23	66	0	0.0557	0.3676	0.3666
	0.1438	0.0379	0.0274	0.0011	0	0	0	0	0	0		
1999	1	1	0	0	27	24	24	94	0	0.013	0.3384	0.2889
	0.2139	0.0234	0.0573	0.0362	0	0	0.0096	0.0096	0.0096	0		
1999	1	1	0	0	27	25	25	90	0	0.0095	0.1571	0.369
	0.207	0.0298	0.0866	0.0791	0.0088	0.0078	0.0266	0.0109	0	0.0078		
1999	1	1	0	0	27	26	26	99	0	0	0.1099	0.3287
	0.2062	0.0576	0.1356	0.076	0	0.0005	0.0353	0	0.0208	0.0295		
1999	1	1	0	0	27	27	27	82	0	0	0.0232	0.4216
	0.2176	0.0876	0.0428	0.0826	0.0426	0.0183	0.0258	0	0.0172	0.0206		
1999	1	1	0	0	27	28	28	74	0	0	0.0208	0.2363
	0.2377	0.0419	0.1411	0.0983	0.0159	0.0234	0.079	0.0149	0.0298	0.0609		

1999	1	1	0	0	27	29	29	55	0	0	0	0.1019
	0.0962	0.0564	0.126	0.1987	0.021	0.0977	0.1507	0	0.0736	0.0779		
1999	1	1	0	0	27	30	30	36	0	0	0.0014	0.1442
	0.0444	0.0784	0.0492	0.2458	0.0517	0.0098	0.1957	0.001	0.0651	0.1133		
1999	1	1	0	0	27	31	31	20	0	0	0	0.0497
	0.0086	0.0146	0.0495	0.109	0.0446	0.1062	0.2138	0	0.0446	0.3594		
1999	1	1	0	0	27	32	32	16	0	0	0	0.0046
	0.1319	0.0615	0.0634	0.3199	0.0055	0.0526	0.1063	0.1038	0	0.1505		
1999	1	1	0	0	27	33	33	11	0	0	0	0.0768
	0	0.0768	0	0.0904	0	0.0914	0.2425	0.1839	0	0.2382		
1999	1	1	0	0	27	34	34	7	0	0	0	0
	0.0088	0	0.0144	0.122	0	0.3255	0.0151	0	0	0.5142		
1999	1	1	0	0	27	35	35	4	0	0	0	0
	0	0	0.1659	0.1659	0	0.2794	0.364	0	0	0.0249		
1999	1	1	0	0	27	36	36	1	0	0	0	0
	0	0	0	0.5	0	0	0	0	0	0.5		
1999	1	1	0	0	27	37	37	1	0	0	0	0
	0.2143	0	0	0.4286	0	0	0	0	0	0.3572		
1999	1	1	0	0	27	38	38	4	0	0	0	0
	0	0	0.209	0	0	0.2648	0.209	0	0.0493	0.2679		
1999	1	1	0	0	27	39	39	2	0	0	0	0
	0	0	0	0	0	0	0.4111	0	0	0.5889		
1999	1	1	0	0	27	40	40	1	0	0	0	0
	0	0	0.5	0	0	0.2087	0	0	0	0.2913		
1999	1	1	0	0	27	41	41	2	0	0	0	0
	0	0	0	0	0.0632	0	0	0	0	0.9368		
1999	1	1	0	0	27	42	42	3	0	0	0	0
	0.0973	0	0	0.0292	0	0	0.8735	0	0	0		
1999	1	1	0	0	27	43	43	2	0	0	0	0
	0	0	0	0.0609	0	0	0	0.9391	0	0		
1999	1	1	0	0	27	49	49	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1999	1	1	0	0	27	50	50	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1999	1	1	0	0	27	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2000	1	1	0	0	28	9	9	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	10	10	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	11	11	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	12	12	4	0.7372	0.2628	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	13	13	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	14	14	2	0.3805	0.6195	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	15	15	3	0.8927	0.072	0.0353	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	16	16	4	0.632	0.2875	0	0.0805
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	17	17	7	0.6476	0.2101	0.1423	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	18	18	19	0.2218	0.644	0.1342	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	19	19	18	0.2636	0.4344	0.2139	0.0881
	0	0	0	0	0	0	0	0	0	0		
2000	1	1	0	0	28	20	20	28	0.3091	0.3001	0.2337	0.0986
	0.0055	0	0.0529	0	0	0	0	0	0	0		
2000	1	1	0	0	28	21	21	43	0.0626	0.449	0.2132	0.1566
	0.0297	0.0297	0.0593	0	0	0	0	0	0	0		
2000	1	1	0	0	28	22	22	53	0.0351	0.2583	0.3768	0.2096
	0.0452	0.025	0.025	0	0.025	0	0	0	0	0		
2000	1	1	0	0	28	23	23	66	0.0092	0.0782	0.3976	0.1475
	0.2501	0.0473	0.0241	0	0.023	0	0	0.023	0	0		

2000	1	1	0	0	28	24	24	99	0.0008	0.2061	0.329	0.1608
	0.1579	0.0438	0.0211	0.0466	0	0	0.0168	0	0.0168	0		
2000	1	1	0	0	28	25	25	105	0.0004	0.0697	0.3671	0.2289
	0.1677	0.0966	0.0296	0.0309	0.0089	0.0001	0	0	0	0		
2000	1	1	0	0	28	26	26	116	0.0004	0.0309	0.2671	0.2791
	0.1928	0.0745	0.0837	0.0168	0.0067	0.0153	0.0225	0.001	0	0.009		
2000	1	1	0	0	28	27	27	137	0.0004	0.0184	0.1218	0.1877
	0.29	0.1558	0.1352	0.0419	0.0068	0.0036	0.0166	0.0056	0	0.0162		
2000	1	1	0	0	28	28	28	147	0	0.0096	0.0541	0.203
	0.2789	0.1346	0.129	0.0852	0.001	0.0215	0.0316	0.0003	0.0205	0.0307		
2000	1	1	0	0	28	29	29	128	0	0.0003	0.0525	0.16
	0.2223	0.1578	0.1305	0.0671	0.0347	0.0148	0.0595	0.0118	0.0171	0.0716		
2000	1	1	0	0	28	30	30	115	0	0	0.0389	0.104
	0.2565	0.1737	0.1304	0.0987	0.0454	0.0436	0.0317	0.0163	0.0192	0.0419		
2000	1	1	0	0	28	31	31	88	0	0	0	0.0585
	0.2353	0.2276	0.0997	0.1159	0.0659	0.0174	0.0278	0.0481	0	0.1038		
2000	1	1	0	0	28	32	32	66	0	0	0	0.0515
	0.3254	0.1629	0.0386	0.0935	0.0198	0.0478	0.0498	0.0448	0.067	0.0988		
2000	1	1	0	0	28	33	33	40	0	0	0.0005	0.0569
	0.249	0.191	0.1156	0.1229	0.0046	0.1039	0.0016	0.0053	0.0247	0.1239		
2000	1	1	0	0	28	34	34	23	0	0	0	0.0523
	0.2118	0.198	0.0613	0.1534	0.058	0.0749	0.0553	0	0.0603	0.0749		
2000	1	1	0	0	28	35	35	20	0	0	0	0
	0.1871	0.2081	0.1102	0.1821	0.0828	0.1502	0	0	0	0.0795		
2000	1	1	0	0	28	36	36	12	0	0	0	0
	0.3523	0.1752	0.2405	0.0631	0.0558	0.0568	0.0002	0.0558	0.0002	0		
2000	1	1	0	0	28	37	37	13	0	0	0	0
	0.1754	0.0125	0	0.2325	0	0.1143	0.0303	0.2883	0	0.1467		
2000	1	1	0	0	28	38	38	5	0	0	0	0
	0	0.1942	0.1389	0.3302	0.1106	0.0062	0	0.0838	0	0.136		
2000	1	1	0	0	28	39	39	4	0	0	0	0
	0.0074	0	0.0148	0	0	0.1072	0.2832	0.1072	0	0.4803		
2000	1	1	0	0	28	40	40	6	0	0	0	0
	0.0761	0	0	0.3226	0	0.0188	0	0	0.0129	0.5695		
2000	1	1	0	0	28	41	41	5	0	0	0	0
	0	0.1412	0	0.3319	0.0232	0.1753	0	0.3165	0	0.012		
2000	1	1	0	0	28	42	42	2	0	0	0	0
	0	0	0.6508	0	0	0	0	0	0.3492	0		
2000	1	1	0	0	28	43	43	5	0	0	0	0
	0	0	0.1079	0	0	0	0.0832	0	0.8089	0		
2000	1	1	0	0	28	44	44	2	0	0	0	0
	0	0	0	0	0	0.0244	0.2942	0	0	0.6814		
2000	1	1	0	0	28	46	46	2	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
2000	1	1	0	0	28	48	48	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2000	1	1	0	0	28	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2000	1	1	0	0	28	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
2001	1	1	0	0	29	8	8	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	11	11	10	0.9598	0.0402	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	12	12	9	0.9352	0.0648	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	13	13	21	0.9294	0.0191	0	0
	0	0	0	0	0	0	0.0515	0	0	0		
2001	1	1	0	0	29	14	14	24	0.9578	0.0422	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	15	15	31	0.9091	0.0786	0.0123	0
	0	0	0	0	0	0	0	0	0	0		

2001	1	1	0	0	29	16	16	36	0.851	0.1457	0.0033	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	17	17	56	0.8824	0.089	0.0286	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	18	18	62	0.7742	0.2023	0	0.0235
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	19	19	68	0.7402	0.2353	0.0244	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	20	20	65	0.4637	0.4296	0.0244	0.062
	0	0	0	0	0	0.0202	0	0	0	0		
2001	1	1	0	0	29	21	21	70	0.1311	0.5606	0.2333	0.061
	0.0027	0.0113	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	22	22	109	0.0273	0.6504	0.2465	0.0591
	0	0.0168	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	23	23	119	0.0126	0.6949	0.1765	0.0865
	0.0287	0	0	0	0	0	0	0.0008	0	0		
2001	1	1	0	0	29	24	24	123	0.0007	0.6177	0.1605	0.1806
	0.0193	0.0211	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	25	25	142	0	0.3584	0.1398	0.3094
	0.1121	0.035	0.0325	0.0128	0	0	0	0	0	0		
2001	1	1	0	0	29	26	26	151	0.0009	0.1764	0.1418	0.4861
	0.1155	0.0511	0.0194	0.0045	0	0	0	0	0.0042	0		
2001	1	1	0	0	29	27	27	173	0	0.1065	0.2057	0.3721
	0.1624	0.067	0.0246	0.0229	0.0235	0.0117	0.0035	0	0	0		
2001	1	1	0	0	29	28	28	178	0	0.0513	0.1824	0.3118
	0.1551	0.1458	0.0909	0.0066	0.0126	0.0094	0.0155	0	0.0065	0.012		
2001	1	1	0	0	29	29	29	194	0.0002	0.023	0.1515	0.3059
	0.1895	0.1541	0.1037	0.0184	0.0121	0.0063	0.0122	0.0061	0.0067	0.0104		
2001	1	1	0	0	29	30	30	144	0	0.0055	0.1369	0.2987
	0.0936	0.2398	0.0862	0.0178	0.0316	0.0207	0.0255	0.0089	0.0226	0.0121		
2001	1	1	0	0	29	31	31	106	0	0.0117	0.075	0.2027
	0.1416	0.3807	0.0839	0.021	0.0038	0.0457	0.0199	0.0125	0.0007	0.0009		
2001	1	1	0	0	29	32	32	76	0	0	0.1558	0.0842
	0.2191	0.1384	0.1086	0.0781	0.0958	0.0593	0.0128	0.0354	0.0015	0.0109		
2001	1	1	0	0	29	33	33	60	0	0	0.1357	0.1356
	0.0705	0.3023	0.1264	0.0215	0.0513	0.0225	0.0466	0.0433	0.0009	0.0434		
2001	1	1	0	0	29	34	34	42	0	0	0.0607	0.0745
	0.1338	0.3196	0.1991	0.0405	0.0437	0.0093	0.0376	0	0.0767	0.0047		
2001	1	1	0	0	29	35	35	37	0	0	0.0072	0.0487
	0.1599	0.2445	0.3257	0.0031	0.0059	0.0702	0.0617	0.0015	0.0009	0.0707		
2001	1	1	0	0	29	36	36	12	0	0	0	0
	0.1341	0.4997	0.1372	0	0.0039	0.0799	0.0905	0.0547	0	0		
#2001	1	1	0	0	29	37	37	9	0	0	0.088	0
	0.0418	0.1283	0.149	0.4305	0.1623	0	0	0	0	0		
#2001	1	1	0	0	29	38	38	12	0	0.1931	0	0
	0.0138	0.2183	0.0109	0.2212	0.1931	0.0059	0	0.0148	0.1222	0.0068		
2001	1	1	0	0	29	39	39	2	0	0	0	0
	0.27	0.019	0	0	0	0	0.27	0.441	0	0		
2001	1	1	0	0	29	40	40	3	0	0	0	0
	0	0	0.0293	0	0	0	0	0	0.481	0.4897		
2001	1	1	0	0	29	41	41	5	0	0	0	0.447
	0	0.0745	0.0169	0	0	0	0.0145	0.447	0	0		
2001	1	1	0	0	29	42	42	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	43	43	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
2001	1	1	0	0	29	44	44	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2001	1	1	0	0	29	45	45	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2001	1	1	0	0	29	46	46	2	0	0	0	0
	0	0	0	0	0	0.9538	0	0	0	0.0462		
2001	1	1	0	0	29	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2001	1	1	0	0	29	51	51	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		

2002	1	1	0	0	30	12	12	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	1	0	0	30	15	15	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	1	0	0	30	16	16	3	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	1	0	0	30	17	17	13	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	1	0	0	30	18	18	27	0.0212	0.9575	0.0212	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	1	0	0	30	19	19	64	0	0.9536	0.0262	0.0087
	0.0014	0.0014	0	0.0087	0	0	0	0	0	0		
2002	1	1	0	0	30	20	20	113	0	0.9516	0.0479	0
	0.0005	0	0	0	0	0	0	0	0	0		
2002	1	1	0	0	30	21	21	153	0	0.92	0.0687	0.0103
	0	0	0	0.0004	0	0	0.0006	0	0	0		
2002	1	1	0	0	30	22	22	176	0	0.8539	0.1351	0.0009
	0.007	0	0.0031	0	0	0	0	0	0	0		
2002	1	1	0	0	30	23	23	156	0	0.7696	0.1876	0.0383
	0	0	0	0.0046	0	0	0	0	0	0		
2002	1	1	0	0	30	24	24	131	0	0.6197	0.3125	0.0152
	0.0326	0.0138	0	0	0	0	0.0054	0	0.0008	0		
2002	1	1	0	0	30	25	25	105	0	0.3903	0.4597	0.0576
	0.0474	0.0248	0.0067	0.0135	0	0	0	0	0	0		
2002	1	1	0	0	30	26	26	78	0	0.2787	0.4258	0.0796
	0.1445	0.0606	0.0014	0.0094	0	0	0	0	0	0		
2002	1	1	0	0	30	27	27	66	0	0.0833	0.3968	0.1322
	0.2763	0.0375	0.0575	0.0141	0.0023	0	0	0	0	0		
2002	1	1	0	0	30	28	28	67	0	0.027	0.2691	0.3369
	0.2088	0.0691	0.0135	0.0394	0.0046	0	0.0036	0.0012	0.0216	0.0052		
2002	1	1	0	0	30	29	29	72	0	0.0372	0.2939	0.1665
	0.1178	0.246	0.0386	0.0602	0.0184	0.0013	0.0166	0	0.0012	0.0023		
2002	1	1	0	0	30	30	30	79	0	0.0289	0.2717	0.2158
	0.2912	0.0453	0.0649	0.0687	0.0071	0.0017	0.0016	0	0.0013	0.0019		
2002	1	1	0	0	30	31	31	82	0	0.0066	0.1999	0.1397
	0.3033	0.084	0.1279	0.066	0.0048	0.0283	0.0345	0.0023	0	0.0026		
2002	1	1	0	0	30	32	32	72	0	0	0.0821	0.2383
	0.1397	0.2734	0.1195	0.1268	0.0061	0.0058	0.0053	0	0	0.0031		
2002	1	1	0	0	30	33	33	58	0	0.0037	0.0629	0.1679
	0.0987	0.1781	0.129	0.096	0.1642	0	0.0862	0.0064	0	0.007		
2002	1	1	0	0	30	34	34	50	0	0	0.1472	0.0996
	0.0224	0.1104	0.3308	0.0903	0.0759	0.0739	0.0494	0	0	0		
2002	1	1	0	0	30	35	35	41	0	0.0026	0	0.1863
	0.0145	0.0756	0.4734	0.1079	0.0326	0.0724	0.0326	0	0	0.0023		
2002	1	1	0	0	30	36	36	28	0	0.0078	0	0.1485
	0.1362	0.2861	0.1138	0.2598	0.0084	0.0195	0	0.0098	0.0101	0		
2002	1	1	0	0	30	37	37	18	0	0	0	0
	0.3278	0.3563	0.0455	0.0221	0	0	0.0119	0	0.0536	0.1828		
2002	1	1	0	0	30	38	38	14	0	0	0	0.1886
	0	0.1937	0.3789	0.0081	0.0129	0.0141	0	0.0077	0	0.196		
2002	1	1	0	0	30	39	39	8	0	0	0	0
	0.0413	0.0488	0.0213	0.1095	0.0358	0	0.0462	0	0	0.6971		
2002	1	1	0	0	30	40	40	5	0	0	0	0
	0	0	0.9383	0.0617	0	0	0	0	0	0		
2002	1	1	0	0	30	41	41	5	0	0	0	0.021
	0	0	0.0362	0	0	0.0357	0	0	0	0.907		
2002	1	1	0	0	30	42	42	2	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
#2002	1	1	0	0	30	43	43	3	0	0.7126	0	0
	0	0	0.2532	0	0	0	0	0	0	0.0342		
2002	1	1	0	0	30	44	44	2	0	0	0	0
	0	0.9624	0.0376	0	0	0	0	0	0	0		
2002	1	1	0	0	30	45	45	3	0	0	0	0
	0	0	0.0264	0.943	0	0	0	0	0.0306	0		
2002	1	1	0	0	30	46	46	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		

2002	1	1	0	0	30	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2002	1	1	0	0	30	49	49	1	0	0	0	0
	0	0	0	0.5	0	0	0	0	0	0.5		
2002	1	1	0	0	30	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
2003	1	1	0	0	31	9	9	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	12	12	2	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	14	14	3	0.2523	0	0.7477	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	15	15	2	0.3497	0	0.6503	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	16	16	6	0	0	0.6704	0.1418
	0	0.1878	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	17	17	29	0	0.1229	0.8322	0.0198
	0.0251	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	18	18	42	0.012	0.1288	0.8306	0.0287
	0	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	19	19	60	0.0223	0.077	0.8543	0.0419
	0.0046	0	0	0	0	0	0	0	0	0		
2003	1	1	0	0	31	20	20	92	0	0.0233	0.8959	0.0327
	0.0232	0.0188	0.0028	0	0.0032	0	0	0	0	0		
2003	1	1	0	0	31	21	21	133	0	0.0407	0.8958	0.0522
	0.0052	0	0.0023	0.0026	0.0011	0	0	0	0	0		
2003	1	1	0	0	31	22	22	205	0	0.0285	0.8839	0.0693
	0.0055	0.0042	0.0086	0	0	0	0	0	0	0		
2003	1	1	0	0	31	23	23	264	0	0.0041	0.8944	0.0668
	0.0145	0.0069	0.0069	0.0041	0.0013	0.001	0	0	0	0		
2003	1	1	0	0	31	24	24	283	0	0.0016	0.8602	0.1027
	0.011	0.0134	0.0056	0.0034	0.0021	0	0	0	0	0		
2003	1	1	0	0	31	25	25	246	0	0.0028	0.7977	0.1425
	0.0179	0.0207	0.016	0.0012	0.0012	0	0	0	0	0		
2003	1	1	0	0	31	26	26	181	0	0.0013	0.7751	0.131
	0.019	0.0367	0.0094	0.0109	0	0.0059	0.0076	0.0031	0	0		
2003	1	1	0	0	31	27	27	121	0	0.0021	0.6549	0.1207
	0.0338	0.0939	0.0296	0.0423	0.0088	0.0051	0	0.0088	0	0		
2003	1	1	0	0	31	28	28	77	0	0	0.3367	0.1165
	0.0608	0.2035	0.1417	0.0483	0.0542	0.0157	0.0005	0.0102	0.0119	0		
2003	1	1	0	0	31	29	29	57	0	0	0.3516	0.1979
	0.0524	0.0917	0.0554	0.0979	0.0742	0.0303	0	0.0263	0	0.0222		
2003	1	1	0	0	31	30	30	39	0	0	0.1948	0.1642
	0.0155	0.0711	0.1806	0.2315	0.0947	0.0202	0.0102	0.0172	0	0		
2003	1	1	0	0	31	31	31	38	0	0	0.1585	0.1644
	0.1092	0.0922	0.0709	0.1619	0.0686	0.1001	0.0247	0.023	0	0.0265		
2003	1	1	0	0	31	32	32	20	0	0	0.0423	0.3264
	0.0644	0.0903	0.1195	0.1637	0	0.0912	0.0412	0.061	0	0		
2003	1	1	0	0	31	33	33	16	0	0	0.0644	0.3435
	0.0541	0.0601	0.1103	0.0578	0.2012	0	0.053	0	0	0.0555		
2003	1	1	0	0	31	34	34	5	0	0	0.3322	0
	0	0.252	0.2176	0	0	0.1983	0	0	0	0		
2003	1	1	0	0	31	35	35	7	0	0	0.134	0.5138
	0.1414	0.1018	0.1089	0	0	0	0	0	0	0		
2003	1	1	0	0	31	36	36	4	0	0	0.3824	0.1644
	0.243	0	0.2102	0	0	0	0	0	0	0		
2003	1	1	0	0	31	37	37	3	0	0	0.3228	0.4274
	0	0	0	0	0	0.2498	0	0	0	0		
2003	1	1	0	0	31	39	39	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2003	1	1	0	0	31	40	40	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2003	1	1	0	0	31	46	46	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
#2004	1	1	0	0	32	1	1	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		

2004	1	1	0	0	32	12	12	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2004	1	1	0	0	32	18	18	3	0	0.6326	0	0.3674
	0	0	0	0	0	0	0	0	0	0		
2004	1	1	0	0	32	19	19	11	0	0.7737	0	0.2263
	0	0	0	0	0	0	0	0	0	0		
2004	1	1	0	0	32	20	20	29	0	0.9268	0.0225	0.0507
	0	0	0	0	0	0	0	0	0	0		
2004	1	1	0	0	32	21	21	73	0	0.5005	0.177	0.3173
	0	0	0.0052	0	0	0	0	0	0	0		
2004	1	1	0	0	32	22	22	138	0	0.324	0.2537	0.4
	0.0223	0	0	0	0	0	0	0	0	0		
2004	1	1	0	0	32	23	23	197	0	0.1389	0.1658	0.6729
	0.0116	0	0.0078	0	0	0	0.0031	0	0	0		
2004	1	1	0	0	32	24	24	284	0	0.0301	0.1207	0.8076
	0.0349	0.0047	0.002	0	0	0	0	0	0	0		
2004	1	1	0	0	32	25	25	298	0	0.0253	0.0914	0.8411
	0.0262	0.0026	0.0093	0.0034	0.0008	0	0	0	0	0		
2004	1	1	0	0	32	26	26	294	0	0.0143	0.0583	0.8355
	0.0554	0.0085	0.0152	0.0108	0.0019	0	0	0	0	0		
2004	1	1	0	0	32	27	27	244	0	0.0013	0.0297	0.8023
	0.0764	0.0248	0.0204	0.037	0.0024	0.0058	0	0	0	0		
2004	1	1	0	0	32	28	28	152	0	0	0.0402	0.6945
	0.1002	0.0285	0.0756	0.0264	0.0033	0.0223	0.009	0	0	0		
2004	1	1	0	0	32	29	29	119	0	0.0057	0.0264	0.5327
	0.098	0.0396	0.1565	0.074	0.0174	0.0167	0	0.018	0	0.015		
2004	1	1	0	0	32	30	30	60	0	0	0.0065	0.4137
	0.1909	0.0281	0.1921	0.0959	0.0405	0.0249	0.0074	0	0	0		
2004	1	1	0	0	32	31	31	42	0	0	0.0126	0.31
	0.2561	0.0566	0.1632	0.0423	0.0471	0.0804	0	0.0317	0	0		
2004	1	1	0	0	32	32	32	25	0	0	0	0.2405
	0.2211	0.1585	0.086	0.1898	0.0344	0	0.0344	0.0355	0	0		
2004	1	1	0	0	32	33	33	19	0	0	0	0.1649
	0.1188	0.0973	0.1768	0.2085	0.1837	0	0.05	0	0	0		
2004	1	1	0	0	32	34	34	7	0	0	0	0
	0.1523	0	0.3585	0.1579	0.3312	0	0	0	0	0		
2004	1	1	0	0	32	35	35	7	0	0.0555	0	0
	0.3404	0	0.1029	0.1029	0.2042	0.1942	0	0	0	0		
2004	1	1	0	0	32	36	36	6	0	0	0	0.3098
	0	0.3037	0.2113	0	0	0	0	0	0.1752	0		
2004	1	1	0	0	32	37	37	5	0	0	0	0
	0.2089	0.4178	0.1247	0	0.02	0.1468	0	0	0	0.0818		
2004	1	1	0	0	32	38	38	2	0	0	0	0
	0.532	0	0	0	0	0	0.468	0	0	0		
2004	1	1	0	0	32	39	39	2	0	0	0	0
	0	0	0.4609	0	0	0	0	0	0	0.5391		
2004	1	1	0	0	32	40	40	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2004	1	1	0	0	32	41	41	3	0	0	0	0
	0	0.3113	0	0.3345	0	0	0	0.3542	0	0		
2004	1	1	0	0	32	42	42	2	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2004	1	1	0	0	32	43	43	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2004	1	1	0	0	32	45	45	2	0	0	0	0.6249
	0	0	0	0.3751	0	0	0	0	0	0		
2004	1	1	0	0	32	48	48	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2004	1	1	0	0	32	51	51	2	0	0	0	0
	0	0	0	0	0.3186	0.3628	0	0.3186	0	0		
2005	1	1	0	0	33	14	14	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	15	15	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	16	16	4	0.7596	0	0	0
	0.2404	0	0	0	0	0	0	0	0	0		

2005	1	1	0	0	33	18	18	4	0.5915	0	0	0
	0.2043	0	0	0	0	0.2043	0	0	0	0		
2005	1	1	0	0	33	19	19	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	20	20	12	0.6044	0.1484	0.155	0
	0.0923	0	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	21	21	34	0.2282	0.155	0.2543	0
	0.3625	0	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	22	22	74	0	0.0415	0.4382	0.038
	0.4592	0.023	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	23	23	164	0	0.0109	0.1942	0.1051
	0.6086	0.0685	0.0126	0	0	0	0	0	0	0		
2005	1	1	0	0	33	24	24	295	0	0.0115	0.1855	0.0741
	0.6754	0.0458	0.0076	0	0	0	0	0	0	0		
2005	1	1	0	0	33	25	25	362	0	0.0016	0.1104	0.0772
	0.714	0.0724	0.0159	0.0038	0.0047	0	0	0	0	0		
2005	1	1	0	0	33	26	26	373	0	0	0.0629	0.0714
	0.7741	0.0621	0.0129	0.009	0.0027	0.0048	0	0	0	0		
2005	1	1	0	0	33	27	27	324	0	0	0.0271	0.0488
	0.7865	0.0548	0.042	0.0166	0.0149	0.0019	0.0074	0	0	0		
2005	1	1	0	0	33	28	28	246	0	0	0.0246	0.0597
	0.7312	0.0816	0.0164	0.0352	0.0332	0.0049	0.0085	0	0.0048	0		
2005	1	1	0	0	33	29	29	150	0	0	0	0.0544
	0.6082	0.1228	0.0249	0.0912	0.0477	0.0128	0.038	0	0	0		
2005	1	1	0	0	33	30	30	98	0	0	0	0
	0.5747	0.138	0.0975	0.1048	0.0311	0.0109	0.0242	0.0189	0	0		
2005	1	1	0	0	33	31	31	63	0	0	0	0
	0.5779	0.0912	0.0392	0.0857	0.0449	0.0507	0.0349	0.053	0	0.0224		
2005	1	1	0	0	33	32	32	42	0	0	0	0.0247
	0.5025	0.0552	0.0135	0.1295	0.1213	0.0641	0.0892	0	0	0		
2005	1	1	0	0	33	33	33	16	0	0	0	0
	0.7348	0.0889	0	0	0	0.1763	0	0	0	0		
2005	1	1	0	0	33	34	34	19	0	0	0.0427	0
	0.2822	0.1596	0.2031	0.1243	0	0.0816	0.1065	0	0	0		
2005	1	1	0	0	33	35	35	9	0	0	0	0.1827
	0.2983	0.1309	0.0977	0.1099	0	0	0	0	0	0.1804		
2005	1	1	0	0	33	36	36	5	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
2005	1	1	0	0	33	37	37	8	0	0	0	0
	0.8069	0	0	0	0	0	0	0.1931	0	0		
2005	1	1	0	0	33	38	38	8	0	0	0	0
	0.6253	0	0.3747	0	0	0	0	0	0	0		
2005	1	1	0	0	33	39	39	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2005	1	1	0	0	33	40	40	4	0	0	0	0
	0	0.3876	0	0	0	0	0.6124	0	0	0		
2005	1	1	0	0	33	42	42	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2005	1	1	0	0	33	47	47	3	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2005	1	1	0	0	33	49	49	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2006	1	1	0	0	34	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	8	8	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	9	9	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	10	10	4	0.6142	0.2926	0	0
	0	0.0932	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	11	11	6	0.871	0	0	0
	0.0171	0.1119	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	12	12	7	0.8446	0	0	0
	0	0.1554	0	0	0	0	0	0	0	0		

2006	1	1	0	0	34	13	13	11	0.7909	0	0	0.0334
	0.1224	0.0533	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	14	14	11	0.7731	0	0	0
	0.1335	0.0331	0.0603	0	0	0	0	0	0	0		
2006	1	1	0	0	34	15	15	10	0.8494	0	0	0
	0	0.1506	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	16	16	9	0.5093	0.3036	0	0.0623
	0	0.1248	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	17	17	7	0.6496	0.2299	0	0
	0	0.1205	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	18	18	14	0.2079	0.6933	0	0.0432
	0	0.0556	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	19	19	28	0.1025	0.8754	0	0
	0	0.022	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	20	20	51	0.0136	0.9143	0.0163	0.0347
	0	0.0132	0.0079	0	0	0	0	0	0	0		
2006	1	1	0	0	34	21	21	96	0.0192	0.8386	0.0498	0.0285
	0	0.0511	0.0106	0	0.0021	0	0	0	0	0		
2006	1	1	0	0	34	22	22	107	0.0092	0.6934	0.0448	0.0698
	0.0054	0.1667	0.0073	0.0009	0	0	0	0.0024	0	0		
2006	1	1	0	0	34	23	23	128	0.0125	0.428	0.0547	0.1532
	0.0071	0.311	0.0335	0	0	0	0	0	0	0		
2006	1	1	0	0	34	24	24	187	0.0021	0.1592	0.0566	0.163
	0.035	0.5616	0.012	0	0.0064	0.0018	0.0024	0	0	0		
2006	1	1	0	0	34	25	25	275	0.0045	0.0446	0.0306	0.1604
	0.0888	0.612	0.0465	0.0029	0.0048	0.0023	0.0026	0	0	0		
2006	1	1	0	0	34	26	26	298	0.0009	0.0289	0.0098	0.1042
	0.0656	0.7374	0.0393	0.0024	0.0064	0.0012	0.0022	0	0.0018	0		
2006	1	1	0	0	34	27	27	328	0.0048	0.0064	0.0066	0.0934
	0.0597	0.7712	0.0379	0.0028	0.0034	0.0019	0.0078	0.0041	0	0		
2006	1	1	0	0	34	28	28	248	0.0011	0.0031	0	0.0738
	0.0671	0.7762	0.0379	0.0123	0.0102	0.0099	0.0011	0.0062	0.001	0		
2006	1	1	0	0	34	29	29	187	0	0	0.002	0.0889
	0.0608	0.7157	0.0615	0.0333	0.0222	0.0128	0	0.0027	0	0		
2006	1	1	0	0	34	30	30	112	0	0.0043	0.0049	0.0682
	0.0419	0.6553	0.0555	0.0351	0.0666	0.0289	0.0091	0	0	0.0302		
2006	1	1	0	0	34	31	31	72	0	0	0.0141	0.0124
	0.1107	0.4962	0.0936	0.1005	0.0498	0.0307	0.0187	0.0585	0	0.0146		
2006	1	1	0	0	34	32	32	45	0	0	0	0.0096
	0.0172	0.5782	0.061	0.0449	0.2078	0.0142	0.0382	0	0.0289	0		
2006	1	1	0	0	34	33	33	18	0.0317	0.0228	0	0.0225
	0	0.5419	0	0.0955	0.0783	0.2072	0	0	0	0		
2006	1	1	0	0	34	34	34	8	0	0	0	0
	0	0.5547	0	0.0776	0	0.0963	0.2333	0.0381	0	0		
2006	1	1	0	0	34	35	35	2	0	0	0	0
	0	0.5319	0	0	0.4681	0	0	0	0	0		
2006	1	1	0	0	34	36	36	8	0	0	0.0209	0.109
	0	0.67	0	0.0772	0.1229	0	0	0	0	0		
2006	1	1	0	0	34	37	37	3	0	0	0	0
	0	0.7188	0.0462	0.2349	0	0	0	0	0	0		
2006	1	1	0	0	34	38	38	6	0	0	0	0
	0	0.5267	0.181	0	0.2922	0	0	0	0	0		
2006	1	1	0	0	34	39	39	4	0	0	0	0
	0	0.197	0.3508	0.2902	0.162	0	0	0	0	0		
#2006	1	1	0	0	34	40	40	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
#2006	1	1	0	0	34	41	41	2	0	0.7817	0	0
	0	0	0.2183	0	0	0	0	0	0	0		
2006	1	1	0	0	34	42	42	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2006	1	1	0	0	34	43	43	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2006	1	1	0	0	34	45	45	2	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2006	1	1	0	0	34	46	46	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		

2006	1	1	0	0	34	47	47	3	0	0	0	0
	0	0.7668	0.2332	0	0	0	0	0	0	0		
2006	1	1	0	0	34	49	49	2	0	0	0	0.3178
	0	0	0	0	0	0	0	0	0	0.6822		
2006	1	1	0	0	34	51	51	5	0	0	0	0.1182
	0	0.2948	0	0	0	0.2307	0.3563	0	0	0		
2007	1	1	0	0	35	1	1	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	3	3	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	8	8	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	9	9	6	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	10	10	8	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	11	11	11	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	12	12	17	0.9923	0.0077	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	13	13	39	0.9844	0	0.0156	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	14	14	41	0.9862	0	0.0038	0
	0	0	0.0101	0	0	0	0	0	0	0		
2007	1	1	0	0	35	15	15	41	0.9732	0.0014	0.0045	0
	0	0	0.0208	0	0	0	0	0	0	0		
2007	1	1	0	0	35	16	16	57	0.9344	0.0271	0.0275	0
	0.011	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	17	17	45	0.9249	0.029	0.005	0
	0.0033	0	0.0378	0	0	0	0	0	0	0		
2007	1	1	0	0	35	18	18	49	0.7971	0.1966	0	0
	0	0.0029	0.0034	0	0	0	0	0	0	0		
2007	1	1	0	0	35	19	19	60	0.5815	0.3678	0.0107	0
	0	0	0.0368	0.0032	0	0	0	0	0	0		
2007	1	1	0	0	35	20	20	42	0.3778	0.4168	0.186	0
	0	0	0.0194	0	0	0	0	0	0	0		
2007	1	1	0	0	35	21	21	46	0.0136	0.5893	0.3929	0.0042
	0	0	0	0	0	0	0	0	0	0		
2007	1	1	0	0	35	22	22	72	0.0297	0.2207	0.6874	0.0353
	0	0	0.0268	0	0	0	0	0	0	0		
2007	1	1	0	0	35	23	23	126	0	0.1017	0.7274	0.0234
	0.0782	0.0174	0.0518	0	0	0	0	0	0	0		
2007	1	1	0	0	35	24	24	155	0.0006	0.067	0.5713	0.0269
	0.0497	0.0252	0.2532	0.0061	0	0	0	0	0	0		
2007	1	1	0	0	35	25	25	235	0	0.0298	0.3914	0.0335
	0.0988	0.0246	0.3901	0.0222	0.0066	0.0007	0.0023	0	0	0		
2007	1	1	0	0	35	26	26	319	0.0004	0.0049	0.2068	0.0205
	0.098	0.0539	0.5364	0.0643	0.0045	0.0059	0.0006	0.0026	0.0012	0		
2007	1	1	0	0	35	27	27	332	0.0041	0.0005	0.112	0.0306
	0.1035	0.0822	0.601	0.0328	0.0128	0.0133	0.0071	0	0	0		
2007	1	1	0	0	35	28	28	315	0.0026	0.0049	0.0604	0.0149
	0.1122	0.0863	0.6003	0.0755	0.0222	0.0051	0.0137	0.001	0.0007	0		
2007	1	1	0	0	35	29	29	259	0.0042	0.0043	0.0532	0.0087
	0.1211	0.0643	0.6378	0.0331	0.0378	0.0293	0.0039	0	0	0.0025		
2007	1	1	0	0	35	30	30	173	0.0024	0.0061	0.0332	0
	0.089	0.0499	0.6318	0.0821	0.0278	0.0247	0.0376	0.0072	0	0.0082		
2007	1	1	0	0	35	31	31	124	0	0	0.0209	0
	0.0707	0.0449	0.594	0.0983	0.0188	0.0876	0.0565	0.0083	0	0		
2007	1	1	0	0	35	32	32	74	0	0	0.0045	0
	0.0643	0.0957	0.5661	0.1267	0.0758	0.0591	0	0	0.0077	0		
2007	1	1	0	0	35	33	33	53	0.0086	0	0	0.0349
	0.0572	0.0744	0.5612	0.0283	0.1532	0.0478	0.0285	0	0	0.0059		

2007	1	1	0	0	35	34	34	31	0	0	0	0
	0	0.0744	0.4638	0.1615	0.147	0.0312	0	0.055	0.0087	0.0584		
2007	1	1	0	0	35	35	35	19	0	0.0208	0.0174	0
	0	0.1247	0.5505	0.2052	0.0815	0	0	0	0	0		
2007	1	1	0	0	35	36	36	14	0	0	0	0
	0	0	0.5045	0.1678	0.0805	0.0432	0	0	0	0.2041		
2007	1	1	0	0	35	37	37	9	0.0358	0	0	0
	0	0	0.6	0.0468	0.2686	0	0	0	0	0.0488		
2007	1	1	0	0	35	38	38	16	0	0	0	0
	0	0.1129	0.3285	0.2399	0.1147	0.0736	0	0.0289	0	0.1015		
2007	1	1	0	0	35	39	39	4	0	0	0	0
	0	0	0.3342	0	0.6658	0	0	0	0	0		
2007	1	1	0	0	35	40	40	6	0	0	0	0
	0	0	0.1221	0.5907	0	0.2873	0	0	0	0		
2007	1	1	0	0	35	41	41	6	0	0	0	0
	0	0	0.3024	0.355	0.2298	0.1129	0	0	0	0		
2007	1	1	0	0	35	42	42	2	0	0	0	0
	0	0	0	0.4418	0	0	0.5582	0	0	0		
2007	1	1	0	0	35	43	43	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2007	1	1	0	0	35	44	44	5	0	0	0	0
	0	0.0529	0	0.6491	0.1778	0.1203	0	0	0	0		
2007	1	1	0	0	35	45	45	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
2007	1	1	0	0	35	46	46	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2007	1	1	0	0	35	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
2007	1	1	0	0	35	51	51	4	0	0	0	0
	0	0	0	0.3215	0.3215	0.1045	0.1821	0.0702	0	0		
2008	1	1	0	0	36	4	4	1	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	5	5	3	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	6	6	2	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	7	7	6	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	8	8	7	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	9	9	6	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	10	10	7	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	11	11	3	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	12	12	11	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	13	13	11	0.8207	0.1793	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	14	14	11	0.6633	0.3367	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	15	15	20	0.6538	0.3462	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	16	16	23	0.1358	0.8497	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0145	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	17	17	28	0.0446	0.9554	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	18	18	48	0.0003	0.9997	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	19	19	78	0.0000	0.9695	0.0019	0.0157
	0.0000	0.0000	0.0000	0.0129	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	20	20	72	0.0000	1.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	21	21	77	0.0001	0.9791	0.0207	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

2008	1	1	0	0	36	22	22	84	0.0000	0.8878	0.0573	0.0407
	0.0031	0.0000	0.0000	0.0112	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	23	23	56	0.0000	0.6120	0.1872	0.1274
	0.0044	0.0000	0.0000	0.0648	0.0042	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	24	24	62	0.0000	0.2892	0.2000	0.3729
	0.0000	0.0356	0.0289	0.0734	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	25	25	95	0.0000	0.0641	0.2004	0.5497
	0.0371	0.0066	0.0147	0.1124	0.0000	0.0149	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	26	26	121	0.0000	0.0479	0.1136	0.4281
	0.0122	0.0553	0.0404	0.2964	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	27	27	155	0.0000	0.0111	0.0432	0.3348
	0.0354	0.0970	0.0493	0.4138	0.0154	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	28	28	183	0.0000	0.0000	0.0264	0.2513
	0.0153	0.0666	0.1020	0.4807	0.0274	0.0233	0.0032	0.0037	0.0000	0.0000		
2008	1	1	0	0	36	29	29	165	0.0000	0.0000	0.0093	0.1596
	0.0030	0.0856	0.0717	0.6021	0.0457	0.0012	0.0009	0.0054	0.0155	0.0000		
2008	1	1	0	0	36	30	30	181	0.0000	0.0039	0.0084	0.1210
	0.0261	0.0654	0.0531	0.6548	0.0202	0.0000	0.0278	0.0051	0.0135	0.0007		
2008	1	1	0	0	36	31	31	132	0.0000	0.0000	0.0099	0.1143
	0.0154	0.0531	0.0601	0.6248	0.0536	0.0245	0.0383	0.0060	0.0000	0.0000		
2008	1	1	0	0	36	32	32	112	0.0000	0.0000	0.0067	0.0620
	0.0174	0.0806	0.1004	0.6761	0.0192	0.0133	0.0152	0.0033	0.0000	0.0059		
2008	1	1	0	0	36	33	33	85	0.0000	0.0000	0.0071	0.0318
	0.0342	0.0693	0.1381	0.5865	0.0571	0.0080	0.0387	0.0188	0.0000	0.0105		
2008	1	1	0	0	36	34	34	64	0.0000	0.0000	0.0000	0.0556
	0.0085	0.0200	0.0429	0.7527	0.0220	0.0428	0.0406	0.0000	0.0148	0.0000		
2008	1	1	0	0	36	35	35	36	0.0000	0.0000	0.0000	0.0696
	0.0000	0.0295	0.0962	0.5985	0.1380	0.0470	0.0000	0.0000	0.0000	0.0213		
2008	1	1	0	0	36	36	36	30	0.0000	0.0000	0.0000	0.0732
	0.0000	0.0118	0.0983	0.7415	0.0752	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	37	37	21	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0169	0.0713	0.8132	0.0000	0.0000	0.0000	0.0000	0.0221	0.0765		
2008	1	1	0	0	36	38	38	13	0.0000	0.0000	0.0000	0.0371
	0.0000	0.0000	0.0758	0.7470	0.0000	0.0804	0.0000	0.0000	0.0597	0.0000		
2008	1	1	0	0	36	39	39	10	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0760	0.4900	0.1470	0.2728	0.0142	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	40	40	6	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.8465	0.0000	0.1383	0.0151	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	41	41	6	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.3964	0.4015	0.2021	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	42	42	4	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.8920	0.0000	0.0000	0.0000	0.1080	0.0000	0.0000		
2008	1	1	0	0	36	43	43	4	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	44	44	2	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.2254	0.0000	0.7746	0.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	46	46	1	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000		
2008	1	1	0	0	36	47	47	2	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5816	0.4184	0.0000	0.0000		
2008	1	1	0	0	36	49	49	1	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
# Canadian Fishery												
1977	1	2	0	0	5	1	51	60	0.0021	0.0021	0.0516	0.0186
	0.0619	0.3772	0.1093	0.1031	0.0866	0.0825	0.0722	0.033	0	0		
1978	1	2	0	0	6	1	51	60	0	0	0.0339	0.0593
	0.0475	0.1797	0.222	0.1898	0.1051	0.0814	0.0356	0.0305	0.0153	0		
1979	1	2	0	0	7	1	51	60	0	0	0.0188	0.0554
	0.1162	0.1019	0.1877	0.2699	0.0983	0.0706	0.0331	0.0223	0.0152	0.0107		
1980	1	2	0	0	8	1	51	60	0	0	0	0.0311
	0.0411	0.1629	0.0609	0.0782	0.4463	0.0841	0.0411	0.0411	0.0133	0		
1981	1	2	0	0	9	1	51	60	0	0	0.0488	0.0131
	0.0682	0.0667	0.207	0.0411	0.1141	0.2988	0.0721	0.029	0.0411	0		
1982	1	2	0	0	10	1	51	60	0	0	0.0221	0.4268
	0.0352	0.046	0.0451	0.141	0.032	0.0249	0.1931	0.0189	0.015	0		
1983	1	2	0	0	11	1	51	60	0.0009	0.218	0.016	0.028
	0.4999	0.0201	0.0291	0.026	0.0869	0.012	0.004	0.053	0.004	0.002		

1984	1	2	0	0	12	1	51	60	0	0.018	0.215	0.028
	0.15	0.338	0.0331	0.0381	0.025	0.0779	0.0151	0.013	0.0429	0.006		
1985	1	2	0	0	13	1	51	60	0.002	0.002	0.0808	0.2648
	0.0544	0.1072	0.3173	0.0162	0.0181	0.0181	0.0544	0.0122	0	0.0524		
1986	1	2	0	0	14	1	51	60	0.0021	0.0021	0.0043	0.0608
	0.5877	0.0369	0.0369	0.1757	0.0196	0.0087	0.0152	0.0217	0.0066	0.0217		
1987	1	2	0	0	15	1	51	60	0	0.0094	0.0063	0.0016
	0.0268	0.7415	0.03	0.03	0.1088	0.0063	0.0047	0.0126	0.0094	0.0126		
1988	1	2	0	0	16	16	16	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	2	0	0	16	18	18	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
1988	1	2	0	0	16	19	19	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	2	0	0	16	20	20	3	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	2	0	0	16	21	21	4	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1988	1	2	0	0	16	22	22	4	0	0.063	0.8963	0
	0	0	0.0407	0	0	0	0	0	0	0		
1988	1	2	0	0	16	23	23	4	0	0	0.6076	0
	0	0.0239	0.3685	0	0	0	0	0	0	0		
1988	1	2	0	0	16	24	24	5	0	0.0157	0.4178	0
	0.0356	0.0154	0.5028	0	0	0.0127	0	0	0	0		
1988	1	2	0	0	16	25	25	5	0	0	0.2662	0.0129
	0.0098	0.01	0.6847	0	0.0065	0.0098	0	0	0	0		
1988	1	2	0	0	16	26	26	5	0	0.0116	0.1763	0.0094
	0.0094	0.0042	0.7612	0.013	0	0.0148	0	0	0	0		
1988	1	2	0	0	16	27	27	5	0	0	0.0915	0
	0.016	0.0218	0.8548	0.016	0	0	0	0	0	0		
1988	1	2	0	0	16	28	28	5	0	0	0.057	0.004
	0.0172	0.0121	0.853	0.011	0.004	0.0367	0.005	0	0	0		
1988	1	2	0	0	16	29	29	5	0	0	0.0431	0.0072
	0.0119	0.0191	0.7988	0.027	0.0144	0.0786	0	0	0	0		
1988	1	2	0	0	16	30	30	5	0	0	0.0084	0.0084
	0	0.0279	0.7414	0.0239	0.0169	0.1732	0	0	0	0		
1988	1	2	0	0	16	31	31	5	0	0	0.0133	0
	0.0052	0.008	0.8117	0.0133	0.0157	0.1275	0	0	0.0052	0		
1988	1	2	0	0	16	32	32	5	0	0	0	0
	0	0.0227	0.6203	0.0125	0.0554	0.2558	0	0	0.0166	0.0166		
1988	1	2	0	0	16	33	33	5	0	0	0	0
	0	0.0384	0.6474	0.0158	0	0.2545	0	0.0296	0.0064	0.0079		
1988	1	2	0	0	16	34	34	5	0	0	0	0
	0	0	0.5295	0.0107	0.0428	0.298	0	0.0268	0	0.0921		
1988	1	2	0	0	16	35	35	5	0	0	0.0255	0
	0	0	0.5594	0.0602	0.051	0.2405	0.0264	0	0.0107	0.0264		
1988	1	2	0	0	16	36	36	4	0	0	0	0
	0	0	0.4977	0	0.0383	0.1996	0	0.041	0	0.2234		
1988	1	2	0	0	16	37	37	4	0	0	0.0396	0
	0	0	0.4063	0.0132	0.0791	0.3634	0.0409	0	0	0.0574		
1988	1	2	0	0	16	38	38	4	0	0	0	0
	0	0	0.2085	0.07	0.0748	0.357	0	0.1013	0	0.1884		
1988	1	2	0	0	16	39	39	4	0	0	0	0
	0	0	0.2196	0.047	0.0773	0.4365	0	0.0908	0.038	0.0908		
1988	1	2	0	0	16	40	40	3	0	0	0	0
	0	0	0.462	0	0	0.3806	0	0	0	0.1574		
1988	1	2	0	0	16	41	41	3	0	0	0	0
	0	0	0.5654	0	0	0.1592	0.0581	0	0	0.2173		
1988	1	2	0	0	16	42	42	2	0	0	0	0
	0	0	0	0	0	0.7157	0	0	0	0.2843		
1988	1	2	0	0	16	43	43	1	0	0	0	0
	0	0	0.5	0	0	0	0	0	0.5	0		
1988	1	2	0	0	16	44	44	1	0	0	0	0
	0	0	0.5	0	0	0.5	0	0	0	0		
1988	1	2	0	0	16	45	45	1	0	0	0	0
	0	0	0	0	0	0.5	0	0	0	0.5		

1988	1	2	0	0	16	46	46	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1988	1	2	0	0	16	51	51	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1989	1	2	0	0	17	21	21	2	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
1989	1	2	0	0	17	22	22	5	0	0.0582	0	0.8415
	0	0	0	0.1004	0	0	0	0	0	0		
1989	1	2	0	0	17	23	23	6	0	0	0	0.9226
	0	0	0	0.0774	0	0	0	0	0	0		
1989	1	2	0	0	17	24	24	6	0	0	0	0.7568
	0	0	0	0.2415	0	0	0.0018	0	0	0		
1989	1	2	0	0	17	25	25	6	0	0	0	0.6973
	0	0	0	0.3027	0	0	0	0	0	0		
1989	1	2	0	0	17	26	26	6	0	0	0.0112	0.5641
	0	0	0	0.4185	0	0.0062	0	0	0	0		
1989	1	2	0	0	17	27	27	6	0	0	0.001	0.4773
	0	0	0.008	0.4922	0	0.016	0.0056	0	0	0		
1989	1	2	0	0	17	28	28	6	0	0	0	0.3428
	0.0073	0.0104	0	0.6163	0	0	0.0231	0	0	0		
1989	1	2	0	0	17	29	29	6	0	0	0	0.2365
	0	0	0.0101	0.6574	0.0302	0.0142	0.0374	0.0142	0	0		
1989	1	2	0	0	17	30	30	6	0	0	0	0.2081
	0	0	0.0197	0.715	0.0278	0	0.0197	0.0098	0	0		
1989	1	2	0	0	17	31	31	6	0	0	0.0153	0.1517
	0	0	0	0.7488	0	0.0173	0.0669	0	0	0		
1989	1	2	0	0	17	32	32	6	0	0	0	0.0167
	0	0	0	0.8686	0	0	0.1147	0	0	0		
1989	1	2	0	0	17	33	33	6	0	0	0	0.1111
	0	0	0.0224	0.5314	0.0408	0.0571	0.2371	0	0	0		
1989	1	2	0	0	17	34	34	6	0	0	0	0.0403
	0	0	0	0.7302	0.0388	0.0973	0.0934	0	0	0		
1989	1	2	0	0	17	35	35	4	0	0	0	0
	0	0.0851	0	0.6749	0.0289	0.0705	0.1347	0	0	0.006		
1989	1	2	0	0	17	36	36	5	0	0.0306	0	0
	0	0	0	0.7102	0	0.0422	0.1797	0	0	0.0373		
1989	1	2	0	0	17	37	37	4	0	0	0	0
	0	0	0	0.5935	0	0.0395	0.2795	0	0	0.0876		
1989	1	2	0	0	17	38	38	4	0	0	0	0
	0	0	0	0.6563	0	0	0.301	0	0	0.0427		
1989	1	2	0	0	17	39	39	3	0	0	0	0.0684
	0	0	0	0.7104	0	0	0.1245	0	0.0967	0		
1989	1	2	0	0	17	40	40	2	0	0	0	0
	0	0	0	0.2674	0.0891	0	0.6434	0	0	0		
1989	1	2	0	0	17	41	41	2	0	0	0	0.0406
	0	0	0	0.4797	0	0.2398	0.2398	0	0	0		
1989	1	2	0	0	17	42	42	1	0	0	0	0
	0	0	0	0.3333	0	0.3333	0	0	0.3333	0		
1989	1	2	0	0	17	43	43	3	0	0	0	0
	0	0	0	0.4939	0	0	0.5061	0	0	0		
1989	1	2	0	0	17	44	44	3	0	0	0	0
	0	0	0	0.5173	0	0	0.2176	0	0	0.2651		
1989	1	2	0	0	17	45	45	2	0	0	0	0
	0	0	0	0.4142	0	0	0.2929	0	0	0.2929		
1989	1	2	0	0	17	46	46	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1989	1	2	0	0	17	47	47	1	0	0	0	0
	0	0	0	0.5	0	0	0	0	0	0.5		
1989	1	2	0	0	17	48	48	2	0	0	0	0
	0	0	0	0.6455	0	0	0.3545	0	0	0		
1989	1	2	0	0	17	51	51	4	0	0	0	0
	0	0	0	0.7198	0	0	0.0479	0	0	0.2322		
1990	1	2	0	0	18	19	19	2	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1990	1	2	0	0	18	20	20	3	0	0.3572	0.2447	0
	0.1534	0.2447	0	0	0	0	0	0	0	0		

1990	1	2	0	0	18	21	21	3	0	0.8579	0	0
	0.1421	0	0	0	0	0	0	0	0	0		
1990	1	2	0	0	18	22	22	4	0	0.6056	0.1558	0
	0.1862	0.0111	0	0	0.0412	0	0	0	0	0		
1990	1	2	0	0	18	23	23	5	0	0.3327	0.0323	0
	0.635	0	0	0	0	0	0	0	0	0		
1990	1	2	0	0	18	24	24	6	0	0.1181	0.0678	0
	0.7562	0.0091	0	0	0.0316	0	0	0.0172	0	0		
1990	1	2	0	0	18	25	25	4	0	0.0561	0.0519	0.0151
	0.7626	0	0.0142	0	0.1001	0	0	0	0	0		
1990	1	2	0	0	18	26	26	4	0	0.0118	0.0146	0
	0.7622	0	0	0	0.2011	0.0103	0	0	0	0		
1990	1	2	0	0	18	27	27	4	0	0	0.0237	0
	0.6975	0.0203	0	0	0.2466	0	0	0.012	0	0		
1990	1	2	0	0	18	28	28	4	0	0	0.0199	0
	0.5867	0	0	0	0.3935	0	0	0	0	0		
1990	1	2	0	0	18	29	29	4	0	0	0	0
	0.5109	0.0123	0.0123	0	0.4408	0.0188	0	0.0048	0	0		
1990	1	2	0	0	18	30	30	4	0	0	0	0
	0.3016	0.0117	0	0	0.675	0.0117	0	0	0	0		
1990	1	2	0	0	18	31	31	5	0	0	0	0
	0.1982	0	0	0	0.6373	0	0	0.1645	0	0		
1990	1	2	0	0	18	32	32	5	0	0	0	0
	0.1635	0	0	0	0.7753	0.0157	0	0.0454	0	0		
1990	1	2	0	0	18	33	33	6	0	0	0	0
	0.0743	0	0	0	0.8912	0	0	0.0345	0	0		
1990	1	2	0	0	18	34	34	4	0	0	0	0
	0.0801	0	0	0	0.6645	0	0	0.2553	0	0		
1990	1	2	0	0	18	35	35	5	0	0	0	0
	0.0495	0.0181	0	0	0.8964	0	0	0.0361	0	0		
1990	1	2	0	0	18	36	36	3	0	0	0	0
	0.3641	0	0	0	0.3778	0.1821	0	0.0507	0.0254	0		
1990	1	2	0	0	18	37	37	4	0	0	0	0
	0.204	0.102	0.0142	0	0.4661	0	0	0.1995	0	0.0142		
1990	1	2	0	0	18	38	38	4	0	0	0	0
	0	0	0	0	0.9823	0	0	0.0177	0	0		
1990	1	2	0	0	18	39	39	3	0	0	0	0
	0.0449	0	0	0	0.4575	0	0	0.4126	0	0.085		
1990	1	2	0	0	18	40	40	4	0	0	0	0
	0	0	0	0	0.9151	0	0	0.0556	0	0.0294		
1990	1	2	0	0	18	41	41	3	0	0	0	0
	0	0	0	0	0.8113	0	0	0.1887	0	0		
1990	1	2	0	0	18	42	42	2	0	0	0	0
	0.6715	0	0	0	0.3285	0	0	0	0	0		
1990	1	2	0	0	18	43	43	4	0	0	0	0
	0	0	0	0	0.5143	0	0	0.2468	0	0.2389		
1990	1	2	0	0	18	44	44	4	0	0	0	0
	0	0	0	0	0.9708	0	0	0.0292	0	0		
1990	1	2	0	0	18	45	45	2	0	0	0	0
	0	0	0	0	0.2684	0	0	0.7316	0	0		
1990	1	2	0	0	18	46	46	2	0	0	0	0
	0	0	0	0	0.2179	0	0	0.7821	0	0		
1990	1	2	0	0	18	47	47	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1990	1	2	0	0	18	48	48	2	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1990	1	2	0	0	18	50	50	1	0	0	0	0
	0	0	0	0	0.5	0	0	0.5	0	0		
1990	1	2	0	0	18	51	51	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1991	1	2	0	0	19	20	20	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1991	1	2	0	0	19	21	21	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
1991	1	2	0	0	19	22	22	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		

1991	1	2	0	0	19	23	23	3	0	0	0.1924	0
	0	0.3336	0	0	0	0.4741	0	0	0	0		
1991	1	2	0	0	19	24	24	6	0	0	0.509	0
	0	0.1479	0	0	0	0.3431	0	0	0	0		
1991	1	2	0	0	19	25	25	14	0	0	0.1965	0.0662
	0	0.4044	0	0	0	0.294	0	0	0.0389	0		
1991	1	2	0	0	19	26	26	16	0	0	0.0568	0.0262
	0	0.639	0	0	0	0.278	0	0	0	0		
1991	1	2	0	0	19	27	27	16	0	0	0.0768	0.0101
	0	0.5971	0.0064	0	0	0.3096	0	0	0	0		
1991	1	2	0	0	19	28	28	16	0	0	0.0762	0.0101
	0.0057	0.5297	0.0033	0	0	0.3691	0.0033	0	0.0027	0		
1991	1	2	0	0	19	29	29	16	0	0	0.0242	0.0214
	0	0.5746	0	0	0	0.3798	0	0	0	0		
1991	1	2	0	0	19	30	30	16	0	0	0.0376	0.011
	0	0.5278	0.0105	0	0	0.4096	0	0	0.0035	0		
1991	1	2	0	0	19	31	31	16	0	0	0	0.0097
	0.0063	0.586	0	0	0	0.3796	0	0	0.0185	0		
1991	1	2	0	0	19	32	32	16	0	0	0.0147	0.0096
	0.0124	0.5178	0.0045	0	0	0.3892	0	0	0.0519	0		
1991	1	2	0	0	19	33	33	13	0	0	0	0.0522
	0	0.5666	0	0	0	0.3358	0	0	0.0278	0.0176		
1991	1	2	0	0	19	34	34	13	0	0	0.0123	0.048
	0	0.4702	0	0	0	0.4392	0.0303	0	0	0		
1991	1	2	0	0	19	35	35	8	0	0	0.0533	0.1965
	0	0.3819	0	0	0	0.2435	0	0	0.1248	0		
1991	1	2	0	0	19	36	36	4	0	0	0	0
	0	0.3992	0	0	0	0.6008	0	0	0	0		
1991	1	2	0	0	19	37	37	8	0	0	0	0
	0	0.0541	0	0	0	0.9459	0	0	0	0		
1991	1	2	0	0	19	38	38	3	0	0	0	0
	0	0.1559	0	0	0	0.6883	0	0	0.1559	0		
1991	1	2	0	0	19	39	39	5	0	0	0	0.1351
	0	0.3317	0	0	0	0.4364	0	0	0.0968	0		
1991	1	2	0	0	19	40	40	3	0	0	0	0
	0	0.4818	0	0	0	0.5182	0	0	0	0		
1991	1	2	0	0	19	41	41	2	0	0	0	0
	0	0.6147	0	0	0	0.3853	0	0	0	0		
1991	1	2	0	0	19	42	42	2	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1991	1	2	0	0	19	43	43	2	0	0	0	0
	0	0.3472	0	0	0	0	0	0	0.6528	0		
1991	1	2	0	0	19	45	45	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1991	1	2	0	0	19	47	47	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
1991	1	2	0	0	19	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1991	1	2	0	0	19	50	50	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1991	1	2	0	0	19	51	51	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1992	1	2	0	0	20	18	18	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
1992	1	2	0	0	20	19	19	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	2	0	0	20	20	20	2	0	0	0	0.8566
	0	0	0	0	0	0	0.1434	0	0	0		
1992	1	2	0	0	20	21	21	3	0	0	0.8034	0.1966
	0	0	0	0	0	0	0	0	0	0		
1992	1	2	0	0	20	22	22	9	0	0.0629	0.4474	0.3831
	0	0	0.1067	0	0	0	0	0	0	0		
1992	1	2	0	0	20	23	23	15	0	0.0707	0.4155	0.2003
	0.0291	0	0.2844	0	0	0	0	0	0	0		
1992	1	2	0	0	20	24	24	22	0	0.0457	0.3167	0.3246
	0.0375	0	0.2681	0	0	0	0.0075	0	0	0		

1992	1	2	0	0	20	25	25	27	0	0	0.1557	0.3182
	0.0334	0.011	0.4011	0	0	0	0.0806	0	0	0		
1992	1	2	0	0	20	26	26	29	0	0.0019	0.0722	0.2586
	0.0312	0	0.5154	0	0	0	0.1208	0	0	0		
1992	1	2	0	0	20	27	27	29	0	0.0033	0.0457	0.2214
	0.0545	0.0035	0.4628	0.0037	0	0.0035	0.2017	0	0	0		
1992	1	2	0	0	20	28	28	29	0	0	0.0257	0.1411
	0.0392	0.0026	0.5138	0.0023	0	0	0.2679	0	0	0.0074		
1992	1	2	0	0	20	29	29	29	0	0	0.0081	0.0788
	0.0295	0.0056	0.52	0.0081	0	0	0.3466	0	0	0.0033		
1992	1	2	0	0	20	30	30	29	0	0.0048	0	0.0651
	0.0118	0.0076	0.4998	0.0056	0	0	0.375	0.0126	0	0.0177		
1992	1	2	0	0	20	31	31	27	0	0	0	0.0178
	0.0063	0	0.6126	0	0	0.0052	0.3534	0	0	0.0046		
1992	1	2	0	0	20	32	32	28	0	0	0	0.046
	0.0102	0	0.5851	0	0	0	0.3213	0	0.0229	0.0145		
1992	1	2	0	0	20	33	33	16	0	0	0	0
	0	0	0.5088	0	0	0	0.4634	0	0	0.0278		
1992	1	2	0	0	20	34	34	15	0	0	0	0
	0.061	0	0.3594	0	0	0	0.3817	0	0	0.1978		
1992	1	2	0	0	20	35	35	12	0	0	0.0638	0
	0	0	0.5697	0	0	0	0.2556	0	0	0.1109		
1992	1	2	0	0	20	36	36	7	0	0	0	0
	0	0	0.287	0	0	0	0.5187	0	0	0.1943		
1992	1	2	0	0	20	37	37	4	0	0	0	0
	0	0	0.6682	0	0	0	0.1704	0	0	0.1614		
1992	1	2	0	0	20	38	38	4	0	0	0	0.3974
	0	0	0.2059	0	0	0	0.2173	0	0	0.1795		
1992	1	2	0	0	20	39	39	4	0	0	0	0.1344
	0.2934	0	0.1986	0	0	0	0.2392	0	0	0.1344		
1992	1	2	0	0	20	40	40	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	2	0	0	20	41	41	3	0	0	0	0
	0	0	0.4912	0	0	0	0.5088	0	0	0		
1992	1	2	0	0	20	43	43	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	2	0	0	20	44	44	2	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	2	0	0	20	51	51	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
#1993	1	2	0	0	21	15	15	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1993	1	2	0	0	21	17	17	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1993	1	2	0	0	21	21	21	5	0	0.2669	0	0
	0.1832	0	0	0.1037	0	0	0	0.4461	0	0		
1993	1	2	0	0	21	22	22	10	0	0.3785	0	0.4759
	0.1456	0	0	0	0	0	0	0	0	0		
1993	1	2	0	0	21	23	23	14	0	0.049	0.2204	0.3917
	0.2392	0	0	0.0279	0	0	0	0.0717	0	0		
1993	1	2	0	0	21	24	24	17	0	0.0065	0.0704	0.3988
	0.3301	0.04	0	0.1362	0	0	0	0.0181	0	0		
1993	1	2	0	0	21	25	25	17	0	0.0134	0.0481	0.282
	0.2498	0.016	0	0.3397	0.0084	0	0	0.0426	0	0		
1993	1	2	0	0	21	26	26	18	0	0.0083	0.0234	0.1825
	0.2647	0.0078	0.0016	0.4499	0	0	0	0.0618	0	0		
1993	1	2	0	0	21	27	27	18	0	0	0.0213	0.1381
	0.1638	0.0225	0.0043	0.5129	0	0	0	0.1371	0	0		
1993	1	2	0	0	21	28	28	18	0	0	0.0017	0.097
	0.2	0.0189	0.01	0.4795	0	0	0	0.1929	0	0		
1993	1	2	0	0	21	29	29	18	0	0	0	0.0401
	0.1918	0.0227	0	0.5464	0.0145	0	0	0.1802	0	0.0042		
1993	1	2	0	0	21	30	30	18	0	0	0.0048	0.0329
	0.1918	0.0107	0	0.4723	0	0	0	0.2711	0.0162	0		
1993	1	2	0	0	21	31	31	17	0.0148	0	0.0201	0.0515
	0.0594	0.0127	0	0.6059	0	0	0	0.2356	0	0		

1993	1	2	0	0	21	32	32	13	0	0	0	0
	0.0676	0.032	0	0.5675	0	0	0	0.3329	0	0		
1993	1	2	0	0	21	33	33	12	0	0	0	0
	0.0449	0	0	0.4602	0	0	0	0.4949	0	0		
1993	1	2	0	0	21	34	34	4	0	0	0	0
	0.1043	0.2424	0	0.5207	0	0	0	0.1326	0	0		
1993	1	2	0	0	21	35	35	5	0	0	0	0
	0	0	0	0.9022	0	0	0	0.0978	0	0		
1993	1	2	0	0	21	36	36	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1993	1	2	0	0	21	39	39	5	0	0	0	0
	0	0	0	0.8445	0	0	0	0.1555	0	0		
#1994	1	2	0	0	22	14	14	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
#1994	1	2	0	0	22	16	16	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1994	1	2	0	0	22	17	17	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
1994	1	2	0	0	22	18	18	1	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
1994	1	2	0	0	22	22	22	6	0	0.1446	0.32	0.0594
	0.0263	0.1446	0	0	0.1239	0.1813	0	0	0	0		
1994	1	2	0	0	22	23	23	10	0	0.0607	0.4747	0.0819
	0.0922	0.1228	0	0	0.1328	0	0	0	0.035	0		
1994	1	2	0	0	22	24	24	20	0	0.113	0.1242	0.1669
	0.2058	0.203	0.1052	0	0.0619	0	0	0	0.0199	0		
1994	1	2	0	0	22	25	25	24	0	0.0085	0.0636	0.0395
	0.2079	0.2954	0.0196	0.0188	0.2712	0	0	0	0.0754	0		
1994	1	2	0	0	22	26	26	28	0	0.0126	0.0364	0.0564
	0.1828	0.2228	0.0322	0.0046	0.3896	0.0084	0	0	0.0528	0.0014		
1994	1	2	0	0	22	27	27	29	0	0	0.0307	0.0239
	0.1444	0.2145	0.0177	0.0025	0.4255	0.0056	0	0	0.1331	0.0021		
1994	1	2	0	0	22	28	28	30	0	0	0.0037	0.0106
	0.0986	0.1857	0.0315	0.0133	0.5073	0.0052	0	0	0.1398	0.0043		
1994	1	2	0	0	22	29	29	31	0	0.0017	0.004	0.0171
	0.1292	0.1952	0.0276	0.015	0.4508	0.0067	0.0027	0	0.1462	0.0039		
1994	1	2	0	0	22	30	30	30	0	0	0.0062	0.0091
	0.0717	0.1661	0.0249	0	0.4854	0.011	0.0106	0	0.2096	0.0055		
1994	1	2	0	0	22	31	31	28	0	0	0	0.0063
	0.0497	0.1058	0.0234	0.0043	0.5769	0.0014	0	0	0.2161	0.0161		
1994	1	2	0	0	22	32	32	28	0	0	0.0128	0.0049
	0.0932	0.1607	0.0227	0	0.4916	0	0.0126	0	0.2015	0		
1994	1	2	0	0	22	33	33	27	0	0	0	0
	0.0438	0.0697	0.0653	0	0.6349	0.0072	0	0	0.1722	0.0069		
1994	1	2	0	0	22	34	34	23	0	0	0	0.0215
	0.0287	0.1084	0.0217	0.0122	0.4374	0.0126	0	0	0.3577	0		
1994	1	2	0	0	22	35	35	18	0	0	0	0
	0	0.1464	0.0182	0	0.6881	0	0	0	0.1205	0.0267		
1994	1	2	0	0	22	36	36	21	0	0	0	0
	0.0157	0.057	0	0	0.7723	0	0	0	0.1315	0.0235		
1994	1	2	0	0	22	37	37	12	0	0	0	0
	0.2011	0.0684	0.0678	0	0.5074	0	0	0	0.062	0.0933		
1994	1	2	0	0	22	38	38	9	0	0	0	0
	0	0.1112	0	0	0.6705	0	0	0	0.2183	0		
1994	1	2	0	0	22	39	39	6	0	0	0	0
	0.2052	0	0	0	0.71	0	0	0	0.0848	0		
1994	1	2	0	0	22	40	40	8	0	0	0	0
	0	0	0	0	0.3183	0	0	0	0.6817	0		
1994	1	2	0	0	22	41	41	6	0	0	0	0
	0	0.1747	0	0	0.3552	0	0	0	0.2124	0.2577		
1994	1	2	0	0	22	42	42	5	0	0	0	0
	0.1924	0	0	0	0.3477	0	0	0	0.4599	0		
1994	1	2	0	0	22	43	43	3	0	0	0	0
	0	0	0	0	0.7261	0	0	0	0.2739	0		
1994	1	2	0	0	22	44	44	2	0	0	0	0
	0	0	0	0	0.4851	0	0	0	0.5149	0		

1994	1	2	0	0	22	45	45	3	0	0	0	0
	0	0	0	0	0.6264	0	0	0	0	0.3736		
1994	1	2	0	0	22	46	46	5	0	0	0	0
	0	0	0	0	0.7399	0	0	0	0.2602	0		
1994	1	2	0	0	22	47	47	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1994	1	2	0	0	22	51	51	2	0	0	0	0
	0	0	0	0	0	0	0	0	0.2489	0.7511		
1995	1	2	0	0	23	4	4	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	5	5	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	6	6	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	8	8	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	14	14	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	22	22	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	23	23	6	0	0.1065	0.283	0.3988
	0.1744	0.0373	0	0	0	0	0	0	0	0		
1995	1	2	0	0	23	24	24	11	0	0	0.4603	0.2464
	0.1938	0.0114	0.0394	0	0	0.0487	0	0	0	0		
1995	1	2	0	0	23	25	25	18	0.0202	0.0175	0.3776	0.2152
	0.0365	0.1002	0.1023	0.0391	0	0.0916	0	0	0	0		
1995	1	2	0	0	23	26	26	21	0	0	0.2148	0.1523
	0.082	0.1676	0.1249	0.0541	0.019	0.132	0	0.0127	0	0.0406		
1995	1	2	0	0	23	27	27	21	0	0.0146	0.1317	0.1007
	0.0437	0.119	0.2029	0.0309	0	0.2953	0.0181	0	0	0.0431		
1995	1	2	0	0	23	28	28	21	0	0.0036	0.0753	0.0903
	0.0374	0.134	0.1723	0.0211	0	0.3675	0.0102	0	0	0.0883		
1995	1	2	0	0	23	29	29	21	0	0.0093	0.0337	0.0176
	0.0108	0.12	0.2076	0.0286	0.0117	0.4131	0.0152	0	0	0.1326		
1995	1	2	0	0	23	30	30	21	0	0.0063	0.0131	0.0145
	0.0448	0.1462	0.1765	0.0453	0	0.4209	0.0078	0	0	0.1247		
1995	1	2	0	0	23	31	31	21	0	0	0.0195	0.0171
	0.0056	0.1207	0.1918	0.0346	0.0198	0.4375	0.0031	0	0	0.1504		
1995	1	2	0	0	23	32	32	21	0	0	0.0122	0.0261
	0.0098	0.0707	0.185	0.0799	0.0115	0.3818	0	0	0	0.2231		
1995	1	2	0	0	23	33	33	17	0	0	0.0289	0
	0.048	0.0888	0.0905	0.0759	0.0194	0.4846	0.0056	0	0	0.1583		
1995	1	2	0	0	23	34	34	17	0	0	0	0.0281
	0.0458	0.0319	0.1026	0.0836	0.0266	0.5102	0.0066	0	0	0.1647		
1995	1	2	0	0	23	35	35	14	0	0	0	0
	0	0.0337	0.0961	0.0955	0	0.5536	0	0	0	0.2212		
1995	1	2	0	0	23	36	36	11	0	0	0	0
	0.0316	0.0316	0.1278	0.0896	0	0.518	0	0	0	0.2014		
1995	1	2	0	0	23	37	37	7	0	0	0	0
	0	0.112	0.057	0.0285	0	0.7172	0	0	0	0.0852		
1995	1	2	0	0	23	38	38	5	0	0	0	0
	0	0	0.1767	0.102	0	0.5726	0	0	0	0.1488		
1995	1	2	0	0	23	39	39	9	0	0	0	0
	0	0	0	0.0497	0	0.9238	0	0	0	0.0266		
1995	1	2	0	0	23	40	40	6	0	0	0	0
	0	0	0.2439	0	0.0714	0.3531	0	0	0	0.3317		
1995	1	2	0	0	23	41	41	4	0	0	0	0
	0	0	0	0	0	0.6004	0	0	0	0.3996		
1995	1	2	0	0	23	42	42	4	0	0	0	0
	0.4388	0	0.2477	0	0	0.081	0	0	0	0.2325		
1995	1	2	0	0	23	43	43	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		

1995	1	2	0	0	23	44	44	2	0	0	0	0
	0	0	0	0	0	0.6925	0	0	0	0.3075		
1995	1	2	0	0	23	45	45	3	0	0	0	0
	0	0	0	0	0.1487	0.5283	0	0	0	0.323		
1995	1	2	0	0	23	46	46	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1995	1	2	0	0	23	47	47	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1995	1	2	0	0	23	48	48	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1995	1	2	0	0	23	50	50	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1995	1	2	0	0	23	51	51	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1996	1	2	0	0	24	12	12	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	13	13	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	14	14	3	0.7801	0.1176	0	0
	0	0	0	0	0	0	0.1023	0	0	0		
1996	1	2	0	0	24	15	15	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	16	16	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	17	17	8	0.9488	0.0512	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	18	18	9	0.8959	0.0671	0	0
	0.037	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	19	19	12	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	20	20	7	0.8573	0.1174	0	0
	0	0	0	0.0254	0	0	0	0	0	0		
1996	1	2	0	0	24	21	21	8	0.7235	0.1658	0.0723	0
	0	0	0	0	0	0	0.0384	0	0	0		
1996	1	2	0	0	24	22	22	6	0.3887	0.32	0	0
	0.2912	0	0	0	0	0	0	0	0	0		
1996	1	2	0	0	24	23	23	14	0.0907	0.3327	0.0359	0.3086
	0.1473	0.0245	0.0245	0	0	0	0.0359	0	0	0		
1996	1	2	0	0	24	24	24	15	0.0392	0.1847	0.0618	0.1652
	0.3377	0.0267	0.1308	0.0169	0.0369	0	0	0	0	0		
1996	1	2	0	0	24	25	25	22	0	0.034	0.0482	0.2096
	0.2696	0.0397	0.1635	0.1614	0	0	0.0738	0	0	0		
1996	1	2	0	0	24	26	26	24	0	0.023	0.0269	0.2128
	0.2057	0.0379	0.1245	0.1283	0.018	0.0258	0.1576	0.0053	0	0.0343		
1996	1	2	0	0	24	27	27	24	0	0	0.0029	0.1606
	0.2049	0.0486	0.1451	0.158	0.0025	0.0048	0.224	0	0	0.0486		
1996	1	2	0	0	24	28	28	24	0	0.0034	0.0087	0.0851
	0.1236	0.0488	0.1278	0.1765	0.0125	0	0.3444	0	0	0.0692		
1996	1	2	0	0	24	29	29	24	0	0	0	0.0625
	0.0884	0.0177	0.1411	0.175	0.0219	0.0285	0.3787	0	0	0.0861		
1996	1	2	0	0	24	30	30	23	0.0041	0.01	0	0.0417
	0.0931	0.0387	0.1383	0.2076	0.0452	0.0113	0.3233	0	0	0.0867		
1996	1	2	0	0	24	31	31	23	0	0	0	0.0783
	0.0253	0.0432	0.093	0.1054	0.0656	0	0.4234	0	0	0.1657		
1996	1	2	0	0	24	32	32	22	0	0	0	0.0205
	0.0492	0.02	0.1245	0.1063	0.0587	0	0.4658	0	0	0.155		
1996	1	2	0	0	24	33	33	17	0	0	0	0.0326
	0.0491	0.0466	0.1239	0.1604	0.0176	0	0.4493	0	0	0.1205		
1996	1	2	0	0	24	34	34	11	0	0	0	0.0415
	0.0813	0	0	0.2205	0.0931	0	0.3872	0	0	0.1764		
1996	1	2	0	0	24	35	35	12	0	0	0	0
	0	0	0	0.1756	0.0486	0	0.4268	0	0	0.349		
1996	1	2	0	0	24	36	36	4	0	0	0	0
	0	0	0	0	0.2724	0.3387	0.389	0	0	0		
1996	1	2	0	0	24	37	37	7	0	0	0	0.163
	0	0.1771	0.1908	0.172	0	0	0.2971	0	0	0		

1996	1	2	0	0	24	38	38	7	0	0	0	0
	0	0	0	0.2281	0	0	0.6124	0	0	0.1595		
1996	1	2	0	0	24	39	39	6	0	0	0	0
	0	0	0.0612	0	0	0	0.5364	0	0	0.4024		
1996	1	2	0	0	24	40	40	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
1996	1	2	0	0	24	41	41	4	0	0	0	0
	0	0	0	0	0	0	0.3943	0	0	0.6057		
1996	1	2	0	0	24	42	42	4	0	0	0	0
	0	0	0	0	0	0	0.7404	0	0	0.2596		
1996	1	2	0	0	24	43	43	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1996	1	2	0	0	24	46	46	2	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1996	1	2	0	0	24	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1996	1	2	0	0	24	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1997	1	2	0	0	25	19	19	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1997	1	2	0	0	25	20	20	7	0	0.8108	0	0.1892
	0	0	0	0	0	0	0	0	0	0		
1997	1	2	0	0	25	21	21	10	0	0.2011	0.775	0
	0.0238	0	0	0	0	0	0	0	0	0		
1997	1	2	0	0	25	22	22	17	0.0219	0.9294	0.0358	0.0047
	0	0.0054	0	0	0	0	0	0.0028	0	0		
1997	1	2	0	0	25	23	23	21	0.0034	0.2016	0.2805	0.335
	0.0032	0.0038	0.1705	0.0019	0	0	0	0	0	0		
1997	1	2	0	0	25	24	24	22	0.0026	0.4606	0.4345	0.0162
	0.0463	0.017	0.0072	0.0027	0.0122	0	0	0	0	0.0005		
1997	1	2	0	0	25	25	25	22	0.0061	0.1771	0.3724	0.011
	0.0726	0.2823	0.0049	0.0279	0.0241	0	0	0.0214	0	0		
1997	1	2	0	0	25	26	26	23	0	0.1097	0.1388	0.0091
	0.1102	0.1434	0.0205	0.0357	0.3632	0.0074	0	0.0516	0	0.0105		
1997	1	2	0	0	25	27	27	23	0	0.0152	0.2461	0.0072
	0.2723	0.0659	0.1072	0.0458	0.1539	0.0107	0.0048	0.0615	0.0034	0.0061		
1997	1	2	0	0	25	28	28	23	0	0.0114	0.0158	0.0721
	0.187	0.2453	0.075	0.096	0.1036	0.0089	0	0.11	0.0684	0.0066		
1997	1	2	0	0	25	29	29	23	0	0	0.0134	0.0079
	0.158	0.0589	0.1172	0.1515	0.1635	0.0178	0.0026	0.1813	0.1183	0.0095		
1997	1	2	0	0	25	30	30	22	0	0.0015	0.0052	0.0094
	0.3102	0.3247	0.0041	0.0255	0.0776	0.1429	0.0062	0.0696	0.003	0.0201		
1997	1	2	0	0	25	31	31	22	0	0	0	0.0037
	0.1864	0.1711	0.0086	0.017	0.1951	0.3268	0	0.0692	0.0111	0.0111		
1997	1	2	0	0	25	32	32	18	0	0	0	0
	0.1552	0.0496	0.0621	0.1722	0.1571	0	0	0.2149	0.0282	0.1607		
1997	1	2	0	0	25	33	33	18	0	0	0	0.0075
	0.0226	0.3958	0.0011	0.4241	0.0401	0.0169	0.0163	0.047	0.0099	0.0188		
1997	1	2	0	0	25	34	34	14	0	0	0	0.0335
	0.0949	0.0322	0	0.1832	0.2078	0.0322	0	0.3055	0.0574	0.0533		
1997	1	2	0	0	25	35	35	9	0	0	0	0
	0.0844	0	0	0.3349	0.0097	0	0	0.4746	0.0963	0		
1997	1	2	0	0	25	36	36	5	0	0	0	0
	0.0415	0	0	0	0	0	0	0.746	0	0.2125		
1997	1	2	0	0	25	37	37	2	0	0	0	0
	0	0	0	0	0.0839	0	0	0.9161	0	0		
1997	1	2	0	0	25	38	38	3	0	0	0	0
	0.9754	0	0	0	0	0	0	0.0029	0.0189	0.0029		
1997	1	2	0	0	25	40	40	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1997	1	2	0	0	25	41	41	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1997	1	2	0	0	25	45	45	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1997	1	2	0	0	25	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		

1998	1	2	0	0	26	1	1	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	2	0	0	26	9	9	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	2	0	0	26	15	15	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
#1998	1	2	0	0	26	17	17	4	0.0345	0	0.0189	0.3449
	0	0	0.2568	0	0.3449	0	0	0	0	0		
1998	1	2	0	0	26	18	18	8	0	0.5986	0.3749	0.0265
	0	0	0	0	0	0	0	0	0	0		
1998	1	2	0	0	26	19	19	10	0.1256	0.578	0.1778	0.1186
	0	0	0	0	0	0	0	0	0	0		
1998	1	2	0	0	26	20	20	17	0	0.8538	0.1205	0.0172
	0	0	0	0.0085	0	0	0	0	0	0		
1998	1	2	0	0	26	21	21	18	0	0.5139	0.381	0.0895
	0.0156	0	0	0	0	0	0	0	0	0		
1998	1	2	0	0	26	22	22	19	0	0.4461	0.2215	0.2761
	0.0064	0.0136	0.0331	0	0	0	0	0	0.0032	0		
1998	1	2	0	0	26	23	23	25	0	0.1167	0.3418	0.4663
	0.0253	0.0175	0.0243	0	0.0066	0.0014	0	0	0	0		
1998	1	2	0	0	26	24	24	24	0	0.0309	0.3833	0.3358
	0.0247	0.1375	0.05	0.0104	0.0261	0.0011	0	0	0	0		
1998	1	2	0	0	26	25	25	25	0	0	0.285	0.4765
	0.0312	0.0925	0.0626	0.0118	0.0175	0.0219	0	0	0.0008	0		
1998	1	2	0	0	26	26	26	25	0	0.0359	0.2319	0.3365
	0.0273	0.1013	0.151	0.0007	0.0293	0.0716	0.0126	0	0	0.0019		
1998	1	2	0	0	26	27	27	25	0	0.0022	0.2871	0.1884
	0.0021	0.0789	0.1817	0.0518	0.0777	0.0814	0.0199	0.0013	0.0222	0.0053		
1998	1	2	0	0	26	28	28	25	0	0.0141	0.172	0.1622
	0.0238	0.1393	0.1426	0.037	0.0989	0.1111	0.0223	0	0.0522	0.0246		
1998	1	2	0	0	26	29	29	23	0	0.0349	0.0549	0.0657
	0.0073	0.2123	0.1676	0.0018	0.0649	0.1436	0.021	0	0.212	0.0139		
1998	1	2	0	0	26	30	30	21	0	0	0.0199	0.0534
	0.0212	0.2403	0.1171	0.0033	0.0718	0.0995	0	0.007	0.2573	0.109		
1998	1	2	0	0	26	31	31	22	0	0	0.0494	0.1161
	0	0.0863	0.2201	0	0.2375	0.0238	0	0	0.2408	0.0259		
1998	1	2	0	0	26	32	32	17	0	0	0.0717	0.0464
	0.0388	0.2628	0.1504	0.0259	0.0168	0.075	0	0.0039	0.3023	0.0061		
1998	1	2	0	0	26	33	33	8	0	0	0	0
	0	0.0261	0.0261	0	0	0.2889	0	0.0742	0.5671	0.0175		
1998	1	2	0	0	26	34	34	8	0	0	0	0.2937
	0	0.1852	0.0291	0	0.0762	0.0818	0	0	0.334	0		
1998	1	2	0	0	26	35	35	6	0	0	0	0
	0	0	0.0338	0	0.4542	0.4	0	0	0	0.112		
1998	1	2	0	0	26	36	36	2	0	0	0	0
	0	0.2931	0	0	0	0.2931	0.4138	0	0	0		
1998	1	2	0	0	26	37	37	2	0	0	0	0
	0	0.4795	0.4795	0.0409	0	0	0	0	0	0		
1998	1	2	0	0	26	38	38	3	0	0	0	0.1498
	0	0	0	0	0.1924	0.6578	0	0	0	0		
1998	1	2	0	0	26	39	39	2	0	0	0	0.7682
	0	0	0	0	0	0	0	0	0.2318	0		
1998	1	2	0	0	26	40	40	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1998	1	2	0	0	26	44	44	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1999	1	2	0	0	27	2	2	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	3	3	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	4	4	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	7	7	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		

1999	1	2	0	0	27	11	11	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	12	12	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	13	13	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	14	14	10	0.9464	0.0111	0.0425	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	15	15	7	0.9785	0	0	0.0215
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	16	16	10	0.9707	0.0045	0.0248	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	17	17	16	0.8775	0.0674	0.0551	0
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	18	18	17	0.7131	0.177	0.0444	0.0655
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	19	19	19	0.4669	0.2718	0.226	0.0354
	0	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	20	20	26	0.228	0.3938	0.2863	0.0515
	0.0404	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	21	21	27	0.0037	0.3535	0.4644	0.1469
	0.0314	0	0	0	0	0	0	0	0	0		
1999	1	2	0	0	27	22	22	30	0	0.1846	0.4158	0.2226
	0.1713	0	0	0.0057	0	0	0	0	0	0		
1999	1	2	0	0	27	23	23	35	0.0174	0.1038	0.408	0.2263
	0.2274	0	0	0.0172	0	0	0	0	0	0		
1999	1	2	0	0	27	24	24	36	0	0.0244	0.34	0.2597
	0.3139	0.0437	0.0016	0.0167	0	0	0	0	0	0		
1999	1	2	0	0	27	25	25	35	0.0016	0.0288	0.2074	0.3925
	0.2757	0.0355	0.0298	0.0162	0	0	0	0	0	0.0124		
1999	1	2	0	0	27	26	26	37	0	0.0145	0.1105	0.4163
	0.3236	0.0378	0.0188	0.0183	0.011	0.022	0.0115	0	0.0074	0.0082		
1999	1	2	0	0	27	27	27	38	0.0063	0.0125	0.0228	0.3987
	0.2864	0.0314	0.0776	0.0889	0.0135	0.0211	0.0175	0	0.004	0.0193		
1999	1	2	0	0	27	28	28	38	0	0.0006	0.0318	0.3619
	0.2354	0.0306	0.1185	0.0935	0.0201	0.0348	0.0261	0.0181	0	0.0286		
1999	1	2	0	0	27	29	29	34	0	0	0.0184	0.2493
	0.2137	0.0408	0.1151	0.0814	0.0561	0.0781	0.067	0.0174	0.0087	0.0541		
1999	1	2	0	0	27	30	30	35	0	0	0.0195	0.3751
	0.1606	0.0085	0.076	0.1532	0.0376	0.0452	0.0681	0.01	0	0.0463		
1999	1	2	0	0	27	31	31	31	0	0	0.0588	0.3042
	0.1252	0	0.0588	0.1102	0.0334	0.0241	0.0901	0.0419	0	0.1532		
1999	1	2	0	0	27	32	32	27	0	0.0257	0.0294	0.1211
	0.0824	0.0704	0.2222	0.1073	0.0798	0.027	0.0299	0.0227	0.0386	0.1435		
1999	1	2	0	0	27	33	33	22	0	0	0	0.1122
	0.1733	0	0.2969	0.0951	0.044	0.1001	0	0.0662	0	0.1124		
1999	1	2	0	0	27	34	34	14	0	0	0	0.0679
	0	0.0069	0.036	0.1597	0.0434	0.0769	0.0883	0.0524	0.0671	0.4013		
1999	1	2	0	0	27	35	35	11	0.015	0	0	0.0647
	0.1004	0	0.1596	0.15	0	0	0.3853	0.1041	0	0.0209		
1999	1	2	0	0	27	36	36	9	0	0	0	0.226
	0.2449	0	0	0	0	0.2069	0.1502	0	0.0313	0.1407		
1999	1	2	0	0	27	37	37	6	0	0	0	0.0239
	0	0.1958	0.137	0	0.21	0.0239	0.0239	0.1916	0	0.1939		
1999	1	2	0	0	27	38	38	2	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1999	1	2	0	0	27	39	39	4	0	0	0	0.0527
	0	0	0	0.2476	0	0.3665	0.3332	0	0	0		
1999	1	2	0	0	27	40	40	4	0	0	0	0
	0	0	0.2948	0	0	0.2809	0.0687	0	0.3556	0		
1999	1	2	0	0	27	41	41	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1999	1	2	0	0	27	42	42	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1999	1	2	0	0	27	43	43	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		

1999	1	2	0	0	27	45	45	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1999	1	2	0	0	27	47	47	2	0	0	0	0
	0	0	0.5163	0	0	0	0.4837	0	0	0		
2000	1	2	0	0	28	12	12	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	15	15	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	16	16	3	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	17	17	4	0	0.8414	0.1586	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	18	18	5	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	19	19	6	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	20	20	5	0	0.907	0.0605	0
	0.0324	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	21	21	9	0.0285	0.9595	0	0
	0.012	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	22	22	13	0	0.8801	0.0958	0.0242
	0	0	0	0	0	0	0	0	0	0		
2000	1	2	0	0	28	23	23	14	0.0117	0.8847	0.0438	0.0239
	0.014	0	0	0.0218	0	0	0	0	0	0		
2000	1	2	0	0	28	24	24	14	0	0.8452	0.1116	0.0338
	0	0	0	0	0.0094	0	0	0	0	0		
2000	1	2	0	0	28	25	25	17	0.007	0.7126	0.1507	0.0359
	0.0625	0.0282	0	0	0.0031	0	0	0	0	0		
2000	1	2	0	0	28	26	26	16	0	0.459	0.1797	0.0828
	0.193	0.0692	0	0.0077	0.0086	0	0	0	0	0		
2000	1	2	0	0	28	27	27	18	0.0081	0.3412	0.1217	0.1624
	0.156	0.133	0.0201	0.0297	0.0133	0.0069	0	0	0	0.0077		
2000	1	2	0	0	28	28	28	19	0	0.1405	0.0814	0.102
	0.3552	0.197	0.0213	0.0301	0.0191	0.0366	0.0066	0.0103	0	0		
2000	1	2	0	0	28	29	29	19	0	0.0796	0.053	0.1444
	0.3267	0.2519	0.045	0.0298	0.0089	0.0074	0.0337	0.006	0	0.0136		
2000	1	2	0	0	28	30	30	19	0	0.018	0.0134	0.106
	0.3534	0.2389	0.0281	0.0795	0.0731	0.0068	0.031	0.0055	0.0085	0.0378		
2000	1	2	0	0	28	31	31	20	0	0.0091	0.0104	0.0371
	0.3035	0.2991	0.035	0.0699	0.0262	0.0134	0.0341	0.1282	0.016	0.018		
2000	1	2	0	0	28	32	32	18	0	0.0096	0.0215	0.0799
	0.3314	0.152	0.0212	0.1212	0.0646	0.043	0.007	0.0464	0.0399	0.0623		
2000	1	2	0	0	28	33	33	16	0	0	0	0.0822
	0.3165	0.1881	0.0116	0.127	0.1003	0.0706	0.0476	0.015	0	0.0412		
2000	1	2	0	0	28	34	34	17	0	0	0.0121	0.02
	0.3169	0.1977	0.0212	0.2137	0.0347	0.013	0.0414	0.1056	0.0136	0.0102		
2000	1	2	0	0	28	35	35	15	0	0	0	0.0048
	0.338	0.1936	0.0127	0.1296	0.0095	0.0048	0.026	0.0066	0.034	0.2404		
2000	1	2	0	0	28	36	36	9	0	0.0059	0	0
	0.6663	0.0822	0	0	0.0691	0	0.0943	0.0647	0.0059	0.0116		
2000	1	2	0	0	28	37	37	10	0	0	0	0.1152
	0.1592	0	0.0163	0.2656	0.0212	0.0172	0.1335	0.1266	0.0085	0.1367		
2000	1	2	0	0	28	38	38	6	0	0.0303	0	0
	0.1299	0.0526	0	0.0569	0	0.5781	0.0526	0	0	0.0995		
2000	1	2	0	0	28	39	39	6	0	0	0.2004	0
	0.0485	0	0.2004	0.0516	0.0197	0	0.2455	0.2004	0	0.0334		
2000	1	2	0	0	28	40	40	8	0	0	0	0
	0.5526	0	0.0491	0.0431	0	0	0.3285	0.0267	0	0		
2000	1	2	0	0	28	41	41	4	0	0	0	0
	0	0	0.1648	0	0.5544	0	0.1473	0	0	0.1334		
2000	1	2	0	0	28	42	42	4	0	0	0	0
	0.0681	0.0681	0	0.4687	0	0	0.2053	0	0	0.1898		
2000	1	2	0	0	28	44	44	2	0	0	0	0
	0.0316	0	0	0	0	0.9684	0	0	0	0		
2000	1	2	0	0	28	45	45	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		

2000	1	2	0	0	28	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2000	1	2	0	0	28	48	48	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
2000	1	2	0	0	28	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
2001	1	2	0	0	29	12	12	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	2	0	0	29	22	22	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2001	1	2	0	0	29	23	23	3	0	0	0.2522	0
	0.7478	0	0	0	0	0	0	0	0	0		
2001	1	2	0	0	29	24	24	4	0	0.351	0.649	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	2	0	0	29	25	25	6	0	0.1256	0.3869	0.293
	0.0818	0	0.0818	0	0.0309	0	0	0	0	0		
2001	1	2	0	0	29	26	26	11	0	0.1061	0.4791	0.0189
	0.1866	0.1727	0.0368	0	0	0	0	0	0	0		
2001	1	2	0	0	29	27	27	15	0	0	0.499	0.0653
	0.2659	0.0759	0.0544	0.0248	0	0	0.0146	0	0	0		
2001	1	2	0	0	29	28	28	18	0	0.0826	0.4287	0.1058
	0.0978	0.1043	0.0791	0.0129	0	0.0424	0.015	0.024	0.0074	0		
2001	1	2	0	0	29	29	29	20	0	0.0494	0.3783	0.1216
	0.1908	0.1078	0.0621	0.0235	0.0122	0.0233	0	0.0142	0.0071	0.0098		
2001	1	2	0	0	29	30	30	20	0	0.0162	0.2301	0.1
	0.1479	0.2316	0.1758	0.0194	0.0201	0.0211	0.0045	0.008	0.0201	0.0053		
2001	1	2	0	0	29	31	31	20	0	0.0162	0.2234	0.0569
	0.1229	0.3025	0.0535	0.0358	0.0313	0.0498	0.013	0.043	0.0284	0.0231		
2001	1	2	0	0	29	32	32	20	0	0.0074	0.2169	0.107
	0.089	0.2881	0.1235	0.0206	0.0526	0.0335	0.0022	0.0162	0.0258	0.0173		
2001	1	2	0	0	29	33	33	20	0	0.0176	0.1685	0.0482
	0.0773	0.3021	0.1377	0.0408	0.0334	0.0597	0.0205	0.0248	0.0238	0.0457		
2001	1	2	0	0	29	34	34	19	0	0	0.0661	0.0105
	0.0522	0.3786	0.2435	0.01	0.0493	0.074	0.047	0.0126	0.0377	0.0187		
2001	1	2	0	0	29	35	35	18	0	0.0149	0.0122	0.0094
	0.0633	0.379	0.2474	0.0437	0.068	0.0474	0	0.0466	0.0302	0.0379		
2001	1	2	0	0	29	36	36	19	0	0	0	0.0195
	0.0926	0.2545	0.1888	0.0642	0.0095	0.1033	0.0362	0.1267	0.0095	0.0953		
2001	1	2	0	0	29	37	37	17	0	0	0.0133	0.0328
	0.1014	0.3356	0.1206	0.0413	0.0673	0.1096	0	0.0154	0.0872	0.0755		
2001	1	2	0	0	29	38	38	17	0	0	0	0
	0.1143	0.2767	0.1861	0.0359	0.1095	0.0993	0.0256	0.0467	0.0339	0.072		
2001	1	2	0	0	29	39	39	17	0	0	0	0
	0.0545	0.3484	0.2062	0.1137	0.0702	0.0926	0.0507	0.0316	0.032	0		
2001	1	2	0	0	29	40	40	12	0	0	0	0
	0	0.3602	0.053	0	0.1103	0.1366	0.0999	0.0334	0.0772	0.1292		
2001	1	2	0	0	29	41	41	9	0	0	0.0686	0
	0.0716	0.4975	0	0.0686	0.2221	0.0716	0	0	0	0		
2001	1	2	0	0	29	42	42	7	0	0	0	0
	0.0693	0.2129	0.0537	0.1276	0.1804	0.1431	0.2129	0	0	0		
2001	1	2	0	0	29	43	43	4	0	0	0	0
	0	0.526	0	0	0.2361	0.1393	0.0987	0	0	0		
2001	1	2	0	0	29	44	44	2	0	0	0	0
	0	0.3367	0.3367	0	0	0	0	0	0	0.3267		
2001	1	2	0	0	29	45	45	2	0	0	0	0
	0	0	0.2827	0	0	0	0	0	0	0.7173		
2001	1	2	0	0	29	46	46	3	0	0	0	0
	0	0.4858	0.2796	0	0	0	0	0	0	0.2346		
2001	1	2	0	0	29	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
2001	1	2	0	0	29	48	48	2	0	0	0	0
	0	0	0	0.4892	0	0.5108	0	0	0	0		
2002	1	2	0	0	30	18	18	1	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	2	0	0	30	24	24	8	0	0.4236	0.4519	0.1244
	0	0	0	0	0	0	0	0	0	0		

2002	1	2	0	0	30	25	25	3	0	0.171	0.829	0
	0	0	0	0	0	0	0	0	0	0		
2002	1	2	0	0	30	26	26	5	0	0.3356	0.1722	0.3875
	0	0.1047	0	0	0	0	0	0	0	0		
2002	1	2	0	0	30	27	27	11	0	0.1017	0.4274	0.0414
	0.3158	0.1137	0	0	0	0	0	0	0	0		
2002	1	2	0	0	30	28	28	15	0	0	0.2106	0.2685
	0.2485	0.0726	0.0837	0.0617	0.0206	0.0338	0	0	0	0		
2002	1	2	0	0	30	29	29	22	0	0.0107	0.2295	0.2895
	0.0831	0.0595	0.1515	0.0784	0.0102	0.0329	0.027	0	0.0278	0		
2002	1	2	0	0	30	30	30	24	0	0.0108	0.1042	0.3278
	0.1159	0.0861	0.1629	0.1356	0.0122	0	0	0	0.0288	0.0156		
2002	1	2	0	0	30	31	31	25	0	0	0.103	0.3927
	0.1028	0.0962	0.1307	0.0816	0.0292	0.0268	0.0277	0	0.0094	0		
2002	1	2	0	0	30	32	32	26	0	0	0.0896	0.311
	0.1478	0.0908	0.165	0.1105	0.017	0.0112	0.042	0	0	0.0151		
2002	1	2	0	0	30	33	33	26	0	0.0114	0.0595	0.4025
	0.0673	0.0631	0.2048	0.0819	0.0064	0.0155	0.0277	0	0.0306	0.0294		
2002	1	2	0	0	30	34	34	26	0	0	0.0482	0.3387
	0.0633	0.091	0.1846	0.1382	0.0399	0.0232	0.0415	0.0058	0	0.0256		
2002	1	2	0	0	30	35	35	26	0	0.0077	0.0894	0.3053
	0.0644	0.0863	0.1933	0.1325	0.0282	0.0153	0.021	0.0117	0.0082	0.0369		
2002	1	2	0	0	30	36	36	26	0	0	0.05	0.2033
	0.0759	0.1598	0.3031	0.1071	0.0113	0.0507	0.0072	0	0.0114	0.02		
2002	1	2	0	0	30	37	37	25	0	0	0.0339	0.1815
	0.0881	0.0913	0.3736	0.0985	0.0087	0.0194	0.0241	0.0139	0.0203	0.0467		
2002	1	2	0	0	30	38	38	25	0	0	0.0512	0.1371
	0.063	0.116	0.3027	0.1265	0.0399	0.0091	0.0713	0	0.029	0.0543		
2002	1	2	0	0	30	39	39	21	0	0	0	0.0997
	0.0216	0.0953	0.3534	0.1685	0.0246	0.0325	0.0858	0.0222	0	0.0965		
2002	1	2	0	0	30	40	40	13	0	0	0.037	0
	0.0313	0.1683	0.4097	0.2748	0.0335	0.0453	0	0	0	0		
2002	1	2	0	0	30	41	41	18	0	0	0.0408	0.036
	0.0872	0.1019	0.2444	0.0507	0.041	0.0844	0.1017	0.0837	0	0.1281		
2002	1	2	0	0	30	42	42	12	0	0	0.0553	0
	0	0.254	0.1736	0.1153	0.0791	0.0504	0.0894	0	0.0486	0.1344		
2002	1	2	0	0	30	43	43	12	0	0	0	0
	0	0.1192	0.6183	0.136	0	0.0628	0	0.0636	0	0		
2002	1	2	0	0	30	44	44	7	0	0	0	0
	0	0	0.4432	0.2129	0	0.1051	0	0	0	0.2388		
2002	1	2	0	0	30	45	45	2	0	0	0	0
	0	0	0	0.5032	0	0	0.4968	0	0	0		
2002	1	2	0	0	30	46	46	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2002	1	2	0	0	30	47	47	2	0	0	0	0
	0	0	0.3475	0.3049	0.3475	0	0	0	0	0		
2002	1	2	0	0	30	48	48	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
2002	1	2	0	0	30	49	49	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
2003	1	2	0	0	31	13	13	2	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2003	1	2	0	0	31	14	14	2	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2003	1	2	0	0	31	17	17	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2003	1	2	0	0	31	21	21	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	2	0	0	31	22	22	3	0	0	0.752	0
	0	0	0	0.248	0	0	0	0	0	0		
2003	1	2	0	0	31	23	23	11	0	0	0.6801	0.1192
	0.0651	0.1015	0.0341	0	0	0	0	0	0	0		
2003	1	2	0	0	31	24	24	14	0	0	0.6859	0.2079
	0.0276	0.0395	0.0199	0.0191	0	0	0	0	0	0		
2003	1	2	0	0	31	25	25	14	0	0.0227	0.5618	0.2715
	0.0468	0.0584	0.0108	0.0091	0.0188	0	0	0	0	0		

2003	1	2	0	0	31	26	26	15	0	0.0183	0.5825	0.1592
	0.0548	0.0717	0.0316	0.0321	0.0283	0.0106	0	0.0108	0	0		
2003	1	2	0	0	31	27	27	15	0	0	0.3791	0.2562
	0.0417	0.112	0.0791	0.0472	0.0567	0.0071	0.0137	0.0073	0	0		
2003	1	2	0	0	31	28	28	15	0	0	0.4119	0.2477
	0.0311	0.1056	0.0556	0.0631	0.0467	0.0156	0	0.014	0	0.0087		
2003	1	2	0	0	31	29	29	15	0	0	0.2732	0.2013
	0.0813	0.1769	0.0849	0.1071	0.0553	0.02	0	0	0	0		
2003	1	2	0	0	31	30	30	15	0	0	0.2971	0.1168
	0.0582	0.2095	0.0773	0.1212	0.0388	0.0202	0.0147	0.0341	0	0.012		
2003	1	2	0	0	31	31	31	15	0	0	0.1271	0.2302
	0.1134	0.156	0.0723	0.1131	0.1345	0.0206	0	0.0177	0	0.0151		
2003	1	2	0	0	31	32	32	13	0	0	0.1499	0.1028
	0.1961	0.1156	0.1554	0.1255	0.0556	0.0619	0	0.0373	0	0		
2003	1	2	0	0	31	33	33	13	0	0	0.0516	0.2507
	0.1773	0.195	0.1347	0.0451	0.091	0.0231	0	0	0.0315	0		
2003	1	2	0	0	31	34	34	11	0	0	0.1028	0.1197
	0.1613	0.254	0.0667	0.113	0.0844	0	0.0373	0.0304	0.0304	0		
2003	1	2	0	0	31	35	35	11	0	0	0	0.1463
	0.0539	0.1878	0.1029	0.2507	0.072	0.1567	0	0.0299	0	0		
2003	1	2	0	0	31	36	36	9	0	0	0.0743	0.1868
	0.3167	0.2594	0	0.0619	0	0.0504	0	0	0	0.0504		
2003	1	2	0	0	31	37	37	7	0	0	0.0817	0.0844
	0.07	0.07	0	0.4607	0.07	0.1633	0	0	0	0		
2003	1	2	0	0	31	38	38	6	0	0	0	0.1396
	0	0.0984	0.1017	0.4465	0.075	0.1388	0	0	0	0		
2003	1	2	0	0	31	39	39	8	0	0	0	0.0889
	0.2559	0.1212	0	0.1836	0	0	0.1072	0.1148	0	0.1284		
2003	1	2	0	0	31	40	40	5	0	0	0	0
	0	0.3535	0	0.4653	0	0	0	0	0	0.1812		
2003	1	2	0	0	31	41	41	5	0	0	0	0
	0.3046	0	0.2984	0.1238	0.1238	0	0.1493	0	0	0		
2003	1	2	0	0	31	42	42	3	0	0	0	0
	0.3126	0.2999	0	0.3875	0	0	0	0	0	0		
2003	1	2	0	0	31	43	43	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
2003	1	2	0	0	31	44	44	1	0	0	0	0
	0	0	0.5	0	0	0	0	0	0	0.5		
2003	1	2	0	0	31	45	45	1	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
2003	1	2	0	0	31	46	46	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2003	1	2	0	0	31	49	49	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
#2004	1	2	0	0	32	10	10	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
#2004	1	2	0	0	32	11	11	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2004	1	2	0	0	32	13	13	1	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	14	14	1	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	15	15	2	0.5851	0	0	0
	0.4149	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	16	16	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	17	17	1	0	0	0	0.2
	0.8	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	18	18	2	0	0	0	0
	0.7035	0	0	0.2965	0	0	0	0	0	0		
2004	1	2	0	0	32	19	19	2	0	0	0.6976	0.1512
	0.1512	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	20	20	3	0	0.1859	0.1231	0.1231
	0	0.5679	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	21	21	11	0	0.5958	0	0.2823
	0.1219	0	0	0	0	0	0	0	0	0		

2004	1	2	0	0	32	22	22	20	0	0.1574	0.054	0.6835
	0.0602	0.045	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	23	23	26	0	0.1215	0.042	0.7519
	0.0708	0.0052	0.0086	0	0	0	0	0	0	0		
2004	1	2	0	0	32	24	24	31	0	0.034	0.0314	0.8306
	0.0749	0.0193	0.0051	0.0048	0	0	0	0	0	0		
2004	1	2	0	0	32	25	25	32	0	0.0048	0.0335	0.7386
	0.1683	0.0137	0.0105	0.0163	0.0078	0.0064	0	0	0	0		
2004	1	2	0	0	32	26	26	32	0	0.0015	0.016	0.7745
	0.1189	0.0157	0.0232	0.0296	0.014	0.0066	0	0	0	0		
2004	1	2	0	0	32	27	27	32	0	0	0.0105	0.7153
	0.1436	0.0379	0.0463	0.0229	0.0097	0.0083	0.0055	0	0	0		
2004	1	2	0	0	32	28	28	32	0	0	0.0036	0.6695
	0.1164	0.0168	0.0932	0.0328	0.0363	0.0245	0.005	0.0018	0	0		
2004	1	2	0	0	32	29	29	31	0	0.0061	0.0167	0.5282
	0.1843	0.0513	0.0903	0.0398	0.0538	0.0193	0.0064	0.0014	0.0024	0		
2004	1	2	0	0	32	30	30	31	0	0	0.0082	0.4812
	0.1592	0.0712	0.0713	0.0837	0.0604	0.0407	0.0094	0	0.0147	0		
2004	1	2	0	0	32	31	31	31	0	0	0.0133	0.2895
	0.127	0.0531	0.2178	0.1077	0.0919	0.0339	0.0172	0.0257	0	0.0229		
2004	1	2	0	0	32	32	32	27	0	0	0.0136	0.3805
	0.1248	0.0288	0.1834	0.0867	0.0527	0.0704	0.0381	0.0032	0	0.018		
2004	1	2	0	0	32	33	33	18	0	0	0.0504	0.3032
	0.0746	0.1446	0.1328	0.1013	0.0439	0.1245	0	0	0.0247	0		
2004	1	2	0	0	32	34	34	17	0	0	0.0474	0.2726
	0.0649	0.1653	0.1763	0.1458	0.0495	0	0	0.0782	0	0		
2004	1	2	0	0	32	35	35	13	0	0	0	0.1624
	0.2113	0.3775	0.064	0.0229	0	0.0354	0	0	0.0594	0.0671		
2004	1	2	0	0	32	36	36	11	0	0	0	0.1877
	0.1735	0.1673	0.2057	0.0985	0.0148	0	0.062	0	0.0284	0.062		
2004	1	2	0	0	32	37	37	5	0	0	0	0.3349
	0.2535	0	0	0	0.0699	0.0699	0	0	0.2718	0		
2004	1	2	0	0	32	38	38	7	0	0	0	0.2722
	0.3457	0.1025	0.0595	0.1606	0.0595	0	0	0	0	0		
2004	1	2	0	0	32	39	39	3	0	0	0	0
	0.2135	0.2327	0	0.5538	0	0	0	0	0	0		
2004	1	2	0	0	32	40	40	1	0	0	0	0
	0.5	0	0	0	0.5	0	0	0	0	0		
2004	1	2	0	0	32	41	41	5	0	0	0	0.1647
	0	0.3677	0.1519	0	0.1638	0	0	0	0.1519	0		
2004	1	2	0	0	32	42	42	2	0	0	0	0
	0	0.2744	0.7256	0	0	0	0	0	0	0		
2004	1	2	0	0	32	43	43	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2004	1	2	0	0	32	44	44	2	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
#2004	1	2	0	0	32	46	46	1	0	0	0	1
	0	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	47	47	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	49	49	1	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
2004	1	2	0	0	32	50	50	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2005	1	2	0	0	33	19	19	2	0	0	0.4816	0
	0.5184	0	0	0	0	0	0	0	0	0		
2005	1	2	0	0	33	21	21	1	0	0	0.3333	0
	0.6667	0	0	0	0	0	0	0	0	0		
2005	1	2	0	0	33	22	22	3	0	0	0	0.5498
	0.234	0	0.2162	0	0	0	0	0	0	0		
2005	1	2	0	0	33	23	23	12	0	0	0.0213	0.0969
	0.8138	0.0107	0.0574	0	0	0	0	0	0	0		
2005	1	2	0	0	33	24	24	17	0	0	0.0573	0.0073
	0.7845	0.1009	0	0	0.0501	0	0	0	0	0		
2005	1	2	0	0	33	25	25	19	0	0	0.0129	0.0043
	0.7532	0.2026	0.027	0	0	0	0	0	0	0		

2005	1	2	0	0	33	26	26	20	0	0	0.0294	0.0525
	0.6111	0.19	0.022	0.076	0.019	0	0	0	0	0		
2005	1	2	0	0	33	27	27	20	0	0	0.0273	0.0054
	0.782	0.1359	0.0006	0.0423	0.0065	0	0	0	0	0		
2005	1	2	0	0	33	28	28	20	0	0	0.0189	0.0074
	0.5929	0.1458	0.0592	0.0456	0.127	0.0004	0.0027	0	0	0		
2005	1	2	0	0	33	29	29	19	0	0	0	0.0789
	0.5674	0.0808	0.0172	0.1509	0.0505	0.0231	0.026	0	0	0.0053		
2005	1	2	0	0	33	30	30	17	0	0	0	0.056
	0.5103	0.1642	0.0562	0.0668	0	0.0716	0.0281	0.0244	0	0.0224		
2005	1	2	0	0	33	31	31	12	0	0	0	0.0358
	0.5092	0.1476	0	0.0168	0.1217	0.0474	0.0781	0	0	0.0434		
2005	1	2	0	0	33	32	32	12	0	0	0	0
	0.3592	0.2362	0.0137	0.0561	0.2593	0.0732	0.0023	0	0	0		
2005	1	2	0	0	33	33	33	2	0	0	0	0
	0.718	0	0.282	0	0	0	0	0	0	0		
2005	1	2	0	0	33	34	34	5	0	0	0	0
	0.2434	0.3445	0	0.4121	0	0	0	0	0	0		
2005	1	2	0	0	33	35	35	7	0	0	0	0
	0.5132	0.0118	0	0.0216	0	0.2492	0.0118	0.1924	0	0		
2005	1	2	0	0	33	36	36	6	0	0	0	0
	0.1941	0.2166	0	0	0.1989	0.2317	0.1588	0	0	0		
2005	1	2	0	0	33	37	37	4	0	0	0	0
	0.6923	0	0.2864	0	0	0.0213	0	0	0	0		
2005	1	2	0	0	33	38	38	2	0	0	0	0
	0.4052	0.2974	0	0	0.2974	0	0	0	0	0		
2005	1	2	0	0	33	39	39	2	0	0	0	0
	0	0.8969	0	0	0.1031	0	0	0	0	0		
2005	1	2	0	0	33	40	40	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2005	1	2	0	0	33	42	42	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2005	1	2	0	0	33	45	45	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2005	1	2	0	0	33	46	46	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2006	1	2	0	0	34	20	20	1	0	0.3176	0	0
	0	0.6824	0	0	0	0	0	0	0	0		
2006	1	2	0	0	34	21	21	2	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2006	1	2	0	0	34	22	22	5	0	0.1542	0.4545	0
	0	0.3913	0	0	0	0	0	0	0	0		
2006	1	2	0	0	34	23	23	13	0	0.1314	0	0.3893
	0	0.4793	0	0	0	0	0	0	0	0		
2006	1	2	0	0	34	24	24	16	0	0.0202	0	0.2148
	0.1668	0.364	0.2342	0	0	0	0	0	0	0		
2006	1	2	0	0	34	25	25	41	0.0176	0.0202	0.0218	0.0596
	0.0195	0.7992	0.0621	0	0	0	0	0	0	0		
2006	1	2	0	0	34	26	26	51	0	0.0113	0	0.0389
	0.0398	0.6975	0.1486	0.0051	0.02	0.0136	0.0251	0	0	0		
2006	1	2	0	0	34	27	27	73	0	0	0	0.1351
	0.0136	0.7032	0.0788	0.0514	0.0075	0.0066	0.0038	0	0	0		
2006	1	2	0	0	34	28	28	82	0	0	0.0094	0.0257
	0.0334	0.759	0.077	0.0369	0.0326	0.0193	0	0.003	0	0.0037		
2006	1	2	0	0	34	29	29	81	0	0	0	0.0633
	0.0503	0.6531	0.0845	0.0334	0.0506	0.0442	0.0131	0	0	0.0077		
2006	1	2	0	0	34	30	30	71	0	0	0	0.0381
	0.0432	0.7271	0.0646	0.0404	0.0136	0.0253	0.0135	0.0175	0.0167	0		
2006	1	2	0	0	34	31	31	70	0	0	0.0249	0.0238
	0.0178	0.6851	0.0817	0.0121	0.1092	0.004	0.0209	0	0.016	0.0046		
2006	1	2	0	0	34	32	32	59	0	0	0	0.0082
	0.0483	0.5428	0.0938	0.085	0.0416	0.0842	0.0617	0.0291	0.0053	0		
2006	1	2	0	0	34	33	33	45	0	0	0	0
	0.0419	0.6242	0.1012	0.0401	0.0677	0.0186	0.053	0	0	0.0532		
2006	1	2	0	0	34	34	34	24	0	0	0	0
	0	0.5707	0.0703	0.0678	0.023	0.0533	0.1225	0.0923	0	0		

2006	1	2	0	0	34	35	35	26	0	0	0	0.0307
	0	0.5945	0.2057	0.0278	0	0.1413	0	0	0	0		
2006	1	2	0	0	34	36	36	10	0	0	0	0
	0	0.4352	0.2936	0.0767	0	0.1944	0	0	0	0		
2006	1	2	0	0	34	37	37	12	0	0	0	0
	0	0.4892	0	0.0436	0.046	0.0921	0.2354	0.0938	0	0		
2006	1	2	0	0	34	38	38	6	0	0	0	0
	0	0.5044	0	0.254	0.1372	0.1044	0	0	0	0		
2006	1	2	0	0	34	39	39	6	0	0	0	0
	0	0.0678	0	0.404	0	0.5282	0	0	0	0		
2006	1	2	0	0	34	40	40	7	0	0	0	0
	0	0.1434	0	0.0526	0.2714	0	0.4197	0.1129	0	0		
2006	1	2	0	0	34	41	41	7	0	0	0	0
	0	0.6224	0	0	0.1142	0	0.2635	0	0	0		
2006	1	2	0	0	34	42	42	6	0	0	0	0
	0	0.0794	0.4332	0.2901	0.0754	0	0	0	0	0.1219		
2006	1	2	0	0	34	44	44	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2006	1	2	0	0	34	45	45	2	0	0	0	0
	0	0	0	0	0.4207	0	0	0	0.5793	0		
2006	1	2	0	0	34	46	46	2	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
2006	1	2	0	0	34	47	47	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
2006	1	2	0	0	34	51	51	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2007	1	2	0	0	35	1	1	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	2	0	0	35	15	15	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	2	0	0	35	16	16	2	0.8893	0	0.1107	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	2	0	0	35	19	19	1	0	0	1	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	2	0	0	35	20	20	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2007	1	2	0	0	35	21	21	4	0	0.2041	0.7959	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	2	0	0	35	22	22	7	0	0	0.2574	0
	0	0.1044	0.6381	0	0	0	0	0	0	0		
2007	1	2	0	0	35	23	23	13	0	0	0.5275	0
	0	0	0.4348	0.0376	0	0	0	0	0	0		
2007	1	2	0	0	35	24	24	15	0	0	0.3889	0.0484
	0.1108	0.0336	0.326	0.0557	0.0367	0	0	0	0	0		
2007	1	2	0	0	35	25	25	19	0	0	0.2279	0.036
	0.114	0	0.4652	0.1152	0.0198	0.0218	0	0	0	0		
2007	1	2	0	0	35	26	26	24	0	0	0.1179	0.0172
	0.1106	0.0208	0.6283	0.0892	0.016	0	0	0	0	0		
2007	1	2	0	0	35	27	27	26	0	0	0.0674	0
	0.0573	0.0861	0.6751	0.0987	0	0	0	0.0154	0	0		
2007	1	2	0	0	35	28	28	29	0	0	0.0323	0.0131
	0.0343	0.0285	0.624	0.1946	0.0137	0.0318	0.0276	0	0	0		
2007	1	2	0	0	35	29	29	30	0	0	0.0007	0.0293
	0.0843	0.0338	0.6401	0.115	0.0174	0.0329	0.0305	0.0024	0.0136	0		
2007	1	2	0	0	35	30	30	33	0	0	0	0.0026
	0.0276	0.0167	0.7084	0.121	0.0234	0.0148	0.0267	0.0384	0.0205	0		
2007	1	2	0	0	35	31	31	31	0	0	0.0015	0.0432
	0.0283	0.0115	0.5761	0.0849	0.0232	0.1112	0.0446	0.0094	0.0662	0		
2007	1	2	0	0	35	32	32	23	0	0	0	0.0003
	0.1689	0.0326	0.4976	0.0629	0	0.0456	0.0789	0.04	0.0732	0		
2007	1	2	0	0	35	33	33	23	0	0	0	0
	0.0883	0.0797	0.4269	0.1145	0.1233	0.1667	0.0008	0	0	0		
2007	1	2	0	0	35	34	34	17	0	0	0	0.0081
	0.0623	0	0.4576	0.1547	0.0004	0.1711	0.1459	0	0	0		
2007	1	2	0	0	35	35	35	21	0	0	0	0
	0.0629	0.014	0.4663	0.2737	0.0113	0.0638	0	0.0574	0.0506	0		

2007	1	2	0	0	35	36	36	10	0	0	0	0
	0	0	0.1413	0.1067	0.1549	0.0113	0.2437	0.1865	0.1557	0		
2007	1	2	0	0	35	37	37	12	0	0	0	0
	0	0.1696	0.6031	0.1897	0.0365	0.0011	0	0	0	0		
2007	1	2	0	0	35	38	38	9	0	0	0	0.0078
	0	0.0435	0.4561	0.0715	0.3395	0.0023	0	0.0715	0.0078	0		
2007	1	2	0	0	35	39	39	12	0	0	0	0
	0	0.0024	0.386	0.186	0.0735	0.194	0.1581	0	0	0		
2007	1	2	0	0	35	40	40	8	0	0	0	0
	0.0529	0	0.492	0.0312	0.4212	0.0028	0	0	0	0		
2007	1	2	0	0	35	41	41	6	0	0	0	0
	0	0	0.1384	0.0094	0	0	0.4509	0.2629	0.1384	0		
2007	1	2	0	0	35	42	42	2	0	0	0	0
	0	0	0.1098	0.1098	0.7804	0	0	0	0	0		
2007	1	2	0	0	35	43	43	4	0	0	0	0
	0	0	0.2583	0.5772	0.1631	0.0014	0	0	0	0		
2007	1	2	0	0	35	44	44	2	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2007	1	2	0	0	35	45	45	3	0	0	0	0
	0	0	0.433	0.567	0	0	0	0	0	0		
2007	1	2	0	0	35	46	46	2	0	0	0	0
	0	0	0.0508	0.9492	0	0	0	0	0	0		
2007	1	2	0	0	35	47	47	2	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
2007	1	2	0	0	35	49	49	3	0	0	0	0
	0	0	0.0167	0.9333	0	0	0	0.05	0	0		
2007	1	2	0	0	35	50	50	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
2007	1	2	0	0	35	51	51	2	0	0	0	0
	0	0	0	0	0	0.0169	0.9831	0	0	0		
2008	1	2	0	0	36	4	4	1	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	5	5	1	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	6	6	1	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	7	7	1	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	8	8	2	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	9	9	2	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	10	10	2	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	11	11	1	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	12	12	4	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	13	13	6	0.8931	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.1069	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	14	14	7	0.9677	0.0323	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	15	15	7	1.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	16	16	8	0.9017	0.0983	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	17	17	7	0.7143	0.2857	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	18	18	7	0.3519	0.6481	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	19	19	8	0.2394	0.7606	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	20	20	12	0.0830	0.8471	0.0698	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	21	21	7	0.0352	0.9293	0.0000	0.0355
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

2008	1	2	0	0	36	22	22	12	0.0301	0.5732	0.0172	0.0372
	0.0000	0.0000	0.0000	0.2301	0.1121	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	23	23	11	0.0000	0.7105	0.0975	0.0365
	0.0000	0.0680	0.0000	0.0876	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	24	24	20	0.0000	0.2117	0.0407	0.2492
	0.0154	0.0734	0.0132	0.2951	0.0747	0.0000	0.0266	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	25	25	27	0.0000	0.0211	0.0185	0.2026
	0.0000	0.0901	0.0987	0.3977	0.1272	0.0000	0.0000	0.0440	0.0000	0.0000		
2008	1	2	0	0	36	26	26	36	0.0000	0.0011	0.0441	0.2212
	0.0074	0.0061	0.0649	0.5547	0.0459	0.0001	0.0175	0.0000	0.0000	0.0371		
2008	1	2	0	0	36	27	27	41	0.0000	0.0236	0.0022	0.1057
	0.0157	0.0189	0.0793	0.5572	0.1175	0.0093	0.0000	0.0122	0.0123	0.0462		
2008	1	2	0	0	36	28	28	42	0.0000	0.0000	0.0037	0.1384
	0.0000	0.0625	0.0301	0.6551	0.0770	0.0128	0.0031	0.0000	0.0087	0.0085		
2008	1	2	0	0	36	29	29	40	0.0000	0.0014	0.0092	0.1455
	0.0000	0.0287	0.0288	0.5657	0.1130	0.0462	0.0118	0.0496	0.0000	0.0000		
2008	1	2	0	0	36	30	30	45	0.0000	0.0007	0.0019	0.0735
	0.0359	0.0374	0.0197	0.6579	0.0748	0.0225	0.0427	0.0168	0.0074	0.0089		
2008	1	2	0	0	36	31	31	40	0.0000	0.0000	0.0140	0.0665
	0.0000	0.0355	0.0144	0.6187	0.1062	0.0573	0.0479	0.0165	0.0000	0.0231		
2008	1	2	0	0	36	32	32	42	0.0000	0.0109	0.0069	0.0069
	0.0123	0.0327	0.0327	0.6637	0.1101	0.0221	0.0184	0.0260	0.0073	0.0498		
2008	1	2	0	0	36	33	33	34	0.0000	0.0000	0.0000	0.0005
	0.0000	0.0350	0.0028	0.6804	0.1380	0.0377	0.0330	0.0324	0.0403	0.0000		
2008	1	2	0	0	36	34	34	29	0.0000	0.0000	0.0008	0.0495
	0.0075	0.0519	0.0497	0.4746	0.0698	0.1864	0.0389	0.0564	0.0146	0.0000		
2008	1	2	0	0	36	35	35	21	0.0000	0.0000	0.0111	0.0410
	0.0000	0.0559	0.0446	0.4459	0.0866	0.0169	0.0930	0.0545	0.0960	0.0545		
2008	1	2	0	0	36	36	36	22	0.0000	0.0000	0.0000	0.0113
	0.0000	0.0000	0.0001	0.6357	0.1916	0.0240	0.0000	0.0708	0.0000	0.0665		
2008	1	2	0	0	36	37	37	13	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0172	0.0000	0.8737	0.0004	0.0612	0.0000	0.0474	0.0000	0.0000		
2008	1	2	0	0	36	38	38	17	0.0000	0.0000	0.0000	0.0426
	0.0000	0.1265	0.0000	0.5277	0.0335	0.1403	0.0165	0.0740	0.0000	0.0388		
2008	1	2	0	0	36	39	39	7	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.8762	0.0000	0.0307	0.0000	0.0005	0.0927	0.0000		
2008	1	2	0	0	36	40	40	8	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.8999	0.0672	0.0329	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	41	41	3	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.2354	0.7646	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	42	42	7	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0822	0.5378	0.2317	0.1469	0.0014	0.0000	0.0000		
2008	1	2	0	0	36	43	43	3	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.9938	0.0000	0.0062	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	44	44	1	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	45	45	2	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000		
2008	1	2	0	0	36	48	48	1	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000		
# Acoustic survey												
1977	1	3	0	0	5	7	7	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	10	10	1	0.6667	0.3333	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	11	11	1	0.5714	0.4286	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	12	12	2	0.9286	0.0714	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	13	13	3	0.8571	0.1429	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	14	14	4	0.8293	0.1707	0	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	15	15	3	0.8	0.2	0	0
	0	0	0	0	0	0	0	0	0	0		

1977	1	3	0	0	5	16	16	9	0.6724	0.2414	0.0862	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	17	17	14	0.6825	0.2063	0.0952	0
	0	0.0159	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	18	18	16	0.6061	0.303	0.0909	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	19	19	14	0.5352	0.2958	0.169	0
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	20	20	17	0.5	0.2639	0.2222	0.0139
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	21	21	20	0.2568	0.3108	0.4189	0.0135
	0	0	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	22	22	22	0.1	0.2231	0.6154	0.0462
	0.0077	0	0.0077	0	0	0	0	0	0	0		
1977	1	3	0	0	5	23	23	24	0.027	0.1689	0.7297	0.0473
	0.0203	0.0068	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	24	24	29	0	0.161	0.7561	0.0341
	0.0098	0.039	0	0	0	0	0	0	0	0		
1977	1	3	0	0	5	25	25	34	0	0.0625	0.825	0.05
	0.0125	0.0458	0.0042	0	0	0	0	0	0	0		
1977	1	3	0	0	5	26	26	40	0	0.0319	0.7211	0.0558
	0.0438	0.1394	0.004	0	0	0.004	0	0	0	0		
1977	1	3	0	0	5	27	27	41	0.0032	0.0354	0.5498	0.045
	0.0611	0.2958	0.0032	0	0.0032	0.0032	0	0	0	0		
1977	1	3	0	0	5	28	28	45	0	0.0023	0.3151	0.0708
	0.0913	0.4772	0.032	0.0114	0	0	0	0	0	0		
1977	1	3	0	0	5	29	29	48	0	0	0.1947	0.0302
	0.0851	0.6314	0.0416	0.0113	0.0019	0.0038	0	0	0	0		
1977	1	3	0	0	5	30	30	48	0	0.0017	0.1224	0.0448
	0.0914	0.6552	0.0552	0.0121	0.0086	0.0017	0.0069	0	0	0		
1977	1	3	0	0	5	31	31	45	0	0	0.0692	0.0242
	0.0725	0.6892	0.0918	0.0258	0.0209	0.0032	0.0032	0	0	0		
1977	1	3	0	0	5	32	32	47	0	0	0.0292	0.0117
	0.0585	0.6433	0.1248	0.0663	0.0409	0.0136	0.0097	0	0.0019	0		
1977	1	3	0	0	5	33	33	46	0	0	0.0139	0.0046
	0.0464	0.5592	0.1601	0.1044	0.0696	0.0302	0.007	0.0046	0	0		
1977	1	3	0	0	5	34	34	44	0	0	0.0259	0.0162
	0.0356	0.466	0.165	0.11	0.0777	0.0777	0.0227	0	0.0032	0		
1977	1	3	0	0	5	35	35	40	0	0	0.0042	0.0084
	0.0084	0.479	0.1555	0.1345	0.1134	0.0378	0.0378	0.0168	0.0042	0		
1977	1	3	0	0	5	36	36	38	0	0	0	0
	0.0291	0.3372	0.1686	0.186	0.1395	0.0756	0.0233	0.0407	0	0		
1977	1	3	0	0	5	37	37	31	0	0	0	0
	0.0216	0.3309	0.1439	0.223	0.1007	0.1079	0.0576	0.0144	0	0		
1977	1	3	0	0	5	38	38	33	0	0	0	0.007
	0	0.2183	0.1972	0.1761	0.169	0.0986	0.0915	0.0352	0.007	0		
1977	1	3	0	0	5	39	39	27	0	0	0	0
	0.0263	0.2237	0.1447	0.1711	0.2237	0.0789	0.0789	0.0263	0.0263	0		
1977	1	3	0	0	5	40	40	19	0	0	0.0182	0
	0	0.1455	0.0909	0.1636	0.2364	0.1636	0.0909	0.0364	0.0364	0.0182		
1977	1	3	0	0	5	41	41	18	0	0	0	0
	0.02	0.2	0.14	0.16	0.22	0.14	0.04	0.06	0.02	0		
1977	1	3	0	0	5	42	42	16	0	0	0	0
	0	0.1026	0.1282	0.2051	0.0513	0.2308	0.1538	0.1282	0	0		
1977	1	3	0	0	5	43	43	11	0	0	0	0
	0.0278	0.0556	0.1389	0.1111	0.1944	0.1944	0.1944	0.0278	0.0278	0.0278		
1977	1	3	0	0	5	44	44	11	0	0	0	0
	0	0.1379	0.1724	0.3103	0.2069	0.1034	0.069	0	0	0		
1977	1	3	0	0	5	45	45	10	0	0	0	0
	0	0	0.0476	0.3333	0.2381	0.1429	0.0952	0.0476	0	0.0952		
1977	1	3	0	0	5	46	46	8	0	0	0	0
	0	0.2778	0.1111	0.1111	0.1667	0.1667	0.0556	0.0556	0.0556	0		
1977	1	3	0	0	5	47	47	8	0	0	0	0
	0	0.1	0	0	0.1	0.6	0.1	0	0	0.1		
1977	1	3	0	0	5	48	48	8	0	0	0	0
	0	0	0.1111	0.3333	0.2222	0.1111	0.1111	0.1111	0	0		

1977	1	3	0	0	5	49	49	7	0	0	0	0
	0	0.125	0.125	0.125	0	0	0.25	0.25	0	0.125		
1977	1	3	0	0	5	50	50	4	0	0	0	0
	0	0	0	0.5	0.1667	0.3333	0	0	0	0		
1977	1	3	0	0	5	51	51	7	0	0	0.0909	0
	0	0.1818	0	0.0909	0	0.0909	0.0909	0	0.0909	0.3636		
1980	1	3	0	0	8	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	15	15	4	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	16	16	7	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	17	17	9	0.0208	0.9375	0.0417	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	18	18	10	0.0154	0.9538	0.0308	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	19	19	12	0.0112	0.9438	0.0449	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	20	20	10	0	0.933	0.067	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	21	21	12	0	0.9263	0.0684	0.0053
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	22	22	11	0	0.8611	0.1319	0.0069
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	23	23	10	0	0.7037	0.2963	0
	0	0	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	24	24	12	0	0.5588	0.3235	0
	0.0294	0.0882	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	25	25	13	0	0.2222	0.2222	0.2778
	0.1111	0.1667	0	0	0	0	0	0	0	0		
1980	1	3	0	0	8	26	26	16	0	0.087	0.087	0.3043
	0.2174	0.1304	0.1304	0	0.0435	0	0	0	0	0		
1980	1	3	0	0	8	27	27	18	0	0.0182	0.0545	0.3455
	0.1636	0.2727	0.0182	0.1091	0.0182	0	0	0	0	0		
1980	1	3	0	0	8	28	28	19	0	0	0	0.2533
	0.16	0.3867	0.12	0.0533	0.0267	0	0	0	0	0		
1980	1	3	0	0	8	29	29	21	0	0	0	0.1801
	0.1491	0.3665	0.0932	0.1801	0.0311	0	0	0	0	0		
1980	1	3	0	0	8	30	30	24	0	0	0.0044	0.136
	0.1316	0.4211	0.1272	0.1404	0.0263	0.0088	0	0.0044	0	0		
1980	1	3	0	0	8	31	31	22	0	0	0	0.0625
	0.0586	0.4297	0.1133	0.2539	0.0625	0.0156	0	0.0039	0	0		
1980	1	3	0	0	8	32	32	22	0	0	0	0.0404
	0.0448	0.3812	0.0807	0.3229	0.0762	0.0448	0.0045	0.0045	0	0		
1980	1	3	0	0	8	33	33	21	0	0	0	0.0264
	0.0529	0.3744	0.0529	0.304	0.1322	0.0396	0.0132	0	0	0.0044		
1980	1	3	0	0	8	34	34	19	0	0	0	0.0226
	0.0056	0.3051	0.1412	0.3164	0.0904	0.0791	0.0113	0.0169	0.0056	0.0056		
1980	1	3	0	0	8	35	35	18	0	0	0	0.0075
	0.0373	0.2761	0.0672	0.2985	0.194	0.0821	0.0224	0.0075	0	0.0075		
1980	1	3	0	0	8	36	36	17	0	0	0	0.0099
	0.0198	0.2376	0.099	0.3069	0.1683	0.0891	0.0396	0.0297	0	0		
1980	1	3	0	0	8	37	37	19	0	0.0137	0	0.0137
	0.0274	0.1507	0.0274	0.3151	0.2329	0.0822	0.0548	0.0411	0.0411	0		
1980	1	3	0	0	8	38	38	16	0	0	0	0
	0	0.2	0.08	0.3	0.16	0.22	0.02	0.02	0	0		
1980	1	3	0	0	8	39	39	11	0	0	0	0
	0	0.0938	0.0625	0.2188	0.3438	0.25	0.0313	0	0	0		
1980	1	3	0	0	8	40	40	14	0	0	0	0
	0.0455	0.0909	0.0455	0.2273	0.2273	0.2273	0.0455	0.0455	0	0.0455		
1980	1	3	0	0	8	41	41	7	0	0	0	0.0588
	0	0.0588	0.0588	0.2941	0.1176	0.2941	0.1176	0	0	0		
1980	1	3	0	0	8	42	42	4	0	0	0	0
	0	0	0	0.1818	0.1818	0.3636	0.0909	0.0909	0.0909	0		
1980	1	3	0	0	8	43	43	3	0	0	0	0
	0	0	0	0	0.5	0.25	0	0.25	0	0		

1980	1	3	0	0	8	44	44	2	0	0	0	0
	0	0	0	0	0	0.4	0.4	0.2	0	0		
1980	1	3	0	0	8	45	45	2	0	0	0	0
	0	0	0	0	0.2857	0.5714	0.1429	0	0	0		
1980	1	3	0	0	8	46	46	3	0	0	0	0
	0	0	0	0	0.3333	0.3333	0	0	0	0.3333		
1980	1	3	0	0	8	47	47	2	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1980	1	3	0	0	8	48	48	2	0	0	0	0
	0	0	0	0	0	0.5	0	0.5	0	0		
1980	1	3	0	0	8	49	49	4	0	0	0	0
	0	0	0	0.1429	0.2857	0	0.2857	0.2857	0	0		
1980	1	3	0	0	8	50	50	3	0	0	0	0
	0	0	0	0.3333	0.3333	0	0	0.3333	0	0		
1980	1	3	0	0	8	51	51	3	0	0	0	0
	0	0	0	0	0	0.25	0	0.25	0.25	0.25		
1983	1	3	0	0	11	14	14	2	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	15	15	4	0.0588	0.9412	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	16	16	3	0.0313	0.9688	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	17	17	5	0.0164	0.9836	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	18	18	7	0	0.9733	0.0133	0
	0.0133	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	19	19	8	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	20	20	9	0	0.9811	0.0189	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	21	21	13	0	0.963	0.0123	0.0247
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	22	22	11	0	1	0	0
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	23	23	11	0	0.9032	0.0645	0.0323
	0	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	24	24	9	0	0.8077	0.0962	0.0385
	0.0577	0	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	25	25	13	0	0.4906	0.0566	0.0566
	0.3585	0.0377	0	0	0	0	0	0	0	0		
1983	1	3	0	0	11	26	26	12	0	0.2759	0.069	0.0517
	0.5517	0.0345	0.0172	0	0	0	0	0	0	0		
1983	1	3	0	0	11	27	27	13	0	0.0725	0.0435	0.0435
	0.7971	0.0145	0.0145	0	0.0145	0	0	0	0	0		
1983	1	3	0	0	11	28	28	12	0	0.0319	0.0213	0.0319
	0.7872	0.0638	0.0319	0.0106	0.0213	0	0	0	0	0		
1983	1	3	0	0	11	29	29	13	0	0	0.0106	0.0426
	0.8191	0.0638	0.0319	0.0213	0	0	0.0106	0	0	0		
1983	1	3	0	0	11	30	30	12	0	0	0.0122	0.0244
	0.7439	0.0854	0.061	0.0244	0.0488	0	0	0	0	0		
1983	1	3	0	0	11	31	31	12	0	0	0	0.0141
	0.6056	0.0282	0.0704	0.0845	0.1127	0.0423	0.0423	0	0	0		
1983	1	3	0	0	11	32	32	11	0	0	0	0
	0.5818	0.0909	0.1091	0.0727	0.0727	0.0364	0.0182	0.0182	0	0		
1983	1	3	0	0	11	33	33	10	0	0	0	0
	0.3922	0.0784	0.0784	0.1176	0.2157	0.0392	0.0784	0	0	0		
1983	1	3	0	0	11	34	34	9	0	0	0	0
	0.2273	0.0227	0.1136	0.1364	0.2273	0.0909	0.0455	0.1136	0.0227	0		
1983	1	3	0	0	11	35	35	8	0	0	0	0
	0.1333	0.0333	0.2333	0.2	0.2667	0.1	0.0333	0	0	0		
1983	1	3	0	0	11	36	36	6	0	0	0	0
	0.0588	0.0588	0.1176	0.1176	0.2353	0.1176	0.1176	0.1765	0	0		
1983	1	3	0	0	11	37	37	5	0	0	0	0
	0.0909	0	0.1818	0.1818	0.0909	0.0909	0.0909	0.2727	0	0		
1983	1	3	0	0	11	38	38	7	0	0	0	0
	0.0909	0	0	0.1818	0.3636	0.1818	0.0909	0	0.0909	0		

1983	1	3	0	0	11	39	39	2	0	0	0	0
	0	0	0.2	0.2	0.4	0.2	0	0	0	0		
1983	1	3	0	0	11	40	40	3	0	0	0	0
	0	0	0	0	0.6667	0	0	0.1667	0.1667	0		
1983	1	3	0	0	11	41	41	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1983	1	3	0	0	11	42	42	2	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1983	1	3	0	0	11	43	43	2	0	0	0	0
	0	0	0	0	0.5	0	0.5	0	0	0		
1983	1	3	0	0	11	44	44	1	0	0	0	0
	0	0	0	0	0.5	0	0	0.5	0	0		
1983	1	3	0	0	11	46	46	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1983	1	3	0	0	11	47	47	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1983	1	3	0	0	11	50	50	1	0	0	0	0
	0	0	0	0	1	0	0	0	0	0		
1986	1	3	0	0	14	10	10	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	11	11	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	12	12	6	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	13	13	8	0.9639	0.0361	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	14	14	8	0.9762	0.0238	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	15	15	9	0.9816	0.0184	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	16	16	9	0.9765	0.0235	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	17	17	11	0.8913	0.087	0.0217	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	18	18	8	0.7647	0.1765	0.0588	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	19	19	10	0.7778	0.2222	0	0
	0	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	20	20	5	0.2	0.2	0.2	0
	0.4	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	21	21	6	0	0	0.1429	0
	0.8571	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	22	22	12	0	0	0	0.2
	0.8	0	0	0	0	0	0	0	0	0		
1986	1	3	0	0	14	23	23	21	0	0	0.0208	0.0729
	0.8438	0.0417	0.0208	0	0	0	0	0	0	0		
1986	1	3	0	0	14	24	24	21	0	0	0.0136	0.0544
	0.8844	0.034	0.0136	0	0	0	0	0	0	0		
1986	1	3	0	0	14	25	25	20	0	0	0.0095	0.0571
	0.8667	0.0619	0.0048	0	0	0	0	0	0	0		
1986	1	3	0	0	14	26	26	21	0	0	0.0047	0.0234
	0.9019	0.0467	0.0187	0.0047	0	0	0	0	0	0		
1986	1	3	0	0	14	27	27	21	0	0	0.006	0.0476
	0.7976	0.1012	0.0417	0.006	0	0	0	0	0	0		
1986	1	3	0	0	14	28	28	17	0	0	0	0.0244
	0.6748	0.1301	0.0488	0.122	0	0	0	0	0	0		
1986	1	3	0	0	14	29	29	18	0	0	0	0.0215
	0.6129	0.129	0.1398	0.0968	0	0	0	0	0	0		
1986	1	3	0	0	14	30	30	16	0	0	0	0.0411
	0.4658	0.1781	0.0959	0.2055	0	0.0137	0	0	0	0		
1986	1	3	0	0	14	31	31	16	0	0	0	0
	0.4211	0.1228	0.1579	0.2807	0.0175	0	0	0	0	0		
1986	1	3	0	0	14	32	32	16	0	0	0	0
	0.18	0.18	0.18	0.42	0.02	0.02	0	0	0	0		
1986	1	3	0	0	14	33	33	11	0	0	0	0
	0.122	0.0976	0.122	0.561	0.0488	0.0244	0	0.0244	0	0		

1986	1	3	0	0	14	34	34	13	0	0	0	0
	0.2571	0.0286	0.1429	0.3429	0.0857	0.0857	0.0286	0.0286	0	0		
1986	1	3	0	0	14	35	35	8	0	0	0	0
	0.1304	0	0.0435	0.4348	0.1304	0.1304	0	0.1304	0	0		
1986	1	3	0	0	14	36	36	9	0	0	0	0
	0.15	0	0.05	0.4	0.1	0.2	0	0.1	0	0		
1986	1	3	0	0	14	37	37	4	0	0	0	0
	0	0.0769	0.1538	0.3846	0.0769	0.1538	0	0.1538	0	0		
1986	1	3	0	0	14	38	38	4	0	0	0	0
	0	0.0769	0.0769	0.3077	0.1538	0.0769	0.0769	0.1538	0.0769	0		
1986	1	3	0	0	14	39	39	3	0	0	0	0
	0	0.0833	0.0833	0.3333	0.1667	0.0833	0	0.25	0	0		
1986	1	3	0	0	14	40	40	3	0	0	0	0
	0	0	0	0.5556	0.2222	0.1111	0	0.1111	0	0		
1986	1	3	0	0	14	41	41	4	0	0	0	0
	0	0	0	0.3333	0	0	0.1667	0.3333	0.1667	0		
1986	1	3	0	0	14	42	42	3	0	0	0	0
	0	0	0	0	0.5	0	0	0.25	0.25	0		
1986	1	3	0	0	14	43	43	2	0	0	0	0
	0	0	0	0	0	0	0	0.75	0	0.25		
1986	1	3	0	0	14	45	45	3	0	0	0	0
	0	0	0	0.3333	0	0	0.6667	0	0	0		
1986	1	3	0	0	14	46	46	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1986	1	3	0	0	14	48	48	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1986	1	3	0	0	14	49	49	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1986	1	3	0	0	14	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	1	0		
1986	1	3	0	0	14	51	51	1	0	0	0	0
	0	0	0	0	0	0	0	0	0.5	0.5		
1989	1	3	0	0	17	8	8	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	14	14	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	15	15	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	16	16	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	17	17	6	0.7778	0.2222	0	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	18	18	8	0.8857	0.0857	0.0286	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	19	19	7	0.8205	0.1538	0.0256	0
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	20	20	9	0.7105	0.2368	0.0263	0.0263
	0	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	21	21	10	0.0833	0.375	0.0833	0.4167
	0.0417	0	0	0	0	0	0	0	0	0		
1989	1	3	0	0	17	22	22	15	0	0.0769	0	0.7436
	0.0513	0.0256	0	0.1026	0	0	0	0	0	0		
1989	1	3	0	0	17	23	23	20	0	0.0167	0.0167	0.9
	0.0083	0	0	0.05	0	0	0.0083	0	0	0		
1989	1	3	0	0	17	24	24	20	0	0.0085	0.0169	0.8686
	0.0169	0.0042	0.0042	0.072	0.0042	0	0.0042	0	0	0		
1989	1	3	0	0	17	25	25	20	0	0	0.0036	0.7607
	0.0036	0.0107	0.0036	0.2	0.0107	0	0.0071	0	0	0		
1989	1	3	0	0	17	26	26	20	0	0	0	0.6541
	0.0171	0	0.0171	0.2842	0.0171	0.0034	0.0068	0	0	0		
1989	1	3	0	0	17	27	27	20	0	0	0	0.4868
	0.0106	0.0106	0.0159	0.4339	0.0265	0	0.0159	0	0	0		
1989	1	3	0	0	17	28	28	18	0	0	0.0082	0.3279
	0.0082	0.0082	0.0246	0.5984	0.0082	0	0.0164	0	0	0		
1989	1	3	0	0	17	29	29	16	0	0	0	0.1957
	0.0217	0.0109	0.0326	0.6413	0.0217	0.0217	0.0543	0	0	0		

1989	1	3	0	0	17	30	30	16	0	0	0	0.1818
	0	0	0	0.7045	0.0455	0	0.0682	0	0	0		
1989	1	3	0	0	17	31	31	10	0	0	0	0.0833
	0	0.0417	0	0.75	0	0	0.125	0	0	0		
1989	1	3	0	0	17	32	32	8	0	0	0	0.2
	0	0	0	0.6	0.0667	0	0.1333	0	0	0		
1989	1	3	0	0	17	33	33	9	0	0	0	0
	0	0	0	0.8	0	0	0	0	0	0.2		
1989	1	3	0	0	17	34	34	6	0	0	0	0
	0	0.125	0	0.5	0	0	0.375	0	0	0		
1989	1	3	0	0	17	35	35	5	0	0	0	0
	0	0	0	0.5714	0	0	0.4286	0	0	0		
1989	1	3	0	0	17	36	36	2	0	0	0	0
	0	0	0	0.5	0	0	0.5	0	0	0		
1989	1	3	0	0	17	37	37	2	0	0	0	0
	0	0	0	0.3333	0	0	0.6667	0	0	0		
1989	1	3	0	0	17	39	39	3	0	0	0	0
	0	0	0	0.6667	0	0	0	0	0	0.3333		
1989	1	3	0	0	17	40	40	2	0	0	0	0
	0	0	0	0.5	0	0	0	0	0	0.5		
1989	1	3	0	0	17	41	41	2	0	0	0	0
	0	0	0	0.5	0	0	0.5	0	0	0		
1989	1	3	0	0	17	44	44	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1989	1	3	0	0	17	45	45	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1989	1	3	0	0	17	46	46	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
1989	1	3	0	0	17	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1989	1	3	0	0	17	51	51	2	0	0	0	0
	0	0	0	0	0	0	0.6667	0	0	0.3333		
1992	1	3	0	0	20	5	5	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	6	6	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	7	7	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	8	8	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	9	9	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	10	10	5	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	11	11	7	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	12	12	7	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	13	13	8	0.9615	0.0385	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	14	14	8	0.9661	0.0339	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	15	15	8	0.8627	0.1373	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	16	16	7	0.898	0.102	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	17	17	6	0.875	0.125	0	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	18	18	6	0.5	0.1667	0.3333	0
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	19	19	5	0.125	0.5	0.25	0.125
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	20	20	8	0.1	0.2	0.5	0.2
	0	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	21	21	7	0	0.1111	0.3889	0.4444
	0.0556	0	0	0	0	0	0	0	0	0		

1992	1	3	0	0	20	22	22	10	0	0.0385	0.3846	0.5385
	0.0385	0	0	0	0	0	0	0	0	0		
1992	1	3	0	0	20	23	23	24	0	0.0526	0.4737	0.3684
	0.0175	0	0.0877	0	0	0	0	0	0	0		
1992	1	3	0	0	20	24	24	28	0	0.0263	0.2632	0.4825
	0.0526	0.0088	0.1316	0.0088	0	0	0.0263	0	0	0		
1992	1	3	0	0	20	25	25	36	0	0.0207	0.1295	0.3731
	0.0311	0.0104	0.3679	0.0155	0	0	0.0466	0.0052	0	0		
1992	1	3	0	0	20	26	26	38	0	0	0.0952	0.2381
	0.022	0.0073	0.4689	0.0073	0.011	0.0037	0.1465	0	0	0		
1992	1	3	0	0	20	27	27	39	0	0	0.0386	0.1544
	0.0421	0.007	0.5684	0.014	0.007	0.007	0.1404	0.014	0	0.007		
1992	1	3	0	0	20	28	28	37	0	0	0.0127	0.135
	0.0211	0.0042	0.6076	0.0211	0.0127	0	0.1646	0.0042	0	0.0169		
1992	1	3	0	0	20	29	29	34	0	0	0.006	0.0904
	0.012	0.0301	0.506	0.0301	0.006	0	0.3012	0.012	0	0.006		
1992	1	3	0	0	20	30	30	30	0	0	0.0095	0.0667
	0	0.0095	0.5048	0.0095	0.0286	0.0095	0.3333	0.019	0	0.0095		
1992	1	3	0	0	20	31	31	22	0	0	0	0.0147
	0.0147	0	0.4706	0.0147	0.0147	0.0147	0.4265	0.0147	0	0.0147		
1992	1	3	0	0	20	32	32	18	0	0	0	0
	0.0233	0.0465	0.3488	0.0233	0	0.0233	0.3953	0.0465	0	0.093		
1992	1	3	0	0	20	33	33	14	0	0	0	0
	0	0.0667	0.5	0.0333	0	0	0.3	0.0333	0	0.0667		
1992	1	3	0	0	20	34	34	6	0	0	0	0
	0	0	0.3529	0.0588	0	0.0588	0.4118	0	0	0.1176		
1992	1	3	0	0	20	35	35	3	0	0	0	0
	0	0	0.25	0.0833	0	0	0.5833	0.0833	0	0		
1992	1	3	0	0	20	36	36	4	0	0	0	0
	0	0	0.7778	0	0	0	0.2222	0	0	0		
1992	1	3	0	0	20	37	37	5	0	0	0	0
	0	0	0.3333	0	0	0.1111	0.5556	0	0	0		
1992	1	3	0	0	20	38	38	4	0	0	0	0
	0	0	0.1667	0.1667	0	0	0.3333	0	0	0.3333		
1992	1	3	0	0	20	39	39	3	0	0	0	0
	0	0	0.4	0	0	0	0.6	0	0	0		
1992	1	3	0	0	20	40	40	1	0	0	0	0
	0	0	0.25	0	0	0	0.75	0	0	0		
1992	1	3	0	0	20	41	41	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	3	0	0	20	42	42	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
1992	1	3	0	0	20	43	43	2	0	0	0	0
	0	0	0	0	0	0	0.5	0	0	0.5		
1992	1	3	0	0	20	44	44	3	0	0	0	0
	0	0	0	0	0	0	0.75	0	0	0.25		
1995	1	3	0	0	23	9	9	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	11	11	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	12	12	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	13	13	9	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	14	14	13	0.9792	0.0208	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	15	15	15	0.954	0.0345	0.0115	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	16	16	21	0.8934	0.1066	0	0
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	17	17	20	0.8571	0.131	0	0.0119
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	18	18	17	0.7358	0.2453	0.0189	0
	0	0	0	0	0	0	0	0	0	0		

1995	1	3	0	0	23	19	19	14	0.5185	0.3333	0.037	0.1111
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	20	20	6	0.1111	0.2222	0.1111	0.5556
	0	0	0	0	0	0	0	0	0	0		
1995	1	3	0	0	23	21	21	11	0	0.2857	0.0714	0.5714
	0	0	0.0714	0	0	0	0	0	0	0		
1995	1	3	0	0	23	22	22	15	0	0.0345	0.069	0.8276
	0	0.0345	0.0345	0	0	0	0	0	0	0		
1995	1	3	0	0	23	23	23	26	0	0.0192	0.0577	0.6538
	0.0385	0.0769	0.1346	0	0	0.0192	0	0	0	0		
1995	1	3	0	0	23	24	24	40	0	0.0101	0.0505	0.6768
	0.0202	0.101	0.0808	0	0	0.0505	0	0	0	0.0101		
1995	1	3	0	0	23	25	25	45	0	0	0.027	0.5608
	0.0405	0.0541	0.1689	0.0068	0	0.1216	0	0	0	0.0203		
1995	1	3	0	0	23	26	26	49	0	0	0.0152	0.4112
	0	0.1015	0.2589	0.0152	0	0.1472	0	0.0152	0	0.0355		
1995	1	3	0	0	23	27	27	53	0	0	0	0.2837
	0.0093	0.0465	0.2698	0	0	0.3023	0	0.0093	0	0.0791		
1995	1	3	0	0	23	28	28	50	0	0	0.0047	0.1721
	0.0186	0.0419	0.2651	0.0093	0	0.3581	0.0047	0.014	0	0.1116		
1995	1	3	0	0	23	29	29	47	0	0	0	0.0795
	0.017	0.0398	0.3466	0.0057	0	0.3693	0	0.0114	0	0.1307		
1995	1	3	0	0	23	30	30	38	0	0	0	0.0526
	0.015	0.0526	0.3459	0	0	0.3985	0	0.0301	0	0.1053		
1995	1	3	0	0	23	31	31	27	0	0	0	0.0319
	0.0213	0.0426	0.2766	0	0	0.5106	0	0.0213	0	0.0957		
1995	1	3	0	0	23	32	32	17	0	0	0	0.0192
	0.0192	0.0769	0.25	0	0	0.4423	0	0.0385	0	0.1538		
1995	1	3	0	0	23	33	33	14	0	0	0	0.0333
	0	0	0.3	0	0	0.4667	0	0	0	0.2		
1995	1	3	0	0	23	34	34	10	0	0	0	0
	0	0.0588	0.2941	0	0	0.4706	0	0	0	0.1765		
1995	1	3	0	0	23	35	35	7	0	0	0	0
	0.0833	0	0.3333	0	0	0.4167	0	0	0	0.1667		
1995	1	3	0	0	23	36	36	5	0	0	0	0
	0	0.1	0.1	0	0	0.7	0	0	0	0.1		
1995	1	3	0	0	23	37	37	6	0	0	0	0
	0	0	0.1667	0	0	0.8333	0	0	0	0		
1995	1	3	0	0	23	38	38	3	0	0	0	0
	0	0.25	0	0	0	0.5	0	0	0	0.25		
1995	1	3	0	0	23	39	39	5	0	0	0	0
	0	0	0	0	0	0.7143	0	0.1429	0	0.1429		
1995	1	3	0	0	23	40	40	2	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1995	1	3	0	0	23	41	41	2	0	0	0	0
	0	0	0.25	0	0	0.25	0	0.25	0	0.25		
1995	1	3	0	0	23	42	42	1	0	0	0	0
	0	0	0	0	0	0	0	1	0	0		
1995	1	3	0	0	23	43	43	4	0	0	0	0
	0	0	0	0	0	0.25	0	0	0	0.75		
1995	1	3	0	0	23	44	44	2	0	0	0	0
	0	0	0.2	0	0	0.4	0	0	0	0.4		
1995	1	3	0	0	23	45	45	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1995	1	3	0	0	23	46	46	2	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1995	1	3	0	0	23	47	47	2	0	0	0	0
	0	0	0	0	0	0.5	0	0.5	0	0		
1995	1	3	0	0	23	48	48	2	0	0	0	0
	0	0	0	0	0	0.3333	0	0.3333	0	0.3333		
1995	1	3	0	0	23	50	50	1	0	0	0	0
	0	0	0	0	0	0	0	0	0	1		
1995	1	3	0	0	23	51	51	3	0	0	0	0
	0	0	0	0	0	0.75	0	0.25	0	0		
1998	1	3	0	0	26	5	5	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		

1998	1	3	0	0	26	6	6	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	7	7	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	8	8	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	9	9	10	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	10	10	13	0.9524	0.0476	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	11	11	16	0.9516	0.0484	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	12	12	20	0.8621	0.1264	0.0115	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	13	13	23	0.8947	0.1053	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	14	14	23	0.8406	0.1594	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	15	15	31	0.7368	0.2632	0	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	16	16	31	0.5238	0.4286	0.0317	0.0159
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	17	17	30	0.2273	0.7273	0.0303	0.0152
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	18	18	36	0.1111	0.7889	0.0667	0.0333
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	19	19	39	0.0194	0.9223	0.0583	0
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	20	20	50	0.0083	0.8083	0.1667	0.0167
	0	0	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	21	21	44	0	0.7895	0.1368	0.0526
	0	0.0211	0	0	0	0	0	0	0	0		
1998	1	3	0	0	26	22	22	55	0	0.3923	0.3154	0.2692
	0.0077	0.0077	0.0077	0	0	0	0	0	0	0		
1998	1	3	0	0	26	23	23	62	0	0.2013	0.327	0.3774
	0.0063	0.0503	0.0189	0.0063	0	0.0126	0	0	0	0		
1998	1	3	0	0	26	24	24	66	0	0.0417	0.3981	0.3889
	0.037	0.0509	0.0648	0.0139	0	0.0046	0	0	0	0		
1998	1	3	0	0	26	25	25	64	0	0.0326	0.2233	0.4977
	0.0279	0.0465	0.1163	0.014	0.0093	0.0233	0	0	0.0093	0		
1998	1	3	0	0	26	26	26	57	0	0.0118	0.2071	0.3728
	0.0237	0.0651	0.2012	0.0237	0.0059	0.0592	0	0	0.0296	0		
1998	1	3	0	0	26	27	27	49	0	0	0.1406	0.3047
	0.0313	0.1172	0.1719	0.0156	0.0234	0.1094	0	0.0078	0.0703	0.0078		
1998	1	3	0	0	26	28	28	51	0	0	0.1271	0.1102
	0.0254	0.1271	0.1864	0.0508	0.0339	0.1949	0	0.0169	0.0763	0.0508		
1998	1	3	0	0	26	29	29	46	0	0.0108	0.1075	0.086
	0.0538	0.0645	0.2796	0.043	0.0323	0.129	0.0108	0.0108	0.1183	0.0538		
1998	1	3	0	0	26	30	30	31	0	0	0.0769	0.0577
	0	0.0385	0.2885	0.0577	0.0192	0.2692	0	0	0.1731	0.0192		
1998	1	3	0	0	26	31	31	22	0	0	0.0294	0.0882
	0	0.0294	0.2353	0	0	0.2353	0.0294	0	0.2647	0.0882		
1998	1	3	0	0	26	32	32	9	0	0	0	0
	0	0.1	0.2	0	0	0	0	0.1	0.5	0.1		
1998	1	3	0	0	26	33	33	5	0	0	0	0
	0	0	0.3333	0	0	0.3333	0	0	0.1667	0.1667		
1998	1	3	0	0	26	34	34	6	0	0	0	0
	0	0	0.1429	0.1429	0	0.2857	0	0	0.2857	0.1429		
1998	1	3	0	0	26	35	35	4	0	0	0	0
	0	0	0	0.25	0.25	0.25	0	0	0	0.25		
1998	1	3	0	0	26	36	36	2	0	0	0	0
	0	0	0	0	0	0	0	0	0.5	0.5		
1998	1	3	0	0	26	37	37	2	0	0	0	0
	0	0	0	0	0	0	0	0.5	0.5	0		
1998	1	3	0	0	26	38	38	3	0	0	0	0
	0	0	0	0	0	0.3333	0	0	0	0.6667		

1998	1	3	0	0	26	39	39	5	0	0	0	0.2
	0	0	0	0	0.2	0.4	0	0	0.2	0		
1998	1	3	0	0	26	41	41	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
1998	1	3	0	0	26	42	42	2	0	0	0	0
	0	0	0	0	0	0.5	0	0	0.5	0		
1998	1	3	0	0	26	50	50	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2001	1	3	0	0	29	8	8	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	11	11	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	12	12	8	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	13	13	14	0.9811	0.0189	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	14	14	17	0.9615	0.0288	0.0096	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	15	15	20	0.9394	0.0424	0.0182	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	16	16	20	0.9416	0.039	0.013	0.0065
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	17	17	20	0.8675	0.0964	0.0361	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	18	18	17	0.9048	0.0952	0	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	19	19	13	0.697	0.2727	0.0303	0
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	20	20	10	0.2941	0.4118	0.2353	0.0588
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	21	21	17	0.0303	0.7576	0.1515	0.0303
	0	0.0303	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	22	22	14	0	0.871	0.0323	0.0968
	0	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	23	23	18	0.0204	0.7347	0.1429	0.0816
	0.0204	0	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	24	24	22	0	0.5	0.1591	0.2955
	0.0227	0.0227	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	25	25	17	0	0.3333	0.1818	0.3333
	0.1212	0.0303	0	0	0	0	0	0	0	0		
2001	1	3	0	0	29	26	26	29	0	0.1111	0.2222	0.375
	0.125	0.0972	0.0694	0	0	0	0	0	0	0		
2001	1	3	0	0	29	27	27	29	0	0.0215	0.2796	0.3333
	0.1398	0.0645	0.0968	0.0323	0.0108	0.0215	0	0	0	0		
2001	1	3	0	0	29	28	28	30	0	0.0253	0.2595	0.2911
	0.1519	0.0886	0.0886	0.019	0.0316	0.019	0.0127	0.0063	0	0.0063		
2001	1	3	0	0	29	29	29	30	0	0.006	0.3155	0.2381
	0.1845	0.1429	0.0595	0.0298	0.0179	0.006	0	0	0	0		
2001	1	3	0	0	29	30	30	28	0	0.01	0.2139	0.2338
	0.1891	0.1144	0.1095	0.0299	0.0299	0.0199	0.01	0.0299	0.005	0.005		
2001	1	3	0	0	29	31	31	27	0	0.012	0.1856	0.1796
	0.1617	0.1916	0.1198	0.0299	0.0479	0.0299	0.018	0.018	0	0.006		
2001	1	3	0	0	29	32	32	25	0	0	0.1045	0.1119
	0.1194	0.3284	0.1418	0.0522	0.0448	0.0299	0.0224	0.0149	0.0075	0.0224		
2001	1	3	0	0	29	33	33	26	0	0	0.1008	0.0756
	0.1513	0.2437	0.1597	0.0504	0.0504	0.0252	0.0504	0.0336	0.0168	0.042		
2001	1	3	0	0	29	34	34	24	0	0	0.0562	0.1348
	0.1461	0.2921	0.1124	0.0674	0.0449	0.0562	0.0337	0.0112	0	0.0449		
2001	1	3	0	0	29	35	35	25	0	0	0.0154	0.0154
	0.0923	0.3077	0.1385	0.1231	0.0923	0.0462	0.0615	0	0.0154	0.0923		
2001	1	3	0	0	29	36	36	18	0	0	0.0244	0
	0.0732	0.3171	0.1951	0.0488	0.0488	0.122	0	0.0732	0.0244	0.0732		
2001	1	3	0	0	29	37	37	13	0	0	0	0
	0.125	0.375	0.2083	0.0417	0.0417	0.0417	0	0.0417	0	0.125		
2001	1	3	0	0	29	38	38	10	0	0	0	0
	0.15	0.35	0.1	0.1	0.05	0.1	0.1	0	0	0.05		

2001	1	3	0	0	29	39	39	10	0	0.05	0	0
	0.05	0.4	0.1	0	0.15	0.05	0.1	0	0	0.1		
2001	1	3	0	0	29	40	40	7	0	0	0	0
	0.125	0.5	0.125	0.125	0	0.125	0	0	0	0		
2001	1	3	0	0	29	41	41	8	0	0	0	0
	0.0714	0.1429	0.0714	0	0.2143	0.1429	0	0.2143	0.0714	0.0714		
2001	1	3	0	0	29	42	42	5	0	0	0	0
	0	0.1429	0	0.2857	0.1429	0	0.1429	0.1429	0	0.1429		
2001	1	3	0	0	29	43	43	3	0	0	0	0
	0	0	0	0.3333	0.3333	0	0	0.3333	0	0		
2001	1	3	0	0	29	44	44	2	0	0	0	0
	0	0.5	0	0	0.5	0	0	0	0	0		
2001	1	3	0	0	29	45	45	4	0	0	0	0
	0	0.25	0.25	0	0.25	0	0	0	0	0.25		
2001	1	3	0	0	29	46	46	3	0	0	0	0
	0	0	0.25	0.25	0	0.25	0	0.25	0	0		
2001	1	3	0	0	29	47	47	2	0	0	0	0
	0	0	0	0	0.5	0	0.5	0	0	0		
2001	1	3	0	0	29	48	48	1	0	0	0	0
	0	0.5	0	0	0	0	0.5	0	0	0		
2001	1	3	0	0	29	49	49	2	0	0	0	0
	0	0.1667	0.1667	0	0	0	0.5	0.1667	0	0		
2001	1	3	0	0	29	50	50	4	0	0	0	0
	0	0.25	0.5	0	0	0.25	0	0	0	0		
2001	1	3	0	0	29	51	51	4	0	0	0	0
	0	0.2222	0	0	0.3333	0.1111	0	0.1111	0.1111	0.1111		
2003	1	3	0	0	31	6	6	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	11	11	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	12	12	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	13	13	4	0.8824	0	0.0588	0.0588
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	14	14	4	0.8148	0.0741	0	0.1111
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	15	15	8	0.68	0.16	0.04	0.12
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	16	16	8	0.6087	0	0.087	0.3043
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	17	17	8	0.5122	0	0.0732	0.3415
	0.0732	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	18	18	9	0.1304	0.2174	0.2174	0.3913
	0.0435	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	19	19	14	0.1875	0.1875	0.4688	0.1563
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	20	20	14	0.0833	0.1667	0.5833	0.1389
	0	0.0278	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	21	21	29	0	0.0462	0.8308	0.1231
	0	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	22	22	43	0	0.0866	0.8504	0.0551
	0.0079	0	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	23	23	56	0	0.0145	0.8836	0.0727
	0.0145	0.0036	0.0073	0.0036	0	0	0	0	0	0		
2003	1	3	0	0	31	24	24	55	0	0.0144	0.9078	0.0634
	0.0058	0.0086	0	0	0	0	0	0	0	0		
2003	1	3	0	0	31	25	25	59	0	0.0093	0.8037	0.1184
	0.0125	0.0343	0.0156	0.0031	0.0031	0	0	0	0	0		
2003	1	3	0	0	31	26	26	61	0	0.0099	0.6414	0.1382
	0.0362	0.0822	0.0461	0.0197	0.0066	0.0132	0.0033	0.0033	0	0		
2003	1	3	0	0	31	27	27	53	0	0	0.5112	0.1418
	0.0299	0.1642	0.0634	0.0373	0.0485	0	0	0.0037	0	0		
2003	1	3	0	0	31	28	28	55	0	0	0.3223	0.1488
	0.0413	0.1612	0.1446	0.0496	0.0702	0.0207	0.0124	0.0083	0	0.0207		

2003	1	3	0	0	31	29	29	43	0	0	0.2159	0.1023
	0.0795	0.1875	0.125	0.0739	0.1023	0.0284	0.0114	0.0455	0.0114	0.017	
2003	1	3	0	0	31	30	30	41	0	0	0.2215	0.1007
	0.0201	0.2013	0.1678	0.0336	0.1007	0.0403	0.0201	0.0201	0.047	0.0268	
2003	1	3	0	0	31	31	31	32	0	0	0.134	0.134
	0.0825	0.1753	0.134	0.1134	0.134	0.0309	0.0309	0	0.0103	0.0206	
2003	1	3	0	0	31	32	32	28	0	0	0.1149	0.046
	0.1034	0.2184	0.1609	0.1149	0.1034	0.046	0.0575	0	0.023	0.0115	
2003	1	3	0	0	31	33	33	24	0	0	0.08	0.1
	0.1	0.14	0.14	0.16	0.1	0.04	0.02	0	0.08	0.04	
2003	1	3	0	0	31	34	34	19	0	0	0.0526	0.0702
	0.193	0.1053	0.1053	0.2105	0.0877	0.0526	0.0526	0.0526	0.0175	0	
2003	1	3	0	0	31	35	35	12	0	0	0.0588	0.1176
	0.2059	0.1765	0.1765	0.1176	0.0588	0.0294	0	0.0294	0	0.0294	
2003	1	3	0	0	31	36	36	12	0	0	0	0.125
	0.2813	0.1563	0.125	0.2188	0.0313	0	0	0.0313	0	0.0313	
2003	1	3	0	0	31	37	37	7	0	0	0	0.0556
	0.3333	0.0556	0	0.3333	0.0556	0.0556	0	0.0556	0	0.0556	
2003	1	3	0	0	31	38	38	6	0	0	0	0.2
	0.2667	0	0.1333	0.0667	0.1333	0.0667	0	0.0667	0	0.0667	
2003	1	3	0	0	31	39	39	5	0	0	0	0.0714
	0.2143	0.1429	0.2143	0.2143	0	0.0714	0	0.0714	0	0	
2003	1	3	0	0	31	40	40	3	0	0	0	0
	0	0	0.25	0.25	0.25	0	0.25	0	0	0	
2003	1	3	0	0	31	41	41	6	0	0	0	0.3
	0.1	0	0.2	0.2	0.1	0	0	0	0	0.1	
2003	1	3	0	0	31	42	42	2	0	0	0	0
	0.1429	0.1429	0.2857	0.2857	0	0	0	0	0	0.1429	
2003	1	3	0	0	31	43	43	5	0	0	0	0
	0.625	0	0	0	0.25	0	0	0	0	0.125	
2003	1	3	0	0	31	45	45	2	0	0	0	0
	0	1	0	0	0	0	0	0	0	0	
2003	1	3	0	0	31	46	46	2	0	0	0	0.3333
	0	0	0.3333	0	0.3333	0	0	0	0	0	
2003	1	3	0	0	31	47	47	2	0	0	0	0
	0	0	1	0	0	0	0	0	0	0	
2003	1	3	0	0	31	48	48	2	0	0	0	0
	0.3333	0	0	0	0	0	0.6667	0	0	0	
2003	1	3	0	0	31	50	50	2	0	0	0	0
	0	0.5	0	0	0	0.5	0	0	0	0	
2003	1	3	0	0	31	51	51	6	0	0	0	0
	0	0	0.1429	0.2857	0	0.2857	0.1429	0	0	0.1429	
2005	1	3	0	0	33	9	9	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	10	10	1	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	11	11	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	12	12	6	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	13	13	7	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	14	14	10	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	15	15	8	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	16	16	10	1	0	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	17	17	9	0.9189	0.0811	0	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	18	18	10	0.8696	0.087	0.0435	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	19	19	8	0.5	0.2857	0.2143	0
	0	0	0	0	0	0	0	0	0	0	
2005	1	3	0	0	33	20	20	10	0.3333	0.4	0.2667	0
	0	0	0	0	0	0	0	0	0	0	

2005	1	3	0	0	33	21	21	6	0.25	0.375	0.125	0.25
	0	0	0	0	0	0	0	0	0	0		
2005	1	3	0	0	33	22	22	22	0	0.0909	0.3636	0.1212
	0.4242	0	0	0	0	0	0	0	0	0		
2005	1	3	0	0	33	23	23	28	0	0.0519	0.2597	0.1558
	0.4805	0.039	0.013	0	0	0	0	0	0	0		
2005	1	3	0	0	33	24	24	36	0	0.0112	0.1229	0.0726
	0.7318	0.0503	0.0112	0	0	0	0	0	0	0		
2005	1	3	0	0	33	25	25	41	0	0	0.123	0.0714
	0.7381	0.0516	0.0079	0.004	0	0.004	0	0	0	0		
2005	1	3	0	0	33	26	26	42	0	0	0.0515	0.0588
	0.7537	0.0809	0.0147	0.0184	0.011	0.011	0	0	0	0		
2005	1	3	0	0	33	27	27	41	0	0	0.0327	0.0531
	0.6939	0.0857	0.049	0.0449	0.0122	0.0163	0	0.0041	0	0.0082		
2005	1	3	0	0	33	28	28	39	0	0	0.016	0.0745
	0.6543	0.1064	0.0372	0.0638	0.0213	0.0213	0.0053	0	0	0		
2005	1	3	0	0	33	29	29	32	0	0	0.0083	0.0167
	0.6667	0.1	0.0333	0.0667	0.05	0.025	0.025	0.0083	0	0		
2005	1	3	0	0	33	30	30	27	0	0	0	0.0448
	0.5522	0.0597	0.0149	0.1493	0.0896	0.0597	0	0.0149	0	0.0149		
2005	1	3	0	0	33	31	31	23	0	0	0.0213	0.0426
	0.4468	0.0638	0.0426	0.1064	0.0851	0.0213	0.0851	0.0426	0.0213	0.0213		
2005	1	3	0	0	33	32	32	12	0	0	0	0
	0.3333	0.0952	0.0952	0.0952	0.1905	0.0952	0.0476	0.0476	0	0		
2005	1	3	0	0	33	33	33	12	0	0	0	0
	0.2	0.2667	0.1333	0.1333	0	0.2	0.0667	0	0	0		
2005	1	3	0	0	33	34	34	9	0	0	0	0.0833
	0.25	0.25	0.0833	0.1667	0.0833	0	0.0833	0	0	0		
2005	1	3	0	0	33	35	35	5	0	0	0	0
	0.25	0.25	0	0	0.375	0.125	0	0	0	0		
2005	1	3	0	0	33	36	36	3	0	0	0	0
	1	0	0	0	0	0	0	0	0	0		
2005	1	3	0	0	33	37	37	5	0	0	0	0
	0.2	0.4	0	0.2	0.2	0	0	0	0	0		
2005	1	3	0	0	33	38	38	2	0	0	0	0
	0	0	0	0.5	0	0	0.5	0	0	0		
2005	1	3	0	0	33	39	39	1	0	0	0	0
	0	1	0	0	0	0	0	0	0	0		
2005	1	3	0	0	33	40	40	1	0	0	0	0
	0	0	1	0	0	0	0	0	0	0		
2005	1	3	0	0	33	45	45	1	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		
2005	1	3	0	0	33	46	46	1	0	0	0	0
	0	0	0	0	0	1	0	0	0	0		
2005	1	3	0	0	33	49	49	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2005	1	3	0	0	33	50	50	1	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2005	1	3	0	0	33	51	51	6	0	0	0	0
	0.1429	0	0	0	0.4286	0.1429	0.1429	0	0.1429	0		
2007	1	3	0	0	35	5	5	3	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	6	6	2	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	7	7	4	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	8	8	7	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	9	9	8	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	10	10	15	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	11	11	17	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	12	12	18	1	0	0	0
	0	0	0	0	0	0	0	0	0	0		

2007	1	3	0	0	35	13	13	17	0.9929	0.0071	0	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	14	14	20	0.9688	0.0208	0.0104	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	15	15	20	0.9762	0.0119	0.0119	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	16	16	16	0.9302	0.0233	0.0465	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	17	17	15	0.7561	0.0976	0.1463	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	18	18	13	0.7692	0.0385	0.1538	0.0385
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	19	19	11	0.2353	0.2353	0.5294	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	20	20	10	0.1429	0.4286	0.3571	0
	0.0714	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	21	21	16	0	0.3684	0.6316	0
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	22	22	14	0	0.4	0.55	0.05
	0	0	0	0	0	0	0	0	0	0		
2007	1	3	0	0	35	23	23	27	0	0.2593	0.5926	0.0556
	0.0185	0.037	0.037	0	0	0	0	0	0	0		
2007	1	3	0	0	35	24	24	36	0	0.0822	0.6438	0.0137
	0.0411	0	0.2192	0	0	0	0	0	0	0		
2007	1	3	0	0	35	25	25	38	0	0.0413	0.4132	0.0331
	0.0661	0.0331	0.3636	0.0496	0	0	0	0	0	0		
2007	1	3	0	0	35	26	26	43	0	0.0089	0.2133	0.0444
	0.1244	0.0533	0.5067	0.0311	0.0089	0.0044	0	0.0044	0	0		
2007	1	3	0	0	35	27	27	44	0	0.0037	0.1157	0.0373
	0.1269	0.0522	0.6045	0.0373	0.0075	0.0112	0.0037	0	0	0		
2007	1	3	0	0	35	28	28	54	0	0	0.0787	0.0131
	0.0787	0.0623	0.6328	0.0754	0.0131	0.0295	0.0066	0.0066	0.0033	0		
2007	1	3	0	0	35	29	29	49	0	0	0.0319	0.0064
	0.0703	0.0479	0.6613	0.0863	0.0383	0.0192	0.0192	0.0096	0.0096	0		
2007	1	3	0	0	35	30	30	46	0	0	0.028	0.008
	0.056	0.052	0.648	0.052	0.044	0.056	0.028	0.016	0.012	0		
2007	1	3	0	0	35	31	31	37	0	0	0.007	0
	0.0282	0.0845	0.6408	0.0775	0.0563	0.0493	0.0282	0.007	0	0.0211		
2007	1	3	0	0	35	32	32	30	0	0	0	0
	0.0769	0.0481	0.5673	0.0962	0.0481	0.0673	0.0288	0.0385	0.0192	0.0096		
2007	1	3	0	0	35	33	33	22	0	0	0	0
	0.0833	0.0333	0.5167	0.05	0.1167	0.1	0.0333	0.0333	0.0333	0		
2007	1	3	0	0	35	34	34	22	0	0	0	0
	0	0.0204	0.6327	0.1224	0.0204	0.0204	0.0816	0.0408	0.0204	0.0408		
2007	1	3	0	0	35	35	35	12	0	0	0	0
	0	0.08	0.48	0.16	0.04	0.08	0	0.12	0.04	0		
2007	1	3	0	0	35	36	36	12	0	0	0	0
	0	0	0.5333	0.0667	0.0667	0.0667	0.0667	0.2	0	0		
2007	1	3	0	0	35	37	37	6	0	0	0	0
	0	0	0.6667	0	0.1667	0	0	0.1667	0	0		
2007	1	3	0	0	35	38	38	6	0	0	0	0
	0	0	0.4286	0	0.2857	0.1429	0	0.1429	0	0		
2007	1	3	0	0	35	39	39	7	0	0	0	0
	0	0	0.5556	0.2222	0.1111	0	0.1111	0	0	0		
2007	1	3	0	0	35	40	40	5	0	0	0	0
	0.1667	0	0.3333	0.1667	0.3333	0	0	0	0	0		
2007	1	3	0	0	35	41	41	6	0	0	0	0
	0	0.1667	0.3333	0.3333	0.1667	0	0	0	0	0		
2007	1	3	0	0	35	42	42	3	0	0	0	0
	0	0	0.5	0	0	0	0	0.5	0	0		
2007	1	3	0	0	35	45	45	4	0	0	0	0
	0	0	0	0	0.6667	0	0.3333	0	0	0		
2007	1	3	0	0	35	47	47	2	0	0	0	0
	0	0	0	1	0	0	0	0	0	0		
2007	1	3	0	0	35	51	51	2	0	0	0	0
	0	0	0	0	0	0	1	0	0	0		

Ghost acoustic survey

1977	1	5	0	0	5	1	51	1	0.0587	0.0415	0.2139	0.0262
	0.0469	0.3971	0.0742	0.0529	0.0398	0.0251	0.0144	0.006	0.0019	0.0016		
1980	1	5	0	0	8	1	51	1	0.002	0.3174	0.0332	0.0512
	0.0444	0.2134	0.0576	0.1568	0.0654	0.0369	0.0095	0.0081	0.002	0.002		
1983	1	5	0	0	11	1	51	1	0.0023	0.4454	0.0196	0.0188
	0.3271	0.0286	0.0339	0.0301	0.0512	0.0166	0.0136	0.0106	0.0023	0		
1986	1	5	0	0	14	1	51	1	0.282	0.0108	0.0059	0.0249
	0.4726	0.0557	0.0371	0.0748	0.0103	0.0088	0.0034	0.0103	0.0024	0.001		
1989	1	5	0	0	17	1	51	1	0.0779	0.0238	0.0077	0.5473
	0.0113	0.0065	0.0095	0.2766	0.0119	0.0018	0.0214	0	0	0.0042		
1992	1	5	0	0	20	1	51	1	0.1534	0.0196	0.0745	0.1651
	0.0206	0.0088	0.366	0.0132	0.0064	0.0039	0.1509	0.0073	0	0.0103		
1995	1	5	0	0	23	1	51	1	0.1987	0.0294	0.0115	0.2141
	0.0125	0.0433	0.1873	0.0035	0	0.2211	0.0005	0.012	0	0.0662		
1998	1	5	0	0	26	1	51	1	0.2018	0.2391	0.1526	0.1814
	0.0136	0.0352	0.0742	0.0119	0.0068	0.0424	0.0008	0.0025	0.028	0.0097		
2001	1	5	0	0	29	1	51	1	0.2721	0.0803	0.1222	0.1261
	0.092	0.1205	0.0695	0.0255	0.0272	0.0194	0.0143	0.0125	0.0035	0.0147		
2003	1	5	0	0	31	1	51	1	0.0401	0.0175	0.5189	0.1126
	0.0442	0.0853	0.0617	0.0394	0.0367	0.0131	0.0084	0.0078	0.0057	0.0084		
2005	1	5	0	0	33	1	51	1	0.1632	0.0142	0.0637	0.0526
	0.5389	0.0637	0.0226	0.0326	0.02	0.0147	0.0074	0.0032	0.0011	0.0021		
2007	1	5	0	0	35	1	51	1	0.2679	0.0216	0.1033	0.013
	0.0525	0.035	0.3942	0.0436	0.0216	0.0199	0.0113	0.0096	0.0045	0.0021		
# Ghost US fishery												
1973	1	6	0	0	1	1	51	1	0	0.26	0.045	0.101
	0.187	0.117	0.107	0.1	0.048	0.021	0.009	0.005	0	0		
1974	1	6	0	0	2	1	51	1	0.0044	0.0033	0.5066	0.0692
	0.1198	0.1494	0.0868	0.0385	0.0121	0.0055	0.0033	0.0011	0	0		
1975	1	6	0	0	3	1	51	1	0.314	0.0417	0.0396	0.3841
	0.0553	0.0678	0.0655	0.0082	0.0059	0.0078	0.005	0.0043	0.0009	0		
1976	1	6	0	0	4	1	51	1	0.0387	0.1588	0.0531	0.0142
	0.1407	0.1109	0.117	0.1021	0.0973	0.0655	0.0564	0.0224	0.0192	0.0038		
1977	1	6	0	0	5	1	51	1	0.0947	0.0408	0.215	0.0289
	0.0528	0.2044	0.077	0.079	0.0627	0.0575	0.0426	0.0295	0.0079	0.0071		
1978	1	6	0	0	6	1	51	1	0.0242	0.1074	0.0705	0.2066
	0.0326	0.0662	0.2077	0.079	0.0704	0.0726	0.0241	0.0205	0.013	0.0053		
1979	1	6	0	0	7	1	51	1	0.0544	0.0986	0.1084	0.0457
	0.1995	0.0682	0.157	0.1473	0.0522	0.0344	0.0145	0.0091	0.0056	0.0053		
1980	1	6	0	0	8	1	51	1	0.0116	0.3165	0.0524	0.0599
	0.0528	0.1392	0.0663	0.0902	0.1022	0.0369	0.0368	0.0187	0.0078	0.0088		
1981	1	6	0	0	9	1	51	1	0.1106	0.0761	0.3302	0.0128
	0.0406	0.0436	0.1364	0.0673	0.0563	0.0893	0.0225	0.0089	0.003	0.0025		
1982	1	6	0	0	10	1	51	1	0.2586	0.0369	0.0148	0.2731
	0.0315	0.0455	0.0451	0.1268	0.0255	0.0377	0.0883	0.0076	0.0034	0.0052		
1983	1	6	0	0	11	1	51	1	0	0.3883	0.0384	0.0183
	0.2179	0.0425	0.0422	0.0546	0.0999	0.0312	0.0256	0.0292	0.0092	0.0026		
1984	1	6	0	0	12	1	51	1	0	0.0071	0.6914	0.0387
	0.0384	0.1183	0.0197	0.0133	0.0096	0.0311	0.0071	0.0057	0.0163	0.0033		
1985	1	6	0	0	13	1	51	1	0.0082	0.0076	0.0606	0.707
	0.0751	0.0437	0.0784	0.0102	0.0036	0.0039	0.0016	0.0001	0	0		
1986	1	6	0	0	14	1	51	1	0.1509	0.0416	0.009	0.0245
	0.4486	0.0656	0.0465	0.1029	0.0241	0.033	0.0143	0.0284	0.0036	0.0071		
1987	1	6	0	0	15	1	51	1	0	0.3819	0.0209	0.0049
	0.0138	0.4487	0.0333	0.0105	0.0678	0.0028	0.0005	0.0023	0.01	0.0026		
1988	1	6	0	0	16	1	51	1	0.0045	0.0032	0.4458	0.0169
	0.0068	0.0086	0.3554	0.0242	0.0058	0.0862	0.0011	0.0026	0	0.0388		
1989	1	6	0	0	17	1	51	1	0.0389	0.0321	0.0129	0.4824
	0.0145	0.0053	0.007	0.339	0.0184	0.0035	0.0406	0.0005	0.0009	0.0039		
1990	1	6	0	0	18	1	51	1	0.0687	0.3184	0.0232	0.0028
	0.1864	0.0033	0.0014	0.0014	0.2986	0.0029	0.0003	0.0828	0	0.0098		
1991	1	6	0	0	19	1	51	1	0.0491	0.2494	0.2193	0.0295
	0.0092	0.227	0.0156	0.0018	0.0017	0.1379	0.0047	0	0.0462	0.0087		
1992	1	6	0	0	20	1	51	1	0.0501	0.0607	0.1531	0.1865
	0.0181	0.0092	0.2877	0.0077	0.0018	0.0052	0.1797	0.0065	0.0003	0.0335		
1993	1	6	0	0	21	1	51	1	0.0101	0.3064	0.0357	0.1392
	0.1565	0.0128	0.0095	0.2204	0.0103	0.0015	0.0006	0.0893	0.0002	0.0075		

1994	1	6	0	0	22	1	51	1	0.0006	0.0464	0.2699	0.0112
	0.1285	0.212	0.0071	0.0039	0.2367	0.0007	0.0049	0.0004	0.0702	0.0074		
1995	1	6	0	0	23	1	51	1	0.0126	0	0.0645	0.3242
	0.0027	0.061	0.2202	0.0092	0.0011	0.2185	0	0.005	0	0.0809		
1996	1	6	0	0	24	1	51	1	0.1851	0.1622	0.0071	0.0895
	0.2083	0.0017	0.0401	0.1087	0.0012	0.0029	0.1595	0	0.0017	0.032		
1997	1	6	0	0	25	1	51	1	0.0038	0.3634	0.2641	0.0032
	0.0438	0.1342	0.0101	0.0271	0.061	0.0036	0.0017	0.0599	0.0006	0.0236		
1998	1	6	0	0	26	1	51	1	0.108	0.2512	0.1541	0.2576
	0.0299	0.0324	0.0883	0.0079	0.0067	0.0329	0.0026	0.0011	0.0232	0.0041		
1999	1	6	0	0	27	1	51	1	0.0783	0.2754	0.2037	0.1655
	0.0902	0.0244	0.0371	0.0416	0.0064	0.0124	0.0267	0.0056	0.0081	0.0247		
2000	1	6	0	0	28	1	51	1	0.0344	0.0718	0.1511	0.1551
	0.2037	0.1161	0.0855	0.0577	0.0188	0.0203	0.0238	0.0126	0.0113	0.0377		
2001	1	6	0	0	29	1	51	1	0.1317	0.2028	0.1327	0.2138
	0.0969	0.1034	0.0499	0.0145	0.0141	0.0116	0.0107	0.0062	0.0049	0.0068		
2002	1	6	0	0	30	1	51	1	0.0005	0.6017	0.1863	0.0547
	0.0551	0.0347	0.0287	0.0194	0.0054	0.0031	0.0048	0.0003	0.0009	0.0045		
2003	1	6	0	0	31	1	51	1	0.0008	0.0123	0.7937	0.1021
	0.0165	0.0256	0.0157	0.0146	0.0072	0.0053	0.0017	0.0024	0.0008	0.0012		
2004	1	6	0	0	32	1	51	1	0	0.0812	0.1116	0.682
	0.0522	0.0139	0.0226	0.0206	0.0035	0.007	0.0012	0.0027	0	0.0015		
2005	1	6	0	0	33	1	51	1	0.0121	0.006	0.0897	0.0629
	0.6939	0.0668	0.0216	0.0195	0.0121	0.0056	0.0067	0.0018	0.0005	0.0008		
2006	1	6	0	0	34	1	51	1	0.0214	0.1454	0.0194	0.0986
	0.0521	0.5872	0.037	0.0102	0.0128	0.0063	0.0043	0.0029	0.0007	0.0017		
2007	1	6	0	0	35	1	51	1	0.179	0.0402	0.1714	0.0155
	0.0729	0.0449	0.3989	0.0402	0.0164	0.0124	0.0075	0.0014	0.0004	0.002		
2008	1	6	0	0	36	1	51	1	0.0331	0.2936	0.0341	0.1445
	0.0123	0.0413	0.0451	0.3509	0.0200	0.0087	0.0089	0.0026	0.0034	0.0015		
# Ghost Canadian fishery												
1977	1	7	0	0	5	1	51	1	0.0021	0.0021	0.0516	0.0186
	0.0619	0.3773	0.1093	0.1031	0.0866	0.0825	0.0722	0.033	0	0		
1978	1	7	0	0	6	1	51	1	0	0	0.0339	0.0593
	0.0475	0.1797	0.222	0.1898	0.1051	0.0814	0.0356	0.0305	0.0153	0		
1979	1	7	0	0	7	1	51	1	0	0	0.0188	0.0554
	0.1162	0.1019	0.1877	0.2699	0.0983	0.0706	0.0331	0.0223	0.0152	0.0107		
1980	1	7	0	0	8	1	51	1	0	0	0	0.0311
	0.0411	0.1629	0.0609	0.0782	0.4464	0.0841	0.0411	0.0411	0.0133	0		
1981	1	7	0	0	9	1	51	1	0	0	0.0488	0.0131
	0.0682	0.0667	0.207	0.0411	0.1141	0.2988	0.0721	0.029	0.0411	0		
1982	1	7	0	0	10	1	51	1	0	0	0.0221	0.4268
	0.0352	0.046	0.0451	0.141	0.032	0.0249	0.1931	0.0189	0.015	0		
1983	1	7	0	0	11	1	51	1	0.0009	0.218	0.016	0.028
	0.4999	0.0201	0.0291	0.026	0.0869	0.012	0.004	0.053	0.004	0.002		
1984	1	7	0	0	12	1	51	1	0	0.018	0.215	0.028
	0.15	0.338	0.0331	0.0381	0.025	0.0779	0.0151	0.013	0.0429	0.006		
1985	1	7	0	0	13	1	51	1	0.002	0.002	0.0808	0.2648
	0.0544	0.1072	0.3173	0.0162	0.0181	0.0181	0.0544	0.0122	0	0.0524		
1986	1	7	0	0	14	1	51	1	0.0021	0.0021	0.0043	0.0608
	0.5878	0.0369	0.0369	0.1757	0.0196	0.0087	0.0152	0.0217	0.0066	0.0217		
1987	1	7	0	0	15	1	51	1	0	0.0094	0.0063	0.0016
	0.0268	0.7414	0.03	0.03	0.1088	0.0063	0.0047	0.0126	0.0094	0.0126		
1988	1	7	0	0	16	1	51	1	0	0.0023	0.106	0.0033
	0.0075	0.0148	0.6643	0.0161	0.0173	0.13	0.0035	0.007	0.0036	0.0247		
1989	1	7	0	0	17	1	51	1	0	0.0013	0.0023	0.3852
	0.0008	0.0029	0.0042	0.5181	0.0083	0.014	0.0533	0.0018	0.0018	0.0061		
1990	1	7	0	0	18	1	51	1	0	0.1036	0.0262	0.001
	0.4077	0.0145	0.0023	0	0.3852	0.0064	0	0.0473	0.0005	0.0054		
1991	1	7	0	0	19	1	51	1	0	0.0013	0.0485	0.0212
	0.0026	0.5343	0.0036	0	0.0005	0.3715	0.0018	0	0.014	0.0007		
1992	1	7	0	0	20	1	51	1	0	0.0052	0.064	0.157
	0.0305	0.0036	0.4791	0.0027	0	0.0009	0.2443	0.0014	0.0008	0.0105		
1993	1	7	0	0	21	1	51	1	0.0006	0.0092	0.0234	0.1475
	0.2018	0.0179	0.0028	0.4509	0.0026	0	0	0.1417	0.0012	0.0005		
1994	1	7	0	0	22	1	51	1	0	0.0045	0.0196	0.0199
	0.1063	0.1723	0.0269	0.0068	0.4704	0.0062	0.0023	0	0.1563	0.0085		

1995	1	7	0	0	23	1	51	1	0.0215	0.0058	0.076	0.059
	0.0347	0.113	0.1659	0.0388	0.0079	0.3592	0.0082	0.0009	0	0.1093		
1996	1	7	0	0	24	1	51	1	0.0869	0.0229	0.0099	0.0998
	0.1252	0.0334	0.1152	0.1381	0.0209	0.0091	0.2667	0.0005	0	0.0716		
1997	1	7	0	0	25	1	51	1	0.0021	0.1134	0.1276	0.0455
	0.1611	0.1472	0.0575	0.0668	0.1049	0.0462	0.002	0.0739	0.0296	0.0223		
1998	1	7	0	0	26	1	51	1	0.0021	0.1	0.2356	0.254
	0.0183	0.1014	0.1035	0.0143	0.0455	0.0553	0.0088	0.0011	0.0501	0.0099		
1999	1	7	0	0	27	1	51	1	0.0903	0.0481	0.1228	0.2775
	0.2013	0.0249	0.0605	0.0569	0.0181	0.0257	0.0266	0.0096	0.0045	0.0335		
2000	1	7	0	0	28	1	51	1	0.0017	0.2365	0.052	0.0591
	0.2582	0.1253	0.0204	0.0677	0.0319	0.0241	0.0427	0.0365	0.007	0.0369		
2001	1	7	0	0	29	1	51	1	0.0003	0.0219	0.1964	0.0652
	0.1113	0.2588	0.1308	0.0307	0.0385	0.0507	0.0158	0.0274	0.024	0.0281		
2002	1	7	0	0	30	1	51	1	0	0.01	0.0861	0.2747
	0.0865	0.0936	0.2133	0.1107	0.022	0.0229	0.0313	0.0054	0.0149	0.0286		
2003	1	7	0	0	31	1	51	1	0	0.0043	0.3594	0.2008
	0.0747	0.1233	0.0639	0.0796	0.0473	0.0201	0.0061	0.0121	0.0019	0.0064		
2004	1	7	0	0	32	1	51	1	0.001	0.0158	0.0212	0.5955
	0.1444	0.041	0.0679	0.0432	0.0296	0.0223	0.0068	0.0034	0.0047	0.0034		
2005	1	7	0	0	33	1	51	1	0	0.0017	0.0207	0.0347
	0.6585	0.1288	0.0224	0.0512	0.0397	0.0229	0.0116	0.0046	0	0.0032		
2006	1	7	0	0	34	1	51	1	0.0008	0.0066	0.0067	0.0502
	0.0335	0.6619	0.0892	0.04	0.0395	0.0299	0.0234	0.0098	0.0039	0.0046		
2007	1	7	0	0	35	1	51	1	0.0016	0.0013	0.067	0.016
	0.0645	0.0332	0.5785	0.1178	0.0247	0.0377	0.0274	0.0131	0.0174	0		
2008	1	7	0	0	36	1	51	1	0.0734	0.0814	0.0110	0.0848
	0.0076	0.0333	0.0287	0.5046	0.0850	0.0289	0.0189	0.0189	0.0078	0.0156		

0 #_N_MeanSize-at-Age_obs
0 # Total number of environmental variables
0 # Total number of environmental observations
0 # No Weight frequency data
0 # No tagging data
0 # No morph composition data

999 # End data file

Pacific Whiting
The Joint U.S.-Canada STAR Panel Report

Pacific Fishery Management Council
Seattle, Washington
February 3-6, 2009

Review Panel Members:

David Sampson (Chair), Oregon State University and SSC representative
Norman Hall, Center for Independent Experts
Jon Helge-Volstad, Center for Independent Experts
Tom Carruthers, University of British Columbia

STAT Team Members Present:

Ian Stewart, Northwest Fisheries Science Center
Owen Hamel, Northwest Fisheries Science Center

Advisors:

John Wallace, GMT representative
Dan Waldeck, GAP representative
Jeff Fargo, Department of Fisheries and Oceans, British Columbia
Chris Grandin, Department of Fisheries and Oceans, British Columbia
Greg Workman, Department of Fisheries and Oceans, British Columbia
John DeVore, PFMC representative

Overview

During 3-6 February 2009, a joint Canada-U.S. Pacific hake / whiting Stock Assessment Review (STAR) Panel met in Seattle, Washington, to review a draft stock assessment document that had been prepared by Hamel & Stewart (2009). The Panel operated under the U.S. Pacific Fishery Management Council's Terms of Reference for the Groundfish Stock Assessment and Review Process for 2009-2010 (PFMC 2008). As in previous years, the Panel attempted to adhere to the spirit of the Canada-U.S. Treaty on Pacific hake / whiting, with the Panel including a member from Canada and Canadian assessment scientists providing data to the stock assessment team. The revised stock assessment and the STAR Panel Report will be forwarded to the Pacific Fishery Management Council (PFMC) and its advisory groups, and to the Canadian Department of Fisheries and Oceans (DFO) managers and the Groundfish Sub-committee of PSARC (Pacific Scientific Advice Review Committee).

Both members of the stock assessment team (STAT, Drs. Owen Hamel and Ian Stewart) attended and actively participated in the meeting. Public comment was entertained throughout the three-and-a-half-day meeting, which was held at the Hotel Deca in Seattle. The STAR Panel members were able to receive all draft assessments and supporting materials via an ftp site two weeks prior to the meeting, which was sufficient time to adequately prepare for the review of the assessment. Although data from the 2008 Canadian fishery were not incorporated into the model developed for the draft assessment document, the STAT had developed a new preliminary base model employing these data shortly before the start of the STAR Panel meeting (discussed further below).

The meeting convened at 09:00 on Tuesday February 3rd. Dr. Elizabeth Clarke (U.S. National Marine Fisheries Service, NMFS) welcomed the group and provided an overview of the U.S. process for ratifying the new treaty, currently stalled pending changes in the implementing language. Dr. Sampson then opened the meeting with a brief review of the agenda (Appendix A), explanation of the Terms of Reference, and discussion of the review and reporting process, followed by self-introductions by Panel members and others in attendance. Mr. John DeVore and Mr. Barry Ackerman reviewed management needs for the U.S. and Canadian fisheries, respectively. The Canadian Advisors stated that their science staff were working on updating last year's assessments and would appreciate the opportunity to provide input to the PFMC process, by either addressing the SSC regarding science and modeling issues or possibly addressing the Council regarding management of the fishery. Mr. John Devore indicated this would be possible. Dr. Stewart and Mr. Grandin then presented overviews of the 2008 whiting fisheries for the U.S. and Canada, respectively, Dr Stewart presented details of the input data used by the STAT in the 2009 stock assessment, Dr Chu presented the plans and described progress made in improving acoustic estimates of Pacific Hake, and Drs Hamel and Stewart presented details of the approaches used and results obtained when applying Stock Synthesis III (SS3) to the data for Pacific hake.

The STAT advised the STAR Panel that they had received and processed the 2008 Canadian length and age composition data after they had already completed the draft assessment document provided to the STAR Panel in advance of the meeting. Large catches by the Canadian fishery late in 2008 had delayed acquisition and processing of data and biological material. The STAT had developed a slightly revised assessment for the STAR Panel to review. The STAR Panel acknowledges the extraordinary achievements of Mr. Chris Grandin and the STAT in bringing these data into the assessment at the eleventh hour so that they could be considered by the review.

Based on discussion of the stock assessment documents and related presentations, the Panel requested 21 clarifications (described below), many involving additional model runs, to help identify the most appropriate base model, explore opportunities for improved model simplification, and evaluate the uncertainty of the stock assessment results and the assessment's sensitivity to assumptions. This iterative process of making additional runs and discussing the results continued until mid-morning of Friday 6 February. The Panel spent the remainder of that morning reviewing the outline structure of its report. The meeting was adjourned at noon. A draft Panel report was distributed by email to all Panel members for continued development and finalization.

After careful review of the model diagnostics and results, but with concern that the reliability of the model predictions is compromised by structural inadequacy and over-parameterization, the Panel recommended a particular configuration of the SS3 model as the final base model. The basic data sets used by this model consisted of the following: total catches from the US and Canadian fisheries for 1966-2008; length compositions from the US fishery (1975-2008) and the Canadian fishery (1988-2008); standard age-composition data (derived from age-length keys) from the US fishery (1973-1974) and the Canadian fishery (1977-1987); conditional age-at-length compositions from the US fishery (1975-2008) and the Canadian fishery (1988-2008); biomass indices, length-composition data, and conditional age-at-length composition data from the joint US-Canadian acoustic/midwater trawl surveys (1977, 1980, 1983, 1986, 1989, 1992, 1995, 1998, 2001, 2003, 2005, and 2007); ageing-error matrices based on 2,820 cross-read otoliths with adjustment for the "lumping effect" of strong cohorts; seasonal length-composition data from Santa Barbara for 1963-1970; plus biological data relating to growth, maturity at length, and natural mortality.

The final base model differed from the preliminary base model (presented by the STAT during the first day of the STAR) in that it assumed a slightly simpler blocking structure for the parameters determining the selectivity curves of the US and Canadian fisheries (four-year rather than two-year blocks after 2001). It also differed from the preliminary model in that it estimated the value of the acoustic survey catchability coefficient rather than keeping this parameter set to a fixed value. When the STAR Panel meeting finished, the STAT had not had sufficient time to conduct a Monte Carlo Markov Chain (MCMC) run to confirm convergence of the final base model and to develop a decision table for the assessment. This work was completed during the week following the STAR Panel and the decision table, based on preliminary converged MCMC results for the final base model, was distributed to the STAR Panelists by email.

Suggestions for future reviews of Pacific hake / whiting assessments.

When it is fully implemented, the Pacific Hake / Whiting Agreement between the U.S. and Canada will establish for this important transboundary stock a process for developing and reviewing stock assessments and providing management advice. The current STAR process for assessment review is not adequate to meet the requirements of the Agreement.

- Ratification and implementation of the U.S. / Canada treaty needs to occur quickly so that there is a more coherent process for addressing unresolved issues.
- Given the definite possibility that the assessment review next year (2010) may again operate under the STAR Terms of Reference, the PFMC's Scientific and Statistical Committee (SSC) should consider altering the STAR Terms of Reference to better accommodate alternative stock assessments developed by Canadian scientists. In particular, simpler assessment models with fewer parameters than the base model employed in 2009 should also be evaluated.
- The process for future assessments of Pacific hake should ensure that the STAT has adequate time to undertake the assessment. Late arrival of data and a compressed schedule to resolve the assessment result in a rushed assessment that can lead to incorrect results. A different assessment and review process is needed given the expectation that this situation will re-occur with late-season fishing in both countries. For example, a partial release of catch quota could be made to accommodate the early season, with a later release based on a new assessment that is completed in March or April.

Requests by the STAR Panel and Responses by the STAT

Request #1: Provide the inverse Hessian matrix for the STAR base run (with the 2008 Canadian data) to show parameter correlation which might reveal possible model over-parameterization.

Response: The STAT presented a graphical (bubble plot) representation of the cross-correlations for most of the estimated parameters (excluding the forecast recruitment deviations). Many of the recruitment deviations had high positive correlation, as did some blocks of selectivity parameters. A strong correlation between two parameters generally indicates that the model is over-parameterized and that comparable fits to the data could be obtained from a different model structure with fewer parameters.

Request #2: Provide a likelihood profile across survey q[1] for all the likelihood components to expose tensions among the data.

Response: The STAT produced Fig. 1 showing the changes in negative log-likelihood (NLL) for a series of fixed values of the survey q parameter. In the preliminary base model the survey q was fixed at 0.7 on the grounds that the available data did not provide sufficient information to reliably estimate this parameter. The likelihood profile shows abrupt changes in the NLL at survey q ≈ 0.85, with a large trade-off between the length-composition component versus the conditional-age-composition component. This pattern suggests that there are complexities in the NLL surface that bear further investigation. Complex trade-offs among data sources could be artifacts of the blocking structure or other assumptions of the model.

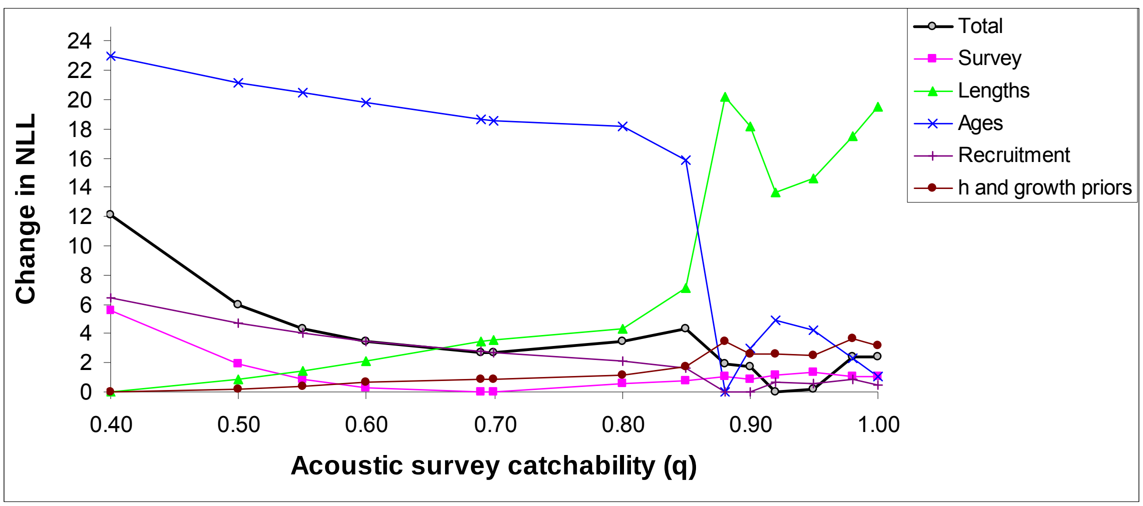

Figure 1. Likelihood contributions for the major data sources profiled across the survey q parameter, which was fixed at 0.7 in the preliminary base model.

Request #3: Provide the MCMC result (cross-correlation matrix for the old M[2] and the dome-shaped selectivity parameters) for the base model (pre-STAR base although not a fully

[1] The "survey q" is a calibration parameter that adjusts for the discrepancy between what the survey estimates for the stock biomass relative to what the model estimates that the survey should see, adjusted by the survey's selection curve and the timing of the survey.

[2] The "old M" parameter is the natural mortality coefficient for the 15+ age-group. The "base M" parameter is the natural mortality coefficient for age-groups 0 to 13, with the natural mortality coefficient for age-14 fish determined by linear interpolation between the other two values.

converged chain). This will provide more information about possible parameter confounding and the shape of the joint posterior function.

Response: Monte Carlo Markov Chain (MCMC) results from the partially-converged chain were plotted for the parameters for survey selectivity, old M, growth, stock-recruitment, and select selectivity parameters. The plots of the selectivity parameters showed much cross-correlation, but the STAT suggested that this was an expected result given that the selectivity blocking was accomplished in SS3 using offsets. There seemed little point to further pursuing this line of investigation with the pre-STAR base model.

Request #4: Provide likelihood contour plots that represent the posterior correlation around ML[3] estimates for the following three comparisons: a) survey q vs. old M, b) old M vs. old acoustic survey selection, and c) survey q vs. old selection. This will provide insight to the extent these parameters are confounded.

Response: The likelihood profiles were flat across a wide range of values for the three parameters (final survey selectivity, old M, and survey q) implying that the data provided little information to distinguish among different combinations of these parameters.

Request #5: Change the effective sample sizes with regard to Canadian and U.S. length data and the catch-at-age data. Reduce the effective sample sizes by half relative to the base model and evaluate three different selectivity scenarios ranging towards less complexity from the base model structure to a time-invariant structure. Compare the number of parameters and likelihoods for the model components for this weighting change and the base model run. The panel is seeking confirmation that the model result is not driven by weighting. In addition, the panel would like to see residual bubble plots and the estimated selectivities, the time series of female spawning biomass, and the fit to the survey.

Response: Relative to the initial STAR Base model, removing all the time blocks for the fishery selection curves coupled with a tenth of the weighting on the fishery length- and conditional age-composition data increased the overall NLL by 166 units and reduced the number of parameters by 27, with most of the change associated with the conditional age-composition data. An alternative four-year blocking structure with a tenth of the weighting on the fishery composition data did not result in significant loss of fit, with NLL increasing by about 11.4 units for a reduction of 6 parameters. The Panel concluded that the choice of blocking structure for the fishery selection curves was not unduly influenced by the weighting on the composition data and noted that the estimated acoustic survey selection curve tended to change in concert with changes in the estimated fishery selection curves. The configuration with a single set of fishery selection curves with a tenth of the weighting provided a very poor fit to the acoustic survey biomass data, especially in the earlier years of the survey. Having time-invariant selection for the fisheries clearly seemed the wrong approach.

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[3] ML = maximum likelihood, which formally measures the best fit that the model provides to the observed data given the model form and parameter values. Note that NLL = negative log-likelihood, which is the negative value of the natural logarithm of the ML.

Request #6: The panel would like to assess the consequences of asymptotic selectivity in the survey. The panel recognizes that the selectivity pattern is uncertain; however, a fixed asymptotic acoustic survey selectivity may help to understand how this pattern affects the model results. Additionally this scenario may also reveal how acoustic selectivity is related to the time blocking assumption and the shape of the commercial selectivities estimated in the base model.

Response: Forcing asymptotic selectivity caused lack of convergence when the model was configured with recent time blocks (after 2001). However, one run using asymptotic survey selectivity with no time blocking after 2001 did converge; the results (Fig. 2) suggested that much of the large biomass estimated by the preliminary base model for the 1980s was "cryptic biomass" (from old ages that were not fully selected in the preliminary base model) and that recent time blocks are needed to account for the large catches from the 1999 year class.

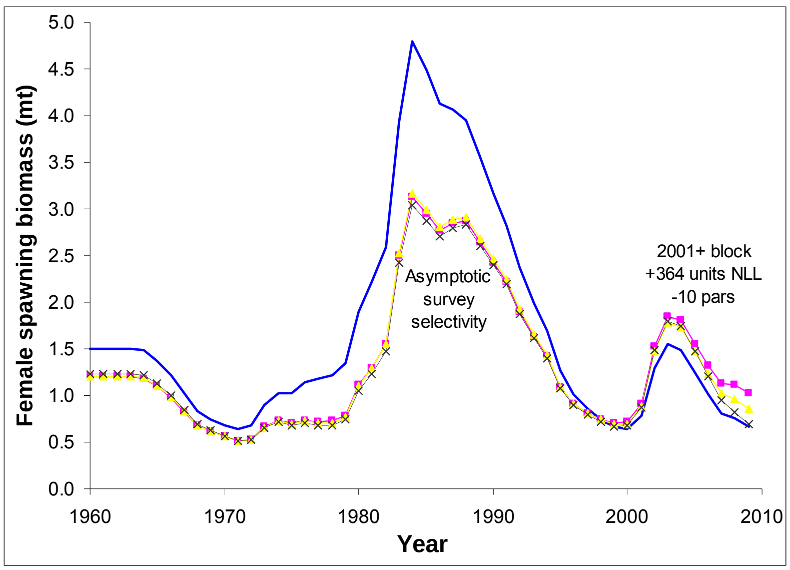

Figure 2. Comparison of spawning biomass trajectories from the preliminary model configuration with domed (solid line) versus asymptotic acoustic survey selection.

Request #7: The panel requested jitter runs to assess whether the model runs are converging appropriately using the fixed q parameter versus a freely estimated q model scenario.

Response: The STAT did not respond to this request because they were reluctant to spend time conducting jitter runs on a preliminary model. The request was subsumed by the STAR Panel's request (#13) to apply jitter runs to the final proposed base model.

Request #8: In reference to Request #2, identify components and parameters responsible for abrupt changes in likelihood with changes in the fixed q values. This will allow better understanding of the apparent trade-offs between different data sources and model configurations.

Response: As survey q was increased progressively from 0.7 to 1, estimates of female spawning biomass declined with no marked change in overall trend (Fig. 3). At the same time, the selectivity curve associated with the acoustic survey shifted towards older fish (Fig. 4). Thus the change in likelihood associated with change in survey q did not appear to reflect a marked change in the state of nature but instead appeared to be due to tension between the length and age composition data.

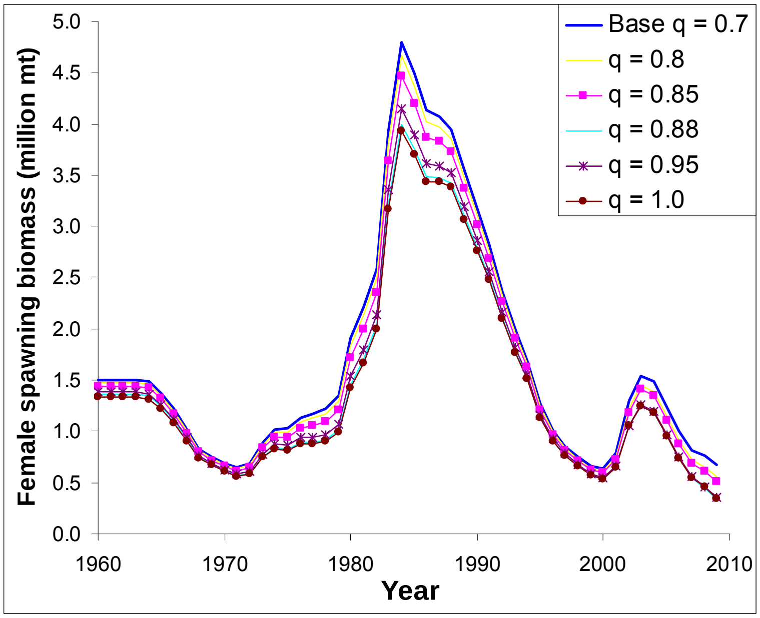

Figure 3. Estimates of female spawning biomass obtained when fitting the model using different fixed values of acoustic survey q.

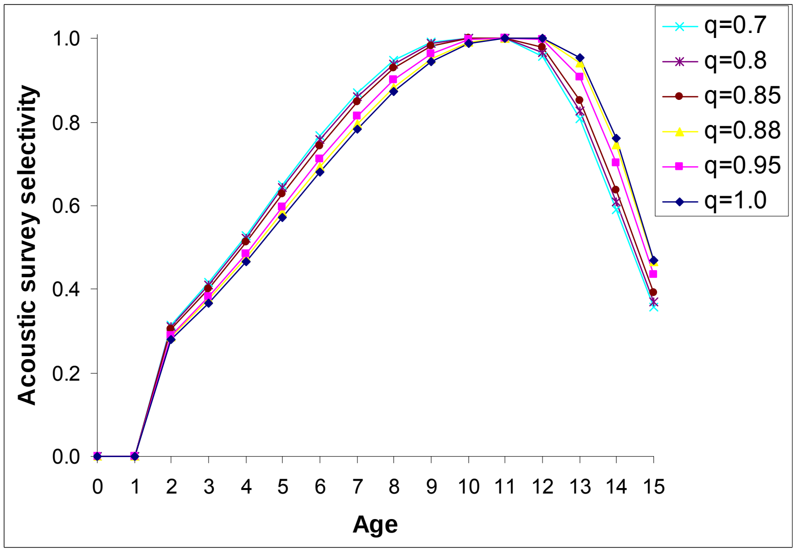

Figure 4. Estimates of the selectivity curve for the acoustic survey obtained when fitting the model using different fixed values of acoustic survey q.

Request #9: Start the 4-yr selectivity blocking structures at different years with a) no offset between U.S. and Canadian fisheries and b) a 2-yr offset between these fisheries. Collapse the blocks at the end of the time series using the base model. The current blocking selection is somewhat arbitrary and there is a need to understand how sensitive the model is to the blocking structure.

Response: The model was sensitive to the starting years used for the four-year selectivity blocking structure for the U.S. and Canadian fisheries (Fig. 5). The best fit was obtained using 1981 as the starting year for the four-year blocking structure, with no offset between the U.S. and Canadian fisheries, which was how the block boundaries were structured in the preliminary model. It appears that this structure best matched the supposed tracking by the fishery of the stronger year classes.

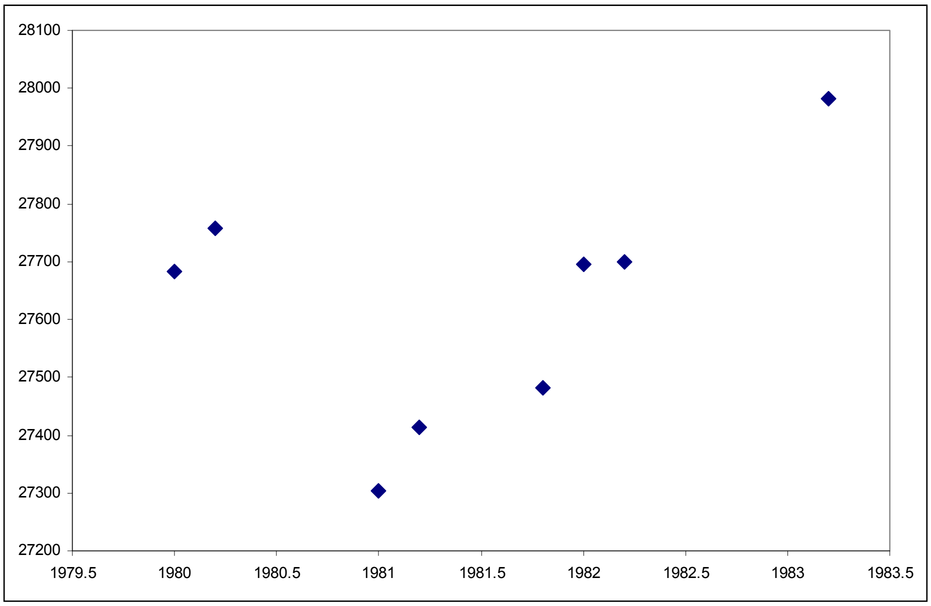

Figure 5. Comparison of the values of negative log-likelihood obtained using different start years for the blocking of the fishery selectivity curves. The first of each pair of values represents the result when the U.S. and Canadian time blocks are synchronised, while the second point reresents the results obtained when the Canadian time blocks lag the U.S. time blocks by two years. The value at 1981.8 represents the result obtained with an 8-year time block at the end.

Request #10: A retrospective analysis of the best model from Request #8 (where q is fixed and final survey selectivity is estimated) featuring runs up to 2000, 2002, 2004, 2006 and 2008 with projections based on observed catches. These runs should undertake projections using the most recent selectivities. This analysis will be used to assess potential bias of model results and projections.

Response: As years were successively stripped from the data used in the analysis, estimates of the strength of the 1999 year class in the female spawning biomass (Fig. 6) and in the estimates of recruitment (Fig. 7) increased until the data were removed for 2001, when the presence of the strong 1999 year class had not yet registered sufficiently in the age composition data from the

U.S. fishery. This suggested that the signal regarding the strength of this year class was driven primarily by the age compositions of the catches recorded by the fisheries. As the more recent years were removed, the selectivity blocking for the last years changed as the final years were collapsed into the last block. These blocking changes account for some of the differences between the curves.

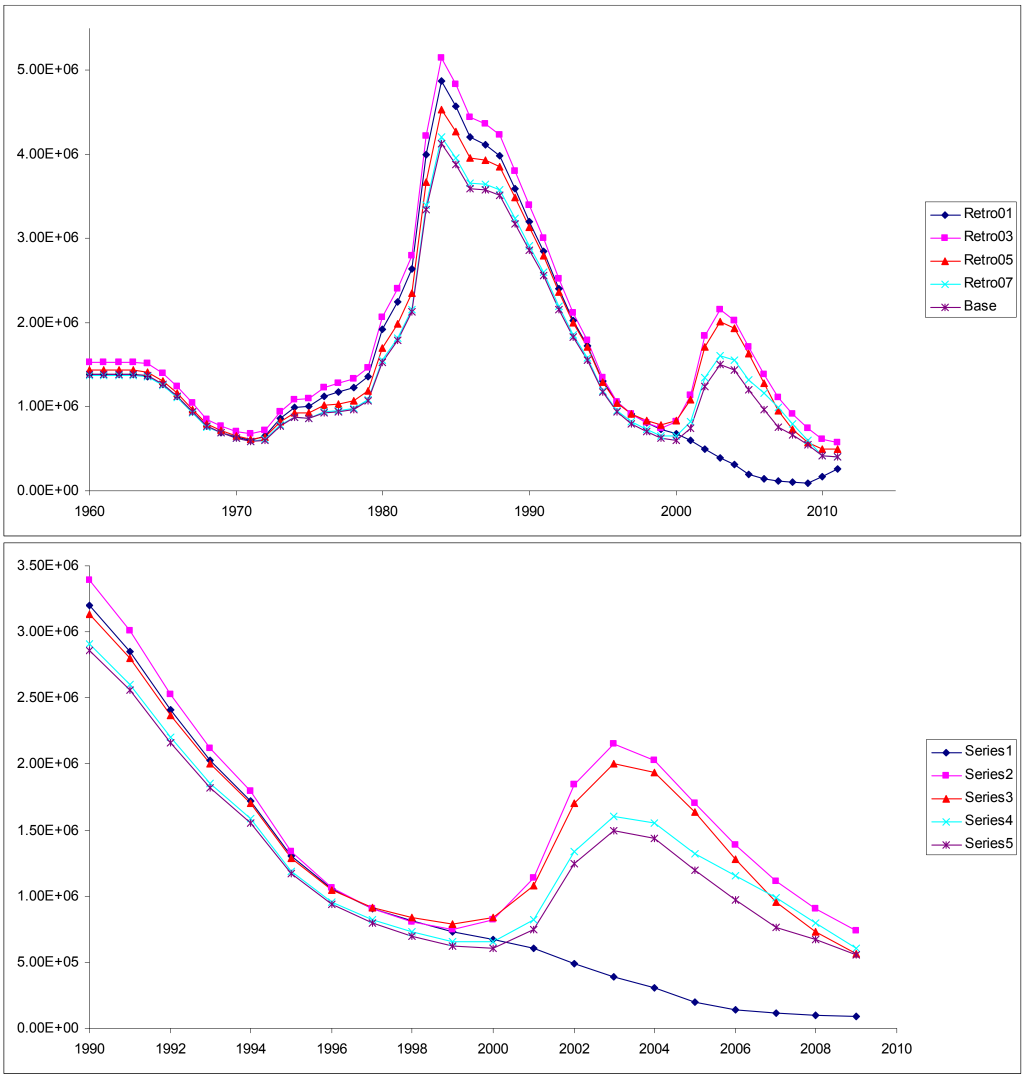

Figure 6. Trends in female spawning biomass obtained when fitting the model to data to 2001, 2003, 2005, 2007, and 2008, and forecasting using the observed values of recent catches.

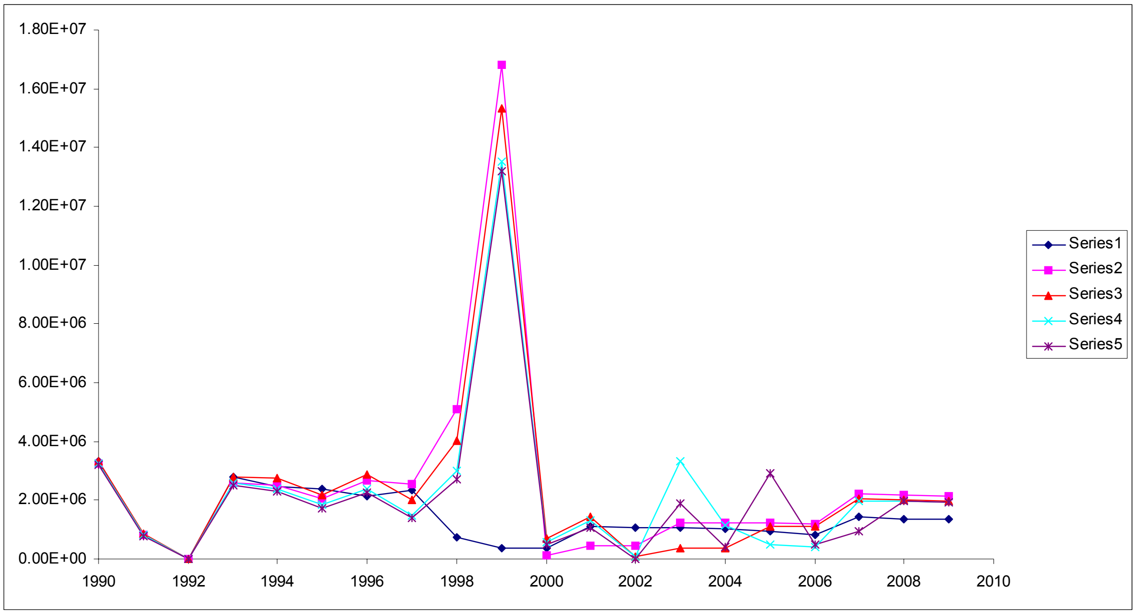

Figure 7. Trends in recruitment estimates from 1990 to 2008 obtained when fitting the model to data to 2001, 2003, 2005, 2007, and 2008, and forecasting using the observed values of recent catches. The different runs differed very little in their estimates of earlier recruitment.

Request #11: Provide runs where q is freely estimated and final survey selectivities are fixed at 0.9, 0.6, and 0.3 (assuming that q can be reliably estimated given fixed selectivity). These runs will ascertain whether the model can converge given those three fixed selectivities.

Response: Fixing the acoustic survey's selectivity coefficient for the biggest fish (final selectivity) at 0.3, 0.6, and 0.9 resulted in progressively lower estimates of female spawning biomass (Fig. 8). When the parameters for acoustic survey q and final selectivity were both freed up, the estimated q was 0.85. Convergence was obtained in all cases.

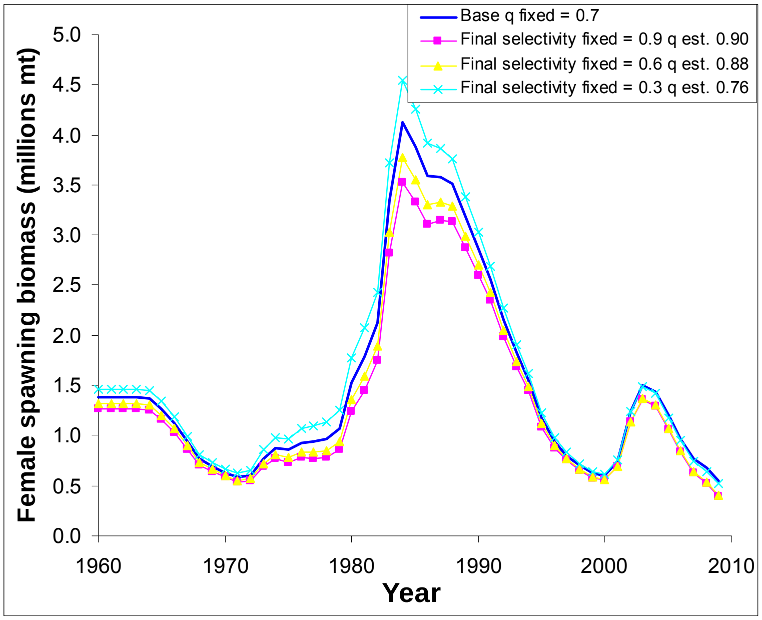

Figure 8. Estimates of female spawning biomass obtained when acoustic survey selectivity value for the biggest fish is fixed at 0.9, 0.6 and 0.3, and acoustic q is estimated.

Request #12: If there is convergence and plausible results for the Request #10 runs, provide a retrospective analysis as structured in Request #10 with the fixed selectivities under Request #11. This analysis will be used to assess potential bias of model results and projections.

Response: Truncating the series of yearly input data progressively (ending the series in years 2008, 2006, 2004, 2000) increased the estimated strength of the 1999 year class and the 2005 year class, as well as spawning biomass estimates (Fig. 9).

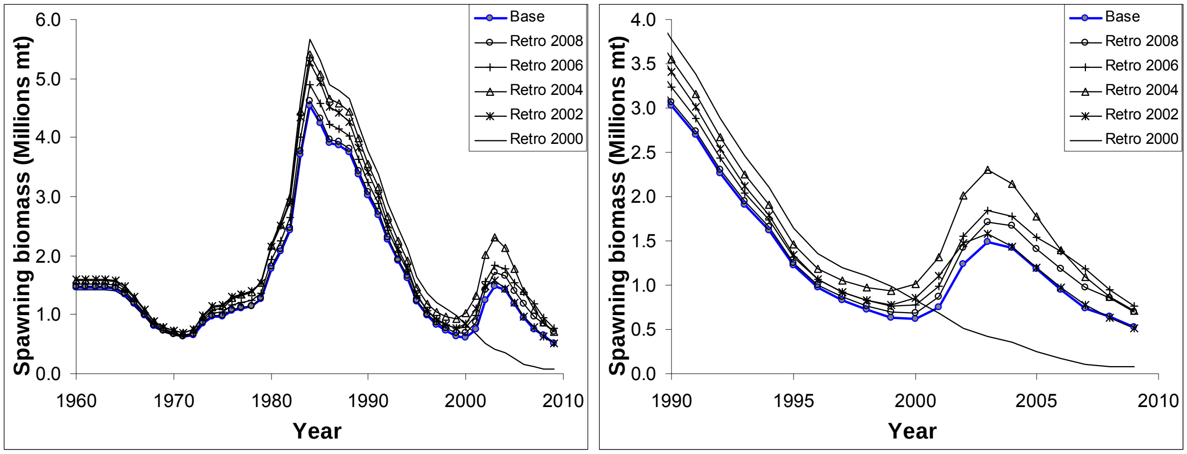

Figure 9. Changes in estimates of spawning biomass from retrospective analysis with final survey selection (on the oldest fish) fixed at 0.3.

At higher fixed values of final survey selection (0.6 and 0.9), spawning biomass estimates were progressively scaled down. In all cases, the biomass trend was maintained, except for the 2000 retrospective run, where the 1999 year class signal was lost. In additional to the requested runs, the STAT ran retrospective analyses where the parameters for acoustic survey q, the final survey selectivities, and old-M were freely estimated (a similar approach as last year's assessment). All retrospective runs showed a similar biomass trend across a wide range of acoustic survey q values.

The analyses based on data restricted to 1960-2000 demonstrate that forward projections are unreliable because the spawning biomass is highly dependent on single cohorts. Future strong cohorts cannot be reliable predicted.

The panel agreed that the best model configuration is one with a freely estimated value for acoustic survey q. The Panel recommended that analyses based on a set of fixed q's could be used to bracket uncertainty in a decision table, in the event that an MCMC run could not be completed.

Request #13: Jitter the new preferred base model with q freely estimated, final acoustic survey selectivity estimated, and a simplified blocking structure. This preferred model differs from the pre-STAR base model by allowing q to be freely estimated and simplifying the selectivity blocking structure to be four year blocks. This is the new preferred base model. The jitters will confirm convergence properties for this model configuration.

Response: A set of 200 jitter runs of the model with widely dispersed starting values resulted in 27.5% converged runs, all with near identical estimates of depletion rates and spawning biomass. This corroborates that the model is stable, and that the converged estimates represent a global solution, and not a local minimum.

Request #14: Provide sensitivity analyses using the pre-recruit survey index with the current weighting of the fishery comp data and a down-weighting of the fishery comp data. Include a run with a simplified 8-yr selectivity blocking structure and under the down-weighting scenario with the pre-recruit index included. This may reveal a general pattern of model sensitivity to such data that may be informative for recruitments. Tension in the data might be informative.

Response: The inclusion of the pre-recruit index and down-weighting the age and length data pulled down the estimated biomass associated with the strong 1999 year class. This result is probably due to the conflicting signals from the acoustic survey and fishery catch-at-age data. This alternate configuration also caused a higher estimate of recent and projected biomass because the entire series was flattened out. The panel agreed with the STAT that the inclusion of the pre-recruit survey should not occur. The pre-recruit time series is short, and the juvenile fish may experience orders of magnitude variation in survival because of changing ocean currents and natural mortality.

Request #15: Provide a sensitivity analysis of an alternative model where historical California length frequencies are dropped. This will determine the sensitivity of model results to these data.

Response: Removing the historical California length composition data had no significant or appreciable effect on the biomass estimates.

Request #16: Provide a run with asymptotic selectivities for the acoustic survey and the Canadian fishery. This will provide an alternative view where the age data are not fitted by the selectivity functions becoming more dome-shaped. Forcing asymptotic selectivity for the Canadian fishery and the survey recognizes that the Canadian fishery tends to catch larger fish reducing availability of larger fish in the U.S. fishery.

Response: Asymptotic selectivity curves for the acoustic survey and the Canadian fishery, combined with constant M =0.23 throughout the life cycle, generally forced the U.S. fishery selectivity curves to become more asymptotic. This change to the configuration also increased the estimates of acoustic survey q, reduced the spawning biomass (all above B0 in the series prior to the mid-1960s), and significantly reduced uncertainty in the recruitment estimates of the large year classes. This scenario was 184 NLL units removed from the base with a reduction of only three parameters. Acoustic survey q was estimated at 1.4 in this scenario, although full selectivity was not achieved until age 14. For the scenario when M for older fish was fixed but selectivities were not forced to be asymptotic, the result was 128 likelihood points removed from the base case with an increase of 2 parameters relative to the previous scenario A similar model with M = 0.25 throughout was109 likelihood points removed from the base, slightly better than with M = 0.23.

To better fit the data under the constraints of this scenario, the selectivity curves shifted significantly to the right, maximizing on 9-10 yr old fish in the acoustic survey, and all three selectivities were quite low at age 15+ (~0.1). For this last scenario, q was estimated at 0.34. The STAT explained that one of the reasons they originally recommended a fixed q was the confounding in the estimates of q and M.

Request #17: Provide a sensitivity analysis assuming an M of 0.25 with and without the free estimation of M for age 15+. This will explore the necessity of assuming a high M for old fish.

Response: At a fixed natural mortality rate of 0.25 with 'old M' fixed, stock trajectory shifts upwards with current spawning stock biomass estimated to be substantially greater than unfished spawning stock biomass (Fig. 10). The result was considered implausible. This run demonstrates a high degree of sensitivity in the model to relatively small changes in the value of natural mortality for ages less than 15. It follows that assuming M is fixed could lead to an important compression of uncertainty. The STAT team confirmed that a defensible prior for M existed and could be implemented in the MCMC run. However, the MCMC run completed after the STAR meeting used M fixed at 0.23^{-yr} for ages less than 14.

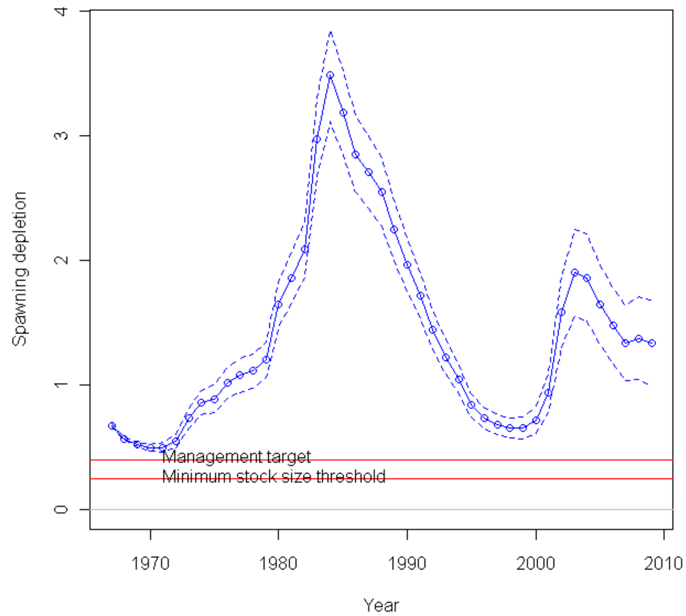

Figure 10. Predicted spawning stock biomass assuming a fixed natural mortality rate of 0.25 for all ages, but otherwise under the proposed base model configuration.

The requested comparison run with free estimation of old-M was included in the response to Request #20.

Request #18: Provide values of q that result in 12.5% and 87.5% of the female spawning biomass probability distribution. This assumes normal distribution of probabilities of the female spawning biomass around the ML estimate. This may be the basis for an alternative decision table if the MCMC does not converge.

Response: The uncertainty over female spawning stock biomass was presented by manually altering q to achieve the 12.5th and 87.5th percentiles of the proposed base model prediction. These results were included in a decision table (included in response to #21) alongside corresponding estimates of depletion over a three year projection period. The final table will include additional rows reflecting different management decisions (a range of quotas).

A different formulation of this table was considered in which depletion and spawning stock biomass are estimated with respect to changes in a key axis of uncertainty such as q. However it was concluded that it would be better to attempt to represent the uncertainty over all important axes, including the parameter controlling the final selectivity of the acoustic survey and natural mortality rate. It was acknowledged that where available the MCMC run would offer a better means of conveying uncertainty in model outputs.

Request #19: Provide a run fixing base M at 0.25 and allowing M for older fish (age 15+) to be freely estimated. This will assess whether a higher M for older fish or a higher estimate of base M is needed to explain the lack of older fish.

Response: The requested run was included in the response to Request #20.

Request #20: Profile over base M from 0.21 to 0.25 with the M for older aged fish and q freely estimated using a) dome-shaped and b) asymptotic selectivity in the acoustic survey and the Canadian fishery. This will establish model sensitivity to estimates of base M.

Response: At the lowest natural mortality rate of 0.215 the model predicts a similar trend in spawning stock biomass that is more damped, with both lower estimates of B0 and smaller recruitment events, particularly in 1980 and 1984 (Fig. 11). In scenarios where fewer individuals die, fewer individuals are recruited in the model to maintain fit to the observed data (Fig. 12). Changing M had the least impact on spawning stock biomass in the most recent years.

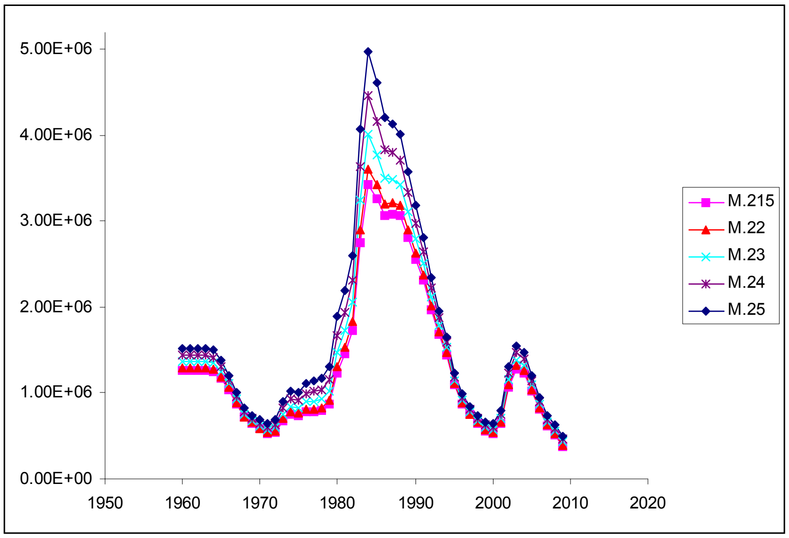

Figure 11. Predicted spawning stock biomass over a range of fixed rates of natural mortality under the proposed base model configuration.

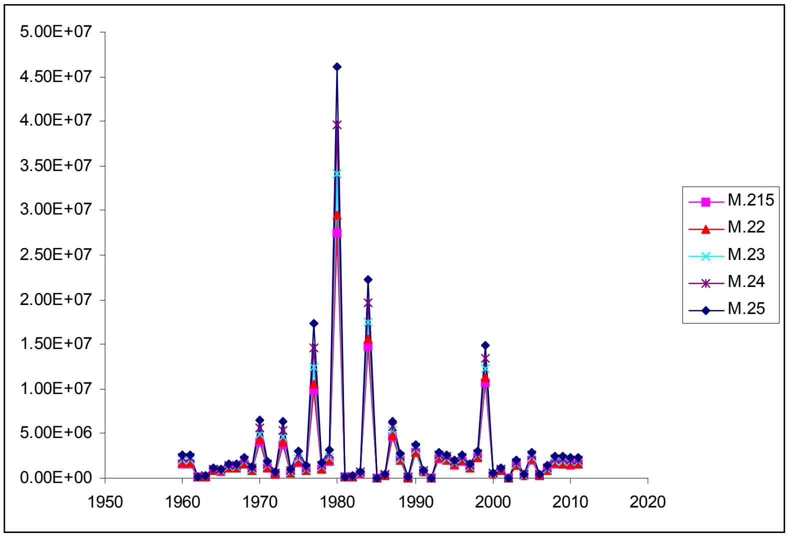

Figure 12. The predicted recruitment over a range of fixed natural mortality rates under base case model specification.

Request #21: Using the results of Request #18, develop one row of a decision table that can be used to exemplify a contingency decision table if the MCMC results do not converge.

Response: Under the proposed base model configuration, the maximum likelihood estimate of the current female spawning stock biomass is 435,000 metric tons corresponding to an estimated depletion of 32 percent (Table 1). Given the 40:10 rule, female spawning stock biomass is projected to fall to 357,000 tons by 2010, at 26 percent depletion. Subsequently, spawning stock biomass is projected to recover slightly to 363,000 tons, a depletion level of 27 percent.

In all years, there is considerable uncertainty over stock status. The most pessimistic of the two alternate models estimates current female spawning stock biomass at 294,000 tons and a considerably lower depletion level of 22%. The most optimistic alternative model predicts current female spawning stock biomass at 575,000 tons at a depletion level just above the 40 percent reference level. The projections are somewhat pessimistic in general; the most optimistic projection predicts a depletion level of 34% in 2011.

		State of nature					
		12.5th percentile of female spawning biomass from base model		Base Model		87.5th percentile of female spawning biomass from base model	
Relative probability		0.25		0.50		0.25	
Management Action							
Year	Coast-wide catch (mt)	Female spawning biomass (millions mt)	Estimated depletion	Female spawning biomass (millions mt)	Estimated depletion	Female spawning biomass (millions mt)	Estimated depletion
2009	253,582	0.294	22%	0.435	32%	0.575	41%
2010	193,109	0.230	17%	0.357	26%	0.484	35%
2011	189,054	0.251	19%	0.363	27%	0.476	34%

Table 1. Predicted female spawning stock biomass and depletion under three model scenarios including a three year forecast.

Description of base model and alternative models used to bracket uncertainty

The initial base model developed by the STAT in advance of the STAR meeting did not include all the data for the 2008 Canadian fishery. Complete data became available just days before the start of the meeting, with the consequence that the STAT did not have time to fully explore the properties of the initial base model. The primary change in the model configuration developed during the STAR meeting was the freeing up of the acoustic survey q parameter, which the STAT had fixed at a value of 0.7 in the initial base model. The final base model also had a slightly simplified blocking structure for the time-varying fishery selection curves.

The SS3 model configuration selected for the final base model had the following features.

- A single coastwide stock was assumed and there was no explicit spatial structure.
- There were separate US versus Canadian fisheries, each with its own length-composition and conditional age-at-length composition data and age-based selection curves.
- The joint US-Canada acoustic / midwater trawl survey biomass index was the only fishery independent time series and was the primary tuning index.
- Age-reading imprecision was incorporated, as it had been in the 2008 assessment, but the age-reading variability coefficients were revised from the 2008 assessment with additional data from new cross-calibration studies of age-readings. Also, the STAT adopted an adjustment for cohort-specific age-reading error, which is thought to occur when very strong cohorts are present.
- Time-varying growth parameters were estimated with two blocks for the length-at-age-12 parameter and four blocks for the growth coefficient (k). This blocking structure was slightly more complicated than the structure used in the 2008 assessment.
- Parameters of a Beverton and Holt recruitment curve were estimated using an assumed beta-prior probability distribution for the steepness parameter, as in recent past assessments, with annual recruitment deviations estimated for 1962 to 2007. The recruitment variability parameter (sigma-R) was estimated in this assessment, whereas in the 2008 assessment it was fixed at a value of 1.13.
- Acoustic survey selection was assumed to be time-invariant.
- The catchability coefficient for the acoustic survey was freely estimated.
- The selection curves for the two fisheries and the acoustic survey were estimated and not forced to be asymptotic.
- Fishery selection was time-blocked to accommodate apparent targeting of strong year-classes and structural changes in the fisheries. There was one block for the early years of the fisheries (through 1980) and then, starting with 1981, there were sets of four-year blocks for some of the fishery selection parameters for each of the two fisheries.
- The natural mortality coefficient was fixed at 0.23 yr^{-1} for ages 0 to 13, and then was allowed to ramp to higher (or lower) values for age-14 and the age-15+ group.

Alternative models used to bracket uncertainty.

The alternative models for constructing the decision table were derived from the posterior distribution of the base model rather than from alternative model formulations. However, in the event that the MCMC did not converge -- the MCMC run was completed after the close of the STAR Panel meeting -- a decision table would have been developed using the acoustic survey q parameter as the primary dimension of uncertainty (see Request #21).

Comments on the assessment

The catchability coefficient for the acoustic survey (survey q) continues to be a major source of uncertainty in the assessment of this stock. In the initial base model brought to the STAR meeting the STAT had fixed the value of survey q because they did not feel it could be well estimated. Past STAR Panels (prior to 2008) had recommended bracketing uncertainty in decision tables by using one or more fixed values of survey q. The current STAR Panelists were concerned that fixing the survey q parameter would grossly constrain the plausible set of model estimates, and the model would produce a misleading and overly optimistic view of how much is known about the status of this stock. As was done for the 2008 assessment, the survey q parameter was freely estimated so that the final model could more appropriately reflect the uncertainty associated with this crucial parameter.

Technical merits:

- Uncertainty associated with the acoustic survey q parameter was incorporated in the assessment results.
- The assessment was able to use the MCMC approach to integrate across the uncertainty associated with all the estimated parameters. For most of the Council's groundfish stocks it has not been possible to use this approach.

Technical deficiencies:

- Although the 2008 assessment developed a prior probability distribution for the natural mortality coefficient (M) (based on Hoenig's relationship between longevity and M), the STAT did not use this prior in fitting the 2009 assessment model, but instead assumed a fixed value (M = 0.23 /yr). The assessment model in its estimates of stock status therefore did not capture the uncertainty about M.
- There were undesirable patterns in the residuals for the length composition data, which suggest a structural misspecification in one or more aspects of the model. The STAT was of the opinion that including growth and composition data by gender in the model structure would alleviate this problem.
- The current version of the Stock Synthesis software does not allow the fishery selection curves to mimic cohort targeting, which is a phenomenon that is supposedly driving fishing behavior. This structural limitation of SS could also account for some of the odd residual patterns associated with the length composition data.

- Some of the maximum likelihood estimates showed strong parameter cross-correlation, which generally indicates over-parameterization and a ridged posterior probability distribution that is likely to inhibit convergence in MCMC routines. Subsequent to the STAR Panel meeting, when the STAT conducted the initial MCMC runs, they encountered lack of convergence due to one redundant selectivity parameter; they solved the convergence problem by fixing this parameter at a reasonable value.
- Although the acoustic survey team made significant progress at responding to some of the deficiencies in the acoustic survey data identified by the 2008 STAR Panel, there remain important gaps in the acoustic survey documentation. The acoustic survey biomass estimates are derived by matching up the acoustic back-scatter data with biological sample data (composition by species, length and sex) collected by midwater trawl tows. The process of matching these two types of data was unclear to the STAR Panel. There should be explicit criteria that determine when and where the midwater tows are taken and their duration, and explicit rules for how these biological sample data are then assigned to the various segments of the acoustic transects. The post-stratification of tows partly based on similarity in the observed length-composition of the catches is particularly problematic, and is a likely source of bias (of unknown direction) in the length composition estimates, and a downward bias in the associated variance estimates.
- Because of the very late arrival of the 2008 fishery data (especially the data from Canada but also the late-season data from the US) the STAT had very little time to assemble and analyze the data, let alone to explore model structure and uncertainty. Also, the 2008 data probably were not thoroughly error-checked because of the need for very rapid turn-around.

Explanation of areas of disagreement regarding STAR Panel recommendations

Among STAR Panel members (including GAP and GMT representatives)

There were no major disagreements.

Between the STAR Panel and STAT Team

There were no major disagreements.

Unresolved problems and major uncertainties

- The re-weighting scheme applied to the input data series in the assessment needs further investigation given the significant tension in the age- and length-composition data in the survey and fisheries. The STAR panel is concerned that the current iterative weighting scheme may be inappropriate in that poorly fitting (but unbiased) data series may simply be down-weighted out of the model. However, it is not clear how to derive a better weighting scheme that will achieve an appropriate balance between process error (e.g., time variation in selection or growth) and observation error (e.g., effective samples sizes for composition data).

- There is concern that some of the input data may be biased. The STAR Panelists suspect, in particular, that the acoustic survey age- and length-compositions may be biased because of a tendency for biological sampling to occur disproportionately on dense aggregations of fish that may not be representative. The raw acoustic survey data need to be analyzed to allow verification that an appropriate stratification was applied. Additionally, there need to be explicit rules regarding how the age and length data are collected in the survey and an explicit recounting of the rules that applied in past surveys. The methods for combining length samples into strata needs further review. A post-stratification scheme that creates more homogeneous strata by pooling tows with catches of similar length structure is not justified. This procedure could bias the estimates of length compositions applied to the acoustic survey tracks, and grossly overestimate the precision in estimated length compositions.
- There is continuing concern regarding the strong dome-shaped selectivity pattern in the acoustic survey. The mechanism responsible for this pattern remains a mystery.
- The residual pattern in the length-composition data indicates model mis-specification and potential bias in model results. Estimates of model uncertainty, either from the maximum likelihood estimates or from MCMC, do not include uncertainty or bias with regard to model structure, or uncertainty in acoustic estimates of biomass resulting from sampling variability and bias in estimated length compositions. A sex-specific model may address some of the problems evident in the length-composition residuals but would not resolve bias caused by the post-stratification scheme.
- The assessment provides very little information regarding the acoustic survey q and consequently provides highly uncertain estimates that are key to management, such as the ABC.
- The assessment provides even less information regarding M.
- The assumption that the older fish experience higher rates of natural mortality needs independent empirical verification.
- There may be a lack of correspondence between the maximum likelihood and MCMC results. The current STAR process does not allow enough time to evaluate MCMC results and determine risk-neutral recommendations.
- The static B0 construct appears to be a poor framework for managing a stock with highly dynamic recruitment, such as Pacific hake.
- Some parameters appear to be highly correlated, which will affect the efficiency of the search algorithm.

Management, data, or fishery issues raised by the GMT or GAP representatives during the STAR Panel.

The issues that were raised are adequately described elsewhere in this report.

Recommendations for future research and data collection.

The 2007 STAR Panel presented a comprehensive review of recommendations from past STAR Panels, many of which still apply but are not reiterated here. The recommendations below resulted from discussions during the 2009 STAR Panel review and subsequent email exchanges.

1) Investigate how the biological sampling in the acoustic survey occurs to determine whether these data are representative of the backscatter in the survey.
2) Investigate how the biological samples are processed and applied to the acoustic estimates, including the post-stratification of length samples.
3) The raw data in the acoustic survey, including the length samples, needs to be appropriately assembled to allow statistical analysis of these data and appropriate stratification.

The 2009 STAR Panel also considers the following recommendations, from the 2008 STAR Panel Report, to merit consideration.

4) A Management Strategy Evaluation approach is needed to evaluate the 40-10 harvest control rule when applied to a stock with dramatically episodic recruitment, such as Pacific hake stock. Related to this is the need to evaluate how well different assessment models recapture the true population dynamics. At issue is whether a simpler model such as ADAPT / VPA performs better or worse than a more complex model such as Stock Synthesis.
5) Future assessment models should explore gender- and length-based selection processes, in recognition that the genders differ in growth and that many of the more influential dynamic processes that operate in the fishery are length-based but are currently considered from an age-based perspective (for example selectivity).
6) When the raw acoustic survey data become available there should be a re-evaluation of the treatment / adjustment of pre-1995 acoustic survey data and index values. For example, the biomass index implied by the area covered by the pre-1995 surveys should be compared with the total biomass from the full area covered by the post-1995 surveys. The difference between these two indices has implications for the magnitude of the survey catchability coefficient prior to 1995.
7) There should be further exploration of geographical variations in fish densities and relationships with average age and the different fisheries, possibly by including spatial structure into future assessment models.
8) There should be exploration of possible environmental effects on recruitment and the acoustic survey.

References

Hamel, O.S., and I.J. Stewart (2009). Stock Assessment of Pacific Hake, *Merluccius productus*, (a.k.a Whiting) in U.S. and Canadian Waters in 2009.

Pacific Fishery Management Council (2008). Terms of Reference for the Groundfish Stock Assessment and Review Process for 2009-2010.

Agenda Item G.1.b
NMFS Report
March 2009

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sustainable Fisheries Division F/NWR2
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115-0070

JAN 14 2009

Don Hansen
Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place
Portland, OR 97220

RECEIVED
JAN 20 2008
PFMC

Dear Mr. Hansen:

In 2008, the National Marine Fisheries Service (NMFS) Northwest Region and the Pacific Fishery Management Council (Council) began to transition the Pacific whiting shoreside fishery to a federally managed maximized retention and monitoring program. Although it was expected that a regulatory program would be in place before the start of the 2009 fishing season, it will not be possible given the complexity of the rulemaking and unanticipated issues that arose during the 2008 season. For 2009, NMFS is proposing to manage the Pacific whiting shoreside fishery under Exempted Fishing Permits (EFPs). The purpose of this letter is to notify the Council members, in advance of the Council's March 2009 meeting, of our intent to issue EFPs for the 2009 Pacific whiting shoreside fishery.

Because the Pacific whiting season begins on April 1, 2009, my staff must soon begin preparations for management of the fishery. Regulations at 50 CFR 600.745 require NMFS to notify the public of the intent to issue an EFP by publishing a notice in the *Federal Register*. Therefore, this letter will be followed by publication of a *Federal Register* notice announcing our intent to issue Pacific Whiting Shoreside Fishery Maximized Retention and Monitoring Program EFPs to Pacific whiting shoreside vessels and first receivers in 2009. As in 2008, the EFPs will be used to investigate the new components of the overall monitoring program before regulatory implementation.

The proposed maximized retention and monitoring program regulations are intended to create the regulatory structure necessary to effectively manage the Pacific whiting shoreside fishery without EFPs while providing accurate catch data such that the Endangered Species Act and Magnuson-Stevens Fishery Conservation and Management Act requirements for this fishery are adequately met. Under the proposed maximized retention and monitoring program, federal regulations would require Pacific whiting shoreside vessels to dump unsorted catch directly below deck and would allow unsorted catch to be landed, providing that an electronic monitoring system (EMS) is used on all fishing trips to verify retention of catch at sea. Participating vessels would be required to procure and pay for EMS services whenever the vessel was participating in the Pacific whiting shoreside fishery. The vessel's EMS responsibilities would include paying for the purchase or lease of EMS equipment, the installation and removal of EMS systems, all additional analysis of EMS data for enforcement or management purposes would be paid for by NMFS as would all administrative costs related to the monitoring program.

Under the proposed maximized retention and monitoring program, Federal regulations would require first receivers to have on-shore monitoring conducted by catch monitors. Catch monitors would be trained in techniques that would be used for the verification of fish ticket data and in species identification. Catch monitors would oversee the process of sorting, weighing, and recordkeeping, as well as gather information on incidentally caught salmon. Catch monitors would verify the accuracy of electronic fish ticket data used to manage the Pacific whiting shoreside fishery such that inaccurate or delayed information does not result in a fishery specification (bycatch limits, species allocations, optimum yields, and biological opinion thresholds) being exceeded.

Catch monitors are third party employees procured from NMFS-specified providers, paid for by industry, and trained to NMFS standards. The first receiver's responsibilities would include paying for the services of the catch monitor, including the days in which the catch monitor is trained, days in which catch monitors are assigned to the first receiver, and post deployment days in which the catch monitors are interviewed by NMFS and in which they submit their final data. Additional data analysis costs for enforcement or management purposes would be paid for by NMFS as would all administrative costs related to the monitoring program. Under the EFP, first receivers would also be required to submit a monitoring plan prior to receiving Pacific whiting shoreside fishery deliveries.

If you have any questions, contact me at your convenience.

Sincerely,

Frank Lockhart

Frank Lockhart
Assistant Regional Administrator

Enclosures:

The 2009 Pacific Whiting Shoreside Fishery Maximized Retention and Monitoring Program

1) **Project Title**: The 2009 Pacific Whiting Shoreside Fishery Maximized Retention and Monitoring Exemption Program

2) **Project coordinator:** NMFS Northwest Region, Sustainable Fisheries Division.
For further information contact: Becky Renko by mail at 7600 Sand Point Way NE, Seattle, WA 98115, by email at becky.renko@noaa.gov, by fax at 206-526-6736, by phone at 206-526-6110.

3) **Purpose of the exemption program and exempted fishing permits (EFP)**

NMFS is in the process of transitioning the Pacific whiting fishery maximized retention and monitoring program managed under an EFP to a Federal regulatory program. The purpose of the exemption program is to test our initial design for the onshore monitoring in advance of the final rulemaking. The EFP would allow vessels to retain unsorted Pacific whiting catch for efficient prosecution of fishery while assuring that there is adequate monitoring at-sea and verification of electronic fish ticket reports.

4) **Specific regulations from which an exemption is being requested**

The EFP, if issued, would authorize, for limited purposes, the following activities which would otherwise be prohibited:

Under 660.306 (a)(2) it is unlawful for any person to retain any prohibited species. Prohibited species must be returned to the sea as soon as practicable with a minimum of injury when caught and brought on board. An EFP is needed to allow vessels to retain prohibited species until offloading and to require deliveries to processors participating in the program.

Under 660.306 (a)(10) it is unlawful for any person to take, retain, possess or land more than a single cumulative limit of a particular species, per vessel, per applicable cumulative limit period. An EFP is needed to allow vessels and first receivers to take, retain, possess or land more than a single cumulative limit.

Under § 660.306 (a)(7), it is unlawful for any person to fail to sort, prior to the first weighing after offloading, those groundfish species or species groups for which there is a trip limit, size limit, scientific sorting designation, quota, harvest guideline, or OY, if the vessel fished or landed in an area during a time when such trip limit, size limit, scientific sorting designation, quota, harvest guideline, or OY applied. An EFP is needed to allow Pacific whiting shoreside first receivers to use a hopper type scale to derive an accurate total catch weight prior to sorting providing that immediately following weighing of the total catch and prior to processing or transport away from the point of landing, the catch is sorted to the species groups and all incidental catch is accurately weighed and the weight of incidental catch deducted from the total catch weight to derive the weight of target species.

5) Catch information

The species (target and incidental) expected to be harvested and/or discarded under the program are similar to those observed in recent years under the State run monitoring program. Please see the attached Pacific whiting shoreside fishery summary from 2007 for the expected catch by species.

Pacific whiting shoreside vessels participating with the EFP would be required to dump unsorted catch directly below deck and would be allowed to land unsorted catch providing an electronic monitoring system (EMS) is used on all fishing trips to verify retention of catch at sea.

On shore monitoring conducted by catch monitors would be required under the EFP. Catch monitors are third party employees procured from NMFS-specified providers, paid for by industry, and trained to NMFS standards. Catch monitor duties would include overseeing the sorting, weighing, and recordkeeping process. Catch monitors would also gather information on incidentally caught salmon.

Marine mammal catch will continue to be document on NMFS forms and submitted by the vessels per NMFS reporting requirements for the Pacific Coast Groundfish Fishery. The monitoring program under an EFP could be used to verify that reporting occurred.

6) Anticipated number of participants

The estimated number or EFPs that would be issued is as follows:

Catcher Vessels: 30-40
First Receivers: 12-16

7) EFP Terms and conditions for Pacific whiting shoreside vessels

The terms and conditions of EFPs issued to Pacific whiting shoreside vessels would include the following:

<u>Reporting requirements:</u>

- Vessels must have a valid declaration for midwater trawl gear in the Pacific whiting shoreside fishery
- Trawl logbooks must be maintained as required by the applicable state law.
- On each EFP trip "Maximum Retention Fishing Trip" (or "MAX") must be legibly written at the bottom of each logbook page.
- Logbooks must be completed in a timely manner and include:

  - The estimated weight of all species, including, prohibited species.
  - An estimate of the total amount of discarded catch for each species legibly written at the bottom of the logbook page, as well as the accurate location of the haul and reason for discarding.
  - If discard occurs as a result of gear malfunction, a description of the event must be recorded.
- Immediately following an unavoidable discard event, the vessel must stop fishing and immediately return to port, with notification to NMFS, Office for Law Enforcement being made prior to arrival in port.

Maximized Retention requirements

- All catch must be brought on board the vessel and retained until offloading, with some exceptions:
  - Pacific whiting removed from the deck and fishing gear during cleaning may be discarded, provided that the total does not exceed one basket from any single haul, with the maximum dimensions of the basket being 24 inches by 16 inches by 16 inches. All catch in excess of the one basket would need to be placed into the fish hold. Discarding species other than Pacific whiting would be prohibited.
  - Large individual marine organisms, such as marine mammals or fish species longer than 6 ft (1.8 m) in length, could be discarded provided the species and the reason for discarding were properly recorded in the required logbook.
  - All incidentally caught marine mammals would need to be documented in the vessel logbook and reported to the NMFS Office of Protected Resources by submitting a completed Marine Mammal Authorization Program mortality/injury report form.
  - Unavoidable discard of catch would be the result of an event that is beyond the control of the vessel operator or crew. The quantity and all species discarded as a result of an unavoidable discard event would need to be estimated, and the location of the tow, and reason for discarding recorded in the required. Immediately following the event, the vessel would be required to stop fishing and return to port, with notification to NMFS OLE being made prior to arrival in port.
  - Discard, that results when more catch is taken than is necessary to fill the hold, is within the control of the vessel operator and would continue to be prohibited.
- All prohibited species incidentally caught in a midwater trawl, and required to be retained under this section, would be abandoned to the State of landing immediately upon offloading.
- All groundfish caught in excess of the trip limits would be abandoned to the State of landing immediately upon offloading.
- No vessel could receive payment for any fish landed in excess of any cumulative trip limits.
- All fish from a delivery must be offloaded at only one first receiver.

EMS requirements

- Owners of vessels participating in the Pacific whiting shoreside fishery would be required to arrange for EMS services from a NMFS-approved provider and pay all associated costs.

- Vessels required to procure EMS services may also be required to carry an NMFS West Coast Groundfish Observer Program observer.
- The vessel operator would be required to schedule maintenance of EMS equipment.
- One each trip prior to the start of fishing, the vessel operator must conduct an EMS status check as specified by the EMS provider to confirm that all components of the EMS are functioning properly. The EMS will record the results of this check. If the EMS check identifies a malfunction, the vessel must contact the NMFS-specified EMS provider immediately.
- From 30 minutes before official sunset until 30 minutes after official dawn, each vessel required to have EMS would be required to provide lighting to areas where the trawl nets and fish are handled and fish hold openings, deck spaces, and the trawl ramp so the activities could be clearly recorded by the EMS cameras:
- When aware that EMS is not functioning properly or the power has been interrupted, the vessel operator would be required to immediately contact the EMS service provider.
- The vessel is obligated to monitor the EMS performance and contact the EMS service provider immediately when the system malfunctions. The EMS provider is required to provide technical service within 24 hours of notification.

Prohibited actions:

- Failure to comply with all EFP requirements.
- Failure to maintain the trawl logbook as required by the State of landing and the EFP.
- Delivery of unsorted whiting catch to first receivers that do not hold EFPs.
- Fish with a vessel that does not have properly installed and functioning EMS equipment.
- Tamper with, disconnect, damage, destroy, alter, or in any way distort, render useless, inoperative, ineffective, or inaccurate any component of the EMS unit.
- Fail to provide notice to NMFS of any interruption in the power supply to the EMS unit or intentionally interrupting the power supply to the EMS unit (failure to provide notice to NMFS OLE will be considered as an intentional interruption);
- Use a gear other than midwater trawl gear.
- Fail to have a valid declaration report for midwater trawl.
- Target a species other than Pacific whiting when the vessel has a declaration for midwater trawl gear in the Pacific whiting fishery.
- Fail to abandon all prohibited species and overage catch to the state of landing
- Fail to bring all catch onboard the vessel and retain that catch until offloading, with the exception of large marine organisms and operational discards.
- Fail to cease fishing and return to port immediately following a discard event of more than one basket of fish.
- Fish for, land, or process fish without observer coverage when a vessel is required to carry an observer under § 660.314(c).

8) EFP Terms and conditions for Pacific whiting shoreside first receiver

The terms and conditions of EFPs for Pacific whiting shoreside first receivers would include the following:

Maximized retention requirements

- Procure catch monitor services from a NMFS approved catch monitor provider and pay all associated costs.
- Catch monitors would be required for all Pacific whiting shoreside fishery deliveries by vessels holding EFPs.
    - Pacific whiting shoreside fishery landings are those landings taken during the primary season by a vessel declared to be using limited entry midwater trawl.
- A catch monitor would be required to be present at the shoreside processing facility each day that Pacific whiting landings are received.
- Catch monitor would be given notification in person, by personal communications radio, or by telephone of planned facility operations, including the receipt of fish, at least 30 minutes and not more than 2 hours prior to the start of the planned operation.
- Catch monitors would be give free and unobstructed access to the catch throughout the sorting process and the weighing process.
- Catch monitors would be given free and unobstructed access to any documentation required by regulation including fish tickets and scale test results.
- Catch monitors would be given free and unobstructed access to a telephone and facsimile during the hours that Pacific whiting is being processed at the facility and 30 minutes after the processing of the last delivery each day.
- The owner or manager of each Pacific whiting shoreside first receiver would be required to provide reasonable assistance to the catch monitors to enable each catch monitor to carry out his or her duties. Reasonable assistance includes, but is not limited to: informing the monitor when bycatch species will be weighed, and providing a secure place to store equipment and gear.
- The owner or manager of each Pacific whiting shoreside first receiver would be required to adhere to all applicable state and federal rules, regulations, or statutes pertaining to safe operation and maintenance of a processing and/or receiving facility.

NMFS-Approved Monitoring plans

- Each Pacific whiting shoreside first receiver would be required to have a NMFS accepted monitoring plan before being issued an EFP.
- A monitoring plan would be submitted to NMFS by the owner or manager of a first receiver at least 14 days prior to receiving Pacific whiting shoreside fishery deliveries.
- The catch monitoring plan must include the following types of information:
    - Name and signature of the person submitting the monitoring plan.
    - Address, telephone number, fax number and email address (if available) of the person submitting the monitoring plan;
    - Name and location of the first receiver;
    - A detailed description on how the first receiver will meet the weighing and sorting requirements including:
        - The sorting locations and the amount of space for sorting catch, the number of personnel assigned to catch sorting and the maximum rate that catch will flow through the sorting area.
        - Personnel skills and training for sorting catch to federal species groups.
        - The process for weighing catch, including large and small volumes of target and incidentally caught species.

        - The scale makes and models being used to weigh catch during the Pacific whiting shoreside fishery, including the most current test date provided by the Department of Weights and Measures for the state of landing and whether or not the scale met the testing criteria either initially or upon retesting.
    - A description of how the catch monitor requirements would be met, including:
        - How the first receiver operates and maintains a safe processing and/or receiving facility.
        - Who would be responsible for notifying the catch monitor of planned facility operations, including the receipt of fish.
        - How the catch monitor would be given access to the catch throughout the sorting process and the weighing process and to any documentation required by regulation including fish tickets and scale test results.
        - The name and contact information for an individual(s) who will be responsible for assuring that the catch monitor obtains the necessary information from the first receiver.
    - A description of when and where prohibited species will be counted.
- NMFS will review the monitoring plans within 14 days of receiving a complete monitoring plan submission. If NMFS does not accept a monitoring plan the first receiver owner or manager may resubmit a revised monitoring plan.

Specifications and management measures

- An allowance would be made to allow Pacific whiting shoreside first receivers that use a hopper type scale to derive an accurate total catch weight prior to sorting. Providing that immediately following weighing of the total catch and prior to processing or transport away from the point of landing, the catch must be sorted to the species groups and all incidental catch (groundfish and non groundfish species) is accurately weighed and the weight of incidental catch deducted from the total catch weight to derive the weight of target species.

Prohibited actions

- Receive for transport or processing, catch from a Pacific whiting shoreside vessel without obtaining verification from vessel personnel that the vessel has an EMS from the NMFS provider installed on the vessel
- Process catch without coverage of a catch monitor unless NMFS has granted a written waiver specifically exempting the first receiver from the catch monitor coverage requirements.
- Fail to sort fish to federal species groups.
- Process, sell, or discard any groundfish received from a Pacific whiting shoreside vessel that has not been accurately weighed on a scale and accounted for on an electronic fish ticket report
- Fail to weigh fish landed from a Pacific whiting shoreside vessel prior to transporting the catch away from the point of landing.
- Mix catch from more than one delivery prior to the sorting and weighing of catch.

- Fail to allow the catch monitor unobstructed access to catch sorting, processing, catch counting, catch weighing, or electronic or paper fish tickets.
- Fail to provide reasonable assistance to the catch monitor.
- Forcibly assault, resist, oppose, impede, intimidate, harass, sexually harass, bribe, or interfere with a catch monitor.
- Interfere with or bias the procedure employed by a catch monitor.
- Tamper with, destroy, or discard a catch monitor's equipment, records, photographic film, papers, or personal effects without the express consent of the catch monitor.
- Harass a catch monitor by conduct that: has sexual connotations, has the purpose or effect of interfering with the catch monitors work performance, and/or, otherwise creates an intimidating, hostile, or offensive environment.
- Require, pressure, coerce, or threaten a catch monitor to perform duties normally performed by processor employees.

ENFORCMENT CONSULTANTS REPORT ON PACIFIC WHITING HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES FOR 2009

The 2008 shoreside Pacific whiting fishery took place in three separate openings throughout the year, as was done in 2007. The duration of each opening was as follows:

Early: May 1-May 21, 2008
Main: June 15- August 19, 2008
Late: October 12-December 21, 2008

The number of participating vessels remained the same in 2008, halting a trend of slight increases since 2004. A total of 36 vessels completed 609 trips and 1248 sets, compared with 820 trips and 1796 sets by 36 vessels in 2007.

Data collection success rates were very high in 2008. There were 568 trips with 100 percent sensor data and 566 trips with 100 percent video data (includes trip with insignificant losses of 0.2 percent or less). Overall, sensor data was more than 98 percent complete and video data was 96.5 percent complete. The largest single loss of video data represents more than half of the total hours of video lost. If this is removed from the totals, the video data success rate jumps to more than 98 percent.

The biggest change in fleet behavior for the 2008 season was the decrease in discarding activity. The total volume of discards dropped from 770 mt in 2007 (1 percent of total catch) to 125 mt (0.25 percent of total catch) in 2008. The percentage of discarding events showed substantial drops in key areas, such as a percentage of total sets (15 percent to 4 percent), and medium and large volume discards (53 percent to 36 percent). Discards on sets other than the last set of a trip also dropped sharply (2007:49; 2008:7), indicating vessels mostly followed the regulation of returning to port after discards occurred. The comparison also shows that the number of vessels with discards decreased. In 2004, 23 of 24 vessels discarded; in 2005, 27 of 28 vessels discarded; in 2006, 31 of 35 discarded; and in 2007, 33 of 36 vessels discarded a percentage of their catch. Discards were confined to 18 of the 36 vessels that participated in the 2008 fishery.

Looking at the 18 vessels with discards, 13 discarded less than 1 percent of their total catch. Three vessels discarded 50 percent of the total discard volume. There were 52 sets with discards, and only seven of those events on sets other than the last set of a trip.

Of the 18 vessels with discard event(s), 9 vessels self reported. Two self reported investigations have been concluded with verbal warnings. The other 16 violations remain under investigation.

PFMC
03/09/09

GROUNDFISH ADVISORY SUBPANEL REPORT ON PACIFIC WHITING HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES FOR 2009

The Groundfish Advisory Subpanel (GAP) is astounded by the troubling decline in harvest and stock trend produced by the post-Stock Assessment Review (STAR) model. It is unfortunate that time is not available to fully investigate why the model is producing such a dramatic change from the 2008 assessment. Catch data from the 2008 fishery is the only new data in the 2009 assessment. The 2008 fishery data appears to confirm the strong presence of the 2005 year class seen in the 2007 acoustic survey and fishery. Structurally, the 2009 assessment is similar to the 2008 model. The major influence changing stock status appears to be the estimate of acoustic survey selectivity, q. In addition, the untested correction for age-reading bias also influenced the model results.

The effect of q is not a surprise. Survey q has been and continues to be the major axis of uncertainty in the whiting assessment. Nonetheless, the wild swings in stock status produced by minor changes in q can produce large variability in stock status. The assessment authors state that the acoustic survey data is not informative enough to accurately estimate q. Prior to 2008, this problem was addressed by fixing q at two equally plausible values to capture the uncertainty. In an effort to let the model directly deal with uncertainty in q, the 2008 model freely estimated q, producing a value of about 0.46. The 2008 model produced results consistent with previous years (for example, in 2008, female spawning biomass was estimated at 1.1M mt and depletion at 38 percent; in 2007, female spawning biomass was estimated to range between 1.1M mt (q = 1.0) and 1.65M mt (q = 0.75) and depletions of 32 percent and 40 percent, respectively). In sharp contrast, the 2009 assessment estimates q to be 0.85, a female spawning biomass of 0.40M mt and depletion of 32 percent (or 29 percent based on the MCMC runs). Most critical are the conflicting depletion trends produced by the 2008 assessment and 2009 assessment. The 2008 assessment showed an increasing population trend (driven by the 2005 year class), the 2009 assessment projects decreasing abundance.

The whiting fishery produced estimated economic impacts of $140 million and $145 million in 2007 and 2008, respectively[*]. It is becoming increasingly difficult to rely on the whiting assessment process to provide a stable basis for business planning for this fishery – a fishery of critical importance to the west coast. The GAP believes there is an urgent need to fully evaluate the underlying model influences that drive trends in stock abundance. The GAP also recommends a Management Strategy Evaluation to investigate the appropriateness of the current groundfish management framework for whiting because of its high recruitment variability.

The GAP is very concerned about the ability of the current model to inform management, especially given its projected depletion trend, which is directly contrary to the 2008 stock assessment. However, the GAP believes it is important to provide advice on harvest levels. Therefore, with all of these uncertainties in mind, a clear majority of the GAP recommends a coastwide 2009 optimum yield of 215,000 mt, which the Scientific and Statistical Committee regards as the best estimate of a 2009 harvest level based on the harvest control rule (i.e., the 40-10 policy).

PFMC 3/9/09

[*] The Research Group, February 20, 2009

GROUNDFISH MANAGEMENT TEAM REPORT ON 2009 PACIFIC WHITING HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The Groundfish Management Team (GMT) reviewed the Pacific Whiting (hake) stock assessment and Stock Assessment Review (STAR) Panel report (Agenda Items G.1.a Attachments 1 and 2). The GMT analyses focus on the base case model as approved by the STAR Panel and Scientific and Statistical Committee (SSC).

Estimates of spawning stock biomass from the current assessment are considerably lower than the estimates from the previous assessment (Agenda Item G.1.a Attachment 1, Table b). New data include historical lengths from California, and 2008 catch, length, and age data from the U.S. and Canadian fisheries. Major changes to model structure include revisions to the descriptions of ageing imprecision and increased flexibility in historical fishery selectivity. Changes in the perception of stock status continue to be reflected in uncertainty regarding catchability (q) of the acoustic survey.

Whiting Stock Depletion and Risk Assessment

The GMT's analysis focuses on the SSC-preferred model for the 2009 whiting assessment (Hamel and Stewart, 2009). The base model suggests the stock is at 32% of unfished biomass in 2009 (Agenda Item G.1.a Attachment 1, Table b), with a reported range of 15% to 49%.[1] This range spans both the overfished and target biomass reference points, reflecting the considerable uncertainty in current stock status.

The current assessment describes catches in 2008 as being dominated by the strong 1999 year-class with evidence of an emergent 2005 year class. Fishing mortality rates have increased since 2003 but constraints associated with bycatch of overfished species have resulted in landings below the OY in recent years. Spawning stock biomass has been in decline since 2003, with estimated levels approaching all time lows. In addition, as described in more detail below, there appears to be a risk of exceeding the overfished threshold in the next few years.

Changes related to ageing imprecision resulted in lower estimates of recruitment and increased recruitment variability. This results in lower estimates of spawning stock biomass and increased uncertainty in projections. Although the current estimate of relative depletion is consistent with the previous assessment, the reduction in spawning stock biomass results in lower harvestable biomass.

[1] The stock assessment uses two statistical techniques to estimate depletion levels. The 32% estimate is a maximum likelihood estimate (MLE). The second method estimates current and future depletion levels in the decision tables based on the median posterior probability distribution obtained from Markov Chain Monte Carlo (MCMC) simulations. This method estimates current stock depletion to be 29%.

Management Considerations

Setting the 2009 Coastwide Whiting OY

The Pacific whiting decision table is composed of three states of nature estimates that describe 1) state of female spawning biomass, 2) the state of depletion, and 3) the relative state of overfishing (relative spawning potential ratio (SPR)). These states of nature are related to the population through projected catches (TABLE 1).

Table 1. Extended decision table with three year projections of posterior distributions for Pacific hake female spawning biomass, depletion and relative spawning potential ratio (1-SPR/1-$SPR_{Target=0.4}$; values greater than 1.0 denote overfishing).

Management Action		States of nature														
		Female spawning biomass (millions mt) posterior interval					Estimated depletion posterior interval					Relative spawning potential ratio posterior interval				
Year	Coast-wide catch (mt)	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th	5th	25th	50th	75th	95th
2009	50,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.24	0.31	0.36	0.42	0.52
2010	50,000	0.23	0.33	0.41	0.50	0.69	17%	24%	29%	36%	49%	0.22	0.29	0.34	0.41	0.52
2011	50,000	0.24	0.33	0.43	0.56	0.90	17%	24%	31%	40%	64%	0.19	0.27	0.33	0.40	0.51
2009	100,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.43	0.52	0.60	0.68	0.81
2010	100,000	0.21	0.31	0.38	0.48	0.66	15%	22%	28%	34%	47%	0.40	0.52	0.60	0.70	0.86
2011	100,000	0.20	0.29	0.39	0.52	0.86	14%	21%	28%	37%	61%	0.37	0.50	0.60	0.72	0.89
2009	137,526	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.54	0.65	0.73	0.82	0.96
2010	131,109	0.19	0.29	0.37	0.46	0.65	14%	21%	26%	33%	46%	0.51	0.64	0.74	0.84	1.02
2011	156,111	0.17	0.26	0.36	0.49	0.83	12%	19%	26%	35%	59%	0.53	0.70	0.82	0.96	1.14
2009	184,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.65	0.77	0.86	0.95	1.08
2010	184,000	0.17	0.27	0.35	0.44	0.63	13%	19%	25%	31%	45%	0.65	0.80	0.91	1.02	1.20
2011	184,000	0.13	0.22	0.32	0.45	0.79	9%	16%	23%	32%	56%	0.62	0.81	0.95	1.10	1.31
2009	215,000	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.72	0.84	0.93	1.02	1.15
2010	215,000	0.16	0.25	0.33	0.42	0.61	12%	18%	24%	30%	44%	0.73	0.89	1.00	1.11	1.29
2011	215,000	0.11	0.19	0.29	0.42	0.77	7%	14%	21%	30%	55%	0.70	0.91	1.05	1.22	1.43
2009	253,582	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.79	0.91	1.00	1.09	1.22
2010	193,109	0.14	0.24	0.32	0.41	0.60	10%	17%	23%	29%	43%	0.69	0.86	0.98	1.10	1.29
2011	189,054	0.10	0.19	0.28	0.42	0.76	7%	14%	21%	30%	54%	0.65	0.86	1.01	1.18	1.40
2009	365,784	0.25	0.33	0.40	0.48	0.64	18%	24%	29%	34%	46%	0.95	1.07	1.15	1.23	1.35
2010	256,993	0.09	0.18	0.27	0.36	0.55	7%	14%	19%	25%	39%	0.85	1.04	1.17	1.30	1.45
2011	222,901	0.04	0.12	0.21	0.34	0.69	3%	9%	15%	25%	50%	0.77	1.02	1.20	1.38	1.46

100,000 mt option

The current assessment suggests that this constant catch scenario results in a 1% decline in relative stock depletion in 2010. Female spawning biomass is projected to increase slightly between 2010 and 2011. All higher catch levels presented in Table 1 result in a consistent decline in female spawning biomass over the 2009-2011 period.

137,526 mt option

This option uses the 40-10 rule and $F_{40\%}$ harvest rate to set catch assuming the 'pessimistic model' wherein catchability (q) equals 1.31. This results in projected depletion rates 1% above the limit reference point/overfished level of $SB_{25\%}$. The probability of overfishing the resources in 2010 is unlikely based on the $SPR_{40\%}$ proxy out to the 95th percentile.

184,000 mt option

This option, requested by the GMT, determines the maximum catch level at which the depletion rate matches the overfished level (25%) in year 2010 at a 50% probability. Through 2011 there is less than a 50% chance of overfishing. However, this catch level will exceed the overfished limit in 2011. Caution is necessary when targeting the limit reference point given the large uncertainty in the assessment and, thus, the current state of the population.

215,000 mt option

A constant coastwide catch of 215,000 mt is the OY associated with the posterior median estimate of stock depletion (29%) (Agenda item G.1.a, Attachment 1, Table f). This amount of catch does not exceed the target harvest rate in 2009. However, there is a greater than 50% probability that spawning biomass will drop below the overfished threshold in 2010.

253,582 mt option

A coastwide catch of 253,582 mt is the 40-10 adjusted OY based on the SSC's preferred estimate of stock depletion (32%) (Agenda item G.1.a, Attachment 1, Table f). Under this constant harvest rate option, the probability of overfishing in 2009 is approximately 50% for this harvest level based on the current assessment. However, the probability of being below the 25% biomass threshold (overfished status) in 2010 is greater than 50% for this management action (Agenda item G.1.a, Attachment 1, Table g(2)).

365,784 mt option

This constant harvest rate option is closest to the 2008 coastwide OY (364,842 mt). Under this option, the probabilities of overfishing in 2009 and being overfished at the start of 2010 both exceed 50%.

Set Asides

Prior to calculating the whiting sector allocations, tribal set-asides and whiting removals in other fisheries must be accounted. The Final Rule (74 FR 9874) published on March 6, 2009 specifies a 50,000 mt tribal set aside. Information presented in the report on *Estimated Discard and Total Catch of Selected Groundfish Species in the 2007 U.S. West*

Coast Fisheries (NWFSC, December 31, 2008) indicate that 2,808 mt of whiting were caught in the shrimp trawl fishery and 1,155 mt in the limited entry non-whiting trawl fishery (Table 17, page 59). The Northwest Region anticipates approximately 50 mt will be needed for research in 2009. In total, 4,000 mt will be deducted from the US OY prior to determining the non-tribal sector allocations.

Once the set asides have been removed from the US OY, 42% of the whiting OY is available for the shoreside, 34% for the catcher-processor, and 24% for the mothership sectors. Table 2 outlines forward catch projections (based on the posterior median of depletion), the resulting allocations by sector after set asides, and projected 2010 depletion levels based on the median of the posterior distribution of the MCMC.

Table 2. Potential 2009 Pacific Whiting Specifications (mt).

Coastwide OY	U.S. OY	Set-asides		Non-treaty whiting allocations				Projected 2010 Depletion (% of B0)
		Non-whiting fishery bycatch	Tribal	Total	MS	CP	SSW	
215,000	158,842	4,000	50,000	104,842	25,162	35,646	44,034	24%
184,000	135,939			81,939	19,665	27,859	34,414	25%
150,000	110,820			56,820	13,637	19,319	23,864	26%
100,000	73,880			19,880	4,771	6,759	8,350	28%

Management Measures

The management measures for the 2009-10 limited entry whiting trawl management include sector-specific bycatch limits for the non-tribal sectors. Bycatch limits for canary, darkblotched, and widow rockfish have been apportioned according to the pro-rata distribution of the whiting allocation with 34 percent of the available yields of these species' bycatch limits allocated to the catcher-processor sector, 24 percent to the mothership sector, and 42 percent to the shoreside sector. This pro-rata distribution is specified in regulation. NMFS also has the ability to institute depth restrictions, on a sector-specific basis, in order to reduce overfished species impacts. Further, NMFS will automatically close the non-tribal whiting fishery upon projection of attainment of a bycatch limit rather than waiting until the limit is attained.

The Council also established a rollover provision for unused bycatch limit yields, such that when a whiting sector is closed by attaining its whiting allocation or if it is closed by projected attainment of a sector-specific bycatch limit, any remaining yield of the bycatch limit is distributed to the other non-tribal whiting sectors using the same pro-rata apportionment used to allocate whiting quota and sector-specific bycatch limits.

Northwest Region staff indicated that monitoring for the catcher vessels delivering to motherships, part of the Council's preferred alternative for whiting, was not able to be accommodated for the 2009 season. Additionally, it is unclear whether non-EFP vessels who are fishing in the RCA with mid-water gear during the primary season will carry observers (paid for by the vessel owner). If observers are not onboard the vessel, the GMT will continue to estimate bycatch impacts of this operation, based on best available data.

Amendments 10 and 15

Amendment 10, the maximized retention and monitoring program for the shoreside whiting fishery will not be implemented in time for the 2009 fishery. As in years past, the shoreside fishery will continue to be monitored under an EFP. Information from the Northwest Region indicates that Amendment 15, the whiting limited entry program should be published this week.

GMT Recommendations

1) The Council should select coastwide and U.S. OYs that reflect their best estimate of the current status of the stock and future biomass projections (Table 1) while taking into account the management measures needed to prosecute the fishery.
2) Prior to calculating the sector specific whiting allocations, the Council should consider a 4,000 mt set aside for catch/mortality in non-tribal non-whiting fisheries.

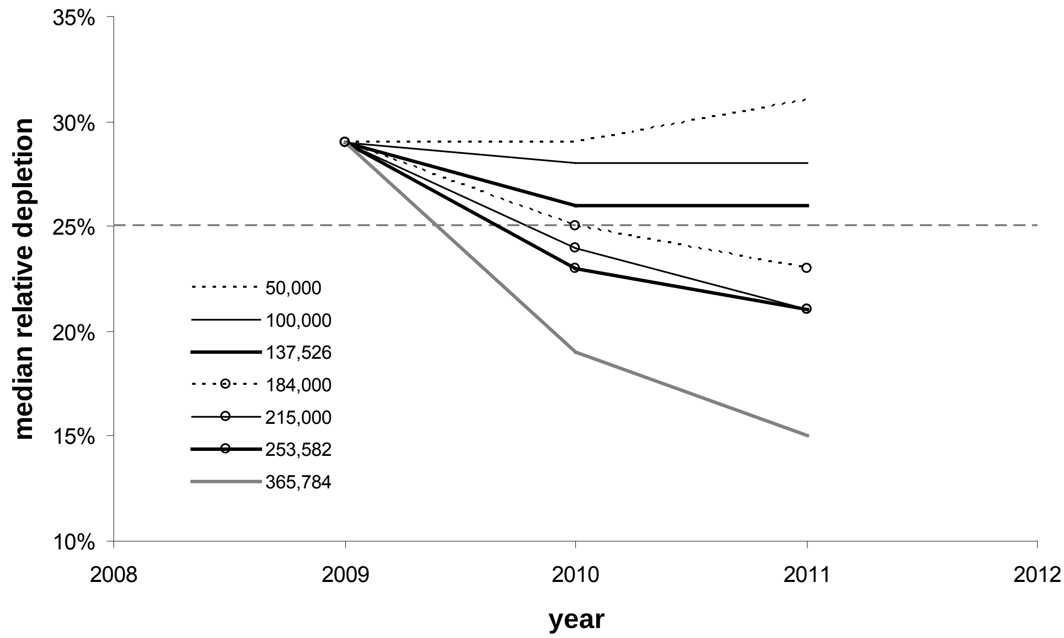

Figure 1. Median relative depletion (current biomass / unfished equilibrium biomass) projections based on posterior distributions from the base model. Catch options correspond to the proposed 2009 coastwide catches listed in Table 1. The overfished threshold (25% of unfished biomass) is shown for reference.

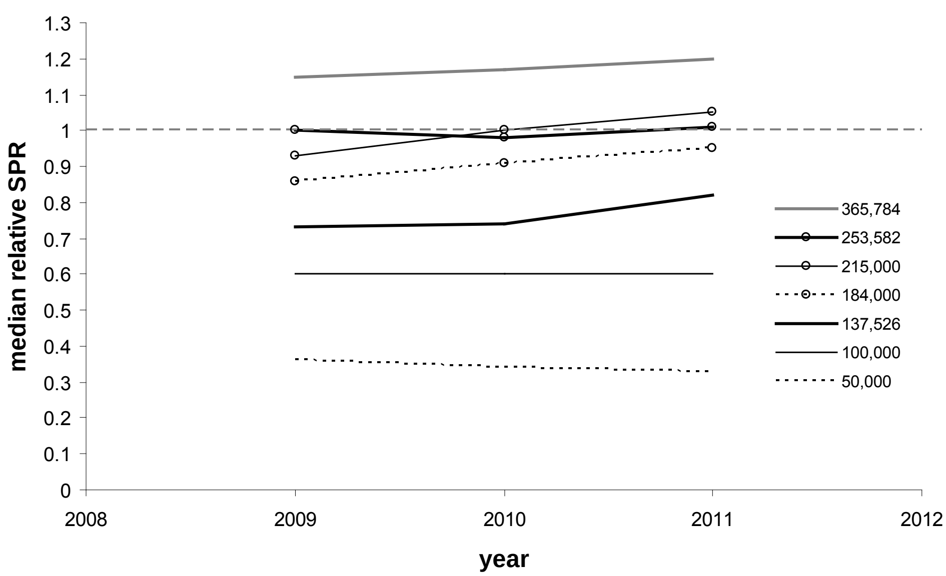

Figure 2. Median relative spawning potential ratio ([1-SPR]/[1-SPR$_{40\%}$]) projections based on posterior distributions from the base model. Catch options correspond to the proposed 2009 coastwide catches listed in Table 1. Values greater than 1 indicate overfishing.

Appendix A. Calculating the Commercial Whiting OY

The groundfish regulations specify that the deductions from the U.S. OY, in order to calculate the commercial whiting OY, are to include the tribal set-aside and potential mortality/catches in: scientific research projects and non-groundfish fisheries. The GMT discussed the best estimates available for whiting catch in the above mentioned sources, and provides the following information to inform the non-tribal set-aside for calculating the 2009 commercial whiting OY (Table A1).

Table A1. Comparison of non-tribal set-asides, used to calculate the commercial whiting OYs and the actual estimates of mortality of whiting.

<table>
<tr><th colspan="2">Sources of non-tribal mortality</th><th>2005 – Set asides[1/]</th><th>2005 – Catch Est.[2/]</th><th>2006 – Set-asides[1/]</th><th>2006 – Catch Est. [2/]</th><th>2007 – Set-asides[1/]</th><th>2007 – Catch Est.[2/]</th><th>2008 – Set-asides[1/]</th><th>2009 – Non-tribal set-aside</th></tr>
<tr><td colspan="2">Research</td><td rowspan="3">2,000</td><td>42</td><td>200</td><td>16</td><td>-</td><td>49</td><td rowspan="3">2,000</td><td>49 (2009 should be similar to 2007 value, due to similar surveys conducted)</td></tr>
<tr><td rowspan="2">Bycatch in non-groundfish fisheries</td><td>Pink Shrimp</td><td>unknown</td><td rowspan="2">1,800</td><td>unknown</td><td rowspan="2">2,000</td><td>2,808</td><td rowspan="2">2,808 (best estimated of mortality from non-groundfish fisheries in 2007)</td></tr>
<tr><td>CA halibut</td><td>>0.5</td><td>No observations</td><td>None observed</td></tr>
<tr><td colspan="2">Total:</td><td>2,000</td><td>42</td><td>2,000</td><td>16</td><td>2,000</td><td>2,857</td><td>2,000</td><td>2,857</td></tr>
</table>

1/ Described in Federal regulations
2/ Described in: NWFS total mortality report for each year.

The GMT also discussed mortality of whiting in the non-whiting groundfish fishery, which occurs primarily in the non-whiting bottom trawl fishery. Previously, mortality estimates shown in Table A2 were not explicitly removed from the whiting OY, prior to setting the sector specific whiting allocations. However, the total whiting mortality from all non-whiting (including the non-whiting bottom trawl fishery) was accounted for within the 2,000 mt non-tribal set-aside described above.

Table A2: Mortality of whiting in non-whiting fisheries.

	2005 – Set asides1/	2005 – mortality est.2/	2006 – Set-asides1/	2006 – mortality est.2/	2007 – Set-asides1/	2007 – mortality est.2/	2008 – Set-asides1/	2008 – mortality est.3/	2009 –
LE bottom trawl fishery	-	822	-	941	-	1,155	-	Likely similar to 2007, though increasing trend	1,155

1/ According to Federal regulations, set-asides of catch in commercial groundfish fisheries must be deducted from the commercial OY, and not from the U.S. OY.
2/ Described in: NWFS total mortality report for each year.
3/ Landings in PacFIN are similar to landings in 2007, so it is likely that total mortality would be similar.

Based on information presented in the 2007 total mortality report, 2,000 mt is no longer an adequate set-aside to account for all whiting mortality that is estimated to occur outside of the primary whiting season. The Council should consider establishing a non-tribal set aside based on the whiting mortality described in Table A1. The Council should consider subtracting whiting mortality from the non-whiting limited entry bottom trawl fishery from the commercial whiting OY before the sector specific whiting allocations are calculated, pending additional guidance from NMFS.

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON PACIFIC WHITING HARVEST SPECIFICATION AND MANAGEMENT MEASURES FOR 2009

Dr. Owen Hamel presented the Scientific and Statistical Committee (SSC) with an overview of the Pacific whiting stock assessment (Agenda Item G.1.a, Attachment 1) and Dr. David Sampson summarized the report of the joint Canadian and U.S. Pacific Whiting Stock Assessment and Review (STAR) Panel that occurred February 3-6th in Seattle (Agenda Item G.1.a, Attachment 2). The SSC also received a presentation on an age-structured model developed by Dr. Steven Martell of the University of British Columbia that was not available for review at the STAR Panel. In addition, Mr. Alan Sinclair (Department of Fisheries and Oceans [DFO] Canada) described the process used by DFO to review the assessment conducted by Dr. Martell and presented the review report. It was not possible for the SSC to review this additional assessment in any detail. The SSC notes, however, that there are major differences between the two stock assessments, including: (1) how selectivity was modeled, (2) how the data were aggregated, (3) the weighting of data elements, and (4) productivity assumptions. A thorough evaluation of these differences in model structure, as would normally occur during a STAR Panel review, would be needed for the SSC to judge the reliability of the Canadian assessment.

The 2009 whiting assessment was implemented using new SS3 software, but on the whole the structure of the assessment was similar to the 2008 assessment. Differences between the 2008 and 2009 assessments included more flexible modeling of fisheries selectivity, improved treatment of aging error, and freely estimating the level of recruitment variability. In combination, these changes produced a large downward shift in the absolute scale of biomass. A new data set, consisting of historical California fishery samples from Santa Barbara during 1963-1970, was also added, but this had very little influence on assessment results. The acoustic survey catchability coefficient (***q***) was freely estimated for the first time in the 2008 assessment, although it was recognized that this parameter was likely to be imprecisely estimated. Survey catchability was again estimated in the current assessment, and the estimate of ***q*** increased from 0.46 in the previous assessment to 0.85 in the current assessment. This had the effect of scaling the estimate of population biomass downwards. Imprecisely estimated parameters are expected to change as additional data are added or when changes are made to a model's structure.

The 2009 assessment did not exhibit a marked retrospective pattern, such that recruitment and spawning stock biomass changed systematically as the terminal year of the assessment was reduced. This is a desirable characteristic of assessment models, but was an issue with the last whiting assessment.

The SSC endorses the use of the SS3-based 2009 Pacific whiting assessment as the best available scientific information and recommends that it be used to form the basis for management of the stock. The assessment results indicate that the Pacific whiting stock has continued to decline as the strong 1999 year class passes out of the population and has not replaced by a similar strong year class. Estimates of stock status indicate that the stock is now at the lowest spawning biomass ever observed and is projected to decline further in the next three years under current harvest management. The Canadian assessment generally led to similar findings as the SS3 model, but also showed a sharp increase in fishing mortality within the last few years.

The SSC recommends that the decision table (Table 1 in Agenda Item G.1.b Supplemental GMT Report) based on the posterior distribution be used for management purposes. The three-year projections in Table 1 indicate that the stock is likely to approach or decline below the minimum stock size threshold ($0.25B_0$), which is an important consideration for Council decision-making. The SSC would like to point out several 2009 OY values in the Table.

- A 2009 OY of 253,582 mt (first row) represents the maximum likelihood estimate (MLE) of the OY based on the 40-10 harvest policy adopted for Pacific whiting, but this level of catch would result in a 50 percent probability of overfishing in 2009. Although an ABC calculated from the MLE results in a catch of 291,965 mt, the SSC considers the catch level that produces a 50 percent probability of overfishing a better way to calculate the ABC. The SSC therefore recommends that 253,582 mt should be considered the upper limit of potential 2009 OYs.

- A 2009 OY of 215,000 mt approximates the 40-10 harvest control rule if the ABC is 253,582 mt. The SSC regards this value as the best estimate of a 40:10 OY in 2009 because results from the posterior distribution best account for uncertainty in the assessment, at least in comparison with the MLE result.

- A 2009 OY of 184,000 mt results in a 50 percent probability of the stock dropping below the minimum stock size threshold in 2010. Therefore, a 2009 catch in excess of this amount corresponds to a greater than 50 percent probability of the stock dropping below $0.25B_0$ in 2010, which may lead to the stock being declared overfished, depending on the outcome of the 2010 assessment.

The SSC has previously noted that the population dynamics of Pacific whiting are not well matched to the default harvest policy for groundfish. Whiting biomass would be expected to fluctuate at a level well below $B_{40\%}$ if the fishery were conducted under an $F_{40\%}$ harvest policy for an extended period of time. Given that whiting recruitment is highly variable, application of the 40-10 control rule will lead to excursions into the overfished zone. The SSC reiterates its previous recommendation that the trade-offs achieved by alternative harvest policies for Pacific whiting should be investigated.

Late arrival of the 2008 fishery data left little time for the STAT to analyze, let alone explore, alternative model structures. Future whiting STAR Panels will likely be presented with more than one model to review. An assessment and review process conducted under a compressed timeline, as was done this year, may cause a decline in the quality of the assessment and the review. The SSC recommends that a later date be considered for the whiting STAR Panel, which would allow more time to assemble the prior year's data and would also facilitate the interaction of the U.S. and Canadian analytical teams. Such a delay in schedule might be achieved without disrupting the current fishing seasons if an initial release of quota allowed the fishery to begin prior to finalizing the assessment.

PFMC
03/09/09

Agenda Item G.1.b
Tribal Report
March 2009

Quileute Natural Resources
QUILEUTE INDIAN TRIBE

401 Main Street • Post Office Box 187
LaPush, Washington 98350

Phone: (360) 374-5695 • Fax: (360) 374-9250

RECEIVED

NOV 10 2008

PFMC

November 3, 2008

BY MAIL AND HAND DELIVERY

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: 2009 Tribal Allocation for Whiting

Dear Council Members:

On behalf of the Quileute Tribe, I request that the PFMC recommend to NMFS that it make clear that any tribal whiting allocation is a **total tribal allocation** which the tribes are responsible for managing, without any language regarding separate "set asides" or "management shares."

Background

As the PFMC is aware, the Quileute Indian Tribe intends to participate in the Whiting fishery starting in 2009. Nearly one year ago, the Tribe announced its intent to participate in the fishery, and asked NMFS to take action necessary to implement the Tribe's treaty right. NMFS Regional Administrator D. Robert Lohn not only acknowledged the Tribe's proper request, but expressly represented in writing to the Tribe that: "***Any whiting allocation will be an overall tribal allocation, and the intertribal distribution of the overall tribal allocation is an intertribal issue.***" I have attached a copy of Mr. Lohn's April 2, 2008 letter for your reference.

In the spring of 2009, NMFS requested information about the anticipated size of the Quileute whiting fleet and harvest levels. Quileute responded with some preliminary numbers. At the time, however, the Quileute understood, based on NMFS's own written statement, that the only issue was what would be an appropriate total tribal allocation. The Quileute made clear that it did not object to setting the 2009 tribal allocation at 20.5% of the OY, or approximately 50,000 metric tons.

Unfortunately, however, during the PFMC's June meeting, a motion was made to not only set the 2009 whiting allocation at 50,000 metric tons but to divide that quota into two shares, giving the Makah 42,000 metric tons and 8,000 metric tons for the Quileute. Again, the Quileute did not object to the

50,000 metric ton tribal whiting allocation, but objected to any intertribal allocation or individual management shares. Despite the Tribe's objections, the motion (number 49) passed. Subsequent to the June meeting, the Quileute continued to object to the intertribal allocation language and advised NMFS that it anticipated that it would have three to four vessels participating in its 2009 whiting fishery, with the capacity to catch up to 24,000 metric tons. The Tribe requested that NMFS set a total tribal whiting allocation which took into account the Quileute Tribe's anticipated harvest.

We have recently learned that NMFS plans to adopt the recommendation contained in motion 49 and divide the total tribal whiting allocation of 50,000 metric tons into two "individual Tribal set asides" for the Makah and Quileute at 42,000 and 8,000 metric tons, respectively. We ask PFMC to recommend to NMFS that it change course. NMFS has no authority or need to set separate tribal shares. Intertribal allocation is a matter for the tribes to resolve amongst themselves on a government to government basis. NMFS has consistently recognized this and has never set intertribal allocations in any fishery. We, therefore, ask that PFMC recommend to NMFS that it delete any reference to "set asides" or "tribal management shares" from the regulation and simply follow its prior practice of setting a single tribal allocation of 50,000 metric tons.

Furthermore, while the Quileute do not object to the 50,000 metric ton share as long it is an undivided total treaty allocation, if NMFS insists on setting separate tribal allocations, the allocation must be sufficient to allow the Quileute to take its anticipated harvest of 24,000 metric tons, an amount well within its treaty share. Although the Quileute informed NMFS of its expected harvest capacity on several occasions, NMFS has indicated it intends to provide only 8,000 metric ton for the Quileute. NMFS's only justification for disregarding the Tribe's anticipated harvest levels is its claim that the Tribe did not submit that information in a timely manner. NMFS's position is unfair for two reasons.

First, there is no written or binding deadline for the submission of anticipated harvest information; there is merely a deadline for indicating intent to participate in the fishery. Indeed, NMFS has not yet issued proposed whiting regulations for 2009. In fact, it is expected that final management measures will not be implemented until March 2009. Second, at the time NMFS sought input from the Quileute in the spring of 2008, the Quileute understood, based on NMFS's own written statement, that the only issue was the amount of the total treaty allocation. The Quileute agreed that the total treaty allocation of 50,000 metric tons was acceptable. It agreed on the assumption that NMFS would be true to its word and continue its practice of not setting separate tribal allocations and that the Quileute would work with the Makah to determine appropriate management measures for the treaty fishery. Thus, the Quileute's input on the treaty quota was timely. It was only after the June 2008 PFMC meeting that it became clear that NMFS was intending to alter course and establish separate tribal allocations. At that time, the Quileute reiterated its objection to separate shares. It also informed NMFS that an 8,000 metric ton set aside was insufficient since it expected to harvest 24,000 metric tons, an amount that is well within its treaty rights.

Request

The Tribe believes PFMC can rectify this situation by taking the following action. Given that implementation of the 2009 harvest specifications and management measures has been delayed until March 2009, PFMC should recommend to NMFS that it make clear that the 50,000 metric tons is a **total tribal allocation** which the tribes are responsible for managing jointly, just like in every other fishery. However, if, despite the Quileute's objection, NMFS insists on setting separate tribal amounts, it must not unfairly limit the Quileute to 8,000 metric tons when the Tribe has indicated that it expects to harvest 24,000 metric tons, and should increase the treaty allocation if necessary.

Sincerely,

Mel Moon, Jr.
Director, Quileute Natural Resources

cc: D. Robert Lohn, NMFS Northwest Regional Administrator
Frank Lockhart, NMFS Assistant Northwest Regional Administrator for Sustainable Fisheries

Agenda Item H.5.b
Supplemental NMFS Report
April 2008

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

APR 0 2 2008

Russell Woodruff
Chair, Quileute Tribal Council
Quileute Natural Resources
P.O. Box 187
La Push, WA 98350

Dear Mr. Woodruff,

Thank you for providing written notification of the Quileute Tribe's interest in harvesting Pacific whiting starting in 2009. Consistent with the process described at 50 CFR § 660.324 (d), I am forwarding your letter to the Pacific Fishery Management Council (Council) for inclusion in the April 2008 briefing book and for Council consideration under the 2009-2010 fishery specifications and management measures. As stated in section 660.324(d), the National Marine Fisheries Service (NOAA Fisheries) will develop tribal allocations and regulations in consultation with the affected tribes and, insofar as possible, with tribal consensus. NOAA Fisheries will make the allocation after consideration of the tribal allocation request, recommendations of the Council, and comments from the public.

At the Council's November 2007 meeting, the Makah tribal fishery representatives indicated that a new tribal allocation framework would be submitted to NOAA Fisheries for 2009-2010. We have not yet, however, received a new a new tribal allocation framework proposal. As Frank Lockhart, my Assistant Regional Administrator for Sustainable Fisheries, discussed with Mel Moon at the March Council meeting, we strongly urge you to coordinate with the Makah tribe to present a unified tribal proposal. Any whiting allocation will be an overall tribal allocation, and the intertribal distribution of the overall tribal allocation is an intertribal issue. NOAA Fisheries is available to work with the tribes on this issue, but both interested tribes must be involved. We also urge that the State of Washington, and possibly Oregon, be involved in discussions on the matter.

NOAA Fisheries recognizes the co-managers role of the Coastal Treaty Tribes over the shared federal and tribal resources. For NOAA Fisheries to meet its obligation for total catch accounting under the Magnuson-Stevens Fishery Conservation and Management Act, we will need to collect routine catch information on both Pacific whiting and incidentally caught species. We, therefore, think that a discussion of data gathering and reporting and potential bycatch issues should be included in the discussions. NOAA Fisheries generally collects catch information weekly during the fishing season.

Please contact Frank Lockhart at 206-526-6142 in order to coordinate further discussions on this matter.

Sincerely,

D. Robert Lohn

D. Robert Lohn
Regional Administrator

Cc: Mel Moon

Quileute Natur
QUILEUTE IND
401 Main Street • Pos
LaPush, Washing
Phone (360) 374-5695 • F

D. [illegible] JS.
File Action SED
Pls prepare response
To. CC:

RECEIVED
APR 0 8 2008
PFMC

January 10, 2008

Robert Lohn
Regional Administrator
NMFS, Northwest Region
7600 Sand Point Way NE
Seattle, WA 98115-0070

RE: Quileute Tribal Request for Whiting Allocation or Regulation

Dear Mr. Lohn:

As you know, Washington coastal Indian Tribes, including the Quileute Tribe, have treaty rights to harvest groundfish, including Pacific whiting (or hake, *Merluccius productus*), within their respective usual and accustomed fishing grounds and stations ("U&A"). The Secretary of Commerce, through NMFS, has issued regulations allocating whiting to the coastal tribes since approximately 1996. The Quileute Tribe has not previously participated in this fishery. However, the Tribe anticipates that one or more of its members will do so commencing with the 2009 fishery. The Tribe communicated its intent to enter this fishery to Frank Lockhart of your office during a recent PFMC meeting in San Diego, California. The Tribe is not presently requesting an increase in the whiting allocation to all coastal tribes. However, pursuant to 50 C.F.R. § 660.324(d), the Tribe is hereby advising NMFS of its intent to participate in this fishery and requesting that NMFS take any action that may be necessary to implement the Tribe's right. If you would like to discuss this matter or believe that additional action by the Tribe is necessary, please contact Mel Moon, Director of Quileute Natural Resources, at (360) 374-3133.

Sincerely,

QUILEUTE INDIAN TRIBE

Russell Woodruff, Jr.
Chair, Quileute Tribal Council

ZIONTZ, CHESTNUT, VARNELL, BERLEY & SLONIM
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Via Telefax and First Class Mail

April 2, 2008

D. Robert Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115-0070

Re: Treaty Indian Groundfish Fisheries in 2009 and 2010

Dear Mr. Lohn:

We have been asked to write to you on behalf of the Makah Indian Tribe. Pursuant to 50 C.F.R. § 660.324(d), the Tribe requests that provision be made for harvest of groundfish by Pacific coast treaty Indian tribes in 2009 and 2010 by continuing, with the exceptions noted below, the treaty regulations and allocations in effect in 2007 and 2008.

The exceptions are as follows. First, as in 2007 and 2008, the Tribe proposes that Tribal fisheries be subject to the Limited Entry trip limits in place at the beginning of each year for both shortspine and longspine thornyheads. However, the Tribe proposes that it be able to combine those trip limits for all periods and all midwater trawl vessels in the Makah fleet, and utilize the total amount in a way that minimizes bycatch of other species.

Second, the Tribe requests that its allocation in the Pacific whiting fishery be equal to 17.5 percent of the Optimum Yield for whiting, instead of using the sliding scale allocation table that has been in use since 1999. Moreover, if the Quileute Tribe intends to participate in the Pacific whiting fishery, an additional allocation should be provided for the Quileute Tribe and appropriate measures should be developed to address observer coverage for and bycatch in the Quileute fishery.

The Tribe's proposals for the Pacific whiting fishery are based on the following considerations. The sliding scale allocation table was first presented to the Pacific Fishery

Management Council in September 1998 as a three-year proposal. At that time, Quileute had expressed interest in participating in the fishery. Accordingly, the sliding scale allocation table explicitly provided for separate Makah and Quileute allocations, as follows:

U.S. Harvest Guideline	Makah Allocation	Quileute Allocation
Up to 145,000 mt	17.5% of U.S. Harv. Guide.	2,500 mt
145,001 to 175,000 mt	25,000 mt	2,500 mt
175,001 to 200,000 mt	27,500 mt	2,500 mt
200,001 to 225,000 mt	30,000 mt	2,500 mt
225,002 to 250,000 mt	32,500 mt	2,500 mt
Over 250,000 mt	35,000 mt	2,500 mt

At the March 1999 Council meeting, Quileute announced that it would not be participating in the whiting fishery in 1999. Accordingly, NMFS used the sliding scale allocation table to make an allocation of 32,500 mt to Makah, based on an OY of 232,000 mt. *See* 64 Fed. Reg. 27,928, 27,929 (May 24, 1999).

Although the allocation was a "tribal" allocation, all parties understood that it had been requested by and was designed to meet the needs of the Makah Tribe alone. This was confirmed by the Ninth Circuit Court of Appeals when Midwater Trawlers Cooperative challenged the 1999 allocation. Among other things, Midwater argued that the allocation was based on an overly expansive definition of the coastal tribes' usual and accustomed grounds. The Court held Midwater lacked standing to challenge the usual and accustomed grounds of Hoh, Quileute or Quinault because "*NMFS has not allocated any Pacific whiting to them.*" *Midwater Trawlers Co-op v. Department of Commerce*, 282 F.3d 710, 716 (9th Cir. 2002) (emphasis added) Rather, "the only tribal allocation properly at issue is that to the Makah Tribe." *Id.*

Quileute has not requested an allocation in any other year, until now. In each year, Makah was the only Tribe requesting an allocation in the whiting fishery and the "tribal" allocation was based on the sliding scale allocation table to meet the needs of the Makah fishery.

Since the Makah Tribe proposed the sliding scale allocation table ten years ago, its fishery has developed and matured. Today, the Makah whiting fleet comprises five vessels that consistently participate in the fishery and fully harvest the Makah allocation. The Tribe has contractual arrangements with both an at-sea and a shore-based processor to harvest the catch. It has observer coverage on-board the at-sea processor and at the shore-based facility. It has a full retention policy for all bycatch and intensively manages the fishery to minimize bycatch of depleted groundfish species and chinook salmon.

Given the development of its fishery, the Tribe believes an allocation of 17.5 percent of the OY would better meet its needs while still remaining well within the scope of its treaty right. A straight 17.5 percent allocation would avoid sudden changes in the Tribe's allocation as a result of small changes in the OY. Also, the Tribe's understanding of the fishery, as a result of twelve years of experience, means that it can fully harvest a 17.5 percent allocation at higher OY levels with its existing fleet, while still minimizing bycatch.

In upholding the sliding scale allocation table, the Ninth Circuit began with the proposition that the Tribe "is entitled to one half of the Pacific whiting passing through its usual and accustomed fishing grounds." *Midwater Trawlers v. Department of Commerce*, 393 F.3d 994, 1003 (9th Cir. 2004). It then noted that NMFS' data suggest that Pacific whiting's migration pattern takes the bulk of the stock through the Makah Tribe's usual and accustomed fishing grounds. *Id.* This is significant because it means that all migrating coastal Pacific whiting are potentially exploitable by Makah. *Id.* at 1004. Accordingly, basing the Makah allocation on a percentage of the OY was consistent with the best available science and treaty allocation principles. *Id.* at 1004-05.

Under the sliding scale allocation table, "the Makah Tribe would be allocated a percentage ranging from 14 [to] 17.5 percent" of the OY. *Id.* at 1004 Midwater argued that NMFS failed to explain the scientific basis for this range. *Id.* at 1004 n.11. In rejecting this argument, the Ninth Circuit made it clear that a 17.5 percent allocation is well within the scope of the Makah's treaty right:

> Contrary to Midwater's argument, [the] Fisheries Service is not required to establish that these percentages are supported by the best scientific information available. We have previously concluded that Makah's treaty rights entitle it to *50 percent* "of the harvestable surplus of Pacific whiting that passes through its usual and accustomed fishing grounds, or that much of the harvestable surplus as is necessary for tribal subsistence." *Midwater II*, 282 F.3d at 719. Nothing, however, supports the notion that a tribe is obligated to take its full 50 percent entitlement. That the tribe opts to not take its full treaty share does not put [the] Fisheries Service in the position of justifying a tribe's lower allocation request. Rather, [the] Fisheries Service is required only to support its decision to use the U.S. Optimum Yield as the basis from which to measure the tribe's allocation. And, we conclude that [the] Fisheries Service has met this obligation.

Id. (italics in original; underlining added).

Accordingly, Makah's current proposal for an allocation of 17.5 percent of the OY will remain well within the scope of its treaty right and, indeed, will remain less than "its full treaty share."

In order to avoid potentially significant disruption to the Makah fishery, Quileute's participation should be based on a separate allocation as contemplated when the sliding scale allocation table was first proposed in 1998. Quileute has not contacted the Makah Tribe to notify it of Quileute's plans to participate in the fishery, and has not provided any information to Makah regarding the number of Quileute vessels that will participate, the anticipated harvest of whiting, or the projected bycatch of other species. The Makah Tribe, its fishermen, their crews, and the processors have all made significant investments to establish and develop the Makah whiting fishery, and have foregone opportunities to participate in other fisheries. Makah's allocation requests have been designed to meet the needs of its fishery and to remain well within the scope of its treaty right. If Quileute wants to participate in the fishery, an additional allocation should be made to accommodate its fishermen, rather than simply diverting an unknown portion of the Makah allocation to them.

The need for a separate, additional allocation to Quileute is particularly acute given bycatch concerns, especially for widow and canary rockfish. The Makah Tribe intensively manages its fishery to reduce impacts on these species and to accommodate the needs of non-treaty fisheries within the constraints of current rebuilding plans. Quileute has provided no information concerning projected impacts on these or other species in its fisheries, its plans for observer coverage, or on management efforts it intends to implement to reduce bycatch.

Under these circumstances, if Quileute intends to participate in the whiting fishery in 2009 or 2010, the "tribal" allocation should include an additional allocation, over and above the 17.5 percent allocation to Makah, to accommodate the Quileute fishery, and appropriate measures should be developed to address observer coverage for and bycatch in the Quileute fishery. The Makah Tribe intends to contact the Quileute Tribe to discuss these matters and to attempt to coordinate the Tribes' respective fisheries.

Makah representatives will be available to discuss any questions you or your staff may have regarding these matters at the upcoming Council meeting.

Very truly yours,

ZIONTZ, CHESTNUT, VARNELL,
BERLEY & SLONIM

Marc Slonim

Marc D. Slonim

cc (via fax):

Frank Lockhart
Eileen Cooney
Russ Svec
Steve Joner

Agenda Item F.4.b
Supplemental Tribal Report
June 2008

Quileute Natural Resources
QUILEUTE INDIAN TRIBE

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Testimony of Mel Moon in Support of Tribal Request for Whiting Allocation

As the National Marine Fisheries Service ("NMFS") and the Pacific Fishery Management Council ("PFMC") are well aware, the Quileute Indian Tribe intends to participate in the Pacific whiting fishery commencing in 2009. Since late 2007, the Tribe has made its intentions clear, both in writing and orally, to NMFS and the PFMC. The Tribe is here today to again reiterate its intention to participate in the 2009 Pacific whiting fishery and, more specifically, to support the Makah Tribe's request for an increase in the tribal whiting allocation to 20.5% of the United States Optimum Yield ("OY").

As you know, the Secretary of Commerce, through NMFS, has issued regulations allocating whiting to the coastal tribes since approximately 1996. The Quileute Tribe has not previously participated in this fishery. In 2009, however, one or more Quileute members intend to participate in this fishery. The Tribe informally advised NMFS of its intent to enter this fishery at the last PFMC meeting in November, 2007. By letter dated January 10, 2008 and pursuant to 50 C.F.R. § 660.324(d), the Quileute Tribe formally provided NMFS with written notification of its intent to participate in the Pacific whiting fishery commencing in 2009. By reply letter dated April 2, 2008, NMFS advised the Tribe that its request had been forwarded to the PFMC for consideration at its April meeting. At that time, NMFS advised that "any whiting allocation will be an overall tribal allocation, and the intertribal distribution of the overall tribal allocation is an intertribal issue." At the April 2008, PFMC meeting, the Tribe again reiterated its intent to participate in the 2009 Pacific whiting fishery.

Subsequently, the Quileute Tribe has met in good faith with other coastal tribes and NMFS to further discuss the specifics of the coastal whiting fishery. Specifically, on May 2, 2008, representatives of the Quileute, Makah, and Quinault tribes met with representatives of NMFS to discuss the tribal whiting fishery. At that time, and pursuant to NMFS's request, the Quileute Tribe provided additional information about the nature and scope of its anticipated 2009 whiting fishery. Specifically, Quileute:

(1) Anticipated one vessel between 95 – 125 feet to participate in the 2009 whiting fishery,
(2) Estimated a whiting harvest of approximately 4,000 to 8,000 metric tons based on historical catches of similarly sized vessels,

(3) Indicated that its whiting fishery would take place between May 15-December 15, 2009 for catcher/processor or "mothership", and June 15-December 15, 2009 for shore-based delivery.

(4) Provided estimates of its bycatch based upon the groundfish management team's weighted average approach;

(5) Stated that it would be working with the NOAA staff and regional science center for time and area management measures to minimize bycatch in the Quileute whiting fishery.

Subsequent to this meeting, the Quileute, Quinault, and Makah tribes engaged in further discussions about the 2009 whiting fishery. At that point, the Quinault tribe made clear that it would not be participating in the whiting fishery until at least 2010. Thereafter, the Quileute and Makah tribes agreed that the total tribal allocation for 2009 should be 20.5% of the OY, which represents a 3% increase on the maximum amount of the prior tribal allocation under the "sliding scale" approach. Accordingly, the Quileute Tribe hereby supports the Makah's request for a total tribal allocation of 20.5% to meet the needs of the Quileute and Makah Tribes who will be participating in this fishery in 2009. Considering that the best available science shows that all harvestable whiting pass through the Quileute and Makah U&As, this amount is clearly well-within their treaty right to harvest up to 50% of the OY.

Although the Quileute and Makah tribes agree upon the total tribal whiting allocation for 2009, they are continuing to negotiate over the proper intertribal distribution of that allocation. To be clear, however, any tribal whiting allocation must be made to the coastal tribes as a whole, and must not be split-up by tribe or made to any specific tribes. In all of its discussions with NMFS, PFMC, and other tribes, the Quileute Tribe has been very clear that NMFS must, as it has in every prior year and in every other federally managed fishery, make a ***total tribal whiting allocation*** and must not take the unprecedented step of allocating groundfish on a tribe-by-tribe basis. Tribal allocations of all federally-managed fisheries, including Pacific whiting, have always been made to ***all coastal tribes***, leaving it up the tribes to decide the appropriate intertribal distribution. The federal regulations make clear that once NMFS receives a tribal request to participate in a groundfish fishery, as it has here, it must implement that right "through an allocation of fish **that will be managed by *the tribes*...** ." 50 C.F.R. § 660.324(d) (emphasis added). In other words, it is up to the tribes to decide how to manage a total tribal groundfish allocation. NMFS could not have been more clear on this point in 1999 when it stated in federal regulations that: **"NMFS believes that the intertribal distribution of the overall tribal allocation is an internal tribal issue, and herein issues only a total allocation for the affected tribes."** 64 Federal Register 27,929 (May 24, 1999) (emphasis added). The Quileute Tribe would strenuously object to issuance of any "separate allocation" to the Quileute or any other action which purports to restrict Quileute's right to harvest from the overall "tribal allocation."

Last, the Quileute Tribe's participation in the whiting fishery will not result in the excessive harvest of overfished species. First, the Quileute Tribe intends to model its observer and bycatch-avoidance programs after those successfully implemented by the

Makah Tribe. The Quileute Tribe continues to research and study those programs and looks forward to working with the Makah tribe to better understand its processes. The Quileute Tribe is confident that by the time it commences this fishery nearly one year from now that it will have an adequate observer program and other steps to minimize bycatch, such as time and area restrictions. Second, although new to this fishery, Quileute fishermen are responsible and very experienced in other fisheries. They have a proven track record of successfully minimizing bycatch in other fisheries, such as halibut and blackcod. Third, there is no evidence suggesting that the Quileutes's U&A is home to higher concentrations of sensitive or protected species of groundfish. To the contrary, analysis of variance (or ANOVA) studies of the bycatch rates for overfished species for the years 2003 to 2007 for the non-tribal at-sea fleets showed no significant differences in the concentration of overfished species between the various tribal U&As.

In short, the Quileute Tribe hereby joins and supports the Makah Tribe's request for a total tribal whiting allocation in 2009 of 20.5% of the OY. This represents a relatively minor increase to the total tribal allocation and remains well-within the treaty right.

CONSIDERATION OF INSEASON ADJUSTMENTS INCLUDING PACIFIC WHITING BYCATCH LIMITS

Management measures for the 2009 groundfish season were set by the Council with the understanding these measures would likely need to be adjusted throughout the biennial period to attain, but not exceed, the optimum yields (OYs). This agenda item will consider inseason adjustments to ongoing 2009 fisheries.

Potential inseason adjustments under this agenda item include changes to Pacific whiting bycatch limits, adjustments to Rockfish Conservation Area boundaries, adjustments to commercial and recreational catch limits, and catch estimate revisions based on the latest bycatch information from the West Coast Groundfish Observer Program.

The Groundfish Management Team and the Groundfish Advisory Subpanel will meet prior to this agenda item to discuss and recommend inseason adjustments to 2009 groundfish fisheries. After hearing this advisory body advice and public comments, the Council will consider preliminary or final inseason adjustments. Agenda Item G.7 is scheduled for Friday, March 13, should further analysis or clarification be needed.

Council Action:

Consider information on the status of 2009 fisheries and adopt preliminary or final inseason adjustments as necessary.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Merrick Burden
b. Reports and Comments of Agencies and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Preliminary or Final Recommendations for Adjustments to 2009 Groundfish Fisheries

PFMC
02/13/08

GROUNDFISH ADVISORY SUBPANEL REPORT ON CONSIDERATION OF INSEASON ADJUSTMENTS INCLUDING PACIFIC WHITING BYCATCH LIMITS

The Groundfish Advisory Subpanel (GAP) discussed inseason adjustments for ongoing groundfish fisheries, as well as bycatch caps for the whiting fishery, and has the following comments and recommendations.

Recreational

The GAP proposed an adjustment to extend the California recreational groundfish season in the North-Central S. of Point Arena management area. The GAP agrees with the Groundfish Management Team (GMT) recommendation to evaluate fishery performance at the September Council meeting and then consider an extension of the recreational fishery in this area at that time.

Commercial

Open Access DTL Fishery between 36° and 40°10' N Latitude
The GAP proposed an increase in the bimonthly limit for the open access daily-trip-limit (DTL) fishery in the area between 36° and 40°10' N latitude to be implemented May 1. The GAP agrees with the GMT recommendation to increase the bi-monthly limit in this area from 2,200 lbs/2 months to 2,500 lbs/2 months starting May 1.

Open Access Black Rockfish Limits North of 40°10' N Latitude
The GAP proposed an increase in the black rockfish landing limit north of 40°10' N latitude from 6,000 lbs/2 months to 7,000 lbs/2 months. The GAP agrees with the GMT recommendation to consider such an increase at the April meeting with the understanding that such an inseason adjustment at the April Council meeting can be implemented on May 1.

Bycatch Limits in the Limited Entry Whiting Trawl Fishery
The GAP agrees with the GMT recommendations regarding bycatch limits in the 2009 limited entry trawl fishery for whiting. The GAP believes a pro-rata distribution of these bycatch caps to sectors of the whiting fishery is a reasonable apportionment method and therefore recommends no change from what was contemplated in the 2009-2010 specifications and management measures decision.

Limited Entry Non-whiting Trawl- Chilipepper Rockfish Limits South of 40°10' N Latitude
The GAP proposed an increase in the chilipepper rockfish limit shoreward of the RCA and south of 40°10' N latitude. The GAP agrees with the GMT recommendation to delay consideration of increased chilipepper limits until fishery performance in this area can be better evaluated.

Limited Entry Non-whiting Trawl- Slope Rockfish Limits

The GAP concurs with the GMT recommendation to increase cumulative limits of species restricted by darkblotch bycatch.

The GAP recommends the GMT analyze arrowtooth limits for inclusion to the consideration.

PFMC
3/10/09

THE GROUNDFISH MANAGEMENT TEAM REPORT ON CONSIDERATION OF INSEASON ADJUSTMENTS (INCLUDING PACIFIC WHITING BYCATCH LIMITS)

The Groundfish Management Team (GMT) considered the most recent information from the west coast Groundfish Observer Program, including the Estimated Discard and Total Catch of Selected Species for 2007 (the Total Mortality Report), and the status of ongoing fisheries. The following considerations and recommendations are offered.

Research

The GMT received an update from the National Marine Fisheries Service (NMFS) Northwest Region (NWR) relative to changes in estimated research catches in the scorecard. The set-asides identified during the 2009-2010 specifications and management measures cycle were all appropriate with the exception of the expected yelloweye impacts. Due to a lack of funding, Oregon Department of Fish and Wildlife (ODFW) will be unable to conduct the enhanced rockfish survey work in conjunction with the International Pacific Halibut Commission annual longline survey during 2009, as they did in 2008. Predicted levels, including other ODFW sponsored research, results in a reduction of estimated yelloweye impacts from 2.8 to 2.4 mt.

Recreational Fisheries

2008 Fisheries
The GMT received reports from Washington, Oregon, and California regarding catch estimates for the 2008 recreational fisheries. None of the catch estimates indicate that harvest guidelines for overfished or target species were exceeded in 2008.

2009 Fisheries
The GMT received a request to examine expansion of the season south of Point Arena by approximately two weeks either by starting on June 1 or ending on November 15. The season is currently scheduled from June 13 to October 31. The 2009 season for the North-Central South of Point Arena Management Area is constrained by the projected catch of blue rockfish and potentially by other species as well (e.g. minor nearshore rockfish South or yelloweye) under the current season structure. If inseason information becomes available indicating lower impacts of constraining species, it may be possible to extend the season later in the year. Therefore, the GMT does not recommend changing the season structure at this time.

A second request was received for an allowance of 1 canary in the marine fish bag limit for the California recreational fishery, but the GMT notes that this concept was considered but rejected for further analysis during the biennial specifications and management measures cycle. While bag limit adjustments may be routine inseason management measures, the GMT does not recommend allowing retention of overfished species due to concerns over unquantifiable targeting that might occur.

Commercial Fisheries

Limited Entry non-whiting Trawl Fishery

The GMT received an updated set of bycatch data from the west coast Groundfish Observer Program. Based on this data, the estimated catch of overfished species in the non-whiting trawl fishery was revised. These updates are shown in Attachment 1.

RCA Changes

The GMT received a request to examine changing the shoreward RCA boundary north of 40° 10' N. lat. from 75 fm to 100 fm for one two-month period in either periods 2, 3, or 5. The GMT notes that this would increase yelloweye and canary impacts putting catch levels very near the optimum yield (OY). Therefore, the GMT recommends no changes to the shoreward Rockfish Conservation Area (RCA) boundary north of 40° 10' N. lat. at this time, but will revisit the issue as more information becomes available.

Slope Rockfish including Darkblotched

The GMT received a request from the Groundfish Advisory Subpanel (GAP) to explore providing more opportunity for deep water species if there is enough darkblotched available. As a result of the updated trawl bycatch model, the GMT scorecard indicates that over 40 mt of darkblotched is available to the fishery. The GMT would like to note that increased uncertainty exists for darkblotched catch estimates in the current year due to the change to a 3-month (increased from 2 months in 2007-2008) time period where the modified 200 fm RCA line is established for 2009-2010. Therefore, the GMT does not recommend developing management measures at this time that would take the entire darkblotched OY, but do provide increased opportunity earlier in the season when DTS species are more available. As more information on the current fishery becomes available, it may be appropriate to craft measures that would more fully take the darkblotched OY; however, given the surplus in the scorecard, the GMT identified fishing opportunities that the Council could recommend to more fully utilize the darkblotched OY at this time:

- Increase shortspine thornyhead limits to 19,000 lbs/2 months beginning in period 3 through the end of the year coastwide (large footrope only in the North).
- Increase slope rockfish limits north of 40° 10' N. lat. to 2,500 lbs/2 months beginning in period 3 through the end of the year.
- Increase sablefish N of 40 10 with large footrope to 24,000 lbs from period 3 through period 5.
- Increase sablefish S of 40 10 to 21,000 lbs beginning period 3 through period 6.

Chilipepper Rockfish

The GMT received a request to increase chilipepper limits in the non-whiting trawl fishery in areas south of 40° 10' N. lat. The GMT notes that chilipepper limits in areas shoreward of the trawl RCA were increased to 5,000 lbs /2 months beginning in 2009 and the effect of those limits is not yet known. However, the Northwest Fisheries Science Center (NWFSC) total mortality reports indicate that bocaccio bycatch in the trawl fishery has been declining over the past several years and as a result opportunities may exist for increasing chilipepper opportunities in the south. The GMT plans to more fully evaluate opportunities for chilipepper rockfish in the south and report back to the Council at a subsequent meeting.

Canary Rockfish

The GMT further notes that based on the latest observer data from the 2007 Total Mortality report that the canary OY was exceeded that year. Beginning in 2007, the Council began implementing relatively restrictive RCA boundaries that closed off two areas north of 40° 10' N. lat. in order to protect canary rockfish. The Total Mortality Report indicates that the catch of canary rockfish in the non-whiting trawl fishery was higher than anticipated, even with these additional closures. However, in 2008, canary bycatch estimates were inflated by the GMT to account for differences between NWFSC estimates of mortality, and trawl bycatch estimates of mortality. A similar comparison based on the 2009 trawl model shows that applying 2007 regulations results in estimates of 2007 trawl mortality very similar to what is contained in the Total Mortality Report. Therefore, the GMT believes that the existing model with updated bycatch rates provides a realistic estimate of canary rockfish catch in the non-whiting trawl fishery.

Table 1. Expected impacts associated with LE trawl recommendations.

	Overfished Speices			
	North	South	Total	
Canary	11.8	4.4	16.3	
POP	81.6	1.2	82.8	
Darkblotch	173.2	43.0	216.2	
Widow	8.1	10.2	18.3	
Bocaccio	1.0	14.2	15.2	
Yelloweye	0.3	-	0.3	
Cowcod	-	1.7	1.7	
	Target Species			OY/Allocation
Sablefish	2,351.1	589.7	2,940.8	3,005
Longspine	434.6	337.2	771.9	2,175
Shortspine	994.0	329.3	1,323.3	1,591
Dover	10,349.9	2,829.4	13,179.3	16,500
Arrowtooth	2,297.1	91.6	2,388.8	10,112
Petrale	2,021.8	344.1	2,365.9	2,393
Otr Flat	1,723.5	643.2	2,366.6	4,884
Slope Rk	83.0	181.4	264.4	1160N/626S

Limited Entry Non-Tribal Whiting Trawl

Bycatch limits

Among the new management measures for inseason management of whiting in 2009-2010 are sector-specific bycatch limits for the three non-tribal sectors of the Pacific whiting fishery. The bycatch limit for each species is apportioned among the sectors based on the same percentages used to allocate whiting: 42 percent going to the shore-based sector, 34 percent going to the catcher/processor sector, and 24 percent going to the mothership sector. These percentages are fixed in Federal Regulations. As of March 1, 2009, the sector specific bycatch limits for canary, widow, and darkblotched rockfish are listed in Table 1 below. A summary of bycatch limits, associated whiting allocations, and catch by year are presented in Table 2.

Table 2. 2009 Regulatory bycatch limits for canary, widow, and darkblotched among non-tribal whiting sectors.

	Canary (mt)	Widow (mt)	Darkblotched (mt)
Catcher-processors	6.1	153	8.5
Motherships	4.3	108	6
Shorebased	7.6	189.0	10.5
Total (mt) *	18	450	25

Table 3. Pacific whiting allocations and bycatch limits with associated catch and bycatch summary by year for 2005-2008. SS=shorebased, CP=catcher-processor, and MS=mothership.

		2005		2006		2007		2008	
Species	Sector	Alloc/Cap	Catch	Alloc/Cap	Catch	Alloc/Cap	Catch	Alloc/Cap	Catch
Pacific whiting	SS	97,469	97,381	97,469	97,297	87,398	73,280	58,669	50,423
	CP	78,903	78,890	78,903	78,864	70,751	73,263	115,789	108,121
	MS	55,696	48,571	55,696	55,355	49,942	47,809	58,087	57,432
	TOTAL	232,068	224,842	232,068	231,516	208,091	194,352	232,545	215,976
Canary	SS		2.22		1.64		2.01		1.66
	CP		0.34		0.10		0.35		2.43
	MS		0.70		0.85		1.62		0.74
	TOTAL	4.7	3.26	4.0 - 4.7	2.59	4.7	3.98	4.7	4.83
Darkblotched	SS		5.34		2.28		0.95		0.94
	CP		5.95		6.73		5.28		2.40
	MS		5.08		4.24		6.73		3.93
	TOTAL	NA	16.37	25.0	13.25	25.0	12.96	40.0	7.27
POP	SS		0.52		0.14		23.14		0.07
	CP		0.78		0.75		2.92		12.83
	MS		0.86		1.88		0.73		2.93
	TOTAL		2.16		2.77		26.79		15.83
Widow	SS		77.15		49.38		88.97		99.09
	CP		43.14		67.00		72.77		52.37
	MS		35.50		71.80		72.99		60.75
	TOTAL	200 - 212	155.79	200 - 220	188.18	200 - 275	234.73	275.0	212.21
Yelloweye	SS		0.01		0.06		0.04		0.00
	CP		0.00		0.01		0.01		0.01
	MS		0.00		0.02		0.00		0.00
	TOTAL		0.01		0.09		0.05		0.01

Widow Rockfish

The GMT notes that for widow rockfish the Council decision in June was to hold all sectors harmless and allocate up to the remainder of the OY to the non-tribal whiting fisheries. Based on the latest observer data, impacts for the Limited Entry non-whiting trawl fleet result in the need to decrease the widow bycatch limit for non-tribal whiting. The GMT requests guidance on whether the Council intends to utilize the entire remainder of the widow OY for that limit.

Darkblotched Rockfish

As with the non-whiting trawl fishery above, the GMT considered the remaining darkblotched rockfish in our current scorecard projections and suggests that the Council could consider increasing the bycatch limit. Any increase would continue to be distributed in a pro-rata fashion across the 3 non-tribal whiting sectors. The GMT notes that the darkblotched limit has been higher in recent years (Table 3) and an increase from 25 mt would allow greater flexibility to the fleet inseason.

Pacific Ocean Perch

In reviewing the NWFSC 2007 Total Mortality Report, the GMT noted that the OY for Pacific Ocean perch was exceeded. The GMT further notes that in 2007, the whiting fisheries took over 27 metric tons of Pacific Ocean perch (POP), which was much higher than the 1.9 metric tons anticipated in September 2007. We attribute this large POP catch to the fact that the fishery was closed early in the year as a result of attainment of a bycatch limit. The subsequent late season re-opening forced fishing effort to occur in deeper water (due to a whiting fishery RCA restriction to reduce impacts on canary rockfish). Based on the existing management measures, the GMT believes that a premature closure of the fishery is less likely in 2009, and therefore does not believe that catch of POP will be as high as that observed in 2007. Should RCA restrictions be considered later in the year, the GMT will explore the potential for increased impacts to POP at that time. The current projected POP impacts in the scorecard reflect the weighted average from 2003-2006.

Limited Entry Fixed Gear

The GMT received a request from industry representatives to examine changing the seaward non-trawl RCA boundary from 125 fm to 100 fm during some portion of the season from July to September for the portion of the coast from 43° N. lat. to Cascade Head (45° 03.83' N. lat.). The GMT is currently exploring inclusion of a finer scale and temporal variation in our fixed-gear model based on the delineation of the latest observer data and will revisit this request later in the year.

Open Access Fishery North of 40° 10' N. lat.

Black Rockfish

The GMT received a request to analyze increasing black rockfish limits in the open access fishery north of 40° 10' N. lat. Black rockfish limits are currently "5,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish" in the area north of 42° N. lat. and "6,000 lb/ 2 months, no more than 1,200 lb of which may be species other than black or blue rockfish" for the area between 40° 10' N. lat. and 42° N. lat. Unfortunately, the GMT was not able to fully analyze implications of this request in light of the new observer data at this meeting.

While the Oregon fishery is currently open, the California fishery is closed and will not re-open until May 1, 2009. The GMT also notes that Oregon's state trip limits are lower than the federal limits; therefore any increase to trip limits afforded by this request would affect California only. NMFS staff also indicated that if the Council chose to increase limits at the April Council meeting, the regulatory change could likely occur on or just after May 1. Because the request was for an increase in trip limits, it could take effect upon implementation and would not have to wait until the start of a cumulative two-month period. Therefore, the GMT recommends re-visiting this request at the April Council meeting so we can examine the impacts of this increase on minor nearshore rockfish and overfished species.

Lingcod

The GMT also received a request to examine allowing lingcod retention for an extra month beginning in April. It is our understanding that the December through April closure has been in place since 2004, as a result of the last full assessment, to protect spawning individuals. The GMT notes that modifying this spawning closure was not analyzed during the biennial specifications and management measures cycle; therefore the effects of changing the current season structure are unknown. The next full assessment is scheduled for 2009 and this request can be included on the list of issues for the next specification and management measures cycle during the November meeting. The GMT does not recommend modifying the lingcod spawning closure at this time.

Open Access Sablefish Fishery N of 36°

The GMT also received requests to examine maintaining or increasing the bi-monthly limits for the DTL fishery north of 36° N. lat. (currently 2,400 lb/2 months) rather than decreasing to 2,200 lbs/2 months beginning May 1st. Even with the expectation of another relatively poor salmon year (and the corresponding increased effort), model results indicate that the increase could be accommodated while still staying within the Open Access allocation as well as current projected impacts to overfished species. Therefore, the Council could consider increasing the bi-monthly limit up to 2,500 lbs/2 months beginning May 1.

GMT Recommendations:

1. Consider increases for slope rockfish and associated DTS species for the limited entry non-whiting trawl fishery.
2. Select a revised widow bycatch limit for the non-tribal whiting fishery.
3. Consider increasing the darkblotched bycatch limit for the non-tribal whiting fishery.
4. Consider increasing the bi-monthly limit for Open Access sablefish North of 36° up to 2,500 lbs/2 months beginning May 1.

Attachment I. Updated Scorecard

Projected mortality impacts (mt) of overfished groundfish species updated with most recent West Coast Groundfish Observer data for LE trawl, nearshore, OA DTL, LE FG.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	**15.1**	**16.2**	**1.3**	**214.4**	**82.1**	**18.1**	**0.3**
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/		4.3		6.0	1.1	**105.5**	0.0
At-sea whiting cat-proc a/		6.1		8.5	1.1	**149.4**	0.0
Shoreside whiting a/		7.6		10.5	0.3	**184.6**	0.0
Tribal whiting		2.1		0.0	1.1	5.5	0.0
Tribal							
Midwater Trawl		3.6		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Fixed Gear Sablefish	**0.0**	**0.3**	**0.0**	**1.0**	**0.2**	**0.3**	**1.1**
Fixed Gear Nearshore	**0.0**	**2.9**	**0.0**	**0.0**	**0.0**	**0.1**	**0.9**
Fixed Gear Other	**5.0**	**0.0**	**0.0**	**9.0**	**0.0**	**0.7**	**0.0**
Open Access: Incidental Groundfish	**2.0**	0.9	0.0	0.0	0.0	**4.0**	0.3
Recreational Groundfish c/							
WA		20.9					5.2
OR						1.0	
CA	67.3	22.9	0.1			6.2	2.8
EFPs	13.7	2.7	0.3	1.3	0.0	5.5	0.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	8.0	0.2	2.0	2.0	1.1	**2.4**
TOTAL	105.1	100.1	1.9	252.7	91.6	522.0	15.6
2009 OY d/	288	105	4.0	285	189	522	17
Difference	182.9	4.9	2.1	32.3	97.4	0.0	1.4
Percent of OY	36.5%	95.3%	47.5%	88.7%	48.5%	100.0%	91.9%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data					

a/ Non-tribal whiting values for canary, darkblotched, and widow reflect bycatch limits for the non-tribal whiting sectors. The widow bycatch limit is the difference between the OY and the projected impacts in all non-whiting fisheries. All other species' impacts are projected from the GMT's whiting impact projection model. The Council may elect to change these bycatch limits when setting final whiting management measures in March of 2009 or 2010 or under any inseason action at any of their future meetings.

b/ South of 40°10' N. lat.

c/ Values in scorecard represent projected impacts for all species except canary and yelloweye rockfish, which are the prescribed harvest guidelines.

d/ 2009 and 2010 OYs are the same except for darkblotched (291 mt in 2010), POP (200 mt in 2010), and widow (509 mt in 2010).

PFMC
03/10/09

Agenda Item G.3
Situation Summary
March 2009

FISHERY MANAGEMENT PLAN AMENDMENT 20 – TRAWL RATIONALIZATION – OWNERSHIP AND MISCELLANEOUS ISSUES

At its November 2008 meeting, the Council took final action on trawl rationalization but left three issues for trailing actions: accumulation limits, eligibility to own, and the adaptive management program. Additionally, it was noted that clarification of the November 2008 decision may need to come before the Council at the first three 2009 Council meetings. This agenda item addresses scoping of the eligibility to own issue and three matters requiring clarification. The schedule for addressing trailing actions and the deeming process for trawl rationalization regulations is provided as Agenda Item G.3.a, Attachment 1; a complete description of the program in Agenda Item G.3.a, Attachment 2; and notes on the Council discussion from November 2008 in Agenda Item G.3.a, Attachment 3.

The first part of this agenda item will consider further guidance for staff analysis of the "eligible to own" provision in the trawl rationalization preferred alternative (Attachment G.3.a, Attachment 4). During initial scoping in 2005-2007, a flexible ownership eligibility alternative was offered as a simple alternative to developing myriad options for communities, crew, and other groups to own individual fishing quotas (IFQ). As a result, the current preferred option indicates that any individual or legal entity would be eligible to own IFQ if they are also eligible to own a U.S.-documented fishing vessel. In November 2008, the Council moved to initiate a trailing action process to help ensure that quota shares (QS) holders have direct ties or investments in the fishery. This would require the creation of criteria for who may be eligible to own or hold QS. The Council also stated that eligibility requirements should not be so onerous as to preclude or discourage crew members, for example, from acquiring QS and entering the fishery.

In January 2009, the Groundfish Allocation Committee (GAC) reviewed the November 2008 Council decision and discussed the direction of the "eligible to own" analysis (Agenda Item G.3.b, Attachment 4). The GAC generally affirmed the proposed direction of the staff analysis, which would compare the current option with an option that would tie quota share ownership to the fishery by narrowing possible eligible quota share owners (Agenda Item G.3.a, GAC Report). In so doing, GAC affirmed the "use or lose" concept and the "owner on board" concept should not fall under the purview of this analysis. Additionally, GAC indicated they would like to see how other rationalized fisheries address the eligible to own issue. Agenda Item G.3a, Attachment 5 contains examples that will be explored.

In order to move forward with development of options and staff analysis of those options, the Council may wish to provide additional direction to staff, such as the inclusion/exclusion of such items as the "use or lose" concept and the "owner on board" concept in this "eligibility to own QS" analysis. So that staff may proceed with analysis of additional "eligible to own" options, the Council may wish to clarify or give examples of entities that have a linkage to the fishery and how that linkage could be assessed and confirmed.

The second part of this agenda item will consider clarifications to the Council's November 2008 Trawl Rationalization decision. These matters include clarifications on:

1. Three versus four trawl sectors and the species managed with IFQ in the shoreside trawl sectors.
2. Clarification of species for which the at sea sectors would be held accountable.
3. The approach for making an initial allocation of overfished species quota shares to permits with history south of 40° 10' N. latitude.
4. The approach for making an initial allocation of Pacific halibut quota shares to permits with history south of 40° 10' N. latitude.

With regard to the first item of clarification, the Council's November 2008 Trawl Rationalization decision established three trawl sectors. However, the motion describing which species each sector would be held accountable for differentiates between shoreside whiting trawl activity and non-whiting activity. This language has the effect of creating a program with four trawl sectors, creating an inconsistency with the motion to establish three trawl sectors.

The GAC met in January 2009 and discussed this first matter of clarification and unanimously voted to clarify the intention of the Council's action was to have three trawl sectors, with both shoreside whiting and non-whiting activity being held accountable for the same set of species (see G.3.b, GAC Report). In addition, GAC discussion suggested that the Council's intent for species accountability in the at sea sector may have been different from the set of species managed under status quo. Additional discussion on this matter is provided as G.3.a, Attachment 6. Staff is seeking clarification on these matters to move forward with analysis.

The third and fourth matters of clarification deal with the method for making an initial allocation of Pacific halibut and overfished species quota share to entities with history in the geographic area south of 40° 10' N. latitude. Two options exist for making initial allocations of Pacific halibut and overfished species in that area (see G.3.a, attachments 7 and 8). Council staff is seeking clarification on these matters in order to move forward on remaining analysis.

Council Action:

1. **Provide guidance on developing the "eligible to own" analysis.**
   a. **Clarify that the "eligible to own" analysis would not include analysis of a "use it or lose it" provision or an "owner on board" requirement.**
   b. **Clarify that the Council wishes to have any additional alternatives analyzed which would link quota share ownership to participation or a connection to the fishery in some way.**
   c. **Indicate examples of entities that have a linkage to the fishery that should be analyzed, and indicate examples of identification criteria that could be applied to these entities to determine whether they would be eligible to own IFQ or not.**

2. **Clarify aspects from November 2008 decision.**
   a. **Clarify the Council's intent on whether to have three or four trawl sectors and whether to hold non-whiting and shoreside whiting activity accountable for the same species.**
   b. **Consider clarifying the set of species for which at sea participants would be held accountable.**
   c. **Specify a manner in which overfished species quota share assignments should be calculated for permits with history south of 40° 10' N. latitude.**

d. **Specify a manner in which Pacific halibut IBQ assignments should be calculated for permits with history south of 40° 10’ N. latitude.**

Reference Materials:

1. Agenda Item G.3.a, Attachment 1: Trawl Rationalization Schedule for 2009.
2. Agenda Item G.3.a, Attachment 2: Pacific Council Recommendations for Rationalization of the Groundfish Trawl Fishery (Including Whiting).
3. Agenda Item G.3.a, Attachment 3: Trawl Rationalization Council Action November 2008 Draft Staff Notes on Discussion.
4. Agenda Item G.3.a, Attachment 4: Eligibility to Own IFQ; Council Staff Report to the GAC on Trailing Action Considerations
5. Agenda Item G.3.a, Attachment 5: Examples of “eligible to own” issue in other rationalized fisheries
6. Agenda Item G.3.a, Attachment 6: Accountability for Species by Sector
7. Agenda Item G.3.a, Attachment 7: Analysis Illustrating the Effect of Two Different Finer Area Bycatch Rate Overfished Species Allocation Formulas
8. Agenda Item G.3.a, Attachment 8: Select Excerpts Pertaining to Pacific Halibut Initial Allocation South of 40 Degrees 10 Minutes North Latitude.
9. Agenda Item G.3.c, GAC Report: Eligible to Own issue and other clarifications
10. Agenda Item G.3.d, Public Comment.

Agenda Order:

a. Agenda Item Overview — Heather Brandon/Merrick Burden
b. NOAA General Counsel Comments — Eileen Cooney
c. Reports and Comments of Agencies and Advisory Bodies
d. Public Comment
e. **Council Action:** Scoping of Ownership Trailing Action and Miscellaneous Clarifications

PFMC
02/23/2009

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Agenda Item G.3.a
Attachment 1
March 2009

Trawl Rationalization - Schedule for 2009

Calendar of Events	Trailing Actions	Drafting of Regulations and EIS
Jan 12: Submitted Report to Congress ***March 6-13 Council Mtg*** ***April 2-10 Council Mtg***	• **Decide on Accumulation Limits** • Identify Scope for **Eligibility to Own** and **Clarifications** • Identify Options for **Eligibility to Own** and Additional **Clarifications** • Identify Options for **AMP**	
May 5-7 **GAC** Meeting ***June 11-18 Council Mtg***	• Develop Recommendations on **Eligibility to Own** • Develop Recommendations for **AMP** • **Decide on Criteria for Eligibility to Own** • **Decide on AMP Provisions**	• NMFS submits partial initial draft of regulations and/or questions to Council. • Council provides clarifications
Summer		• Finish drafting regulations • Draft EIS Finalized
Sept10-17 Council Mtg		• Council review of draft regulations (deeming)
Fall		• Package submitted to NMFS

Agenda Item G.3.a
Attachment 2
March 2009

Pacific Council Recommendations for Rationalization of the Groundfish Trawl Fishery (Including Whiting)

1.0 Overview of Recommendations by Sector

The Pacific Fishery Management Council's (Council) sector specific recommendations for rationalizing the trawl fishery are provided here and will be finalized and forwarded to the National Marine Fisheries (NMFS) for approval later in 2009. The recommendations were adopted at the Council's November 2008 meeting. In general, the Council recommends the following:

Shoreside Trawl Sector (nonwhiting groundfish species and whiting):
- Manage with IFQs.
- Provide 90% of the initial allocation of nonwhiting IFQ to holders of vessel permits; and set aside 10% of the initial allocation for an adaptive management program that may benefit processors and communities, among others.
- Provide 80% of the initial allocation of whiting IFQ to holders of vessel permits; and provide 20% of the initial allocation of whiting to processors.

Mothership Trawl Sector (whiting and groundfish bycatch species):
- Manage with a harvester co-op system.
- Require that vessels declare preseason the mothership processor for which they will fish in a coming year.

Catcher Processor Sector (whiting and groundfish bycatch species):
- Create a permit endorsement to prevent expansion of the number of participants.

License the current voluntary co-op.
Allocate whiting and bycatch to participants in the existing voluntary co-op program.
Provide an IFQ program if the voluntary co-op program fails (initially allocate IFQ equally among all permit holders).

The amount of allocation available for these sectors will be determined through the intersector allocation process. IFQ for the shoreside fishery may not be delivered to at-sea processors, nor may quota allocated to the mothership or catcher-processor sectors be delivered shoreside.

The following sections provide a general summary of the program for each sector, followed by a complete description that also identifies trailing actions the Council will take in 2009, prior the time it submits the package to NMFS for approval. These trailing actions pertain to eligibility to own IFQ, accumulation limits, and an adaptive management. Implementation is not expected earlier than 2011.

2.0 Shoreside Trawl Sector: IFQ Program (Appendix A of the EIS)

This section details the IFQ program that the Council is recommending for the shoreside sector of the groundfish fishery. The first part of the section describes major components of the program. Table 1, which starts on page 5, presents complete details on elements of the recommended IFQ program.

2.1 Overview of the IFQ Program Elements

Under this program, most status quo management tools would remain in place. The main exceptions are cumulative landing limits and the use of season closures to control whiting harvest. Other measures, such as RCA boundaries, may be adjusted as experience is gained with the IFQ program.

An IFQ will grant an entity the privilege to catch a specified portion of the trawl sector's allocation. Within the IFQ program, vessels will be allowed to use a variety of directed groundfish commercial gear (including nontrawl gear) to take the shoreside trawl sector allocation, which will thus allow for "gear switching." IFQs will be created for most species of groundfish under the Groundfish FMP (although some will still be managed collectively at the stock complex level, e.g. remaining minor slope rockfish). Some groundfish species rarely caught by trawl gear and dogfish will be excluded from the IFQ program. To ensure that optimum yields (OY) for rarely caught species are not exceeded, catch of those species will be monitored and deductions made from the OY in anticipation of the expected level of shoreside trawl sector catch. For trips targeted on whiting, IFQ will be required only for whiting and the main bycatch species.

Halibut individual bycatch quota (IBQ) will be required to cover the incidental catch of Pacific halibut in the groundfish trawl fishery. Under an IBQ program, retention would not be allowed.

The following sections describe the major provisions of the IFQ program.

2.1.1 Initial Allocation

The program will initially allocate IFQ as quota share (QS) to fishery participants based mainly on their historic involvement in the fishery. Following the initial allocation, transfers (described below) will allow for others to also participate in the fishery as quota holders. The initial allocation can be viewed in two segments:

First, in developing its recommendation the Council considered the groups that should be included in the initial allocation, and the proportional split among the groups. The Council recommended that harvesters (those holding limited entry permits for trawl vessels) be given an initial allocation of 90% of the nonwhiting QS and 80% of the whiting QS. Ten percent of the QS for nonwhiting species would be made available for an adaptive management program and processors would receive 20% of the whiting QS.

Second, the Council considered specific allocation formulas that will determine the amount of QS each eligible entity will receive. These calculations are based primarily on the delivery history associated with a vessel permit or processing company over a set number of years. For the allocation to permits, the QS associated with the history of permits retired in the buyback program will be distributed equally among the remaining qualified permits (just less than 45% of the QS will be allocated in this fashion). A special calculation is provided for incidentally caught overfished species. For these species the allocation will be based on the QS recipient's need to cover incidental catch under current fishing practices (as measured by bycatch rates, individual permit logbooks, and the amount of target species QS that an entity receives). None of the QS for these species will be allocated equally among harvesters. A similar approach would be used for the allocation of halibut IBQ.

2.1.2 Stock Management Units for IFQs

QS will be issued for the species groups and areas for which there are OYs (management units). There may be further area subdivisions for species for which there is an area specific precautionary harvest policy. However, QS will not be required for some rarely-caught species. Catch of these species would be monitored to ensure they don't exceed any established allocations. There are also provisions that provide for the subdivision of QS after initial allocation.

2.1.3 Annual Issuance, Holding Requirements and Transfer Rules

In designing the management regime for the IFQ program, the Council is balancing the benefits of flexibility and individual accountability with program costs and the constraints of the very low allowable catch levels of overfished species. Prior to the start of each fishing year, NMFS will issue quota pounds (QP) to entities based on the amount of QS they hold and the overall trawl sector allocation. The QP would have to be transferred to a vessel account in order to be used. When a vessel goes fishing under the IFQ program, all catch must be recorded (including discards) and must be matched by an equal amount of QP from the vessel's QP account. If there is not enough QP to cover the catch from a trip, there is a 30-day grace period during which adequate QP must be transferred into the vessel's account. A vessel's fishing will be limited, and its permit cannot be sold, until the overage is covered. A carryover provision will allow for an overage in one year to be covered by up to 10 percent of the following year's QP; likewise, the provision also will allow QP that were not used in one year to be carried over into the following year, up to 10 percent.

Bycatch reduction and greater efficiency are expected to occur in the groundfish fishery under the IFQ program because of the transferability of QS and QP. Through the transfer of QS/QP (bought and sold or "leased" through private contract), it is anticipated that those best able to avoid catching overfished species, and those who are most efficient, will increase the amount registered to them, while those who consistently have high bycatch rates or operate less efficiently might choose to sell their QS and leave the fishery. Generally, anyone eligible to own a U.S.-documented fishing vessel could also acquire QS and QP, and the QS and QP could be acquired in very small increments.[1] These provisions will allow for new

[1] To be eligible to own QS the person need not actually own a U.S. documented fishing vessel.

entrants into the fishery; for example, a crew member could slowly purchase amounts of quota. During some of its trailing actions the Council may consider modifying provisions pertaining to who is eligible to own the QS.

While transferability is an important component, in order to protect against unintended consequences some provisions limit transferability. For example, there will be accumulation limits on the amount of QS or QP that can be controlled by an entity, and accumulation limits on the amount of QP registered to a vessel. The intent of these limits is to prevent excessive control of quota by a participant. The exact percentages which will be used in these limits will be determined through a trailing action.

An adaptive management provision will allow the Council to use 10 percent of the trawl allocation to provide incentives, support, or other compensation to offset adverse impacts of the program. This program may benefit communities and processors, among others. Details will be the subject of a trailing action.

2.1.4 Tracking and Monitoring

A tracking and monitoring program is necessary to assure that all catch (including discards) is documented and matched against QP. At-sea observers would be required on all vessels and shoreside monitoring during all off-loading (100 percent coverage). Cameras may be used to augment the observers and assure compliance. Compared to status quo monitoring, this will be a significant increase for a large portion of the trawl fleet, particularly non-whiting shoreside vessels. More accurate estimates of total mortality will benefit stock conservation goals. Discarding will be allowed, though all fish discarded will also have to be covered by QP. There would be 100 percent shoreside monitoring; and there may be limited landing hours to control costs. Additionally, a program for the mandatory submission of economic data is included to facilitate monitoring program performance.

2.1.5 Costs and Fee Structure

Program costs are of concern and ongoing Federal administrative costs are estimated in the EIS at $2.4 to $2.9 million per year for the entire trawl rationalization program, including the co-ops for the at-sea segment of the fishery (see Section 3). Program benefits are expected to significantly exceed costs. The costs listed here do not include initial implementation costs or the costs that industry will bear for observers. Fee structures will be proposed to recover program costs from industry, up to the limit of 3% of exvessel value.

2.1.6 Program Monitoring, Review and Future Auction

The Council will conduct a formal review of program performance no later than 5 years after implementation and every four years thereafter. The result of the evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. At the time of its first review, the Council will consider also the use of an auction or other non-history based method when distributing quota share that may become available after the initial allocation.

2.2 Detailed Specification of IFQ Program Elements and Options

Table 1 provides a complete description of the IFQ program.

Table 1. Full description of the IFQ Program for shoreside trawl deliveries.

	Element	SubElement	
A. ***Trawl Sector Management***			
A-1.1	Scope for IFQ Management, Including Gear Switching		For trips delivered shoreside, QP will be required to cover catch of all groundfish (including all discards) by LE trawl vessels with certain gear and species exceptions. Gear Exception: Vessels with an LE trawl permit using the following gears would not be required to cover their groundfish catch with QP: exempted trawl, [a] gear types defined in the coastal pelagic species FMP, gear types defined in the highly migratory species FMP, salmon troll, crab pot, and LE fixed gear when the vessel also has a LE permit endorsed for fixed-gear (longline or fishpot) AND has declared that they are fishing in the LE fixed-gear fishery. Species Exception: The following would be excepted from the QP requirement. On nonwhiting trips: except longspine thornyheads south of 34º27' N latitude, minor nearshore rockfish (north and south), black rockfish (WOC), California scorpionfish, cabezon, kelp greenling, shortbelly rockfish, "other" rockfish, [b] and spiny dogfish. On whiting trips: except **<u>all species other than</u>** whiting, sablefish, widow rockfish, canary rockfish, darkblotched rockfish and Pacific Ocean perch. *This definition of the scope allows an LE trawl vessel to switch between trawl and nontrawl groundfish gears, including fixed-gear, for the purpose of catching their QP ("gear switching"). It also allows a nontrawl vessel to acquire a trawl permit, and thereby use trawl QP to catch the LE trawl allocation using nontrawl gear.*[c]

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-1.2	IFQ Management Units, Including Latitudinal Area Management		QS will carry designations for the species/species group, area, and trawl sector to which it applies (see A-1.3 for the list of trawl sectors). The QP will have the same species/species group, area, and sector designations as the QS on the basis of which the QP was issued. QP will not be used in a trawl sector other than that for which it was issued,[d] and will not be used in a nontrawl sector (i.e. by vessels without trawl permits).[e] QP will not be used in a catch area or for a species/species group other than that for which it is designated. The QS/QP species, species groupings and area subdivisions will be those for which OYs are specified in the ABC/OY table that is generated through the groundfish biennial specifications process and those for which there is an area-specific precautionary harvest policy[f] QS for remaining minor rockfish will be aggregated for the shelf and slope depth strata (nearshore are excluded from the scope, see Section A-1.1). Changing the management units. After initial QS allocation the Council may alter the management units by changing the management areas or subdividing species groups. Section A-2.1.6 provides methods for reallocating QS when such changes are made after initial implementation of the program.[g] *Hereafter, all references to species include species and species group, unless otherwise indicated.*
A-1.3	General Management and Trawl Sectors		Unless otherwise specified, status quo regulations, other than trip limits, will remain in place. If individual vessel overages (catch not covered by QP) make it necessary, area restrictions, season closures, or other measures will be used to prevent the trawl sector (in aggregate or the individual trawl sectors listed here) from going over allocations.[h] The IFQ fishery may also be restricted or closed as a result of overages in other sectors. There will be three trawl sectors: shoreside, mothership, and catcher-processors. However, as per Section A-1.1, IFQ will be required only for the shoreside trawl sector. The mothership and catcher-processor sectors will be managed using co-ops, as specified in the co-op section of the trawl rationalization program. If the industry organized voluntary co-op program for the catcher-processor sector collapses, IFQ will be required for the catcher-processor sector, as specified in the co-op program described for that sector. *Allocation among trawl sectors will be determined in the intersector allocation process.*[i] *Trawl vessels fishing IFQ with nontrawl gear will be required to comply with the RCA lines applicable for that gear. Such restrictions, as necessary, will be determined in a separate process.*
A-1.4	Management of NonWhiting Trips		Nonwhiting trips are those with less than 50% whiting. No changes to management measures, other than those identified in Section A-1.3, have been identified at this time.
A-1.5	Management of Whiting Trips[j]		Whiting seasons will not be changed under the IFQ program, and so the current spring openings will be maintained to control impacts on ESA-listed salmon.[k] When the primary whiting season for a sector is closed for shoreside deliveries, sector-specific QP will be required plus cumulative whiting catch limits apply.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-1.6	Groundfish Permit Length Endorsements		Length endorsement restrictions on LE permits endorsed for groundfish gear will be retained; however, the provision that requires that the size endorsements on trawl permits transferred to smaller vessels be reduced to the size of that smaller vessel will be eliminated (i.e., length endorsements will not change when a trawl-endorsed permit is transferred to a smaller vessel)..
A-2. ***IFQ System Details***			
A-2.1	**Initial Allocation and Direct Reallocation**		
A-2.1.1	Eligible Groups	a Groups and Initial Split of QS	***Eligible Groups*** The initial allocation of QS will be made either only to permit owners and processors, as follows. Whiting QS: 80% to permits, 20% to processors and 0% for adaptive management. Nonwhiting QS: 90% to permits, 0% to processors, and 10% for adaptive management. *After initial allocation, trading will likely result in changes in the distribution of shares among permit owners and processors. Additionally, entities that are neither permit owners nor processors may acquire QS (see below: "IFQ/Permit Holding Requirements and IFQ Acquisition").*
		b Permits	Landing history will accrue to the permit under which the landing was made. The owner of a groundfish LE permit at the time of initial allocation will receive the QS issued based on the permit. (Also, see Section A-2.1.4 on permit combinations and other exceptional situations.)
		c Processors and Processing Definition	A special definition of "processor" and "processing" will be used for initial QS allocation. A main intent of the definition is to specify that only the first processor of the fish be credited for the history of that delivery when the initial allocation formula is applied (see footnote for definition).[l]
		d Attributing and Accruing Processing History	For an allocation for **shoreside processors (applies only to whiting):** attribute history to the receiver reported on the landing receipt (i.e. the entity responsible for filling out the state fish ticket), except history may be reassigned to an entity not on the landings receipt, if parties agree or through an agency appeals process. *The intent of this option is to provide an opportunity for catch history to be assigned to the entity that actually processed the fish.* For shoreside processors, allocations go to the processing business and successor-in-interest will be recognized. NMFS will develop criteria for use in determining the successor in interest with respect to the entities listed on the landings receipts or otherwise eligible for an initial QS allocation based on being the first processor of the fish.[m]
A-2.1.2	Recent Participation	a Permits (including CP permits)	Recent participation is not required in order for a permit to qualify for an initial allocation of QS.
		b Processors (motherships)	Not applicable because a co-op program was provided for this sector rather than IFQs. *(This header is being left in the document so that paragraph numbering will correspond to numbering in the analysis.)*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		c Processors (shoreside)	Recent participation is required to qualify for an initial allocation of whiting QS: 1 mt or more of deliveries from whiting trips in each of any two years from 1998-2004.
A-2.1.3	Allocation Formula	a Permits with catcher vessel history	For all fish management units, as specified in Section A-1.2: Equal Division: There will be an equal division of the buy-back permits' pool of QS among all qualifying permits (except the incidentally caught overfished species). (The QS pool associated with the buyback permits will be the buyback permit history as a percent of the total fleet history for the allocation period. The calculation will be based on total absolute pounds with no other adjustments and no dropped years.) Permit History: Tithe remaining QS will be allocated based on each permit's history (see following formulas). **For the portion of the allocation based on each permit's history .** For **non-whiting** trips, permit history used for QS allocation will be calculated: **For non-overfished species**: using an allocation period of 1994-2003. Within that period use relative history and drop the three worst years.[n] **For overfished species taken incidentally:**[o] use target species QS as a proxy based on the following approach: Apply fleet average bycatch rates to each permit's depth and latitude distributions and target species QS allocations. Fleet average bycatch rates for the areas shoreward and seaward of the RCA and north and south of 40° 10' N will be developed from West Coast Observer Program data for 2003-06. For the purposes of the allocation, a permit's QS for each target species will be distributed shoreward and seaward of the RCA and latitudinally based on the permit's logbook information for 2003-06. If a permit does not have any logbooks for 2003-06, fleetwide averages will be used.[p] For **whiting** trips, permit history used for QS allocation will be calculated as follows: **For whiting**, use an allocation period of 1994-2003. Within that period, use relative history and drop the two worst years.[q r] **For bycatch species** (if IFQ is used for bycatch species): use the whiting history as a proxy (i.e., allocation will be pro rata based on the whiting allocation). **Area Assignments:** Landings history will be assigned to catch areas based on port of landing.[s] **Relative history (%).** For each sector, the permit history for each year is measured as a percent of the sector's total for the year.
.		b Permits with catcher-processor history	Not applicable because a co-op program was provided for this sector rather than IFQs. *(This header is being left in the document so that paragraph numbering will correspond to numbering in the analysis).*
		c Processors (motherships)	Not applicable because a co-op program was provided for this sector rather than IFQs *(This header is being left in the document so that paragraph numbering will correspond to numbering in the analysis).*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		d Processors (shoreside)	For whiting: • Allocate whiting QS based on the entity's history for the allocation period of 1994-2004 (drop two worst years) and use relative history.
A-2.1.4	History for Combined Permits and Other Exceptional Situations		Permit history for combined permits will include the history for all the permits that have been combined. For history occurring when two or more trawl permits were stacked, split the history evenly between the stacked permits. History for illegal landings will not count toward an allocation of QS. Landings made under nonwhiting Experimental Fishing Permits (EFPs) that are in excess of the cumulative limits in place for the non-EFP fishery will not count toward an allocation of QS. Compensation fish will not count toward an allocation of QS.
A-2.1.5	Initial Issuance Appeals		There will be no Council appeals process on the initial issuance of IFQ. NMFS will develop a proposal for an internal appeals process and bring it to the Council for consideration. Any revisions to an entity's fish tickets must be approved by the state in order to be accepted. Any proposed revisions to fish tickets should undergo review by state enforcement personnel prior to finalization of the revisions.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.1.6	Direct Reallocation After Initial Issuance		**Reallocation With Change in Overfished Status**: When an overfished species is rebuilt or a species becomes overfished there may be a change in the QS allocation within a sector (allocation between sectors is addressed in the intersector allocation process). When a stock becomes rebuilt, the reallocation will be to facilitate the re-establishment of historic target fishing opportunities. When a stock becomes overfished, QS may be reallocated to maintain target fisheries to the degree possible. That change may be based on a person's holding of QS for target species associated with the rebuilt species or other approaches deemed appropriate by the Council. **Reallocation With Changes in Area Management** (Changes in management lines are expected to be rare; however, when they occur the following provides for the reallocation of QS in a manner that will give individual QS holders with the same amounts of total QP before and after the line changes.) **Area Subdivision**: If at any time after the initial allocation an IFQ management unit is geographically subdivided, those holding QS for the unit being subdivided will receive an amount of QS for each newly created area that is equivalent to the amount they held for the area before it was subdivided. **Area Recombination**: When two areas are combined, the QS held by individuals in each area will be adjusted proportionally such that (1) the total QS for the area sums to 100%, and (2) a person holding QS in the newly created area will receive the same amount of total QP as they would if the areas had not been combined. **Area Line Movement**: When a management boundary line is moved, the QS held by individuals in each area will be adjusted proportionally such that they each maintain their same share of the trawl allocation on a coastwide basis (a fishing area may expand or decrease, but the individual's QP for both areas combined wouldn't change because of the change in areas). In order to achieve this end, the holders of QS in the area being reduced will receive QS for the area being expanded, such that the total QP they would be issued will not be reduced as a result of the area reduction.[t] Those holding QS in the area being expanded will have their QS reduced such that the total QP they receive in the year of the line movement will not increase as a result of the expansion (nor will it be reduced). **Reallocation With Subdivision of a Species Group**: If at any time after the initial allocation an IFQ management unit for a species group is subdivided, those holding QS for the unit being subdivided will receive an amount of QS for each newly created IFQ management units that is equivalent to the amount they held for the species group before it was subdivided. For example, if a person holds 1% of a species group before the subdivision, that person will hold 1% of the QS for each of the groups resulting from the subdivision.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.2	**Permit/IFQ Holding Requirements and Acquisition** **(after initial allocation)**		
A-2.2.1	Permit/IFQ Holding Requirement		1. Only vessels with LE trawl permits are allowed to fish in the trawl IFQ fishery. 2. For a vessel to use QP, the QP must be in the vessel's QP account. 3. All catch a vessel takes on a trip must be covered with QP within 30 days of the landing for that trip unless the overage is within the limits of the carryover provision (Section A-2.2.2.b), in which case the vessel has 30 days or a reasonable time (to be determined) after the QP for the following year are issued, whichever is greater.[u] 4. For any vessel with an overage (catch not covered by QP), fishing that is within the scope of the IFQ program (Section A-1.1) will be prohibited until the overage is covered, regardless of the amount of the overage. Vessels which have not adequately covered their overage within the time limits specified in paragraph 3, must still cover the overage before resuming fishing, using QP from the following year(s), if necessary. If a vessel covers its overage, but coverage occurs outside the specified time limit (paragraph 3), the vessel may still be cited for a program violation. 5. For vessels with an overage, the LE permit may not be sold or transferred until the deficit is cleared.
A-2.2.2	IFQ Annual Issuance	a Annual Quota Pound Issuance	QP will be issued annually to QS holders based on the amount of QS held. *As specified above, QS holders will have to transfer their QP to a vessel account in order for those QP to be used.*
		b Carryover (Surplus or Deficit)	A carryover allowance will allow surplus QP in a vessel's QP account to be carried over from one year to the next or allow a deficit in a vessel's QP account for one year to be carried over and covered with QP from a subsequent year. Surplus QP may not be carried over for more than one year. A vessel with a QP **surplus** at the end of the current year will be able to use that QP in the immediately following year, up to the limit of the carryover allowance (see below). A vessel with a QP **deficit** in the current year will be able to cover that deficit with QP from the following year without incurring a violation if (1) the amount of QP it needs from the following year is within the carryover allowance (see below), and (2) the QP are acquired within the time limits specified in A-2.2.1.[v] **Carryover Allowance**: Limit of up to 10 percent carryover for each species. This applies to both non-overfished species and overfished species. The percentage is calculated based on the total pounds (used and unused) in a vessel's QP account for the current year.[w]

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		c QS Use-or-Lose Provisions	No QS use-or-lose provision has been specified.. The need for this provision will be evaluated as part of program review process, and the provision could be added later, if necessary. *Section A-2.2.3.b contains a provision mandating the transfer of QP to vessels each year. This is intended to encourage QP use.*
		d Entry Level Opportunities	Under the MSA, the Council is required to consider entry level fishermen, small vessel owners, and crew members, and in particular the possible allocation of a portion of the annual harvest to individuals falling in those categories. No special provisions have been identified for analysis. New entry is addressed indirectly by allowing crew, captains and others to acquire QS in small increments.
A-2.2.3	IFQ Transfer Rules	a Eligible to Own or Hold	Those eligible to own QS/QP will be restricted to (i) any person or entity eligible to own and control a US fishing vessel with a fishery endorsement pursuant to 46 USC 12113 (general fishery endorsement requirements and 75% citizenship requirement for entities) and (ii) any person or entity that owns a mothership that participated in the west coast groundfish fishery during the allocation period and is eligible to own or control that US fishing vessel with a fishery endorsement pursuant to Sections 203(g) and 213(g) of the American Fisheries Act (AFA). *Other criteria for eligibility to own or hold QS may be developed through a trailing action process (e.g., ownership interest in a vessel or permit). The purpose of such provisions would be to help ensure that QS holders have direct ties or investments in the fishery. Requirements should not be so onerous so as to preclude or discourage crew members, for example, from acquiring QS and entering the fishery. The trailing action will be completed prior to submission of the program to NMFS for approval.*
		b Transfers and Leasing	QS/QP will be transferable and transfers must be registered with NMFS. NMFS will not differentiate between a transfer for a lease and a permanent transfer.[x] Each year, all QP must be transferred to a vessel account. A penalty for not meeting this transfer requirement has not been recommended; however, this requirement is intended to encourage its availability for use by the fleet.
		c Temporary Transfer Prohibition	NMFS may establish temporary prohibitions on the transfer of QS, as necessary to facilitate program administration. QS will not be transferred in the first two years of the program (QP will be transferable).
		d Divisibility	QS will be highly divisible and the QP will be transferred in whole pound units (i.e. fractions of a pound may not be transferred).

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
		e Accumulation Limits (Vessel and Control)	It is the intent of the Council to have accumulation limits. However, the details for the accumulation limits will be further developed and analyzed through a trailing action to be completed prior to submittal of the trawl rationalization program to NMFS for approval. The trailing action will address (1) identification of the species that would be subject to accumulation limits; (2) description of how to treated overfished species; (3) determination of whether to apply accumulation limits at the vessel (usage) or entity (ownership/control) level or both; (4) how accumulation limits would be tracked; and (5) how accumulation limits would apply to and affect community-based or regional fishery associations. The following language on accumulation limits is currently under consideration. Limits[y] may vary by species/species group, areas, and sector. See options listed in Table 2. **Vessel Use Limit**: A limit on the QP that may be registered for a single vessel during the year. This element will mean that a vessel could not have more used and unused quota pounds registered for the vessel than a predetermined percentage of the QP pool. **Control Accumulation Limit:** A person, individually or collectively, may not control QS or QP in excess of the specified limit (because there is no the grandfather clause). QS or QP controlled by a person shall include those registered to that person, plus those controlled by other entities in which the person has a direct or indirect ownership interest, as well as shares that the person controls through other means. The calculation of QS or QP controlled by a person will follow the "individual and collective" rule. Individual and Collective Rule: The QS or QP that counts toward a person's accumulation limit will include 1) the QS or QP owned by them, and 2) a portion of the QS or QP owned by any entity in which that person has an interest. The person's share of interest in that entity will determine the portion of that entity's QS or QP that counts toward the person's limit.[z] **Grandfather Clause:** There will not be a grandfather clause for the accumulation limits. *Note: QS that is not allocated because of the accumulation limits and absence of the grandfather clause will be distributed to other eligible recipients in a manner that maintains the distribution among groups specified in A-2.1.1 and based on the allocation formulas specified in A-2.1.3.*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.3	**Program Administration**		
A-2.3.1	Tracking, Monitoring and Enforcement		**Discarding by Shoreside Sector** Non-whiting – *Discarding of fish covered by QP allowed*, discarding of fish covered by IBQ required, discarding of non-groundfish species allowed. **W**hiting *Maximized retention vessels:* Discarding of fish covered by QP and IBQ, and non-groundfish species prohibited. *Vessels sorting at-sea:* Same as for non-whiting. **At-Sea Catch Monitoring for Shoreside Sector** Nonwhiting – The sorting of catch, the weighing and discarding of any IBQ and IFQ species, and the retention of IFQ species must be monitored by the observer. Whiting *For maximized retention vessels*: video monitoring as proposed under Amendment 10. Observers would be required in addition to or as a replacement for video monitoring. *For vessels that sort at-sea:* The sorting, weighing and discarding of any IFQ or IBQ species must be monitored by an observer with supplemental video monitoring. **Shoreside Landings Monitoring** The sorting, weighing and reporting of any IFQ species must be monitored by a shoreside landings monitor (IBQ will have been discarded at sea). *(Description continued on next page.)*

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
			(...continued from previous page) **Catch Tracking Mechanisms for Shoreside Sector** **Electronic vessel logbook report** VMS-based electronic logbook required to be transmitted from vessel. At-sea entry by vessel personnel required including catch weight by species and if retained or discarded. **Vessel landing declaration report** Mandatory declaration reports. **Electronic ITQ landing report** Mandatory reports completed by processors and similar to electronic fish ticket report. **Processor production report** Mandatory reports (possible inclusion of proprietary data included to be recommended as option is fleshed out). **Cost Control Mechanisms for Shoreside Sector** **Shoreside landing hour restrictions** Landing hours may be restricted. **Shoreside site Licenses** Mandatory license for shoreside deliveries. License can be issued to any site that meets the monitoring requirements. **Vessel Certification** Mandatory certification. Certificate can be issued to any vessel that meets the monitoring requirements. **Program Performance Measures for Shoreside Sector** Integrate into the tracking and monitoring program the collection of data on cost, earnings and profitability; Economic efficiency and stability; capacity measures; net benefits to society; distribution of net benefits; product quality; functioning of quota market; incentives to reduce bycatch; market power; spillover effects into other fisheries; contribution to regional economies (income and employment); distributional effects/community impacts; employment-seafood catching and processing; safety; bycatch and discards; administrative, enforcement, and management costs. (See A-2.3.2)
A-2.3.2	Socio-Economic Data Collection[aa]		The data collection program will be expanded and submission of economic data by harvesters and processors will be mandatory. Random and targeted audits may be used to validate mandatory data submissions. See footnote for a full description[bb] Information on QS transaction prices, will be included in a central QS ownership registry. *NOTE: Data collection started before the first year of implementation would be beneficial, in order to have a baseline for comparison.*
A-2.3.3	Program Costs Options to be Refined.	a Cost Recovery	Fees up to 3% of exvessel value, consistent with 303A(e) of the MSA, page 86, may be assessed. Cost recovery shall be for costs of management, data collection, analysis, and enforcement activities.
		b Fee Structure	To be determined. The TIQC recommended a fee structure that reflects usage. A fee structure that allows for equitable sharing of observer costs for smaller vessels may be developed.

Table 1. Full description of the IFQ program (continued).

	Element	SubElement	
A-2.3.4	Program Duration and Modification		The Council shall begin a review of the IFQ program no later than 5 years after implementation of the program. The review will evaluate the progress the IFQ program has made in achieving the goal and objectives of Amendment 20. The result of this evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. Holders of quota shares should remain cognizant of this fact when making decisions regarding their quota shares, including buying selling, and leasing of these shares. The Council shall consider the use of an auction or other non-history based methods when distributing quota share that may become available after initial allocation. This may include quota created when a stock transitions from overfished to non-overfished, quota share not used by the adaptive management program, forfeited "use it or lose it" quota shares , and any quota that becomes available as a result of the initial or subsequent reviews of the program. The specific form of the auction or other method of distribution shall be designed to achieve the goals of Amendment 20, specifically including minimizing the adverse effects from an IFQ program on fishing communities to the extent practical. After the initial review, there will be a review process every four years. A community advisory committee will take part in the review of IFQ program performance.
A-3	***Adaptive Management (Option)***		It is the intent of the Council to have an adaptive management program for the shoreside non-whiting sector. Up to 10% of the non-whiting QS will be reserved for this program. QS will be divided among the three states. QS/QP will be provided through separate, but parallel, processes in each of the three states (e.g., through the use of regional fishery associations or community stability plans or other means). Further details will be developed through a trailing action with the intent of having the adaptive management provisions apply during the first year of implementation of the trawl rationalization program.
A-4	***Pacific Halibut IBQ—non-retention (Option)***		IBQ for Pacific halibut bycatch in the trawl fishery will be established. The IBQ limit will be for legal-sized Pacific halibut bycatch mortality for up to 10% of the Area 2A Constant Exploitation Yield (CEY) as set by the International Pacific Halibut Commission. This amount will be set initially at 10% and may be adjusted through the biennial specifications process. Such IBQ will be issued on the basis of a bycatch rate applied to the target species QS an entity receives in a manner similar to that described in Section A-2.1.3.a, for overfished species caught incidentally. Area-specific bycatch rates may be used for allocation but halibut IBQ will not be geographically subdivided.

[a] California halibut gear of 7.5" or greater used in state waters would be exempted.

Table 1. Full description of the IFQ program (continued).

[b] The list of exempted species adopted by the Council in November 2008 also included "other" rockfish. However, "other" rockfish is not one of the IFQ management units identified in Section A-1.2. Therefore "other" rockfish was dropped from the list of exempted species.

[c] Mandatory gear conversion (the permanent switching from trawl to some other gear) was considered but not included at this time.

[d] Since the shoreside trawl sector covers all shoreside deliveries, this implies that IFQ issued for the shoreside trawl sector may not be used for at-sea deliveries (i.e. may not be used to cover deliveries made to motherships or catch by catcher-processors).

[e] Not withstanding this provision, a vessel with a LE trawl permit may catch the trawl QP with a nontrawl gear, as per Section A-1.1.

[f] An example of an area specific precautionary policy is the geographic differential recommended by the SSC for lingcod. Lingcod is monitored and managed differently in different geographic areas though there is a single coastwide ABC and OY for lingcod.

[g] Such changes in latitudinal area management may occur as a result of changes in the management areas for species/species complexes in the ABC/OY table or as a result of separate Council action to change the trawl QS by area. In either case, specific Council action will be required to change the management areas and such action will be accompanied by appropriate supporting analysis and public comment opportunity.

[h] The Council authority to establish or modify RCAs will not be changed by this program.

[i] The allocation among trawl sectors will be determined as part of the intersector allocation process. The Trawl Individual Quota Committee (TIQC) recommended a number of options for determining the allocation among trawl sectors. One of these would have based the allocation on fleet history, but would not have included in the fleet history the history of any vessel not meeting the recent participation requirement. The Council rejected this application of a recent participation requirement to a determination of fleet history. The remaining TIQC options recommended that the division of allocation among trawl sectors be based on the fleet history over the same time periods used to allocate QS. The TIQC further recommended that if different periods are used for different trawl sectors, either (1) calculate the share for each sector based on its IFQ allocation period, then adjust all percentages proportionately such that they sum to 100%; OR (2) use the shortest period common to the allocation formula for all sectors.

The TIQC recommends allocation among the whiting sectors based on: Option 1: pro rata in proportion to the whiting allocation, or Option 2: weighted historical catch formula (for example, in projecting bycatch in the whiting fisheries prior to the start of the season, the GMT uses a four-year weighted average starting with the most recent year: 40%, 30%, 20%, 10%).

[j] A whiting QP rollover provision was considered but rejected from further analysis. This provision would have allowed unused QP to be reclassified so that they could be used in any whiting sector.

[k] The current process for changing the whiting fishery opening dates involves a regulatory amendment developed under the FMP through a framework process. Implementation of an IFQ program should not change this process.

[l] "**Processors**" are defined as follows:

An at-sea processor is a vessel that operates as a mothership in the at-sea whiting fishery or a permitted vessel operating as a catcher-processor in the at-sea whiting fishery.

Table 1. Full description of the IFQ program (continued).

A shoreside processor is an operation, working on US soil, that takes delivery of trawl-caught groundfish that has not been "processed at-sea" and that has not been "processed shoreside"; and that thereafter engages that particular fish in "shoreside processing." Entities that received fish that have not undergone "at-sea processing" or "shoreside processing" (as defined in this paragraph) and sell that fish directly to consumers shall not be considered a "processor" for purposes of QS allocations.

"Shoreside Processing" is defined as either of the following:

1. Any activity that takes place shoreside; and that involves: cutting groundfish into smaller portions; OR freezing, cooking, smoking, drying groundfish; OR packaging that groundfish for resale into 100 pound units or smaller for sale or distribution into a wholesale or retail market.

OR

2. The purchase and redistribution into a wholesale or retail market of live groundfish from a harvesting vessel.

[m] Transfer of physical assets alone should not be considered a basis for successor in interest. Business relationships such as transfer of the company name and customer base might be reasonable evidence of successor in interest.

[n] State landings receipts (fish tickets) will be used to assess landings history for shoreside deliveries.

[o] The intent is to provide an allocation method for QS for overfished species which addresses the vessel's need to have the QS to cover incidental catch in fisheries that target healthy stocks. The method would attempt to allocate the species to those who will be receiving QS for related target species. By allocating overfished species QS to those most in need of it, such an allocation would be expected to reduce transition costs. Currently, the list of overfished species that fall into this category is as follows: canary rockfish, darkblotched rockfish, Pacific Ocean perch, widow rockfish, and yelloweye rockfish. This list may change by the time the program is ready to be implemented. If a major target species became overfished, it would not be intended that such a species would be allocated via an alternative method (for example species such as Dover sole, sablefish, or Pacific whiting).

[p] In order to determine an amount of aggregate target species to which bycatch rates will be applied, each vessel's QS will be multiplied by the trawl allocation at the time of implementation.

[q] When the IFQ alternative covered both the shoreside and mothership whiting sectors language was included that specified that permits would have to drop the same years for both their shoreside and mothership deliveries: "If a permit participated in both the shoreside and mothership whiting sectors, the same two years must be dropped for calculation of the permit's QS for each sector." Since QS will not be issued for the mothership sector this sentence was dropped from the program. However, there was a similar provision in the co-op alternative (a permit qualifying for both the shoreside and mothership co-op programs would have to drop the same worst years from the formula used to calculate its allocation). Because there is not a shoreside co-op alternative, this language was also dropped from the co-op program. It might be determined that it was the Council intent to require that a permit qualifying for whiting in the shoreside IFQ program and the mothership co-op program drop the same two years in applying the allocation formula for the IFQ and co-op programs.

[r] State landings receipts (fish tickets) will be used to assess landings history for shoreside deliveries.

[s] Catch area data on fish tickets are not considered appropriate for this purpose. The catch area field is often filled out by fish receivers that do not know the area in which the vessel fished. Additionally catch area is often left unspecified. Therefore it will be assumed that all catch comes from ocean areas near the port of landing.

Table 1. Full description of the IFQ program (continued).

[t] Unless there is a change in the total OY or other factors affecting trawl allocation for the areas involved, in which case their change in QP would be proportional to the change in the trawl allocation.

[u] QP from a subsequent year may not be accessed until such QP have been issued by NMFS.

[v] Carryover of deficits provides some flexibility to use pounds from a year to cover a deficit from a previous year. Without a carryover provision, a vessel would still need to use pounds in a subsequent year to cover an overage but would incur a violation.

[w] There has been some GMT discussion of a possible need for the QP surpluses carried over to a following year be adjusted proportionally in the following year if the trawl allocation for the following year changes.

[x] QS may be transferred on a temporary basis through private contract (leased) but NMFS will not track lease transfers differently than any other transfer.

[y] The "vessel" accumulation limit was originally termed a "permit" limit. The term "permit" was changed to "vessel" to be consistent with Section A-2.1.3, which indicates that QP go into vessel accounts, not permit accounts. The term "own or control" was shortened to "control" for simplicity. "Control" includes ownership and therefore is inclusive of "ownership."

[z] For example, if a person has a 50 percent ownership interest in that entity, then 50 percent of the QS owned by that entity will count against the individual's accumulation limit.

[aa] Status quo **data collection** includes:

voluntary submission of economic data for LE trawl industry (status quo efforts);

voluntary submission of economic data for other sectors of the fishing industry; and

ad hoc assessment of government costs.

[bb] **Expanded data collection** would include:

mandatory submission of economic data for LE trawl industry (harvesters and processors),

voluntary submission of economic data for other sectors of the fishing industry,

transaction value information in a centralized registry of ownership, and

formal monitoring of government costs.

Mandatory Provisions: The Pacific Fishery Management Council and NMFS shall have the authority to implement a data collection program for cost, revenue, ownership, and employment data, compliance with which will be mandatory for members of the West Coast groundfish industry harvesting or processing fish under the Council's authority. Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA.

A mandatory data collection program shall be developed and implemented as part of the groundfish trawl rationalization program and continued through the life of the program. Cost, revenue, ownership, employment and other information will be collected on a periodic basis

Table 1. Full description of the IFQ program (continued).

(based on scientific requirements) to provide the information necessary to study the impacts of the program, including achievement of goals and objectives associated with the rationalization program. This data may also be used to analyze the economic and social impacts of future FMP amendments on industry, regions, and localities. The program will include targeted and random audits as necessary to verify and validate data submissions. Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA. Additional funding (as compared to status quo) will be needed to support the collection of these data. The data collected would include data needed to meet MSA requirements (including antirust).

The development of the program shall include: a comprehensive discussion of the enforcement of such a program, including discussion of the type of enforcement actions that will be taken if inaccuracies are found in mandatory data submissions. The intent of this action will be to ensure that accurate data are collected without being overly burdensome on industry in the event of unintended errors.

Voluntary Provisions: A voluntary data collection program will be used to collect information needed to assess spillover impacts on non-trawl fisheries.

Central Registry: Information on transaction prices will be included in a central registry of QS owners. Such information will also be included for LE permit owners/lessees.

Government Costs: Data will be collected and maintained on the monitoring, administration, and enforcement costs related to governance of the trawl rationalization program.

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Table 2. Control cap, and vessel cap options to define QS/QP accumulation limits in IFQ Program (to be refined in trailing actions, prior to the time the Council submits its recommendations to NMFS).

Stock	Option 1		Option 2		Option 3	
	Control Cap (%)	Vessel Cap (%)	Control Cap (%)	Vessel Cap (%)	Control Cap (%)	Vessel Cap (%)
All nonwhiting groundfish (in aggregate)	1.5	3.0	2.2	4.4	3.0	6.0
Lingcod - coastwide c/	5	10	7.5	15		
N. of 42° N (OR & WA)	5	10	7.5	15		
S. of 42° N (CA)	5	10	7.5	15		
Pacific Cod	5	10	7.5	15		
Pacific Whiting			0	0		
Shoreside Whiting (IFQs)	10	15	15	22.5	25	37.5
Mothership Whiting (co-ops)	10	25	15	37.5	25	50
All Whiting Combined	15	25	22.5	37.5	40	50
Sablefish (Coastwide)	1.9	3.8	2.9	5.7		
N. of 36° N (Monterey north)	2	4	3	6		
S. of 36° N (Conception area)	5	10	7.5	15		
PACIFIC OCEAN PERCH	5	10	7.5	15		
Shortbelly Rockfish	5	10	7.5	15		
WIDOW ROCKFISH	3.4	6.8	5.1	10.2		
CANARY ROCKFISH	5	10	7.5	15		
Chilipepper Rockfish	5	10	7.5	15		
BOCACCIO	5	10	7.5	15		
Splitnose Rockfish	5	10	7.5	15		
Yellowtail Rockfish	5	10	7.5	15		
Shortspine Thornyhead - coastwide	3.1	6.2	4.7	9.3		
Shortspine Thornyhead - N. of 34°27' N	4.8	9.6	7.2	14.4		
Shortspine Thornyhead - S. of 34°27' N	4.7	9.4	7.1	14.1		
Longspine Thornyhead - coastwide	2	4	3	6		
Longspine Thornyhead - N. of 34°27' N	2	4	3	6		
Longspine Thornyhead - S. of 34°27' N	5	10	7.5	15		
COWCOD - Conception and Monterey	5	10	7.5	15		
DARKBLOTCHED	5	10	7.5	15		
YELLOWEYE g/	5	10	7.5	15		
Black Rockfish	5	10	7.5	15		
Black Rockfish (WA)	5	10	7.5	15		
Black Rockfish (OR-CA)	5	10	7.5	15		
Minor Rockfish North	5	10	7.5	15		
Nearshore Species	5	10	7.5	15		
Shelf Species	4	8	6	12		
Slope Species	5	10	7.5	15		
Minor Rockfish South	5	10	7.5	15		
Nearshore Species	5	10	7.5	15		
Shelf Species	5	10	7.5	15		
Slope Species	5	10	7.5	15		
California scorpionfish	5	10	7.5	15		
Cabezon (off CA only)	5	10	7.5	15		
Dover Sole	1.8	3.6	2.7	5.4		
English Sole	10	20	15	30		
Petrale Sole (coastwide) c/	2.9	5.8	4.4	8.7		
Arrowtooth Flounder	5	10	7.5	15		
Starry Flounder	5	10	7.5	15		
Other Flatfish	10	20	15	30		
Other Fish	5	10	7.5	15		

3.0 Whiting At-sea Trawl Sector: Cooperative Program (Appendix B of the EIS)

The at-sea whiting sector co-op program is described generally below. Table 1 provides an outline of the sections of the program. A full description of the co-op programs follows Table 1, beginning with a section on management of the whiting fishery and followed by sections on the mothership and catcher-processor sectors of the whiting fishery (the "at-sea" sectors).

The Council considered but did not adopt a co-op program for the shoreside whiting fishery. Instead, the shoreside whiting sector was merged with the nonwhiting sector, both to be managed with IFQs. However, section place holders for the shoreside whiting co-op program are maintained in this document to maintain a numbering system that will correspond to the numbering of the alternatives and sections of the analysis as they are laid out in the EIS.

3.1 Overview of Co-op Program Elements

3.1.1 At-sea Whiting Sector Management under Co-ops

While co-ops will be used to control the harvest within the at-sea whiting sectors, a number of management measures will still be required to control competition between the whiting sectors. This section covers those measures along with other measures which will apply to all sectors managed under co-ops, such as observer requirements and mandatory submission of economic data. The description of the co-op management program for each at-sea whiting sector starts in Section 3.1.2.

The existing allocation of whiting between the shoreside, mothership, and catcher-processor (CP) sectors will not change under the rationalization program (42, 24, and 34 percent, respectively).

Provisions also address bycatch in the at-sea whiting fishery (particularly that of certain overfished species). The Council is recommending incidental groundfish species caps for each of the whiting sectors, for the co-op and non-co-op fisheries within the mothership sectors, and for the co-ops within the mothership sector. Within sectors, bycatch allocations would be pro rata, based on the amount of whiting allocated to that sector.

Area closures may be used to control the pace of the fishery. For the mothership sector, the fishery will be divided into a co-op fishery and a non-co-op fishery (for those who do not desire to take part in a co-op). Participants in the non-co-op fishery will not have a claim to a particular amount of the fish allocated to that fishery; therefore the vessels will likely race to harvest the available allocation..

NMFS will close the whiting fishery, a particular sector, the co-op or non-co-op fishery within a sector, or individual co-ops, as appropriate, if a whiting catch or bycatch limit is reached or in some cases, is projected to be reached. With respect to co-ops, inseason monitoring and closure will be needed only at the highest level of aggregation of the co-ops. For example, if individual co-ops join together to form an inter-co-op that covers the entirety of one of the whiting sectors, then NMFS will track and close at the sector level.

Given the high level of monitoring already in place in the whiting fishery, only moderate changes in monitoring are expected to be needed to implement this program for the at-sea whiting fishery.

For the at-sea segment of the fishery, 100 percent coverage aboard mothership and catcher processors will continue. A program for the mandatory submission of economic data is also included, to facilitate monitoring program performance.

3.1.2 Co-ops for Catcher Vessels Delivering to Motherships

Under this program, those who hold whiting-endorsed permits for catcher vessels in the mothership sector will choose each year whether to be part of a co-op or to register to fish in the non-co-op portion of the fishery. The holders of catcher vessel permits with mothership whiting endorsements will form the co-ops. Based on its catch history, each permit that qualifies for a mothership whiting endorsement will be allocated a portion of the history (endorsement share) of the mothership sector allocation of whiting and bycatch species. Each year, NMFS will distribute a catch allocation to a catcher vessel co-op based on the sum of the endorsement shares for the permits registered to that co-op. NMFS will also distribute a catch allocation each year to the non-co-op portion of the fishery, based on the collective endorsement shares of the permits opting to participate in the non-co-op fishery.

The co-op organization will coordinate harvest by its members. Although co-op agreements will include a mandatory clause that the catch allocation made to a member must equal the amount that the member brings into the co-op, co-op members may transfer catch allocations among themselves. Similarly, if multiple co-ops join together in an inter-co-op, one co-op will be allowed to transfer catch allocation to another co-op within that inter-co-op. NMFS will not necessarily need to track transfers among co-op members or within an inter-co-op.

The class of motherships will be closed by creating a LE permit for mothership vessels. There will be restrictions limiting a vessels ability to both catch and operate as a mothership in the whiting fishery in the same year.

Prior to the start of each season, each catcher vessel permit desiring to participate in the co-op fishery will obligate itself to deliver its catch to a particular mothership. The obligation to a particular co-op or mothership will not carry-over from one year to the next, it may be changed at the catcher vessel permit owners discretion based on its preseason declaration. While catch may be transferred among participants in a co-op or inter-co-op, such transfers would not change the mothership to which the catch is obligated, unless a mutual agreement is reached.

As in the IFQ program, accumulation limits will be imposed to prevent excessive concentration of catch allocations. They will cap the proportion of whiting that an individual or entity can process and will cap the proportion of whiting an individual or entity could accumulate via ownership of catcher vessel permit(s).

3.1.3 Co-ops for Catcher-Processors

Under the catcher-processor (CP) co-op program, the main change from the current CP sector management will be the creation of a CP endorsement to close the CP fishery to new entrants. This endorsement will be granted to LE permits registered to CP vessels if they meet specified qualification criteria. Only vessels with a CP LE permit will be allowed to harvest fish from the sector's allocation. LE permits with CP endorsements will continue to be transferable.

Another important change is that NMFS will, in regulation, assign an amount of catch to the CP sector co-op. This amount will be based on the allocation to the CP sector as a whole. Catch by the CP sector will be controlled primarily by closing the fishery when a constraining allocation is reached. As under status quo, co-op(s) may continue to be formed voluntarily by CP permit holders. If a co-op is formed, the sector will be managed as a private voluntary cooperative and governed by a private contract that will likely include division of the sector allocation among eligible vessels according to an agreed harvest schedule. NMFS will not establish an allocation of catch or catch history among CP permits unless the co-op fails to form. If the co-op fails to form, an IFQ system will be put into place with IFQ allocated equally to each CP permit (equally divided among all CP endorsed permits). If more than one CP co-op is formed, a race for fish could ensue absent an inter co-op agreement.

3.2 Detailed Specification of Co-op Program Elements

Table 1. Overview of the co-op program.

B.1	***Whiting Sector Management Under Co-ops***
B-1.1	Whiting Management
B-1.2	Annual Whiting Rollovers
B-1.3	Bycatch Species Management
B-1.4	At-sea Observers/Monitoring
B-1.5	Mandatory Data Collection
B-1.6	Adaptive Management—Not included in recommendation. *(This section header is being maintained as a place holder so that numbering will correspond to that of the alternatives and analysis in the EIS).*
B-1.7	Length Endorsement
B-2	***Whiting Mothership Sector Co-op Program***
B-2.1	Participation in the Mothership Sector
B-2.2	Permits/Endorsement Qualification and Characteristics
B-2.3	Co-op Formation and Operation Rules
B-2.4	Obligations to Processors
B-2.5	NMFS Role
B-3	***Whiting Shoreside Sector Co-op Program***
	Not included in recommendation. *(This section header is being maintained as a place holder).*
B-4	***Co-ops for Catcher-Processors***
B-4.1	Participation in the Catcher-Processor Sector and Endorsement Qualification
B-4.2	Co-op Formation and Operation Rules
B-4.3	NMFS Role

B-1 Whiting Sector Management Under Co-ops

B-1.1 Whiting Management

Under the co-op program, catcher vessel permits for the mothership sector will be endorsed for deliveries to motherships and amounts of history assigned; and catcher-processor permits will be endorsed for participation in the catcher-processor sector.

The whiting catch history calculation for each mothership-endorsed catcher vessel permit [CV(MS)] will be assigned to a pool for the co-op in which the permit will participate or a pool for the mothership non-co-op fishery. Co-ops are responsible for monitoring and enforcing the catch limits of co-op members. NMFS will make an allocation assignment to the catcher-processor sector co-op based on the allocation to that sector.

NMFS will monitor the catch in the non-co-op fishery, the co-op fisheries, and the overall whiting catch of all sectors. NMFS will close the mothership co-op fishery when its catch limit has been achieved, and the mothership non-co-op fishery based on projected attainment its catch limit, and the catcher-processor fishery when its catch limit has been achieved. Additionally, all sectors will be subject to closure based on attainment of the overall trawl whiting allocation.

B-1.2 Annual Whiting Rollovers

Under status quo, there is a whiting rollover. The Council's final action did not directly address whiting rollovers.

B-1.3 Bycatch Species Management

For the foreseeable future, the whiting fishery will be managed under bycatch limits (hard caps) for widow, canary, and darkblotched rockfish. The ESA-listed salmon bycatch management measures—that is, the 11,000 Chinook threshold, 0.05 rate threshold, and triggered 100 fathom closure—will also continue to be in place. The goal of bycatch management is to control the rate and amounts of rockfish and salmon bycatch to ensure each sector is provided an opportunity to harvest its whiting allocation.

B-1.3.1 Bycatch Allocation Subdivision

Subdivide bycatch species allocation among each of the whiting sectors, within the sectors subdivide between the co-op fishery and non-co-op fishery (subdivision for the non-co-op fishery does not apply to the catcher-processor co-op program) and subdivide bycatch among co-ops.

B-1.3.2 Bycatch Management

All sectors and co-ops will close as soon as the whiting fishery bycatch cap is reached for one species. The Council may use area closures (seasonal or year-round) to manage overfished stocks in the co-op and non-co-op fisheries. The area closures may be the same or different for different species. Area closures may be year-round, seasonal, or triggered automatically by the attainment of certain levels of catch.

Unused bycatch may be rolled over from one sector to another if the sector's full allocation of whiting has been harvested or participants in the sector do not intend to harvest the remaining sector allocation.

A sector's bycatch allocation will be divided between the co-op and non-co-op fishery of the sector, based on the allocations made to the permits participating in each portion of the fishery. The mothership co-op fishery will close based on attainment of its allocation. The mothership non-co-op fishery and catcher-processor fishery will close based on projected attainment of its allocation.[2]

Bycatch will be allocated to each permit and co-op pro rata in proportion to its whiting allocation. Each co-op will cease fishing when its bycatch allocation is reached.

B-1.4 At-sea Observers/ Monitoring

At-sea Whiting Fishery: 100 percent observer coverage aboard mothership and catcher-processors will continue.

For some coverage, cameras may be used in place of observers (feasibility to be determined).

B-1.5 Mandatory Data Collection

The following are the central elements of the data collection program that will be implemented as part of the co-op program.

- Mandatory submission of economic data for LE trawl industry (harvesters and processors).
- Voluntary submission of economic data for other sectors of the fishing industry.
- Include transaction value information in a centralized registry of ownership.
- Formal monitoring of government costs.

Mandatory Provisions. The Pacific Fishery Management Council and NMFS shall have the authority to implement a data collection program for cost, revenue, ownership, and employment data, compliance with which will be mandatory for members of the west coast groundfish industry harvesting or processing fish under the Council's authority. Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA.

A mandatory data collection program shall be developed and implemented as part of the groundfish trawl rationalization program and continued through the life of the program. Cost, revenue, ownership, employment and other information will be collected on a periodic basis (based on scientific requirements) to provide the information necessary to study the impacts of the program, including achievement of goals and objectives associated with the rationalization program. These data may also be used to analyze the economic and social impacts of future FMP

[2] This alternative included options for a quota buffer for the non-co-op fishery. The Council's preliminary preferred alternative from June 2008 recommended that there not be a buffer. The Council's final action in November 2008 did not address this issue.

amendments on industry, regions, and localities. The program will include targeted and random audits as necessary to verify and validate data submissions. *Data collected under this authority will be treated as confidential in accordance with Section 402 of the MSA.* Additional funding (as compared to status quo) will be needed to support the collection of these data. The data collected would include data needed to meet MSA requirements (including antirust).
The development of the program shall include a comprehensive discussion of the enforcement of such a program, including discussion of the type of enforcement actions that will be taken if inaccuracies are found in mandatory data submissions. The intent of this action will be to ensure that accurate data are collected without being overly burdensome to industry in the event of unintended errors. Annual reports will be provided to the Council.

Voluntary Provisions: A voluntary data collection program will be used to collect information needed to assess spillover impacts on non-trawl fisheries.

Central Registry: Information on transaction prices will be included in a central registry of whiting endorsed permit and mothership permit owners. Such information will also be included for sales and lessees.

Government Costs: Data will be collected and maintained on the monitoring, administration, and enforcement costs related to governance of the rationalization program.

B-1.6 Adaptive Management

There will not be an adaptive management set aside for the at-sea whiting fisheries. *(This section is being maintained as a place holder so that numbering will correspond to that in the alternatives and analysis of the EIS.)*

B-1.7 Length Endorsement

Length endorsement restrictions on LE permits endorsed for groundfish gear will be retained, however, the provision that requires that the size endorsements on trawl permits transferred to smaller vessels be reduced to the size of that smaller vessel will be eliminated (i.e. length endorsements will not change when a trawl endorsed permit is transferred to a smaller vessel).

B-2 Whiting Mothership Sector Co-Op Program

Overview. Qualified permits will be endorsed for mothership (MS) co-op participation. Each year the holders of those permits will choose whether their vessels will fish in the co-op fishery, in which individual co-ops will direct harvest, or fish in a non-co-op fishery that will be managed by NMFS as an Olympic style fishery. The co-op will be obligated to deliver its fish to specific mothership processors based on the obligations of each permit in the co-op determined based on preseason declarations. LE permits will be issued for motherships and required for a mothership to receive whiting from catcher vessels.

B-2.1 Participation in the Mothership Sector

a. Catcher Vessels

Vessels with CV(MS)-endorsed permits may participate in either the co-op or non-co-op portion of the mothership fishery. They will choose annually which fishery they will participate in for the coming year. Additionally, any groundfish LE trawl permitted vessels may participate in the co-op portion of the fishery if they join a co-op (as described in Section B-2.3.3).[3] No other catcher vessels may participate in the mothership fishery.

A vessel may not engage in the processing of whiting during any year in which a catcher vessel (mothership) (CV(MS)) endorsed permit is registered for use with the vessel.

b. Processors

Only motherships with a mothership LE permit may receive deliveries from catcher vessels participating in the co-op or non-co-op portions of the mothership sector whiting fishery. (Note: motherships may acquire such permits by transfer; see Section B-2.2.2.)

c. Vessels Excluded[4]

Motherships also operating as a catcher-processor may not operate as a mothership: during a year in which it also participates as a catcher-processor.

B-2.2 Permits/Endorsement Qualification and Characteristics

B-2.2.1 Catcher Vessel Mothership Whiting Endorsement (CV(MS) Whiting Endorsement)

a. Endorsement Qualification and History Assignment

Permits with a qualifying history will be designated as CV(MS) permits through the addition of an endorsement to their LE groundfish permit. At the time of endorsement qualification, each permit will also be assigned a catch history that will determine the share of the mothership whiting allocation associated with that permit.

Qualifying for a CV(MS) Whiting Endorsement. A LE permit will qualify for a CV(MS) whiting endorsement if it has a total of more than 500 mt of whiting deliveries to motherships from 1994 through 2003

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3 When such permits participate in a co-op the co-op will not be allocated any additional fish based on participation by such a vessel.

4 A vessel that has been under foreign registry after the date of the AFA and that has participated in fisheries in the territorial waters or exclusive economic zones of other countries will not be eligible to participate as a mothership in the mothership sector of the Pacific whiting fishery, as per Section 12102(c)(6) of the AFA.

Catch History Assignment (Identification of Endorsement Related Catch History). The initial catch history calculation for CV(MS) whiting endorsements will be based on whiting history of the permit for 1994 through 2003, dropping 2 worst years (see footnote q to Table 1). This catch history will be used by NMFS to assign both whiting and bycatch species allocations to the co-ops and non-co-op fishery pools, as per section B.1.3.2.

For the purpose of the endorsement and initial calculation, catch history associated with the permit includes that of permits that were combined to generate the current permit.

b. Whiting Permit and Endorsement Transferability and Endorsement Severability

The CV(MS) whiting endorsement (together with the associated catch history) *may not be* severed from the groundfish LE trawl permit. CV (MS) permits may be transferred two times during the fishing year, provided that the second transfer is back to the original catcher vessel (i.e. only one transfer per year to a different catcher vessel

c. Accumulation Limit

CV(MS) Permit Ownership: Accumulation limits will be addressed as part of the Council's trailing actions. Recommendations will included when the program is submitted to the secretary for approval.

d. Combination

CV(MS) Permit Combination to Achieve a Larger Size Endorsement. When a CV(MS)-endorsed permit is combined with another permit (including unendorsed permits), the resulting permit will be CV(MS) endorsed[5]

B-2.2.2 Mothership Processor Permit

a. Qualifying Entities

The owners of qualifying motherships will be issued MS permits. In the case of bareboat charters, the charterer of the bareboat will be issued the permit.

b. Qualification Requirements

A qualifying mothership is one which processed at least 1,000 mt of whiting in each of any two years from 1997 through 2003.

[5] Specifically, a CV(MS)-endorsed permit that is combined with a LE trawl permit that is not CV(MS) endorsed or one that is CV(Shoreside) [CV(SS)] endorsed will be reissued with the CV(MS) endorsement. If the other permit is CV(SS) endorsed, the CV(SS) endorsement will also be maintained on the resulting permit. However, CV(MS) and CV(SS) catch histories will be maintained separately on the resulting permit and be specific to participation in the sectors for which the catch histories were originally determined. If a CV(MS) permit is combined with a CP permit, the CV(MS) endorsement and history will not be reissued on the combined permit. The size endorsement resulting from permit combinations will be determined based on the existing permit combination formula.

c. Transferability

1. MS permits will be transferable
2. MS permits may be transferred to a vessel of any size (there will be no size endorsements associated with the permit) MS permits **may not** be transferred to a vessel engaged in the *harvest* of whiting in the year of the transfer.
3. Limit on the Frequency of Transfers: MS permits may be transferred two times during the fishing year provided that the second transfer is back to the original mothership (i.e. only one transfer per year to a different mothership).

d. Usage Limit

No individual or entity owning a MS permit(s) may process more than 45 percent of the total MS sector whiting allocation..

B-2.3 Co-op Formation and Operation Rules.

B-2.3.1 Who and Number of Co-ops

Co-ops are not required but may be voluntarily formed among CV(MS) permit owners. The number of co-ops will be indirectly limited by the limit on the minimum number of vessels able to form a co-op (see Section 2.3.3-b).

B-2.3.2 When

Each year at a date certain prior to the start of the fishery, MS and CV(MS) permit holders planning to participate in the mothership sector must register with NMFS. At that time CV(MS) permit holders must identify which co-op they will participate in or if they plan to participate in the non-co-op fishery.

B-2.3.3 Co-op Agreement Standards

a. Submissions to NMFS and the Council

Co-op agreement. Co-op agreements will be submitted to NMFS for approval. Signed copies of the cooperative contracts must be filed with the Council and NMFS and available for public review before the co-op is authorized to engage in fishing activities.[6] Any material changes or amendments to the contract must be filed annually with the Council and NMFS by a date certain.

Letter to Department of Justice. Co-ops must also file with the Council and NMFS a copy of a letter from the co-op requesting a business review letter on the fishery cooperative from the Department of Justice and any response to such request.

[6] During council discussion this was flagged by NOAA GC as a potential legal problem.

b. Number of Participants in Each Co-op (Including Inter-co-ops)

CV permits may join together in separate harvester co-ops. A minimum of 20% of the CV(MS) permit holders are required to form a co-op.[7] Co-ops may form co-ops with other co-ops. Within one of the whiting sectors, these co-ops may be formed to manage directed catch and/or bycatch. Whiting and bycatch allocations may be transferred among co-ops through inter-co-op agreements.

c. Catch History Distributions Among Permits

Co-op agreements must stipulate that catch allocations to members of the co-op be based on their catch history calculation by NMFS used for distribution to the co-op.

d. Participation by Non-CV (MS) Endorsed Permits

Through temporary arrangements a co-op allocation may be harvested by any catcher vessel holding a valid LE trawl permit which has joined the co-op (including one that does not have a CV(MS) endorsement).[8]

e. Other Required Co-op Agreement Provisions

The Council's intent is to have mothership sector participants work with NMFS to develop and describe a process and co-op agreement requirements to include in implementing regulations for this action.

A co-op agreement must include:
1. A list of all vessels, and which must match the amount distributed to individual permit holders by NMFS
2. Signature of all permit holders participating in the co-op
3. A plan to adequately monitor catch and bycatch
4. Adequate enforcement and penalty provisions to ensure that catch and bycatch overages do not occur
5. Measures designed to reduce bycatch of overfished species
6. An obligation to manage inseason transfers of catch history
7. A requirement that agreement by at least a majority of the members is required to dissolve a co-op (**During council discussion this was flagged by NOAA GC as a potential legal problem**)
8. An obligation to produce an annual report to the Council and NMFS by a date certain documenting the co-op's catch and bycatch data and inseason transfers (the report is to be available for review by the public)
9. Identification of a co-op manager who will:
    a. serve as the contact person with NMFS, the Council and other co-ops,
    b. be responsible for the annual distribution of catch and bycatch,
    c. oversee transfers,
    d. prepare annual reports, and

[7] The minimum threshold number of participants required to form a co-op balances the potential advantages for multiple co-ops while limiting implementation and management costs and administrative requirements for managing this sector.

[8] As a member of the co-op, such a vessel would be subject to Section B-2.4 and the indicated processor obligations.

e. be authorized to receive or respond to any legal process against the co-op.

10. Provisions that prohibit co-op membership by permit holders that have incurred legal sanctions that prevent them from fishing groundfish in the Council region
11. A provision that requires new owners to comply with membership restrictions in the co-op agreements

f. Additional Provisions for Inter-co-op Agreements

1. In the case of two or more cooperatives entering into an inter-cooperative agreement, the inter-co-op agreement must incorporate and honor the provisions of the individual co-op agreements unless all such agreements (or modifications thereof) are resubmitted for approval.
2. The requirements of Sections 2.3.3.a-2.3.3.e apply to the inter-co-op agreement, except that for the purpose of Section 2.3.3.e., subparagraph 7, the members of the inter-co-ops are the co-ops and not the participants in each co-op.

B-2.3.4 Annual Allocation Transferability

1. The annual allocations received by a co-op based on catch history of the whiting endorsements held by its members may be transferred among co-op members and from one co-op to another so long as obligations to processors are met (as per Section B-2.4). Additionally, in order to transfer annual allocation from one co-op to another there must be a NMFS approved inter-co-op agreement.
2. Allocations may not be transferred from the mothership sector to another sector.

B-2.4 Obligations to Processors

There will not be a processor tie that carries from one year to the next. CV(MS) permits will be obligated to a single MS permit for an entire year but may change to a different MS permit through a preseason declaration of intent.

> By September 1 of the year prior to implementation and every year thereafter, each CV(MS) permit is required to contact NMFS and indicate whether CV(MS) permit will be participating in the co-op or non-co-op fishery in the following year. If participating in the co-op fishery, then CV(MS) permit must also provide the name of the MS permit that CV(MS) permit will be linked to in the following year (i.e., annual catcher vessel, mothership linkage that may be changed each year without requirement to go into the "non-co-op" fishery). Once established, the catcher vessel, mothership linkage shall remain in place until changed by CV(MS) permit.

B-2.4.1 Modification of Obligations

Mothership Permit Transfer. If a mothership transfers its MS permit to a different mothership or different owner, the CV(MS) permit obligation for that year remains in place and transfers with the MS permit to the replacement mothership unless the obligation is changed by mutual agreement. The obligation does not extend beyond the fishing year.

B-2.4.2 Flexibility in Meeting Obligations to Processors

a. Temporary Transfer of the Annual Allocation Within the Co-op or from One Co-op to Another

When CV(MS) permit owners transfer co-op allocations from one co-op member to another within the co-op or from one co-op to another within an inter-co-op such allocations must be delivered to the mothership to which the allocation is obligated through the preseason declaration, unless released by mutual agreement.

b. Mutual Agreement Exception

By mutual agreement of the CV(MS) permit owner and mothership to which the permit is obligated, a permit may deliver to a licensed mothership other than that to which it is obligated.

B-2.4.3 Mothership Processor Withdrawal

If a mothership withdraws subsequent to quota assignment, then the CV(MS) permit that it is obligated to it is free to participate in the co-op or non-co-op fishery. The MS permit shall notify NMFS and linked CV(MS) permits of its withdrawal, and CV(MS) permits shall notify NMFS of their intent to participate in the co-op or non-co-op fishery thereafter. If continuing in co-op fishery, then CV(MS) permit shall provide NMFS with the name of the new MS permit to which it will be obligated for that season.

B-2.5 NMFS Role

B-2.5.1 Permit and Endorsement Issuance

NMFS will issue all necessary permits and endorsements under the rules specified under this program. Appeals processes will be provided as appropriate and necessary.

B-2.5.2 Fishery Registration and Co-op Approval

NMFS will announce a deadline before which all co-op agreements must be received for the coming year. NMFS will review and approve or reject co-op agreements based on standards provided here and other standards that it deems necessary to achieve the policy intent of the Council's actions.

B-2.5.3 Annual Allocation to Co-ops and the Non-co-op Fishery

a. Co-op Allocation

Each year NMFS will determine the percent of the mothership sector's harvest allocation to be given to each co-op based on the catch history calculation of CV(MS) permits registered to participate in the co-op that year. NMFS does not allocate to the individual permit holder; rather, NMFS allocates an aggregate amount of harvest tonnage annually to the co-op based on the catch histories associated with the members of the co-ops.

b. Non-co-op Allocation

Each year NMFS will determine the distribution to be given to the non-co-op fishery based on the catch history calculation of permit holders registered to participate in that fishery.

B-2.5.4 Fishery Management and Co-op Monitoring

1. NMFS will track all permit transfers and the invocation of mutual agreement exceptions. Permit transfers will not be valid until registered and acknowledged by NMFS.

2. NMFS will monitor catch and close segments of the fishery as necessary to ensure catch limits are not exceeded for:
   a. the whiting mothership co-op fishery
   b. the whiting mothership non-co-op fishery
   c. the mothership whiting sector as a whole
3. NMFS will not necessarily monitor, but will investigate and enforce as it deems necessary, the permit and co-op obligations to motherships.
4. NMFS will not necessarily monitor or enforce (except as it deems necessary):
   a. an individual permit's progress towards its catch allocations (permit level catch control will be at the co-op level and enforced through execution of the private contract)
   b. a co-op's progress toward its catch allocation[9]
   c. actual performance of the co-op agreement (the parties to the contract will resolve through private contract and remedies any deviation from provisions such as that requiring that a vessel have the opportunity to harvest the catch allocated to the co-op based on that vessel's permit, Section B-2.3.3.c)
5. NMFS will monitor other program provisions as needed. In some situations, there may need to be a declaration procedure to determine where a permit is delivering its obligated catch, for example, if a mothership withdraws without transferring its permit or reaching a mutual agreement for the transfer of obligated deliveries to a different mothership.

B-3 Whiting Shoreside Sector Co-Op Program (placeholder, not recommended)

The shoreside whiting sector will be managed with an IFQ program. This section header is being maintained so that section numbering here will correspond to section numbering in the alternatives and analysis in the EIS.

[9] This assumes that there is an inter-co-op agreement in place that covers the entire co-op fishery. If such an agreement is not in place covering both catch and bycatch, NMFS may need to monitor catch by each individual co-op (but not by the individual vessels in the co-op).

B-4 Catcher-Processors Co-op Program

Catch by the catcher-processor sector will be controlled primarily by closing the fishery when a constraining allocation is reached. As under status quo, vessels may form co-ops to achieve benefits that result from a slower-paced, more controlled harvest. The main change from status quo is the creation of a limited number of catcher-processor endorsements and the specification in regulation of the amounts that will be available for harvest by the voluntary co-op.. A new entrant will have to acquire a permit with a catcher-processor endorsement in order to enter the fishery.

B-4.1 Participation in the Catcher-Processor Sector , Endorsement Qualification and Permit Transferability.

Catcher-processor (CP) Endorsement. The class of CP endorsed permits (CP permits) will be limited by an endorsement placed on a LE permit. LE permits registered to qualified catcher-processor vessels will be endorsed as CP permits. A qualified permit is one that harvested and processed in the catcher-processor sector of the Pacific whiting fishery at any time from 1997 through 2003. Only vessels catcher-processor vessels with a CP endorsed LE permit will be allowed to process whiting at-sea. LE permits with CP endorsements will continue to be transferable.

Participation as Mothership. Catcher-processors cannot operate as a mothership during the same year it participates in the CP fishery.

CP Permit Combination to Achieve a Larger Size Endorsement. A CP permit that is combined with a LE trawl permit that is not CP endorsed will result in a single CP permit with a larger size endorsement. (A CV(MS) endorsement on one of the permits being combined will not be reissued on the resulting permit.) The resulting size endorsement will be determined based on the existing permit combination formula.

CP Permit Transfers to Smaller Vessels. Length endorsement restrictions on LE permits endorsed for groundfish gear will be retained, however, the provision that requires that the size endorsements on trawl permits transferred to smaller vessels be reduced to the size of that smaller vessel will be eliminated (i.e. length endorsements will not change when a trawl endorsed permit is transferred to a smaller vessel).

Number of Transfers Per Year. CP permits may be transferred two times during the fishing year, provided that the second transfer was back to the original CP (I.e., only one transfer per year to a different CP).

B-4.2 Co-op Formation and Operation Rules

No annual registrations or declarations are required. As under status quo, co-op(s) will be formed among holders of permits for catcher-processors. Participation in the co-op will be at the discretion of those permit holders. If eligible participants choose to form a co-op, the catcher-processor sector will be managed as a private voluntary cooperative and governed by a private contract that specifies, among other things, allocation of whiting among CP permits, catch/bycatch management, and enforcement and compliance provisions. Under the co-op program, if more than one co-op is formed, a race for fish could ensue absent an inter co-op agreement. NMFS will not establish an allocation of catch or catch history among permits unless the co-op fails to form. If the co-op system fails it will be replaced by an IFQ program and the initial issuance of IFQ will equal among the permits (equally divided among all CP endorsed permits).

Annual Reporting Requirements. The CP cooperative will submit an annual report to the Pacific Fishery Management Council at their November meeting. The report will contain information about the current year's CP fishery, including the CP sector's annual allocation of Pacific whiting; the CP cooperative's actual retained and discarded catch of Pacific whiting, salmon, rockfish, groundfish, and other species on a vessel-by-vessel basis; a description of the method used by the CP cooperative to monitor performance of cooperative vessels that participated in the CP sector of the fishery; and a description of any actions taken by the CP cooperative in response to any vessels that exceed their allowed catch and bycatch. The report will also identify plans for the next year's CP fishery, including the companies participating in the cooperative, the harvest agreement, and catch monitoring and reporting requirements.

B-4.3 NMFS Role

B-4.3.1 Permit and Endorsement Issuance

NMFS will issue all necessary endorsements under the rules specified under this program. Appeals processes will be provided as appropriate and necessary.

B-4.3.2 Annual Allocation

Harvest amounts for the co-op will be specified in regulation. If the co-op breaks up, harvest will be divided equally among the 10 permits.

The catcher-processor sector allocation may be divided among eligible catcher-processor vessels (i.e., those catcher-processor vessels for which a CP permit is held) according to an agreed catcher-processor cooperative harvest schedule as specified by private contract.

B-4.3.3 Fishery and Co-op Monitoring

1. NMFS will track all permit transfers. Permit transfers will not be valid until registered and acknowledged by NMFS.
2. NMFS will monitor catch and close the catcher-processor sector fishery as necessary to ensure catch limits are not exceeded.

TRAWL RATIONALIZATION
COUNCIL ACTION
NOVEMBER 2008
DRAFT STAFF NOTES ON DISCUSSION

The following are the staff notes on the discussion. After refinement and proofing, these notes will be incorporated into the draft Council minutes.

Discussion on Final Action

Mr. Lockhart started out by noting the administration's support of limited access privilege programs.

Mr. Anderson noted that regardless of today's outcome follow-up action on the part of the Council will be required and provided history of the groundfish limited entry program from the first adoption of a control date in July of 1987 through development of a groundfish strategic plan to where it is today. There will be some implementation concerns including National Marine Fisheries Service (NMFS) and state capacity to implement the program from a human resource perspective, along with fishermen's ability to pay for the program. Mr. Anderson then spoke to his philosophy on the role of government. Our economy relies on competition and on individuals and businesses acting in their own self interest for growth, innovation, price setting, and the allocation of resources. Government should not interfere in business competition unless it is necessary for the public benefit. The Council interferes with harvesting businesses because of problems identified relative to conservation and management both in the nonwhiting and whiting fishery. When we intervene in harvesting we cannot help but also interfere with the processing businesses by changing the basic bargaining dynamics in the raw fish product market. We should leave exvessel price negotiations up to the harvesters and processors but we cannot ignore how our actions might influence those negotiations. Under status quo, the section on marketing power states that processors are in a strong position to exert bargaining power (starting on Page A-60 and on page A-67). Some concerns about transitioning to individual fishing quota (IFQ) are: consolidation of fleet and shifts in the timing and geography of landings (Chapter 4, 307-309). Because of this reshuffling, communities and processors that are dependent on the fishery face some or a lot of uncertainty about their future economic future and viability (Chapter 4, Page 407). Washington Department of Fish and Wildlife (WDFW) has been consistent in its expression of concern about communities in Washington, many of which have been adversely and disproportionately affected by the trip limit system. In addition, not unlike California, the buyback program also reduced the number of trawl boats delivering in Washington. Through this program various ideas have been proposed to address community stability and geographic dispersion of the fleet, including adaptive management, allocation to processors, and the concept of regional landing zones. With respect to allocation to processors, Mr. Anderson noted the Magnuson-Stevens Act (MSA) Limited Access Privilege Program (LAPP) provisions in Section 303A(5) require that the Council ensure fair and equitable initial allocations, including consideration of (1) current and historic harvests, (2) employment in the harvesting and processing sectors, (3) investments in and dependence on the fishery, and (4) the current and historical participation of fishing communities. Congress specifically instructed the Council to fully analyze alternative program designs, including the allocation of limited access privileges to harvest fish to fishermen and processors. Two motion packages were presented (Agenda Item F.3.i, Supplemental WDFW Motion, Package 1 and Supplemental WDFW Motion, Package 2). The packages differed only with respect to the shoreside fishery. Separate packages were presented because Mr. Anderson was aware of divergent views on the Council with respect to the best approach to be used in managing the shoreside fishery. In the packages, the term "trailing action" was used to describe additional action that would be needed to support the foundational decisions at this meeting, prior to the submission of the package to NMFS, and the term "trailing amendment" was used to reference any decisions that would be implemented in a separate regulatory or plan amendment.

Mr. Anderson began with Motion #1 of Agenda Item F.3.i, Supplemental WDFW Motion Package 1. He moved and Mr. Cedergreen seconded a motion to adopt the following as the Council's preferred alternative with respect to the general provisions for whiting co-ops (Motion 19).

Motion 19		
Topic	**Section**	**Council Preferred Alternative**
General Provisions - Whiting Co-ops		
		The mothership and catcher-processor sectors will be managed under a co-op system rather than an IFQ system
Bycatch Rollover	B-1.3.2	Option 1 – Unused bycatch may be rolled over from one sector to another if the sector's full allocation of whiting has been harvested or participants do not intend to harvest the remaining sector allocation
Bycatch Management	B-1.3	Subdivide bycatch among whiting sectors and within sectors, subdivide between co-op and non-co-op fishery and among co-ops within sectors
At-Sea Observers/ Monitoring	B-1.4	Include as specified
Mandatory Data Collection	B-1.5	Include as specified

Mr. Mark Cedergreen seconded the motion, (Motion 19).

Mr. Myer said that he would recuse himself from the discussion and vote on this motion and the second motion in the WDFW motion package. In response to a question, Mr. Anderson confirmed that the omission of Section B-1.2 was intentional. Motion 19 passed with Mr. Myer recusing.

Mr. Anderson moved and Mr. Cedergreen seconded a motion (Motion 20) to adopt as the Council's preferred alternative for the mothership sector (Motion #2 of Agenda Item F.3.i, Supplemental WDFW Motion, underlined sections indicate changes from the preliminary preferred alternative):

Motion 20		
Topic	**Section**	**Council Preferred Alternative**
Mothership (MS) Sector		
Groundfish LE Permit Length Endorsement	B-1	Retain the length endorsement for permits, with two modifications: 1) If a permit is transferred to a smaller vessel, then the permit would retain the larger length endorsement (e.g., if a permit endorsed for a 75 ft vessel is transferred on to a 50 ft vessel, the permit would retain the endorsement for a 75 ft vessel); and 2) to add length to a permit, additional permits required (as needed), but only one endorsement would be required for all combined permits (i.e., do not need to acquire multiple endorsed permits).
Processor Participation	B-2.1a & c & B-2.2c	As specified for CVs and processors. Vessels excluded: Motherships operating as a catcher-processor may not operate as a mothership during a year in which it also participates as a catcher-processor
Catcher Vessel Allocations	B-2.2a	Qualifying for a CV whiting endorsement in the MS fishery: minimum 500 mt in 1994-2003

Motion 20		
Topic	**Section**	**Council Preferred Alternative**
		Catch history assignment: 1994-2003, drop 2 years
		Bycatch history assignment: Pro-rata in proportion to whiting catch assignment
Whiting Endorsement Transferability	B-2.2b	Transfer Option 1 - The CV whiting endorsement may not be severed from the permit
		CV permits may be transferred two times during the fishing year, provided that the second transfer is back to the original CV (I.e., only one transfer per year to a different CV).
MS Processor Permit Qualification	B-2.2a	Qualifying Entities: The owner or bareboat charterer of qualifying motherships will be issued MS permits
		Qualification Requirements: Minimum requirement of 1000 mt of whiting in any two years, 1997-03
MS Processor Permit Transferability	B-2.2c	Transferability: MS permits will be transferable and MS permits may be transferred to a vessel of any size
		Option 1 - MS permits may not be transferred to a vessel engaged in harvest of whiting in the year of the transfer
		Modified Option - MS permits may be transferred two times during the fishing year, provided that the second transfer is back to the original mothership (I.e., only one transfer per year to a different mothership).
		Usage Limit: No individual or entity owning an MS permit may process more than 45% of the total MS sector whiting allocation
Co-op Formation	B-2.3.1	Co-ops are not required, but may be voluntarily formed. A minimum of 20% CV permit holders is required to form a co-op. This minimum threshold balances the potential advantages for multiple co-ops while limiting implementation and management costs and administrative requirements for managing this sector.
		Subdivide whiting between co-op and non-co-op fishery and among co-ops within sectors.
		In the event there is more than one co-op, whiting and bycatch QP will be transferable between co-ops through an inter-co-op agreement.
		The non-co-op fishery will close based on projected attainment of their allocation of either whiting or one or more bycatch species
Co-op Agreement Provisions	B-2.3.3e	Include as specified. The intent is to have MS participants work with NMFS to develop and describe a process and co-op agreement requirements to include in the implementing regulations for this action.
Initial Ties to the Motherships	B-2.4.1	No processor tie. By September 1 of the year prior to implementation and every year thereafter, CV permit is required to contact NMFS and indicate whether CV permit will be participating in the co-op or non-co-op fishery in the following year. If participating in the co-op fishery, then CV permit must also provide the name of the MS permit that CV permit QP will be linked to in the following year (i.e., annual CV-MS linkage that may be changed each year without requirement to go into "open access" fishery). Once established, the CV-MS linkage shall remain in place until changed by CV permit.

Motion 20		
Topic	**Section**	**Council Preferred Alternative**
		By July 1 of the year prior to implementation and every year thereafter, if CV permit would be participating in the co-op fishery in the following year, then CV permit must notify the MS permit that the CV permit QP will be linked to in the following year.
		In the event there is agreement between the CV permit holder and the MS permit holder to which it is linked, the QP may be transferred to another MS permit.
MS Processor Withdrawal	B-2.4.2	If the MS permit withdraws subsequent to QP assignment, then the CV permits that it is linked with is free to participate in the co-op or non-co-op fishery. The MS permit shall notify NMFS and linked CV permits of its withdrawal, and CV permits shall notify NMFS of their intent to participate in the co-op or non-co-op fishery thereafter. If continuing in co-op fishery, then CV permit shall provide NMFS with the name of the MS permit for new linkage.

Mr. Lockhart noted that the requirement that ties be identified prior to September 1st may be awkward in the first year if implementation occurs after September 1st. He said the NMFS intent would be to announce as far in advance as possible when this is implemented. Mr. Anderson stated that there should be flexibility to adjust that date in the first year so that it would not delay implementation.

Motion 20 passed. Mr. Myer recused himself.

Mr. Anderson moved and Mr. Myer seconded Motion #3 of the WDFW motion package (Motion 21), to adopt as the Council's preferred alternative for the catcher-processor sector:

Motion 21		
Topic	**Section**	**Council Preferred Alternative**
Catcher Processor Sector		
General Provisions	B-4	Adopt a co-op for the catcher-processor sector; include provisions as specified
		Specify harvest amounts in regulation for co-ops.
		Do not require unanimous consent for a member to leave the co-op
		If the voluntary co-op fails, then QS will be divided equally among ten CP permits in sector Catcher processor cannot operate as a mothership during the same year it participates in the CP fishery
		Mandatory data collection included
		Annual co-op report required
		Bycatch: The CP sector fishery will close based on projected attainment of its bycatch allocation

Motion 21		
Topic	**Section**	**Council Preferred Alternative**
CP Endorsement		Create a catcher-processor endorsement to be placed on qualified limited entry permits. Qualified permits are those that harvested and processed in the catcher-processor sector of the whiting fishery sometime from 1997-2003. Limited entry permits with catcher-processor endorsements will continue to be transferable; however, the endorsement is not severable from the permit.
Permit Transfer		CP permits may be transferred two times during the fishing year, provided that the second transfer was back to the original CP (I.e., only one transfer per year to a different CP).
Length Endorsement		Retain the length endorsement for permits, with two modifications: 1) If a permit is transferred to a smaller vessel, then the permit would retain the larger length endorsement; and 2) to add length to a permit, additional permits required (as needed), but only one endorsement would be required for all combined permits (i.e., do not need to acquire multiple endorsed permits).

Ms. Vojkovich questioned the rationale for the length endorsement provisions. Mr. Anderson indicated that the provisions existed under status quo but that the rules for combining permits when there is a new type of endorsement needed to be addressed. Mr. Myer responded that in public testimony we heard that as the program moves forward people may want to lengthen their vessels to add more efficiencies such as a meal plant or oil plant. This would allow them to do that by not requiring that the permits that are being combined have the same sector endorsements. Motion 21 passed unanimously.

Mr. Lockhart noted that NMFS has made a preliminary determination that both the mothership (MS) sector and catcher-processer (CP) sector will be defined as a LAPP under the MSA. As part of that, in order to monitor and enforce the system NMFS would be issuing a permit to the co-ops. This would mean that the cost recovery provisions would apply to these two sectors.

Mr. Anderson noted that in package #1, Motion #4 applies to shoreside whiting and non-whiting fisheries, but in package #2 Motion #4 is for shoreside whiting only. Ms. Vojkovich moved and Ms. Fosmark seconded a motion (**Motion 22**) that the Council manage the shoreside non-whiting fishery under status quo management.

Ms. Vojkovich said that there has been opposition to the IFQ program in public testimony, in comments at the hearings and over the last two years since the state had in-state meetings. She had reviewed the documents to determine where the IFQ program would be a better way of doing business. She also examined the goals and objectives to see how current management might, with some variation, meet those needs. And, she looked at what might be generated out of this fishery if we have IFQs. She was not seeing where there would be an economic payback for the fleet. Economics is one of the major portions of the goal of the entire program.

Ms. Vojkovich said that for the IFQ to work, consolidation is required. We have heard that the savings would be somewhere around $14 million. If we are going to have that cost savings realization, consolidation has to happen quickly. We cannot wait. If we have a slow consolidation, which is what is expected to save communities (e.g. low accumulation caps) she questioned whether the consolidation will happen quickly enough. While we are waiting for the benefits of consolidation, there will be real costs to bear every day (tracking, monitoring, and enforcement). An assumption that underlies the $14 million is that we are expected to gain in the volume of the fish landed and that processors will buy the fish. The price of the fish paid to fishermen will not increase. The only increased value is from the increase in the amount of fish, not the price.

This increased volume is expected to offset the upfront cost to acquire the additional shares in order for consolidation to occur. However, in order for this to happen the markets have to be able to absorb the additional catch volumes immediately. There must be an immediate demand in order to realize the benefits needed to offset costs. If we have a use it/lose it program, that works against markets. You lose the fish because you haven't used it but you can't deliver it because there is no market for it. You may be able to access more of the OY if you are carrying observers and it turns out you are avoiding bycatch and able to land more target species. But right now there is not a major financial benefit that will support the fishermen as they bear the costs of the program, or while the market develops for the extra fish that might be produced from the program. There is nothing in the program to change the rockfish conservation areas (RCAs), so accessing more fish there will be difficult. She did not know how we would move forward with an IFQ program with no place to sell the extra fish, and no extra value out of it.

Ms. Vojkovich also noted that we would be allocating catch shares based on historical landed catch but that vessels would need those shares to cover catch, not landings. Therefore vessels may not receive enough to cover their discards. Therefore people will not start out "whole" with respect to their need for QS.

There are only one to three target species that actually generate money for the shoreside fishery. Going through CDFG logbooks, median exvessel trawl fleet value for one of the major revenue species, sablefish, was less than $2,000 a day. If observers cost $350 a day that's almost 18 percent of the daily amount. Then there is the 5 percent fee for the buyback program and the program administration cost of 3 percent. If you don't have enough sablefish to cover your discards you'd need another 17 percent-18 percent to cover your sablefish discard rate. You end up with potentially half the amount of money you are currently making today. She is trying to find in the document information on the potential revenue for the fleet relative to what they are making today. She can only find speculation in the document. During testimony the processors indicated that "someday" the market would develop for the additional fish. So she is concerned that for the shorebased fishery we really don't have a clear idea of what we are setting ourselves up for. She is not saying that IFQs are not where we need to go. While she hopes the predictions develop, she is not sure and does not see a lot of concrete evidence for it in the document. She is concerned that many people will be put out of business and we will end up worse off than we are now.

She then discussed whether there is a way to get total catch accounting without going to IFQs. Fishermen have been talking a lot about full retention as an option. How do we promote practices that reduce bycatch and discard mortality. Since most of the discards are regulatory, she suggested the possibility of a longer trip limit period. This would give people an opportunity to catch more fish, avoid the bycatch and discard mortality. It would also increase operational flexibility. The objectives state that we should minimized adverse effects of IFQ program. The California communities and constituents would be very negatively impacted by going to an IFQ program right now. Another objective is safety. A longer trip limit period would promote safety. With respect to the promotion of economic benefits throughout the industry she noted that under an IQ program California could lose fishermen and the ports. Status quo will not exacerbate those issues. In summary she does not see solid evidence that this is going to be better.

Dr. Dave Hanson asked if it was the intent of the motion that all work on rationalization for the non-whiting fleet would cease and there would be no trailing amendments or actions.

Ms. Vojkovich said we should continue forward to get real analysis of what the fleet is currently, the initial allocation and quantification of benefits. How many people will be consolidated out and how many people will have to buy up to get to where they are currently. She does not have a clear picture of that.

Mr. Steve Williams said he would not support Motion 22. In the executive summary of the analysis it states that the "trawl fishery is currently viewed as economically unsustainable due to the number of participating vessels, excess capacity, a regulatory approach that constrains efficiency and the status of certain groundfish stocks along with the measures in place to protect those stocks." One of the challenges that the Council faces is that there are differences among the state fisheries. While we heard testimony in support of status quo, over the last year we have also heard public testimony to the effect that it is critical that we move forward on this. We have heard that even after the buyback we are still over capitalized. With respect to the objectives, he had been told they cannot be attained without an IFQ program. IFQ will decrease harvesting costs and markets will develop over time. Assumptions are that it will result in increased revenues, safety, higher profits and a better chance at achieving OYs. There has been extensive analysis. There is no doubt that more analysis could be done. He does not believe that after five years of work we should step away from what we have come down to for a preferred alternative. This has been talked out, all of the analysis has been examined, and without a change in the approach, such as IFQs, these non-whiting trawl fisheries are going to crumble, they will not be sustainable in the future. If there is a delay we will lose momentum and never get back to this point again.

Mr. Myer shared many of Ms. Vojkovich's concerns that the package is not ready to move forward; but at the same time shares the sentiments of Mr. Steve Williams that this not be dropped. The way the motion is stated right now, he could not support it.

Mr. Anderson also shares many of Ms. Vojkovich's concerns. He is uncertain about how this IFQ program will impact the fleet over time. We are at least 3 or 4 years away from implementation even if we stay on schedule. However, the program must be viewed in comparison to other alternatives. For Washington, there are only five trawl boats left. While the program is not completely ready, the principal components are there. Mr. Larkin talked about discarding marketable fish at an unacceptable rate. The exempted fishing permit (EFP) proved that if the fishermen were held accountable for bycatch they can catch more marketable healthy species. In 2006, the trawl fishery left 1,000 tons of sablefish on the table, worth close to $3 million. The cost of the observer program was $3.7 million, including the dockside monitors. There are large quantities of sebastes available, such as yellowtail rockfish. Mr. Dulcich indicated that while it might take some work to expand the market for Dover sole the ability to market sebastes is there right now. He would like to give our fleet a chance to be successful. He has a lot of concerns about our small processors and how they will be affected by this; while there are not many they are important. While Washington does not have many boats in the trawl fishery right now, the people that are in it are as important as if there were more of them. So he will be voting against the motion and will continue to work to try to make the program successful and address the concerns that have been raised.

Mr. Cedergreen also shares Ms. Vojkovich's concerns. Much more work needs to be done and he was disappointed that some members of industry had not gotten together during the time we have been involved in this. But we can't afford to lose all of the work that has been done so far. So he cannot support the motion as written and therefore he would vote against it.

Mr. Ortmann empathized with Ms. Vojkovich's comments, but he also agreed with the comments of other Council Members that we need to follow-up on the investment that we have made so far and manage the trawl fishery in an improved manner. He does not support the motion.

Dr. Dave Hanson noted that Ms. Vojkovich raised some valid points. While this is specified as final action, in reality it is not. There will be a number of elements which will need to come back in front of the Council. We have the funding to work on it now and we may not have it available for a long period of time. In a subsequent meeting there will be an opportunity to not move forward if we are not happy with the program. It would be too early to do that now.

Ms. Fosmark supported the motion. She does not believe we are over-capitalized based on the number of vessels active in California and the small number of processors. She does not see it as forming a safety factor. There are other means to create a longer season to allow people to choose when to go fishing. She does not expect increased profits, especially if they consolidate. She does not see provisions for future generations that will allow other fishermen to get into the fishery under this program. Even as we have heard about processors and harvesters being impacted we have not heard about crewmen being impacted. Most people get into fisheries by being a crewman, that's how they learn. They will be priced out of the program. Regional associations can be formed even without an IFQ program. She is not sure it is ready to go forward. She understands the amount of money and time that have been put into this, however, she does not want this to move to a system where the fishermen themselves are priced out of the market and have to work like the plantation system. There is not enough protection for the fishermen in the program. She requested a referendum some time ago, to give people a chance to do a little more work on the program. She also said that California, in general, has a lot of work to do to improve the trawl fisheries. We have gone through the Marine Protected Area (MPA) process and are looking at possible sanctuary marine protected areas, the essential fish habitat (EFH) and RCAs. She is concerned that we will not be able to attract anyone down there to help the processors out and that we don't put additional costs on the fishermen that are already marginal.

Mr. Wolford noted a number of excellent points made by Ms. Vojkovich. His assessment was that the outcome could be worse than status quo. However, he was concerned about killing the program. There are some features that are valuable, such as community based fishing association, 100 percent monitoring and the attendant conservation benefits. He was uncertain about which way to go.

Mr. Lockhart noted that with respect to IFQs for the shoreside boats one of the greatest benefits is that it aligns economic and conservation incentives for the fishermen. He stated his belief that fishermen and processors will work together to figure out a way to use the additional fish that may be landed, though it may take some time. He believed that the basic components of the package provide the tools to address concerns raised by Ms. Vojkovich. We will never have all of the information and we need to move forward with the information before us. The time to move forward is now. Given the concerns about the program, it was his hope that the Council would continue to watch and evaluate the program. The guidance in the MSA is clear that the Council must continue to evaluate LAPPs with respect to their achievement of objectives. He will vote against the motion.

Mr. Roth expressed his support for going forward at least provisionally with the IFQ program. This would be a historic and positive event as compared to the negative outcome from earlier this year when the Council was forced to shut down the salmon fishery. The basic framework has been crafted to move the process down the road for needed management reform. There is no doubt there are many more details to be worked out but today's action to approve the LAPP system sets the stage for that to happen. The action captures the management framework that will provide the most benefits to the nation for the public resource including assigning personal accountability for the fisheries, providing opportunities for bycatch reduction, providing opportunities to maximize catch of targeted species while protecting species of concern, helping to maintain community stability, guarding against local stock depletion and addressing unforeseen circumstances through a robust innovative adaptive management provision. He supports the action and then to follow up with the various details that have yet to be developed.

Mr. Gordon Williams heard testimony about the Alaskan IQ program. The circumstances are much different there. There have been unintended and unanticipated consequences, but there are changes being made to those programs through a review process. There is data coming out of Alaska on those programs that will be helpful to the Pacific Council as they move forward. The halibut and sablefish IFQ programs had effects on communities. Some of those were recognized after the fact and programs were developed to accommodate those interests. But it has been difficult, due to the price of the quota, for communities to play catch-up.

Mr. David Sones said he will also vote no on the motion. He shared many of the same concerns of Ms. Vojkovich. Some of them are big concerns. There are 160 boats or permits in the fleet. Because of under harvest we are dividing up something that has not been fully utilized. We will be taking quota and assigning it to permits that have been on the sidelines, which seems unfair to the vessels that have been actually harvesting the fish. However, the amount of unused fish is a reason to move forward. As we go through the process there will be an opportunity to resolve problems in the program. But the current situation we have now with 2-month quotas is flawed too and needs to be addressed in the interim. If it is going to take us 2 or 3 years to implement, is there something we can do in the interim to allow the fishermen to access those unused fish and reduce discards. This would allow them to keep their businesses viable and get the markets in place to utilize some of these under harvested species as we are working out the details and during the implementation process. It's an important program to our fishermen, to the use of public resources and to develop the markets.

Mr. Warrens said he will be voting no on this motion. A lot of time and effort has gone into this proposal. There will be consolidation of the fleet and winners and losers. It is only fair that the Council sends that message now for however this shakes out in the next two or three years. To take a system that is not economically viable for many, and turn it into a system that works for the people who will come out of this on the other end in a businesslike fashion only makes sense.

Mr. Rod Moore noted that at the June meeting many processors indicated that they were just as well off under status quo. He agreed with Ms. Vojkovich's concerns about the economic cost-benefit data. There are a lot of big assumptions and a lot of big costs flowing down to the fleet. He has yet to see that anybody wants to help the processors even though they are part of the fishery. There has been a lot of good, hard-working people involved in this, a lot of good debate and facts developed – but rarely has he seen the level of personal attack that there has been on this issue. However, he is voting against the motion because of the hard work put in on the program, and there will be opportunities to address the deficiencies, including accumulation limits and looking at innovative ways to get fishermen and processors to work together. If we don't do this, we will wind up in a situation where we have continued problems with our trip limits and it will support those who want to get rid of the trawl fishery completely. There are problems with discard and bycatch that would be resolved by the program.

Mr. Mallet opposed the motion. We have heard a lot about people catching more fish and making more money, and all of the work that has gone into this. However, the conservation of the fish resources is his main reason for voting against the motion. This would help reduce bycatch and discards and rebuild stocks that are suffering partially because of the discards.

Chairman Hansen noted the length of the process and degree of acrimony. This week the fishermen and processors started to work together. We started five and half years ago to protect the resource, because of discards and bycatch. This is not a time to stop. There has been much progress since June. The funding is there now to keep going. There is an opportunity to protect the resource and bring more fish in so both harvesters and processors can make more money.

Motion 22 failed. 11 no, 2 yes. Ms. Vojkovich and Ms. Fosmark voted yes.

Mr. Anderson moved and Mr. Rod Moore seconded Motion #4 of the WDFW motion package 1 (Motion 23), to adopt as the Council's preferred alternative for the shoreside sector:

Motion 23 – See "Motion 23 as amended" for final version		
Topic	**Section**	**Council Preferred Alternative**
IFQ Program		
General Provisions	A-1	Applies to shoreside whiting and non-whiting fisheries
Scope: Gears and Fisheries Covered	A-1.1	Modified Option 2 - If a vessel has an LE trawl permit and groundfish is caught by any gear, IFQ must be used, with the following exceptions: exempted trawl, California halibut trawl, coastal pelagic species gear, highly migratory species gear, salmon troll, and crab pot.
Gear Switching and Conversion	A-1.1 & 1.7	Gear switching allowed. Do not include any provisions for permanent gear conversion.
IFQ Management Units: Species	A-1.2	For non-whiting sector, IFQ is required for all species, except: longspine S. of 34.27'; minor nearshore rockfish (N & S); black rockfish (WOC); CA scorpionfish; cabezon; kelp greenling; shortbelly rockfish; other rockfish; spiny dogfish. The catches of these species would be accounted for and tracked against the overall OY. If a trawl allocation for any of these species is adopted in the future, then QS/QP for those species could be added at that time. For whiting fisheries, IFQ required for whiting and species with bycatch caps. Bycatch caps would be established for the following species; widow, canary, and darkblotched rockfish, and Pacific ocean perch. The catches of all groundfish species would be accounted for and tracked against the overall OY.
Area Management	A-1.2	For species managed under coastwide OY with precautionary harvest policy (I.e., 40:10 or some other policy) applying to a specific area, subdivide the OY and apply the precautionary policy as recommended by the Council's SSC.
Number of Trawl Sectors	A-1.3	Three trawl sectors
Limited Entry Permit Length Endorsement	A-1.6	Retain the length endorsement for permits, with a modification: If a permit is transferred to a smaller vessel, then the permit would retain the larger length endorsement (e.g., if a permit endorsed for a 75 ft vessel is transferred on to a 50 ft vessel, the permit would retain the endorsement for a 75 ft vessel).
Initial Allocation - Whiting	A-2.1	80% to harvesters;20% to processors (no adaptive management)
Initial Allocation - Non-whiting	A-2.1	90% harvesters; 10% to adaptive management
Attributing and Accruing Processor History	A-2.1.1	Option 3 (whiting) - Attribute history to the receiver reported on the fish ticket, except history may be reassigned to an entity not on the landings receipt, if parties agree or through an agency appeals process

Mr. Anderson spoke to the motion. On gear switching he thought it was premature to make a decision on gear conversion and would like to first see how temporary switching works and the impacts of bycatch on other sectors. The species for IFQ management was narrowed for the whiting sector. In the whiting fishery there are species that are rarely caught or caught in de mininis amounts and he did not see a need to require IFQ for those species. For the length endorsement, the analysis does talk about how the fleet might consolidate and the optimum size of vessel. We wanted to allow people with permits for larger vessels to move to smaller vessels if that was the most efficient and effective thing to do, yet not have a permanent reduction on the length of the permit for the vessel. With respect to the issue of processor shares, the motion does not include an allocation of QS to processors for the nonwhiting side. For the whiting sector, an allocation is appropriate based on a few factors identified in the analysis. First, there are three large volume shoreside whiting processors; fleet consolidation will take place among shoreside whiting vessels but not to the extent of the non-whiting portion of the shoreside fleet. The analysis predicts that the shoreside whiting fleet would drop to approximately 20 vessels (see 4.6.2.2, page 312). Even with a 20 percent allocation to processors, it is uncertain whether the initial allocation to processors will offset the gains in negotiating power to harvesters relative to status quo (Chapter 4, page 435). For shoreside whiting, the need for processing capital may decline by 30 percent to 50 percent (see 4.9.2.4, page 415, and Figure 4-2.2, which shows the projected changes in the seasonality under this type of an approach). Initial allocation of QS to processors functions as a means of guaranteeing supply, and to provide an incentive to make necessary capital investments to increase product recovery yield (public testimony and Section 4.9.2.6 page 416 which addresses product recover).

Mr. Anderson also noted his concerns about processors in the nonwhiting fishery and that he was pinning a lot on the 10 percent set aside for adaptive management. If he was going to make an allocation of QS to processors, he would likely consider something along the lines of a 10 percent allocation. In the non-whiting fishery we know there is a high degree of market concentration in the processing sector. Small processors face some risk under the IFQ program because of vessel consolidation. Yet there is reason to believe that issuing QS to processors would increase market concentration in an already concentrated sector. In contrast to whiting, the nonwhiting trawl fishery is not a derby style system. The Council has attempted to achieve optimum yields, albeit with limited success, minimize bycatch and rebuild overfished stocks with the bimonthly trip limit system (see Section 4.4.2). The buyback program left 163 permits in the fishery. In 2006 there were 123 permits active, earning approximately $25 million in exvessel revenue (see Section 4.4.2, page 289). There has been significant consolidation in the processing sector resulting in high market concentration. The number of nonwhiting processing firms has dropped in half since 1994. The processing sector for nonwhiting groundfish is characterized by a relatively small number of processing companies processing the majority of the harvest. The consolidation has already occurred as part of the current management approach. Because of concern about the potential for further consolidation if QS to processors are issued, Mr. Anderson favored a 10 percent set aside for adaptive management that could be used to not only provide certainty and security to the larger processors, but also provide flexibility to tailor a program that would provide some protection to smaller processors. A set of protocols will need to be established to ensure that the program accomplishes this as one of its objectives.

Dr. Dave Hanson said, on the scope of fisheries covered, the GAC recommended that California halibut trawl be included in the program, as they are using the same nets in Federal groundfish fisheries. That would also get observers in that fleet.

Ms. Vojkovich moved and Ms. Fosmark seconded an amendment (Amendment #1 to Motion 23) to amend the scope in Section A-1.1. to strike "California halibut trawl" in the list of exemptions. Ms. Vojkovich clarified that there are limited entry trawl vessels participating in the California halibut fishery in the central coast with the same gear. In southern California there is a state fishing area that requires a different set of gear, 7.5" mesh, so she did not know if we have any LE fishermen that participate in that fishery. Her motion deals with the gear type that is exactly the same as the groundfish gear type. Amendment #1 to Motion 23 passed unanimously.

Mr. Moore supported the motion. He had some disagreement with Mr. Anderson with his characterization of consolidation in the groundfish processing sector. He had seen some of the same data in the analysis and had been confused about some of it based on his own knowledge. His preference would be to allocate harvesting shares non-whiting groundfish species to the processors. There has been testimony on that issue, and while we have been successful getting together harvesters and processors in the whiting sector, we are still not there yet in the non-whiting sectors. The approach being taken, while not his preferred approach, is a reasonable way to get people working together and resolving some of the issues identified. He will address this issue further with a motion on adaptive management.

Mr. Mallet stated that adaptive management seems to be something that the fishermen and processors were against. He did hear everybody agree, environmental community fishermen and processors, that we don't want to damage communities, and in particular, the small and medium size processors that were affected by our buyback program. This is a way to have the staff develop a program so we can help out the communities and those small and medium processors in particular which were affected by buyback and may be affected unintentionally by this program. The normal Federal program is to give each of the three states a third and let them give it to regional associations. Mr. Mallet felt that staff should focus on the small and medium processors that are struggling and the communities that are struggling because of our actions, and determine a plan on how to use this 10 percent to try to aid those communities and entities rather than just broad-brushing it off and giving everyone a small amount. This is an important part of this program. We don't want to have unintended results where we further damage those that have been damaged by the buyback program. We want to try to maintain our processors in a diverse geographic area so we have places for the fishermen to deliver their fish. If we take the adaptive management provision out and we have no way of aiding places like Bellingham and Fort Bragg, it will be difficult to support the motion.

Ms. Vojkovich asked Mr. Anderson about the initial allocation to non-whiting; where it says 90 percent to harvesters and 10 percent to adaptive management. Up until now we've been talking about QP being put in the adaptive management program, not QS. This appears to be QS. Up until now it has been listed as 100 percent to harvesters with 10 percent QP to the adaptive management program.

Mr. Wolford moved and Ms. Vojkovich seconded an amendment (Amendment #2 to Motion 23) to change the initial allocation for whiting and non-whiting to read "100 percent QS to harvesters and 10 percent QP to adaptive management" in both the whiting allocation and the nonwhiting allocation. This is more than a clarification, it is a change.

Mr. Wolford said there is no philosophical objection to processors having shares. There is not a way to prosecute the fisheries without both harvesters and processors, working together. Each is required, both must be healthy. There has been a lot of talk about community stability. There is nothing that protects shares from beings sold or leased by either harvesters or processors. It is not clear that giving shares to one group or the other specifically protects the community. Both of those factions are clear they are loyal to their communities and have no intention of leaving. He saw no risk to the community on the issue of harvester shares themselves. The issue of unbalanced power between processors and harvesters is not really the issue. We are only talking about the initial allocation. The processors will be able to acquire shares and achieve the balance of power that is necessary. They will do that whether there is an initial allocation or not. The real issue is one of the control caps to ensure that the balance of control does not get out of hand. That is where the real focus ought to be. There are some practical differences that relate to processors getting an initial allocation. An initial allocation comes as a tax on all the participants. Whether they want to cede some amount of the shares or not, it is a tax on everyone. Whereas if there are individuals who want to transfer some of their QS to processors, that is a business decision that they would make on an individual basis. With respect to fairness, the question is one of whether we balance the investment and commitment to the fishery made by processors against the risk that they take. When it comes down to looking at risk, the scale tips to the side of the harvesters, who risk their very lives for the business. There is a question as to how to effectively change behavior on the water using QS. It is the harvesters that are on the water. That is clearly in the hands of harvesters. No matter who has custody, the only way to realize benefit from the shares is to put it back on the boat and let it be fished. No matter what, if the processor has shares or not it will go back to the boat and will be fished. The fishermen will ultimately get their chance, but that gets to the heart of the issue. If they are going back to the boats, why remove them in the first place? Why have the administrative complication of a difficult allocation process, taking that away from the boats only to turn around and give it back. That is an unnecessary complication. Therefore, we ought to leave the allocation 100 percent on the vessels. With respect to adaptive management, it is important across all segments. To not have any adaptive management in the whiting sector is an injustice. In aerospace, he never saw a program where they got every wrinkle ironed out before it was implemented. A management reserve needs to be held back. Adaptive management is needed in all segments for practical reasons of providing opportunities to look at new gear, to put money into processors, or to put QP into communities to achieve stability there. Adaptive management is important in all of those things. It is important to take the QP up front. This distributes the burden to everyone, but then everyone can plan for it. If you don't plan for it and the problem arises, you are going to need to take it away to address a problem that you did not foresee. It is easier to plan for these things if it is taken up front. He was certain that it would be needed. It is clear that time needs to be spent defining in greater detail how it will be dispersed and for what purposes. However, this is something we set aside to fix problems we can't forecast or control at the onset. There needs to be some flexibility in how we use it but that can be addressed in a follow-up action that helps define and clarify how we use it.

Mr. Dale Myer said during public testimony we heard from just about the entire shoreside whiting industry in favor of an 80 percent/20 percent harvester processor split. These people had been at odds for a long time and it would be an injustice not to move ahead based on their agreement. He also noted Mr. Anderson's earlier explanation of the differences between whiting and non-whiting sectors with respect to the processing issues. He was not in favor of amendment #2.

Mr. Cedergreen also opposed the amendment. He noted that most of the Council would have hoped that the nonwhiting sector had been able to work out an agreement like the whiting shoreside and mothership folks had. If that had happened, the Council would have been supportive of it. Making this kind of a change to the whiting sector agreement is essentially saying that even if the nonwhiting folks were to get together with an agreement, the Council might not support it.

Ms. Vojkovich supported the amendment. Ms. Vojkovich noted the state of California's policy in opposition to the granting of the right to harvest fish to processors. They agree that processors serve as an integral part in the development and maintenance of fisheries, but there does not appear to be any logic for using the performance of fishermen to award rights or benefits to processors. They are two wholly separate industries and functions. Awarding processors shares based on a harvester's prior performance is not rationally related to the performance of the processor. If the state wants to reward processors, it should be on their own merits. The most recent MSA allows us to consider allocating shares to processors. The Council's task is to determine whether the processors meet the standard of whether they substantially participate in the fishery. The first definition of fishery in the MSA is "one or more stocks of fish," the second definition is "any fishing for such stocks." During the past several years we've had discussions about processing at-sea and onshore. NMFS has said the reason we can permit or limit the MS in the whiting fleet is because, by definition, they are considered a fishing entity, but we can't do the same for shoreside processors because they are not considered a fishing entity. This guidance indicates to her that shoreside processors are not part of the fishery so they cannot be allocated harvester shares. The

MSA does provide for processors through communities or regional fishery associations. Additionally, several skippers and crew members spoke about the fishery and how they might be affected. If we are not considering giving shares to skippers and crew members, why would we think about giving shares to a trucking firm, a fabricator, a processor, or the storage company? This is a back-door entry into processing privileges. Processors indicated that they would give it free to the vessels delivering it to them. However, there is no free lunch in any industry. There is a cost associated with it. The cost is the requirement that the vessel deliver to the processor. This is like the linkage that we will not allow in the mothership fishery, or like processing shares. Adaptive management and RFAs will take care of the stranded capital and community issues that might develop. Processors are vital to the fishing communities but this does not make sense, it is not rationale, and it may set a precedent. There is no place where this has happened in a conscious decision by a public policy group. It has been done by Congress as a directive but there has not been a decision by a body like the Council in a public process to do this.

Mr. Warrens said he is in opposition to the amendment. The reason was clearly spelled out when the shoreside whiting group stood up together in total agreement. This is consistent with recommendations coming from the harvesting group, advisory panel throughout the whole Council process. When there is agreement among the majority of the parties to do something, for us to not follow through does not make sense, in this case. The rationale was explained fairly well by Mr. Joe Plesha when he said they needed commitment of delivery to their plants in order to improve their efficiency and their recovery rates. That would have a mutual benefit to the processors as well as the harvesters.

Mr. Anderson spoke against the amendment. He acknowledged the precedential nature of the decision. The Council has managed this fishery through its development for 18 or more years, to the current Olympic fishery. As a result, we have a processing industry that has 30-50 percent more harvest capacity and capital investment than is needed to process the resource. Also, through our management, we have forced processors and fishermen to be inefficient. We are exporting raw product out of the country to where the final processing is done. That does not make sense. We have to give this fishery the tools to be efficient and successful and allow the processors the ability to make the needed investments, similar to what they have done in the pollock fishery, to extract the maximum value out of the resource and within our boarders. This is about money, in large part, and who will control the profit. There needs to be a balance in that. What we do here can result in a balance of that power over the extraction of rent, the ability of the fishermen to have quality platforms from which to operate their businesses, and processors having an opportunity to have a quality processing plant that delivers a high quality of product to the consumer within our borders.

Mr. Lockhart mentioned that he will be abstaining because it is more largely about allocation.

Amendment #2 to Motion 23: Amendment failed. Ms. Vojkovich, Ms. Fosmark, and Mr. Wolford voted yes. Mr. Lockhart abstained.

Mr. Cedergreen moved and Mr. Anderson seconded an amendment (Amendment #3 to Motion 23) to add "limited entry fixed-gear" under Section A-1.1 to the list of exceptions; under IFQ management [Section A-2.1] strike the phrase "species with bycatch caps. Bycatch caps would be established for" and add "sablefish" to that list.

Mr. Moore noted that limited entry fixed-gear had been added as a gear for which you did not have to have IQs for but that gear conversion allows the use of IFQs with fixed-gear. It was agreed that the motion should be understood to include the language that is already in A-1.1 that allows vessels with limited entry trawl endorsements and fixed-gear endorsements to fish against their fixed-gear endorsement without needing trawl IFQs by going through a declaration procedure. Mr. Anderson noted that the reason for removing the bycatch cap language is that we have three sectors, not four. The vessels would have to have IQs for those other species but there would not be sector bycatch caps. Amendment #3 to Motion 23 passed unanimously.

Ms. Vojkovich asked whether NMFS will issue processors Federal permits and recover costs from them. Mr. Lockhart said that the 3 percent landing fee would be collected.

Ms. Vojkovich moved and Mr. Wolford seconded an amendment (Amendment #4 to Motion 23), under the section "Gear Switching and Conversion" have it read "Gear switching is allowed, include provisions for permanent gear conversion." She stated that this should be a tool in the box and that we would not lose anything by including it with no special provisions for how it might happen or when.

Mr. Lockhart asked if under the original motion, someone would not be able to switch permanently to another gear. Mr. Anderson noted the amount of uncertainty in the program and stated that we should go slow and allow gear switching to occur, but at the same time not require the gear change to be permanent. When the program is reviewed the effect of gear switching could be evaluated and a determination made on the need for gear conversion. Ms. Vojkovich withdrew her Amendment #4.

Mr. Wolford asked if the intent of the motion was that 100 percent of the QS go to harvesters and 10 percent QP to adaptive management. Mr. Anderson explained that under adaptive management program we might have a multi-year business plan brought forward. In such case, some portion of the QS that were assigned to a particular region could be given to that group. So he specified QS for the adaptive management program rather than every year having to calculate QP and then converting those.

Ms. Vojkovich said that we had not discussed the QS approach before. The whole adaptive management plan was to go away at some point in time. Giving QP for five years to a business to plan, that allows them to make the money to buy the QP, then engage in that kind of fishery. It is "up to 10 percent," with the remainder to go back to the fleet, it has changed completely with QS going to the adaptive management program instead of QP.

Mr. Anderson said that this lack of synchronization of vision is why a trailing action is going to be needed to put together the adaptive management component of our program. If that trailing action results in the need to specify QP instead of QS, that modification to the language could be made at that time. Mr. Anderson clarified that regardless of the language being used at this time, the intent would be that if the QP arising from the QS set aside for adaptive management were not needed for the adaptive management program, those QP would be issued to the other QS holders.

Main Motion 23 passed as amended. Mr. Lockhart abstained.

The following is the motion as amended.

Motion 23 – As Amended		
Topic	**Section**	**Council Preferred Alternative**
IFQ Program		
General Provisions	A-1	Applies to shoreside whiting and non-whiting fisheries

Motion 23 – As Amended		
Topic	**Section**	**Council Preferred Alternative**
Scope: Gears and Fisheries Covered	A-1.1	Modified Option 2 - If a vessel has an LE trawl permit and groundfish is caught by any gear, IFQ must be used, with the following exceptions: exempted trawl, ~~California halibut trawl~~, coastal pelagic species gear, highly migratory species gear, salmon troll, crab pot**, and LE fixed gear** (when it is declared they are fishing against their endorsement).
Gear Switching and Conversion	A-1.1 & 1.7	Gear switching allowed. Do not include provisions for permanent gear conversion.
IFQ Management Units: Species	A-1.2	For non-whiting sector, IFQ is required for all species, except: longspine S. of 34.27'; minor nearshore rockfish (N & S); black rockfish (WOC); CA scorpionfish; cabezon; kelp greenling; shortbelly rockfish; other rockfish; spiny dogfish. The catches of these species would be accounted for and tracked against the overall OY. If a trawl allocation for any of these species is adopted in the future, then QS/QP for those species could be added at that time. For whiting fisheries, IFQ required for whiting and ~~species with bycatch caps. Bycatch caps would be established for~~ the following species; **sablefish,** widow, canary, and darkblotched rockfish, and Pacific ocean perch. The catches of all groundfish species would be accounted for and tracked against the overall OY.
Area Management	A-1.2	For species managed under coastwide OY with precautionary harvest policy (I.e., 40:10 or some other policy) applying to a specific area, subdivide the OY and apply the precautionary policy as recommended by the Council's SSC.
Number of Trawl Sectors	A-1.3	Three trawl sectors
Limited Entry Permit Length Endorsement	A-1.6	Retain the length endorsement for permits, with a modification: If a permit is transferred to a smaller vessel, then the permit would retain the larger length endorsement (e.g., if a permit endorsed for a 75 ft vessel is transferred on to a 50 ft vessel, the permit would retain the endorsement for a 75 ft vessel).
Initial Allocation - Whiting	A-2.1	80% to harvesters;20% to processors (no adaptive management)
Initial Allocation - Non-whiting	A-2.1	90% harvesters; 10% to adaptive management
Attributing and Accruing Processor History	A-2.1.1	Option 3 (whiting) - Attribute history to the receiver reported on the fish ticket, except history may be reassigned to an entity not on the landings receipt, if parties agree or through an agency appeals process

Mr. Anderson moved and Mr. Cedergeen seconded Motion #5 of the WDFW motion package 1 (Motion 24), to adopt as the Council's preferred alternative for the shoreside sector:

Motion 24 – See "Motion 24 as amended" for final version		
Topic	**Section**	**Council Preferred Alternative**
Recent Participation Requirements (Permits)	A-2.1.2	Recent participation not required
Recent Participation Requirements (Processors - SS)	A-2.1.2	Option 2 (whiting) - 1 mt or more of deliveries from whiting trips in each of any two years from 1998-04
Allocation Formula for Catcher Vessel Permits	A-2.1.3	Option 2 – An equal division of the buyback permits' pool of QS for all groundfish, except overfished species, among all qualifying permits plus allocation of the remaining QS based on each permit's history
		Non-whiting non-overfished species: Use permit catch history (1994-03, drop 3 worst years)
		Non-whiting overfished species: Modified option 2 - use finer scale bycatch rates
		Shoreside Whiting: Use 1994-03, drop 2 worst years
		Shoreside Whiting overfished species: Option 2 - pro-rata based on whiting allocation
Allocation Formula for Processors	A-2.1.3	Shoreside Whiting: No bycatch allocation; whiting allocation only.
Permit Holding Requirement	A-2.2.1	If a vessel has an overage: Element 4 - Allow exceptions for vessel to participate in the fisheries for which IFQ would not be required to cover groundfish catch: exempted trawl; CPS purse seine; HMS fisheries; salmon troll; and crab pot. Element 6 - Alternative compliance options would not apply.
Carryover	A-2.2.2	Will not apply to QP that are not transferred to a vessel's account
Eligibility to Own or Hold	A-2.2.3a	Include as specified (p. A-212)
Temporary Transfer Rules	A-2.2.3c	Suboption 2 - QS will not be transferred in the first two years of the program (QP will be transferable)
Accumulation Limits	A-2.2.3e	It is the intent of the Council to have accumulation limits. However, the details of the accumulation limits would be further developed and analyzed through a trailing action. Items to be addressed through the trailing action would include: 1) identification of the species that would be subject to accumulation limits; 2) description of how to treat overfished species; 3) determination of whether to apply accumulation limits at the vessel (usage) or entity (ownership/control) level or both; and 4) how accumulation limits would be tracked. The intent would be to have the trailing action process completed in time for the accumulation limits to begin upon implementation of the trawl rationalization program.
Grandfather Clause	A-2.2.3	No grandfather clause

There was a discussion of the method that would be used to allocate overfished species. Mr. Anderson indicated that his intent was to take the allocation that would otherwise be associated with the buyback permits and pro-rate them to the individual permits based on the finer scale bycatch rate approach, that seems a more logical approach to align the overfished species with the QS for the target species each permit would have. This was a change for the approach specified in June. Mr. Anderson confirmed Dr.

McIsaac's interpretation that the column in Supplemental WDFW Motion Package 1 labeled "change from June" is for informational purposes only and not part of the motion.

With respect to the permit holding requirement, Ms. Cooney noted that they would be fleshing that out in how the enforcement and compliance parts interact based on the enforcement consultant report. That does not need to be dealt with now but she wanted to note that the previous discussion was relevant and would have to be dealt with. Also the citation to statutes in the section on eligibility to hold or own (A-2.2.3.a) has been recodified and will need to be updated.

Mr. Moore moved and Mr. Anderson seconded an amendment (Amendment #1 to Motion 24) to adopt the following:

> Allocation formula for processors is amended to include:
> *"Allocate whiting quota share based on the entity's history for the allocation period of 1998 – 2004 (drop two worst years) and use relative history"*
> This amends section A-2.1.3(d) of the IQ alternatives regarding whiting.

Mr. Moore explained that when the whiting co-ops were discussed there was an option put together for the processing history and this is what it read. At the June meeting, the co-op option was dropped and as a result the processing history portion of the allocation formula had reverted to the vessel history portion of the allocation formula. This goes back to the original language that had been in there for the whiting processor sector. These years were chosen to better reflect the historic and current participation in the processing sector. They recognize that there were some low years that occurred during that time and there was movement in and out of the whiting processing sector during that period.

Ms. Vojkovich reiterated her opposition to processor allocations and opposed this extension of the qualifying period beyond the control date. If we want to explain why we think its a good idea then maybe we should extend the control date for all of the other participants because some people are disadvantaged by going only to 2003. We have had 2003 all along and now we are changing it for one minor section of this program. She did not think it is fair and equitable.

Mr. Lockhart noted that going past the control date is an important consideration and asked why this was crucial. Mr. Moore said that this came up in testimony. This is language that has been in there all along. Because the co-op opportunity was declared illegal we dropped the shoreside co-op option in June. In doing so the processing history year range had been dropped back from 1994-2003. These dates were chosen to be included in the shoreside co-op alternative to reflect the difference in the whiting fishery for a couple of poor years and movement in and out of the fishery during the latter part of this period. There is a major issue of stranded capital. This will still not recognize the history of various processors that operated either before or after.

Amendment #1 to Motion 24 passed. Ms. Vojkovich voted no and Mr. Lockhart abstained.

Mr. Wolford moved and Ms. Vojkovich seconded an amendment (Amendment #2 to Motion 24) to amend the paragraph by striking the "and" in front of "4" and then insert "and 5), how accumulation limits would apply to and affect community-based or regional fishery associations." Mr. Wolford noted that this concept of regionally based fishing associations is very important as we move forward and there is a lot of uncertainty about how they would be affected by accumulation caps. It deserves explicit mention in this paragraph. Amendment #2 to Motion 24 passed unanimously.

Motion 24 passed as amended. Mr. Lockhart abstained from the main motion. The following is the motion as amended.

Motion 24 as amended		
Topic	**Section**	**Council Preferred Alternative**
Recent Participation Requirements (Permits)	A-2.1.2	Recent participation not required
Recent Participation Requirements (Processors - SS)	A-2.1.2	Option 2 (whiting) - 1 mt or more of deliveries from whiting trips in each of any two years from 1998-04
Allocation Formula for Catcher Vessel Permits	A-2.1.3	Option 2 – An equal division of the buyback permits' pool of QS for all groundfish, except overfished species, among all qualifying permits plus allocation of the remaining QS based on each permit's history
		Non-whiting non-overfished species: Use permit catch history (1994-03, drop 3 worst years)
		Non-whiting overfished species: Modified option 2 - use finer scale bycatch rates
		Shoreside Whiting: Use 1994-03, drop 2 worst years
		Shoreside Whiting overfished species: Option 2 - pro-rata based on whiting allocation
Allocation Formula for Processors	A-2.1.3	Shoreside Whiting: No bycatch allocation; whiting allocation only. Allocate whiting quota share based on the entity's history for the allocation period of 1998-2004 (drop two worst years) and use relative history.
Permit Holding Requirement	A-2.2.1	If a vessel has an overage: Element 4 - Allow exceptions for vessel to participate in the fisheries for which IFQ would not be required to cover groundfish catch: exempted trawl; CPS purse seine; HMS fisheries; salmon troll; and crab pot. Element 6 - Alternative compliance options would not apply.
Carryover	A-2.2.2	Will not apply to QP that are not transferred to a vessel's account
Eligibility to Own or Hold	A-2.2.3a	Include as specified (p. A-212)
Temporary Transfer Rules	A-2.2.3c	Suboption 2 - QS will not be transferred in the first two years of the program (QP will be transferable)
Accumulation Limits	A-2.2.3e	It is the intent of the Council to have accumulation limits. However, the details of the accumulation limits would be further developed and analyzed through a trailing action. Items to be addressed through the trailing action would include: 1) identification of the species that would be subject to accumulation limits; 2) description of how to treat overfished species; 3) determination of whether to apply accumulation limits at the vessel (usage) or entity (ownership/control) level or both; ~~and~~ 4) how accumulation limits would be tracked and 5) how accumulation limits would apply to and affect community-based or regional fishery associations. The intent would be to have the trailing action process completed in time for the accumulation limits to begin upon implementation of the trawl rationalization program.
Grandfather Clause	A-2.2.3	No grandfather clause

Mr. Anderson moved and Mr. Cedergeen seconded Motion #6 of the WDFW motion package 1 (Motion 25), to adopt as the Council's preferred alternative for the shoreside sector:

Motion 25 – See "Motion 25 as amended" for final version		
Topic	**Section**	**Council Preferred Alternative**
Tracking and Monitoring	A-2.3.1	Program: Alt 1 - discards allowed; discards of IBQ required
		At-sea Catch Monitoring - Non-whiting: Alt 2 - At-sea observers required
		Shoreside Whiting: Observers would be required in addition to or as a replacement for video monitoring
		At-sea Whiting: Observers would be required in addition to or as a replacement for video monitoring
		MS and CP: Remove reference to "supplemental video monitoring on processors may also be used"
		Shoreside Catch Monitoring - Include as specified
		Catch Tracking Mechanisms - Include as specified
		Landing Hour Restrictions: Landing hours not restricted
		Vessel Certification - Include as specified
		Program Performance Measures - Include as specified
Data Collection	A-2.3.2	Include as specified
Program Costs	A-2.3.3	Cost Recovery: Option 1 - Fees up to 3% consistent with 303A(e) Magnuson Stevens Act, page 86, costs recovery shall be for costs of management, data collection, analysis and enforcement activities.
Program Duration and Modification	A-2.3.4	Include as specified: 4-year review process
Pacific Halibut IBQ	A-4	Establish limit for legal-sized Pacific halibut bycatch mortality through the use of an IBQ in the trawl fishery up to 10% of the Area 2A Constant Exploitation Yield (CEY) as set by the International Pacific Halibut Commission. This amount will be set initially at 10% and may be adjusted through the biennial specifications process.
Other Provisions		Require that all QP be deposited into a vessel account each year
		Require that all retained IFQ non-whiting groundfish in the non-whiting groundfish fishery be landed shoreside (i.e., no at-sea landings allowed for non-whiting groundfish). Ensuring that non-whiting groundfish continues to be delivered shoreside helps protect shoreside processors and communities that have historically relied on groundfish deliveries.
		Initiate a trailing action process to require eligibility criteria to own or hold QS (e.g., ownership interest in a vessel or permit) to help ensure that QS holders have direct ties or investments in the fishery. Requirements should not be so onerous so as to preclude or discourage crew members, for example, from acquiring QS and entering the fishery.

Mr. Myer stated he would recuse himself from the motion discussion and vote.

Mr. Anderson said the intent of the last provision is to not have this program result in QS holders who are absentee, or not involved or engaged in the fishery in some way.
Mr. Moore asked Mr. Anderson about the landing requirement for non-whiting groundfish shoreside with respect to the MS and CP fisheries. Mr. Anderson said this is for the non-whiting groundfish fishery. It

is not intended to preclude nonwhiting groundfish taken in the whiting fishery from being taken care of at-sea.

Ms. Fosmark moved and Ms. Vojkovich seconded an amendment (amendment #1 to Motion 25) to adopt for the non-whiting trawl rationalization alternative for consideration as a trailing action a permit-owner-on-board requirement and grandfathering provision similar to that specified in Amendment 14 to the Pacific Coast Groundfish FMP language.

Ms. Fosmark said her concern was to keep the fishery in the fishermen's hands. There are owner-on-board provisions in the halibut IFQ program in Alaska as well as programs managed by the state of California, and the National Marine Fisheries Service through this Council. This would offer an opportunity for younger people to get into the fishery, it is also addressed in appendix A (page A-48 under the consideration of communities). She feels we should not restrict the fishery or make it more difficult for people to sell their permits. It would not restrict the QS but would offer an opportunity for fishermen to get into the fishery that would not ordinarily be able to do so. This would not be for the initial allocation but would be for the second generation. There needs to be some provision of 150 days or something similar to what the limited entry fixed-gear sector has to at least show an effort that they have been in the fishery before they purchase the fishery.

Mr. Lockhart noted that the TIQC considered and rejected this several times. It seems like this would be changing the way the fishery operates now. Ms. Fosmark said she would not disrupt the existing fishery. Her concern is the future of the fishery and if permits are bought and sold by people who are not invested in the fishery other than just owning a permit it would create a movement that the fishermen themselves would not have as much control over. This would apply just to the second generation.

Ms. Vojkovich read this as a possible way to do what is already in the current motion. It does not preclude the group from thinking of using something like this. Mr. Anderson concurred. Dr. McIsaac stated that the Council is attempting to take final action to the extent that it can. The amendment is on whether or not to have an owner-on-board and grandfather provision and the follow-on action would be to develop some specifics. The motion as it now stands is to come back with a variety of options, this might be one of them. This is a motion to get more specific now on that general provision.

Ms. Fosmark withdrew her amendment #1 to Motion 25.

Ms. Vojkovich moved to amend (Amendment #2 to Motion 25) the landing hour restrictions, revert to the June alternative 2 where landing hours are limited. Mr. Lockhart seconded the amendment. Ms. Vojkovich said this was identified in the EC report as something that would help with enforcement. It may control costs. She thinks it needs to be in there and if it doesn't work we can change it after we have tested it. Mr. Anderson said the fishery is a 24-hour fishery. We are planning on having monitors at the off-load sites. If the restriction is on the order of no more than 12 hours a day it will be very onerous on the industry. Our offload monitors are going to be able to contact state or Federal law enforcement if there is an issue. So not knowing what restrictive landing hours means, he would rather leave this as is; but if we need to restrict hours, we can consider that at that time.

Mr. Myer felt that with observors and monitors, the landing hour restriction to ensure that enforcement can be there at the same time was excessive. Mr. Moore opposed the amendment. While there are costs, there is also a safety issue, this is a 24 hour fishery. If someone has an operational problem or ill crew member and cannot offload because it is not the proper hour, what is he going to choose?

Ms. Vojkovich noted that while some fisheries are 24 hours, this will cost the smaller fishermen. This program is supposed to end the race for fish.

Mr. Anderson asked if her concern would be addressed by saying that landing hours "may" be restricted and noted that this could be done on a port by port basis, depending on circumstances. In response to a question, Mr. Seger indicated that the specific hours would be developed as part of the implementation phase. Mr. Lockhart stated that as long as the original motion does not preclude that type of decision-making process he would be okay with the original motion.

Mr. Anderson moved and Dr. Dave Hanson moved to amend Amendment #2 to specify that the Landing hours may be restricted" (Amendment #3 to Motion 25). Amendment #3 passed unanimously. Amendment #2 to Motion 25, as amended by Amendment #3, passed unanimously.

Mr. Lockhart moved and Ms. Vojkovich seconded an amendment (Amendment #4 to Motion 25) to adopt the following:

> The Council shall begin a review of the TIQ program no later than 5 years after implementation of the program. The review will evaluate the progress the TIQ program has made in achieving the goal and objectives of Amendment 20. The result of this evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. Holders of quota shares should remain cognizant of this fact when making decisions regarding their quota shares, including buying selling, and leasing of these shares.
>
> The Council shall consider the use of an auction or other non-history based methods when distributing quota share that may become available after initial allocation, such as quota that results after a stock transitions from overfished to non-overfished, when Quota share from an AMP is no longer needed, when "use it or lose it" quota shares are forfeited, and if any quota is available after the initial or subsequent reviews of the program are completed.
>
> The specific form of the auction or other method of distribution shall be designed to achieve the goals of Amendment 20, specifically including minimizing the adverse effects from an IFQ program on fishing communities to the extent practical.

Mr. Lockhart said this promotes the idea that the fisheries resources are the property of the citizens of the United States and not perpetual grants to the QS holders. This also recognizes that we are not developing the perfect system. It puts the QS holders on notice that there may be changes to the program that could involve their QS and affect them. There will be a review in four or five years. At that point in time the Council could consider what is going on in the fishery, including whether there are adverse effects on communities, new entrants are effectively prohibited due to costs of entry, or there are other adverse effects. If the adaptive management program is not adequate, the Council could consider an auction of some of the QS to correct these things or deal with other results of the review. There were concerns that under the auction those with the deepest pockets will get it all. The last paragraph addresses ways to limit the auction so as to not disrupt communities, e.g. limiting the auction to small vessels. The motion is not requiring the Council to have an auction, it is putting it in there as a specific item that the Council would consider after the initial review.

Ms. Vjokovich said she would support the amendment. It aligns very closely to the State of California's views on ITQs and the fact that they are not property rights in perpetuity.

Mr. Myer objected to the auction because the people with the deepest pockets may not be a fishermen or processor but rather it may be an NGO, if that is also considered an adverse effect.

Mr. Moore expressed concern about the burden that future consideration of auctions would place on the Council process in terms of production of documents and additional meeting time when there are other fishery management issues that need to be dealt with.

In response to questions from Mr. Williams and Dr. Hansen, Mr. Lockhart said that after the review, there may be some problems, and that the tools we have may not be adequate to handle those problems. An auction or some other nonhistory based method may be used to try fix that, it would not be required. The earliest the auction might be implemented would likely be six to eight years after implementation. There would be no additional action or analysis at this time.

Amendment #4 to Motion 25 passed. Mr. Jerry Mallet, Mr. Dave Ortmann, Mr. Frank Warrens and Ms. Kathy Fosmark voted no.

Motion 25 passed as amended. Mr. Myer recused himself.

Motion 25 as amended		
Topic	**Section**	**Council Preferred Alternative**
Tracking and Monitoring	A-2.3.1	Program: Alt 1 - discards allowed; discards of IBQ required
		At-sea Catch Monitoring - Non-whiting: Alt 2 - At-sea observers required
		Shoreside Whiting: Observers would be required in addition to or as a replacement for video monitoring
		At-sea Whiting: Observers would be required in addition to or as a replacement for video monitoring
		MS and CP: Remove reference to "supplemental video monitoring on processors may also be used"
		Shoreside Catch Monitoring - Include as specified
		Catch Tracking Mechanisms - Include as specified
		Landing Hour Restrictions: Landing hours may be ~~not~~ restricted
		Vessel Certification - Include as specified
		Program Performance Measures - Include as specified
Data Collection	A-2.3.2	Include as specified
Program Costs	A-2.3.3	Cost Recovery: Option 1 - Fees up to 3% consistent with 303A(e) Magnuson Stevens Act, page 86, costs recovery shall be for costs of management, data collection, analysis and enforcement activities.
Program Duration and Modification	A-2.3.4	~~Include as specified: 4-year review process~~ The Council shall begin a review of the TIQ program no later than 5 years after implementation of the program. The review will evaluate the progress the TIQ program has made in achieving the goal and objectives of Amendment 20. The result of this evaluation could include dissolution of the program, revocation of all or part of quota shares, or other fundamental changes to the program. Holders of quota shares should remain cognizant of this fact when making decisions regarding their quota shares, including buying selling, and leasing of these shares. The Council shall consider the use of an auction or other non-history based methods when distributing quota share that may become available after initial

Motion 25 as amended		
Topic	**Section**	**Council Preferred Alternative**
		allocation, such as quota that results after a stock transitions from overfished to non-overfished, when Quota share from an AMP is no longer needed, when "use it or lose it" quota shares are forfeited, and if any quota is available after the initial or subsequent reviews of the program are completed. The specific form of the auction or other method of distribution shall be designed to achieve the goals of Amendment 20, specifically including minimizing the adverse effects from an IFQ program on fishing communities to the extent practical.
Pacific Halibut IBQ	A-4	Establish limit for legal-sized Pacific halibut bycatch mortality through the use of an IBQ in the trawl fishery up to 10% of the Area 2A Constant Exploitation Yield (CEY) as set by the International Pacific Halibut Commission. This amount will be set initially at 10% and may be adjusted through the biennial specifications process.
Other Provisions		Require that all QP be deposited into a vessel account each year
		Require that all retained IFQ non-whiting groundfish in the non-whiting groundfish fishery be landed shoreside (i.e., no at-sea landings allowed for non-whiting groundfish). Ensuring that non-whiting groundfish continues to be delivered shoreside helps protect shoreside processors and communities that have historically relied on groundfish deliveries.
		Initiate a trailing action process to require eligibility criteria to own or hold QS (e.g., ownership interest in a vessel or permit) to help ensure that QS holders have direct ties or investments in the fishery. Requirements should not be so onerous so as to preclude or discourage crew members, for example, from acquiring QS and entering the fishery.

Mr. Anderson moved and Mr. Myer seconded Motion #7 of the WDFW motion package 1 (Motion 26), to adopt as the Council's preferred alternative for the shoreside sector:

Motion 26		
Topic	**Section**	**Council Preferred Alternative**
Adaptive Management	A-3	It is the intent of the Council to have an adaptive management program for the shoreside non-whiting sector. Up to 10% of the non-whiting QS will be reserved for this program. QS will be divided among the 3 states. QS/QP will be provided through separate, but parallel, processes in each of the three states (e.g., through the use of regional fishery associations or community stability plans or other means). Further details will be developed through a trailing action with the intent of having the adaptive management provisions apply during the first year of implementation of the trawl rationalization program.

Ms. Vojkovich supported the motion. Ms Vojkovich noted that throughout the discussion of adaptive management we have talked about it being within the Council's purview and not a state responsibility to go off on its own. She expressed her view that it would be within the way the Council operates but state-specific, i.e. whatever process it is in the state. She was concern about state costs. Mr. Anderson did not concur. He said he would expect a process within the respective states that would bring forward recommendations to the Council, though his thoughts were not entirely formed on this issue. He did not see independent state programs and decision making outside the Council process but that there would be independent public processes within the states that would bring recommendations forward to the Council. Ms. Vojkovich asked if there would be Council guidelines that would run the program. Mr. Anderson replied that as the further details are developed through the trailing action some criteria and protocols would be developed as part of that process.

Mr. Moore moved and Mr. Myer seconded an amendment (Amendment to Motion 26) to adopt the following:

> The Council will allocate 10 percent of target species quota shares (QS) to be set aside for fishing communities.
>
> The Council will distribute these shares to fishing communities (as defined) on a first-come, first-serve basis with no less than 3 percent available to fishing communities in each of the states of Washington, Oregon, and California. Distributions will be made in perpetuity subject to future action by the Council. Special accumulation caps will apply to fishing communities. Upon dissolution of a fishing community, QS will revert to the Council to be redistributed. At the end of the 6 year period following initial implementation of the IQ system, any QS not distributed to fishing communities or returned following dissolution of a fishing community shall be distributed to initial recipients of QS on the same basis as QS were originally distributed.
>
> Definition of fishing community:
>
> A fishing community shall consist of one shoreside processor (as defined under A-2.1.1(c)) of non-whiting groundfish and at least 2 entities owning or holding non-whiting groundfish quota shares. The fishing community may include other entities. Members of the fishing community must demonstrate by a signed contract among all parties that QS issued to the fishing community will be harvested and processed in the port where the processor is located and must provide a business plan showing how the QS will be used.

Mr. Moore said he is trying to figure out a way to get at this issue of how do we protect local processors and communities without taking away fish from the fishermen. We have heard that people support processors, but no one wants to give QS to processors. Processors want QS because they are worried about the effects of consolidation in light of their experiences with the trawl buyback program. Section 303A(c)(3) of the MSA provides a solution in that it allows QS to be allocated to fishing communities. The term is misleading because while it implies a municipality, port or some other political organization, the NOAA Technical memorandum on design and use of LAPs states that the "revised MSA sets up procedures for the Councils to create fishing communities." He envisions this to work by setting aside 10 percent of the groundfish target species QS. The formation of fishing communities is entirely voluntarily. This will require fishermen and processors to work together. The NOAA Tech memo provides guidance on the types of provisions that would be included in the business plan. He expects that guidance would be used. He specified a six year time frame for triggering the reversion of unused QS back to the initial QS recipients because six years was too long for fishermen to boycott these fishing community associations but not so long that there would be significant economic harm to fishermen given the amount of fish that would be in the program. By allowing QS to remain with the fishing community we avoid some of the pit falls with the BC system, e.g. not having continuity in business planning. A system that allows for planning and partnership is important. This provides the basis for that, gets us out of the box around the issue of an initial allocation to processors and provides an opportunity, especially in small ports, for processors and fishermen to work together.

In response to a question from Mr. Williams, Mr. Moore said the reference to "perpetuity" was that in order to support the business plans of entities representing a fishing community you need to have some long range assurance. Once these are established they keep the QS for as long as they carry out the business plan and they remain as a legally contracted entity. With respect to the entities that joined with the processors to form a community association, the two other entities would not be processors (e.g. they could be a boat or The Nature Conservancy).

Mr. Anderson said a copy of Mr. Moore's motion should be provided to the committee that will work on this proposal but at this time we should not be moving forward with a motion with this amount of detail. Mr. Moore said if we can take a look at this seriously later, he would withdraw his amendment.

Motion 26 passed unanimously.

PFMC
2/23/09

Eligibility to Own IFQ
Council Staff Report to the GAC on Trailing Action Considerations

Current Preferred Option - Any U.S. citizen or legal entity[1]

Any individual or legal entity eligible to own a U.S.-documented fishing vessel[2] is also eligible to own IFQ. The IFQ owner need not actually own a U.S.-documented fishing vessel to own quota shares or quota pounds. This option is the most open and flexible, but does not require any connection to fishing in order to own IFQ. Quota shares would behave more like shares of stock in a company, which anyone can own, and could be bought, sold or traded through a broker.

November 2008 Council Decision: ***The Council moved to initiate a trailing action process to require eligibility criteria*** *to own or hold QS (e.g., ownership interest in a vessel or permit) to help ensure that QS holders have direct ties or investments in the fishery. Requirements should not be so onerous so as to preclude or discourage crew members, for example, from acquiring QS and entering the fishery.*

Proposed Focus of Additional Analysis

General

During scoping, a flexible ownership eligibility alternative was offered as a simple alternative to developing myriad options for communities, crew, and other groups to own IFQ. **To greatly restrict the ownership eligibility now, would require a re-examination of the possible owner-groups who may wish to obtain IFQ and the rationale for other provisions of the program.** For example, one of the rationales for not specifically allocating to communities was that, if they wished to be involved, communities could acquire IFQ. For crew members no special provisions were provided to facilitate new entry because they would be able to make incremental investments in the acquisition of IFQ.

Initial allocation currently is to LE permit holders (SS whiting and non-whiting IFQ), processors (SS whiting IFQ only) and undefined entities (adaptive management IFQ).

[1] Exact language in A-2.2.3 on who is eligible to own quota shares is: "(i) any person or entity eligible to own and control a US fishing vessel with a fishery endorsement pursuant to 46 USC 12113 (general fishery endorsement requirements and 75% citizenship requirement for entities) and (ii) any person or entity that owns a mothership that participated in the west coast groundfish fishery during the allocation period and is eligible to own or control that US fishing vessel with a fishery endorsement pursuant to Sections 203(g) and 213(g) of the American Fisheries Act (AFA)."

[2] Originally, AFA exceptions were included to ensure that all current participants would be allowed to continue in the fishery under trawl rationalization. However; it is our understanding that due to changing ownership structures in the fishery this exception would no longer be needed.

For consistency with current provisions, those receiving an initial allocation should also be legally eligible to own IFQ. For ease of trading and tracking, **the simpler the eligible to own definition is the easier it will be to monitor and enforce** the eligible to own provision.

<u>Alternative 1. Tie IFQ ownership to the fishery via a listing of eligible owners.</u>
Those eligible to own IFQ could include harvesters, processors, crew members, fishing/coastal communities and/or entities that represent communities (such as a community fishing associations), states, local governments, and non-governmental organizations with a fishery-related connection. **This option would provide a great deal of flexibility in who can own IFQ while still requiring some kind of tie between the quota share holder and the act of harvesting.** If separate categories of participants are created, the Council may want to be sure that the qualification to be a member of that group cannot be contrived. For example, if only the purchase of a state processing license is required to qualify as a processor, the purchase of such licenses by entities that never process might become widespread.

<u>Potential Additional Analysis Not Currently in Queue</u>

In relation to the eligible to own topic, there has been discussion of other potential alternatives that are not currently in queue for further development or analysis.

One potential alternative is an "owner on board" provision, as has been used in the Alaska halibut/sablefish fishery (see below). An "owner on board" provision would be problematic in a multi-species IFQ fishery with transferable QS in that the QS of various species initially allocated to an owner may ultimately be fished on several vessels. Furthermore, the initial allocation of some QS in the shoreside whiting fishery to processors makes an owner on board provision somewhat complicated.

Additionally, in the Alaska halibut/sablefish[3] IFQ fishery, only individuals are eligible to own IFQ; however, for liability protection an individual can form a limited liability company after purchasing IFQ. There was a grandfather clause for corporations existing at the time of initial allocation. Many west coast harvesting businesses are organized as corporations and partnerships. To use the Alaska halibut/sablefish approach, the west coast groundfish IFQ would have to be held outside the corporate/partnership structure.

Another alternative discussed is a "use or lose" provision. This provision was discussed at length in the TIQC, where several problematic aspects were discussed. Further, the Council did not select this alternative from the preliminary DEIS, where analysis was presented.

[3] Those who are eligible to own quota shares in halibut/sablefish are either 1) individuals with an initial allocation, 2) individuals with proven crew experience in any U.S. commercial fishery for at least 150 days, or 3) an eligible community non-profit. The community non-profit can hold quota shares, but must lease out annual quota pounds to community residents. Of the 27 eligible Gulf of Alaska communities, 20 have formed a non-profit; however, only one community non-profit is functional. Many do not have the funds to buy quota shares, while others lack organizational infrastructure.

Examples of Eligibility Requirements in Other Fisheries

1. Only permit holders can own IFQ

An example of this can be found in the British Columbia (B.C.) groundfish program. This program restricts the fishery to the current harvesters and new harvester entrants. In B.C., this rule has driven processors to become more vertically integrated by buying a vessel with a permit in order to buy, sell and trade IFQ. If this provision were applied to the U.S. trawl rationalization program, **processors receiving IFQ in the initial allocation would be excluded from owning IFQ, therefore an exception would need to be created immediately**.

2. Only individuals can own IFQ

In the Alaska halibut/sablefish[1] IFQ fishery, only individuals are eligible to own IFQ; however, for liability protection an individual can form a limited liability company after purchasing IFQ. There was a grandfather clause for corporations existing at initial allocation. This "only individuals can own IFQ" provision is coupled with an "owner on board[2]" provision. Many west coast harvesting businesses are organized as corporations and partnerships. **To use the Alaska halibut/sablefish approach, the IFQ owned by businesses would have to be held outside the corporate/partnership structure.**

3. Crew IFQ shares

The Alaska commercial crab fishery set aside about 3% of the quota shares[3] specifically for captains and crew with recent (within 365 days) participation harvesting in the crab fishery. Owners of crew shares must be an individual, not a corporation. Those who wish to own crew shares must prove recent participation each time they buy or utilize shares. **Under the current trawl rationalization program design, crew would be able to own IFQ without proof of participation in the fishery, saving time and effort for crew and for NMFS regulators.**

[1] Those who are eligible to own quota shares in halibut/sablefish are either 1) individuals with an initial allocation, 2) individuals with proven crew experience in any U.S. commercial fishery for at least 150 days, or 3) an eligible community non-profit. The community non-profit can hold quota shares, but must lease out annual quota pounds to community residents. Of the 27 eligible Gulf of Alaska communities, 20 have formed a non-profit; however, only one community non-profit is functional. Many do not have the funds to buy quota shares, while others lack organizational infrastructure.

[2] The IFQ owner must be aboard at all times during the fishing trip and the IFQ owner must sign the landing report. There are exceptions in the case of an emergency.

[3] Other quota shares in the commercial crab fishery can be held by any processor (does not have to be U.S. owned); by a harvester with a crab limited license permit (must be either a U.S. citizen or corporation); and by any of the six Community Development Quota groups (comprised of 65 communities).

Agenda Item G.3.a
Attachment 6
March 2009

Accountability for Species by Sector

At the November, 2008 Council meeting, the Council voted to establish a Trawl Rationalization program with three trawl sectors. This was achieved by merging the two shoreside sectors (SS whiting and non-whiting) into a single sector. In doing so, shoreside whiting entities and non-whiting entities would be allowed to trade quota with one another.

The language from the November 2008 decision on species accountability literally states that shoreside whiting vessels would be accountable for a smaller set of species than non-whiting vessels. In order to accomplish such a differentiation in species accountability within the different types of shoreside activity, it would be necessary to construct regulations that have the effect of creating four different trawl sectors. This creates an inconsistency with the motion to establish three trawl sectors. For reference, the set of species each sector would be held accountable for, based on a literal interpretation of the November 2008 decision, is included in the table below. Shaded cells represent species that a sector would not be held accountable for. The shoreside whiting sector includes "hashed" cells, and it is these sector-species combinations which create an inconsistency.

At the January 2009 Groundfish Allocation Committee meeting, members voted unanimously to clarify that the Council's intent was to have three trawl sectors and to hold both types of shoreside activity accountable for the same set of species. This would effectively be done by holding shoreside whiting activity accountable for the set of species that are unshaded in the non-whiting column indicated in the table below.

During discussion of this matter, voting members of the GAC also suggested that the intent of the November Council motion on species coverage in the shoreside sector was meant to apply to the at sea sectors. During the process of the November 2008 motion on Trawl Rationalization, the original motion for species coverage on this item included canary rockfish, darkblotched rockfish, widow rockfish, and Pacific Ocean perch. Following a Council break, a revised motion was adopted which added sablefish to this list of species. The addition of sablefish appears to have been motivated by the understanding that the motion applied to the shoreside whiting fishery, not the at sea whiting fishery.

If the intention of the November 2008 Council motion was to hold the at sea fishery accountable for a different set of species than status quo (status quo includes canary, widow, and darkblotched) then it may be useful to revisit staff analysis presented at the November 2008 Council meeting (see November 2008 Briefing Book, Agenda Item F.3.c, Supplemental Additional Analysis 2, pages 9 – 13). This analysis suggests that the species with the highest priority for coverage in the at sea sector include: canary, widow, and one or more of darkblotched, POP, and slope rockfish. By extension, the analysis suggests that sablefish is not be a high priority species for coverage in the at sea fisheries.

		SHORESIDE Non-whiting	SHORESIDE whiting	MS	CP
Sector Allocations Decided Through ISA Process	Lingcod - coastwide b/	Covered	Seeking clarification	Not covered	Not covered
	Pacific Cod	Covered	Seeking clarification	Not covered	Not covered
	Pacific Whiting (U.S.)	Covered	Covered	Covered	Covered
	Sablefish (Coastwide)	Not covered	Not covered	Not covered	Not covered
	N of 36° (Monterey north)	Covered	Covered	Not covered	Not covered
	S of 36° (Conception area)	Covered	Seeking clarification	Not covered	Not covered
	PACIFIC OCEAN PERCH	Covered	Covered	Not covered	Not covered
	Shortbelly Rockfish	Not covered	Not covered	Not covered	Not covered
	WIDOW ROCKFISH	Covered	Covered	Covered	Covered
	Chilipepper Rockfish	Covered	Seeking clarification	Not covered	Not covered
	Splitnose Rockfish	Covered	Seeking clarification	Not covered	Not covered
	Yellowtail Rockfish	Covered	Seeking clarification	Not covered	Not covered
	Shortspine Thornyhead - coastwide	Not covered	Not covered	Not covered	Not covered
	Shortspine Thornyhead - N of 34º27'	Covered	Seeking clarification	Not covered	Not covered
	Shortspine Thornyhead - S of 34º27'	Covered	Seeking clarification	Not covered	Not covered
	Longspine Thornyhead - coastwide	Not covered	Not covered	Not covered	Not covered
	Longspine Thornyhead - N of 34º27'	Covered	Seeking clarification	Not covered	Not covered
	Longspine Thornyhead - S of 34º27'	Not covered	Not covered	Not covered	Not covered
	DARKBLOTCHED	Covered	Covered	Covered	Covered
	Black Rockfish	Not covered	Not covered	Not covered	Not covered
	Blue Rockfish (CA)	Not covered	Not covered	Not covered	Not covered
	Minor Rockfish North	Not covered	Not covered	Not covered	Not covered
	Nearshore Species	Not covered	Not covered	Not covered	Not covered
	Slope Species	Covered	Seeking clarification	Not covered	Not covered
	Minor Rockfish South	Not covered	Not covered	Not covered	Not covered
	Nearshore Species	Not covered	Not covered	Not covered	Not covered
	Slope Species	Covered	Seeking clarification	Not covered	Not covered
	California scorpionfish	Not covered	Not covered	Not covered	Not covered
	Cabezon (off CA only)	Not covered	Not covered	Not covered	Not covered
	Dover Sole	Covered	Seeking clarification	Not covered	Not covered
	English Sole	Covered	Seeking clarification	Not covered	Not covered
	Petrale Sole (coastwide) b/	Covered	Seeking clarification	Not covered	Not covered
	Arrowtooth Flounder	Covered	Seeking clarification	Not covered	Not covered
	Starry Flounder	Covered	Seeking clarification	Not covered	Not covered
	Other Flatfish	Covered	Seeking clarification	Not covered	Not covered
	Spiny Dogfish	Not covered			
	Kelp Greenling HG (OR)	Not covered	Not covered	Not covered	Not covered
Sector Allocations Decided Through Spex	CANARY ROCKFISH	Covered	Covered	Covered	Covered
	BOCACCIO	Covered	Seeking clarification	Not covered	Not covered
	COWCOD	Covered	Seeking clarification	Not covered	Not covered
	YELLOWEYE	Covered	Seeking clarification	Not covered	Not covered
	Shelf Species	Covered	Seeking clarification	Not covered	Not covered
	Shelf Species	Covered	Seeking clarification	Not covered	Not covered
	Other Fish	Covered	Seeking clarification	Not covered	Not covered
	Longnose Skate	Covered	Seeking clarification	Not covered	Not covered

Not covered
Covered
Seeking clarification

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Attachment 7
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Analysis Illustrating the Effect of Two Different Finer Area Bycatch Rate Overfished Species Allocation Formulas

The Council's November 2008 motion on the initial allocation of overfished species specifies the use of "finer area bycatch rates" for use in estimating the amount of quota share of overfished species. In June of 2008, Council staff proposed two different methods for making a finer area bycatch rate allocation of overfished species. The difference between these two methods is the treatment of that area south of 40° 10' N. latitude. One option uses one latitudinal area south of 40° 10' N. latitude while the other area uses two latitudinal areas south of 40° 10' N. latitude. Council staff will need clarification on which of these options the Council intended in order to move forward on various pieces of analysis.

The following figures illustrate the effect of the two options. From these figures, it is evident that the initial allocation of bocaccio, darkblotched, and widow are the species most highly affected by differences in the initial allocation formula. These differences apply purely to those entities with history south of 40° 10' N. latitude. The effect of applying the finest scale bycatch rate area (splitting the area south of 40° 10' N. latitude into two regions for purposes of estimation) is that those entities with history in areas where darkblotched, bocaccio, and widow are most abundant would tend to receive relatively greater amounts of quota share for those species. Inversely, the effect of applying the more moderately fine scale bycatch area approach is to more evenly spread out the initial allocations of darkblotched, widow, and bocaccio to entities with history south of 40° 10' N. latitude.

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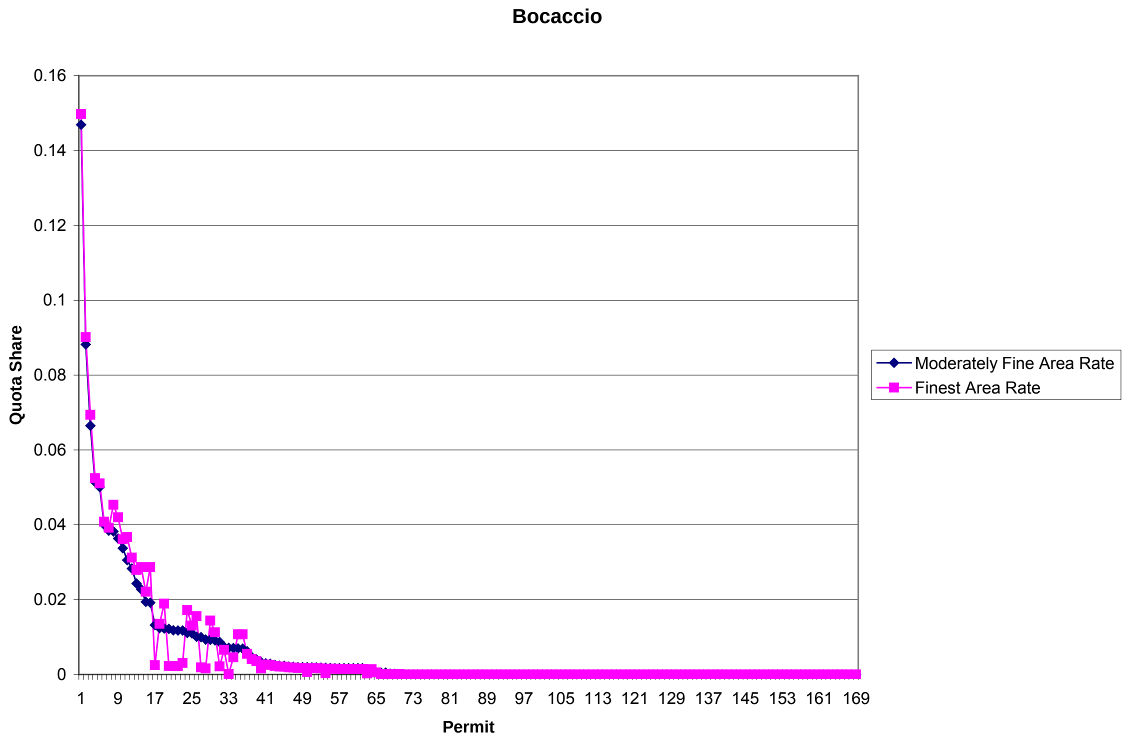
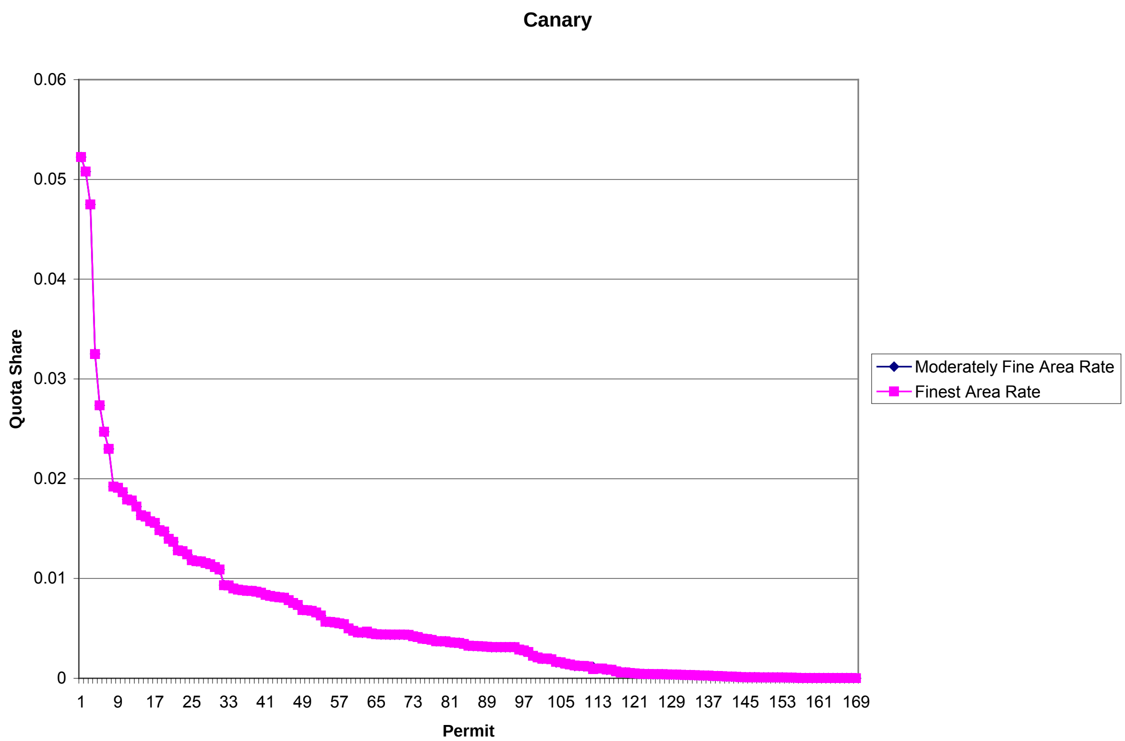
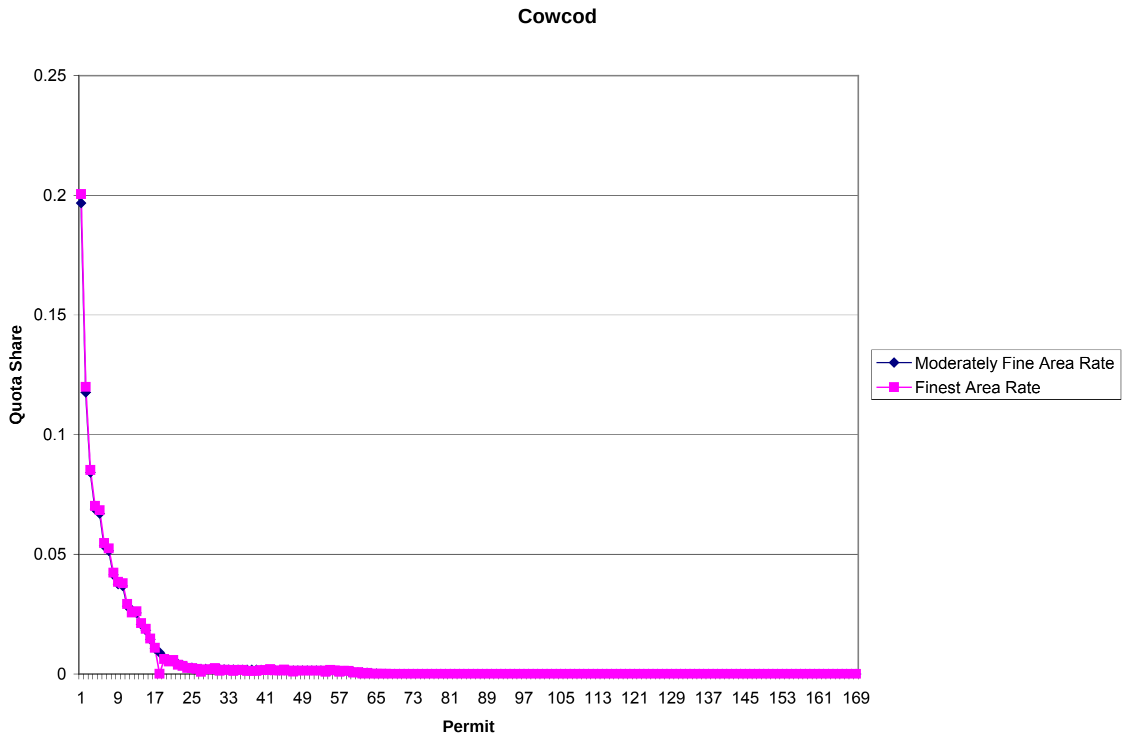
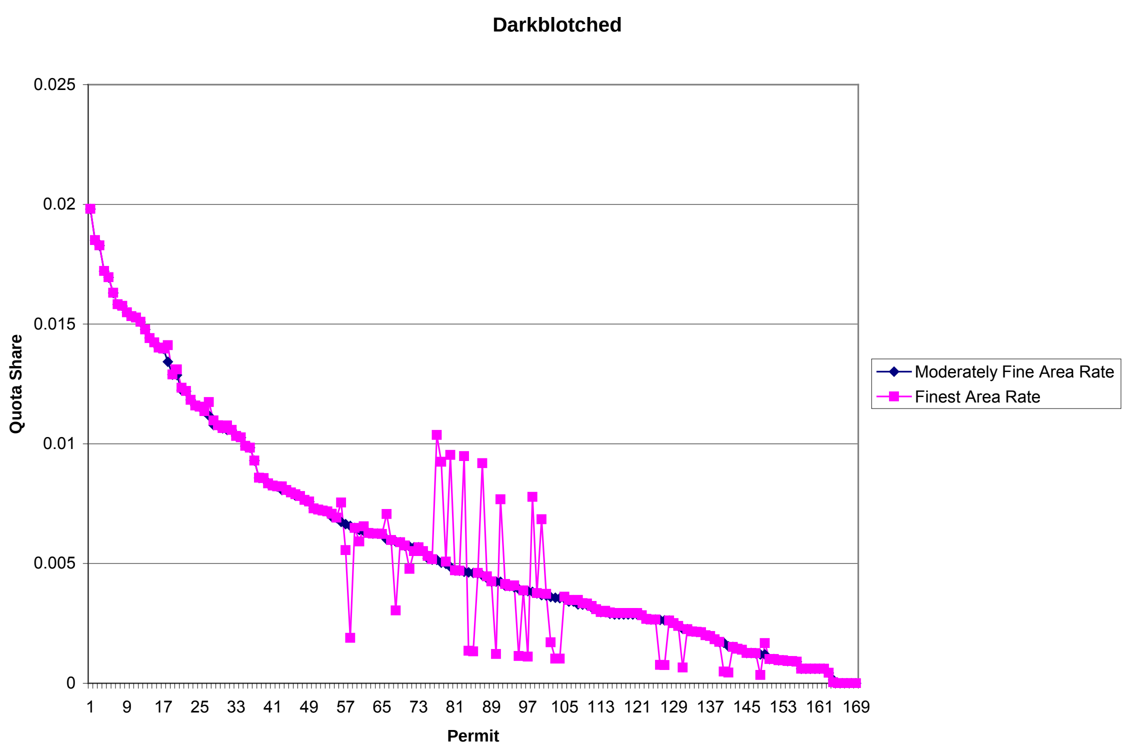
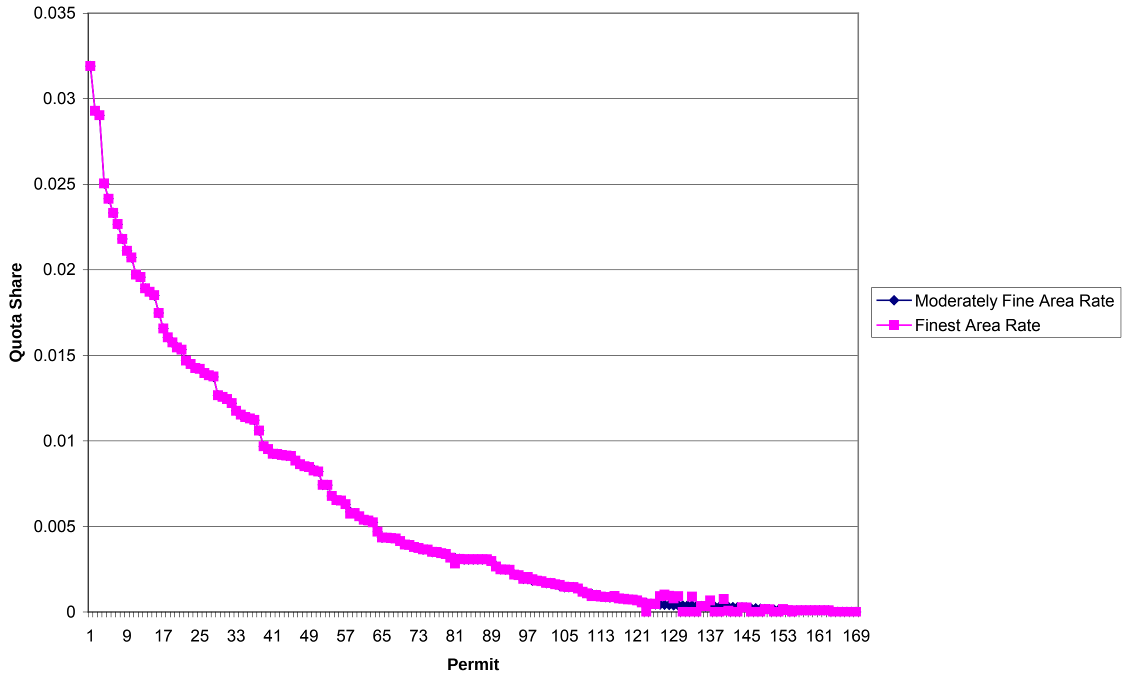

Bocaccio
Quota Share
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137 145 153 161 169
Permit
Moderately Fine Area Rate
Finest Area Rate


Canary
Quota Share
0.06
0.05
0.04
0.03
0.02
0.01
0
1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137 145 153 161 169
Permit
Moderately Fine Area Rate
Finest Area Rate

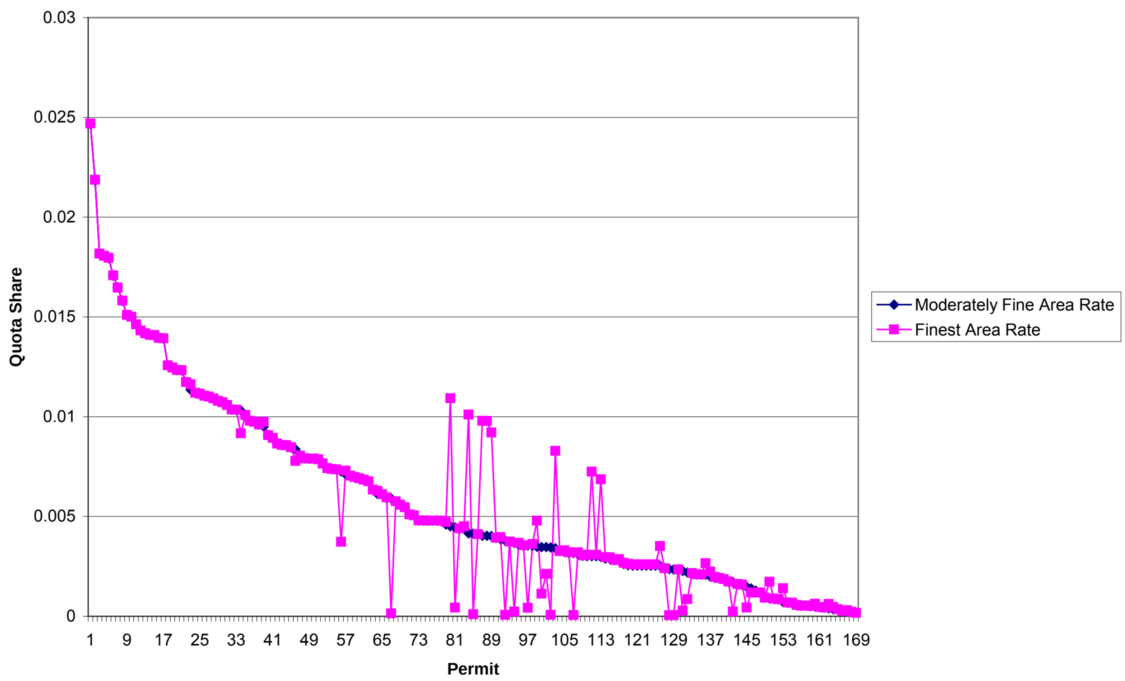

Cowcod
0.25
0.2
0.15
0.1
0.05
0
Quota Share
1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137 145 153 161 169
Permit
Moderately Fine Area Rate
Finest Area Rate

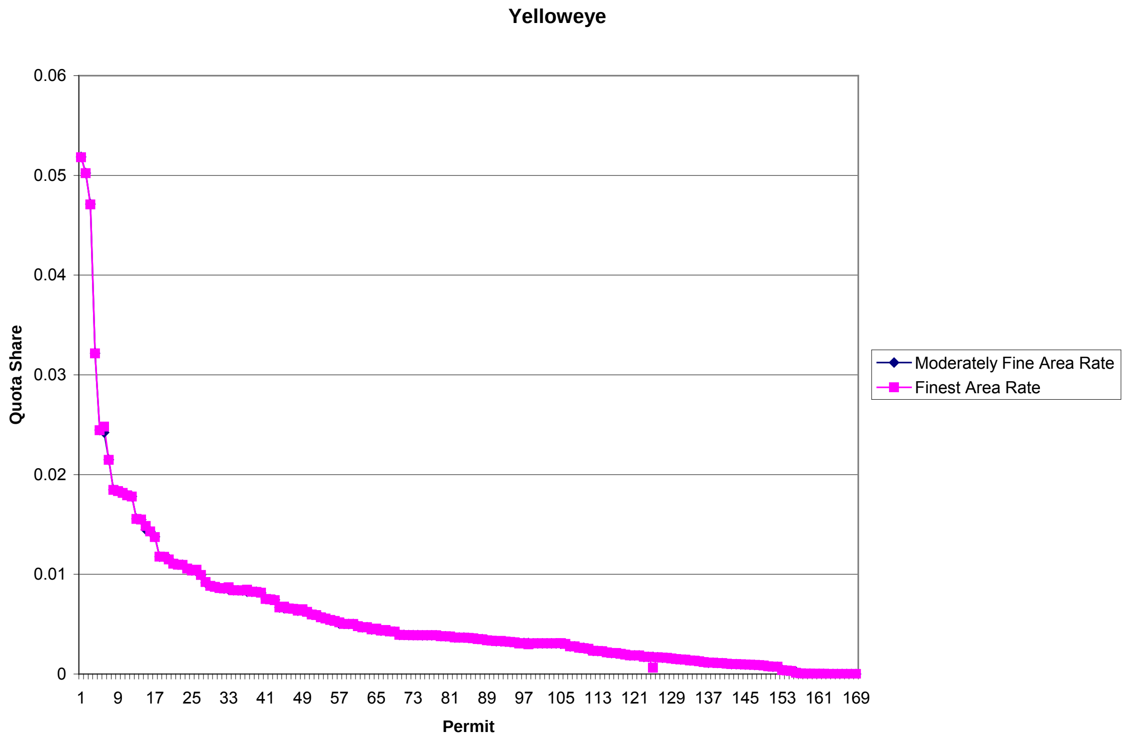

Darkblotched
0.025
0.02
0.015
0.01
0.005
0
Quota Share
1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137 145 153 161 169
Permit
Moderately Fine Area Rate
Finest Area Rate

Pacific Ocean Perch



Widow




Yelloweye
Quota Share
0.06
0.05
0.04
0.03
0.02
0.01
0
1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137 145 153 161 169
Permit
Moderately Fine Area Rate
Finest Area Rate

Agenda Item G.3.a
Attachment 8
March 2009

Selected Excerpts and Discussion Pertaining to the Initial Allocation of Pacific Halibut South of 40 Degrees 10 Minutes North Latitude

The Council's November 2008 motion on Trawl Rationalization specifies that "…[Pacific halibut] IBQ will be issued on the basis of a bycatch rate applied to the target species QS an entity receives…". Council staff identified a method for allocating Pacific halibut to entities based on a bycatch rate to arrowtooth flounder and petrale sole in areas north of 40° 10' N. latitude. However, Pacific halibut are also found south of that area and the International Pacific Halibut Commission's area 2A extends to the US/Mexico border. In order to make an initial allocation of Pacific halibut to permits operating in that southern area, staff will need a Council action to specify the manner in which an initial allocation of Pacific halibut IBQ in the southern area should be done. Available data from the West Coast Groundfish Observer Program indicates encounters with Pacific halibut in the trawl fishery in that southern area, but data is not sufficiently robust to develop a bycatch rate approach similar to that used in the northern area. Therefore, staff has identified two options for making such an allocation. The first option would allocate Pacific halibut equally to those permits with activities in the southern area. The second option would allocate Pacific halibut on a pro-rata basis to permits with activity in that southern area.

1. Equal allocation of Pacific halibut quota to entities with history south of 40° 10' N. latitude.
2. Allocate Pacific halibut quota on a pro rata basis to entities with history south of 40° 10' N. latitude.

Information provided by NWFSC indicates that over the 2003 – 2006 period, 1,300 lbs of Pacific halibut were observed in the trawl fishery south of 40° 10' N. latitude while 549,952 lbs of Pacific halibut were observed to the north. This means that the allocation of Pacific halibut to the south would be approximately 0.24 percent of the trawl allocation, while the area to the north would be comprised of 99.76 percent of the trawl allocation. The effect of this relatively small percentage being allocated to permits with history south of 40° 10' N. latitude means that both the pro-rata distribution and the equal allocation distribution to permits with history south of 40° 10' N. latitude will have very similar results. The figure below shows that, in any case, each permit would receive less than 0.015 percent of the trawl sector allocation of Pacific halibut.

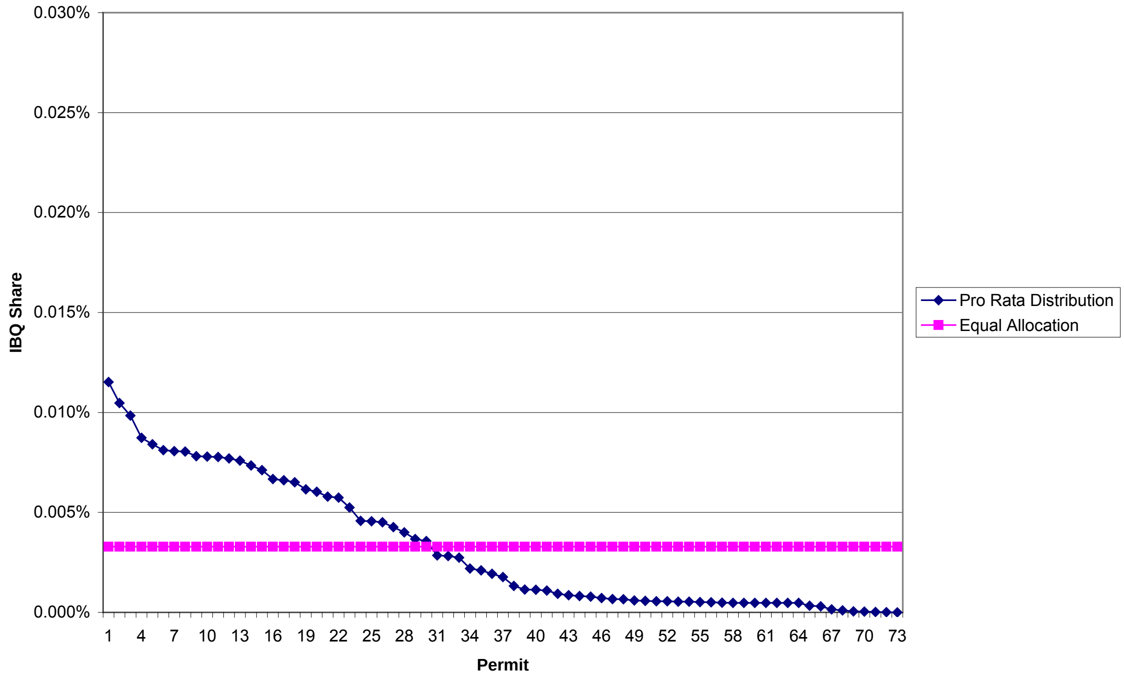


Figure 1. Initial Allocation of Pacific Halibut to Permits with History South of 40° 10' Using Two Different Formulas

EXAMPLE IDENTIFICATION CRITERIA FOR THE ELIGIBLE TO OWN ISSUE

Quota owner would have a **direct tie** to fishing/processing:

- Harvester with an LE trawl permit
- Shoreside processor
    - Any
    - Any with groundfish processing history
- Crew members
    - Anyone with harvesting experience in any U.S. fishery
    - Anyone with harvesting experience in the LE trawl fishery from any time period
    - Anyone with recent harvesting experience in the LE trawl fishery
- Coastal Community
    - Any coastal community
    - Any coastal community with groundfish landings
    - Any coastal community with recent groundfish landings

Quota owner would have a **less direct tie** to fishing/processing:

- Community non-profit
    - Any non-profit entity
    - A non-profit entity established by or partnered with a local government entity (city council, port authority, county commission, etc), state government entity, or tribal government entity
- State fishery management agency
    - Agency can hold QS, but must lease out QP (profit to state)
    - Agency can hold QS, but must award use of QP (no profit to state)

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Agenda Item G.3.a
Supplemental Attachment 10
March 2009

COMPARISON OF "ELIGIBLE TO OWN" LANGUAGE FROM AMENDMENT 6 AND AMENDMENT 20

The following text was in Amendment 6, and is in the Groundfish Fishery Management Plan (FMP):

Ownership Restriction and Changes in Ownership

Only entities (human beings, corporations, etc.) qualified to own a U.S. fishing vessel may be issued or may hold (by ownership or otherwise) an LE permit. (Foreign ownership of LE permits should be limited to the maximum degree possible given what is allowed under the law.)

The above regulatory language is implemented in policy as follows (taken from the National Marine Fisheries Service Northwest Region website regarding who is eligible to own a limited entry permit):

Eligibility to own or hold a West Coast Groundfish Limited Entry Permit: Please note that a West Coast Groundfish Limited Entry Permit may be issued or may be held only by a person eligible to own a documented vessel under the terms of 46 U.S.C. 12102(a).

Persons eligible to own a documented vessel are:

- *an individual who is a citizen of the United States*
- *an association, trust, joint venture or other entity -*
  - *a) all of whose members are citizens of the United States; and*
  - *b) that is capable of holding title to a vessel under the laws of the United States or of a State*
- *a partnership whose general partners are citizens of the United States*
- *a corporation established under the laws of the United States or of a State, whose president or other chief executive officer and chairman of the board of directors are citizens of the United States and no more of its directors are non-citizens than a minority of the number necessary to constitute a quorum;*
- *the United States Government;*
- *the government of a State;*
- *an alien lawfully admitted to the United States for permanent residence who operates a fishing vessel off the coast of the State of California.*

The following text is from Amendment 20:

Those eligible to own QS/QP will be restricted to (i) any person or entity eligible to own and control a US fishing vessel with a fishery endorsement pursuant to 46 USC 12108 (general fishery endorsement requirements) and 12102(c) (75% citizenship requirement for entities) and (ii) any person or entity that owns a mothership that participated in the west cost groundfish fishery during the allocation period and is eligible to own or control *that US fishing vessel with a fishery endorsement pursuant to Sections 203(g) and 213(g) of the American Fisheries Act (AFA).*

Part (i) of the above Amendment 20 text regarding who is eligible to own quota shares is similar to Amendment 6 language defining who is eligible to own a limited entry groundfish trawl permit. Therefore, it is anticipated that the implementing policy language for Amendment 20 would be similar to the policy language resulting from Amendment 6.

Part (ii) of Amendment 20 was inserted to accommodate the ownership structure of certain motherships; however, that accommodation may no longer be necessary due to ownership changes for certain vessels. If that is true, Part (ii) of the Amendment 20 eligible to own language could be removed from the preferred alternative.

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3/5/09

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Agenda Item G.3
Clarifications to November Action

1. Clarification on 3 trawl sectors and species covered with IFQ in shoreside sectors (attachment 6)
2. Species covered with bycatch caps in at sea sectors (attachment 6)
3. Clarification on the “bycatch rate” approach for initial allocation of overfished species south of 40 10 (attachment 7)
4. Clarification on the initial allocation of Pacific halibut south of 40 10 (attachment 8)

1) Species Covered with IFQ in Shoreside Sectors

- The November 2008 Council action specifies having three trawl sectors
- Within the shoreside sector, the action further states that SS whiting vessels will have IFQ for a different set of species than non-whiting vessels
  - SS whiting: Whiting, widow, canary, darkblotched, POP, sablefish
- This has the effect of creating 4 sectors
  - Staff is seeking a Council motion to clarify whether the intention is to have 3 or 4 trawl sectors
    - 3 sectors would require non-whiting and shoreside whiting having IFQ for same set of species

GAC Recommendations and Discussion

- At the January 2009 GAC meeting, the GAC unanimously voted to clarify that the intention is to have three trawl sectors.
  - This would be done by holding SS whiting vessels accountable for the same (larger number of) species as non-whiting
    - See attachment 6

2) Species Coverage in At Sea Sectors

- The November Council motion results in the at sea sectors having bycatch caps for widow, darkblotched, and canary
- January 2009 GAC discussion indicated that the motion applying to SS whiting was supposed to apply to at sea whiting.
  - First motion included IFQ for widow, darkblotched, canary, and POP
  - Subsequent motion included widow, darkblotched, canary, POP, and sablefish
  - This second motion to add sablefish appears to have been motivated by the understanding that the addition of sablefish applied to shoreside whiting, not at sea

Species	OY/ Allocation	Average portion of 2008 OY (2004 to 2006)	Substantially Caught in Non-trawl Sectors
WIDOW ROCKFISH	368	21.89%	No
CANARY ROCKFISH	44	4.85%	Yes
DARKBLOTCHED ROCKFISH	330	2.77%	No
SLOPE ROCKFISH (N)	1,160	2.48%	No
PACIFIC OCEAN PERCH	150	2.20%	No
YELLOWTAIL ROCKFISH	4,548	1.69%	No
SABLEFISH	2,651	0.50%	NA
SHELF ROCKFISH (N)	958	0.47%	Yes
SHORTSPINE THORNYHEAD	1,634	0.38%	No
ARROWTOOTH FLOUNDER	5,800	0.06%	No
LINGCOD	5,558	0.05%	Yes
OTHER FLATFISH	4,884	0.03%	No
LONGNOSE SKATE			No
PACIFIC HALIBUT			Yes
SPINY DOGFISH			Yes

This analysis suggested the original motion (POP, darkblotched, widow, canary) was more appropriate than the subsequent motion

3) Initial Allocation of Overfished Species Based on a Bycatch Rate (South of 40 10)

- The November Council motion specifies the use of “finer area rates” for use in making an initial allocation of OFS
- Two options exist in the “finer area rate” formula for the area south of 40 10
  - Staff is seeking a Council motion to clarify which approach to use

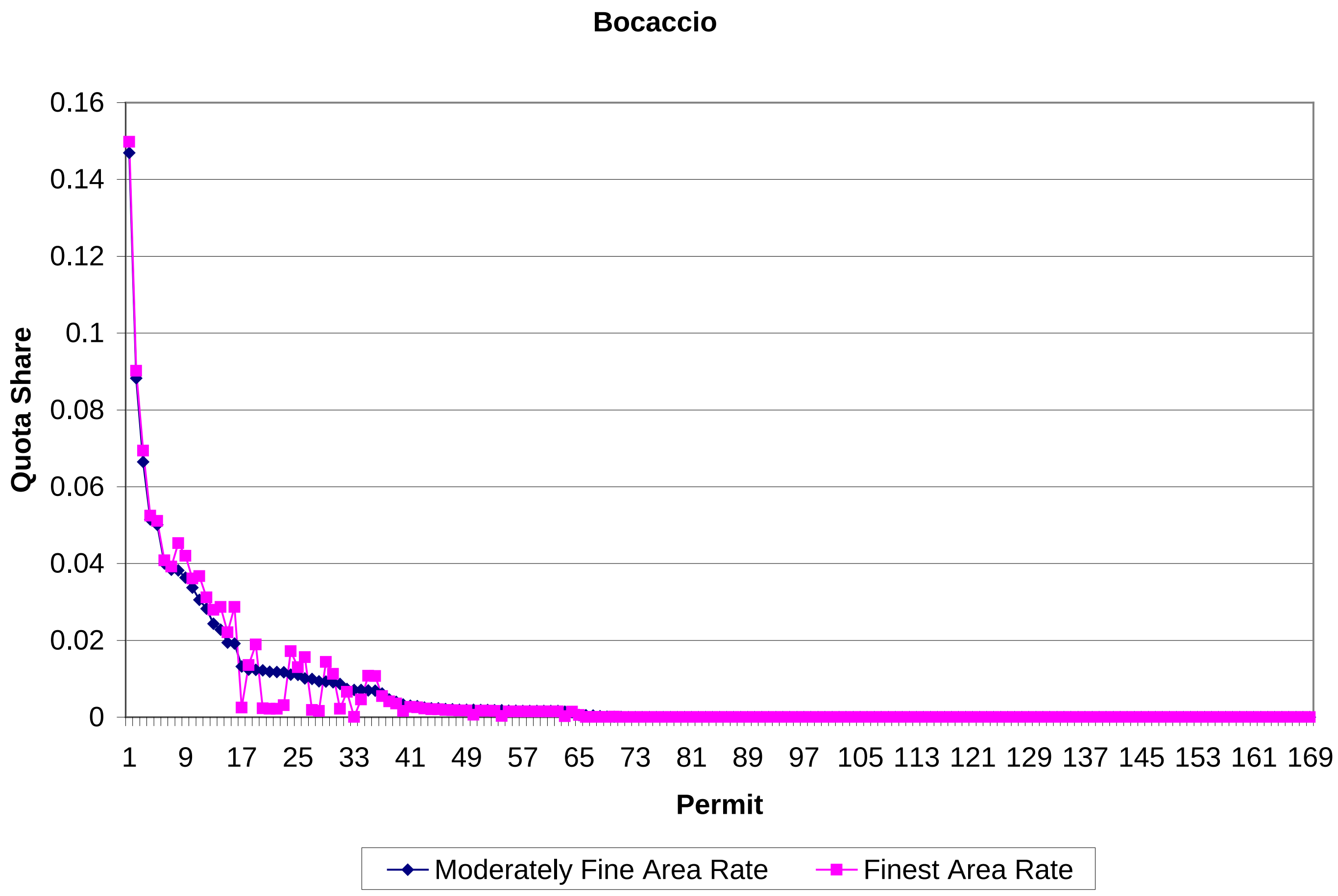
Two Options for a Bycatch Rate-Based Formula for Initial Allocation of Overfished Species in the South

1. One latitudinal area south of 40 10
2. Two latitudinal areas south of 40 10
    - Split at 38 degrees

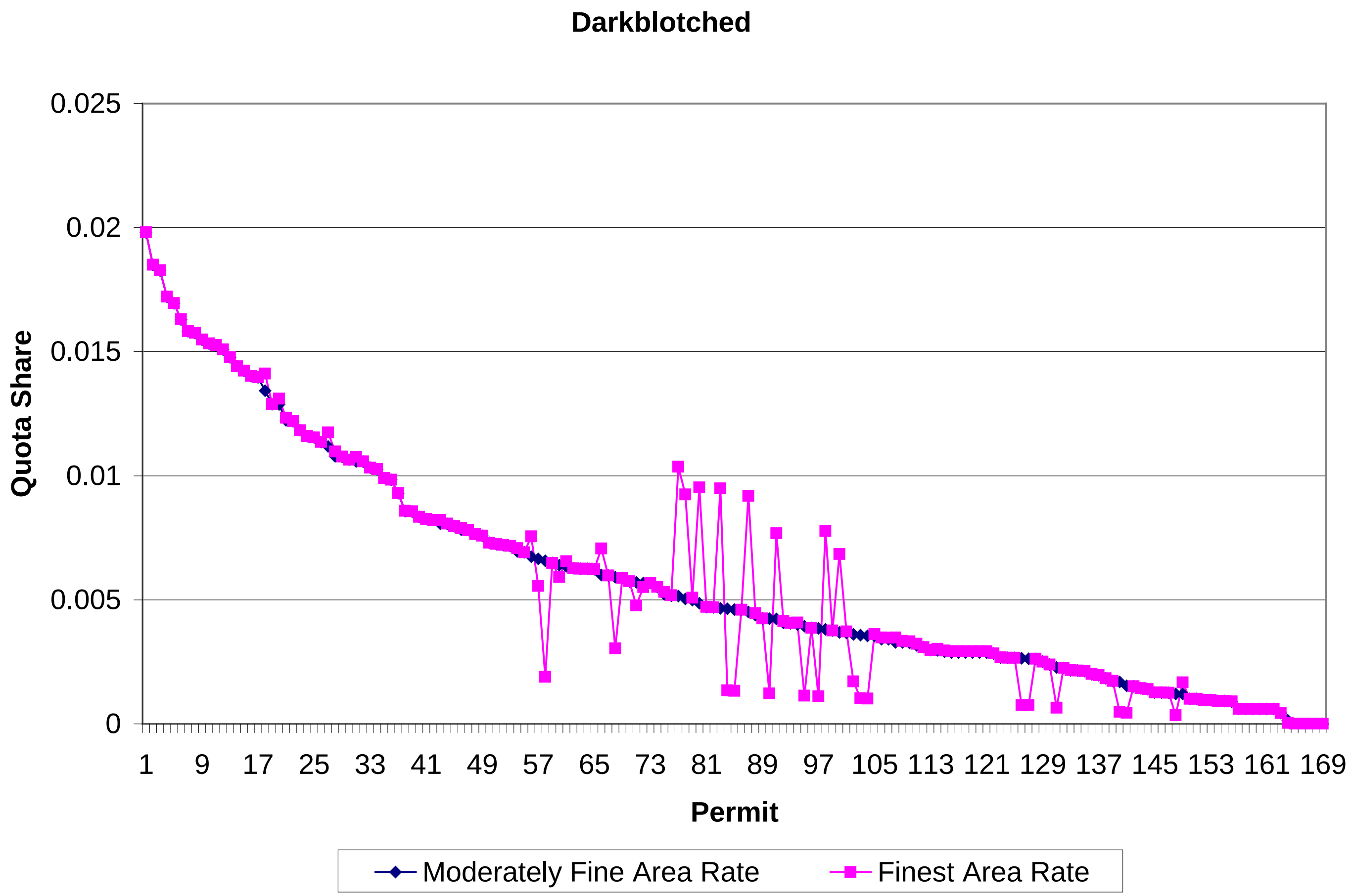
Reasons for having two options

- A relatively finer scale is intended to better match fishing practices with overfished species needs
- The relatively larger scale acknowledges the relative degree of uncertainty associated with predictions based on two latitudinal areas in the south
  - Observer data is more sparse in southern areas

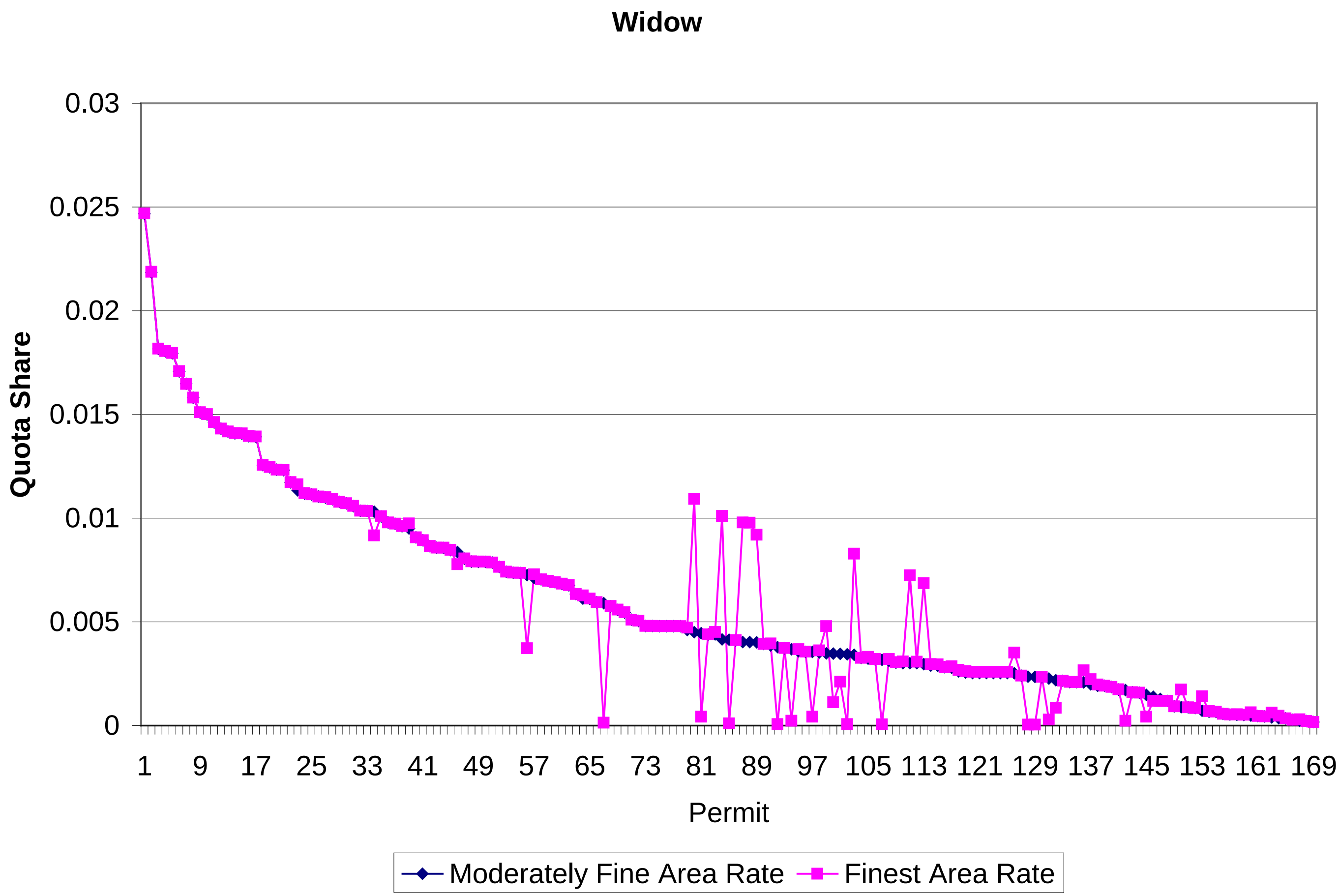
Comparison of both approaches (bocaccio)



Comparison of both approaches (darkblotched)



Comparison of both approaches (widow)



Summary considerations

- Finest area based formula is intended to most closely match OFS initial allocation to the needs of various permit holders
- More aggregated area is intended to match OFS initial allocation to the needs of various permit holders, but distributes OFS more broadly
- Tradeoffs:
  - Place entities on a more similar footing on day one, and rely more on quota trading after day one?

  Or

  - Try to match OFS initial allocation as close as possible to potential needs, realizing that estimates are relatively uncertain?

4) Initial Allocation of Pacific Halibut South of 40 10

- The November 2008 motion specifies the use of a Pacific halibut bycatch rate formula for making an initial allocation of Pacific halibut quota.
- The formula specifies an approach for making an allocation north of 40 10, but no approach has been identified for the area south of 40 10
  - Staff is requesting a Council motion to specify how an initial allocation of Pacific halibut south of 40 10 should be done (if at all)

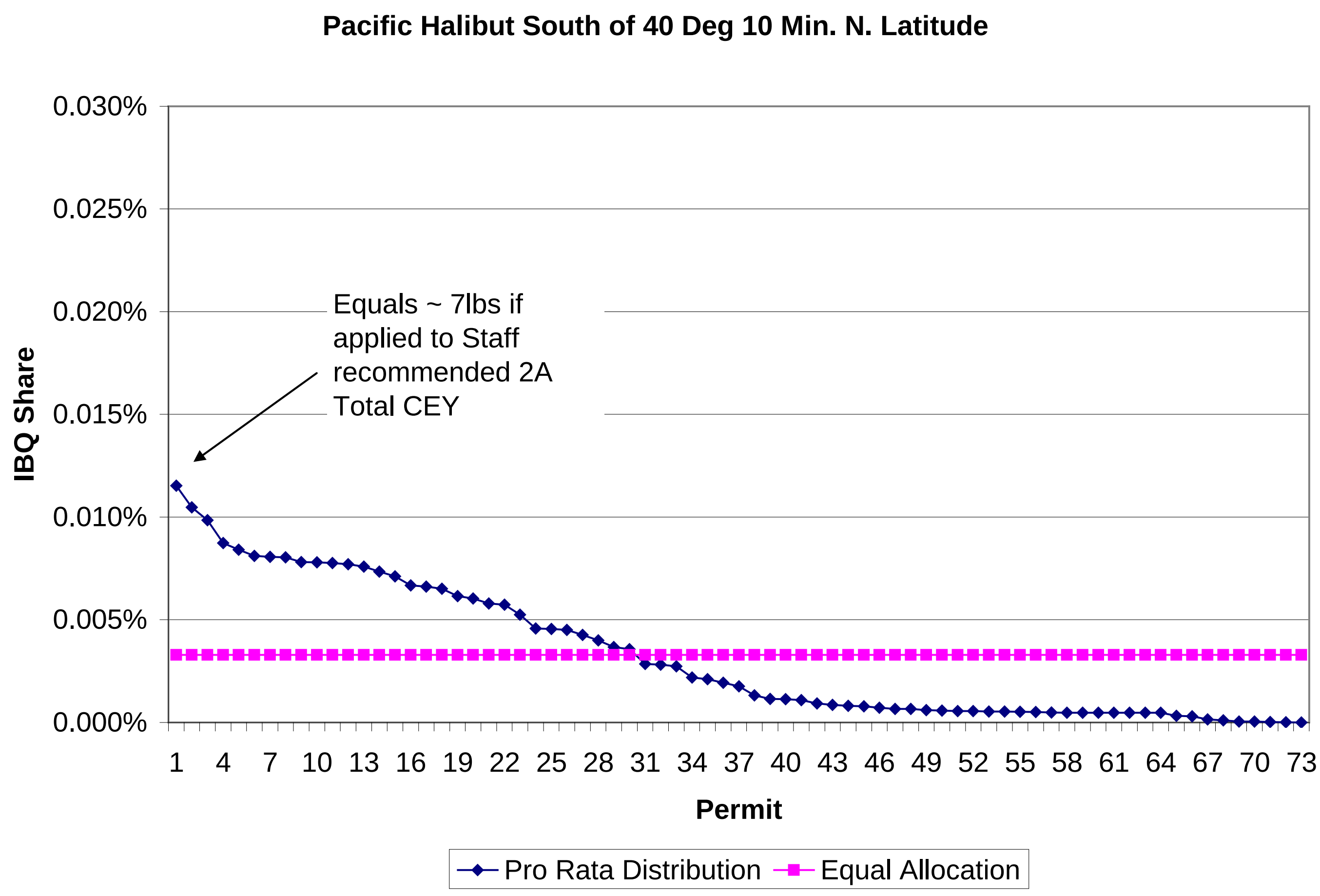
Three options for Pacific halibut south of 40 10

1. Equal allocation of that portion of Pacific halibut caught south of 40 10 among permits with history south of 40 10
2. Pro-rata distribution of that portion of Pacific halibut caught south of 40 10 among permits with history south of 40 10 (pro-rata to their target species QS)
3. Do not directly manage Pacific halibut south of 40 10. Instead, establish a set aside and monitor catch

Some Information

- Information from NWFSC indicates that, over the 2003 – 2006 period, approximately 0.24% of the trawl catch of Pacific halibut occurred south of 40 10
- The IPHC area 2A extends to the US/Mex border, meaning this catch needs to be managed or accounted for in some way
- Pacific halibut would need to be discarded if caught in the trawl fishery

Results of the two initial allocation approaches



Implications of directly managing Pacific halibut vs establishing a set aside

- Trawl bycatch of Pacific halibut south of 40 10 is minimal, so managing through a set aside without IBQ does not appear to raise a conservation need
- Establishing a set aside may increase management complexity
  - Trips south of 40 10 would need to be monitored/tracked differently than trips north of 40 10
- If no direct management south of 40 10, need to prohibit retention when engaged in gear switching

DRAFT REPORT
Groundfish Allocation Committee
Pacific Fishery Management Council
Shilo Inn – Portland Airport
Mt. Hood Room
11707 NE Airport Way
Portland, OR 97201
(503) 252-7500
January 27-29, 2009

The Groundfish Allocation Committee (GAC) met in Portland, Oregon on January 27-29, 2009 to discuss several issues, including the direction of the "eligible to own IFQ" analysis and other trawl rationalization issues. The following GAC recommendations pertain to this agenda item.

Regarding 3 or 4 sectors within the trawl fishery

- The GAC recommends the Council clarify at the March Council meeting that the Council motion intent in November was to manage all individual fishing quota (IFQ) species in both the shoreside whiting and non-whiting portions of the sector under the IFQ program.

Regarding Eligibility to Own Issues

- The GAC concurs with further analysis of this issue in the direction described by staff.

PFMC
2/23/09

Agenda Item G.3.c
Supplemental GAP Report
March 2009

GROUNDFISH ADVISORY SUBPANEL REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20 – TRAWL RATIONALIZATION— OWNERSHIP AND MISCELLANEOUS ISSUES

Eligibility to own

The Groundfish Advisory Subpanel (GAP) received a presentation from Ms. Heather Brandon on the topic of who would be eligible to own quota shares in the trawl rationalization program, along with the distinct but related topics of "use it or lose it" and "owner on board" provisions. The GAP has the following comments and recommendations.

The GAP was initially interested in making an effort to establish restrictions on who would be eligible to own quota in order to maintain control of the fishery by fishermen and closely related persons or entities. It was suggested to the GAP that the best way to do this would be to restrict quota ownership to permit holders. The justification for limiting ownership to permit holders was based largely on concerns over corporate ownership and the GAP spent some time trying to determine whether "wall street type", big corporate ownership could be distinguished from small corporations put in place to shield individual owners from liability. Social concerns and the shape of the fishery were expressed as the specific concerns of the GAP. In addition, the GAP felt that it would be easier to monitor compliance with caps if the pool to be monitored was restricted in size (e.g. 169 permit holders as opposed to 280,000,000 citizens). Ultimately, the GAP determined that it would be difficult to establish a reasoned basis to differentiate between types of corporate ownership, and that restricting quota share ownership to permit holders would unduly restrict the market for quota shares between willing buyers and sellers. The GAP thought that vessel and control limits were a better tool with which to maintain desired social and economic aspects of the fleet. The GAP supports the Council's preferred alternative that anyone eligible to own a U.S. documented vessel would also be eligible to own quota sharing (QS).

"Use it or lose it" and "owner on board"

The GAP also revisited the distinct but related topics of "owner on board" and "use it or lose it" provisions. The GAP determined, as with eligibility to own, that neither "use it or lose it" nor "owner on board" made sense in this fishery. For "owner on board," it was determined that it did not reflect current business practices. And, where such provisions have been adopted in other fisheries there have typically been exemptions for current fishery participants as well as hardship and other exemptions, indicating that it may not be the best policy for a year-round fishery like the groundfish trawl fishery. For "use it or lose it," the GAP concluded that it didn't make sense from either a market or conservation perspective as it would make people land fish they otherwise wouldn't, driving prices down and landings up.

Halibut

The GAP also discussed the issue of halibut individual bycatch quota (IBQ). The GAP does not recommend control limits at this time for Pacific halibut IBQ. If the Council goes ahead, the GAP believes more analysis needs to be done to better understand how to apportion and limit Pacific halibut IBQ. The major concern is the proposal to issue IBQ based upon initial allocation of target species. Given the time lag between the catch history period (1994-2003) and the date of implementation (2011), the GAP believes that there will be a serious disconnect between the amount and location of where catch history occurred and where the QS will be fished. This will leave some QS holders left scrambling to obtain the proper balance between target species and IBQ.

Specifically, the GAP recommends that the Council refrain from allocating the IBQ during the two-year moratorium on trading immediately after program implementation. This would allow the Council to apportion the IBQ in a way that more closely resembles current fishing activity. The GAP is aware that parameters would need to be placed on how halibut would be apportioned at the end of that period to ensure that there wouldn't be incentives to pad catch history, and that incentives are provided to avoid catching halibut to the extent possible. One option discussed includes penalizing those with high halibut bycatch rates when halibut is ultimately allocated.

Divestiture

The GAP also spent some time talking about the issue of divestiture in the case of entities that will receive an initial allocation in excess of the control caps. The conclusion of the GAP was that anyone who acquired excessive shares as defined by the GAP's accumulation caps after the control date should not have the opportunity to divest as they were on notice that any activity might not be rewarded. If an excessive allocation was based on fishing history during the window period or permit acquisitions prior to the control date then the GAP believes a divestiture period would be justified.

Finer scale overfished species

The GAP briefly discussed the analysis illustrating the finer area bycatch rate for overfished species and determined that maintaining the initial formula was a more appropriate approach.

PFMC
03/10/09

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ESTABLISHED BY A CONVENTION BETWEEN CANADA

AND THE UNITED STATES OF AMERICA

DIRECTOR
BRUCE M. LEAMAN

P.O. BOX 95009
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March 4, 2009

Mr. Don Hansen, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Re: March 2009 PFMC Meeting, Agenda Item G3 – Halibut IBQ

Dear Don:

The staff of the International Pacific Halibut Commission (IPHC) has reviewed the recommendation for a methodology to establish an Individual Bycatch Quota (IBQ) for the rationalized west coast trawl fishery. We offer the following comments and recommendations.

1. **Use historical bycatch as a basis for the IBQ.** Instead of tying this method to the CEY, we recommend the Council state the IBQ as an average of the actual bycatch mortality over a recent time period, such as the most recent three or five years. Reductions could then be applied to that average. With changing assessment methodologies and harvest policies, CEY can be a dynamic index which could prompt unintended changes to the IBQ. In addition, the added step of conversion from legal-size bycatch to total bycatch unnecessarily complicates the process. Using historical bycatch mortality is straightforward, and the Council can promote additional conservation by applying a target reduction, such as 50 percent, to that average. For example, we note that halibut trawl bycatch mortality has averaged approximately 350,000 pounds during 2003-2007 (Hastie and Wallace 2008). We suggest the Council set an initial IBQ at 50% of this average, or 175,000 pounds. Experience with the Canadian trawl fishery has shown that this level of reduction can be accommodated and exceeded when an IBQ program is adopted.

   The Canadian trawl fishery is very similar in character to that in Area 2A. IBQs for the B.C. trawl fishery were introduced in 1996 and have remained in place since. The impetus for the IBQ program was associated with the introduction of a comprehensive mandatory observer program for this fleet, to address unknown levels of discarding of both target and non-target species. In the case of halibut, an additional incentive came from the results of a joint Canada-U.S. Halibut Bycatch Work Group that was created at the Commission's 1991 Annual Meeting. This work group identified targets and schedules for reduction of halibut bycatch mortality in non-target fisheries. For Canada, the Canadian Department of Fisheries and Oceans (DFO) identified a target of at least a 50% reduction in bycatch mortality for its trawl fisheries.

The bycatch mortality of Pacific halibut in the Area 2B trawl fishery in 1991 was 1.992 Mlb. To achieve a 50% reduction in mortality the DFO established an administrative cap of 1.0 Mlb of bycatch mortality that was apportioned as IBQs to each vessel on the basis of recent catch history and area of activity. These IBQs were fully transferrable among vessels in an open-market framework. There was no allocation of bycatch mortality at the IPHC level. Instead, the DFO simply used the 1.0 Mlb cap as a vehicle to calculate the IBQs. Operationally, observers sampled halibut aboard trawlers, measuring length and assessing condition factors of released fish in order to calculate total discard mortality. Data were summarized at sea and the necessary bycatch mortality quota reduction was calculated at landing of the vessel's catch for each trip. If the vessel's IBQ was exceeded, the vessel was given a grace period to retire the outstanding mortality through purchase of IBQ on the open market. If this retirement could not be achieved with IBQ purchase, the vessel was prohibited from further fishing in those areas to which its IBQ applied.

This Area 2B IBQ program has been extremely successful. Bycatch mortality for the fishery dropped from 1.522 Mlb in 1995 to 0.307 Mlb in 1996. No vessel came within 50% of its IBQ during the year and almost all of the available groundfish target species quota was caught. Halibut bycatch mortality in this fishery has continued to be below the sum of the IBQs since the inception of the program and vessels have become even more efficient at catching the groundfish TACs. Prior to this program, groundfish trawl skippers had adamantly maintained that halibut bycatch mortality could not be reduced in that fishery. Contrary to this claim, the target reduction was achieved and exceeded through provision of an effective incentive and penalty regulatory framework. This framework allowed trawl skippers to use their own creativity to minimize bycatch while maximizing groundfish catch. The target of 50% reduction in halibut bycatch mortality was thought initially to be an extreme and unrealistic target, yet the fishery has easily exceeded this target reduction through changes in the behavior of how fishing is conducted.

In summary, we believe this successfully demonstrated approach is consistent with the Council's goals and with the intent of the IBQ program as outlined in the proposal.

2. **Continue the collection of halibut length and discard condition, and use observer data to determine mortality.** The proposal calls for discontinuing the recording of release condition, in spite of the Council's decision in November 2008 to use observer data as the best way to estimate mortality. This part of the proposal is a step backward, in our opinion. The Council's goal for the IBQ program is to reduce trawl bycatch mortality of halibut. Managers should be providing as many tools as possible for operators to achieve this goal, and improved handling will be reflected in the observer data on discard condition. Forgoing collection of condition information will remove any ability for the vessel to benefit from its own creative solutions to lowering discard mortality. Further, the use of a fixed discard mortality rate serves as a disincentive to institute handling procedures that would reduce discard mortality since there would be no benefit to a vessel to do so. In addition to condition information, we recommend continued collection of length information, to convert to weight via the Commission length-weight conversion formula. Obtaining weights at sea is

fraught with difficulty and error. A length-weight conversion procedure is how data on weight of discards of halibut is obtained in all other jurisdictions.

3. **Clarification of quota tracking in Alaskan IFQ fishery.** Finally we wish to clarify the statement provided in the final paragraph of the proposal, which incorrectly states that "*...quota for the North Pacific directed halibut IFQ fishery is also converted to round weight and tracked in a similar manner.*" In the Alaskan IFQ fishery, NMFS Restricted Access Management (RAM) tracks all halibut landings in net (dressed) weight, which is head off and eviscerated.

IPHC staff will be in attendance at the meeting and can answer any questions the Council may have on this issue.

Sincerely,

Bruce

Bruce M. Leaman
Executive Director

cc: Commissioners

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW) **REVISED** REPORT ON PACIFIC HALIBUT INDIVIDUAL BYCATCH QUOTA (IBQ)

The Washington Department of Fish and Wildlife (WDFW) has identified the following objectives relative to applying an individual bycatch quota (IBQ) through the Trawl Rationalization Program and would like to offer them for Council consideration:

1. Account for total mortalities of all halibut bycatch in the trawl fishery
2. Prosecute a successful Trawl Rationalization Program that is not overly restricted by halibut bycatch limits
3. Hold individual harvesters accountable for halibut bycatch
4. Provide incentives to minimize halibut bycatch and halibut bycatch mortality

Given those objectives, we reviewed the Council's action taken in November 2008, which was:

> Establish limit for legal-sized Pacific halibut bycatch mortality through the use of an IBQ in the trawl fishery up to 10% of the Area 2A Constant Exploitation Yield (CEY) as set by the International Pacific Halibut Commission (IPHC). This amount will be set initially at 10% and may be adjusted through the biennial specifications process.

Upon further reflection of this motion, WDFW has identified a couple of concerns with taking the approach adopted by the Council. Specifically, while the motion provides an incentive to avoid bycatch, it does not explicitly provide an incentive to reduce halibut bycatch mortality, and it does not address the mortality of sublegal bycatch.

In addition, the initial allocation of halibut bycatch could be too low at the outset to allow successful prosecution of Trawl Rationalization Program. For example, the Total CEY from the 2008 IPHC stock assessment was 640,000 lbs, which would produce a trawl bycatch quota of 64,000 lbs of legal-sized halibut bycatch mortality. Compared to an estimate of 127,677 lbs. of legal-sized halibut mortality in the trawl fishery in 2007, this would represent a 50% reduction from recent mortality levels concurrent with the first year of trawl rationalization implementation.

What we would view as a positive aspect of the motion adopted in November is that it uses a percentage of the trawl set aside that directly ties the trawl halibut bycatch mortality limit to halibut abundance. This is especially useful as the halibut abundance fluctuates and what it will be for the first year of trawl rationalization is unknown. So, for the purposes of initial allocation, it is our view that specifying a percentage of the CEY is a favorable approach.

However, having an allocation amount in pounds that changes from year-to-year results in unpredictability in the fishery and, absent an overall cap on the amount of halibut that may be set aside, could result in increased bycatch in years of higher abundance. Although we note that the 10% is currently represented as a cap and could be adjusted downward, especially in years of higher abundance so as not to increase halibut bycatch.

To address these concerns and achieve the objectives described above, WDFW would recommend the following alternative approach:

Apply a halibut bycatch reduction program in phases to provide sufficient time to establish a baseline of trawl halibut bycatch and for harvesters to explore methods (e.g., adjustments to time and/or area fished, gear modifications) to reduce halibut bycatch and bycatch mortality by revising the Council's action as follows:

> Establish a limit for total Pacific halibut bycatch mortality (legal-sized and sublegal fish) through the use of an IBQ in the trawl fishery. The initial amount for the first two years of the trawl rationalization program would be calculated by taking 15% of the Area 2A Total Constant Exploitation Yield (CEY) as set by the International Pacific Halibut Commission (IPHC) for the previous year not to exceed 130,000 lbs per year for total mortality. For example, if the trawl rationalization program went into effect in 2013, the trawl halibut IBQ would be set at 15% of the Area 2A CEY adopted for 2012 or 130,000 lbs per year, whichever is less, for 2013 and 2014 (Years 1 and 2 of the program).
>
> Note: 130,000 lbs represents an approximate reduction of 50% from the total bycatch estimate provided by the Northwest Fisheries Science Center for the most recent year (2007) as contained in Agenda Item E.1.b, Supplemental NMFS Report, September 2008.
>
> Beginning with the third year of implementation, the maximum amount set aside for the trawl rationalization program would be reduced to 100,000 lbs per year for total mortality. This amount may be adjusted downward through the biennial specifications process for future years.

WDFW would recommend that the Council consider approving this recommendation as a preliminary approach for public review, with final action scheduled for the June 2009 Council meeting.

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW) REPORT ON AMENDMENT 20: TRAWL RATIONALIZATION

With regard to the motions in November 2008 relative to Amendment 20 Trawl Rationalization, the Washington Department of Fish and Wildlife would like to offer the following clarifications and recommendations:

Motion # 4 – Issue 1: Shoreside Species

Motion # 4 had included the species for which IFQ would be required and specified the number of trawl sectors; however, there had been inconsistency within the motion as adopted.

For the non-whiting sector, the motion stated that:

> "IFQ is required for all species, except: longspine S. of 34°27'; minor nearshore rockfish (N & S); black rockfish (WOC); CA scorpionfish; cabezon; kelp greenling; shortbelly rockfish; other rockfish; spiny dogfish. The catches of these species would be accounted for and tracked against the overall OY…."

For whiting fisheries, the motion identified a subset of species that included only whiting, sablefish, widow, canary, and darkblotched rockfish, and Pacific ocean perch.

However, as part of the same motion, the Council specified that there would be three trawl sectors instead of four, indicating that the whiting and non-whting shoreside fisheries would be combined into a single IFQ program. To ease tracking of IFQ and catches, the species requiring IFQ would need to be the same for both of those shoreside subsectors.

Therefore, WDFW would like to clarify the original intent of the motion had been to apply the species and exceptions listed for the non-whiting sector to the entire shoreside sector.

Motion # 4 – Issue 2: At-Sea Whiting Species

As part of this same section, the species listed for whiting fisheries were intended to apply to the at-sea whiting sectors. The intent had been that the at-sea sectors be held responsible for: whiting, sablefish, widow, canary, and darkblotched rockfish, and Pacific ocean perch. We would note that sablefish was added as a recommendation from Council staff based on the understanding that the motion applied to the shoreside whiting sector; however, our understanding is that holding at-sea sectors accountable for sablefish may prove to be constraining to the fishery while having little benefit to management or conservation.

Therefore, WDFW recommends that, for the at-sea whiting sectors, the species requiring IFQ would be: whiting, widow, canary, and darkblotched rockfish, and Pacific ocean perch. The catches of all groundfish species would be accounted for and tracked against the overall OY.

Motion # 5: Initial Allocation

Motion # 5 specified the allocation formula for catcher vessel permits and included:

"Option 2 – An equal division of the buyback permits' pool of QS for all groundfish, except overfished species, among all qualifying permits plus allocation of the remaining QS based on each permit's history"

The section that the motion had referenced referred to the IFQ program, which could be interpreted to apply to only the shoreside sector. However, for clarification purposes, WDFW would like to confirm that the intent of this motion was that an equal division of the catch history from the permits that had been bought back would go to all A permit holders that are contributing to the reimbursement of the buyback loan. This would include all A permit holders in the shoreside and mothership sectors, but not the catcher/processor sector.

Jan-27-09 05:29A

PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

http://www.pcffa.org

Please Respond to:
☑ **California Office**
P.O. Box 29370
San Francisco, CA 4129-0370
Tel (415) 561-5080
Fax (415) 561-5464

☐ **Northwest Office**
P.O. Box 11170
Eugene, OR 97440-3370
Tel: (541) 689-2000
Fax: (541) 689-2500

26 January 2009

Mr. Donald Hansen, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

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PFMC

RE: Groundfish Allocation Committee

Dear Chairman Hansen:

The Pacific Coast Federation of Fishermen's Associations (PCFFA), representing working men and women in the West Coast commercial fishing fleet, wishes to bring the following two issues to your attention and the attention of council staff and NOAA General Counsel as the Pacific Council's Groundfish Allocation Committee prepares to begin meeting Tuesday, the 27th, in Portland.

Fishing Communities/Regional Fishing Associations

As you are aware, Congress in its reauthorization of the Magnuson-Stevens Fishery Conservation & Management Act provided under its Limited Access Privilege Programs (§303A.) the establishment of Fishing Communities (303(c)(3)) and Regional Fishing Associations (303(c)(4)). However, we note that the Council failed to consider either Fishing Communities (FC) or Regional Fishing Associations (RFA) in its deliberations on the groundfish trawl IFQ program at its November meeting where initial action was taken on establishing a "catch-share" program for the trawl fishery. Now we note there is a failure to include any discussion of either FCs or RFAs on the Groundfish Allocation Committee's agenda. The 10 percent set-aside of OY is not specific to FCs or RFAs, nor would that amount necessarily be sufficient if it were for set aside specifically to address FC or RFA needs

This effort by the Council to basically "blow-off" Congress by failing to establish guidelines for establishment of either FCs or RFAs, to prevent discussion of such groups as part of the Council discussion and, now, to withhold from consideration by your allocation committee consideration of allocation to either FCs or RFAs, is clearly contrary to the spirit, if not the letter, of the reauthorized MSA.

PCFFA respectfully requests no recommendation be accepted by the Pacific Council from its Groundfish Allocation Committee until such time as 1) guidelines are established for creation of FC's and RFA's by the Pacific Council; and 2) there is a survey made to determine the interest and likely allocation need for FC's and RFA's for groundfish in order that a fair and equitable allocation can be made to these groups as Congress directed

Given the sweeping changes being enacted by the new Administration in Washington, we suggest the Council should be in no great hurry to act on policy directive issued under the previous regimes, as thos directives are likely soon to be changed or reversed

Groundfish Allocation Committee Membership

Second. PCFFA requests the Pacific Council to revise the membership of its Groundfish Allocation Committee (GAC) 'sto eliminate the non-voting committee members. The non-voting panel consists of industry members, all of whom have a direct interest, or represent interests with a direct stake, in determining who is eligible for allocation and how much they are allocated. Although these non-voting members have no direct say in who is eligible for allocation or how fish are to be allocated to a particular sector, they certainly have sway and special influence, over and above the public, with voting members of the Allocation Committee.

PCFFA has long fought for fishermen's – commercial, recreational and tribal – membership on the regional fishery councils, along with fish processors and conservation interests. That is because fishermen have special expertise on fishing operations and a practical knowledge of the oceans and catching of fish. It is also why we've fought allowing association attorneys, lobbyists, executive directors or any others with no first-hand fishery expertise on the councils. Having fishermen on the regional councils, or other members of industry, was never intended by us to allow for self-dealing Yet, your GAC with members from industry who will directly benefit from the committee decisions allows for self-dealing that a "non-voting" label cannot hide.

FACA, we should note allows for interest groups to serve on bodies such as the Regional Council where the individuals are representing a class of individuals and not their personal interest. On the GAC, however, it is clear the non-voting members are either representing either their own interest or a very narrow group, not a broad class as FACA intended.

We would remind you, too, the GAC is not the same as the Groundfish Advisory Subpanel or your other groundfish panels. Its job is solely to allocate the fish – that requires no special knowledge and certainly no representation on that body of those who stand tohave a greater, and will, directly benefit from the decisions made by that committee As the GAC is currently construed, industry members, even if non-voting, have a greater sway over the decisions made as to who will get allocation and how much. over individuals and groups that are not members of the Allocation Committee. That is clearly self-dealing and must be ended

PCFFA requests that no recommendations made from the GAC be made to the Pacific Council until such time as the membership of that committee is changed.

Sincerely,

Dave Bitts
President

W.F "Zeke" Grader, Jr.
Executive Director

Agenda Item G.3.d
Supplemental Public Comment 2
March 2009

SUPPLEMENTAL PUBLIC COMMENT REGARDING TRAWL RATIONALIZATION

1. 10 "Don't let local fishermen disappear" postcards advocating use of fixed-gear, small boats, quota set-asides for communities and adaptive management, and advocating against quota shares for processors.
2. 3 faxed form letters containing the subject line, "IQ PROGRAM PREFERRED ALTERNATIVE ALLOCATION" requesting a delay in the Ownership and Control decision until after permit owners find out what they will receive through initial allocation and the program costs to the permit holder.
3. Paper entitled "ABDICATING RESPONSIBILITY: THE DECEITS OF FISHERIES POLICY" by Professor Daniel W. Bromley, University of Wisconsin-Madison.

PFMC
03/04/09

Don't let local fishermen disappear

Dear Mr. Hansen,

Traps and hook and line gear are sustainable ways to catch rock cod. Don't let the trawl quota program push small boats out of business. Please allow trawl boats to switch to cleaner gears, stop processor quota, and set some quota aside for communities and adaptive management. Our fishing communities provide local fish for local consumers -- give fixed gear boats the chance to fish.

Sincerely,

Shauna Marty
192 Dexter Ave Redwood City, CA 94063

RECEIVED
FEB 2 7 2009
PFMC

Mr. Don Hansen, Chairman
Pacific Fishery
Management Council
7700 NE Ambassador Place,
Ste. 101
Portland, OR
97220-1384

February 24, 2009

RECEIVED
MAR 0 2 2009
PFMC

PFMC Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place #101
Portland OR 97220
FAX 503-820-2299

RE: IQ PROGRAM PREFERRED ALTERNATIVE ALLOCATION

Dear Council Members

My name is Bernard Robert Nowell and, I am the owner of the fishing vessel, Doma J. This is to advise that I request that any and all decisions on Ownership and Control be delayed until I, as a permit owner, have receipt of what I am going to receive under the the preferred alternative allocation and what the individual costs of the IQ program will be. I cannot make an informed decision until I know how I will be impacted.

Sincerely,
Bernie Nowell

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PFMC

February 24, 2009

PFMC Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place #101
Portland OR 97220
FAX 503-820-2299

RE: IQ PROGRAM PREFERRED ALTERNATIVE ALLOCATION

Dear Council Members:

My name is F/V Northern Light Inc. and, I am the owner of the fishing vessel, James Sundstrom Pres. This is to advise that I request that any and all decisions on Ownership and Control be delayed until I, as a permit owner, have receipt of what I am going to receive under the the preferred alternative allocation and what the individual costs of the IQ program will be. I cannot make an informed decision until I know how I will be impacted.

Sincerely

3-2-09

RECEIVED
FEB 2 4 2009
PFMC

February 24, 2009

PFMC Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place #101
Portland OR 97220
FAX 503-820-2299

RE: IQ PROGRAM PREFERRED ALTERNATIVE ALLOCATION

Dear Council Members

My name is RANDALL Schlecht and I am the owner of the fishing vessel. Northern LIGHT This is to advise that I request that any and all decisions on Ownership and Control be delayed until I, as a permit owner, have receipt of what I am going to receive under the the preferred alternative allocation and what the individual costs of the IQ program will be. I cannot make an informed decision until I know how I will be impacted.

Sincerely,

Randall Schlecht 2-24-09

Forthcoming: FISHERIES, Vol. 34 (4), 2009.

ABDICATING RESPONSIBILITY: THE DECEITS OF FISHERIES POLICY[1]

Daniel W. Bromley
Anderson-Bascom Professor of Applied Economics
University of Wisconsin-Madison
427 Lorch Street
Madison, WI 53706
www.aae.wisc.edu/dbromley

I. Introduction

The economic crisis now sweeping the world has been attributed to the abandonment of governments' necessary oversight responsibilities whose purpose is to reassure citizens that economic processes conduce to the enhancement of public well being. For several decades now the prevailing *zeitgeist* has celebrated the wisdom and prudence of the widest possible scope for individual autonomy in matters of creating income and accumulating wealth. These attitudes have flourished in an evolving culture that willingly accepted a falsely dichotomized polity—there is the "economy" and then there is "government." The resultant, encouraged by the profound ascendancy of globalization throughout the 1990s, was an imperative that government (the realm of collective action—"politics") must not be allowed to interfere with the economy (the realm of alleged individual "freedom"). The currency crisis to strike Southeast Asia in 1997 was an early warning of what happens when wealth creation is unhitched from what might be thought of as proper adult supervision.

National fisheries policy since the advent of the Exclusive Economic Zones seems small stuff indeed compared to the economic trauma that began in the summer of 2008. However, the central argument advanced here is that widespread abdication of due diligence on the part of national governments with respect to their fisheries resources arises from the same *zeitgeist* that has brought us the worst economic scenery since the world-wide depression of the 1930s.

In national financial affairs the debate is cast in terms of "free markets" versus government "interference" in the market. In fisheries policy the debate is cast in terms of the documented failure of national governments to manage—assure the sustainability of—fish stocks versus the utopian vision of so-called "privatization" and the implied abdication of management. The advocacy of individual fishing quotas—known as IFQs or ITQs—is the natural resource equivalent of economic deregulation dating back to the triumphalism of the

[1] An earlier version was submitted as written testimony to the Pacific Fisheries Management Council in conjunction with the planned introduction of an IFQs fishery for West Coast Groundfish. I am grateful for helpful comments by Seth Macinko and two anonymous reviewers.

1990s when the Soviet Union collapsed and it was happily announced that "markets had won." In contrast to the emerging understanding in world financial affairs that "the market" and its self-interested players cannot be trusted with the greater public good, quite the opposite ideology persists in fisheries policy—just leave it to the industry to bring about efficiency and rent maximization.

This faith in the universal beneficence of individual maximizing behavior underwrites the several deceits of contemporary fisheries policy and the bewitching allegories advanced on their behalf. I will discuss the five core deceits that authorize utopian claims about the beneficial outcomes to arise from an introduction of IFQs. These deceits are: (1) over-fishing can be blamed on missing property rights; (2) private ownership is necessary and sufficient for socially beneficial stewardship; (3) IFQs must be of infinite life and freely tradable in order to produce the desired efficiency and stewardship properties; (4) IFQs are private property; and (5) IFQs are necessary and sufficient to produce efficiency, and to maximize resource rent, in a fishery.

I will show each of these claims to be incoherent. I will then offer a brief outline of a national fisheries policy that acknowledges the clear need for allotted catch shares, but that rejects the common myth that an IFQ fishery is one that will not require careful and attentive management by governments. I will also explain the economic logic that underpins the imperative that fishing firms must pay a royalty share (resource rent) on the fish they catch and sell.

Before proceeding, the term "IFQ" is generally used to connote a particular set of attributes. In particular, an IFQ fishery has all of the following attributes:

1. Catch shares—portions of a fixed total allowable catch (TAC)—are given away free (gifted) to members of a specific fishery based on certified catch history over a politically determined time period;
2. This allotment is a gift in perpetuity and the gift may be leased or sold to others;
3. There is no attempt by governments to capture the resource rent in a fishery.

II. The Five Deceits

A. The Ownership Fetish

> *"From an economic theory point of view, the major source of the overfishing problem is the lack of property rights [Anderson and Holliday, 2007, p. 9]."*

To those not indoctrinated by the fisheries literature dating back to Scott Gordon's article in 1954, this assertion will be quite incomprehensible. To be as clear as possible, the unique "source" of over-fishing is that the annual rate of human-induced mortality on a renewable fish stock induces a decrease in future stocks and their productivity. Over-fishing, like over-hunting, and over-grazing is straightforward biology, taught to countless undergraduate students exposed, for the first time, to the elegance of a Lotka or a Volterra.

Why do people fish? They fish to gain control of a future value—fish that can be eaten or sold. Fishing is explained by a quest for future value. Why do people over-fish? They over-fish because their desire for the control of future value exceeds the rate at which a renewable natural resource can produce future value. How does one prevent fishing? You do not allow fishing. How does one prevent over-fishing? You constrain the quest for control over future value to the rate at which nature can yield up future value today—and for evermore. If people are caught in the act of over-fishing penalties are imposed. Human societies, over a rather long history, have figured out how to prevent all manner of unwanted activities and outcomes—from child pornography to organized dog fighting. It is no great mystery, and ownership plays no part in the story. Only fisheries economists—and ideologues—believe that property rights (or the lack thereof) explain over-fishing.

Is it possible to stop over-fishing? Departments of natural resources in approximately 50 states seem to have figured this out. Over-fishing in federally managed fisheries occurs because the government agency charged with preventing over-fishing has failed to do so. Does it matter that the National Marine Fisheries Service is in the U.S. Department of Commerce rather than in a government department concerned with natural resource conservation? Does it matter that the regional fisheries management councils contain locally prominent representatives of the commercial fishing industry?[2] Does it matter that regional politicians interfere with the findings and recommendations of fisheries scientists?

If fisheries economists wish to offer up plausible hypotheses about over-fishing it will be necessary to develop comprehensive explanatory models as opposed to trivial ones. The act of over-fishing has become elaborately obfuscated by bogus claims about ownership. Those bogus claims are then magnified in fallacious ways.

B. Property Rights and Stewardship

> *"A key to creating incentives for more sustainable behavior is to provide fishers with more secure harvesting or territorial rights to fish. Such rights enable fishers to enjoy a sustainable flow of benefits from fishing with an enforceable right to exclude others from those benefits but generally do not give ownership over the resource stock [Grafton, et al. 2006. p. 701]."*

.

> *"…a key to generating appropriate incentives is for fishers to have the ability to exclude others from fishing, thereby reaping both the pain of overexploitation and the gains from conservation. Exclusive property rights, however, do not guarantee sustainability [Grafton, et al. 2006. p. 701]."*

[2] See Okey [2003].

> *"The key to IAFs [inventive-based approaches to sustainable fisheries] is to provide harvesters with long-term secure rights (Hannesson 2004) that are legally enforceable, along with corresponding duties by nonowners to not interfere with these rights (Cole and Grossman 2002). In practice, individual harvesting rights are often specified as a revocable privilege…However, these privileges are de facto economic property rights, provided that adequate monitoring and surveillance exists [Grafton, et al. 2006. p. 701]."*

These quotes are consistent with the tradition in fisheries economics. Sadly, they are consistent with the deep and chronic conceptual confusion in that literature.[3] We see here that revocable privileges are long-term secure rights, that such privileges are de facto economic property rights, and that these revocable privileges protect the holder from nonowners. Those who understand legal matters will tell us that it is quite impossible to believe that "revocable privileges" are "secure rights." They would also point out that it is impossible to believe that such "privileges" are "de facto economic property rights." These dual impossibilities spring from the legal reality that "privileges" cannot be "rights," that there is no such thing as "de facto rights," and that there is surely no such thing as "economic property rights." Finally, since those holding "revocable privileges" are not owners, it is logically impossible to claim that these revocable privileges protect the holder from "nonowners." Only owners can be protected from nonowners [Becker, 1966; Hohfeld, 1913].

Some fisheries economists have acquired the habit of using terms—concepts—to mean anything they want, and very often to mean nothing at all.[4] Fisheries biologists must come to a shared understanding about concepts such as recruitment and age class before they can write down models of population dynamics. Ecologists must do likewise with concepts such as succession and resilience. Physicists are not free to define entropy to mean whatever they wish—at the moment—for it to mean. In contrast, many fisheries economists seem under no obligation to adhere to the precise legal meaning of the legal concepts they invoke. Fisheries economists are not at liberty to deploy legal concepts as if seen through a "looking glass."

Ignoring the above legal mumbo-jumbo for the moment, notice that the authors regard "exclusive property rights" as necessary but not sufficient for stewardship. This hedge is problematic for the simple reason that the claim of necessity is itself bogus.

As above, a necessary condition for sustainability—the only condition—is that a renewable resource will be used ("drawn down") at a rate that does not diminish its capacity to reproduce itself in subsequent time periods. Those who claim that exclusive property rights are necessary (but not sufficient) for sustainability commit a logical fallacy that pervades public perceptions about private ownership and socially beneficent behavior. This fallacy draws on political ideology—and nothing more than such ideology—that sanctifies the individual as the sole decision maker who can produce "optimal" outcomes. But its core flaw is that it reflects the same incoherence exposed in the previous section—the desire to embed

[3] These concepts are discussed in great detail in Bromley [1989, 1991, 2006].
[4] Robert Brandom reminds us that "Grasping a concept is mastering the use of a word [Brandom, 2000, p. 6]."

over-fishing in the realm of property rights rather than in the realm of biology and how humans act with respect to nature.

Notice that if private ownership were necessary for stewardship, as the above quote implies, it would be impossible for there to be good stewardship in the absence of individual property rights. And of course this is nonsensical. The stewardship properties of Yosemite National Park, or the Grand Canyon, do not seem defective by the absence of exclusive private property rights therein. The timber resources on federal lands in the United States do not seem under threat by the absence of private property. Indeed there are plausible arguments that timber resources are bounteous precisely because they are protected by public ownership rather than by private ownership. And this brings us to the sufficiency argument.

The State of Washington, 1945, passed the Forest Practice Act to require that private landowners re-plant trees on land from which they had harvested trees, or leave a certain number of trees per acre to enhance regeneration of the stock. If private property were so salubrious for stewardship this law in the State of Washington would, quite obviously, be unnecessary. The Soil Conservation Service was created in the USDA following the Dust Bowl because farmers—obviously the owners of the land they farmed—were destroying their top soil by practices giving rise to soil loss in the neighborhood of 15 tons per acre per year. If private ownership of land were sufficient for stewardship, the Soil Conservation Service would be redundant. Virtually every city in America has local ordinances requiring that private dwellings (and surrounding landscaping) be kept in some plausible state of repair. Owners who ignore such ordinances are subject to fines. If owning private property were a sure guarantee that an asset—a house and a yard—would be kept neat and tidy then such laws would be redundant.

These examples remind us that private (individual, exclusive) ownership and control not only fails the sufficiency claim, it cannot even survive the necessity claim. While this fact is well known among economic theorists, it seems to have gone unnoticed by many who contribute to the fisheries literature. To be precise about the matter, if the "time preference" of a private owner is such that income now trumps income in the future then private owners will be quite intent on liquidating (destroying) a renewable natural resource in order to spend the proceeds—or invest them elsewhere [Clark 1973; Page 1977; Smith 1969]. It is surprising that so many fisheries economists remain innocent of this work. Perhaps they have been smitten by the utopian claims for IFQs.

C. On Perpetuity

> *" …ITQ fishers may often be expected to favor management actions that protect and enhance fish populations, because the value of a quota share increases as stocks become more abundant. Problems that may arise, such as misreporting or high-grading of catches, have been successfully countered by the use of observers, required by the management system but paid for by the industry; …Experience with ITQ systems shows that many fishers willingly support and adhere to conservative management strategies and may also avoid fishing practices that endanger habitat or*

> *threaten other species, so long as they are guaranteed long-term rights. But this does not mean that enforcement and scientific monitoring are unnecessary in ITQ systems; both are essential unless catch levels are set at precautionary low levels. It is thus unsurprising that the two countries with perhaps the most fully developed ITQ systems, New Zealand and Iceland, have some of the highest costs of management per fishing vessel [Beddington, et al. 2007, p. 1714]."*(emphasis added)

Here we see yet another rendering of the optimistic speculations concerning how IFQ (ITQ) programs are alleged to work—fishers "may often be expected," "problems that may arise …have been successfully countered," "may also avoid." Notice that all of these promising results are strictly conditional: "…so long as they are guaranteed long-term rights." It seems that fishing firms can be expected to act in socially optimal ways—except when they decide not to. And then we need government observers—and fishing firms need "guaranteed long-term rights." The cynic might speculate that this resembles a threat—give us long-term rights or we will not be good stewards. More curiously, the necessity of observer coverage, and high "management costs," suggest that even with the "most fully developed ITQ systems," fishing firms—like teenagers—cannot be trusted out alone. If IFQs are so salubrious for stewardship and enlightened management, why is there a need for on-board observers? Why can't these firms with IFQs be trusted?[5]

The common assertion (as above) is that IFQs must bestow "long-term rights" and that the IFQs must be fully transferable. It is claimed that only in this way can the holder of an IFQ (I refuse to call such a person an "owner") capture the future value of his/her beneficent stewardship over time. We see that an IFQ program is intended to allow the lucky recipients of these government handouts to make money two ways—either by fishing or by selling the gifted IFQs.

But of course reality undermines such optimistic speculation. Since an IFQ is for a share of an unknown future TAC, there is sweeping uncertainty concerning what, exactly, the empirical content will be of a share of an unknown TAC in 5 or 10 years. What exactly IS the value in 10 years of a share of an unknown TAC if the buyer has no idea whether or not the fish stock will crash because of increased ocean temperatures? It is not in doubt that a seller and a buyer of an IFQ could conjure some price that both would find compelling. But that is not the economically pertinent question. The only question that matters is whether or not that eventual and highly speculative market provides a sufficient incentive for current holders to practice good stewardship each and every season they fish—that is, until the current holder decides to cash out. The requisite incentive properties are vanishingly small.

It will be claimed (as above) that IFQs must be granted in perpetuity so that holders will have a long-run motivation for stewardship. Perpetuity induces stewardship, unless it fails to—see Clark [1973], Page [1977], and Smith [1969]. Apparently it is possible to believe most anything. The argument for perpetual IFQs fails. Does "tradability" matter for long-run

[5] See Branch and Hilborn [2008] for an account of the British Columbia groundfish trawl fishery where individual transferable quotas and "100% observer coverage" produced "optimal" results.

efficiency? It cannot matter for the reasons above. The only situation in which trades among holders of IFQs (catch shares) might conduce to efficiency is within a single fishing season. That is, if one holder ends up with excess landings no great harm is perpetrated by a consensual bargain that transfers all or a portion of that overage to others. No great harm would result, as well, from ex ante swaps of shares before a season starts. But these trades enhance efficiency within a single season only.

D. IFQs and Property Rights

> *"[I]ndividual permanent catch quotas of a regulator-determined TAC are only a stage in the development of management from licensing to private rights. This evolution can be expected to continue until the owner has a share in management decisions regarding the catch; and, further still, until he has an owner's share in management of the biomass and its environment... [Scott, 1989, p.33]."*
>
> *"[A]nother important issue is the quality of the property right in what really counts, i.e., the resource itself and its environment [Árnason, 2000, p. 23]."*
>
> *"The so-called public goods, of which roads, public parks and national defense are often-quoted examples, are by definition non-amenable to private property rights. But, on closer inspection it turns out that there are ways to turn public goods into private goods [Árnason, 2000, p. 24]."*
>
> *"The solution to the current wasteful race to fish involves establishing property rights. Individual transferable quotas represent a positive step toward private property rights, and they have stopped excessive exploitation and improved fisher profitability. With the exception of New Zealand, however, current ITQs still rely heavily on political management of the resource. The ultimate solution is full- fledged property rights [Leal, 2000, p.27]."*

These quotes capture the standard deceit—that IFQs are private property rights. There are two genres of literature to which we might turn for an answer to this important legal matter. We could consult some fisheries economists whose grasp of the relevant legal literature—as above—is seriously defective.[6] Or, we could consult the U.S. Congress. The Magnuson-Stevens Fishery Conservation and Management Act states:

> "SEC. 303A. LIMITED ACCESS PRIVILEGE PROGRAMS.
>
> (a) In General.--After the date of enactment of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, a Council may submit, and the Secretary may approve, for a fishery that is managed under a limited access

[6] See Cole and Grossman [2002] for an account of how economists are often confused about legal concepts such as property rights.

system, a limited access privilege program to harvest fish if the program meets the requirements of this section.

(b) No Creation of Right, Title, or Interest.--Limited access privilege, quota share, or other limited access system authorization established, implemented, or managed under this Act--

(1) shall be considered a permit for the purposes of sections 307, 308, and 309;

(2) may be revoked, limited, or modified at any time in accordance with this Act, including revocation if the system is found to have jeopardized the sustainability of the stock or the safety of fishermen;

(3) shall not confer any right of compensation to the holder of such limited access privilege, quota share, or other such limited access system authorization if it is revoked, limited, or modified;

(4) shall not create, or be construed to create, any right, title, or interest in or to any fish before the fish is harvested by the holder; and

(5) shall be considered a grant of permission to the holder of the limited access privilege or quota share to engage in activities permitted by such limited access privilege or quota share."

IFQs are permits and nothing more [Bromley, 2005; Macinko and Bromley, 2002, 2004]. But of course this legal clarity does not deter the issuance of contrary opinions among those who write about IFQs. Many authors claim that because IFQs can be transferred (leased or sold) they thereby become a property right. The fact that they can be (and have been) contested in divorce proceedings is also claimed to make them a property right. And then the fact that bankers will loan money to purchase IFQs seems adequate to these observers to render IFQs a property right. In this latter regard, recent financial difficulties remind us that American bankers have shown themselves quite eager to lend money on a wide variety of instruments of dubious credibility and provenance. Apparently one could obtain a mortgage without a credit history, without a down payment, and without an income to service the debt.

I now turn to a recent effort to document the alleged salubrious stewardship outcomes of IFQs [Costello, et al. 2008]. To set the stage, the authors wish to describe a fishery without IFQs: "Because individuals lack secure rights to part of the quota, they have a perverse motivation to 'race to fish' to outcompete others. This race can lead to poor stewardship and lobbying for ever-larger harvest quotas, creating a spiral of reduced stocks, excessive harvests and eventual collapse [Costello, et al. 2008, p. 1679]." Notice once again the conventional catechism that over-fishing is inevitable in the absence of "secure rights." And from this false encomium to something called "rights," the story glides immediately to IFQs—we are put on notice that in a fishery without IFQs there is a good chance of an "eventual collapse." From this inauspicious start the authors set about to test the following proposition: "Can catch shares prevent fisheries collapse? [p. 1679]."

But of course their findings are comprehensively spurious because they failed to make the essential distinction between the effects of a binding total allowable catch (TAC) as opposed to the effects of IFQs (catch shares). Notice that it is impossible to make this distinction because an IFQ is simply a share of a TAC. So when they tell us that they found 121 fisheries using "catch shares" they should have told us that they found 121 fisheries in which TAC limits had been introduced. Notice that this correct specification of the research question undermines the celebration of IFQs (and catch shares) as solving the over-fishing problem. Since a "catch share" is a portion of an annual TAC this would seem to suggest that prior to the introduction of catch shares there were no limits on total catch in these 121 fisheries. Could it be that all of these fisheries were crashing not because of the absence of IFQs (catch shares) but because of the absence of binding TAC limits? Is it possible that the authors have captured the effects of the introduction of catch limits (TAC) but have chosen to attribute the reversal of "eventual collapse" to catch shares (IFQs)? It would seem that their IFQ cases are simply TAC cases. We have an attribution problem here.[7]

If one wished to test the stewardship properties of catch shares (IFQs), the careful researcher must analyze a large number of TAC-controlled fisheries and then find some that have introduced IFQs. The pertinent research question would then become—have catch shares enhanced the stewardship properties of a fishery already under coherent and binding TAC management? Only then could the researcher be sure whether the claim of stewardship is correctly attributed to catch shares and not to the existence of a firm TAC. After all, it is binding TACs that explain the absence of over-fishing. Catch-shares stifle racing, but their contribution to stewardship across seasons is nugatory.

Recall that the purpose of a TAC is to prevent over-fishing, while the purpose of allotted catch shares is to preclude racing for fish in a given season. And it is precisely here that we encounter the fount of so much conceptual and policy mischief. The advocates for IFQs have violated the first "law" of coherent economic policy—one policy instrument for one policy problem. If over-fishing is a problem then address that problem with a single coherent policy instrument. This is the purpose of a TAC, and the dreary record of fisheries management suggests that TACs are not taken seriously, nor rigorously enforced, in many fisheries. If racing is a problem then address that with a single coherent policy instrument. That is the purpose of allotted catch shares.

With over-fishing addressed by a meaningful and binding TAC, and with racing addressed by the allotment of catch shares, what possible reason can there be for the free gifting of allotted catch shares into perpetuity to the members of an industry—without any obligation to return resource rent to the nominal owner of the valuable fish in the EEZ? The only possible reason can be yet another deceit—that by handing over the public's wealth in the EEZ fisheries to the private sector, members of the industry will then buy and sell these gifted quota shares in an elaborate exercise of consolidation until decentralized

[7] Not only are catch shares and TAC limits locked together as "one thing" managerially, there is a good chance that they are linked in the mind of those who fish. The linguistic charade of "rights-based" fishing over the past decades has induced those who fish to believe that they are gaining "rights" (rather than a revocable permit under the control of fisheries managers) when they receive the marvelous free gifting of catch shares under IFQs. Having received this enormous free income stream, embodied in something they imagine to be a "right," renders them more willing to accept hard TACs. We might, to good effect, understand this to be a form of bribery: "We will give you, for free, all of that wealth and all we ask in return is that you now behave better than you have heretofore." But of course the large management costs in New Zealand and Iceland, and the need for elaborate observer coverage in many fisheries, suggests that many governments have been duped.

"rationalization" has created a closed class of vessels earning excess (extra-competitive) profits.

We now encounter the final conjuring—that the creation of this extra-competitive income constitutes the maximization of resource rent, thereby bringing about "efficiency" in the fishery which will "make society better off."

E. Resource Rent and Efficiency

> *"One can interpret the arguments over ITQ programs primarily as a debate over objectives: proponents of economic efficiency against those more concerned about jobs, social equity, and community impacts [Hilborn, 2007, p. 155]."*

This quote captures yet another conceptual confusion that has plagued fisheries policy for decades—achieving efficiency versus something else vaguely called "jobs, social equity, and community impacts." The problem here is the false choice on offer—you can have an "efficient" fishery, or you can have those others things. This framing puts managers and public officials on notice—if they decide in favor of jobs, social equity, and communities it signals that they do not care about "efficiency." And of course this then reinforces the worst (or the best, depending) anecdotes about managers and politicians—given a choice, they favor "inefficiency."

The incoherence of this approach does not preclude its wide acceptance—as revealed here in its repetition by an esteemed fisheries biologist. This particular incoherence has its origins in the failure of most fisheries economists to comprehend the concept of efficiency, and then to pass on that failure to non-economists where it can do mischief. Very soon it has been repeated often enough that it comes to be thought true. We can set the record straight with a few tight paragraphs.[8]

Efficiency is a property that concerns economic decisions at the margin. Technical efficiency is attained when all factors of production are allocated precisely in accord with their respective marginal contribution to the desired output. Price efficiency is attained when that allocation also brings the marginal value of the contribution of those factors to total output precisely in accord with their marginal cost. Top level efficiency means that both technical and price efficiency prevail, and that the final product is traded in a market where its price is perfectly in accord with the marginal valuation of the consumer of the product. In contrast to this quite elaborate theoretical idea, efficiency in the fisheries literature has become thoroughly mongrelized to mean that resource rent has been maximized. The deceit is then compounded by the fact that most authors are confused about the concept of rent.

The concept of efficiency has a profound bearing on public policy—what we call welfare economics. Every economist is presumed to understand the two fundamental theorems of welfare economics for the simple reason that these two theorems underwrite any

[8] See Bromley [1990] for an elaboration of this material.

possible prescriptive claim—policy recommendation. The indirect theorem tells us that for any possible set of initial conditions—factor endowments, income and wealth position, institutional arrangements (legal structure)—there is an allocation of resources that is Pareto optimal. This means that the particular allocation cannot be improved upon and it is, therefore, Nash efficient. The direct theorem tells us that this efficient allocation of resources can be sustained by competitive markets that assure equilibrium across all margins [Bromley, 1990]. Both confusions—efficiency and resource rent—can be exposed with reference to Figure 1.

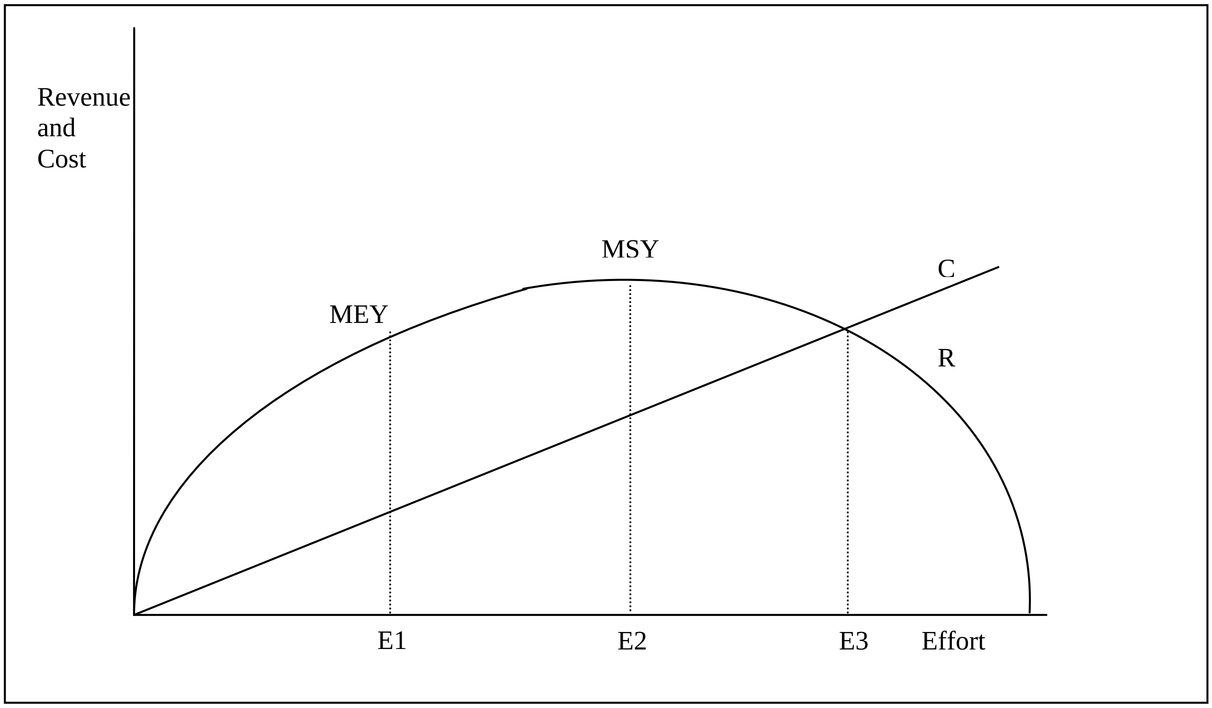

Figure 1.

Though we could draw on a large number of accounts of this iconic Figure, I will use the one that was presented to the Pacific Fishery Management Council in a report pertaining to the proposed introduction of an IFQ fishery. The authors wrote:

> *To explain how sustainable and economically desirable resource rents arise it is useful to look at a simple fishery model (Figure 1) that includes: fishing effort; revenue and costs; and a biological optimum called maximum sustainable yield (MSY). MSY is a standard reference point for the biologically optimum level of catch. In Figure 1 MSY is reached at point E2 -- beyond this point revenue begins to fall as catches fall and costs continue to rise due to the increased effort needed to catch fewer fish. Resource rent is the vertical difference between the revenue curve R and cost line, C. The difference is largest at point E1. This point is referred to as the Maximum Economic Yield (MEY). At MEY the resource rent is greatest, the fishing effort is at its*

> *lowest, and the total catch at E1 is equal to that at E3, the point at which revenue equals cost, only normal profits are earned, and a depletion of fish stocks results. MEY is therefore a desirable ecological and economic goal for the management of a sustainable fishery. The resource rent accrued at MEY would generate the highest net revenue and result in the largest return to society.*
>
> *Most fisheries do not operate at E1 and fail to maximize rents. They operate at E3. This is because the cost line C includes an allowance for normal profits. New entrants will continue to enter an unrestricted fishery until E3 is reached and a profit can no longer be made. At E3 all rent has been dissipated and the stock is being over-fished by the difference between E3 and E2. Even if regulations restrict fishing to MSY and some rents are generated this is still economically inefficient compared to E1. Over time rents can be increased through incentives and entrepreneurial behavior by improving output markets (increasing the height of the revenue curve) or improving technologies (decreasing the angle of the cost line).”* [Sylvia, et al. 2008, pp. 2-3].

Notice that the vertical distance in Figure 1 is referred to as resource rent and it is claimed that this magnitude must be maximized in order to produce the “largest return to society.” The reader is then told that fishing effort must be restricted from E3 or E2 back to the “efficient” level of effort—E1. It is also claimed that all of us (“society”) are suddenly made better off when effort is driven back to E1 because it is here that “resource rent is maximized.” It is said that here the fishery will be efficient. If resource rent is maximized in an efficient fishery, and if society is alleged to be better off at E1 as opposed to E3, the question worth asking is what sort of magic has transpired to bring about this happy result? The magic is that firms are evicted or bought out—it is called “rationalization”—in order to generate extra-competitive profits in an exercise reminiscent of a quest for a “sole owner” [Scott, 1955]. A sole owner is a monopolist.[9]

I will return to this matter, but it is first necessary to focus attention on the common assertion that a fishery with effort level E3 is inefficient. The standard account refers to “rent dissipation” when aggregate effort is at E3 rather than at E1. The idea of rent dissipation seems wasteful—as if something important is disappearing or being squandered. The problem is that the term rent has a very distinct meaning in economics, and a different meaning in the fisheries literature. Rent (correctly speaking, “economic rent”) *is the net revenue to a firm that is in* ***excess*** *of what would be necessary to keep the firm engaged in its current activity.* Economic rent is extra-competitive (excess) profit. Industries with blocked entry, or with some other means to prevent competitive pressure, earn economic rent. The point of a competitive market economy—see the above first and second theorems of welfare economics—is to provide opportunities for entry so that supply is increased and prices are thereby “pushed down” to their competitive (lowest-possible) level. Consumers gain from lower prices. That is the sole justification for a competitive market economy.

[9] Scott denies that a sole owner is a monopolist [Scott, 1955, p. 117]. However, for a single fishery—say the Alaskan halibut/sablefish fishery—it seems difficult to maintain that having that particular fishery exploited by a single owner is not a situation of a single (monopoly) supplier of halibut/sablefish into the market. The same reasoning applies to the Bering Sea/Aleutian Island crab fishery, or indeed the Bering Sea pollock fishery.

The standard account of Figure 1 invites the unsuspecting reader to believe that something horrible is happening when effort E3 is observed. It is said that "rent dissipation" has occurred and the fishery is "inefficient." But which rent do fisheries economists have in mind here—economic rent or resource rent? The common lament seems to be that resource rent is being dissipated as the fishery moves toward E3—but this is incorrect. As effort expands from E1 to E3 it is the economic rent that is being dissipated—and this is not to be lamented. In fact, the dissipation of this economic rent is precisely what happens in a competitive economy. And it **must happen** if the industry is to be competitive rather than monopolistic (or oligopolistic). At E3 all fishing firms are earning competitive profits—what all firms earn in a competitive market. If firms were not earning competitive profits they would exit the fishery to realize a greater return for their labor and management skill in other lines of work. Notice that when aggregate effort is less than E3 there are extra-competitive returns (excess profits) to be made in the fishery as evidenced by the vertical distance between R and C in Figure 1. We see that these excess profits serve as the attractant (the "economic pheromone") that draws entrants in pursuit of these artificially high returns. Firms will enter—capturing some of that excess profit—until all firms are earning no more than competitive returns (normal profit). We now see that this thing called "rent dissipation" is nothing but the elimination of excess profit that would otherwise accrue to firms when aggregate effort is less than E3.

Notice how the authors of the above quote describe this process—"New entrants will continue to enter an unrestricted fishery until E3 is reached and a profit can no longer be made [Sylvia, et al. 2008. pp. 2-3]." But these authors have already told us that "the cost line C includes an allowance for normal profits." The reader is therefore induced to believe that firms which are actually making normal (competitive) profits are unable to make any profits at all. And from this deceit emerges the standard prescription that these fishing firms, because they are "not making any profit" would actually be better off if they were evicted or bought out of the fishery so that they might escape the impoverished servitude of rent-dissipated fishing. [10] After all, wouldn't they be much happier as electricians, or school teachers [Bromley, 2008]? Apparently those who fish cannot be trusted with their own occupational choices.

It is now apparent that the "rent" fisheries economists wish to maximize is not resource rent at all but is, instead, economic rent—excess profits accruing to the lucky firms NOT excluded from the fishery. The pursuit here is simply to maximize the income that would accrue to the sole owner (a monopolist or a "near" monopolist).

The slippery nature of "profit" shows up in yet another curious claim: "Even when management sets harvest quotas that could maximize profits, the incentives of the individual harvester are typically inconsistent with profit maximization for the fleet [Costello, et al. 2008,

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[10] In a serious theoretical *faux pas*, Gordon lamented this situation by saying: "This is why fishermen are not wealthy, despite the fact that the fishery resources of the sea are the richest and most indestructible available to man [Gordon, 1954, p. 132]." The flaw I have in mind is not his claim of fisheries as "indestructible" but rather the observation about poor fishermen. His assertion is akin to lamenting that an Iowa family farmer is not wealthy despite being settled in the middle of the most bounteous agricultural land in the world.

p. 1679].” The abiding problem here is that the job of fisheries managers is to protect fish stocks—not to try to maximize the profits of the fleet. Only a sole owner (of the entire fleet) in a particular fishery would be concerned with maximizing profits of the fleet. The above quote seems to suggest that individual fishing firms should be treated as mere pieces of capital (vessels) to be deployed or shunted aside so that aggregate fleet profit can be maximized. It is rather like General Motors or Ford closing assembly plants in order to increase corporate profits. Except here the “plants” to be closed (removed from the fishery) are individual firms. Are individual fishing firms—many of them family firms—nothing but pieces of capital to be used or banished as government fisheries managers seek to “maximize profit for the fleet”?

I am not aware of another setting in which economists would seriously claim that “maximizing industry profits” represents the pertinent objective function. Firms seek to maximize profits—industries do not and cannot because an “industry” is not a plausible decision-making entity (unless the “industry” is a monopolist). An industry is merely the sum of the firms in it, and economic theory regards a perfectly competitive industry as one in which each firm in that industry is making normal profits. Talk of “maximizing industry profits” is incoherent. No economist would talk of maximizing the profits of a group of farmers growing Granny Smith apples—increasing or decreasing the number of apple producers until aggregate industry profits were somehow maximized. The only thing that matters is whether or not each firm in an industry is earning a competitive return on its investment. The U.S. Forest Service, when it provides timber to the private sector, is certainly not motivated by the mandate to maximize the aggregate profits of those firms harvesting federal timber. The Minerals Management Service is certainly under no obligation to lease oil and gas resources in the Outer Continental Shelf in order to “maximize industry profits” for the oil sector.

And this brings us back to the persistent problem concerning resource rent. The confusion is about to get worse by the introduction of yet another rent—this one called Ricardian rent. Ricardian rent is the differential income earned by the most productive fixed asset (land) in comparison to all other parcels of lesser quality in the same “local market.” He who owns superior land in a particular market earns Ricardian rent. In fact there is a continuum of Ricardian rents from the very best land ranging all the way down to a parcel that is just slightly better than the worst. The worst parcel earns zero Ricardian rent, but each of the other parcels earns “infra-marginal” (Ricardian) rent. Henry George suggested that all of this differential surplus (Ricardian rent) could be taxed away without altering the uses to which each parcel of land would be put. After all, Ricardian rent is a species of economic rent in that it is a surplus over and above what is required by way of income in order to keep that parcel of land in its current use. And since it is excess (infra-marginal) income why not tax it away? Why should an owner get to keep all of the surplus value created by the fortuitous gifts of nature (superior land), or the public’s investment in roads, busy intersections, schools, and parks?

Scott Gordon [1954] got fisheries economics off to a rather bad start by speaking of two fishing “grounds” as if discussing two agricultural parcels. He insisted that fishing firms will over-fish the superior ground and under-fish the inferior ground—and Gordon called this the dissipation of “resource rent” (even though it is Ricardian rent). Gordon wanted an owner of the fishing grounds so that effort would be optimally allocated across grounds of differential quality. All of Gordon's fish were seriously demersal and stayed close to home.[11] And so the underwater version of "Ricardian rent" soon lost its differential-quality component and became "resource rent" in any fishery of any size or species composition. Gordon wanted to maximize this "wet" Ricardian rent. Interestingly, if fisheries economists insist on maximizing this "resource rent" for an entire fishery then there is no good reason why the entirety of it should not be taxed away. If effort is restricted to E1 in the hope of maximizing "resource rent" then the government should tax away that excess profit and return it to the owner of the fish in the EEZ. Doing so would allow all fishing firms to capture their full competitive return, and it would have no effects upon fishing effort.

There are no coherent reasons to maximize economic rent in a fishery. The single policy innovation that will induce efficiency in the fishery is to require fishing firms to pay for the fish they catch. A market economy requires that all owners of factors of production—and fish in the EEZ are a factor of production to fishing firms—must receive a payment for their relative contribution to the value of the total product of the firm using those factors. In this case fish are the raw material (similar to gold, silver, timber, and oil) gathered up by the private sector and delivered to the market ready for further processing. Payment for this raw material is correctly understood to be resource rent.

Very few managed fisheries require firms to pay for the fish they extract from the ocean. Moreover, rationalization programs to reduce effort from E3 to E1 do not require the remaining firms to pay for what they catch and sell. They do not pay any resource rent. Starting again at effort E3, if firms were made to pay for the fish they catch then the cost ray C in Figure 1 would rotate in a counter-clockwise direction and would then intersect R to the left of its current point (E3). This payment of resource rent is necessary to establish both technical and price efficiency—and it would result in a reduced level of aggregate effort. Effort would be reduced because when firms must pay for the fish they catch their average and marginal costs rise somewhat, leading to profit maximization at a slightly reduced level of effort.

The standard fisheries story fails to grasp this point and insists that aggregate effort must be reduced in a bogus and chimerical quest to reach E1—at which point fishing firms who manage to remain in the fishery get to keep all of the resource rent, plus they reap excess profits made possible by the exclusion of most of their former competitors. We now see that avoiding "rent dissipation" is nothing but the creation of excess profits for the fortunate firms not evicted under rationalization schemes. And these extra-normal profits are then bolstered by using gifted IFQs as leverage to acquire additional quota shares, thereby augmenting these excess profits into perpetuity. This flawed model—and the conceptual and linguistic conjuring attendant to it—are then deployed to offer ersatz indictments concerning the lack of "efficiency" in the fishery. Effort at E3 is said to produce a situation in which: "…the so-

[11] Gordon recognized the limiting nature of his model but few fisheries economists seem to have noticed. He wrote: "Other species, such as herring, mackerel, and similar pelagic or surface dwellers migrate over very large distances, and it is necessary to treat the resource of an entire geographic region as one. The conclusions arrived at below are applicable to such fisheries, but the method of analysis employed is not formally applicable. The same is true of species that migrate to and from fresh water and the lake fishes proper [Gordon, 1954, p. 129]."

called economic rents (total revenue minus total costs) from the fishery will equilibrate at zero, resulting in minimal overall economic efficiency [Beddington, et al., 2007, p. 1713]." And, as we saw above: "New entrants will continue to enter an unrestricted fishery until E3 is reached and a profit can no longer be made [Sylvia, et al. 2007]."

These authors seem unaware that a competitive industry is precisely one in which the difference between average revenue and average cost, both at the individual level of the firm, and aggregating across all firms, must be zero. A competitive industry is one in which total industry revenue is precisely exhausted (used up) by total industry costs (when all factors of production—including the fish from the EEZ—have been paid their competitive return). There can be—must be—no economic rent (excess profit) in a competitive industry. That is precisely the point of a competitive market.

At effort level E3 each fishing firm is covering all necessary costs, and also realizing enough of a net return (profit) to make fishing the preferred occupational choice. And as long as landings are on the sustainable curve R it cannot be claimed that the fish stock is in danger of overexploitation. Sustainability is assured. The curious reader might therefore be justified in asking: "Please tell me again what is wrong with effort level E3?" The only honest answer to this pertinent question is that those firms comprising aggregate effort E3 are not required to pay anything for the fish—the owners of the fish are not receiving any resource rent.

We see that the advocacy for IFQs is based on this flawed understanding of efficiency and resource rent. When IFQs are gifted to those with a history in a particular fishery, there is an after-market for quota as consolidation occurs. This after-market fails to produce any resource rent (payments for fish landed) for the owners of the resource (the U.S. Treasury acting as the repository for the government's trust responsibility as manager of the fishery). Payments for additional quota shares by those who wish to expand are received by others who were similarly gifted, but who now wish to cash out and do something besides fish for a living. Commercial fishing firms stand to the fish they seek to catch in exactly the same relationship as those who seek to harvest timber from federal lands, or those who wish to extract oil and gas from federal lands (or from the outer continental shelf). In the absence of payments to the owners of the fishery resource we see that the "rent-maximizing" level of effort in Figure 1 (E1) represents nothing but the creation and maintenance of excess profits accruing to those fortunate enough to remain in the fishery after all others have been excluded through consolidation of the initial free gifting of IFQs. And, it means that the firms are not paying for the fish they catch. The free gift of IFQs has an added bonus—free fish. It is impossible to assert that efficiency has been achieved when a fishery is being exploited at effort E1.

III. Bringing Management Back In

The decades-long accretion of deceits, confusions, conjurings, and contrivances conspire to yield up a conceptually incoherent diagnosis of the "fisheries problem." This bogus diagnosis then underwrites a plethora of counterfeit justifications for the introduction of IFQs. Fisheries policy makers have been deceived to believe that IFQs are private property rights, that private property is a reliable engine of stewardship, that fishermen cannot make money in the absence of IFQs, and that economic efficiency will be realized if some fishing capacity can be restricted in order to maximize the difference between total revenue and total cost in an industry. This is said to be consistent with "maximizing resource rent" in the fishery. It is fantasy—all the way down.[12]

Drawing on this ersatz picture, the inevitable impression to arise from the phony claims for IFQs is that management is no longer necessary—IFQs can be handed out as gifts to those firms with a history in a particular fishery, and then the after-market can be relied upon to bring about "efficiency" in terms of who will remain in the fishery. Fishing effort will automatically equilibrate at the efficient level, and resource rent will be maximized. It all sounds too good to be true—and of course it is. Indeed, as Beddington, et al. [2007] point out, the most thoroughly "privatized" fisheries—New Zealand and Iceland—have some of the highest management costs in the industry. If IFQs accomplish so many desired results—enlightened stewardship, economic efficiency, rent maximization—why are management costs so high?

If we can escape the extravagant claims for IFQs, is there a plausible path forward? Imagine fisheries policy motivated by the following objectives: (1) assure sustainable fish stocks; (2) produce resource rent for return to the owners of the stocks; (3) reduce racing (derbies); and (4) offer entry opportunities for aspiring firms. From these four central principles, other objectives—contribute to enhanced product quality, re-vitalize small fishing ports, offer tourist attractions to coastal communities—can be appended where appropriate.

The <u>first objective</u> is met by honest science-based limits on total annual catch. While the science is indeed difficult at times, the principle of listening to the scientists is quite unimpeachable. Science-based TACs—assiduously enforced—are the necessary and sufficient condition for sustainability in fisheries.

The <u>second objective</u> is met by requiring fishing firms to pay the owners of the fish they catch a royalty for the privilege of being able to make a living off of the public's endowment of fisheries wealth in the EEZ. The best way to accomplish this is to require those who seek to participate in a particular fishery to submit a royalty bid indicating what fraction (the royalty bid) of annual gross landings receipts they are willing to pay the government in order to gain income and wealth from catching <u>our</u> fish.[13]

The <u>third objective</u> is met by abandoning the practice of giving away catch shares (IFQs) into perpetuity—a practice that restricts all future management options to the blunt instrument of raising and lowering TACs. All permits must be for fixed time periods—say five years, or ten years—so that fisheries managers can also control the number of vessels participating in a particular fishery without having to devote the public's money to buyback

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[12] I was reminded to re-visit my Ph.D. dissertation which was published by the U.S. Bureau of Commercial Fisheries over 40 years ago [Bromley, 1969]. While all dissertations, even when finished, are "rough drafts," my arguments then seem as pertinent today as they did back then.

[13] The royalty auction is explained in Bromley [2005, 2008] and in Bromley and Macinko [2007].

that which was recently given away to the industry for free.[14] This will solve the derby fishery, and it will enable accomplishment of the fourth objective.

The fourth objective is achieved by virtue of having accomplished the second and third objectives. That is, the existence of limited-term permits assures everyone that at frequent intervals (perhaps annually, perhaps every five years, depending on the design of the allotment-share program), some portion of the existing permits in a fishery will come open for acquisition by new entrants. Those firms holding permits could bid once again to retain them, but new entrants would also have an opportunity to enter the fishery through submitting a higher qualifying bid.

It is here that we find a profound difference between an allotment-share fishery (ASF) and the standard IFQ fishery. In an IFQ fishery, quota shares are controlled by a closed class of vessels who are able to block new entrants by trading shares among themselves, but not selling to new entrants. With the entire TAC obligated in perpetual gifts to the industry, the management agency loses the ability to offer fishing opportunities to new entrants. Moreover, in an IFQ fishery, entry requires the up-front purchase of quota from those who now hold it. Notice that this cost represents an entry barrier that can be overcome only through a contractual arrangement with the current holder of the IFQ (paying for the quota shares at the end of the season), or through entering the credit market in search of liquidity. Either route exposes the entrant to virtually all of the stochastic variation in next-year's TAC, as well as to the endemic risks in a highly variable economic activity.

The allotment-share fishery (ASF) requires no such ex ante financial maneuvers. If the aspiring fishing firm submits a winning royalty bid, there is no prior financial obligation required. The royalty is simply deducted from the proceeds due the fishing firm upon sale of the product at dockside. No fish, no fee.

Notice that I have left aside many of the possible refinements—two classes of permits (5-year, 10-year), staggered terms for permits so that a portion of them come up for renewal each year, size-class permits so that small vessels are not bidding against large vessels, concentration caps so that a few firms are not allowed to gain control of a fishery. I have elsewhere spelled out a number of refinements to this basic model [Bromley, 2005; 2008, Bromley and Macinko, 2007].

IV. Summary

The manifold contrivances under discussion here have given rise to a perception that management will be virtually unnecessary in an IFQ fishery. The magic of IFQs is alleged to produce a setting in which fishing firms will become exemplary stewards, they will become efficient, the fishery will become efficient, resource rent will be maximized, there will be no more racing for fish, and society will be better off.

[14] New Zealand seems to have learned this lesson the hard—and expensive—way [NRC, 1999].

The foregoing discussion reveals that those who offer this utopian vision are themselves confused about the necessary concepts they deploy to support their optimistic allegories. Among the key concepts they have wrong are: (1) efficiency; (2) economic rent; (3) resource rent; (4) Ricardian rent; (5) average costs and average revenue among firms and across an industry; (6) extra-normal profits; (7) stewardship; (8) property; (9) rights; (10) privileges; and (11) property rights. This is not auspicious ground on which to construct a coherent case for anything at all. In the wake of this dismal account, the only possible reaction to their over-confident policy offerings concerning IFQs is comprehensive incredulity. At a practical level, empirical evidence from New Zealand and Iceland reveals the deceit that IFQs will bring us a self-regulating fishery.

The world's fisheries are in desperate condition precisely because fisheries management over the past several decades has been one of rather complete malfeasance on the part of national governments and their fisheries management agencies. The advocates of IFQs have managed to exploit this tragedy by offering up the canard that if only their roseate policy instrument could be introduced there would be no need for management in the first place.

Adopting this spurious advice would compound the tragedies of past malfeasance by the foolish embrace of confusions, contrivances, and deceits.

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SUPPLEMENTAL PUBLIC COMMENT REGARDING TRAWL RATIONALIZATION

1. 6 form letters urging the Council defer action on the trawl individual fishing quota program until there is more information for permit holders to evaluate impacts on business planning.
2. 5 form letters urging the Council defer action on the trawl individual fishing quota program until there is more information for permit holders to evaluate impacts on business planning.
3. 1 letter urging the Council defer action on the trawl individual fishing quota program.

PFMC
03/05/09

RECEIVED
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PFMC

March 3, 2009

Mr. Donald K. Hansen
Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Ste. 101
Portland, OR 97220-1384

Dear Chairman Hansen:

I strongly urge that the Council move to defer any future decisions relating to the Trawl IQ plan until permit owners, like myself, have the information necessary to evaluate and understand the impacts of the plan on our own businesses.

I appreciate the opportunity to comment. If you have any questions about this important matter, please contact me at (541) 272 - 2237

Sincerely,

Michael Retherford Jr.

F/V Excalibur

March 3, 2009

Mr. Donald K. Hansen
Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Ste. 101
Portland. OR 97220-1384

Dear Chairman Hansen:

The Council is scheduled to take action in March on trailing amendments to the TIQ Preferred Alternative. At this point, groundfish permit owners who are affected by past and future decisions have no information available to them. Without information about how this plan affects me, I cannot provide informed public input on future or past decision-making on this very important regulatory change.

I strongly urge that the Council move to defer any future decisions relating to the Trawl IQ plan until permit owners, like myself, have the information necessary to evaluate and understand the impacts of the plan on our own businesses.

I appreciate the opportunity to comment. If you have any questions about this important matter, please contact me at 1 541 961 2334

Sincerely,

Ben Chestnut

F/V Golden Dolphin

February 26,2009

RECEIVED
MAR 0 3 2009
PFMC

Dear Council Members;
My name is Bruce Campbell ,I'am the Captain of the fishing vessel Sea Princess out of Eureka Ca.This is to advise you that I Request that any and all decisions planed in March be delayed until all Permit Owners have receipt of what is going to be received under the Preferred Alternative Allocation and what the cost of the IQ program will be.
I strongly urge that the Council move to defer any decisions relating to the Trawl IQ plan.
I appreciate the opportunity to comment.
You can contact me about this important matter by phone,mail or e-mail.

Bruce Campbell
5840 Elk River Rd.
Eureka Ca. 95503
(707)443-2499
bruce campbell2@aol.com

Sincerely

U.S DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
National Marine Sanctuary Program

West Coast Region
99 Pacific Street, Bldg. 200, Suite K
Monterey, CA 93940

March 9, 2009

Agenda Item G.3.d
Supplemental Public Comment 4
March 2009

MEMORANDUM FOR: Frank Lockhart
Assistant Regional Administrator
National Marine Fisheries Service, Northwest Region

FROM: William J. Douros
West Coast Regional Director
Office of National Marine Sanctuaries

SUBJECT: Support for Community Fishing Associations

Please accept support from the Office of National Marine Sanctuaries (ONMS), West Coast Regional Office for the development of Community Fishing Associations (CFAs) as part of the Pacific Fishery Management Council's (PFMC) groundfish individual fishing quota (IFQ) process.

Well-managed CFAs along the west coast will help with promoting community-based stewardship, infrastructure, and ecologically and economically sustainable fishing practices. We view the emerging efforts to transition to more sustainable and community focused fisheries management as closely aligned and consistent with the ONMS's mandate to promote and facilitate placed-based approaches to marine ecosystem protection and resource utilization. We are therefore very interested in discussing ways that we could help support PFMC, NOAA Fisheries, state agencies, local fishermen, and others with this innovative approach to resource management and utilization.

Thank you for the opportunity to provide support for well-managed CFAs as part of the individual fishing quota system.

cc:
Donald Hansen, Chair, Pacific Fishery Management Council
Donald McIsaac, Executive Director, Pacific Fishery Management Council

FISHERY MANAGEMENT PLAN AMENDMENT 20 – TRAWL RATIONALIZATION – ACCUMULATION LIMITS

Additional specifications for accumulation limits is one of the three trailing actions identified in the Council's final trawl rationalization action in November 2008 (see Agenda Item G.3). The following aspects of accumulation limit provisions were decided at that time.

- There will be accumulation limits. Limits on the accumulation of quota share (QS) and quota pound (QP) are envisioned for individual species (including overfished species) as well as for all species combined; such limits would be set for ownership and control (control limits) by any entity as well as use by a vessel.
- There will not be a grandfather clause. At the time of initial quota share (QS) allocation, the QS that would otherwise go to those who would qualify for an allocation greater than the accumulation limits will instead be redistributed to those who are under the limits.
- Control limits on the accumulation of QS will be measured by direct ownership by any entity as well as indirect control by such entity.

Completion of action on this element of the individual fishing quota (IFQ) program requires determination of the accumulation limit percentages. In determining the accumulation limit percentages, there are a number of factors the Council indicated it may want to consider. These are provided in the staff summary (Agenda Item G.4.a, Staff Report).

Additionally, the current options all specify that QPs will count against both the control limit and the vessel use limits and that the vessel use limits will be greater than the control limits. This creates an inconsistency that will need to be resolved either by making the control limits equal to or greater than the vessel use limits or changing the rules that counts QP against the control limits (see Agenda Item G.4.a, Staff Report for more information and Agenda Item G.4.b, GAC Report for the GAC recommendations).

The Groundfish Allocation Committee (GAC) met in January 2009 and has provided a report which addresses the issues which need to be resolved to complete action, with the exception of accumulation limits for overfished species (Agenda Item G.4.b, GAC Report). The Groundfish Management Team (GMT) was asked to analyze the GAC recommendations and has provided a report for the briefing book (Agenda Item G.4.b, GMT Report). During the GAC meeting, National Marine Fisheries Service (NMFS) volunteered to develop a paper on the accumulation limit issue (Agenda Item G.4.b, NMFS Report) as it relates to the possibility of developing higher limit levels for community associations through a trailing amendment, rather than a trailing action (trailing actions are to be completed prior to submission of the program adopted at the November Council meeting for Secretarial approval, while a trailing amendment would occur later under a separate Fishery Management Plan amendment process).

The Council is scheduled to reach finality on accumulation limits at this meeting.

Council Action:

1. **Adopt a set of accumulation limit percentages.**
2. **Address other issues of concern, as needed.**

Reference Materials:

1. Agenda Item G.4.a, Staff Report: Summary of Accumulation Limit Issues and Analysis.
2. Agenda Item G.4.b, GAC Report: Groundfish Allocation Committee Report On Amendment 20 – Trawl Rationalization – Accumulation Limits
3. Agenda Item G.4.b, GMT Report: Groundfish Management Team (GMT) and Council Staff Report On Amendment 20 – A Framework Approach For Setting Control and Vessel Usage Limits For Non-Whiting Target Species
4. Agenda Item G.4.b, Supplemental NMFS Report: Trailing Amendment Considerations for Regional Fishery Associations
5. Agenda Item G.4.c, Public Comment.

Agenda Order:

a. Agenda Item Overview — Jim Seger
b. Reports and Comments of Agencies and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Final Accumulation Limits

PFMC
02/24/09

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Summary of Accumulation Limit Issues and Analysis

Analysis in the preliminary draft Environmental Impact Statement. The accumulation limit analysis in preliminary draft EIS can be found on Pages A-226 through A-312 of Appendix A and, for mothership co-ops, on Pages B-54 through B-58 of Appendix B A table on Page A-228 provides **a general guide** to the material, identifying the location of the rationale and analysis on numerous issues that are within the scope of the accumulation limits discussion.

http://www.pcouncil.org/groundfish/gffmp/gfa20/gfa20decdoc.html

Decision Points for March 2009

Decisions needed:

Decide on Groundfish Accumulation Limit Percentages .... Page 5

This decision can encompass

Species covered with limits and treatment of overfished species.

Whether or not to have both vessel and control limits

Whether or not vessel limits will be set above control limits (and, if so resolution of the inconsistency that creates)

Whether to have special limits for community based or regional fishery associations.

Decide on Halibut Accumulation Limit Percentages .... Page 31

Other potential decisions, as needed:

Guidance disposition of QS in excess of limits at time of initial allocation .... Page 34

Guidance on disposition of QS in excess of limits resulting from changes in the OY .... Page 37

Goals and Objectives Related to Accumulation Limits

The Magnuson Stevens Act requires consideration of concerns about excessive shares and the establishment of maximum share that an entity may control or use. Excessive shares are of concern primarily because of their potential adverse impacts on effectively functioning markets and other socio-economic effects addressed in management objectives. With respect to the socio-economic issues, the NMFS guidelines point out that "other than a **broadly defined** cost-benefit [emphasis added] analysis, there is no body of theory, economic or otherwise, up on which to base the determination of a share limit based on management objectives [other than control of market power]...."[1]. The main standards, goals and objectives related to this issue pertain to the following topics.

- Improving net national benefits and fleet efficiency.
- Achieving change with minimal disruption
- Distributing benefits, including consideration of community effects, employment, and small vessels.
- Preventing excessive control (including market power)
- Addressing equity

A complete description of goals and objectives related to trawl rationalization is provided in Chapter 6 of the draft EIS. Some of the key relationships between the categories of goals and objectives and the accumulation limits are outlined in **Table 1**.

1 "Design and Use of Limited Access Privilege Programs," Lee G. Anderson and Mark C. Holliday, Editors. NOAA Technical Memorandum NMFS-F/SPO-86, November 2007.

Table 1. Relationship between goals and objectives and accumulation limits.

Goals and Objectives	Vessel Use Limits (limits on harvest activities)	Control Limits (limits on QS ownership/control)
Improving net national benefits and fleet efficiency	Higher vessel limits allow consolidation on fewer vessels and efficiency gains, increasing total wealth generated.	Higher control limits may allow some efficiency gains, but likely have less of an effect on allowing increased efficiency than vessel limits.
Achieving Change with Minimal Disruption	Vessel limits lower than recent harvest levels or not high enough to allow the harvest consolidations and increased profits necessary to offset cost of participating in the program will disrupt the major harvesters in the fishery.	Control limits less than needed to support recent harvest levels or less than vessel limits will change the relationship between harvesters and those owning the access rights. Each year harvesters would have to negotiate to acquire from others enough quota for the vessel to harvest at higher levels. Currently the vessel can own a permit which gives it complete access to what it can catch under the regulations.
Distributing benefits, including consideration of community effects, employment, and small vessels	Lower vessel limits distribute <u>benefits from harvest activities</u> across more individuals and possibly a broader geographic area but reduce the total benefits available for distribution.	Lower control limits distribute <u>benefits from QS ownership</u> among more individuals and possibly a broader geographic area but may reduce the total benefits available for distribution.
Preventing excessive control (including market power)		Higher control limits increase the opportunity for exertion of market power, redistributing benefits and potentially interfering with efficiency.
Addressing Equity	Equity considerations vary and are tied to many of the effects listed above. The MSA lists consideration of current and historical harvests and participation, employment, investment and dependence as some of the considerations related to equity. The following are a few perspectives.	
	For some, **lower vessel limits** may be viewed as inequitable if those limits prevent them from achieving previous harvest levels or realizing full benefits from the IFQ program by increasing their harvest levels. In the latter case, feelings of inequity will likely increase to the degree that the benefits a person receives are not enough to offset their increased costs. For others, **higher vessel limits** may be viewed as inequitable because the benefits from harvest will be concentrated among fewer fishing businesses, possibly making it more difficult for smaller participants to compete.	For some, **lower control limits** may be viewed as inequitable (1) if those limits prevent them from qualifying for all QS they would be receive under the allocation formula if they were otherwise treated on a par with everyone else, or (2) if the limits reduce their independence with respect to the control of access rights they need for their vessel operations (i.e. the vessels have to rely on acquiring QP from others each year). For others, **higher control limits** may be viewed as inequitable because the benefits from QS ownership will be concentrated among fewer fishing businesses.

Council November 2008 Action and GAC January 2009 Recommendations

The following is the text on accumulation limits from the Council's November 2008 action.

> It is the intent of the Council to have accumulation limits. However, the details for the accumulation limits will be further developed and analyzed through a trailing action to be completed prior to submittal of the trawl rationalization program to NMFS for approval. The trailing action will address (1) identification of the species that would be subject to accumulation limits; (2) description of how to treated overfished species; (3) determination of whether to apply accumulation limits at the vessel (usage) or entity (ownership/control) level or both; (4) how accumulation limits would be tracked; and (5) how accumulation limits would apply to and affect community-based or regional fishery associations. The following language on accumulation limits is currently under consideration.
>
> Limits may vary by species/species group, areas, and sector. See ... [see first four columns of limits in Table 2 plus footnote on Option 3]. ...
> **Vessel Use Limit**: A limit on the QP that may be registered for a single vessel during the year. This element will mean that a vessel could not have more used and unused quota pounds registered for the vessel than a predetermined percentage of the QP pool.
> **Control Accumulation Limit:** A person, individually or collectively, may not control QS or QP in excess of the specified limit (because there is no the grandfather clause). QS or QP controlled by a person shall include those registered to that person, plus those controlled by other entities in which the person has a direct or indirect ownership interest, as well as shares that the person controls through other means. The calculation of QS or QP controlled by a person will follow the "individual and collective" rule.
>
> > Individual and Collective Rule: The QS or QP that counts toward a person's accumulation limit will include 1) the QS or QP owned by them, and 2) a portion of the QS or QP owned by any entity in which that person has an interest. The person's share of interest in that entity will determine the portion of that entity's QS or QP that counts toward the person's limit.
>
> **Grandfather Clause:** There will not be a grandfather clause for the accumulation limits.
>
> *Note: QS that is not allocated because of the accumulation limits and absence of the grandfather clause will be distributed to other eligible recipients in a manner that maintains the distribution among groups specified in A-2.1.1 and based on the allocation formulas specified in A-2.1.3.*

At its January 2009 meeting, the GAC developed an alternative set of options for nonoverfished species. These are provided in the second four columns of numbers in Table 1. The GAC nonwhiting limits are based on the 90th percentile performers in terms of share of landings for 1994-2003 and 2004-2006. However, it was specified that no control limit should be above 10% and no vessel limit above 15%.

The GAC recommendation is based on data using shares of landed landings. For some species, the 90th percentile and maximum **shares of landings** (the basis for the GAC recommendations) will be substantially different from the 90th percentile and maximum **shares of the trawl allocation (assumed allocation[2]) landed** because significant portions of the assumed trawl allocation were not harvested.

In most cases the GAC options are more restrictive than the existing options. Table 3 provides the same two sets of options with highlighting to identify the differences. If the GAC option is more restrictive than either of the existing options, the cell is highlighted in bold. If it is less restrictive, the cell is shaded in grey. Cells that are neither bold nor grey are within the range of the existing options.

[2] For some portions of the analysis, a trawl allocation was assumed based mainly on the GAC's most recent recommendations. For these purposes, it is more important that the assumed allocation is somewhere in the ballpark rather than the exact allocation which will eventually be adopted.

In general, GAC option 2 (based on 2004-2006 shares of harvest) has limits that are less restrictive (larger) than Option 1 (based on 1994-2003 shares of harvest). This is mainly because both the amounts of harvest available and the number of vessels participating were greater in the earlier period. Where GAC Option 2 is more restrictive than GAC Option 1, the cell in Table 3 is highlighted with a box around it.

Table 2. Existing options and GAC options for accumulation limit percentages (italicized values are provided for reference but are not part of the GAC recommendations).

	EXISTING OPTIONS				GAC Options				90th Percentile, If Different from GAC Options	
	Option 1		Option 2		GAC Option 1		GAC Option 2			
Species Category	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	'94-'03	'04-'06
Nonwhiting Groundfish Species	0.030	0.015	0.044	0.022	0.020	0.010	0.030	0.015	-	-
Lingcod - coastwide										
N. of 42° (OR & WA)	0.100	0.050	0.150	0.075	0.048	0.024	0.060	0.030	-	-
S. of 42° (CA)	0.100	0.050	0.150	0.075	0.086	0.043	0.160	0.080	-	-
Pacific Cod	0.100	0.050	0.150	0.075	0.128	0.064	0.120	0.060	-	-
Pacific whiting (shoreside)	0.15	0.100	0.225	0.15	0.15	0.100				
Sablefish (Coastwide)										
N. of 36° (Monterey north)	0.040	0.020	0.060	0.030	0.020	0.010	0.030	0.015	-	-
S. of 36° (Conception area)	0.100	0.050	0.150	0.075	0.200	0.100	0.200	0.100	0.240	0.435
PACIFIC OCEAN PERCH	0.100	0.050	0.150	0.075	***0.054***	***0.027***	***0.074***	***0.037***	-	-
WIDOW ROCKFISH	0.068	0.034	0.102	0.051	***0.090***	***0.045***	***0.120***	***0.060***	-	-
CANARY ROCKFISH	0.100	0.050	0.150	0.075	***0.070***	***0.035***	***0.076***	***0.038***	-	-
Chilipepper Rockfish	0.100	0.050	0.150	0.075	0.124	0.062	0.200	0.100	-	0.149
BOCACCIO	0.100	0.050	0.150	0.075	***0.200***	***0.100***	***0.200***	***0.100***	0.600	0.368
Splitnose Rockfish	0.100	0.050	0.150	0.075	0.114	0.057	0.200	0.100	-	0.121
Yellowtail Rockfish	0.100	0.050	0.150	0.075	0.056	0.028	0.104	0.052	-	-
Shortspine Thornyhead - coastwide										-
N. of 34°27'	0.096	0.048	0.144	0.072	0.026	0.013	0.044	0.022	-	-
S. of 34°27'	0.094	0.047	0.142	0.071	0.084	0.042	0.200	0.088	-	-
Longspine Thornyhead - coastwide									-	-
N. of 34°27'	0.040	0.020	0.060	0.030	0.028	0.014	0.044	0.022	-	-
COWCOD	0.100	0.050	0.150	0.075	***0.200***	***0.100***	***-***	***-***	1.000	-
DARKBLOTCHED	0.100	0.050	0.150	0.075	***0.040***	***0.020***	***0.062***	***0.031***	-	-
YELLOWEYE	0.100	0.050	0.150	0.075	***0.200***	***0.094***	***0.200***	***0.100***	-	0.137
Minor Rockfish North										
Shelf Species	0.080	0.040	0.120	0.060	0.058	0.029	0.044	0.022	-	-
Slope Species	0.100	0.050	0.150	0.075	0.040	0.020	0.060	0.030	-	-
Minor Rockfish South										
Shelf Species	0.100	0.050	0.150	0.075	0.122	0.061	0.200	0.100	-	0.131
Slope Species	0.100	0.050	0.150	0.075	0.116	0.058	0.200	0.100	-	0.122
Dover sole (total)	0.036	0.018	0.054	0.027	0.022	0.011	0.032	0.016	-	-
English Sole	0.200	0.100	0.300	0.150	0.030	0.015	0.052	0.026	-	-
Petrale Sole (coastwide)	0.058	0.029	0.088	0.044	0.028	0.014	0.046	0.023	-	-
Arrowtooth Flounder (total)	0.100	0.050	0.150	0.075	0.038	0.019	0.064	0.032	-	-
Starry Flounder	0.100	0.050	0.150	0.075	0.200	0.100	0.110	0.055	0.132	-
Other Flatfish	0.200	0.100	0.300	0.150	0.026	0.013	0.040	0.020	-	-
Other Fish	0.100	0.050	0.150	0.075	0.050	0.025	0.180	0.090	-	-

* Existing Option 3: Same as Option 2 but with an aggregate nonwhiting vessel limit of 6% and % control cap of 3% and a shoreside whiting vessel limit of 25% and control cap of 37.5%.

Table 3. Comparison of GAC options to existing options for accumulation limit percentages (value for overfished species are provided for reference but are not part of the GAC recommendations).

	EXISTING OPTIONS				GAC Options			
	Option 1		Option 2		GAC Option 1		GAC Option 2	
Species Category	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim
Nonwhiting Groundfish Species	3.0%	1.5%	4.4%	2.2%	**2.0%**	**1.0%**	3.0%	**1.5%**
Lingcod - coastwide								
N. of 42° (OR & WA)	10.0%	5.0%	15.0%	7.5%	**4.8%**	**2.4%**	**6.0%**	**3.0%**
S. of 42° (CA)	10.0%	5.0%	15.0%	7.5%	**8.6%**	**4.3%**	16.0%	8.0%
Pacific Cod	10.0%	5.0%	15.0%	7.5%	12.8%	**6.4%**	**12.0%**	**6.0%**
Pacific whiting (shoreside)	15.0%	10.0%	22.5%	15%	15.0%	10.0%		
Sablefish (Coastwide)								
N. of 36° (Monterey north)	4.0%	2.0%	6.0%	3.0%	**2.0%**	**1.0%**	**3.0%**	**1.5%**
S. of 36° (Conception area)	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	20.0%	10.0%
PACIFIC OCEAN PERCH	10.0%	5.0%	15.0%	7.5%	**5.4%**	**2.7%**	**7.4%**	**3.7%**
WIDOW ROCKFISH	6.8%	3.4%	10.2%	5.1%	9.0%	**4.5%**	12.0%	6.0%
CANARY ROCKFISH	10.0%	5.0%	15.0%	7.5%	**7.0%**	**3.5%**	**7.6%**	**3.8%**
Chilipepper Rockfish	10.0%	5.0%	15.0%	7.5%	12.4%	**6.2%**	20.0%	10.0%
BOCACCIO	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	20.0%	10.0%
Splitnose Rockfish	10.0%	5.0%	15.0%	7.5%	11.4%	**5.7%**	20.0%	10.0%
Yellowtail Rockfish	10.0%	5.0%	15.0%	7.5%	**5.6%**	**2.8%**	**10.4%**	**5.2%**
Shortspine Thornyhead - coastwide								
N. of 34°27'	9.6%	4.8%	14.4%	7.2%	**2.6%**	**1.3%**	**4.4%**	**2.2%**
S. of 34°27'	9.4%	4.7%	14.2%	7.1%	**8.4%**	**4.2%**	20.0%	8.8%
Longspine Thornyhead - coastwide								
N. of 34°27'	4.0%	2.0%	6.0%	3.0%	**2.8%**	**1.4%**	**4.4%**	**2.2%**
COWCOD	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	-	-
DARKBLOTCHED	10.0%	5.0%	15.0%	7.5%	**4.0%**	**2.0%**	**6.2%**	**3.1%**
YELLOWEYE	10.0%	5.0%	15.0%	7.5%	20.0%	9.4%	20.0%	10.0%
Minor Rockfish North								
Shelf Species	8.0%	4.0%	12.0%	6.0%	**5.8%**	**2.9%**	**4.4%**	**2.2%**
Slope Species	10.0%	5.0%	15.0%	7.5%	**4.0%**	**2.0%**	**6.0%**	**3.0%**
Minor Rockfish South								
Shelf Species	10.0%	5.0%	15.0%	7.5%	12.2%	**6.1%**	20.0%	10.0%
Slope Species	10.0%	5.0%	15.0%	7.5%	11.6%	**5.8%**	20.0%	10.0%
Dover sole (total)	3.6%	1.8%	5.4%	2.7%	**2.2%**	**1.1%**	**3.2%**	**1.6%**
English Sole	20.0%	10.0%	30.0%	15.0%	**3.0%**	**1.5%**	**5.2%**	**2.6%**
Petrale Sole (coastwide)	5.8%	2.9%	8.8%	4.4%	**2.8%**	**1.4%**	**4.6%**	**2.3%**
Arrowtooth Flounder (total)	10.0%	5.0%	15.0%	7.5%	**3.8%**	**1.9%**	**6.4%**	**3.2%**
Starry Flounder	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	**11.0%**	**5.5%**
Other Flatfish	20.0%	10.0%	30.0%	15.0%	**2.6%**	**1.3%**	**4.0%**	**2.0%**
Other Fish	10.0%	5.0%	15.0%	7.5%	**5.0%**	**2.5%**	18.0%	9.0%

* Grey cells: GAC option is **less** restrictive than either existing option. Bold values: GAC Option is **more** restrictive than either existing options. Boxed cells, GAC Option 2 is more restrictive than GAC Option 1.

Accumulation Limit Percentages

In its November action the Council indicated it would have accumulation limits. Left open were questions about

A. whether there would be limits for vessel limits or control limits or both,
B. how accumulation limits would be tracked,
C. the species that would be subject to the accumulation limits
D. how overfished species would be treated
E. how accumulation limits would apply to and affect community-based or regional fishery associations.

All of these issues will be covered through the Council's consideration of the levels at which accumulation limits will be set. The following section addresses where vessel limits are set in relation to control limits and implications for tracking. After that, specific percentages for the accumulation limits are considered.

Vessel Limits, Control Limits, and Tracking

Under all options being considered, there would be separate limits for vessels and control, and all options would set vessel limits higher than the control limits.

Vessel limits may inhibit the achievement of maximum efficiency but are proposed to ensure the distribution of the benefits of harvesting activities across more entities. For example, it is hoped that with more vessels in the fishery there will likely be greater geographic distribution, more crew positions, and the distribution of harvester profits across more harvesting companies. At the same time, this end would be achieved through a reduction in the total wealth generated.

Control limits are proposed mainly to limit the accumulation of market power and distribute the benefits of QS ownership across more entities. See **Table 1** for additional information on the relationship between these limits and the goals and objectives.

Tracking the Control Limits and an Inconsistency

Setting the vessel limits higher than the control limits is intended to strike a better balance between efficiency (promoted by higher vessel limits) and dispersion of the benefits of QS ownership (promoted by lower control limits) than could occur if both were set to the same level. When this differential in the limits is combined with certain rules that were developed to assist in the effective tracking of compliance, an inconsistency results. Specifically QP is counted against control limits in order to help enforce the control limit. However, since all QP transferred to a vessel would count against the entity controlling the vessel it would be difficult for the vessel to acquire QS up to the vessel limit because it would be constrained first by the control limit.

"Control" is very broadly defined for the purpose of the control accumulation limits (see page A-235 through A-236 of the draft EIS). As part of the effort to monitor compliance with the control rule, it is anticipated that NMFS will collect complete ownership information on all entities receiving QS at the time of initial allocation or QS/QP transfer. Additional information might also be required, for example, the source of any loan received to purchase the QS. While ownership will be tracked closely, detection of other forms of control will likely rely largely on investigations instigated based on substantiated complaints or other sources of information. Given the difficulty of completely monitoring the compliance with the control limit the following features assist in effective monitoring.

1. Both QS and QP count against the control limits. This approach was proposed as a means of reducing the opportunity for a person to attempt to circumvent detection of control limit violations by indirectly controlling a number of different QS accounts but having the QP issued to that account directed to that person's business.
2. QP in a vessel account is under the harvester's control and will count toward the harvester's control limit.
3. One type of control, "ownership" will be measured by the "individual and collective rule." Under this rule, the QS a person owns counts against that person's accumulation limit as well as the QS owned by any entity in which the person has an ownership interest in proportion to that ownership interest.

These are intended to make it easier to effectively track control and detect violations. However, any one or all could be eliminated without changing an underlying intent and rule, i.e. that control of QS, however it is exerted, not exceed a certain level.

Fixing the Inconsistency

The inconsistency between setting vessel limits above control limits and counting QP against the vessel limits might be addressed through any one of the following adjustments.

1. Don't set control limits above the vessel limits.
2. Don't count QP in a vessel account against the control limit.
3. Don't count any QP holdings against the control limit (i.e. the GAC recommendation to apply the vessel limit to QPs and the control limit to QS).

   Note: The British Columbia system of accumulation limits is set up along the lines of Fix 3. They have a cap for the amount of permanent IVQ associated with a vessel (equivalent to our QS) that is less than the amount of temporary IVQ associated with a vessel (equivalent to our QP).

Fix 1 would abandon the policy of setting the vessel limits above control limits. This policy is intended to promote efficiency gains from trawl rationalization by allowing consolidation of harvest on fewer vessels, while at the same time ensuring that the benefits of QS ownership are distributed among more entities. Absent this differential, more compromise would be needed either on the efficiency objective or the social objective related to distribution.

Fix 2 would not change the control rule but make it somewhat easier to circumvent the control limit. Fix 2 would still apply QP against an entities control limits except for QP that are placed in a vessel QP account. QP in vessel accounts would be exempt.

Fix 3 broadens the exemption more than necessary to facilitate vessel limits greater than control limits but simplifies the rule in that there are no exceptions to explain: QP count against vessel limits and QS count against control caps.

Non-whiting, Non-Overfished Species Limits

This section provides the analysis and information that is most pertinent to the non-whiting and non-overfished species.

Net National Benefits, Fleet Efficiency, and Vessel Efficiency

> *Increasing the potential landings per vessel will likely increase the opportunity for vessels to achieve greater efficiency.*

Increasing the landings per vessel can mean increased retention, but gain is also expected from consolidation and a decrease in fleet size. This section evaluates the following two questions:

- To what degree can a more efficient fleet size be achieved?
- To what degree will vessels be able to increase efficiency by increasing their scale of operation?

An objective of the trawl rationalization programs is to increase net national benefits by increasing retained harvest and fleet efficiency. The accumulation limits may have a major effect on the degree to which the fleet is able to increase efficiency. Fleet efficiency will be increased through (1) more flexibility in harvest operations, (2) increased scale of operations, and (3) transfer of quota from less efficient to more efficient vessels. Because the current fishery, with the exception of whiting, is already operating under bi-monthly cumulative limits, there is probably less to be gained from the increased flexibility of harvest operations than there would be if the fishery was operating as an Olympic fishery. Increased efficiency from increased scale of operations will be limited by the vessel limits. Limits on the opportunity to increase scale of production will also limit the gains available from transfer from less efficient to more efficient operations (i.e. the efficiency of the more efficient operations to which quota may be transferred will be constrained by the vessel limits). Thus, qualitatively we can say that higher caps are likely to provide more opportunity for increased efficiency than lower caps, up to the point where increased concentration of ownership interferes with efficient market function.

Information is not available to quantitatively estimate efficiency gain that might be possible under a particular set of vessel limits. While exact effects of the vessel limits on efficiency cannot be provided, some quantitative indicators can be developed. Two ways of looking at effects on fleet efficiency are considered here, one is fleet based and the other vessel based. The fleet based approach considers whether aggregate limits allow the fleet to achieve expected optimum levels and the potential increase in the efficiency of the fleet as a whole relative to status quo. The vessel based approach considers as an indicator the highest levels of landings that individual vessels can achieve under the vessel limit options relative to the levels observed under status quo. The vessel based comparison can help us better describe the degree, direction and distribution of the expected change in efficiency under various accumulation limit options.

Overall, modeling has indicated that we expect an efficiency optimum to be reached at about 40 to 50 vessels (Lian, et.al., 2008). However, this optimum may vary depending on a number of variables including catch per unit effort, input prices, trawl allocations, and OYs. Based on the modeling, only the most constraining limit (a 2% or less aggregate limit) might effectively restrict minimum fleet size to something above the projected efficiency optimum. However, it is expected that not every vessel will harvest the maximum allowed and there will be more vessels than the minimums allowed by the vessel limits.

The relative magnitude of the vessel limits might provide a very rough quantitative indicator of the relative performance of different vessel limits. If it assumed that the vessel limits are constraining, the amount of capital in the fleets is likely to have some relationship to the vessel limits. The following table indicates that if

- the aggregate limits put some degree of constraint on fleet size, and
- one assumes a linear relationship between the limits and their degree of influence on capital in the fishery,

the influence of the vessel limit on maintaining more capital in the fishery will be

- 32% less under Option 2 than Option 1 and
- 47% more under Option 3 than Option 1.

Table 4. Comparison of aggregate vessel limit options.

	Existing Options		**New GAC Options**	
	Option 1	Option 2	Option 1	Option 2
Aggregate Nonwhiting, Vessel Limit	0.03	0.044	0.02	0.03
Minimum Number of Vessels	34	23	50	34
Percent Difference Relative to Existing Option 1		-32%	+47%	0%

If the limits are constraining, it is likely there would be some correlation between percent difference and relative amount of capital that would remain in the fishery. The degree of that correlation is uncertain.

As vessel limits are decreased, an increasing number of higher producing vessels will experience a decrease in efficiency relative to status quo and more lower producing vessels will experience an opportunity to increase their scale of operation and efficiency. Over the long run the increases in operating efficiency by the smaller producers will not be enough to offset the reduced opportunity to harvest at higher levels (assuming total efficiency increases with scale of operation over the range of operation sizes that exist in the fishery).

With respect to the highest levels of efficiency that a vessel might achieve, **Table 5** and **Table 6** shows for the existing vessel limit options and those proposed by the GAC, respectively, the number of vessels that would not be able to achieve their recent harvest levels (2004-2006) and the percent of harvest over that period that would have been above the limits. This indicates the degree to which some vessels might have their production and likely their efficiency constrained relative to their level of operations in the recent past, assuming 2004-2006 harvest levels. From the percent of vessels constrained one can determine the percent of vessels unconstrained, inferring the number of participants that would be able to expand production as compared to the recent past. Appendix A (on a QS basis) and Appendix B (on a poundage basis) scattergrams show the levels of 2004-2006 production by vessel for each species and in comparison to proposed limits.

In Table 5 and Table 6 the information on vessels is based on the history for the permits. For existing options, most of the vessel limits would not be constraining **(Table 5)**. The existing Option 1 lingcod south vessel limit (10%) would constrain the greatest number of permits (5, or about 9% of all those permits with lingcod harvest in the area) and about 4% of the harvest would be in excess of the limits. The limit for sablefish south (10%) would affect the greatest amount of the harvest (27%) and 3 permits.

The GAC vessel limit options are generally lower than the existing options, increasing the emphasis on the distribution of benefits and decreasing the emphasis on efficiency. While there may a substantial reduction in the opportunity to increase efficiency, using comparisons to recent history the number of entities affected is relatively small. For example, the most restrictive GAC option (Option 1) would constrain recent production as measured by the share of the likely trawl allocation for only two additional species (northern shortspine thornyheads and arrowtooth flounder[3]) (Table 6 compared to Table 5). For arrowtooth flounder, three permits and 9% of the landings would be affected. One of the species for which the GAC options are more liberal than the existing options is sablefish south. One of the management units for which the GAC options are more liberal than the existing options is sablefish south. The sablefish south vessel limit under the GAC Option 1 is 20% as compared to 10% for the existing Option 1. Under the existing Option 1, 3 permits are affected while under the GAC Option 1 only 2 permits would be affected. While this 10% difference only results in a small change in the number of entities affected, it does reduce the share of the allocation affected from 27% to 2%. Petrale sole production is affected under both the existing options and the new GAC Options. However, the decrease in the accumulation limits (from 5.8% under the existing options to 3.8% under the GAC option) increases the number of permits affected from 1 (and less than 0.01% of the assumed allocation) to 7 (and 6% of the assumed trawl allocation). The GMT report points out that the degree of this affect may be the result of the higher than expected harvests in 2005.

For many species, no data shows up in Table 5 and Table 6 because the proposed vessel limits would not impose a constraint relative to recent harvest levels. Figures in Appendix A provide information for all permits which shows where the limits are relative to recent harvest levels.

Many species were under harvested relative to the assumed trawl allocation (Table 7). For those species, even if the accumulation limits accommodate the recent year maximum shares of the assumed allocation, if the limits are constraining top producers fully harvesting the trawl allocation would require the expansion of harvest by those under the limits, rather than at or close to the limits

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[3] Widow also shows up for the first time on Table 6 but it is not one of the species covered by the GAC recommendations.

Table 5. Existing vessel use limit options compared to per permit shares of assumed trawl allocations and amounts landed by harvesting entities from 2004 through 2006.

-		Existing Vessel Limit Option 1					Existing Vessel Limit Option 2				
Species group	MAX Share of Trawl Allocation (04-06)	Option 1 Vessel Limit	Vessel Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)	Option 2 Vessel Limit	Vessel Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)
Nonwhiting Groundfish Species	1.8%	3.0%	3,219,754				4.4%	4,722,305			
Lingcod – coastwide											
N. of 42° (OR & WA)	1.0%	10.0%	114,751				15.0%	172,127			
S. of 42° (CA)	21.0%	10.0%	6,088	5	9%	4%	15.0%	9,132	2	4%	2%
Pacific Cod	7.2%	10.0%	446,803				15.0%	670,204			
Sablefish (Coastwide)											
N. of 36° (Monterey north)	4.3%	4.0%	308,937	1	1%	0%	6.0%	463,406			
S. of 36° (Conception area)	22.0%	10.0%	25,494	3	25%	27%	15.0%	38,241	3	25%	12%
PACIFIC OCEAN PERCH	3.1%	10.0%	93,410				15.0%	140,115			
WIDOW ROCKFISH	6.8%	6.8%	38,835	1	1%	0%	10.2%	58,252			
Chilipepper Rockfish	0.5%	10.0%	352,739				15.0%	529,109			
Splitnose Rockfish	8.5%	10.0%	96,551				15.0%	144,827			
Yellowtail Rockfish	0.6%	10.0%	783,269				15.0%	1,174,904			
Shortspine Thornyhead - coastwide											
N. of 34°27'	4.0%	9.6%	199,788				14.4%	299,682			
S. of 34°27'	16.0%	9.4%	33,984	3	7%	3%	14.2%	51,338	1	2%	0%
Longspine Thornyhead - coastwide											
N. of 34°27'	2.0%	4.0%	206,172				6.0%	309,257			
DARKBLOTCHED	3.7%	10.0%	54,314				15.0%	81,472			
Minor Rockfish South											
Shelf Species	3.1%	8.0%	102,435				12.0%	153,653			
Slope Species	3.5%	10.0%	207,146				15.0%	310,719			
Minor Rockfish South											
Shelf Species	1.7%	10.0%	23,611				15.0%	35,417			
Slope Species	12.1%	10.0%	88,751	2	5%	3%	15.0%	133,127			
Dover sole (total)	5.7%	3.6%	562,771	1	1%	1%	5.4%	844,156	1	1%	0%
English Sole	2.3%	20.0%	1,298,521				30.0%	1,947,782			
Petrale Sole (coastwide)	5.9%	5.8%	335,513	1	1%	0%	8.8%	509,054			
Arrowtooth Flounder (total)	8.3%	10.0%	1,214,746				15.0%	1,822,118			
Starry Flounder	8.3%	10.0%	170,704				15.0%	256,056			
Other Flatfish	1.9%	20.0%	2,073,166				30.0%	3,109,749			
Other Fish	1.5%	10.0%	1,507,225				15.0%	2,260,838			

Table 6. New GAC vessel use limit options compared to per permit shares of assumed trawl allocations and amounts landed by harvesting entities from 2004 through 2006.

-		New GAC Vessel Limit Option 1					New GAC Vessel Limit Option 2				
Species group	MAX Share of Trawl Allocation (04-06)	Option 1 Vessel Limit	Vessel Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)	Option 2 Vessel Limit	Vessel Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)
Aggregate Non-whiting Groundfish	1.8%	2.0%	2,146,502				3.0%	3,219,754			
Lingcod – coastwide											
N. of 42° (OR & WA)	1.0%	4.8%	55,081				6.0%	68,851			
S. of 42° (CA)	21.0%	8.6%	5,236	5	9%	5%	16.0%	9,741	2	4%	1%
Pacific Cod	7.2%	12.8%	571,908				12.0%	536,164			
Sablefish (Coastwide)											
N. of 36° (Monterey north)	4.3%	2.0%	154,469	2	1%	2%	3.0%	231,703	2	1%	1%
S. of 36° (Conception area)	22.0%	20.0%	50.988	2	17%	2%	20.0%	50.988	2	17%	2%
PACIFIC OCEAN PERCH	3.1%	5.4%	50,441				7.4%	69,123			
WIDOW ROCKFISH	6.8%	9.0%	51,399				12.0%	68,532			
Chilipepper Rockfish	0.5%	12.4%	437,397				20.0%	705,478			
Splitnose Rockfish	8.5%	11.4%	110,069				20.0%	193,103			
Yellowtail Rockfish	0.6%	5.6%	438,631				10.4%	814,600			
Shortspine Thornyhead											
Shortspine Thornyhead - N. of 34°27'	4.0%	2.6%	54,109	2	2%	2%	4.4%	91,569			
Shortspine Thornyhead - S. of 34°27'	16.0%	8.4%	30,369	4	9%	5%	15.0%	63,630	1	2%	0%
Longspine Thornyhead											
Longspine Thornyhead - N. of 36°	2.0%	2.8%	144,320				4.4%	226,789			
DARKBLOTCHED	3.7%	4.0%	21,726				6.2%	33,675			
Minor Rockfish North											
Shelf HG	3.1%	5.8%	74,266				4.4%	56,340			
Slope HG	3.5%	4.0%	82,858				6.0%	124,288			
Minor Rockfish South											
Shelf HG	1.7%	12.2%	28,806				20.0%	47,223			
Slope HG	12.1%	11.6%	102,952	2	5%	1%	20.0%	133,127			
Dover Sole	5.7%	2.2%	343,915	2	1%	2%	3.2%	500,241	2	1%	1%
English Sole	2.3%	3.0%	194,778				5.2%	337,616			
Petrale Sole	5.9%	2.8%	161,972	7	5%	6%	4.6%	266,096	3	2%	1%
Arrowtooth Flounder	8.3%	3.8%	461,603	3	2%	9%	6.4%	777,437	2	2%	2%
Starry Flounder	8.3%	20.0%	256,056				11.0%	187,774			
Other Flatfish	1.9%	2.6%	269,512				4.0%	414,633			
Other Fish	1.5%	5.0%	753,613				18.0%	2,713,005			

Note: Species names that in all capes are overfished. The GAC has not proposed accumulation limits for those species but information is provided for reference.

Table 7. Landings as a percent of the assumed allocation and the trawl share of the OY assumed for this analysis.

Species Category	Landings as a Share of Assumed Trawl Allocations 2004	2005	2006	Assumed Trawl Share of OY
Aggregate Non-whiting Groundfish	37%	42%	39%	
Lingcod – coastwide				
N. of 42° (OR & WA)	22%	9%	15%	40%
S. of 42° (CA)	144%	57%	74%	5%
Pacific Cod	36%	48%	22%	95%
Sablefish (Coastwide)				
N. of 36° (Monterey north)	71%	67%	75%	47%
S. of 36° (Conception area)	69%	48%	11%	42%
PACIFIC OCEAN PERCH	31%	14%	16%	95%
WIDOW ROCKFISH	17%	31%	21%	91%
Chilipepper Rockfish	2%	2%	1%	80%
Splitnose Rockfish	37%	20%	24%	95%
Yellowtail Rockfish	6%	6%	5%	88%
Shortspine Thornyhead				
Shortspine Thornyhead - N. of 34°27'	47%	38%	47%	95%
Shortspine Thornyhead - S. of 34°27'				58%
Longspine Thornyhead				
Longspine Thornyhead - N. of 36°	31%	27%	31%	95%
DARKBLOTCHED	83%	32%	36%	95%
Minor Rockfish North				
Shelf HG	6%	6%	4%	60%
Slope HG	22%	11%	10%	81%
Minor Rockfish South				
Shelf HG	2%	5%	5%	15%
Slope HG	59%	28%	24%	63%
Dover Sole	101%	98%	85%	95%
English Sole	30%	30%	30%	95%
Petrale Sole	73%	105%	99%	95%
Arrowtooth Flounder	43%	38%	33%	95%
Starry Flounder	15%	3%	7%	87%
Other Flatfish	20%	29%	29%	95%
Other Fish	3%	6%	4%	

* Shelf rockfish percents are "placeholders" based on 1995 – 2005 history, and not part of the GAC recommendations.

Vessel Profitability and Disruption

Disruption to the industry may result from a variety of effects including redistribution of harvest opportunity among vessels, reduction in harvest opportunity, or increases in costs that are greater than vessels are able to compensate for through increased profits. The previous section identifies those situations in which vessel use limits are insufficient to accommodate recent harvest levels. The following sections will identify situations in which control limits would be too low to allow a harvesting firm to retain direct control over its access privileges (currently many of these firms maintain control over their access privileges through permit ownership). Either of these situations (a vessel or an entity unable to achieve recent harvest levels) would be at least somewhat disruptive to current participants. This section provides information similar to the previous section except, rather than shares of landings, recent and historic revenues are compared to revenue levels that might be attainable under the accumulation limits. The GMT report (Agenda Item G.4.b, GMT Report) goes into a more detailed discussion on the consideration of accumulation limits in the context of revenues and the importance of a fishing business's ability to increase profits in order to pay for the costs of the trawl rationalization program.

The aggregate nonwhiting species vessel limits would be expected to allow vessels to achieve recent maximum revenues per vessel, with the exception of the new GAC Option 1 (Table 8). The estimate for the nonwhiting aggregates are based on a proportional distribution of harvest among all species. While it is unlikely that any vessel will land species in this combination, this information is still indicative of the relative opportunity that would be allowed under the aggregate nonwhiting vessel limit options. In general, existing Option 2 is the most liberal option and would allow for the greatest expansion of revenue for most management groups relative to the 2004-2006 harvests. However, not every vessel would be able to harvest the maximum allowed for each species because of the restriction imposed by the aggregate nonwhiting vessel limits. Additionally, different species are available in different geographic areas. This is another area into which the GMT report (Agenda Item G.4.b, GMT Report) goes into more depth.

Table 8. Maximum revenue of **vessels** by option (shaded cells under options show largest values for all options) and for maximum revenue for a single year for 1994-2003 and 2004-2006 (shaded value under max revenues indicates the maximum is greater than any of the options).

	Maximum Annual Revenue Per Vessel (Thousands of Dollars)		**Maximum Possible Revenue of Vessels By Option Based on Assumed Trawl Allocations and 2006 Prices and OYs (Thousands of Dollars)**			
Species Category	'94-'03	'04-'06	Existing Option 1	Existing Option 2	New GAC Option 1	New GAC Option 2
Nonwhiting Groundfish Species	1,126	1,018	1,382	2,027	921	1,382
LINGCOD- coastwide						
N. of 42° (OR & WA)	68	5	93	139	44	56
S. of 42° (CA)	29	6	6	9	5	9
Pacific Cod	122	151	169	254	217	203
Pacific whiting (shoreside)						
Sablefish (Coastwide)						
N. of 36° (Monterey north)	243	394	406	609	203	304
S. of 36° (Conception area)	57	54	25	37	49	49
PACIFIC OCEAN PERCH	40	13	44	66	24	33
WIDOW ROCKFISH	154	16	17	26	23	30
Chilipepper Rockfish	258	9	217	325	269	433
Splitnose Rockfish	57	27	29	43	33	57
Yellowtail Rockfish	182	22	321	482	180	334
Shortspine Thornyhead - coastwide						
N. of 34°27'	169	75	169	254	46	78
S. of 34°27'	71	115	27	41	24	51
Longspine Thornyhead - coastwide						
N. of 34°27'	234	56	121	181	85	133
DARKBLOTCHED	93	9	26	39	10	16
Minor Rockfish North						
Shelf Species	55	13	46	69	34	25
Slope Species	72	34	98	147	39	59
Minor Rockfish South						
Shelf Species	37	2	15	23	19	31
Slope Species	134	53	49	73	57	98
Dover sole (total)	138	333	213	319	130	189
English Sole	115	49	428	641	64	111
Petrale Sole (coastwide)	200	340	339	515	164	269
Arrowtooth Flounder (total)	143	110	134	201	51	86
Starry Flounder	23	57	69	103	138	76
Other Flatfish	202	76	687	1,031	89	137
Other Fish	79	34	178	268	89	321

Distribution of Benefits and Social Structure

> *Restricting harvester ability to control quota to levels below that needed by the vessel will change some of the social structure and economic relationships in the fishery. Smaller vessel limits and control will limits will reduce total benefits but likely disperse those benefits among more individuals.*

Under status quo, the harvester is able to secure all the access privileges needed for the harvesting operations (i.e. holds the limited entry permit on its own). All options under consideration anticipate that control limits will be lower than the vessel limits. Therefore, there is some level of production above which the harvester will need to acquire quota pounds from others in order to achieve the level of production allowed under the vessel limits. Rather than being vertically integrated with respect to controlling the access privileges (as is the case when a harvester owns its own vessel and permit) harvesters with vessels desiring to expand production above the control limits will need to acquire at least some of their privileges each year from others. In addition to the distributional effect the need for these transactions will also have some effect on efficiency, adding some "friction" in the form of the costs associated with executing transactions to acquire additional QP each year and the associated uncertainty about the price at which the QP will be available.

The amount of QS an entity could control relative to the amount needed to achieve its recent levels of harvest provides one metric by which this criteria can be evaluated. Tables are provided for each of the control limit options showing the number of entities that would require quota in excess of the control limit in order to achieve their recent harvest levels (2004-2006) and the total amount of quota that they would need acquire.

If the impact of interest is the degree to which entities holding single permits would need to acquire quota from others, Table 10 and Table 11 should be reviewed. These tables compare the 2004-2006 history by permit to the control limits. If the impact of interest is the degree to which entities holding single or multiple permits would need to acquire quota from others to achieve previous harvest levels, Table 12 and Table 13 should be reviewed. These tables compare the history by entity to the control limits (based on the distribution of permits among entities as of fall 2006). Each table also displays the maximum share of harvest by any permit and by any single entity for 2004-2006.

Because the control limits are more constraining than the vessel limits, evaluation of the constraints control limits place at the permit level shows a greater number of impacted entities than the evaluation of the constraints vessel limits place at the permit level. While the existing Option 1 shortspine thornyhead south **vessel** limits (the most restrictive of the existing option limits) constrained a maximum of 5 permits (Table 5), the existing Option 1 **control** limits would constrain a maximum of 14 permits (shortspine thornyhead south, Table 10). Though none of the vessel limit options were constraining at the aggregate level, the existing Option 1 control limit would constrain 3 permit owners, based on their aggregate nonwhiting groundfish landings (Table 10). The existing Option 2 aggregate nonwhiting control limits would not be constraining. Both of the new GAC options aggregate nonwhiting control limits (Table 11) would be constraining of permit owners, affecting 3 or 4 permits and between 1 and 3 percent of the landings. Considering an individual species example, the most constraining of the GAC options (Option 1) would set the sablefish north control limit at 1%, constraining 28 permits and affecting 7% of the landings (Table 11). For sablefish north, GAC Option 2 would set the sablefish north control limit at 1.5%, constraining only 2 permits and affecting 3% of the landings. Similarly, the existing Option 2 control limit, while set at 3%, would still only affect 2 permits (Table 10), but the amount of landings affected would be less than GAC Option 2 (1%). The single species control limit affecting the most permits (55) would be the GAC Option 1 control limit for Dover sole (1.1%) (Table 10). Fourteen percent of the landings would be affected. The GAC Option 2 limit of 1.6% for Dover sole would affect only 14 permits and 4% of the landings. In contrast, the existing option control limits would only affect 2 permits and between 2 and 3 percent of the landings (Table 11).

In the previous paragraphs, we evaluated the control limits for situations in which owners only owned one permit. Here we will look at the effects on entities, taking into account multiple permit ownership as that ownership stood in the fall of 2006. On the one hand the number of entities over the control limits may be higher relative to the number of permits because multiple permit under the same ownership are evaluated together, on the other hand the number of entities over limits may be lower for permits because there are fewer entities than there are permits. For the most constraining of the existing options, (Option 1) the number of entities constrained at the aggregate nonwhiting control limit (1.5%) would be 6 and the total landings by these entities over the limits during that period would be 1% (Table 12). For the most constraining of the new GAC options, (Option 1) the number of entities constrained at the aggregate nonwhiting control limit (1.0%) would be 11 and the total landings by these entities over the limits during that period would be 7% (Table 13). As with the comparison to permits, the single species control limit affecting the most entities (44) would be the GAC Option 1 control limit for Dover sole (1.1%) (Table 10). Twenty several percent of the landings would be affected. The GAC Option 2 limit of 1.6% would affect only 24 entities and 14% of the landings. In contrast, the existing option control limits would only affect between 9 and 16 entities and between 5 and 12 percent of the recent landings (Table 11).

Control

Quantitative information is not adequate for a complete evaluation of the effect of control on markets. The control limits would generally be 10% or less. The following is one type of dynamic that might be of concern in evaluating a control limit. For many species, the Option 2 control limit would allow as few as 14 individuals to control all of the QS (Table 9). When QS for a species that is caught by many can be concentrated into the hands of 10 to 20 individuals, it is not too difficult to imagine a scenario whereby a few individuals seek to hold the maximum amount of QS. Then as the supply becomes constrained others seek to increase their holdings to either gain advantage in anticipation of a tightening market or to secure the QS they need to cover their incidental catch. As QS is accumulated momentum might build toward further accumulation and a choke point might be established as a large majority of the shares are concentrated in the hands of a relatively few individuals with those holding smaller amounts unwilling to release them because of their own needs. While price collusion would be illegal, in such situations prices being asked often become known and there will sometimes be price leaders that others follow.

Table 9. Minimum numbers of **entities** by option (shaded cells show largest values for all options) and maximum entities in a single year for 1994-2003 and 2004-2006.

	Historic Maximum Number of Entities in a Single Year	**Minimum Possible Numbers of Entities By Option** (Overfished species values are listed for reference but are not part of the GAC recommendations)			
Species Category	'04-'06	Option 1	Option 2	GAC Option 1	GAC Option 2
Nonwhiting Groundfish Species	106	67	46	100	67
Lingcod - coastwide					
N. of 42° (OR & WA)	77	20	14	42	34
S. of 42° (CA)	39	20	14	24	13
Pacific Cod	60	20	14	16	17
Sablefish (Coastwide)					
N. of 36° (Monterey north)	100	50	34	100	67
S. of 36° (Conception area)	8	20	14	10	10
PACIFIC OCEAN PERCH	71	20	14	38	28
WIDOW ROCKFISH	57	30	20	23	17
CANARY ROCKFISH	64	20	14	29	27
Chilipepper Rockfish	25	20	14	17	10
BOCACCIO	12	20	14	10	10
Splitnose Rockfish	22	20	14	18	10
Yellowtail Rockfish	65	20	14	36	20
Shortspine Thornyhead - coastwide					
N. of 34°27'	77	21	14	77	46
S. of 34°27'	29	22	15	24	12
Longspine Thornyhead - coastwide					
N. of 34°27'	80	50	34	72	46
COWCOD	0	20	14	10	
DARKBLOTCHED	86	20	14	50	33
YELLOWEYE	31	20	14	11	10
Minor Rockfish North					
Shelf Species	81	25	17	35	46
Slope Species	77	20	14	50	34
Minor Rockfish South					
Shelf Species	81	20	14	17	10
Slope Species	77	20	14	18	10
Dover sole (total)	101	56	38	91	63
English Sole	95	10	7	67	39
Petrale Sole (coastwide)	94	35	23	72	44
Arrowtooth Flounder (total)	89	20	14	53	32
Starry Flounder	52	20	14	10	19
Other Flatfish	102	10	7	77	50
Other Fish	51	20	14	40	12

Table 10. Existing control limit options compared to per permit shares of assumed trawl allocations and amounts landed by harvesting entities from 2004 through 2006.

-		Existing Control Limit Option 1					Existing Control Limit Option 2				
Species group	MAX Share of Trawl Allocation (04-06)	Option 1 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)	Option 2 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)
Aggregate Non-whiting Groundfish	1.8%	1.5%	1,609,877	3	2%	1%	2.2%	2,361,153			
LINGCOD - coastwide	1.1%		60,420					90,630			
N. of 42° (OR & WA)	1.0%	5.0%	57,376				7.5%	86,063			
S. of 42° (CA)	21.0%	5.0%	3,044	9	16%	13%	7.5%	4,566	6	11%	7%
Pacific Cod	7.2%	5.0%	223,401	3	3%	2%	7.5%	335,102			
Sablefish (Coastwide)	4.1%		167,216	2	1%	2%		250,824	2	1%	1%
N. of 36° (Monterey north)	4.3%	2.0%	154,469	2	1%	2%	3.0%	231,703	2	1%	1%
S. of 36° (Conception area)	22.0%	5.0%	12,747	4	33%	50%	7.5%	19,121	3	25%	36%
PACIFIC OCEAN PERCH	3.1%	5.0%	46,705				7.5%	70,057			
WIDOW ROCKFISH	6.8%	3.4%	19,417	4	5%	8%	5.1%	29,126	1	1%	3%
Chilipepper Rockfish	0.5%	5.0%	176,370				7.5%	264,554			
Splitnose Rockfish	8.5%	5.0%	48,276	3	8%	6%	7.5%	72,413	1	3%	1%
Yellowtail Rockfish	0.6%	5.0%	391,635				7.5%	587,452			
Shortspine Thornyhead	3.6%	3.1%	75,722	1	1%	0%	4.7%	114,805			
Shortspine Thornyhead - N. of 34°27'	4.0%	4.8%	99,894				7.2%	149,841			
Shortspine Thornyhead - S. of 34°27'	16.0%	4.7%	16,992	14	33%	23%	7.1%	25,669	6	14%	8%
Longspine Thornyhead	2.0%	2.0%	103,516				3.0%	155,274			
Longspine Thornyhead - N. of 36°	2.0%	2.0%	103,086				3.0%	154,629			
DARKBLOTCHED	3.7%	5.0%	27,157				7.5%	40,736			
Minor Rockfish North											
Shelf HG	3.1%	4.0%	51,218				6.0%	76,827			
Slope HG	3.5%	5.0%	103,573				7.5%	155,360			
Minor Rockfish South											
Shelf HG	1.7%	5.0%	11,806				7.5%	17,709			
Slope HG	12.1%	5.0%	44,376	4	9%	19%	7.5%	66,564	4	9%	9%
Dover Sole	5.7%	1.8%	281,385	2	1%	3%	2.7%	422,078	2	1%	2%
English Sole	2.3%	10.0%	649,261				15.0%	973,891			
Petrale Sole	5.9%	2.9%	167,756	7	5%	6%	4.4%	254,527	3	2%	2%
Arrowtooth Flounder	8.3%	5.0%	607,373	3	2%	6%	7.5%	911,059	1	1%	1%
Starry Flounder	8.3%	5.0%	85,352	1	1%	13%	7.5%	128,028	1	1%	3%
Other Flatfish	1.9%	10.0%	1,036,583				15.0%	1,554,874			
Other Fish	1.5%	5.0%	753,613				7.5%	1,130,419			

Table 11. New GAC <u>control</u> limit options compared to per <u>permit</u> shares of assumed trawl allocations and amounts landed by harvesting entities from 2004 through 2006.

-		New GAC Control Limit Option 1					New GAC Control Limit Option 2				
Species group	MAX Share of Trawl Allocation (04-06)	Option 1 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)	Option 2 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Permits Over Limit	Percent of Permits Over Limit	Percent of Landings Over Limit (04-06)
Aggregate Non-whiting Groundfish	1.8%	1.0%	1,073,251	4	3%	3%	1.5%	1,609,877	3	2%	1%
LINGCOD - coastwide	1.1%		30,158					39,296			
N. of 42° (OR & WA)	1.0%	2.4%	27,540				3.0%	34,425			
S. of 42° (CA)	21.0%	4.3%	2,618	14	25%	16%	8.0%	4,870	5	9%	6%
Pacific Cod	7.2%	6.4%	285,954	1	1%	1%	6.0%	268,082	1	1%	1%
Sablefish (Coastwide)	4.1%		102,729	4	3%	4%		141,346	2	1%	3%
N. of 36° (Monterey north)	4.3%	1.0%	77,234	28	20%	7%	1.5%	115,852	2	1%	3%
S. of 36° (Conception area)	22.0%	10.0%	25,494	3	25%	27%	10.0%	25,494	3	25%	27%
PACIFIC OCEAN PERCH	3.1%	2.7%	25,221	1	1%	1%	3.7%	34,562			
WIDOW ROCKFISH	6.8%	4.5%	25,699	1	1%	4%	6.0%	34,266	1	1%	1%
Chilipepper Rockfish	0.5%	6.2%	218,698				10.0%	352,739			
Splitnose Rockfish	8.5%	5.7%	55,034	1	3%	3%	10.0%	96,551			
Yellowtail Rockfish	0.6%	2.8%	219,315				5.2%	407,300			
Shortspine Thornyhead	3.6%	1.1%	26,869	12	9%	6%	1.8%	43,968	5	4%	2%
Shortspine Thornyhead - N. of 34°27'	4.0%	1.3%	27,055	5	5%	6%	2.2%	45,785	2	2%	3%
Shortspine Thornyhead - S. of 34°27'	16.0%	4.2%	15,184	17	40%	28%	8.8%	31,815	3	7%	4%
Longspine Thornyhead	2.0%	1.4%	72,461	10	8%	4%	3.7%	191,504			
Longspine Thornyhead - N. of 36°	2.0%	1.4%	72,160	10	8%	4%	2.2%	113,394			
DARKBLOTCHED	3.7%	2.0%	10,863	18	14%	8%	3.1%	16,837	3	2%	1%
Minor Rockfish North											
Shelf HG	3.1%	2.9%	37,133	1	1%	1%	2.2%	28,170	1	1%	5%
Slope HG	3.5%	2.0%	41,429	2	2%	3%	3.0%	62,144	1	1%	1%
Minor Rockfish South											
Shelf HG	1.7%	6.1%	14,403				10.0%	23,611			
Slope HG	12.1%	5.8%	51,476	4	9%	16%	10.0%	88,751	2	5%	3%
Dover Sole	5.7%	1.1%	171,958	55	39%	14%	1.6%	250,120	14	10%	4%
English Sole	2.3%	1.5%	97,389	3	2%	2%	2.6%	168,808			
Petrale Sole	5.9%	1.4%	80,986	40	29%	22%	2.3%	133,048	12	9%	9%
Arrowtooth Flounder	8.3%	1.9%	230,802	7	6%	18%	3.2%	388,719	3	2%	10%
Starry Flounder	8.3%	10.0%	170,704				5.5%	93,887	1	1%	11%
Other Flatfish	1.9%	1.3%	134,756	4	3%	1%	2.0%	207,317			
Other Fish	1.5%	2.5%	376,806				9.0%	1,356,503			

Table 12. Existing control limit options compared to per entity shares of assumed trawl allocations and amounts landed by harvesting entities from 2004 through 2006.

-		Existing Control Limit Option 1					Existing Control Limit Option 2				
Species group	MAX Share of Trawl Allocation (04-06)	Option 1 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Entities Over Limit	Percent of Entities Over Limit	Percent of Landings Over Limit (04-06)	Option 2 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Entities Over Limit	Percent of Entities Over Limit	Percent of Landings Over Limit (04-06)
Aggregate Non-whiting Groundfish	2.0%	1.5%	1,609,877	6	5%	1%	2.2%	2,361,153			
LINGCOD - coastwide	1.3%		60,420					90,630			
N. of 42° (OR & WA)	1.4%	5.0%	57,376				7.5%	86,063			
S. of 42° (CA)	23.8%	5.0%	3,044	9	20%	14%	7.5%	4,566	6	13%	7%
Pacific Cod	7.2%	5.0%	223,401	5	7%	3%	7.5%	335,102			
Sablefish (Coastwide)	4.1%		167,216	6	6%	4%		250,824	3	3%	1%
N. of 36° (Monterey north)	4.3%	2.0%	154,469	6	6%	5%	3.0%	231,703	5	5%	1%
S. of 36° (Conception area)	36.2%	5.0%	12,747	3	38%	68%	7.5%	19,121	3	38%	55%
PACIFIC OCEAN PERCH	3.4%	5.0%	46,705				7.5%	70,057			
WIDOW ROCKFISH	6.8%	3.4%	19,417	4	5%	8%	5.1%	29,126	1	1%	3%
Chilipepper Rockfish	0.5%	5.0%	176,370				7.5%	264,554			
Splitnose Rockfish	8.5%	5.0%	48,276	4	14%	7%	7.5%	72,413	1	4%	1%
Yellowtail Rockfish	0.6%	5.0%	391,635				7.5%	587,452			
Shortspine Thornyhead	3.6%	3.1%	75,722	3	3%	0%	4.7%	114,805			
Shortspine Thornyhead - N. of 34°27'	4.0%	4.8%	99,894				7.2%	149,841			
Shortspine Thornyhead - S. of 34°27'	19.9%	4.7%	16,992	11	32%	37%	7.1%	25,669	6	18%	22%
Longspine Thornyhead	3.7%	2.0%	103,516	4	5%	5%	3.0%	155,274	1	1%	1%
Longspine Thornyhead - N. of 36°	3.7%	2.0%	103,086	4	5%	5%	3.0%	154,629	1	1%	1%
DARKBLOTCHED	6.8%	5.0%	27,157				7.5%	40,736			
Minor Rockfish North											
Shelf HG	3.1%	4.0%	51,218				6.0%	76,827			
Slope HG	3.5%	5.0%	103,573				7.5%	155,360			
Minor Rockfish South											
Shelf HG	1.7%	5.0%	11,806				7.5%	17,709			
Slope HG	12.1%	5.0%	44,376	5	14%	19%	7.5%	66,564	4	11%	9%
Dover Sole	5.7%	1.8%	281,385	16	15%	12%	2.7%	422,078	9	8%	5%
English Sole	2.3%	10.0%	649,261				15.0%	973,891			
Petrale Sole	5.9%	2.9%	167,756	9	9%	9%	4.4%	254,527	7	7%	2%
Arrowtooth Flounder	8.3%	5.0%	607,373	3	3%	6%	7.5%	911,059	1	1%	1%
Starry Flounder	8.3%	5.0%	85,352	1	2%	13%	7.5%	128,028	1	2%	3%
Other Flatfish	2.6%	10.0%	1,036,583				15.0%	1,554,874			
Other Fish	1.5%	5.0%	753,613				7.5%	1,130,419			

Table 13. New GAC control limit options compared to per entity shares of assumed trawl allocations and amounts landed by harvesting entities from 2004 through 2006.

-		New GAC Control Limit Option 1					New GAC Control Limit Option 2				
Species group	MAX Share of Trawl Allocation (04-06)	Option 1 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Entities Over Limit	Percent of Entities Over Limit	Percent of Landings Over Limit (04-06)	Option 2 Control Limit	Control Limit in Pounds (04-06 Avg)	Number of Entities Over Limit	Percent of Entities Over Limit	Percent of Landings Over Limit (04-06)
Aggregate Non-whiting Groundfish	2.0%	1.0%	1,073,251	11	10%	7%	1.5%	1,609,877	6	5%	1%
LINGCOD - coastwide	1.3%		30,158					39,296			
N. of 42° (OR & WA)	1.4%	2.4%	27,540				3.0%	34,425			
S. of 42° (CA)	23.8%	4.3%	2,618	14	31%	18%	8.0%	4,870	5	11%	7%
Pacific Cod	7.2%	6.4%	285,954	1	1%	1%	6.0%	268,082	1	1%	1%
Sablefish (Coastwide)	4.1%		102,729	20	19%	11%		141,346	7	6%	6%
N. of 36° (Monterey north)	4.3%	1.0%	77,234	30	28%	18%	1.5%	115,852	15	14%	9%
S. of 36° (Conception area)	36.2%	10.0%	25,494	3	38%	43%	10.0%	25,494	3	38%	43%
PACIFIC OCEAN PERCH	3.4%	2.7%	25,221	2	2%	2%	3.7%	34,562			
WIDOW ROCKFISH	6.8%	4.5%	25,699	1	1%	4%	6.0%	34,266	1	1%	1%
Chilipepper Rockfish	0.5%	6.2%	218,698				10.0%	352,739			
Splitnose Rockfish	8.5%	5.7%	55,034	2	7%	4%	10.0%	96,551			
Yellowtail Rockfish	0.6%	2.8%	219,315				5.2%	407,300			
Shortspine Thornyhead	3.6%	1.1%	26,869	19	19%	14%	1.8%	43,968	9	9%	6%
Shortspine Thornyhead - N. of 34°27'	4.0%	1.3%	27,055	12	14%	10%	2.2%	45,785	4	5%	4%
Shortspine Thornyhead - S. of 34°27'	19.9%	4.2%	15,184	15	44%	41%	8.8%	31,815	5	15%	15%
Longspine Thornyhead	3.7%	1.4%	72,461	12	14%	12%	3.7%	191,504			
Longspine Thornyhead - N. of 36°	3.7%	1.4%	72,160	12	14%	12%	2.2%	113,394	4	5%	4%
DARKBLOTCHED	6.8%	2.0%	10,863	15	15%	10%	3.1%	16,837	5	5%	3%
Minor Rockfish North											
Shelf HG	3.1%	2.9%	37,133	1	1%	1%	2.2%	28,170	1	1%	6%
Slope HG	3.5%	2.0%	41,429	2	2%	3%	3.0%	62,144	1	1%	1%
Minor Rockfish South											
Shelf HG	1.7%	6.1%	14,403				10.0%	23,611			
Slope HG	12.1%	5.8%	51,476	4	11%	16%	10.0%	88,751	2	6%	3%
Dover Sole	5.7%	1.1%	171,958	44	41%	27%	1.6%	250,120	24	22%	14%
English Sole	2.3%	1.5%	97,389	5	5%	3%	2.6%	168,808			
Petrale Sole	5.9%	1.4%	80,986	36	35%	27%	2.3%	133,048	15	14%	13%
Arrowtooth Flounder	8.3%	1.9%	230,802	8	8%	21%	3.2%	388,719	3	3%	11%
Starry Flounder	8.3%	10.0%	170,704				5.5%	93,887	1	2%	11%
Other Flatfish	2.6%	1.3%	134,756	4	4%	4%	2.0%	207,317	2	2%	1%
Other Fish	1.5%	2.5%	376,806				9.0%	1,356,503			

Fairness and Equity

There are a variety of factors that may affect the perceived fairness and equity of a program. In **Table 1** we identified a number of criteria that might be considered. Vessel limits that prevent vessels from achieving their recent harvest levels or from experiencing benefits sufficient to compensate for program costs may be viewed as unfair and inequitable. Level of vessel harvest relative to recent years was addressed above in the sections on efficiency and disruption. Control limits that allow for the exertion of market power, reduce independence, reduce the revenue of fishing businesses, or reduce initial allocations may also be viewed by some as inequitable. The first two of these factors are addressed in previous sections. In this section the focus will be on the effect of the control limits on the revenue of fishing businesses and initial allocations.

For a number of species, many of the control limits in the proposed options are likely to place a substantial constraint on business revenue (Table 14). The maximum revenue per entity (aggregate nonwhiting species), based on permit revenue for 2004-2006, was $1,163,000. Under the most liberal of the control limit options (existing Option 2), the maximum revenue (assuming proportional distribution among all species) would be $1,014,000. Under all of the other options, the maximum revenue would be at least 40% less than the recent historic average. The recent individual species exvessel revenues for which reductions would be anticipated, no matter which option is selected, are highlighted in grey in the first column of numbers in Table 14. Some of the species for which substantial revenue reductions stand out are sablefish north, shortspine thornyheads south, Dover sole, and Petrale sole.

The Council has decided that there will be no grandfather clause, and possibly that those that would receive an allocation over the control limit will not be allowed to receive and then divest to get themselves under the control limit (see "Disposition of QS in Excess of Limits—Initial Allocation"). Under such circumstances, any allocation that would be in excess of the control limits will be redistributed to those under those limits. Section 303A(c)(5)(A) of the MSA requires consideration of current and historical harvests, investments and dependence on the fishery, among other factors, in determining what might be a fair and equitable allocation. The effect of the control limits and absence of a grandfather clause on the allocations resulting from the initial allocation formulas need to be taken into account as part of the Council deliberations. This section is intended to fulfill that requirement.

The number of occurrences of those who, with a grandfather clause, would receive QS in excess of the control limits are provided in Table 15 and Table 16. The most constraining of the existing options (existing Option 1) would, for aggregate nonwhiting QS, affect 8 entities and result in the redistribution of 8.1% of the QS Table 15. The most constraining of the new GAC options (Option 1) would, for aggregate nonwhiting QS, affect 25 entities and result in the redistribution of twice the amount of QS, 16.0% (Table 16). Under the existing control limit Option 1, for the following species over 15% of the QS would be reallocated to those under the limits: sablefish south and starry flounder. For these species between 3 or 4 entities would be affected Under the new GAC control limit Option 1, for the following species over 15% of the QS would be reallocated to those under the limits: sablefish north and south, arrowtooth flounder, starry flounder and other flatfish.

Table 14. Maximum revenue of entities by option (shaded cells show largest values for all options) and maximum revenue for a single year for 2004-2006.

Species Category	Historic Maximum Annual Revenue Per Entity (Thousands of Dollars)	Maximum Possible Revenue of Entities By Option Based on Assumed Trawl Allocations and 2006 Prices and OYs (Thousands of Dollars)			
	'04-'06	Existing Option 1	Existing Option 2	New GAC Option 1	New GAC Option 2
Nonwhiting Groundfish Species	1,163	691	1,014	461	691
Lingcod - coastwide					
N. of 42° (OR & WA)	8	46	69	22	28
S. of 42° (CA)	7	3	4	2	5
Pacific Cod	178	85	127	108	102
Pacific whiting (shoreside)	1,422				
Sablefish (Coastwide)					
N. of 36° (Monterey north)	409	203	304	101	152
S. of 36° (Conception area)	86	12	18	25	25
PACIFIC OCEAN PERCH	16	22	33	12	16
WIDOW ROCKFISH	16	9	13	11	15
Chilipepper Rockfish	11	108	162	134	217
Splitnose Rockfish	27	14	22	16	29
Yellowtail Rockfish	25	161	241	90	167
Shortspine Thornyhead - coastwide					
N. of 34°27'	75	85	127	23	39
S. of 34°27'	115	14	21	12	25
Longspine Thornyhead - coastwide					
N. of 34°27'	97	60	91	42	67
DARKBLOTCHED	15	13	19	5	8
Minor Rockfish North	34				
Shelf Species	13	23	35	17	13
Slope Species	34	49	74	20	29
Minor Rockfish South	53				
Shelf Species	2	8	12	9	15
Slope Species	53	24	37	28	49
Dover sole (total)	333	106	160	65	95
English Sole	49	214	321	32	56
Petrale Sole (coastwide)	340	170	257	82	135
Arrowtooth Flounder (total)	110	67	100	25	43
Starry Flounder	57	34	52	69	38
Other Flatfish	102	344	515	45	69
Other Fish	34	89	134	45	161

Table 15 Number of entities receive QS in excess of <u>existing control limit options</u> and amount of QS in excess (QS Allocated 90%* based on harvest history with equal sharing.

			Existing Control Limit Option 1			Existing Control Limit Option 2		
	Number of Entities Receiving QS	MAX QS Alloc.	Option 1 Control Limit	Number of Entities Over the Limit	Total QS Over the Limit	Option 2 Control Limit	Number of Entities Over the Limit	Total QS Over the Limit
Aggregate Non-whiting Groundfish	121	4.6%	1.5%	8	8.1%	2.2%	4	4.2%
LINGCOD - coastwide	121	4.6%	5.0%			7.5%		
N. of 42° (OR & WA)	121	4.2%	5.0%			7.5%		
S. of 42° (CA)	121	6.2%	5.0%	1	1.2%	7.5%		
Pacific Cod	121	10.2%	5.0%	3	9.5%	7.5%	2	4.3%
Sablefish (Coastwide)	121	4.3%	1.9%	5	4.7%	2.9%	1	1.4%
N. of 36° (Monterey north)	121	4.3%	2.0%	4	3.9%	3.0%	1	1.3%
S. of 36° (Conception area)	121	28.9%	5.0%	3	33.6%	7.5%	2	27.4%
PACIFIC OCEAN PERCH	117	5.0%	5.0%	1	0.0%	7.5%		
WIDOW ROCKFISH	121	5.1%	3.4%	1	1.7%	5.1%	1	0.0%
Chilipepper Rockfish	121	8.8%	5.0%	6	14.2%	7.5%	3	2.5%
Splitnose Rockfish	121	9.4%	5.0%	5	14.6%	7.5%	3	3.8%
Yellowtail Rockfish	121	6.2%	5.0%	1	1.2%	7.5%		
Shortspine Thornyhead	121	4.0%	3.1%	1	0.9%	4.7%		
Shortspine Thornyhead - N. of 34°27'	121	4.1%	4.8%			7.2%		
Shortspine Thornyhead - S. of 34°27'	121	12.9%	4.7%	3	10.8%	7.1%	1	5.8%
Longspine Thornyhead	121	4.2%	2.0%	5	6.5%	3.0%	4	2.4%
Longspine Thornyhead - N. of 36°	121	4.2%	2.0%	5	6.5%	3.0%	4	2.4%
DARKBLOTCHED	121	4.5%	5.0%			7.5%		
Minor Rockfish North	121	3.7%	5.0%			7.5%		
Shelf HG	121	4.3%	4.0%	1	0.3%	6.0%		
Slope HG	121	3.7%	5.0%			7.5%		
Minor Rockfish South	121	11.9%	5.0%	3	9.9%	7.5%	1	4.4%
Shelf HG	121	7.5%	5.0%	4	7.8%	7.5%		
Slope HG	121	12.0%	5.0%	3	10.0%	7.5%	1	4.5%
Dover Sole	121	4.5%	1.8%	4	6.8%	2.7%	3	3.4%
English Sole	121	6.8%	10.0%			15.0%		
Petrale Sole	121	4.4%	2.9%	3	2.2%	4.4%	1	0.0%
Arrowtooth Flounder	121	5.6%	5.0%	2	0.7%	7.5%		
Starry Flounder	121	27.4%	5.0%	4	26.9%	7.5%	1	19.9%
Other Flatfish	121	8.3%	10.0%			15.0%		
Other Fish	121	6.4%	5.0%	2	2.4%	7.5%		

* Relative lbs: Drop 3 years for non-whiting harvesters, 2 years for shoreside whiting harvesters.
Overfished species are allocated based on old bycatch rate method (to be replaced by new method, after clarification is received from the Council).

Table 16. Number of entities receive QS in excess of <u>new GAC control limit options</u> and amount of QS in excess (QS allocated 90%* based on harvest history with equal sharing).

Total Harvesters' + Buyers' Allocation			New GAC Control Limit Option 1			New GAC Control Limit Option 2		
	Number of Entities Receiving QS	MAX QS Alloc.	Option 1 Control Limit	Number of Entities Over the Limit	Total QS Over the Limit	Option 2 Control Limit	Number of Entities Over the Limit	Total QS Over the Limit
Aggregate Non-whiting Groundfish	121	4.6%	1.0%	25	16.0%	1.5%	8	8.1%
LINGCOD - coastwide								
N. of 42° (OR & WA)	121	4.2%	2.4%	2	2.4%	3.0%	1	1.2%
S. of 42° (CA)	121	6.2%	4.3%	2	2.2%	8.0%		
Pacific Cod	121	10.2%	6.4%	2	6.5%	6.0%	2	7.3%
Sablefish (Coastwide)								
N. of 36° (Monterey north)	121	4.3%	1.0%	23	15.8%	1.5%	9	7.0%
S. of 36° (Conception area)	121	28.9%	10.0%	2	22.4%	10.0%	2	22.4%
PACIFIC OCEAN PERCH	117	5.0%	2.7%	3	4.6%	3.7%	2	2.4%
WIDOW ROCKFISH	121	5.1%	4.5%	1	0.6%	6.0%		
Chilipepper Rockfish	121	8.8%	6.2%	5	7.9%	10.0%		
Splitnose Rockfish	121	9.4%	5.7%	5	11.1%	10.0%		
Yellowtail Rockfish	121	6.2%	2.8%	2	4.0%	5.2%	1	1.0%
Shortspine Thornyhead								
Shortspine Thornyhead - N. of 34°27'	121	4.1%	1.3%	18	11.3%	2.2%	3	3.1%
Shortspine Thornyhead - S. of 34°27'	121	12.9%	4.2%	3	12.3%	8.8%	1	4.1%
Longspine Thornyhead								
Longspine Thornyhead - N. of 36°	121	4.2%	1.4%	14	12.6%	2.2%	4	5.6%
DARKBLOTCHED	121	4.5%	2.0%	6	5.7%	3.1%	2	2.7%
Minor Rockfish North								
Shelf HG	121	4.3%	2.9%	3	2.6%	2.2%	5	5.0%
Slope HG	121	3.7%	2.0%	8	7.0%	3.0%	3	1.6%
Minor Rockfish South								
Shelf HG	121	7.5%	6.1%	4	3.4%	10.0%		
Slope HG	121	12.0%	5.8%	3	7.6%	10.0%	1	2.0%
Dover Sole	121	4.5%	1.1%	17	14.2%	1.6%	8	7.9%
English Sole	121	6.8%	1.5%	11	13.1%	2.6%	4	5.6%
Petrale Sole	121	4.4%	1.4%	12	9.4%	2.3%	3	4.0%
Arrowtooth Flounder	121	5.6%	1.9%	8	15.5%	3.2%	5	7.4%
Starry Flounder	121	27.4%	10.0%	1	17.4%	5.5%	3	25.1%
Other Flatfish	121	8.3%	1.3%	12	22.2%	2.0%	8	14.5%
Other Fish	121	6.4%	2.5%	7	10.2%	9.0%		

* Relative lbs: Drop 3 years for non-whiting harvesters, 2 years for shoreside whiting harvesters.
Overfished species are allocated based on old bycatch rate method (to be replaced by new method, after clarification is received from the Council).

Overfished Species Limits

While the existing accumulation limit options cover all of the overfished species, the GAC did not develop new options for overfished species. Further, additional guidance is needed from the Council regarding the geographic stratification used for the QS allocation formula that will be used for overfished species. This issue will be addressed under Agenda Item G.3. After the initial allocation formula is resolved, further analysis of the overfished species limit will be possible. However, in order to complete that analysis an assumption will need to be made regarding the allocation of overfished species between the shoreside whiting and nonwhiting fisheries (widow and darkblotched, in particular).

An approximation of the allocation between the shoreside nonwhiting and whiting sectors will be needed to complete the analysis and the final allocation between the shoreside sectors will be required prior to implementation. The allocation formula for nonwhiting QS allocated based on nonwhiting trips is quite different from the allocation formula for nonwhiting QS based on whiting trips. The two formulas cannot be combined. Therefore, there will be a separate calculation made for the QS for each of the sectors. These separate allocations will total to 100% and the allocations for the two sectors together will total to 200%. The allocations made for each sector will then have to be adjusted so that they sum to 100%. The allocation between the shoreside whiting and nonwhiting sectors will be used to achieve that adjustment. This is described in Table 18.

<table>
<tr><td colspan="2">Table 17. Use of the intersector allocation result to finalize the calculation of the catch history based portion of the QS allocation to the combined whiting and nonwhiting shoreside sector.</td></tr>
<tr><td colspan="2">Step 1. Conduct the QS allocation for each shoreside sector.</td></tr>
<tr><td>A. QS Allocation to Nonwhiting Harvesters

Allocate based on catch history for species or bycatch rate

Results sum to 100%</td><td>B. QS Allocation to Whiting Harvesters

Allocate pro rata based on whiting allocation

Results sum to 100%</td></tr>
<tr><td colspan="2">Step 2. Make the results add up to 100%</td></tr>
<tr><td colspan="2">Use the allocation to each sector to weight the QS allocated to each shoreside sector..

E.g. 60% to Nonwhiting

Multiply all individual allocations in A by 0.6

Multiply all individual allocations in B by 0.4</td></tr>
</table>

Note: Further adjustments would be needed to bring in the equal sharing component.

The following two graphs provide a preliminary look at the distribution of QS among permits in relation to the amount of target species QS they would receive. For the overfished species, there will be little incentive to try to accumulate more QP for use on a vessel because of the relatively small amount of additional revenue that will be generated. Harvesting operations will likely be most interested in making certain they have enough QP to cover their catch. Therefore the need for vessel use limits for overfished species may be limited. Additionally, if overfished species are typically caught in "lightning strikes" vessel use limits might inhibit a vessel from covering their landings and then being able to continue to fish. On the other hand, distribution of control of the QS for the overfished species is likely to be a sensitive issue. Thus the need for a vessel limit is minimal and there may be flexibility to consider smaller control limits for overfished species while allowing entities to control larger amounts of the primary target species.

The following figures illustrate the amounts of overfished species quota that might be allocated for three trawl-dominant overfished species. Each permit is represented by a dot and the points are distributed by the amount of overfished species and target species quota that would be issued based on 2006 OY levels and assumed trawl allocations. These graphs illustrate the likely distributions but do not take into account the more spatially refined allocation formula the Council adopted in November. The Council is expected to provide more guidance on that method at the March 2009 meeting (see Agenda Item G.3). Additional information on the recent landings of overfished species, by permit, is provided in Appendices A and B.

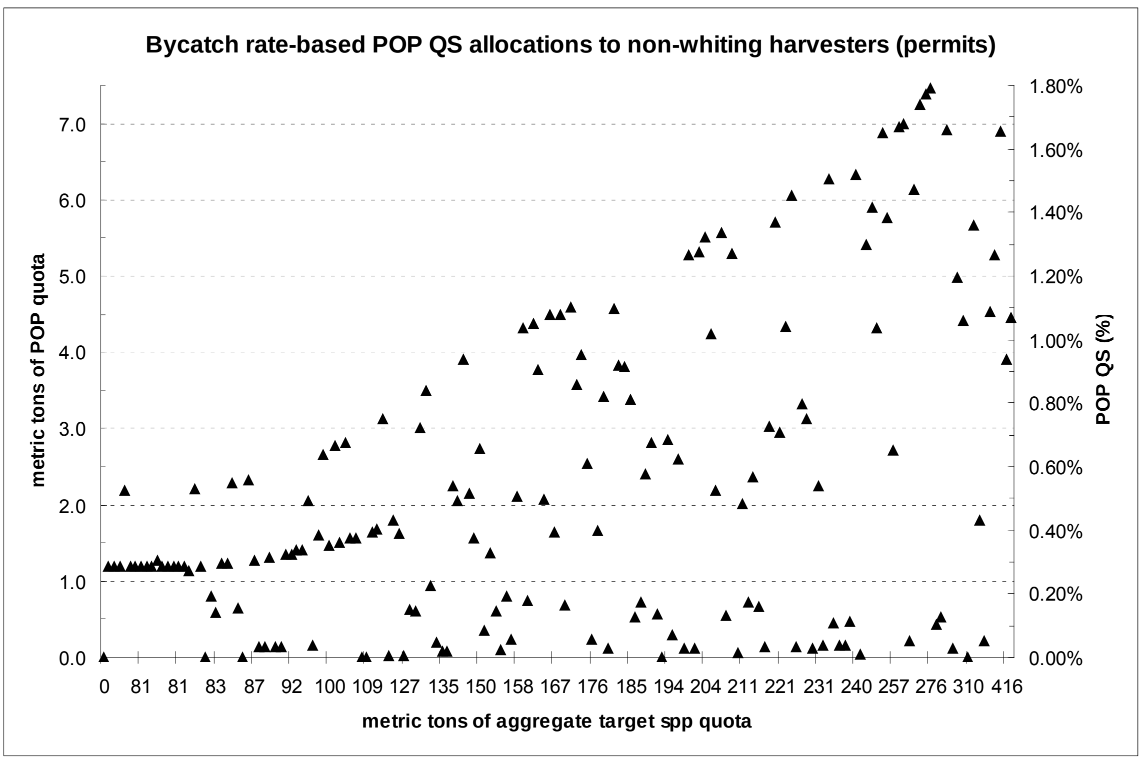


Figure 1. Distribution permits by the amount of Pacific Ocean perch quota and target species quota they would be expected to receive.

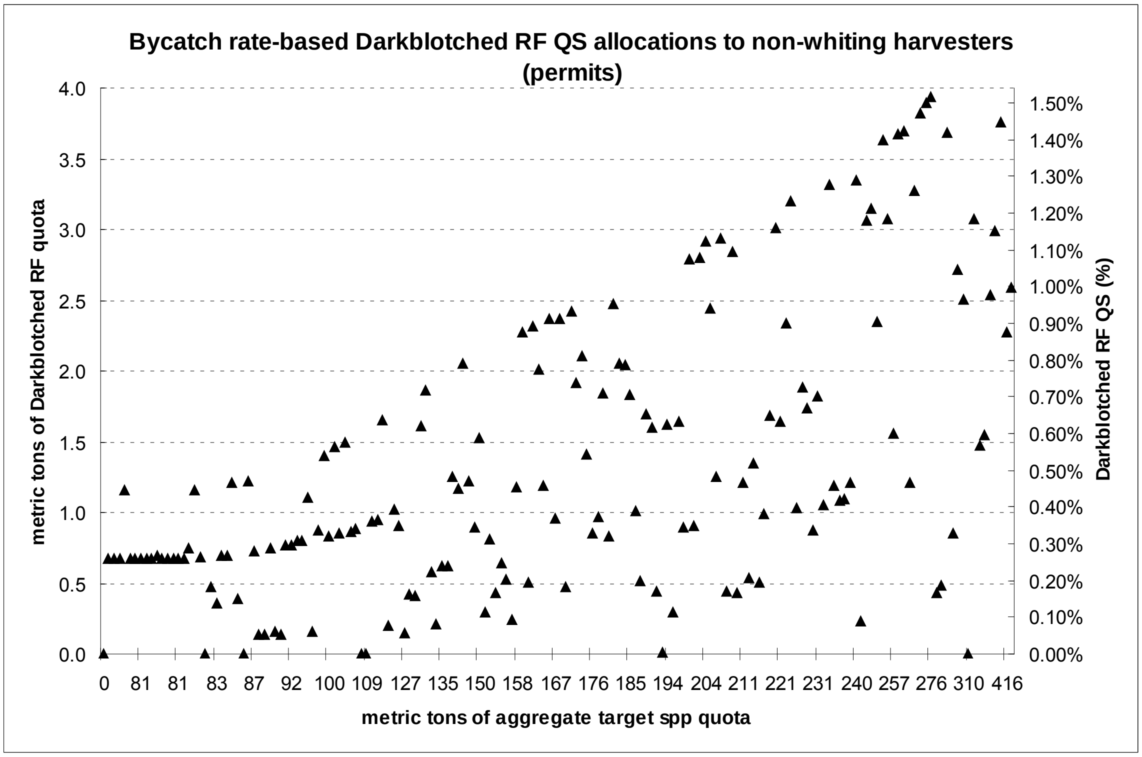


Figure 2. Distribution permits by the amount of darkblotched rockfish quota and target species quota they would be expected to receive.

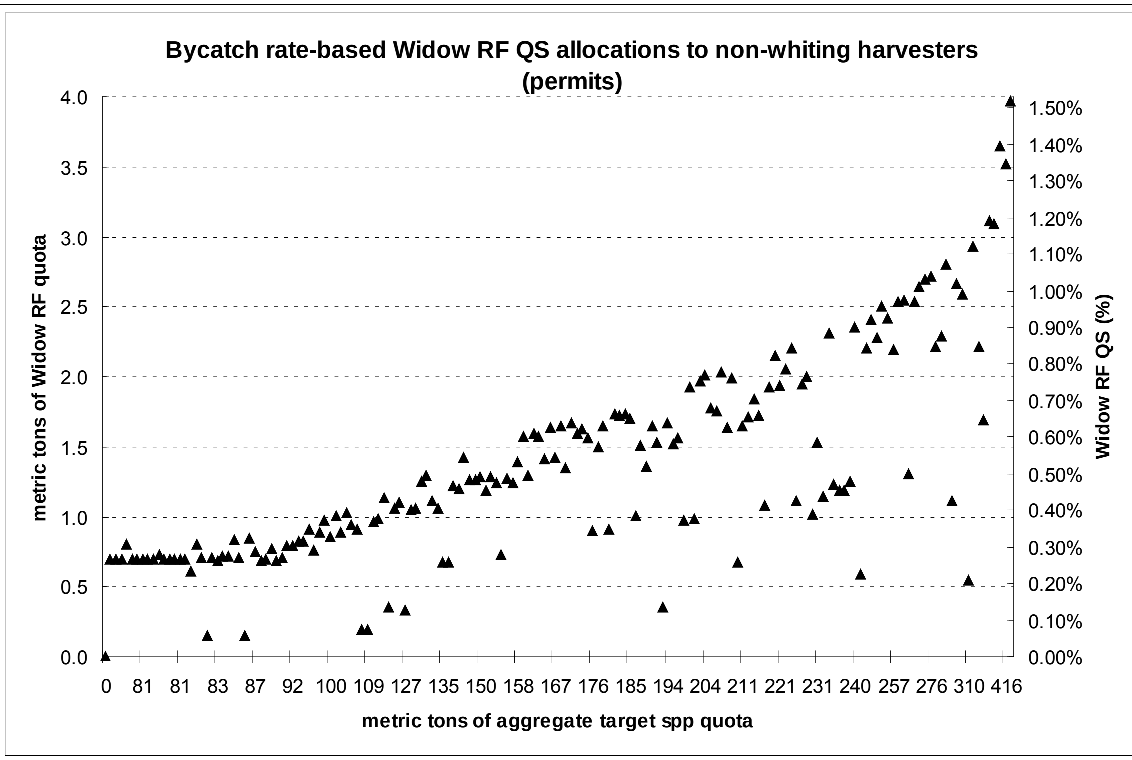


Figure 3. Distribution permits by the amount of widow rockfish quota and target species quota they would be expected to receive.

Whiting (Shoreside Sector Accumulation Limits)

The GAC report recommends a 10% control limit and 15% vessel use limit (Table 2). Additional information will be provided in the supplemental materials for the March 2009 Council meeting.

Whiting (Mothership Sector Accumulation Limits)

The final Council motion in November 2009 did not specify a preferred option with respect to the whiting mothership sector program, leaving this issue to be addressed at the same time as the accumulation limits for IFQs. The options under consideration were as follows. Related information is provided on pages B-54 through B-58 of Appendix B and Agenda Item F.3.c, Supplemental Additional Analysis (3). Information provided for the analysis of IFQs for the mothership sector may also be useful in this decision (pages A-308 through A-310). The GAC recommended the Council adopt a co-op program catcher vessel control accumulation limit of 15%. No vessel usage limit options were included for catcher vessels in the mothership sector. Additional information will be provided in the supplemental materials for the March 2009 Council meeting.

CV(MS) Permit Ownership: No individual or entity may own CV(MS) permits for which the allocation totals greater than:

Option 1: 10 percent,
Option 2: 15 percent, or
Option 3: 25 percent
Option 4: the amount of the largest current owner (no grandfather clause)

of the total mothership sector whiting allocation.
The alternatives do not specifically address how ownership of a permit will be evaluated however, the analysis assumed application of the same "individual and collective rule" that was applied for the IFQ program. Absent Council direction otherwise, this is likely the approach that will be specified in the draft regulations presented for deeming and in the programming that will be under development. This issue is presented here primarily as an information point and an opportunity to present guidance if another approach would be more desirable. In contrast to the approach taken in trawl rationalization, under the sablefish permit stacking program, if an entity had any ownership of a permit then the entire permit counted against its 3 permit cap.

Pacific Halibut Limits

To this point, accumulation limits have not been considered for halibut. The GAC has recommended that the Council consider such limits. For halibut, even more than for overfished species, there is not an incentive for vessels to accumulate halibut IBQ-QP since the catch of halibut provides no economic benefit. The main reasons a harvester would accumulate halibut IBQ quota shares would be to ensure that it had enough to cover its own harvest. However, some might try to accumulate QS as a means of either garnering a higher price for IBQ-QP or controlling access to target species.

The Council specified a formula for allocating halibut based on application of bycatch rates to target species QS. Some additional choices have yet to be made regarding the method that will be used for the allocation of halibut for the most southern areas. These will be discussed under Agenda Item G.3. For the purpose of this analysis, we are looking at the IBQ-QS allocations for the northern areas. Figure 4 shows the IBQ allocations per permit arrayed ordered along the horizontal axis according to the amount of QP allocation an entity would receive for Petrale sole and arrowtooth, the two species on which basis the halibut IBQ will be allocated. The IBQ-QS amount is indicated on the right hand vertical axis and the corresponding IBQ-QP amount, assuming 2006 conditions, is displayed on the left hand vertical axis.

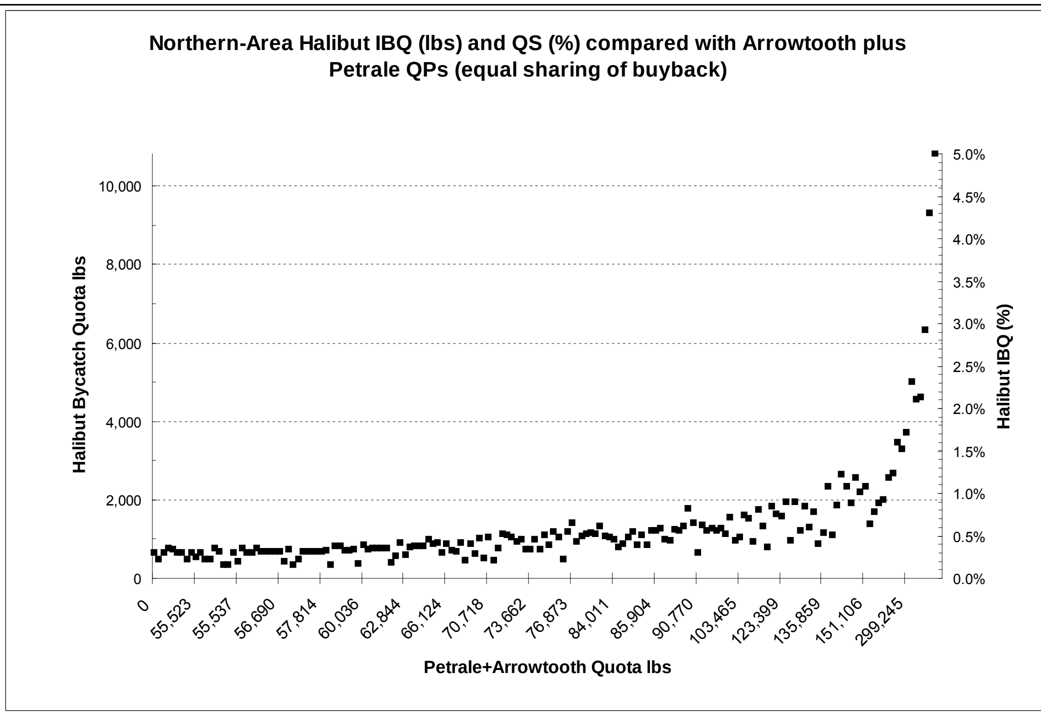


Figure 4. Amount of halibut IBQ quota pounds (left vertical axis) and quota shares (right vertical axis) permit (permits are arrayed from the smallest to greatest based on amount of Petrale sole and arrowtooth quota pounds allocated assuming 2006 OY levels.

The following describes how the trawl halibut allocation was calculated for 2006 (Table 18). The Council specified that up to 10% of the total halibut constant exploitable yield (CEY) would be allocated for the trawl fishery. The total CEY for 2006 was 1,710,000 pounds of legal sized dressed halibut. Ten percent of this was taken to get the trawl allocation of legal sized dressed pounds (Step 1). This was converted to round pounds by multiplying by a round to dressed conversion rate (Step 2). A report on the 2005 fishery indicated that the unweighted average portion of the trawl catch (legal and sublegal) relative to that which was of legal size was 1.62 (Wallace and Hastie, 2006). This ratio was applied assuming that it would have been available for use in the 2006 fishery and the total pounds available expanded on that basis (Step 3). Halibut IBQ will be for pounds caught, rather than mortality. Therefore, the mortality had to be converted to pounds caught. The most recent estimate for a the ratio of catch to mortality was 1.36% (Step 4).

Table 18. Steps for calculating trawl allocation of halibut for IBQ in 2006 based on NMFS report on the 2005 fishery.

		Factor	Pounds
	Total CEY (legals dressed weight)		1,710,000
1	Allocation times CEY	10%	171,000
2	Expand from dressed to round.	1.33	227,430
3	Expand by ratio of total weight (legal and sublegal) to legal weight (unweighted average)	1.62	369,264
4	Expand for total pounds by ratio of total catch to mortality (round pounds)	1.36	503,085

From the above it can be seen that if in addition to a control limit a vessel limit is established, a limit of 5% on IBQ-QS would accommodate the largest initial allocations Figure 4. Since the allocations are based on proportion in relation to target species, the shares should be distributed in a manner that allows vessels comparable access to the target species they are allocated. In order to evaluate whether the amounts of QS indicated would be enough to facilitate the target species these permits would be allocated, the highest average and lowest average bycatch rates have been applied to the pounds of Petrale and arrowtooth each entity would be expected to receive (based on initial allocations and 2006 OYs, upper and lower lines in Figure 5). From this, it appears that the amount of halibut bycatch allocated as a proportion of the Petrale and arrowtooth allocation would be within the range of observed bycatch rates using 2006 harvest levels.

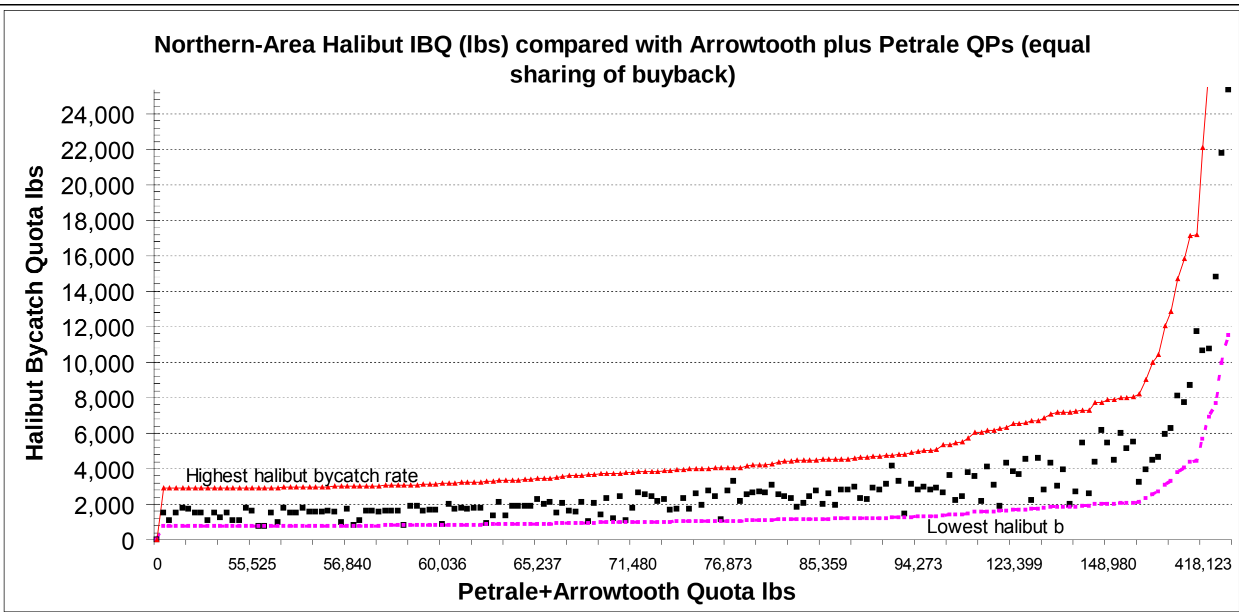


Figure 5. Amount of halibut IBQ quota pounds per permits (dots) based on 2006 harvest levels and amount of quota pounds needed assuming the highest average halibut bycatch rate used in the allocation formula (upper line) and lowest average bycatch rate used in the allocation formula lower line.

Disposition of QS in Excess of Limits—Initial Allocation

Since there is no grandfather clause some QS will not be allocated to entities that would otherwise receive amounts in excess of accumulation limits. Under the provisions as specified, that QS would be redistributed among those receiving less than the accumulation limits (in proportion to the allocations they receive). An alternative approach would be to provide an initial allocation of QS to entities, even if it is in excess of the limits, but require that they immediately divest themselves of that QS. There has been some uncertainty as to whether the decision on divesture was made when the Council decided not to have a grandfather clause. Therefore ***an opportunity is presented here for Council discussion.*** This issue is covered on pages A-239 through A-240 and A-265 through A-267 of Appendix A of the draft EIS.

On the one hand, if individuals are allowed to receive the full initial allocation and then divest themselves of the excess, they will benefit from the sale of the QS and may be able to direct the QS into the hands of those who are likely to continue to use it in a way that benefits the initial recipient (i.e. a potential opportunity is created to circumvent the control accumulation limits through disguised indirect control, e.g. side contracts or other conditions on the sale). On the other hand, if divestment is not allowed, it is likely that those with permits in excess of the limits will sell those permits in advance of the initial allocation to gain some financial benefits from the expected initial allocation. With respect to the opportunity to disguise control, if NMFS collects more information on transfers of QS than it does when permits are transferred and QS first issued, there might be greater opportunity to disguise indirect control of QS through permit transfers prior to the initial QS allocation.

The current analysis indicates that without a grandfather clause there is not much need for a **control date** on the acquisition of additional permits. However, if divestment is allowed, without a control date individuals will benefit from acquiring additional permits up to the time of initial allocation. Under such circumstances, the Council may wish to address whether or not a control date should be applied to permit acquisition. The application of a control date is discussed on pages A-237 and A-261 through A-264 of the EIS and two tables are provided here indicating the number of permits and amount of related QS that have been accumulated from January 1, 2004 (just after the existing control date) through January 1, 2008. Between January 1, 2004 to the fall of 2006, 36 entities exited the fishery and the individual holding permits representing the most QS increased from 1.35% to 4.06%. From the Fall of 2006 through January 1, 2008 the holdings of the entity with permits representing the most QS did not change. These values are only representative of the order of magnitude of the changes because the final allocation formula is somewhat different from that on which these tables are based.

Table 19. Summary of information on changes in permit ownership, amount of associated QS and maximum amounts of QS represented by entities acquiring and divesting themselves of permits between January 1, 2004 and January 1 2008 (QS allocations based on a 80-20 permit-processor split, equal sharing, a grandfather clause and shoreside processor recent participation requirement).

	Permit Ownership Dates		
	Jan 1, 2004	Fall 2006	Jan 1, 2008
Numbers of Entities Changing Permit Holdings			
Number of Entities Exiting After the Year	36	3	
Number of Remaining Entities Divesting Permits		-	1
Number of Existing Entities Acquiring Permits		6	2
Number of Entities Entering in the Year		15	2
Amount of Potential QS Transferred Through Permit Transfers			
QS Divested by Entitles Leaving the Fishery After the Previous Period		-15.0%	-2.0%
QS Divested by Entitles Remaining in the Fishery		-	-0.6%
QS Accumulated by Existing Entities		4.3%	0.7%
QS Acquired by Entities Entering in the Year		10.7%	1.9%
Amounts of Potential QS Held by (includes the 36 entities departing in 2004)			
Largest	1.35%	4.06%	4.06%
2nd largest	1.10%	3.33%	3.79%
3rd largest	0.79%	1.35%	1.35%
4th largest	0.76%	1.18%	1.32%
5th largest	0.71%	1.11%	0.97%
6th largest	0.70%	0.97%	0.81%

Table 20. Harvester shoreside aggregate non-whiting QS allocations to business entities acquiring or divesting themselves of permits between January 1, 2004, and January 1, 2008 (QS allocations based on a 80-20 permit-processor split, equal sharing, a grandfather clause and shoreside processor recent participation requirement).

	Permit Ownership Dates			Change in Initial QS Allocation					
				2004 to 2006		2006 to 2008		2004 to 2008	
BUSID	Jan 1, 2004	Fall 2006	Jan 1, 2008	Gained	Lost	Gained	Lost	Gained	Lost
B01	1.10%	4.06%	4.06%	Y				Y	
B02	0.63%	1.18%	0.63%	Y			Y		
B03	0.60%	0.81%	0.81%	Y				Y	
B04	0.42%	0.69%	0.69%	Y				Y	
B05	0.40%	0.47%	0.47%	Y				Y	
B06	0.39%	0.60%	0.60%	Y				Y	
B07	-	3.33%	3.79%	Y		Y		Y	
B08	-	1.11%	1.32%	Y		Y		Y	
B09	-	0.97%	0.97%	Y				Y	
B10	-	0.79%	0.79%	Y				Y	
B11	-	0.70%	0.70%	Y				Y	
B12	-	0.69%	0.69%	Y				Y	
B13	-	0.66%	0.66%	Y				Y	
B14	-	0.48%	0.48%	Y				Y	
B15	-	0.48%	0.48%	Y				Y	
B16	-	0.37%	0.37%	Y				Y	
B17	-	0.24%	0.24%	Y				Y	
B18	-	0.24%	0.24%	Y				Y	
B19	-	0.22%	0.22%	Y				Y	
B20	-	0.21%	0.21%	Y				Y	
B21	-	-	1.35%			Y		Y	
B22	-	-	0.55%			Y		Y	
B23	-	0.21%	-	Y			Y		
B24	1.35%	1.35%	-				Y		Y
B25	0.47%	0.47%	-				Y		Y
QS for 36 entities Departing After 2004	14.95%	-	-		Y				
TOTAL QS	20.3%	20.3%	20.3%						
Count	44	23	22	21	36	4	4	21	38
Number of entities acquiring permits		21	4						
Number of entities divesting of permits		36	4						

Note: Shaded cells indicate a change from one year to the next for entity that already owned a permit. Ownership changes estimated based on based on changes in ownership information for permits on record at the NMFS Limited Entry Permit office and may not reflect changes in control.

Disposition of QS in Excess of Limits—With Changes In the OY

The current options would provide accumulation limits for each individual species and an aggregate limit for all nonwhiting species. Increases or decreases in the OYs for individual species will not affect a QS owner's standing relative to being above or below the control limit for an individual species. However, a change in the OY for an individual species could push someone who is close the aggregate nonwhiting limit above it. It is currently left open for determination during implementation as to whether an entity that is pushed above the aggregate limit by a change in the OY would be allowed to retain their QS or would be required to divest themselves of that QS. ***The Council may wish to provide guidance on this issue or specify a method for calculating the aggregate under which changes in the OY would not change the person's aggregate QS holdings..***

Calculating the Aggregate and Effects of OY Changes. As currently analyzed, an entity's aggregate nonwhiting QS is evaluated by weighting the QS of each species using the expected trawl allocations and summing the results. For example, under this approach if the trawl allocation of Dover sole is 10,000 mt and the trawl allocation of Pacific cod is 1,000 mt, then an individual who holds 1% of the Dover sole QS and 2% of the Pacific cod QS would hold QS for 120 mt of a total of 11,000 mt (1.09% of the combined Dover sole and Pacific cod QS). In this example, either an increase in the Pacific cod OY or a decrease in the Dover sole OY would increase the combined QS holdings, as illustrated in the following table.

Table 21. Examples calculations showing how increases or decreases in the OY (represented as changes in the amounts allocated to the trawl fishery) may increase an entity's aggregate holdings.

	Trawl Allocation	Entity's QS Holdings	Entities QP
Starting point for the trawl allocation and entity's holdings (aggregate holdings 1.09%).			
Dover Sole	10,000 mt	1%	100 mt
Pacific cod	1,000 mt	2%	20 mt
Aggregate	11,000 mt	**1.09%** (120/11,000)	120 mt
Entity's aggregate increases with an **increase** in Pacific Cod OY (from 1.09% to 1.13%)			
Dover Sole	10,000 mt	1%	100 mt
Pacific cod	1,500 mt	2%	30 mt
Aggregate	11,500 mt	**1.13%** (130/11,500)	130 mt
Entity's aggregate increases with a **decrease** in Dover sole OY (from 1.09% to 1.17%)			
Dover sole	5,000 mt	1%	50 mt
Pacific cod	1,000 mt	2%	20 mt
Aggregate	6,000 mt	**1.17%** (70/6,000)	70 mt

Alternative Methods for Calculating the Aggregate. Under certain methods for calculating the aggregate a person's holdings would not change with a change in the OYs. Two examples are provided here.

Under one method **QS for all species would be weighted the same.** For example, the aggregate holdings of someone with 2% of the Dover sole QS and 1% of the Pacific cod QS would be the average (1.5% of the combined Dover sole and Pacific Cod QS). This would provide a more stable system and make it easier for QS holders to determine their aggregate. There would be no need to deal with situations in which QS holders are forced over the aggregate limit through no action of their own. However, there is also some reason to believe it could distort QS markets, putting a premium on the QS and participation in those strategies which require fewer different types of QS.

Under another method, **relative weights of the QS for each species would be set at a certain point in time but changed only through direct Council action** (i.e. would not automatically change whenever the OY or trawl allocation changes). This would provide a hybrid that preserves the relative weighting system currently being used in the analysis while providing the stability of the equal weighting approach. This would reduce the frequency with which QS holders are faced with an externally imposed change in their aggregate holdings but would still require QS holders to multiply their shares of each IFQ management unit by a factor in order to determine their aggregate holdings.

In the **BC system** the original plan was to use a relative weighting scheme based on price and to adjust the weights annually. However, they have left the same weighting in place since 1997 because significant alterations to the scheme could by default put a license over it cap, as is discussed here for QS (Personal Communication, Barry Ackerman, 2009). The updating of the BC weightings will be discussed later in the year within their advisory process and there is some expectation that there will be a change in the future.

APPENDIX A (Scattergrams, Shares)

MAXIMUM ANNUAL 2004-2006 LANDINGS COMPARED WITH VESSEL ACCUMULATION LIMITS BASED ON ANNUAL OYS

The attached figures display each permit's maximum annual landings (as a share of the assumed trawl allocation) for OY species during 2004-2006. The permits are arrayed in the same order in each graph, starting with permits with recent history only in the shoreside whiting fishery, then both the shoreside whiting and nonwhiting fisheries, and finally those that have recent history only in the shoreside nonwhiting fishery.

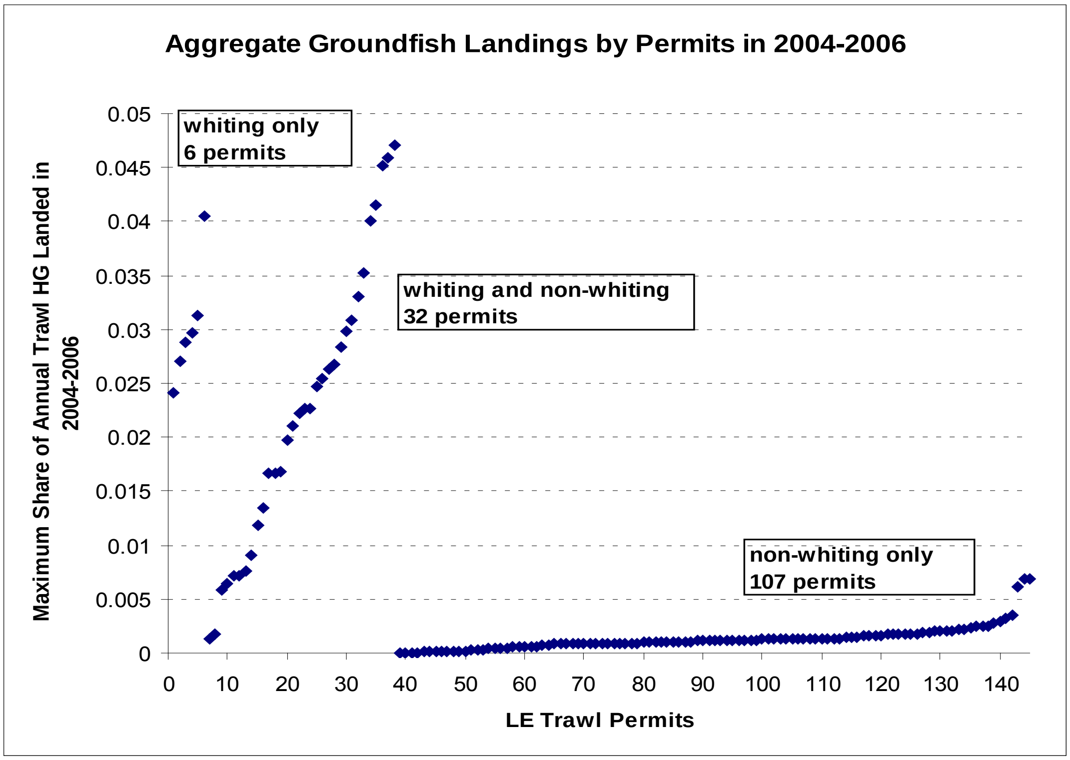


Figure 6. Maximum annual landings by permit as a share of the assumed summed groundfish trawl allocations, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

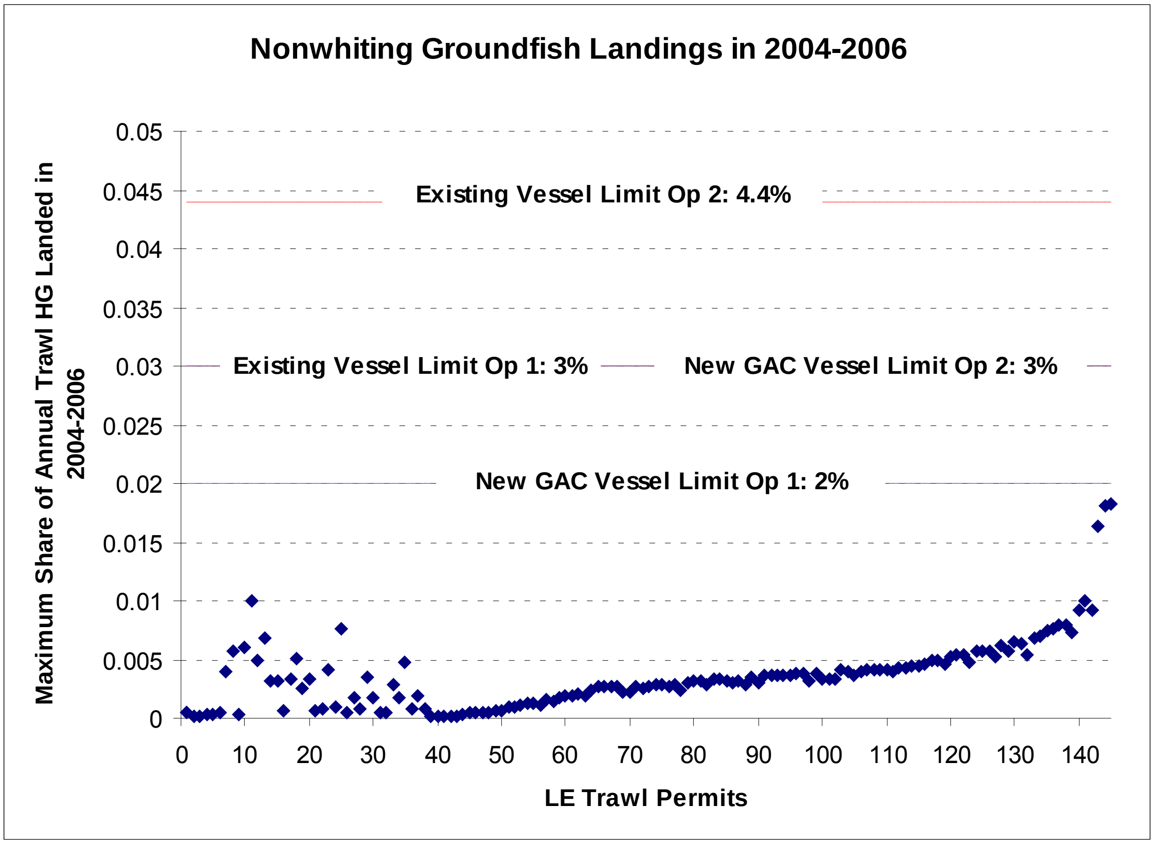


Figure 7. Maximum annual landings by permit as a share of the assumed nonwhiting groundfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

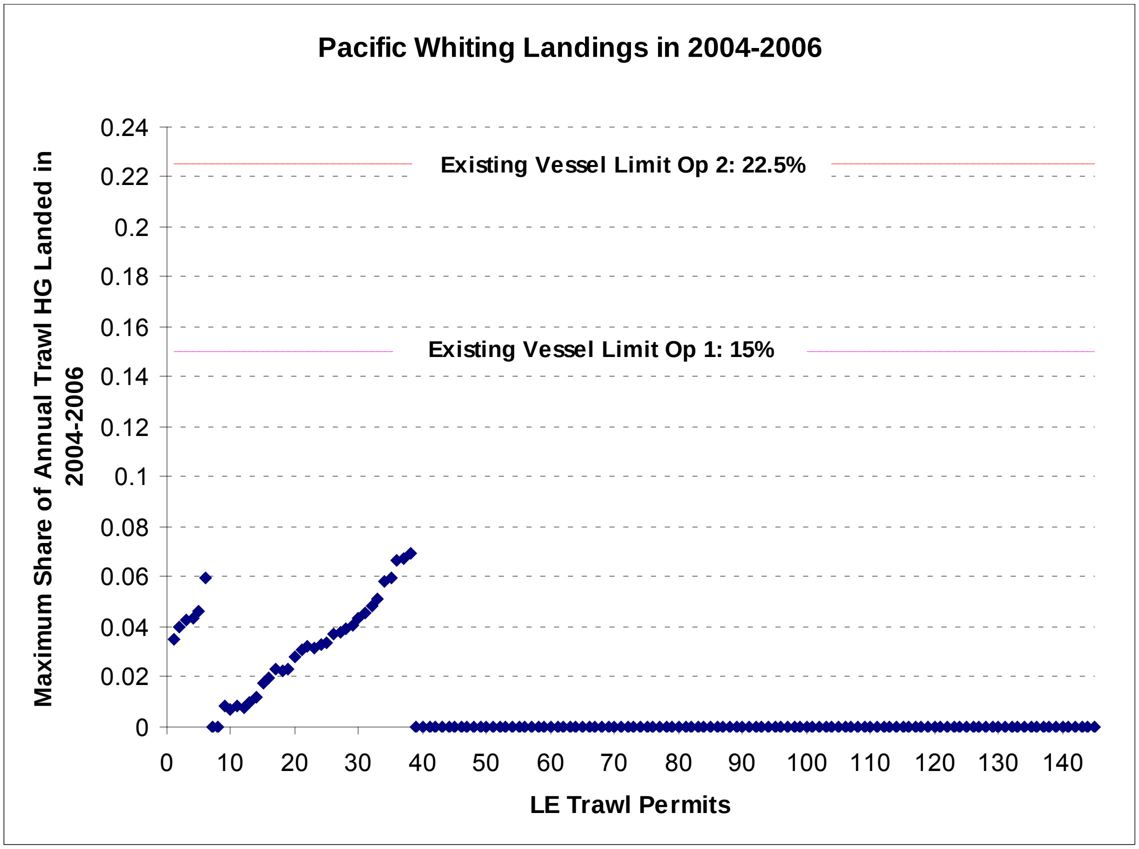


Figure 8. Maximum annual landings by permit as a share of the shoreside Pacific whiting trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

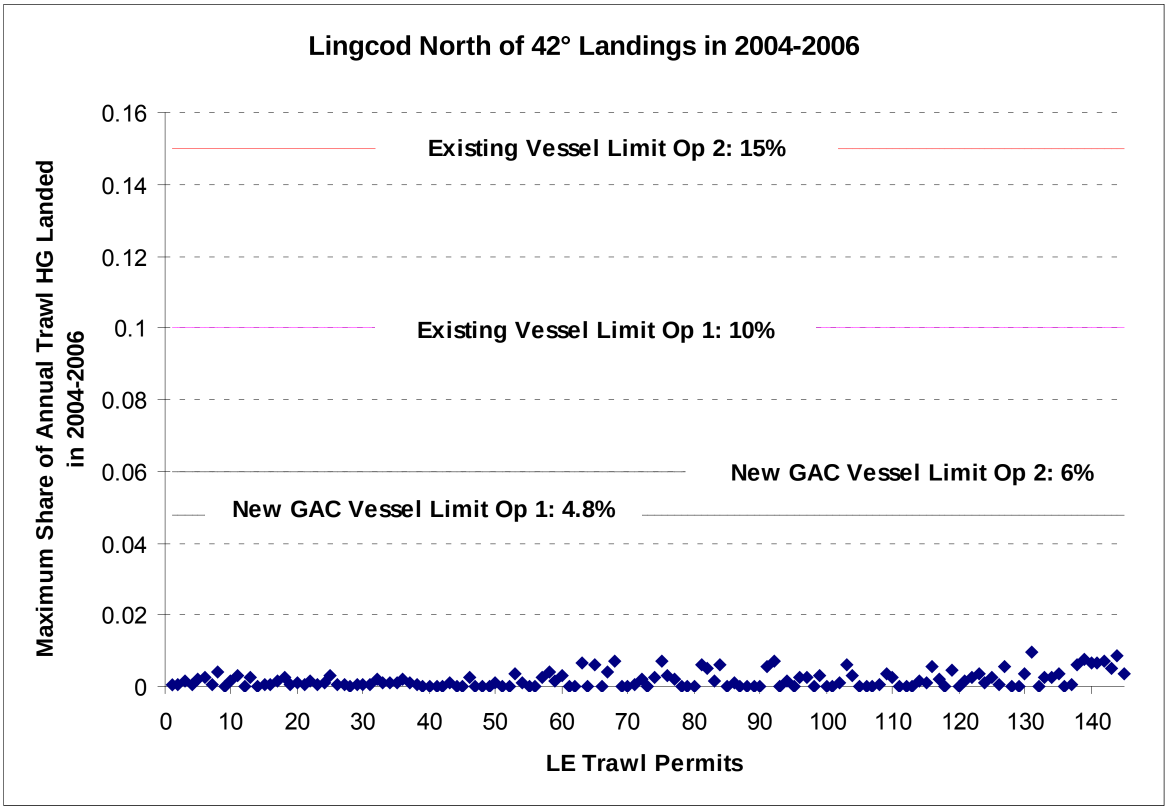


Figure 9. Maximum annual landings by permit as a share of the assumed lingcod north trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

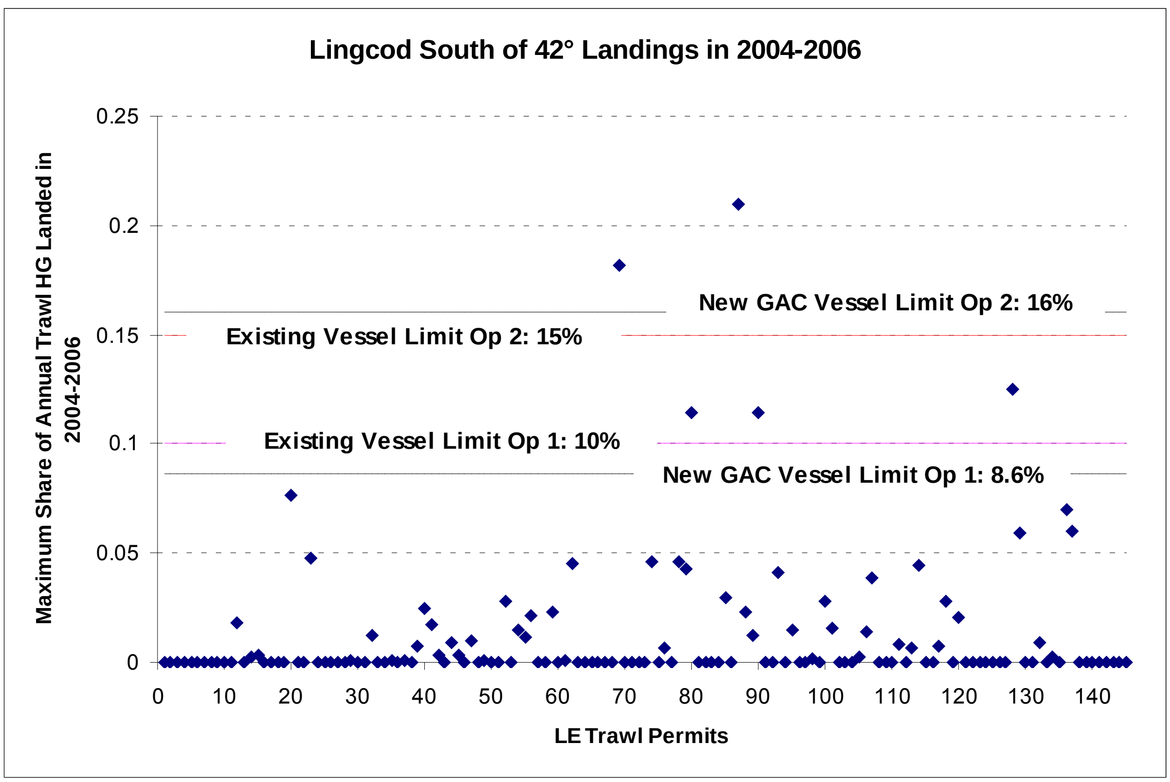


Figure 10. Maximum annual landings by permit as a share of the assumed lingcod south trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

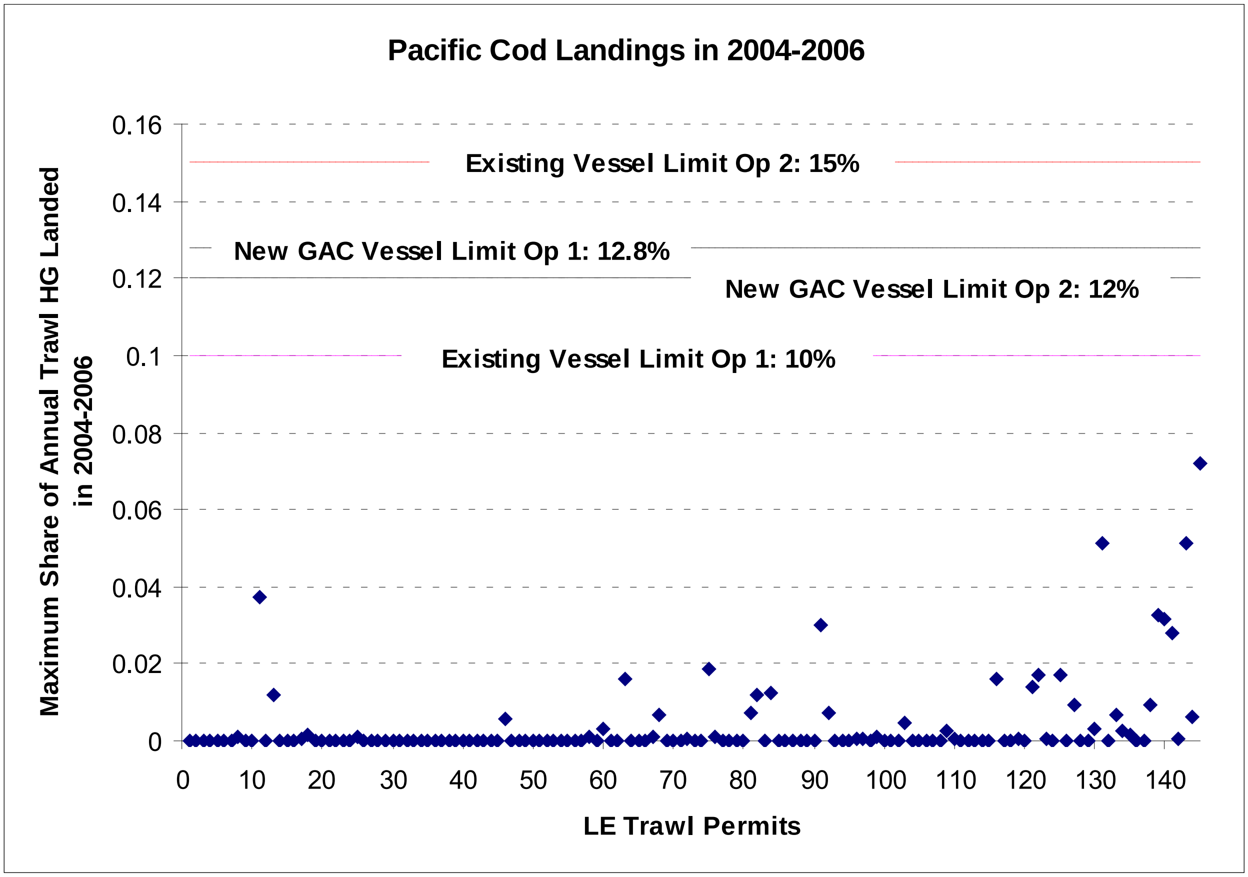


Figure 11. Maximum annual landings by permit as a share of the assumed Pacific cod trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

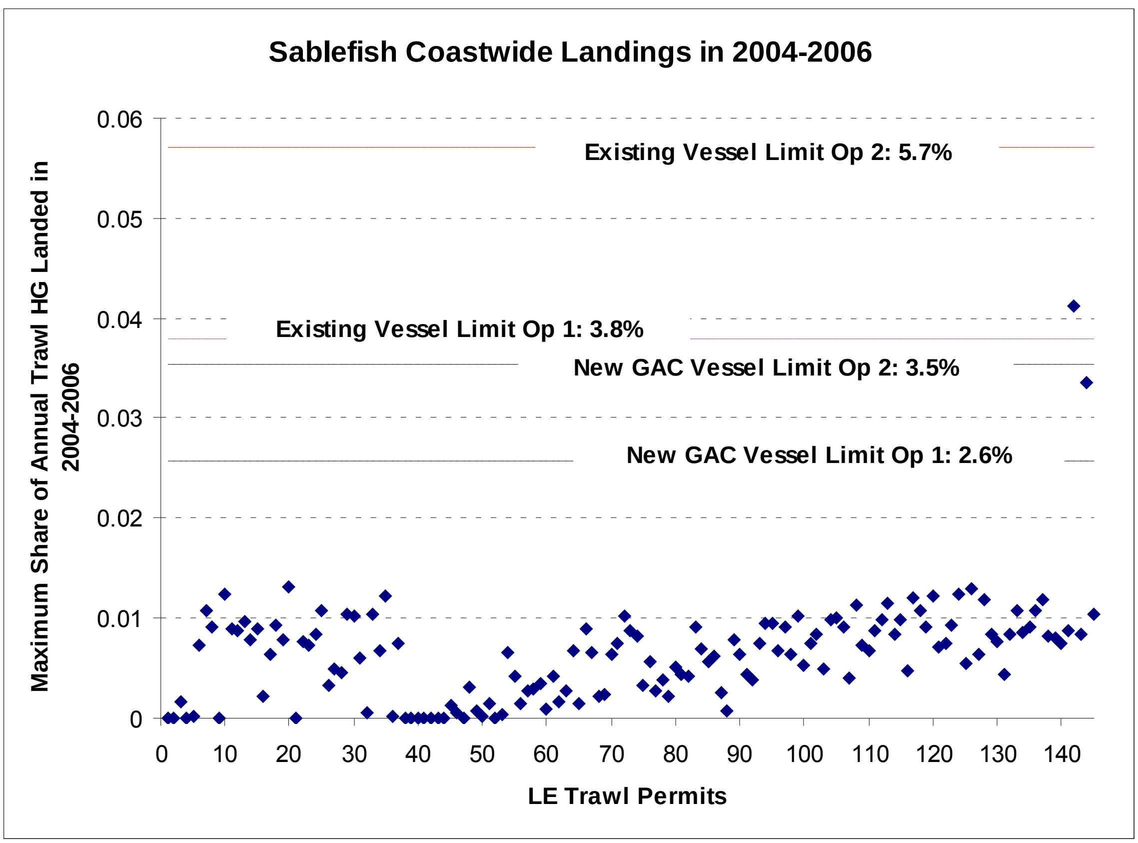


Figure 12. Maximum annual landings by permit as a share of the assumed coastwide sablefish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

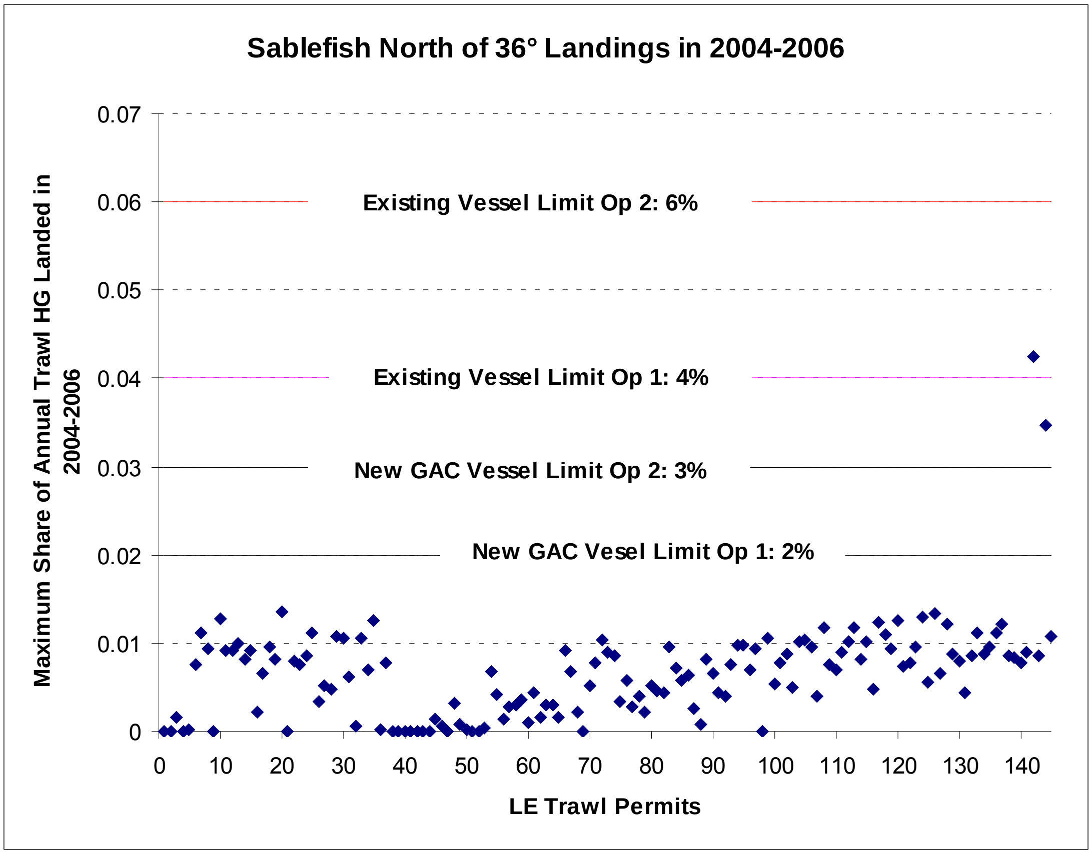


Figure 13. Maximum annual landings by permit as a share of the assumed sablefish north trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

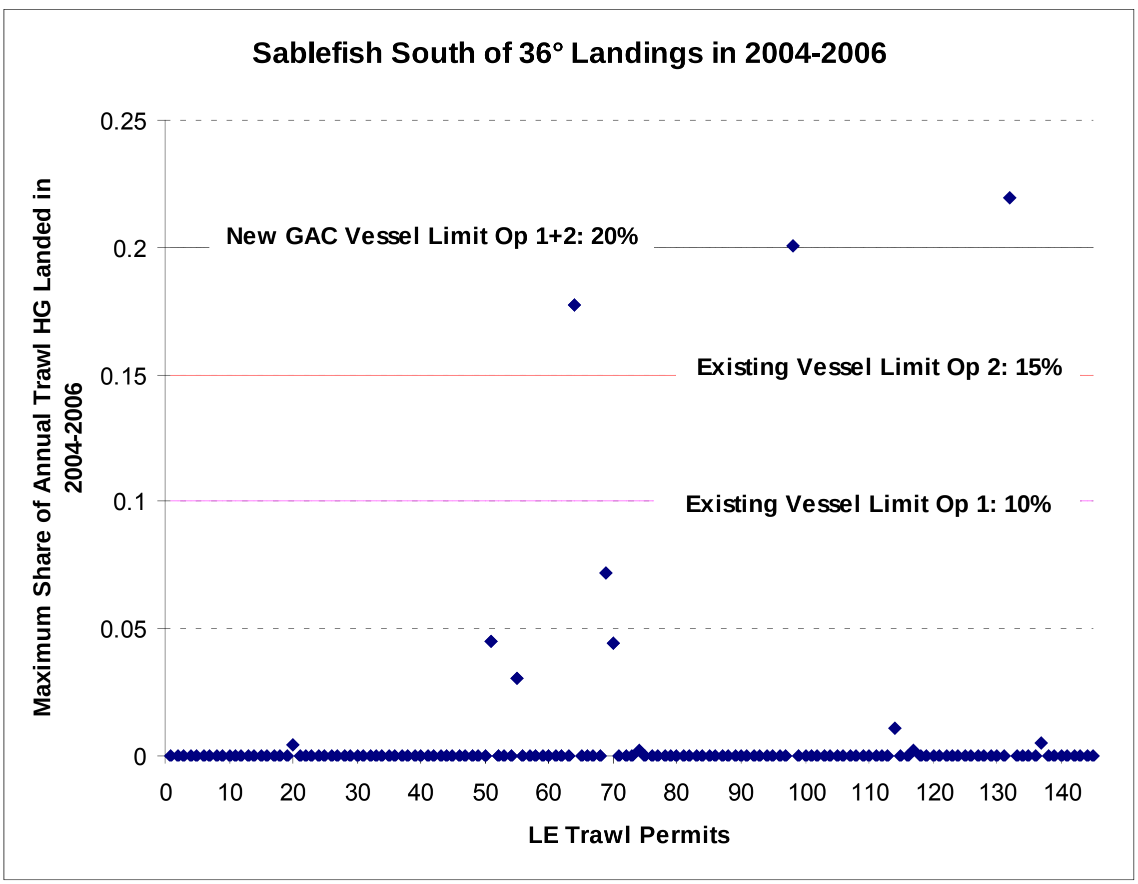


Figure 14. Maximum annual landings by permit as a share of the assumed sablefish south trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

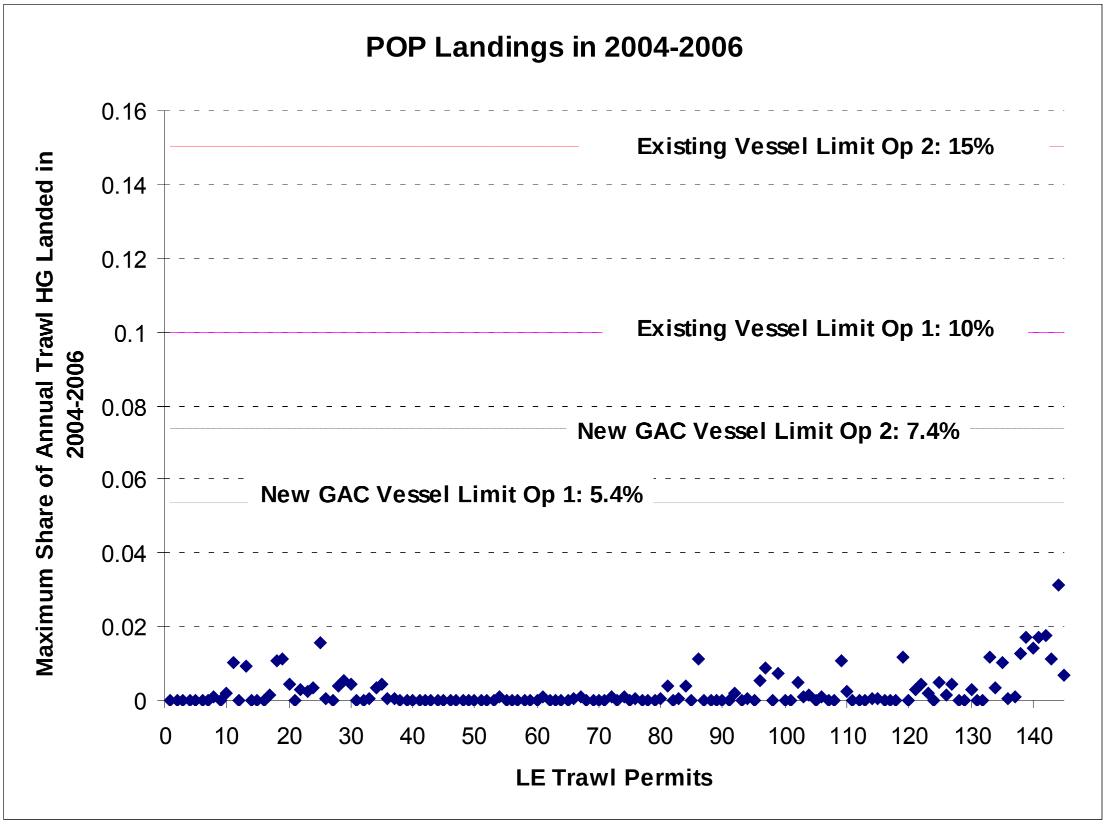


Figure 15. Maximum annual landings by permit as a share of the assumed Pacific Ocean perch trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

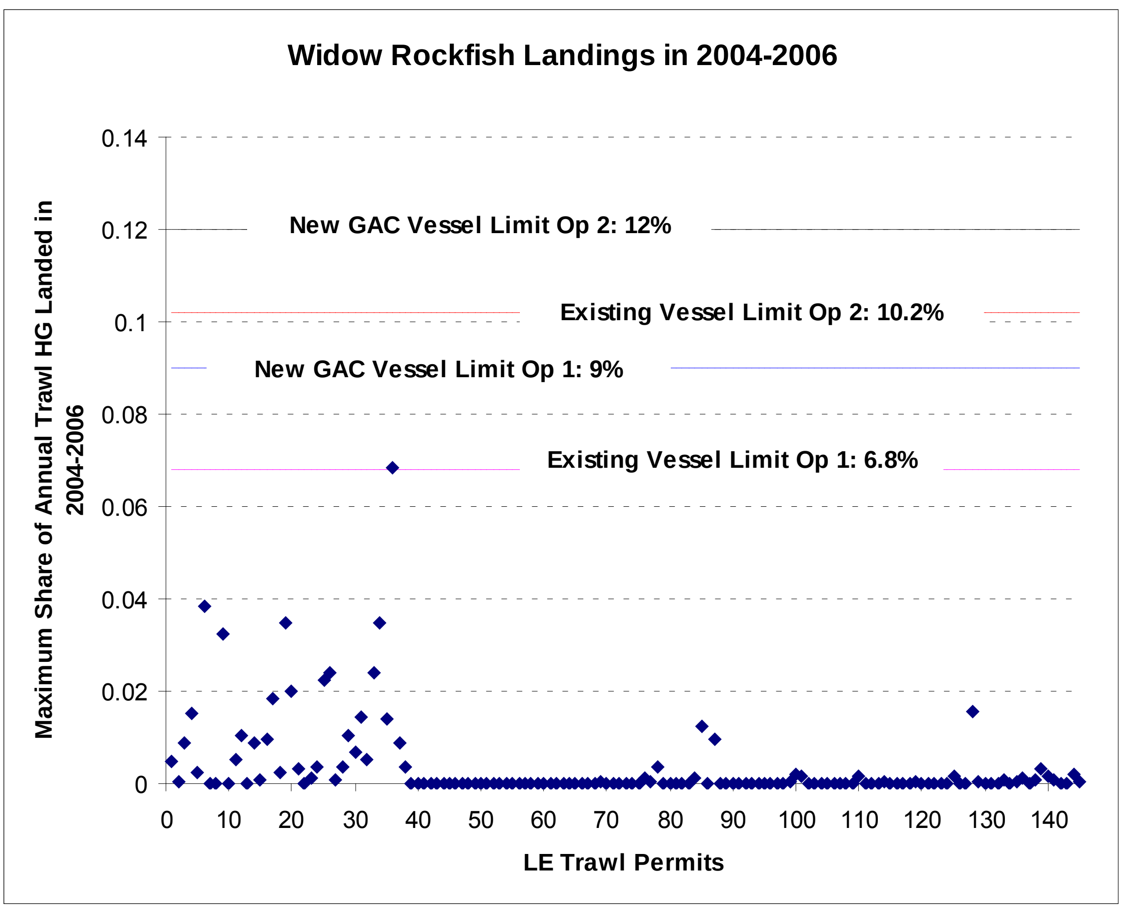


Figure 16. Maximum annual landings by permit as a share of the assumed widow rockfish trawl allocation ,for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

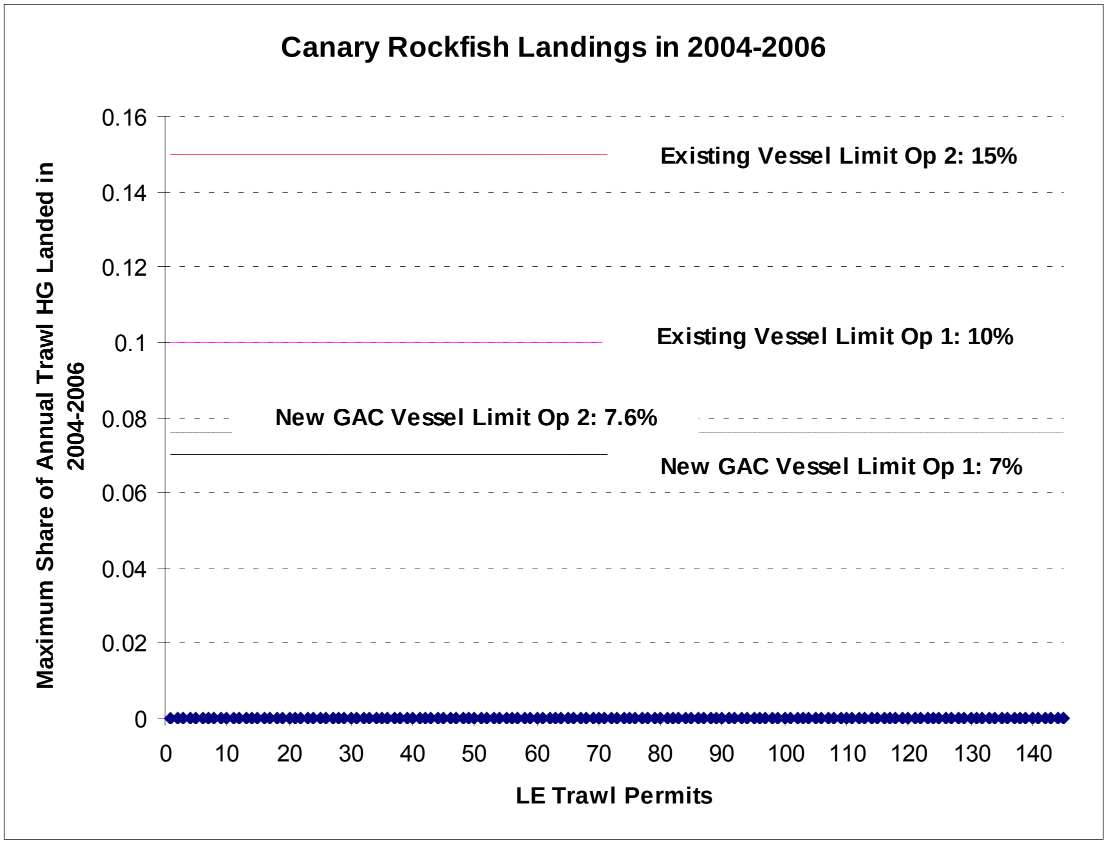


Figure 17. Maximum annual landings by permit as a share of the assumed canary rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

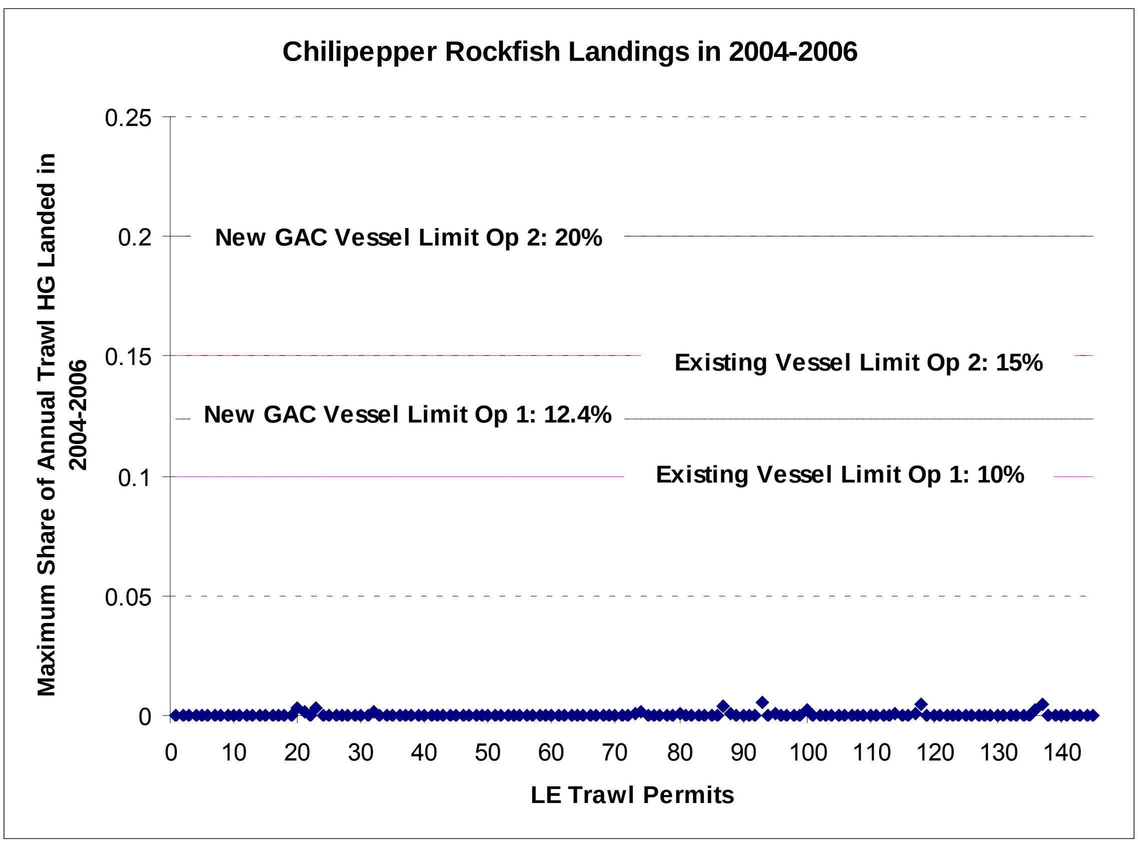


Figure 18. Maximum annual landings by permit as a share of the assumed chilipepper rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

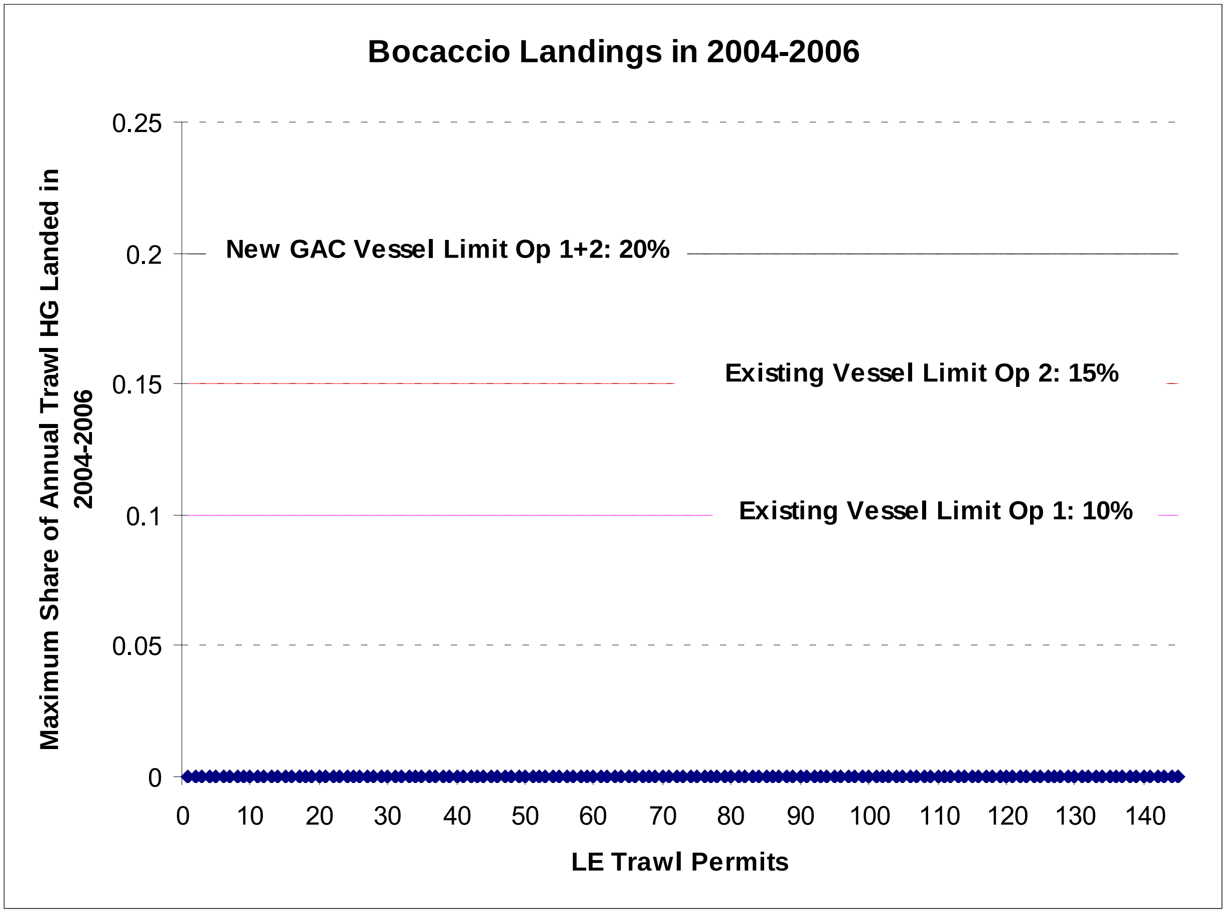


Figure 19. Maximum annual landings by permit as a share of the assumed bocaccio rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

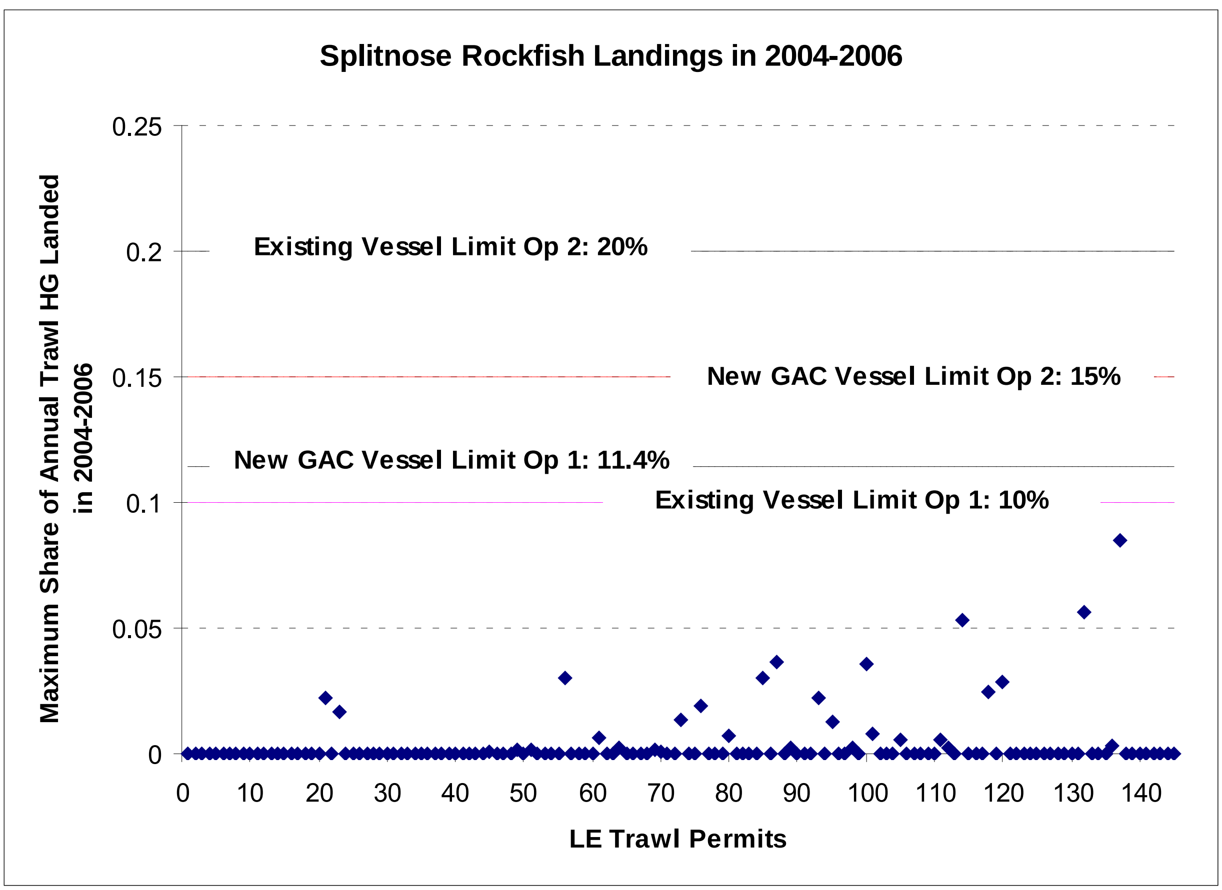


Figure 20. Maximum annual landings by permit as a share of the assumed splitnose rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

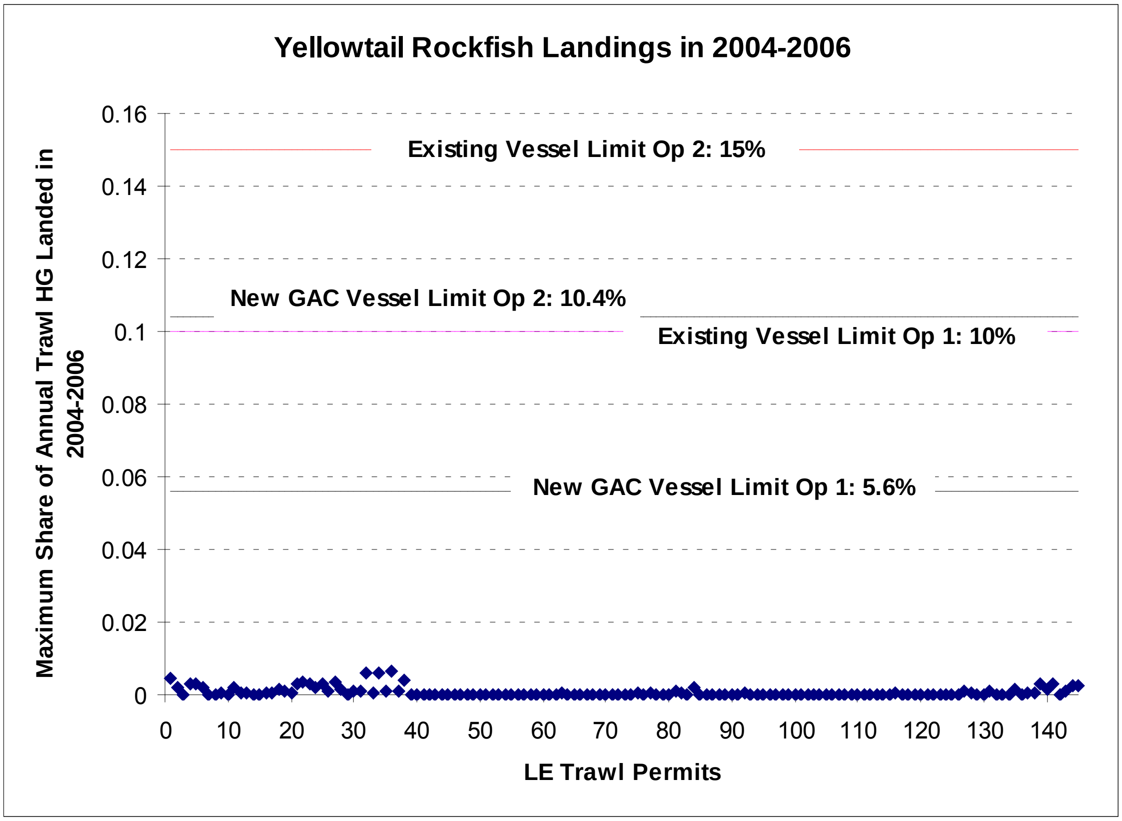


Figure 21. Maximum annual landings by permit as a share of the assumed yellowtail rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

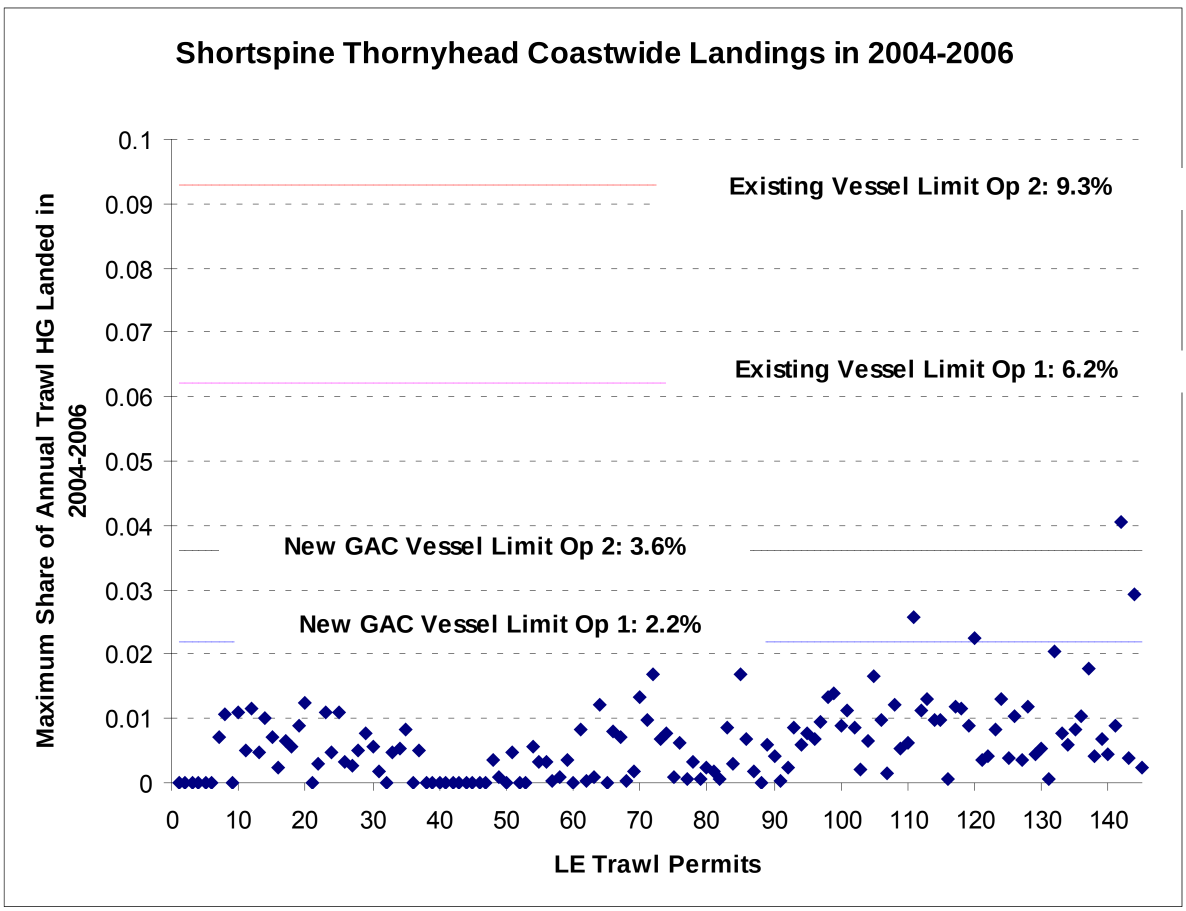


Figure 22. Maximum annual landings by permit as a share of the assumed shortspine thornyhead coastwide trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

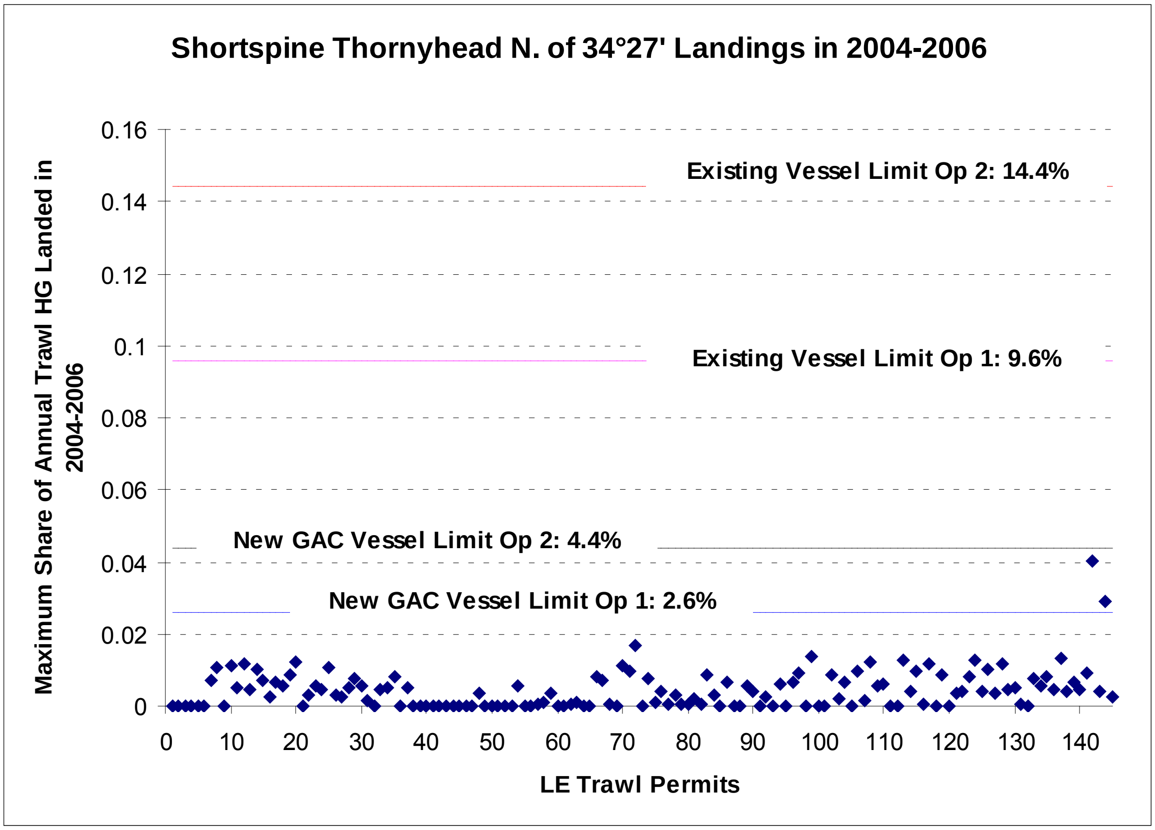


Figure 23. Maximum annual landings by permit as a share of the assumed shortspine thornyhead north trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

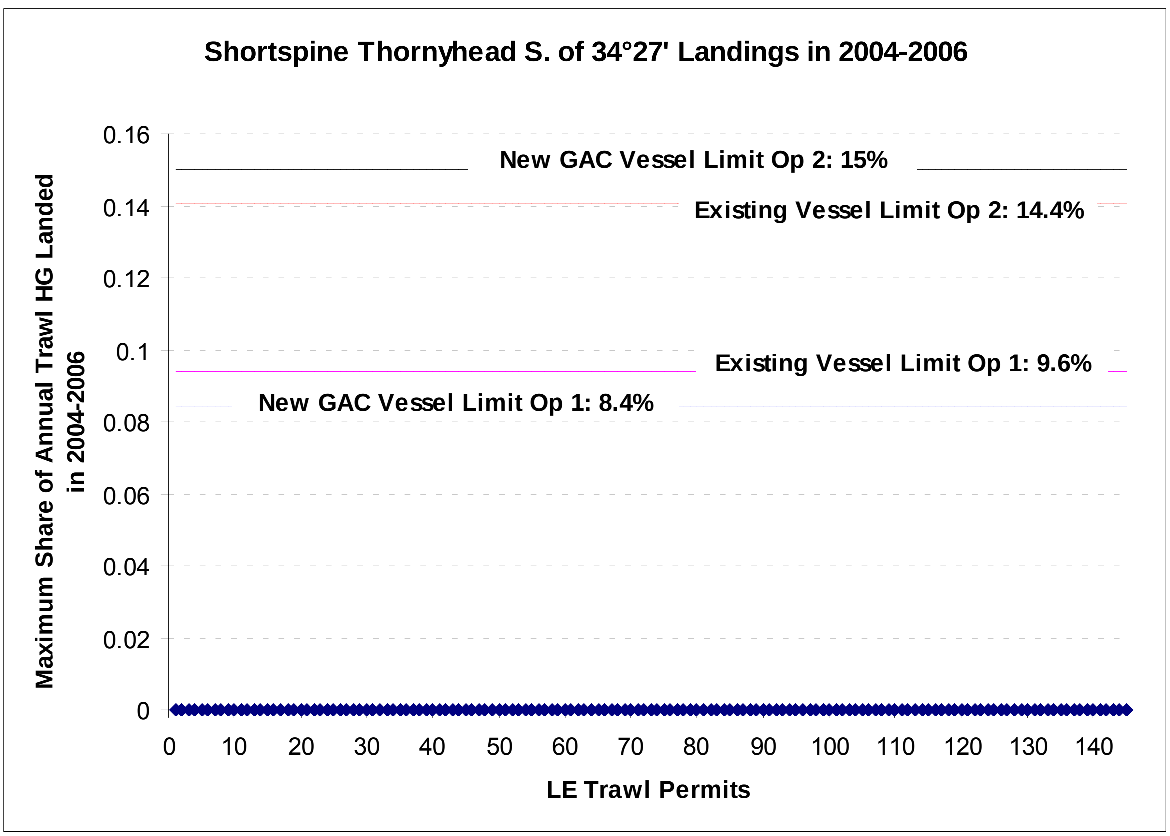


Figure 24. Maximum annual landings by permit as a share of the assumed shortspine thornyhead south trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

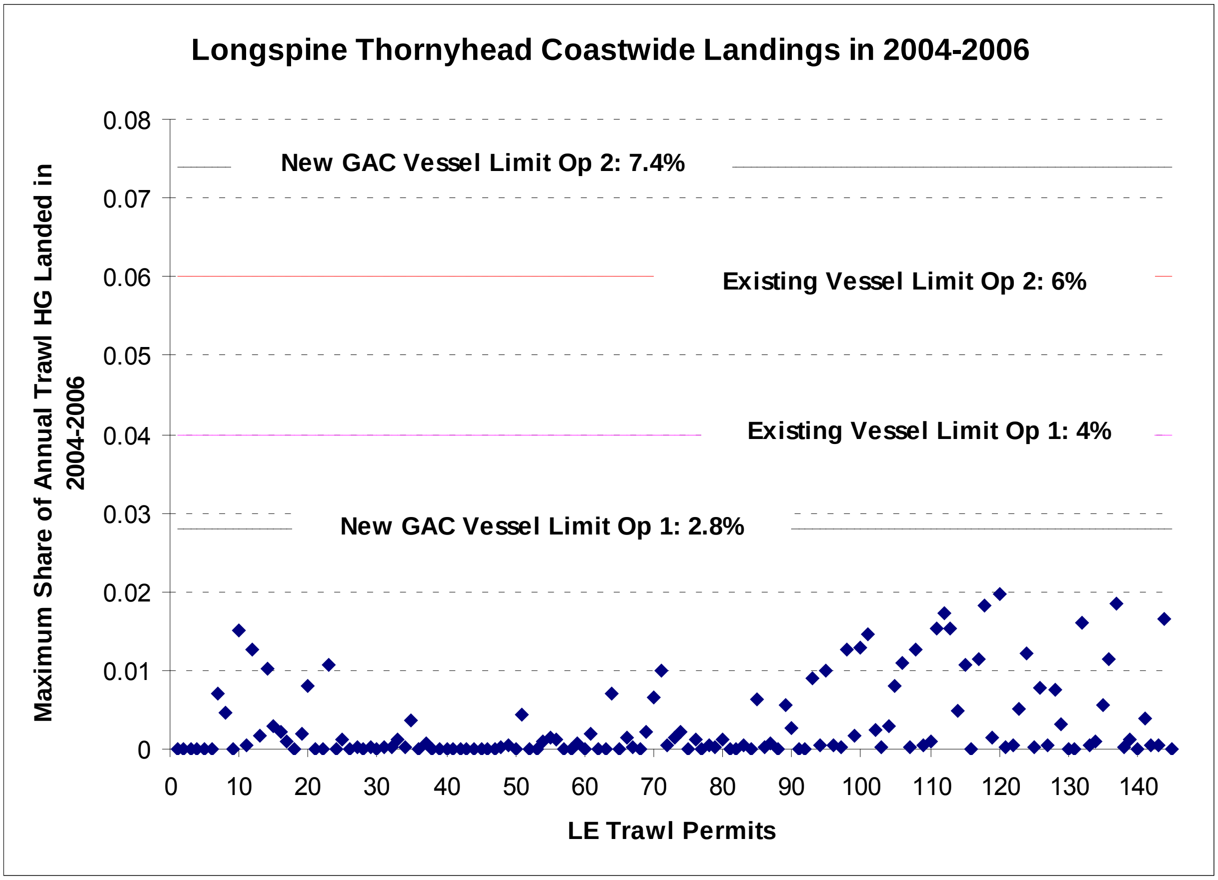


Figure 25. Maximum annual landings by permit as a share of the assumed longspine thornyhead coastwide trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

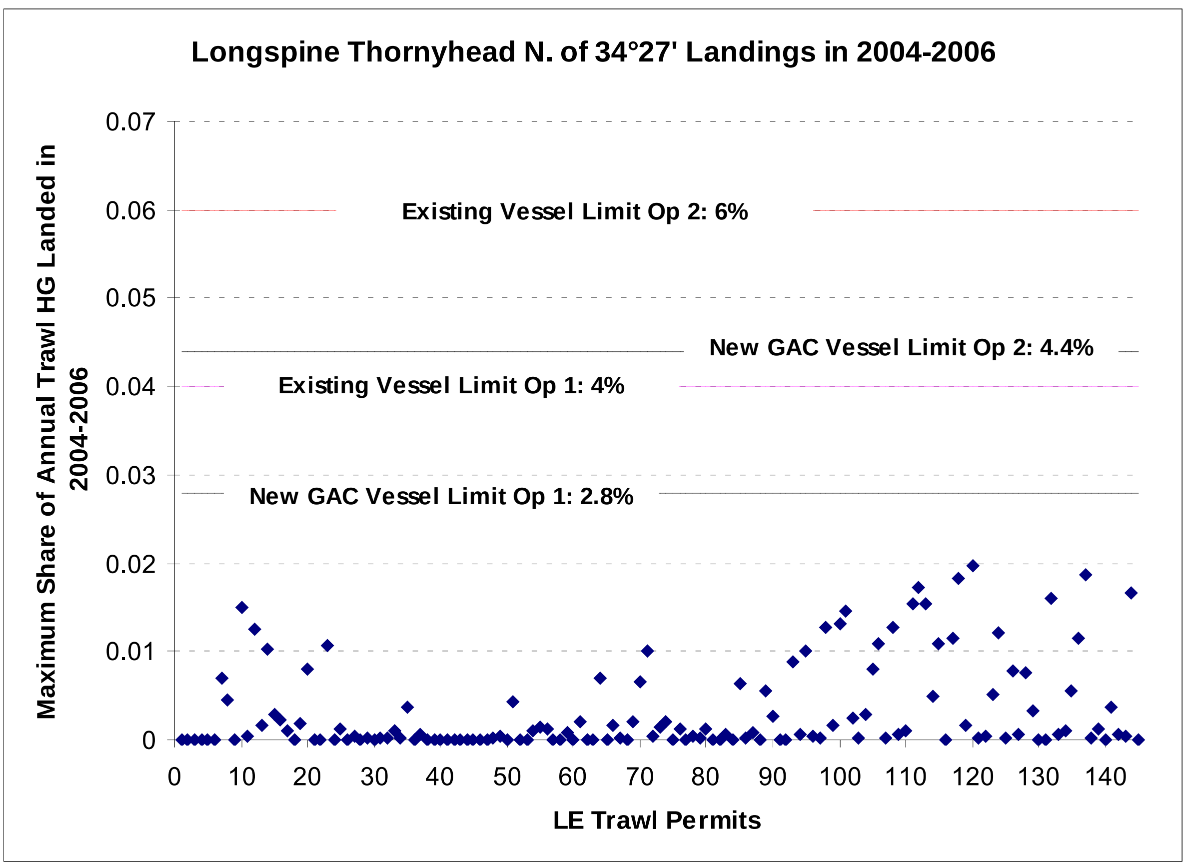


Figure 26. Maximum annual landings by permit as a share of the assumed longspine thornyhead south trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

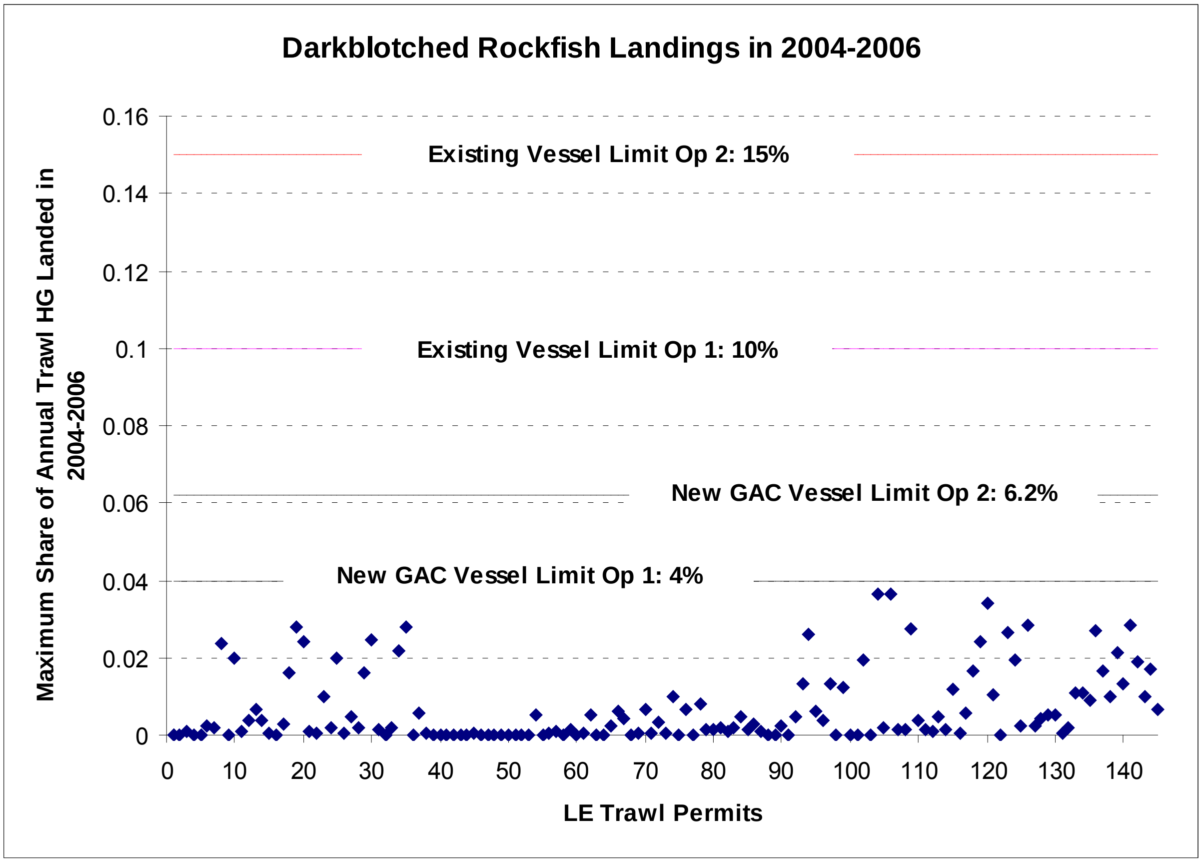


Figure 27. Maximum annual landings by permit as a share of the assumed darkblotched rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

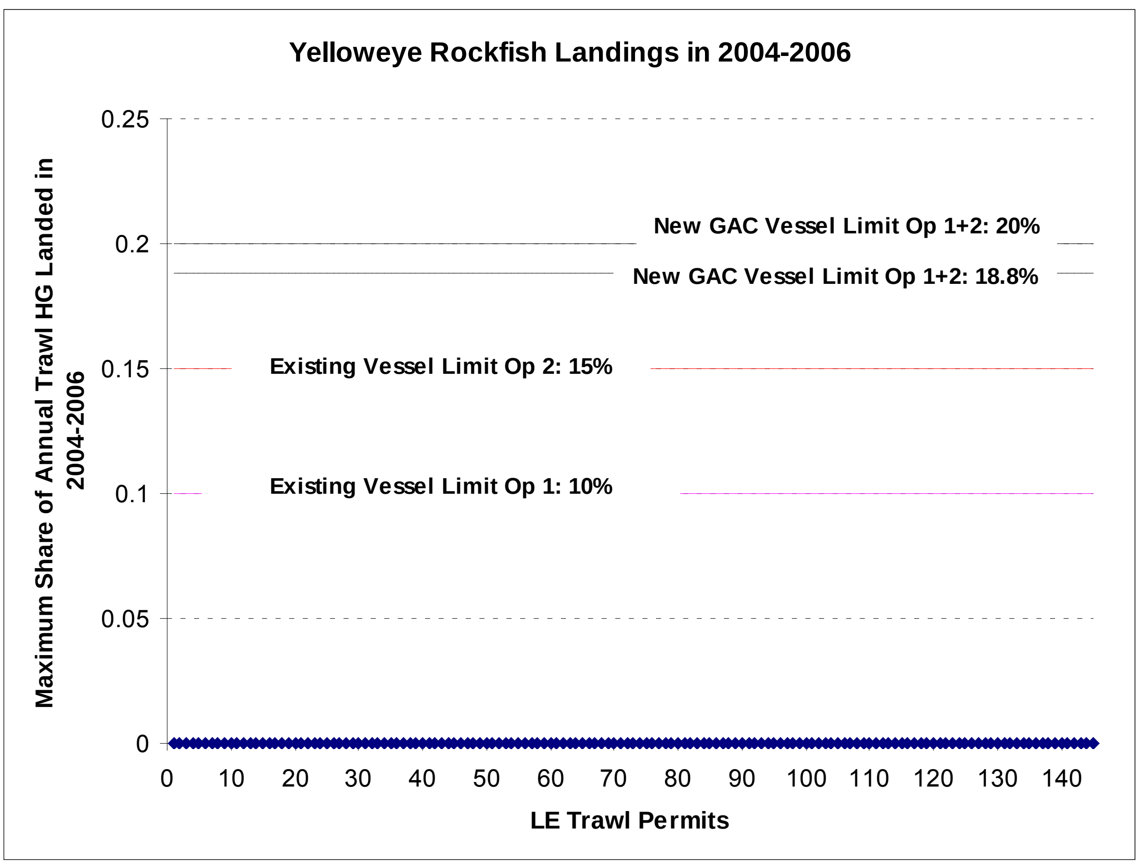


Figure 28. Maximum annual landings by permit as a share of the assumed yelloweye rockfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

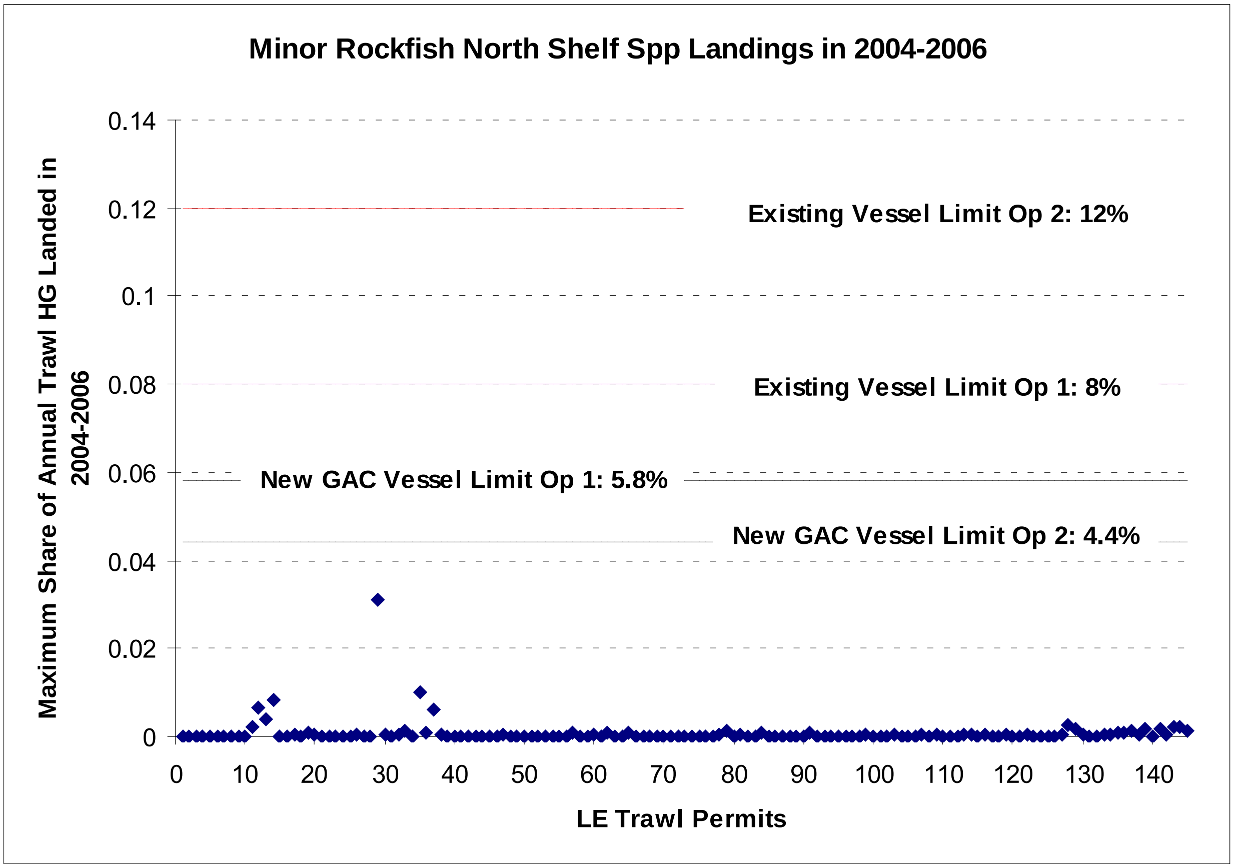


Figure 29. Maximum annual landings by permit as a share of the assumed minor rockfish north shelf species trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

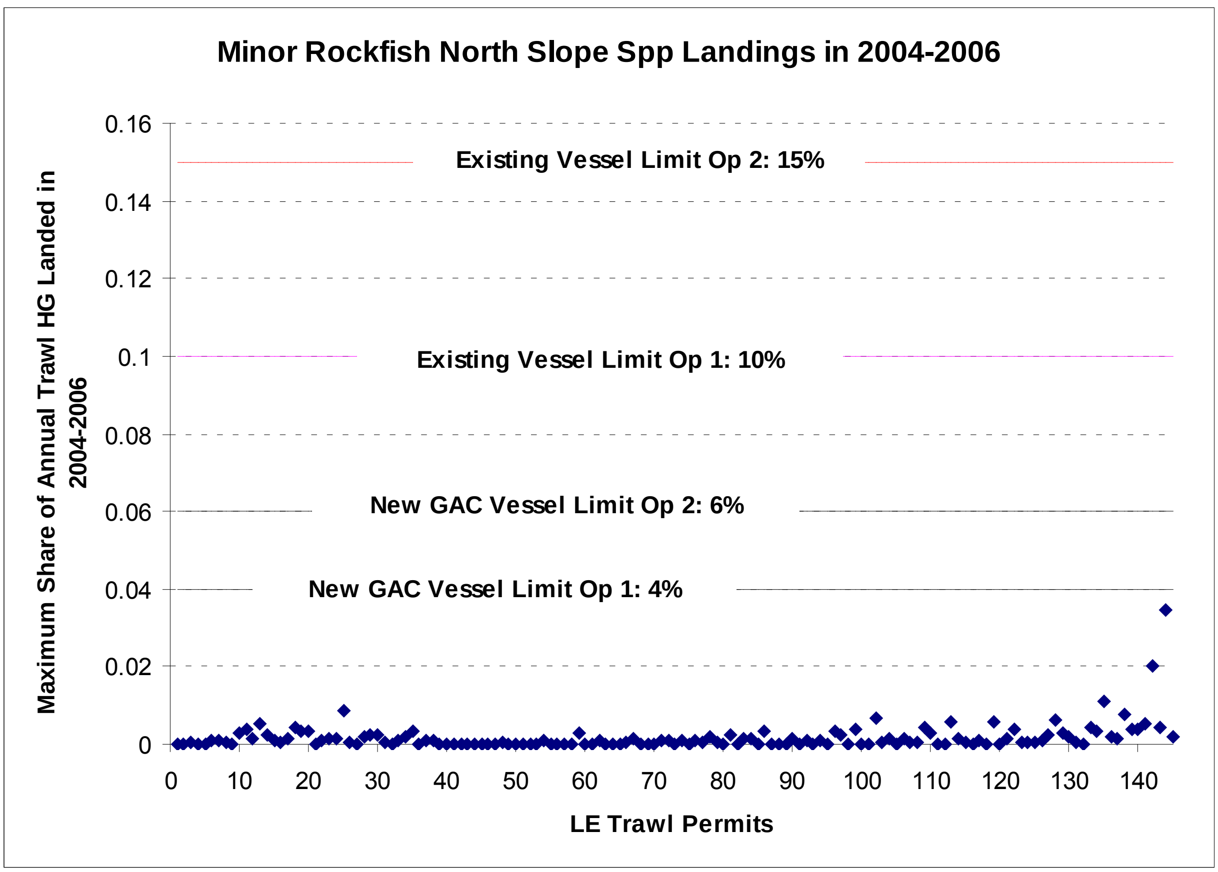


Figure 30. Maximum annual landings by permit as a share of the assumed minor rockfish north slope species trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

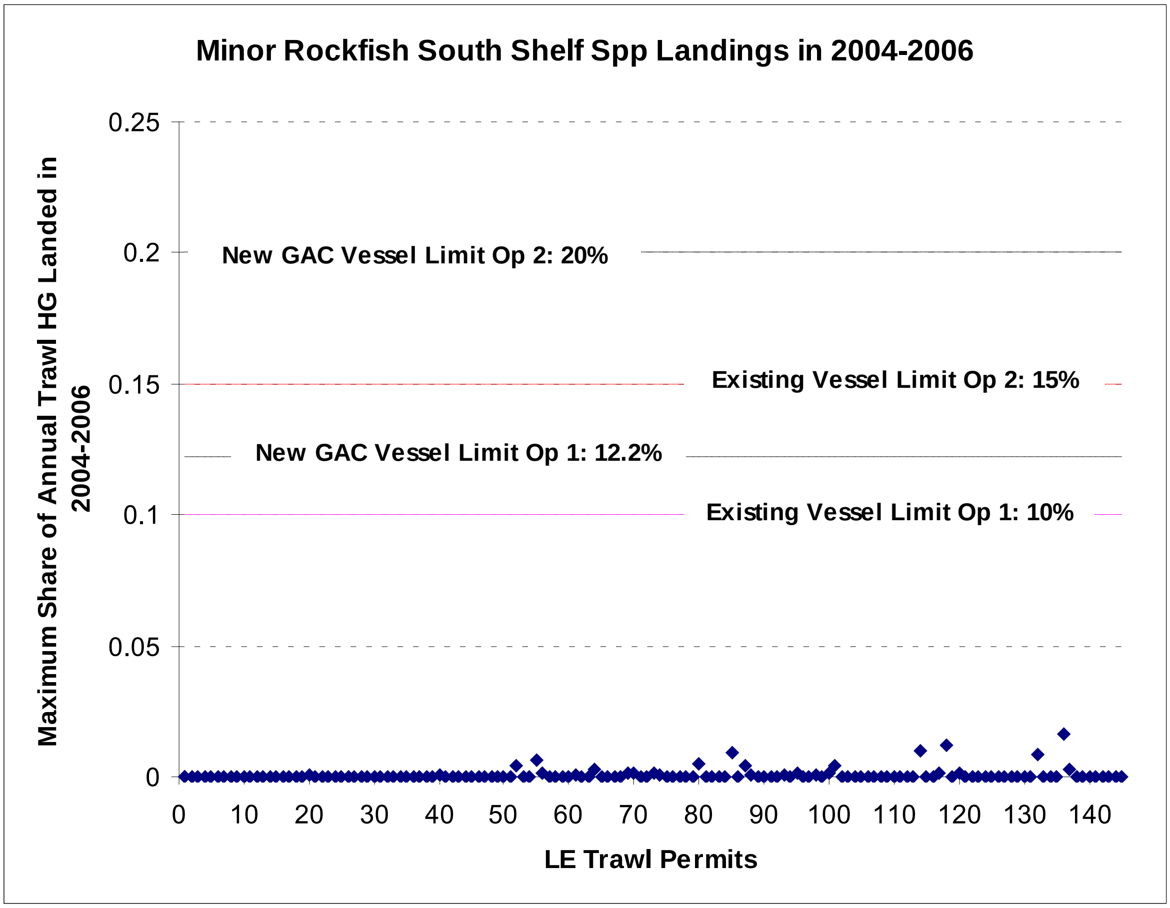


Figure 31. Maximum annual landings by permit as a share of the assumed minor rockfish south shelf species trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

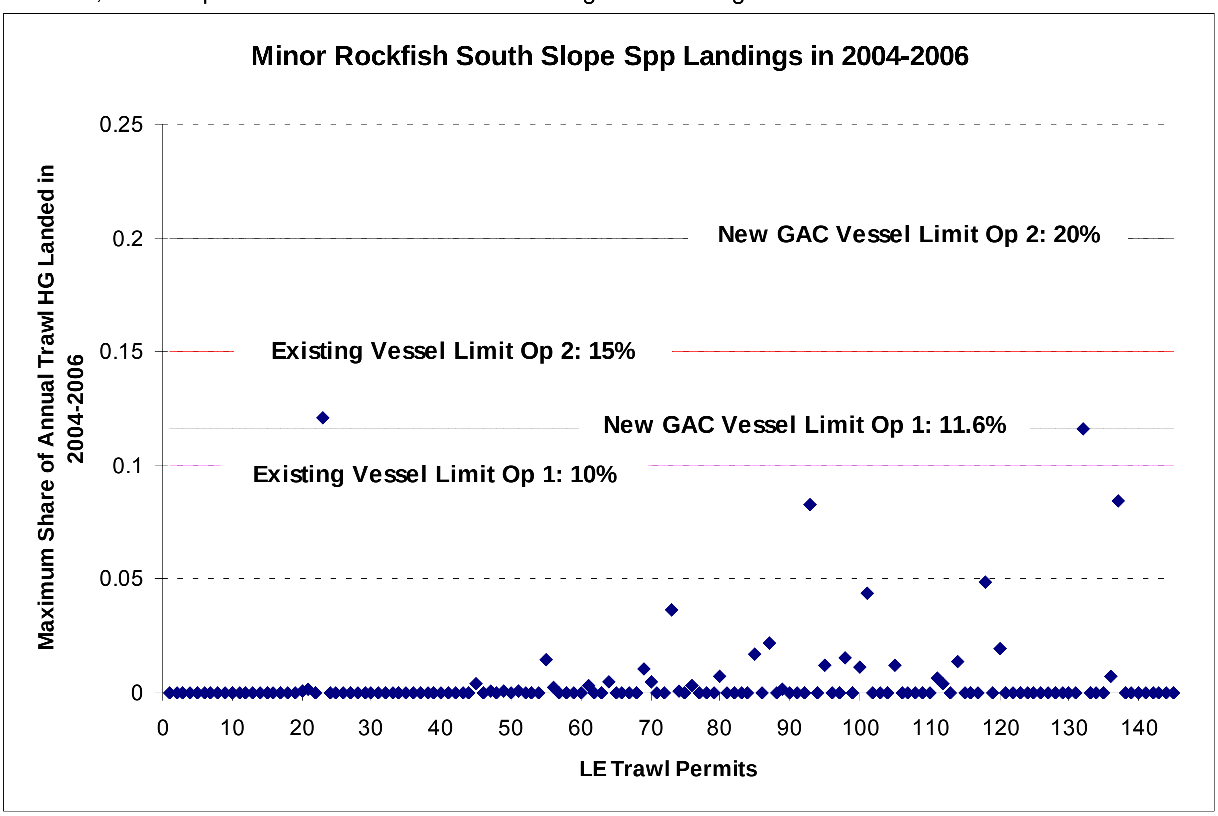


Figure 32. Maximum annual landings by permit as a share of the assumed minor rockfish south slope species trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

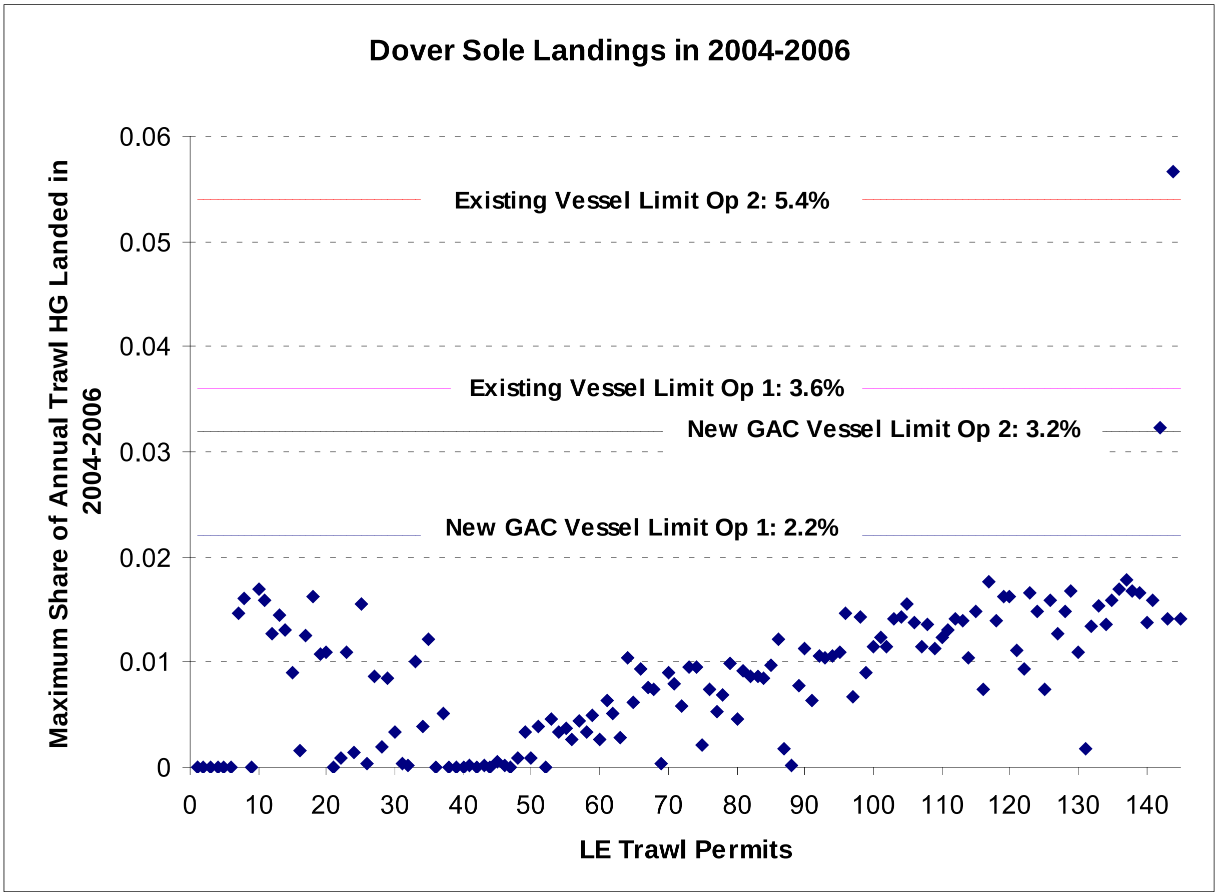


Figure 33. Maximum annual landings by permit as a share of the assumed Dover sole trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

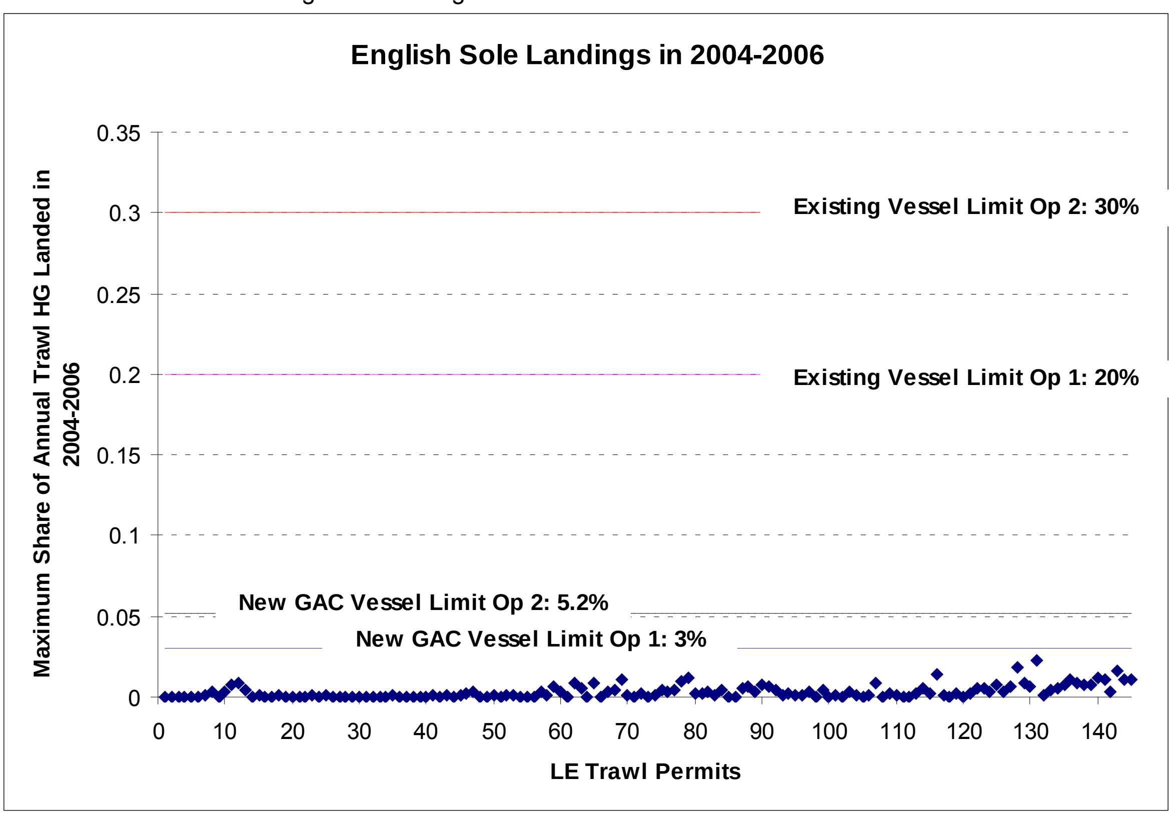


Figure 34. Maximum annual landings by permit as a share of the assumed English sole trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

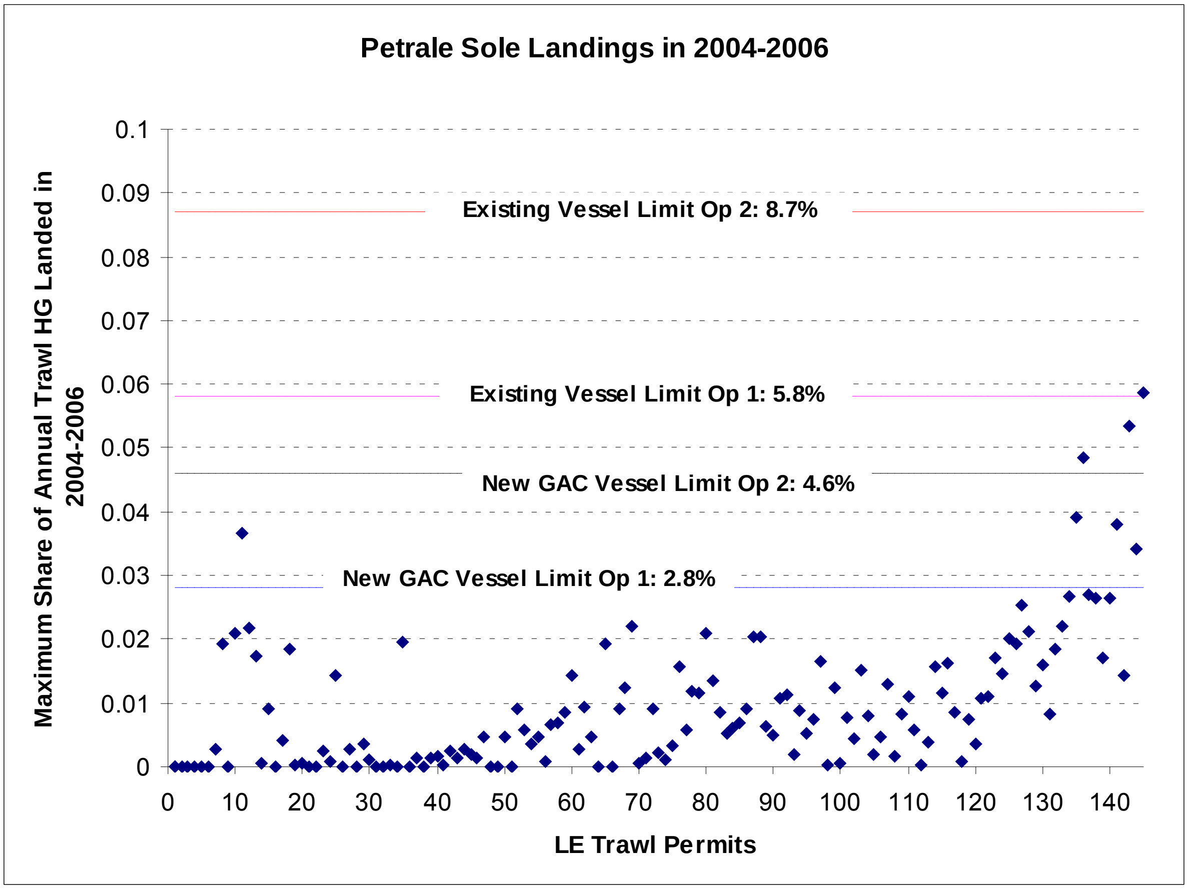


Figure 35. Maximum annual landings by permit as a share of the assumed Petrale sole trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

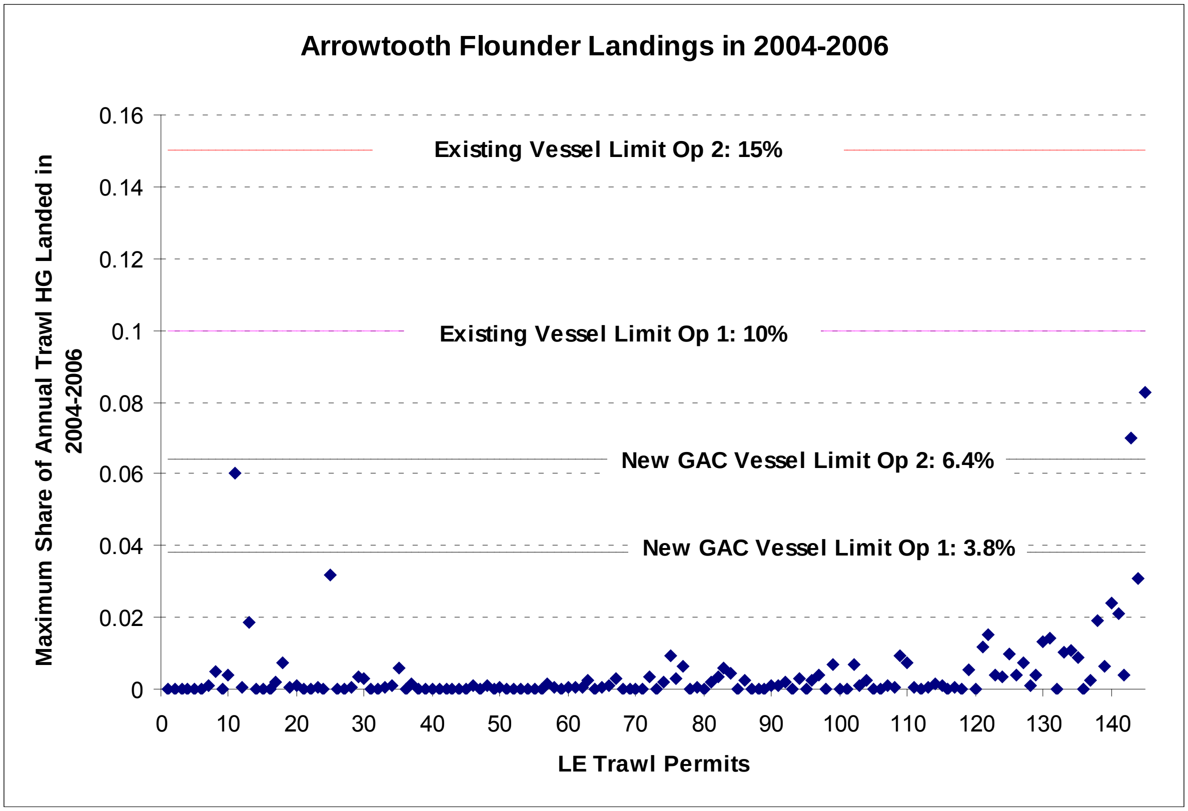


Figure 36. Maximum annual landings by permit as a share of the assumed arrowtooth flounder trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

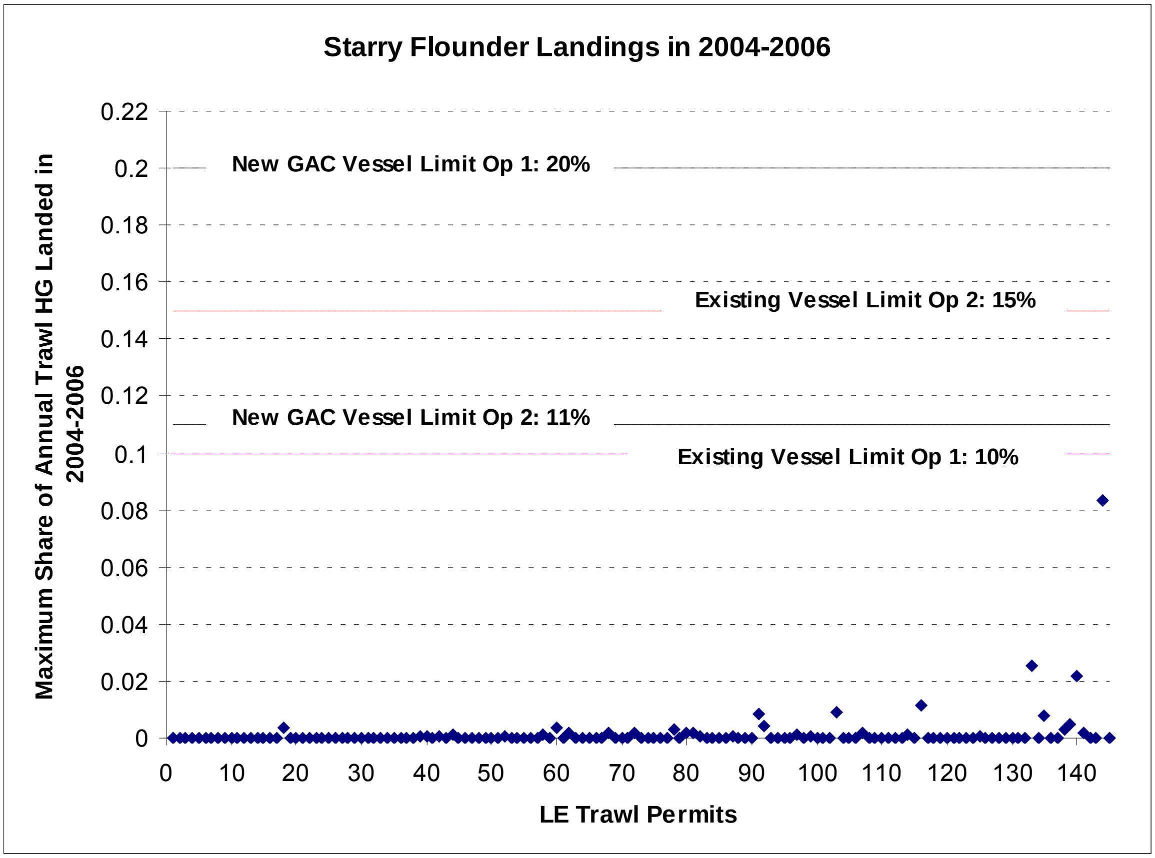


Figure 37. Maximum annual landings by permit as a share of the assumed starry flounder trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

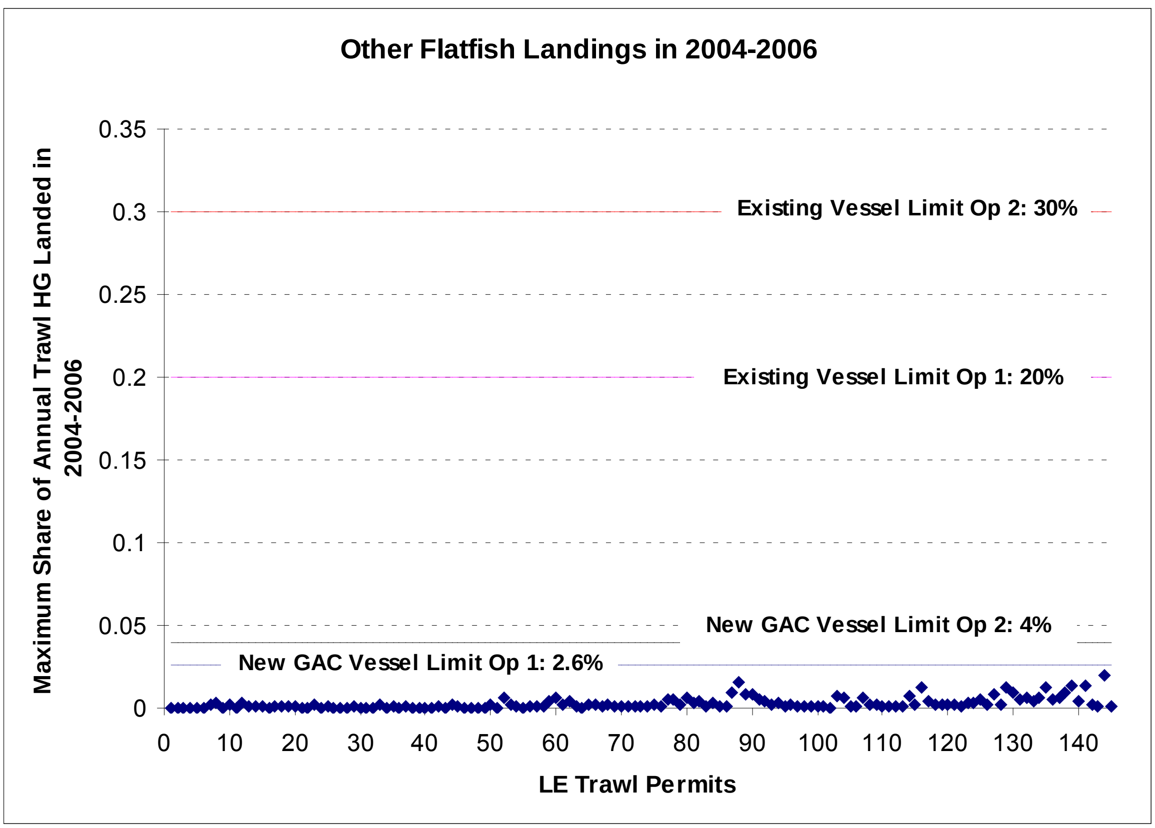


Figure 38. Maximum annual landings by permit as a share of the assumed other flatfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

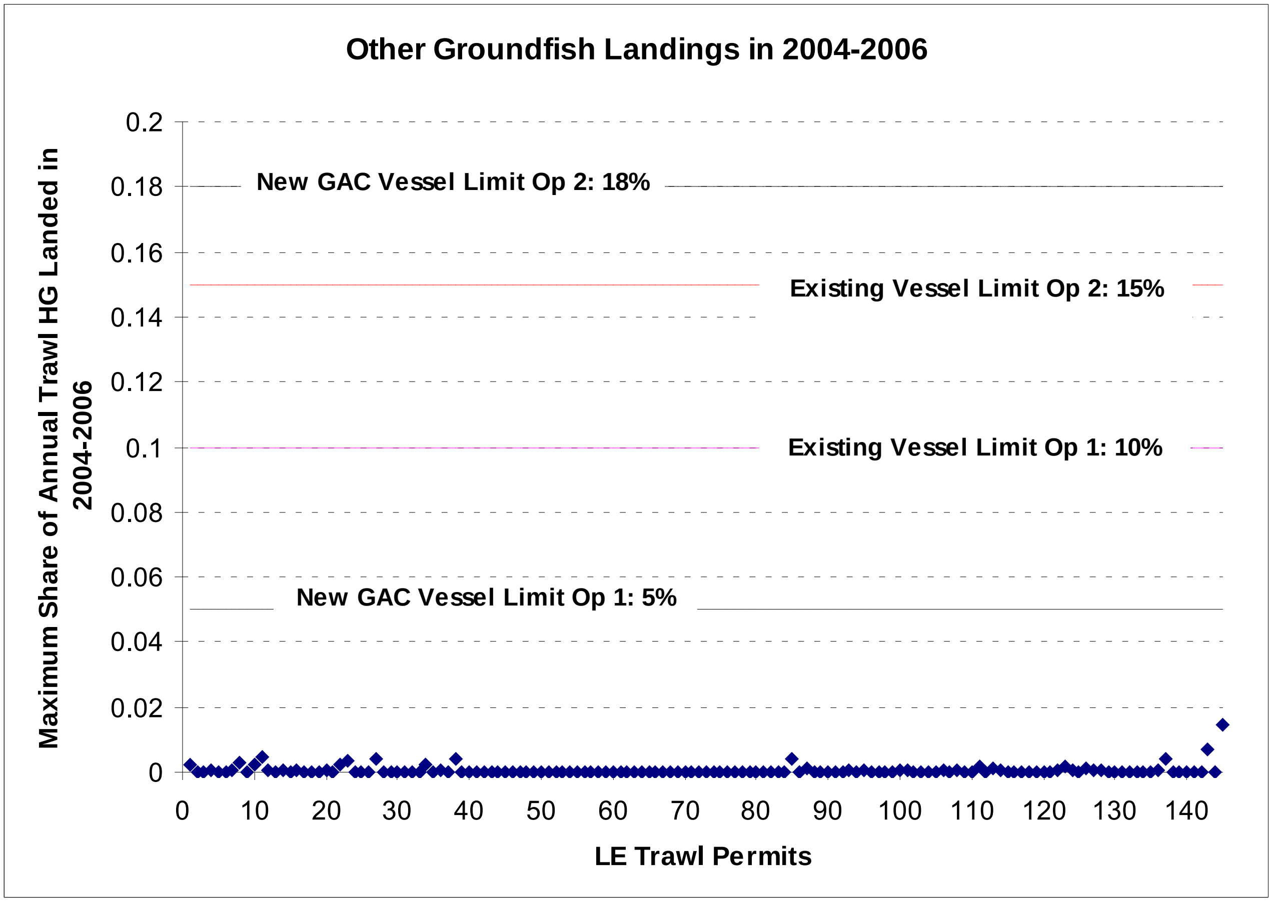


Figure 39. Maximum annual landings by permit as a share of the assumed other groundfish trawl allocation, for each permit active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

APPENDIX B (Scattergrams, Pounds)

MAXIMUM ANNUAL 2004-2006 LANDINGS COMPARED WITH VESSEL ACCUMULATION LIMITS BASED ON ANNUAL OYS

The attached figures display each permit's maximum annual landings (in pounds) for OY species during 2004-2006. The permits are arrayed in the same order in each graph, starting with permits with recent history only in the shoreside whiting fishery, then both the shoreside whiting and nonwhiting fisheries, and finally those that have recent history only in the shoreside nonwhiting fishery.

Two sets of proposed vessel accumulation limit options are also shown. The percentage amounts have been converted to pounds using 2004-2006 annual OYs and trawl harvest guidelines.

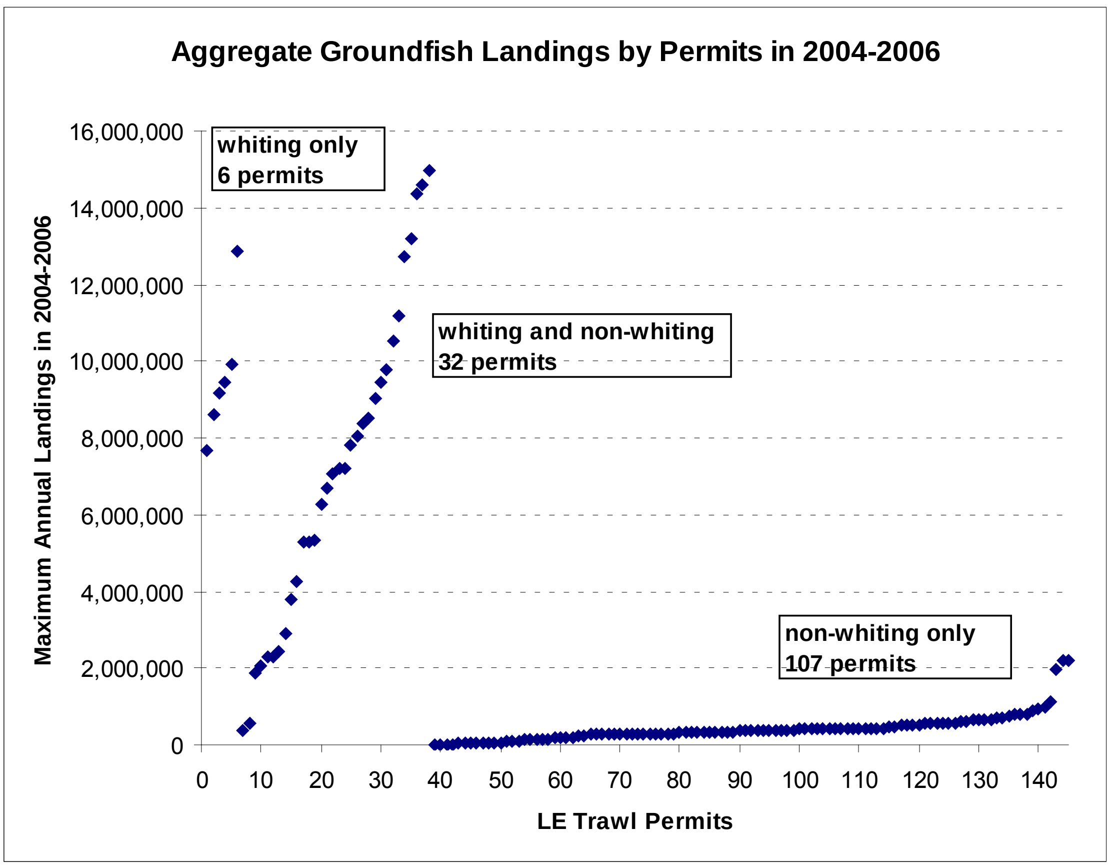


Figure 40. Maximum annual landings by permit of summed groundfish species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

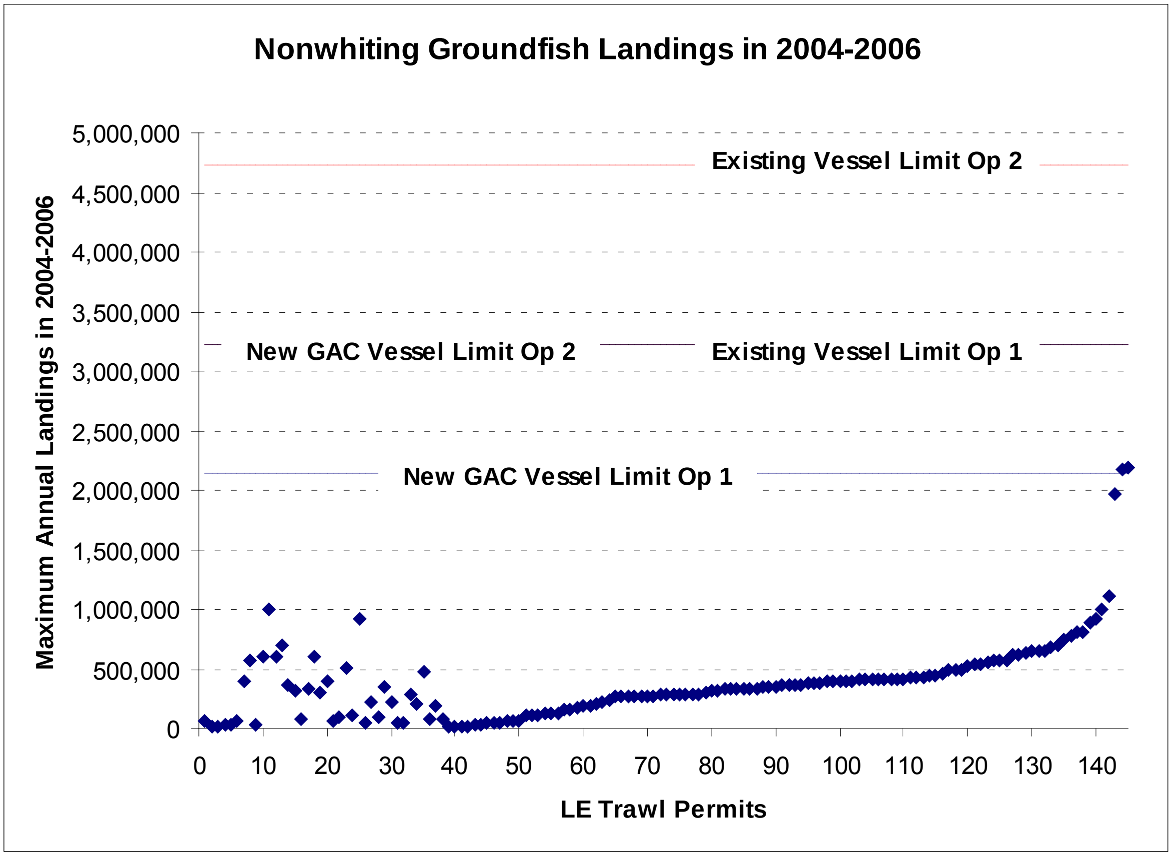


Figure 41. Maximum annual landings by permit of summed nonwhiting groundfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

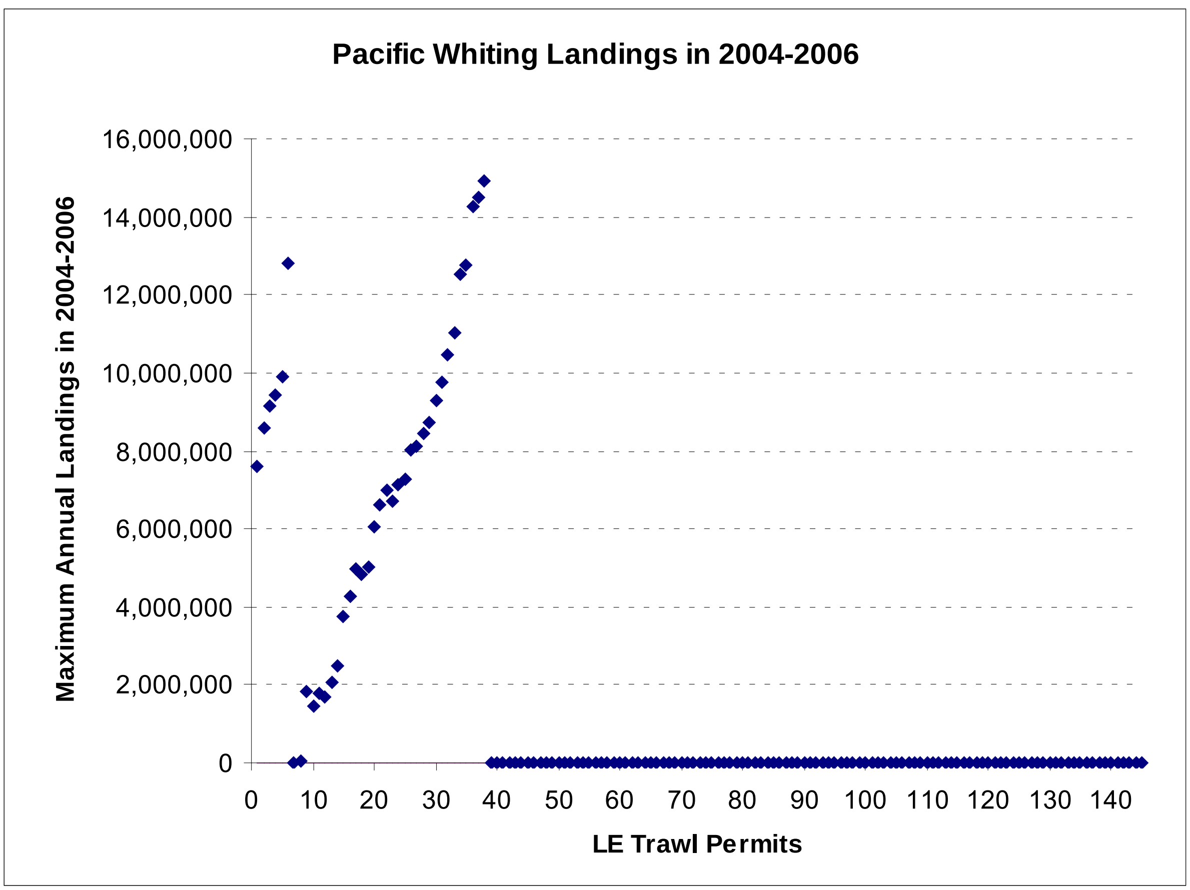


Figure 42. Maximum annual landings by permit of shoreside Pacific whiting for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

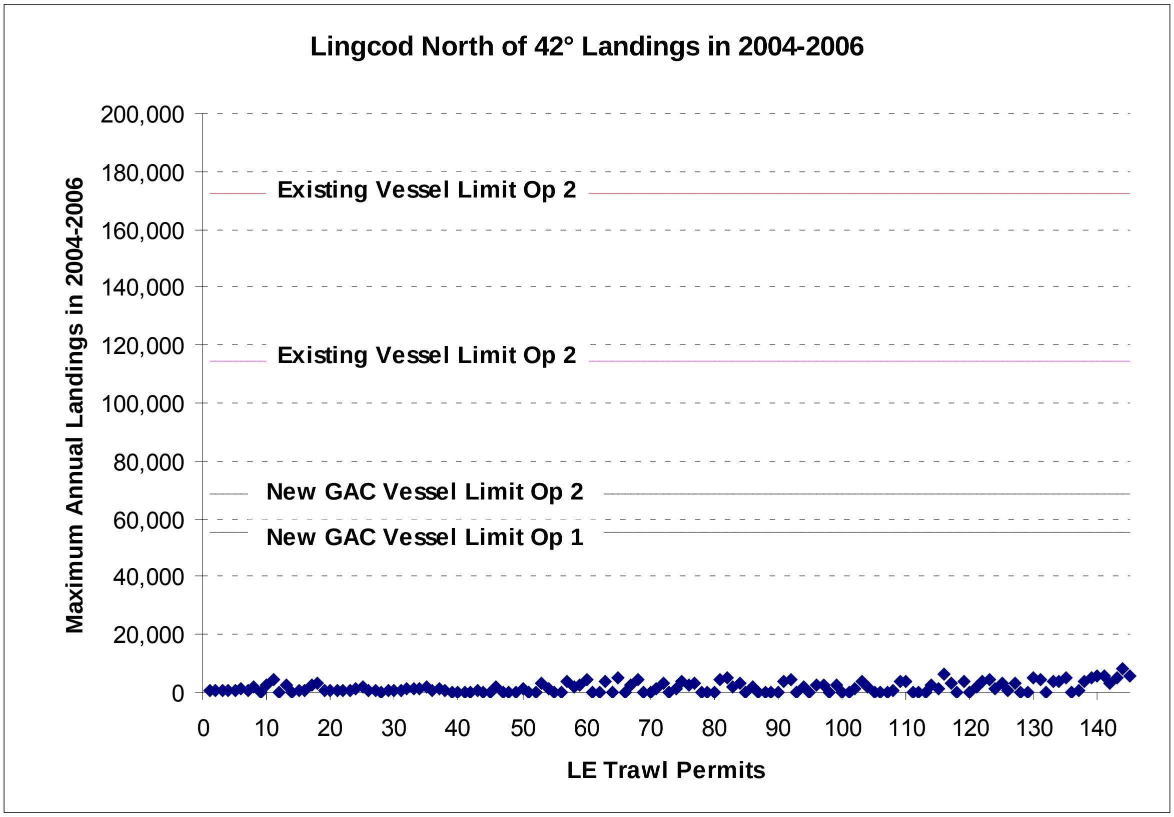


Figure 43. Maximum annual landings by permit of lingcod north of 42° for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

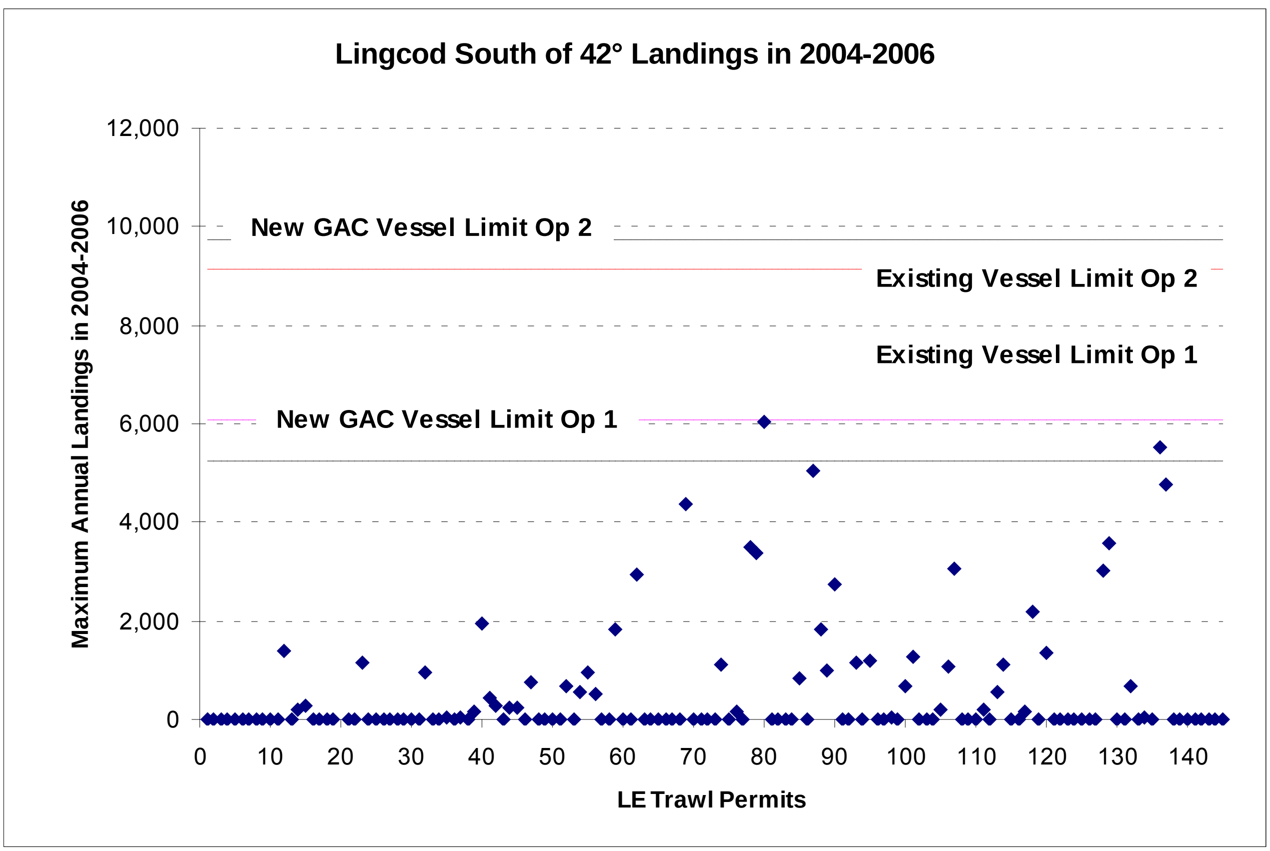


Figure 44. Maximum annual landings by permit of lingcod south of 42° for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

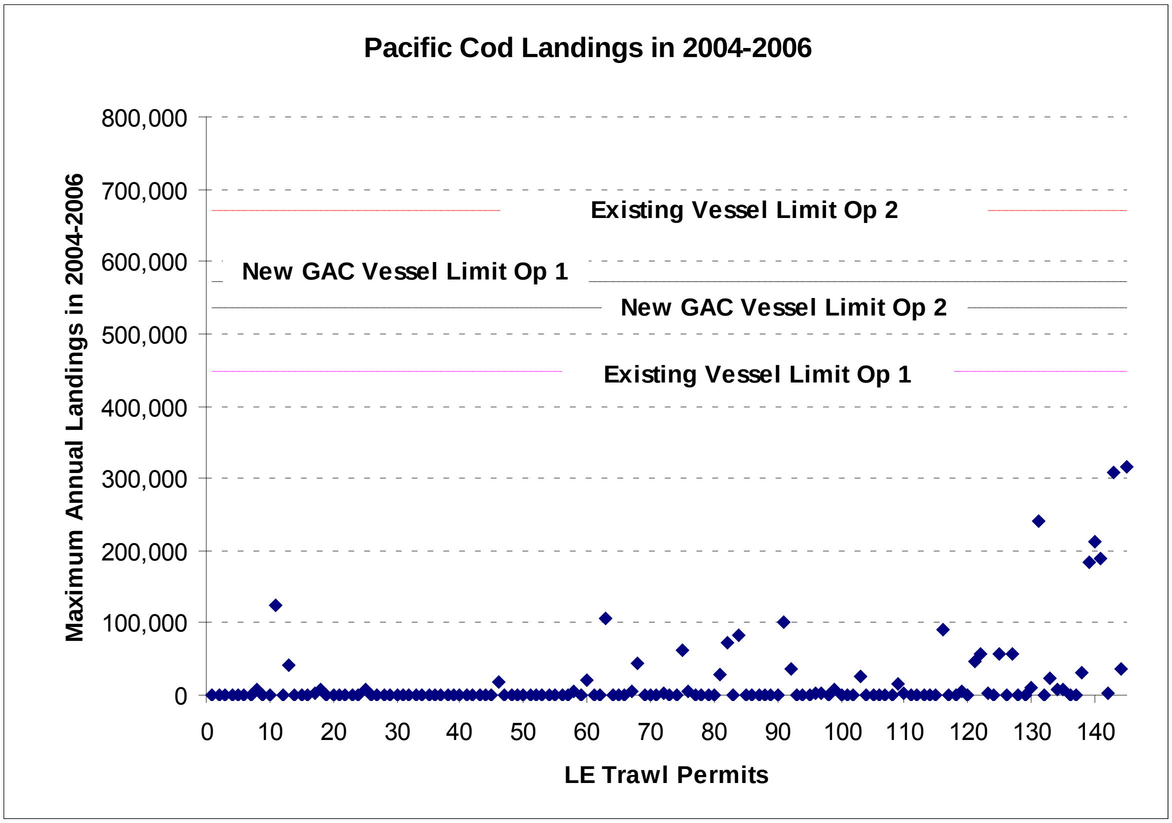


Figure 45. Maximum annual landings by permit of Pacific cod for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

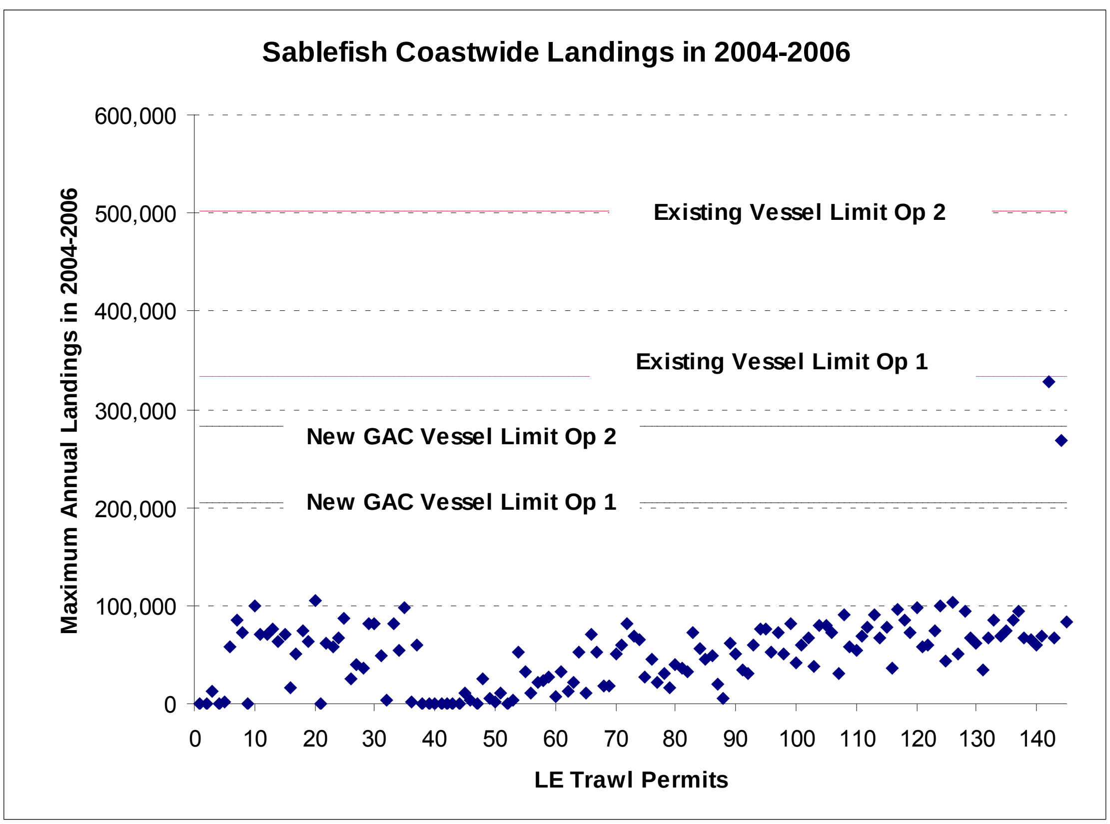


Figure 46. Maximum annual landings by permit of coastwide sablefish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

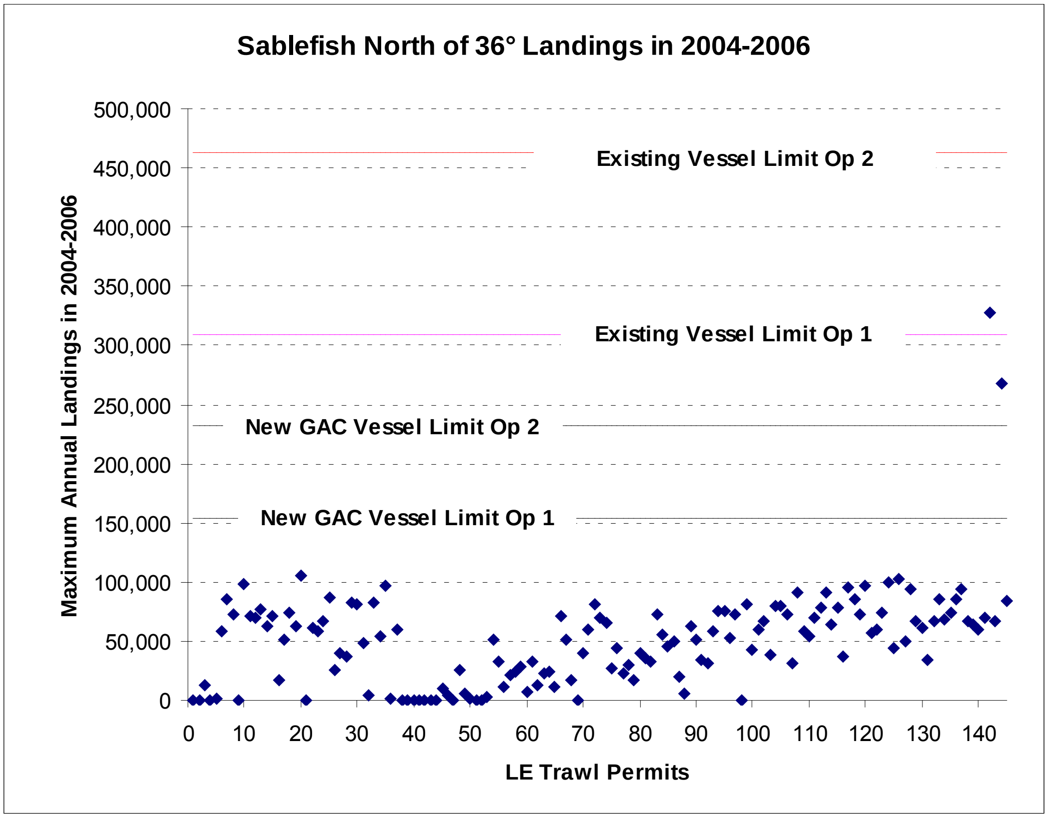


Figure 47. Maximum annual landings by permit of sablefish north of 36° for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

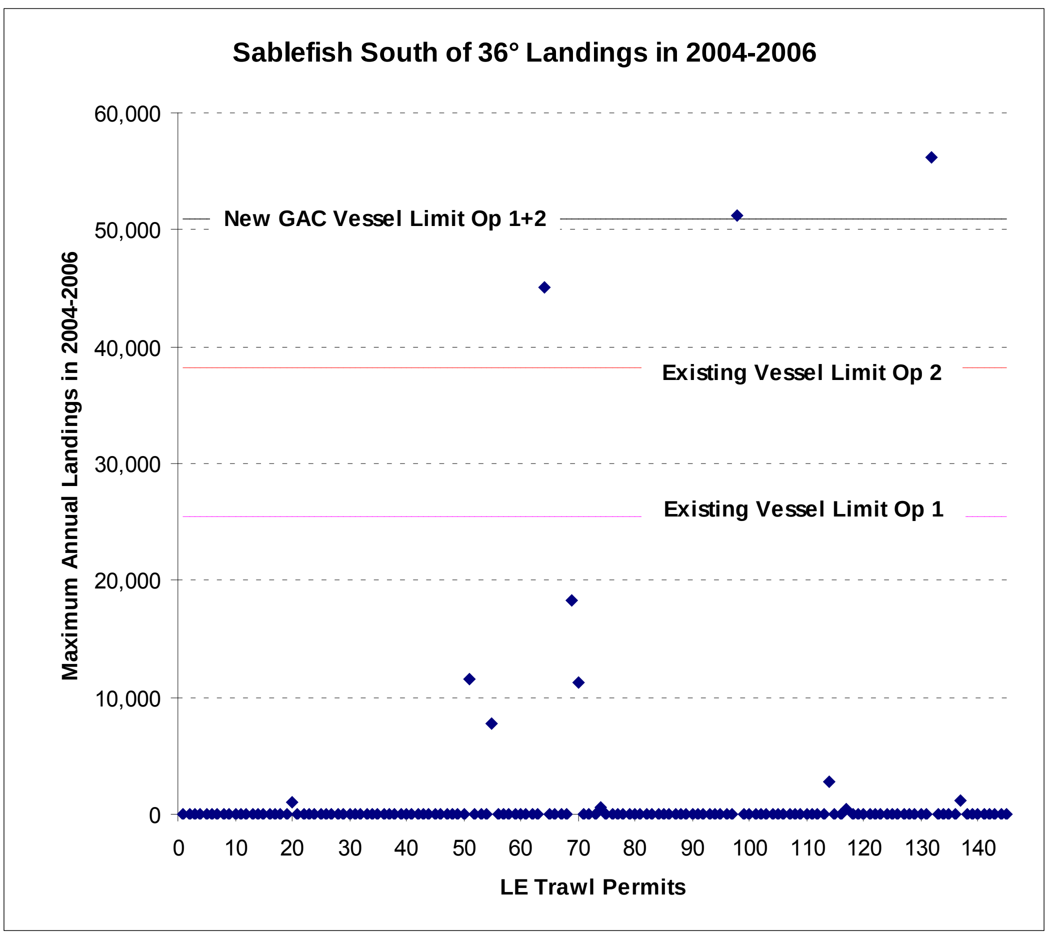


Figure 48. Maximum annual landings by permit of sablefish south of 36° for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

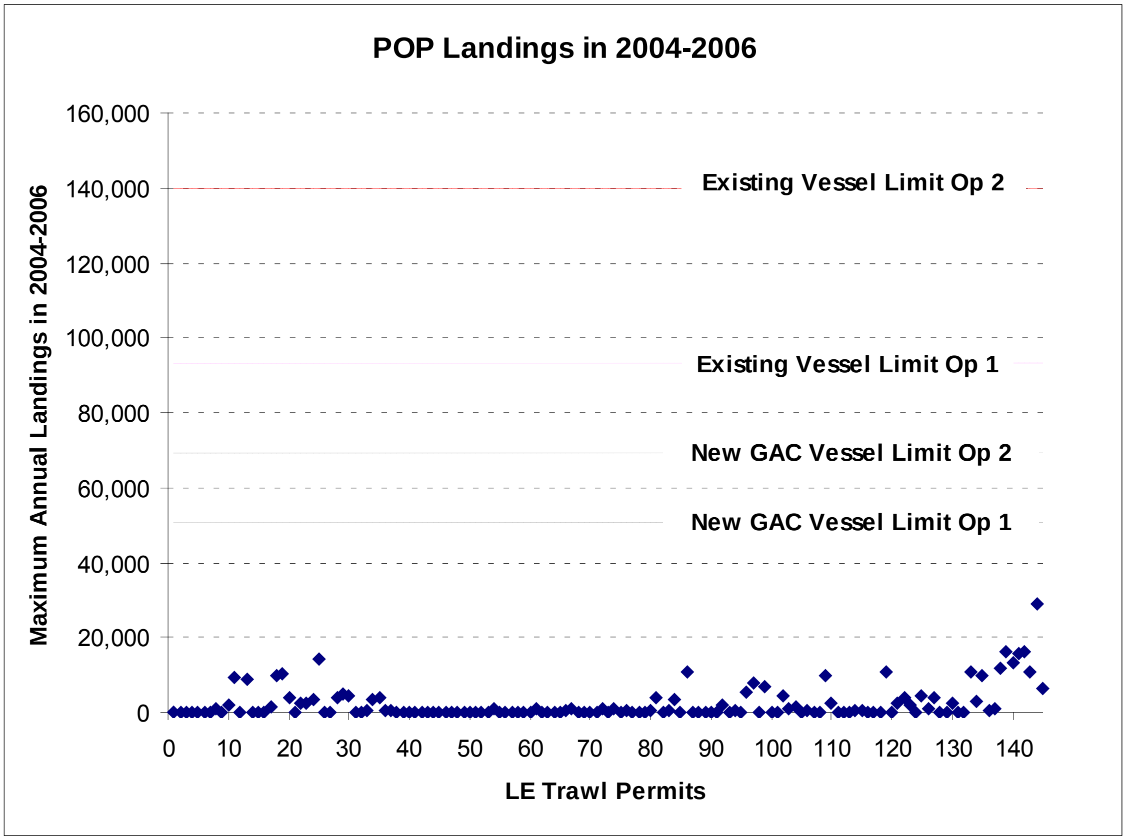


Figure 49. Maximum annual landings by permit of Pacific Ocean perch for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

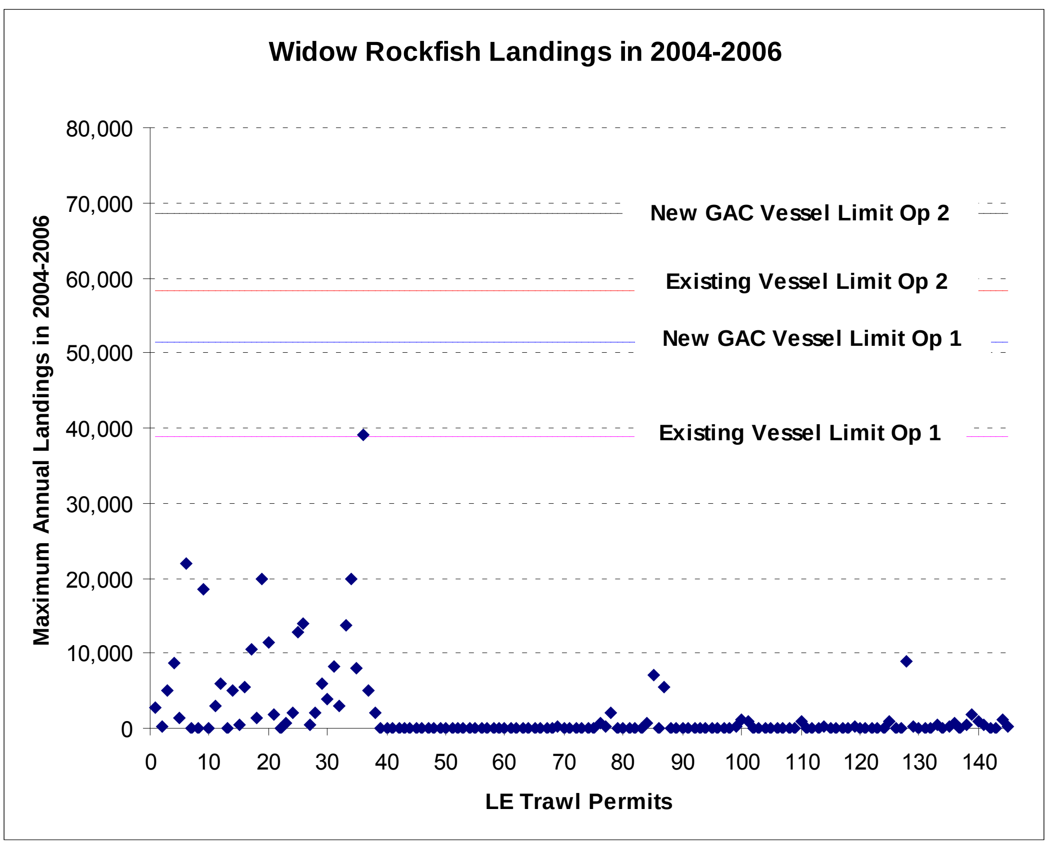


Figure 50. Maximum annual landings by permit of widow rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

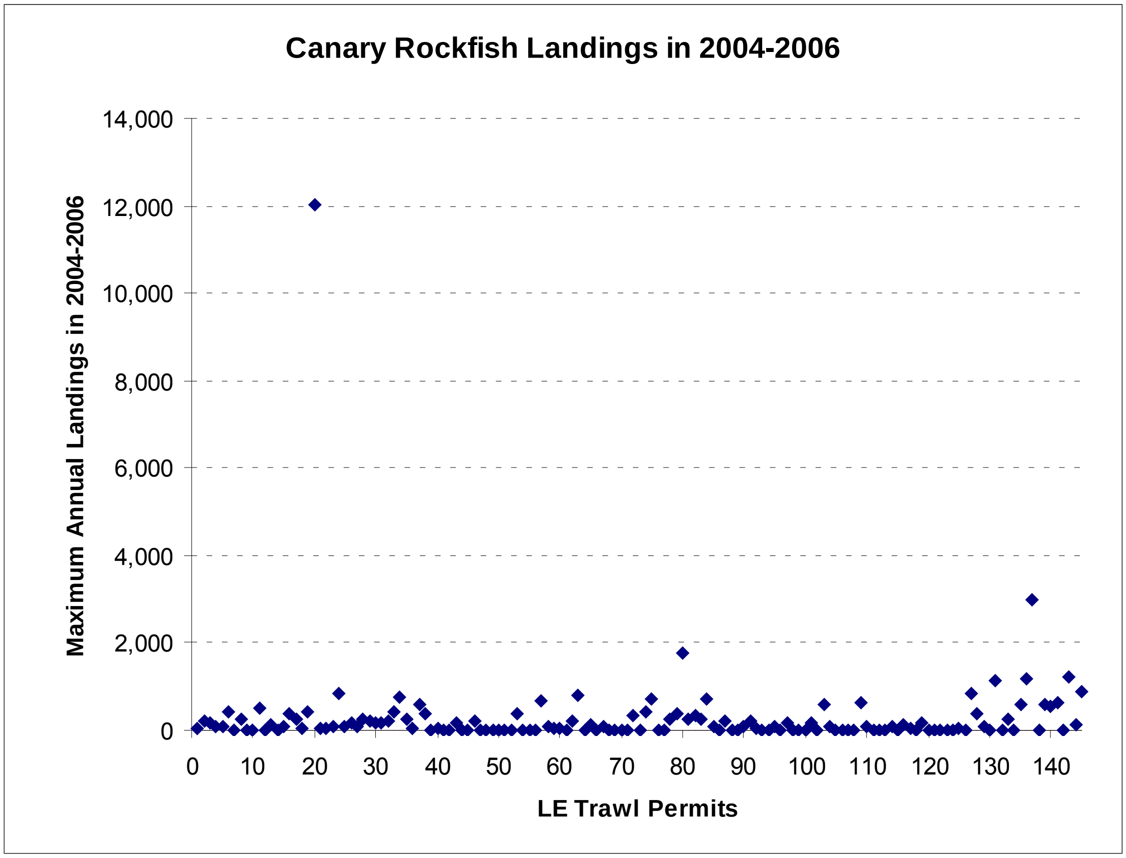


Figure 51. Maximum annual landings of canary rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

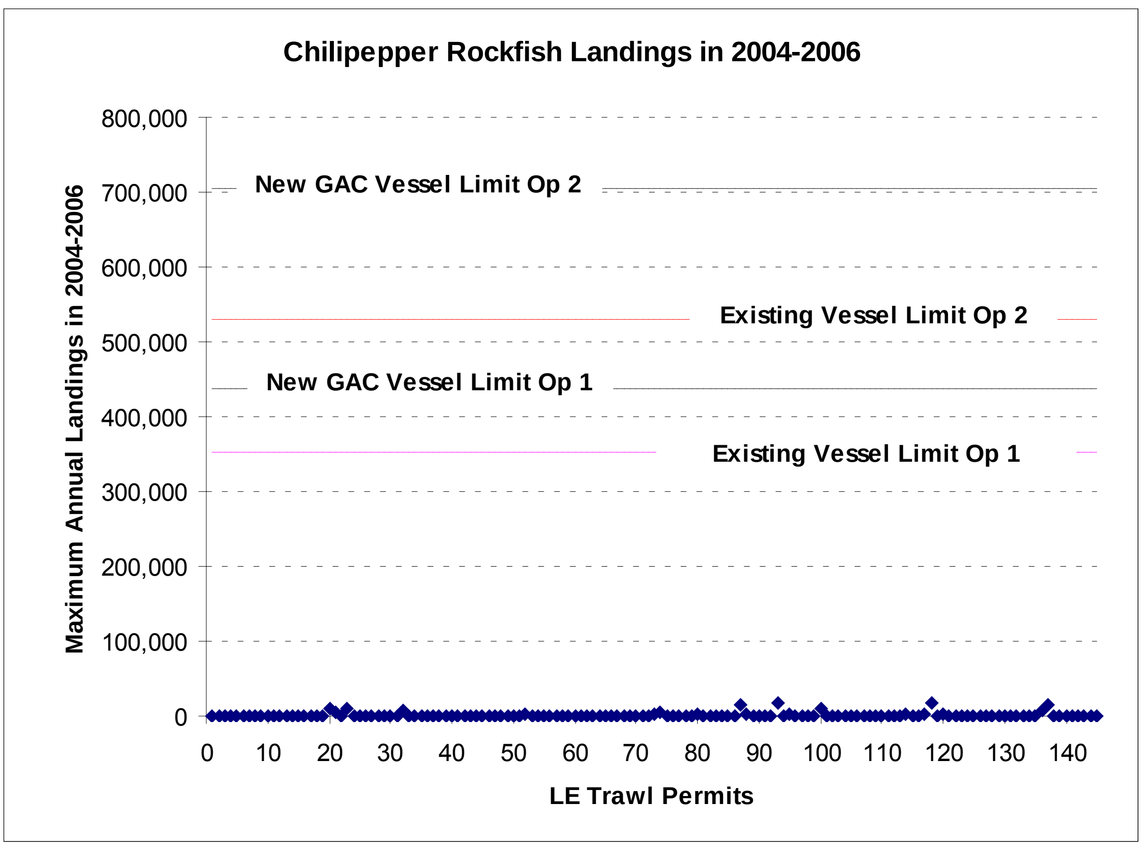


Figure 52. Maximum annual landings by permit of chilipepper rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

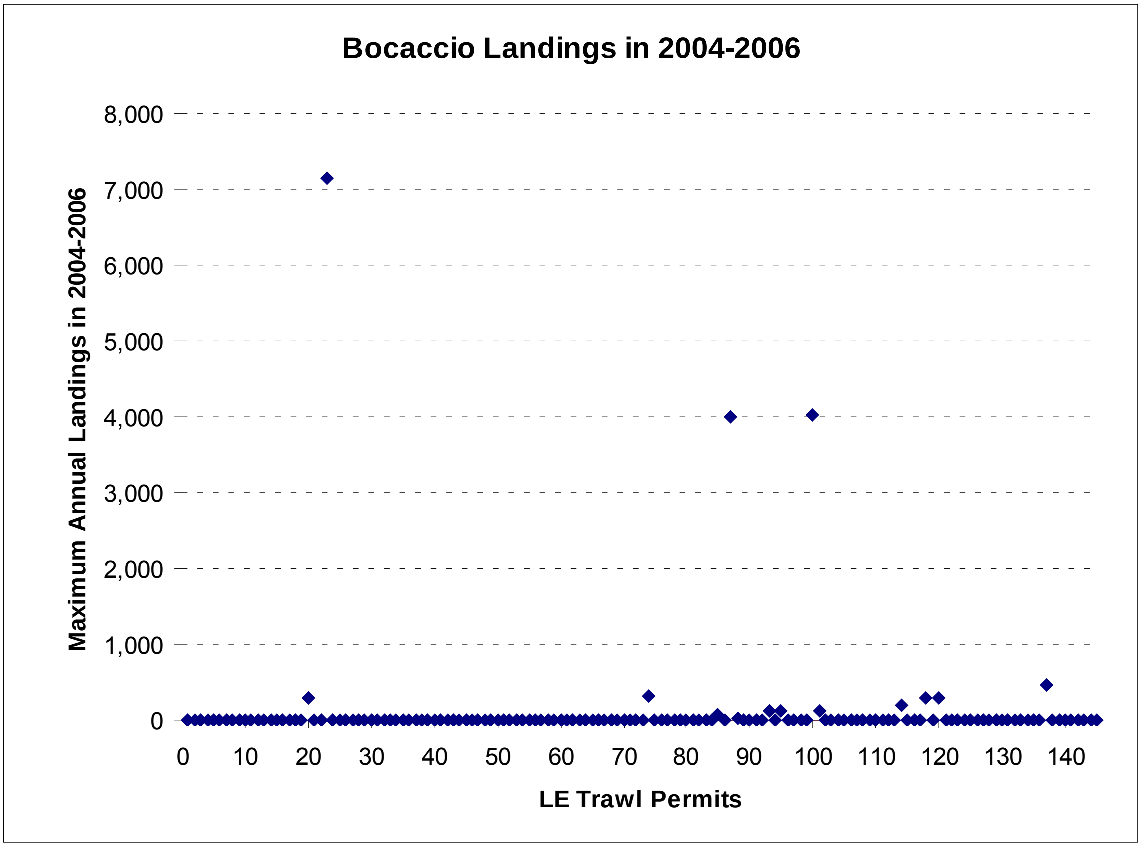


Figure 53. Maximum annual landings by permit of bocaccio rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

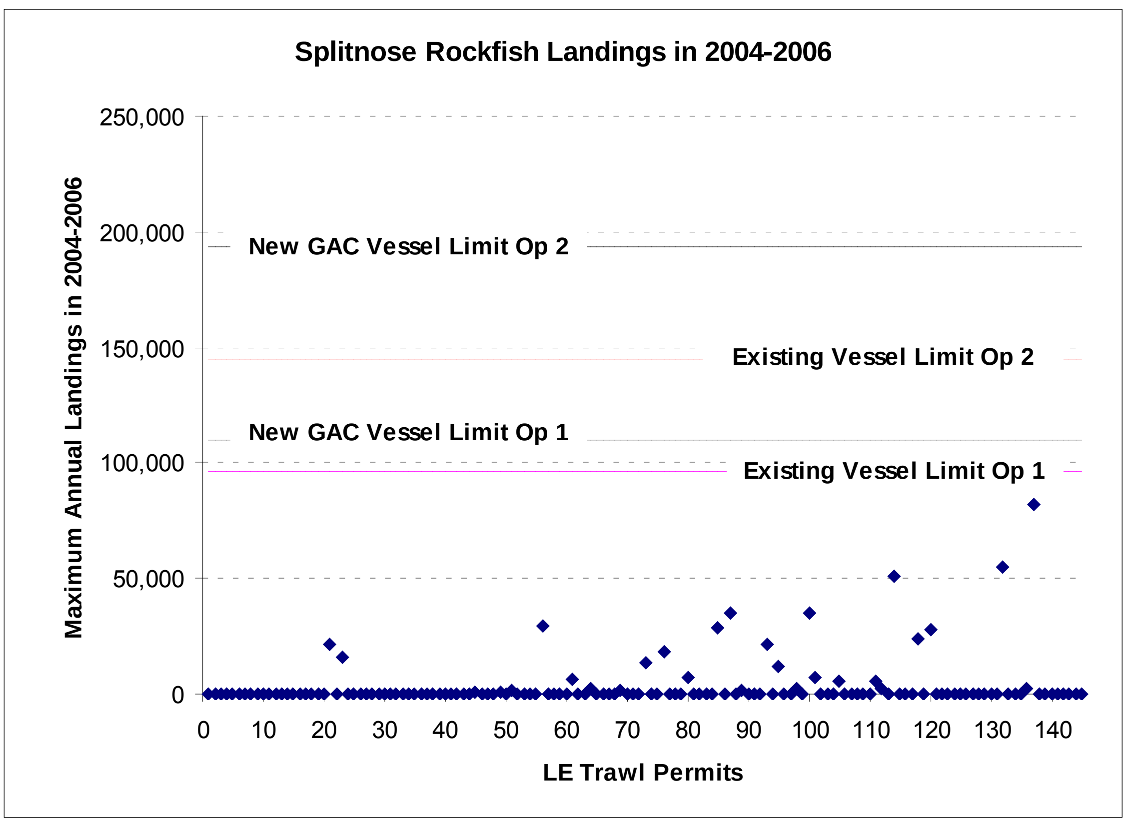


Figure 54. Maximum annual landings by permit of splitnose rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

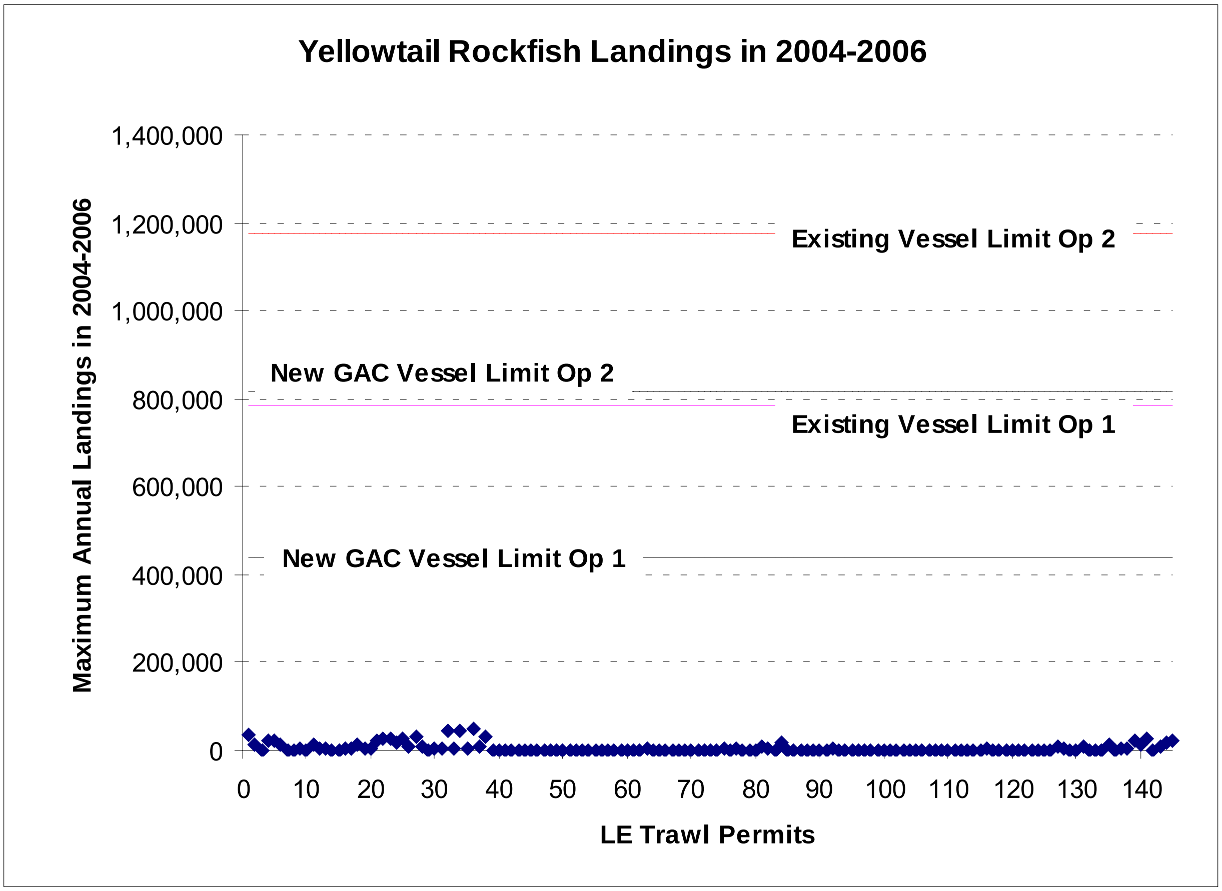


Figure 55. Maximum annual landings by permit of yellowtail rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

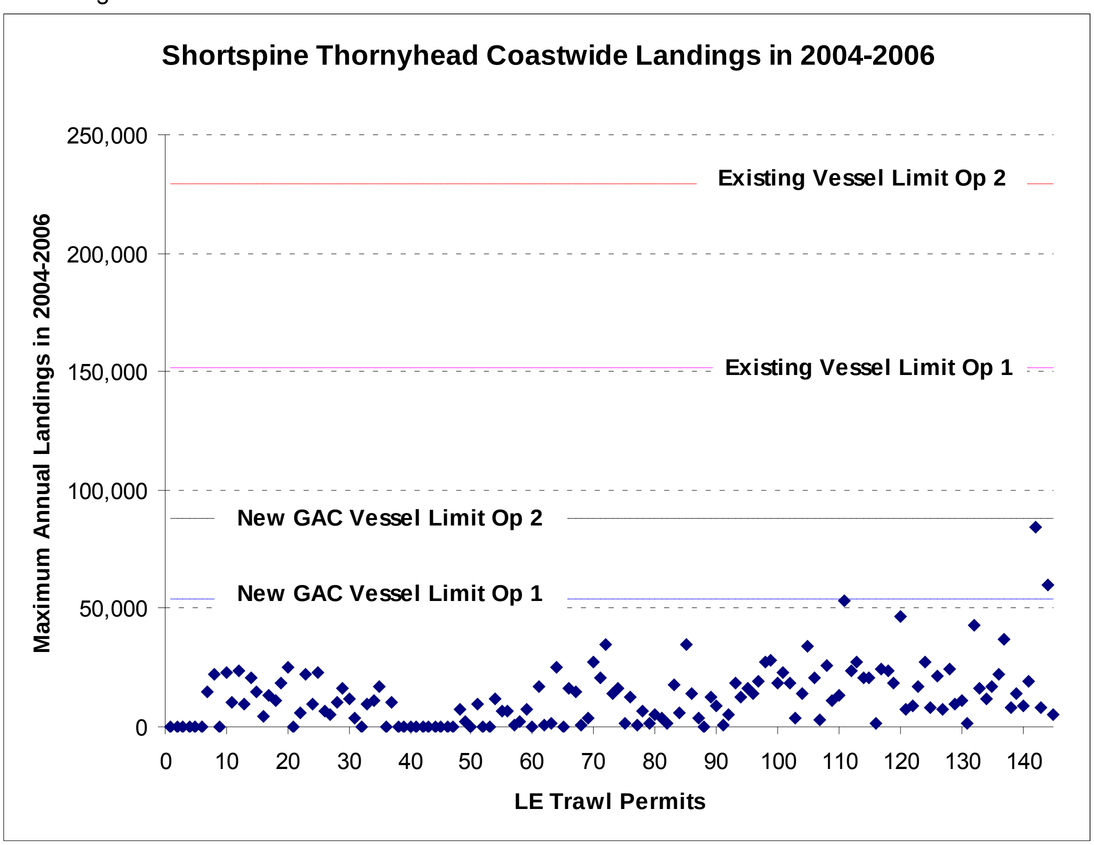


Figure 56. Maximum annual landings by permit of shortspine thornyhead coastwide for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

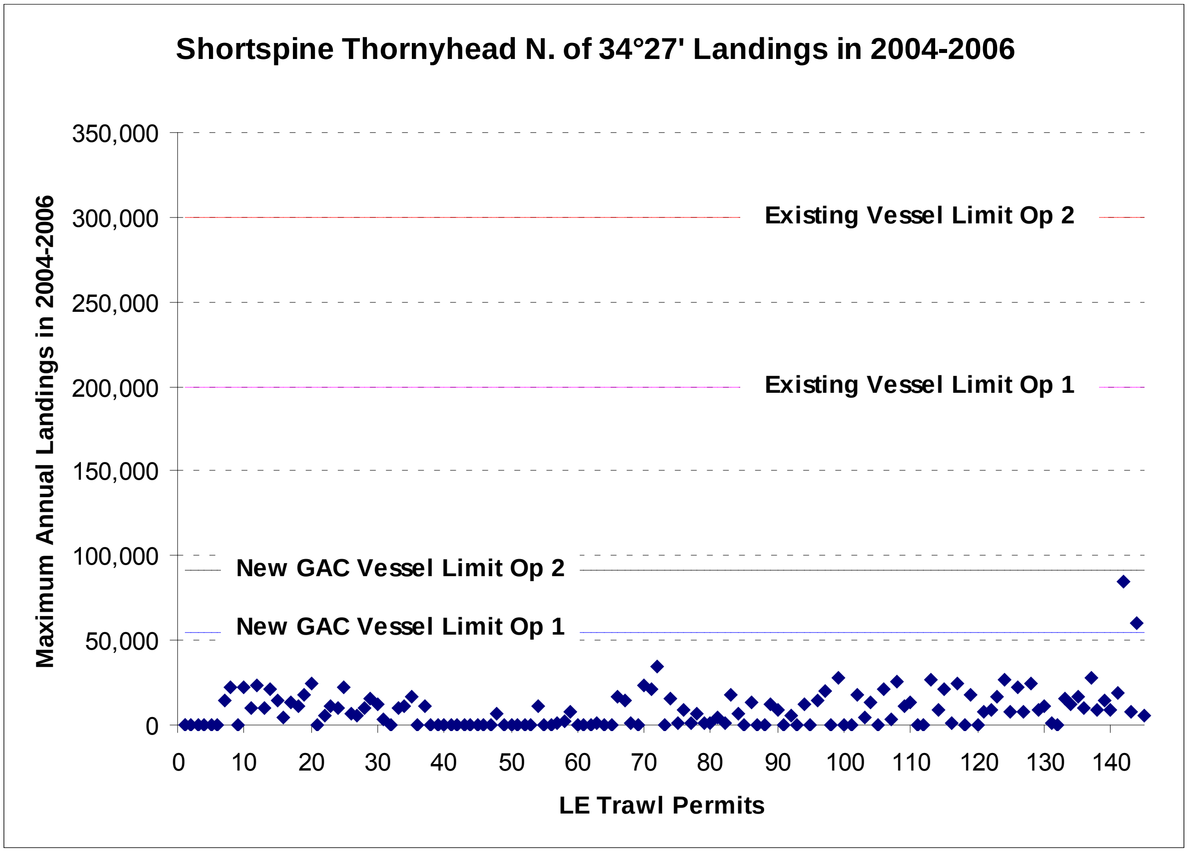


Figure 57. Maximum annual landings by permit of shortspine thornyhead north of 34°27' for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

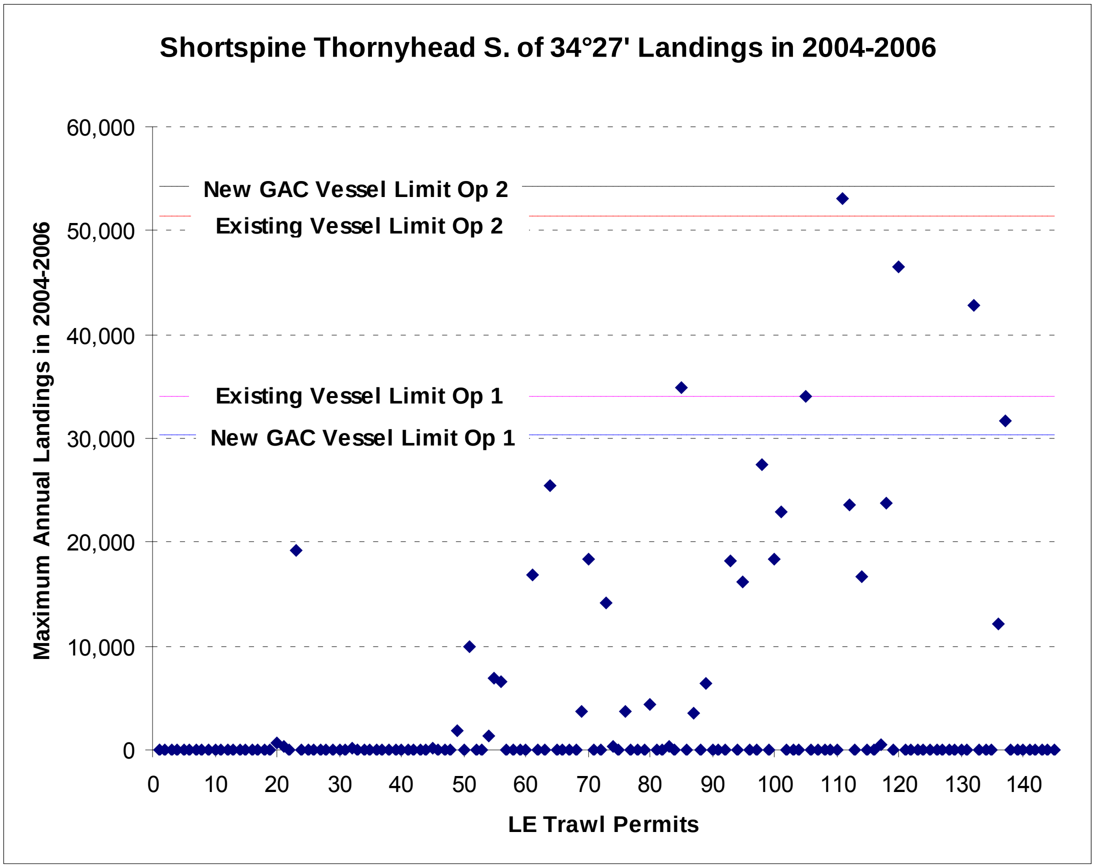


Figure 58. Maximum annual landings by permit of shortspine thornyhead south of 34°27' for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

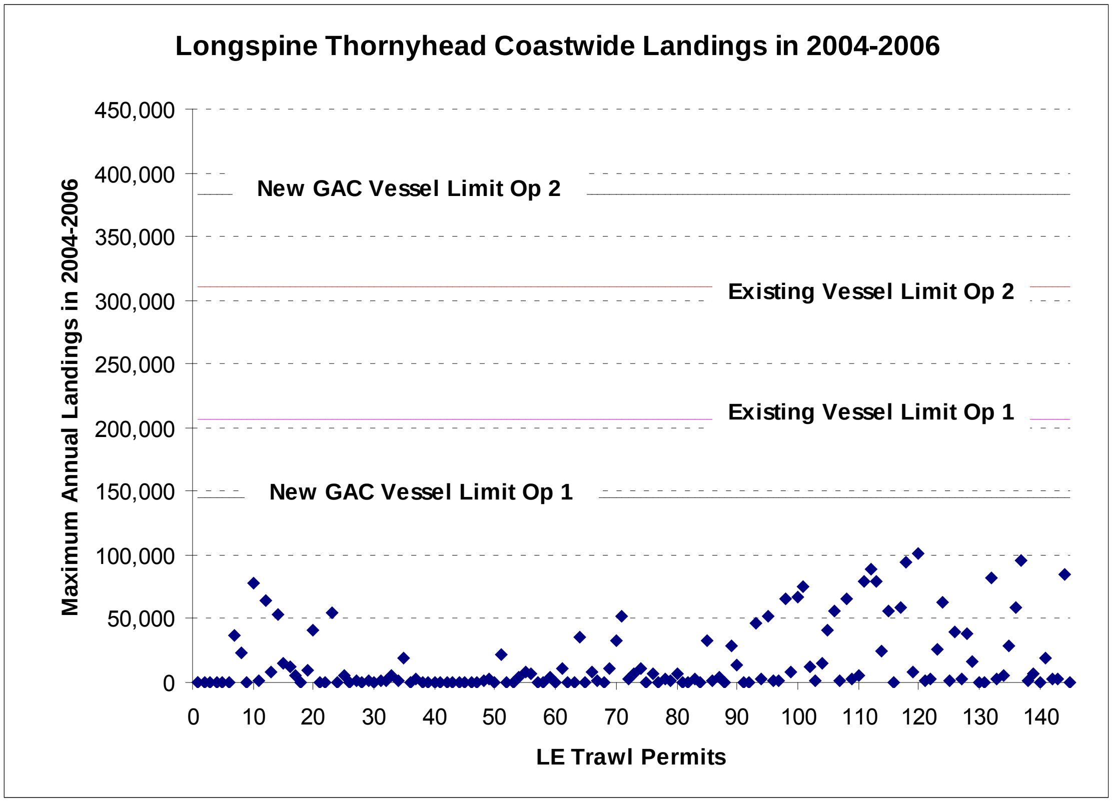


Figure 59. Maximum annual landings by permit of assumed longspine thornyhead coastwide for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

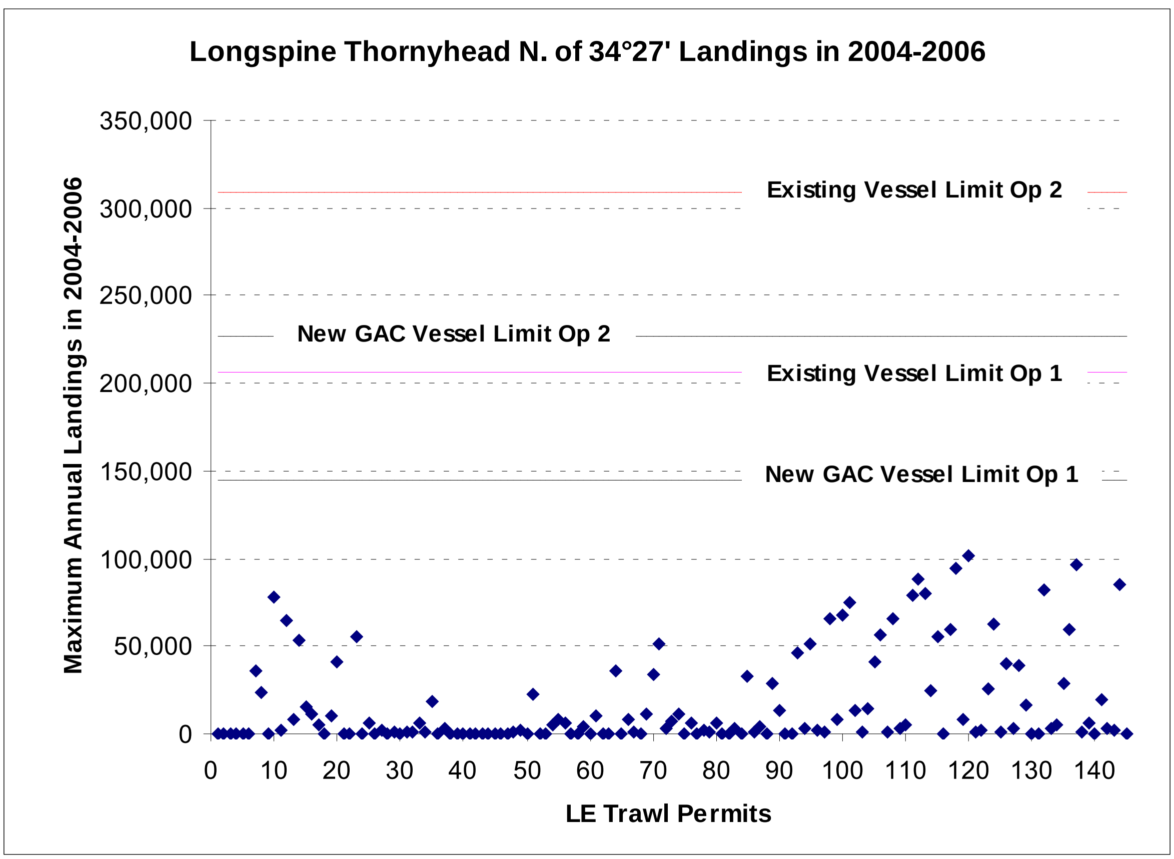


Figure 60. Maximum annual landings by permit of longspine thornyhead north of 34°27’ for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

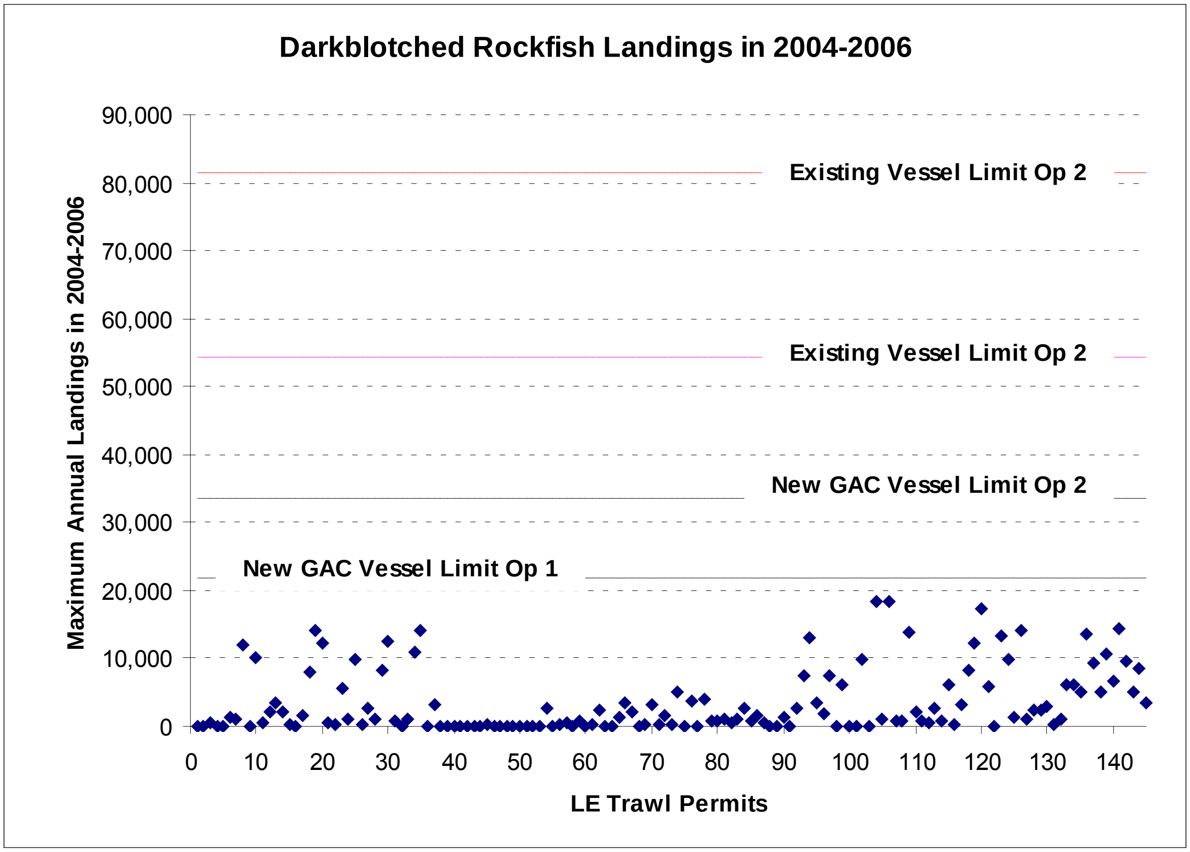


Figure 61. Maximum annual landings by permit of darkblotched rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

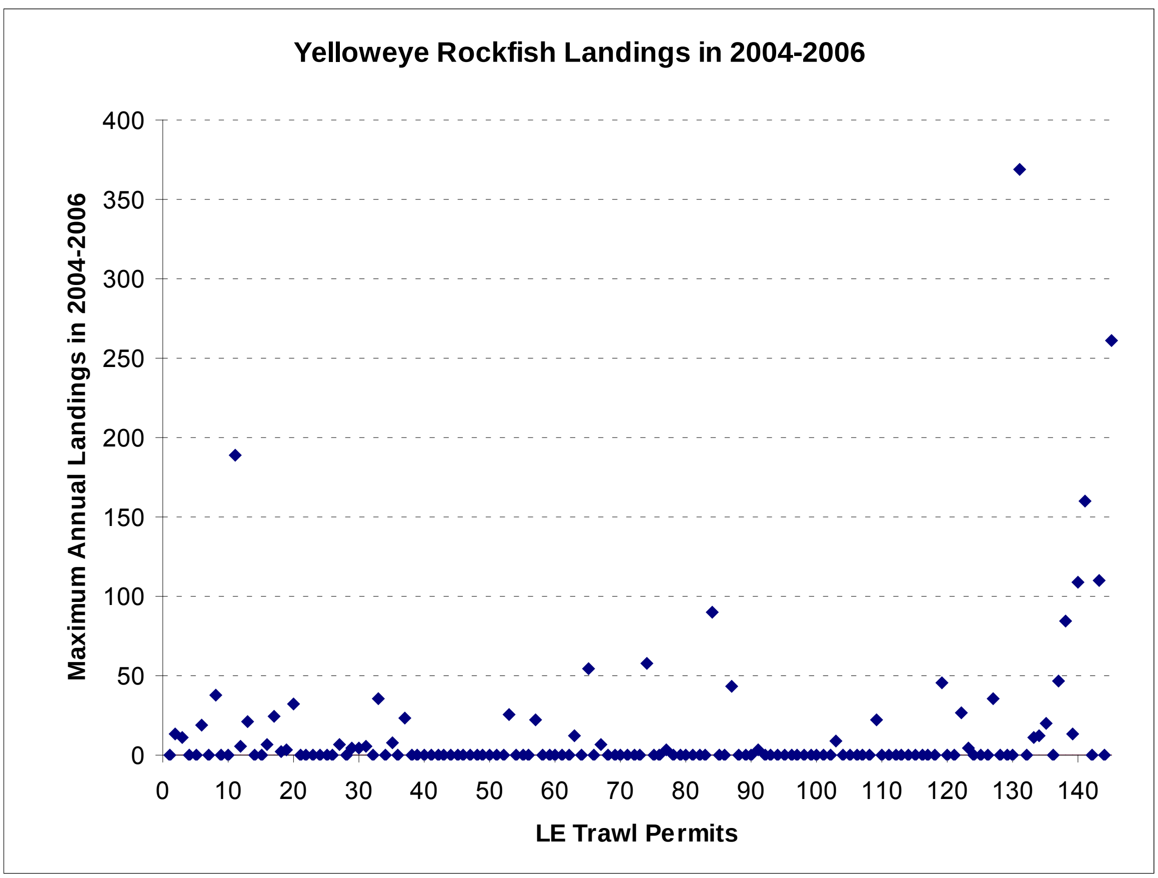


Figure 62. Maximum annual landings by permit of yelloweye rockfish for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

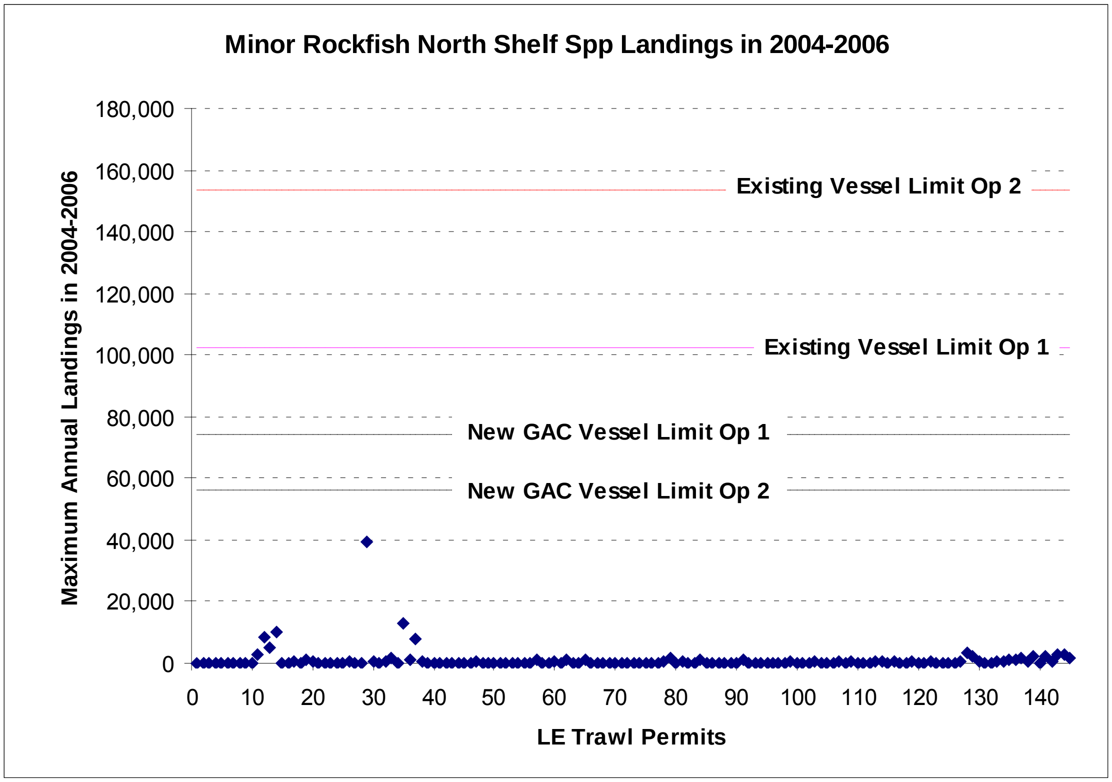


Figure 63. Maximum annual landings by permit of minor northern rockfish shelf species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

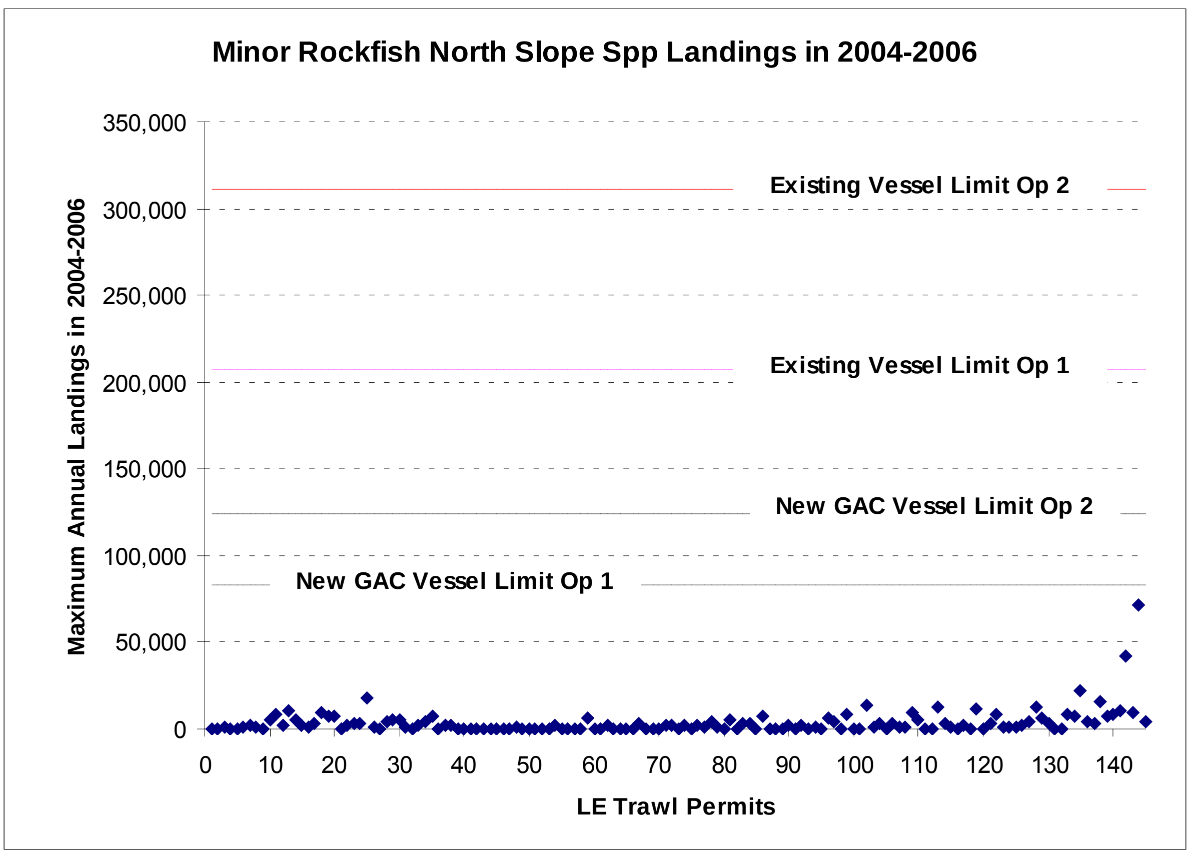


Figure 64. Maximum annual landings by permit of minor northern rockfish slope species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

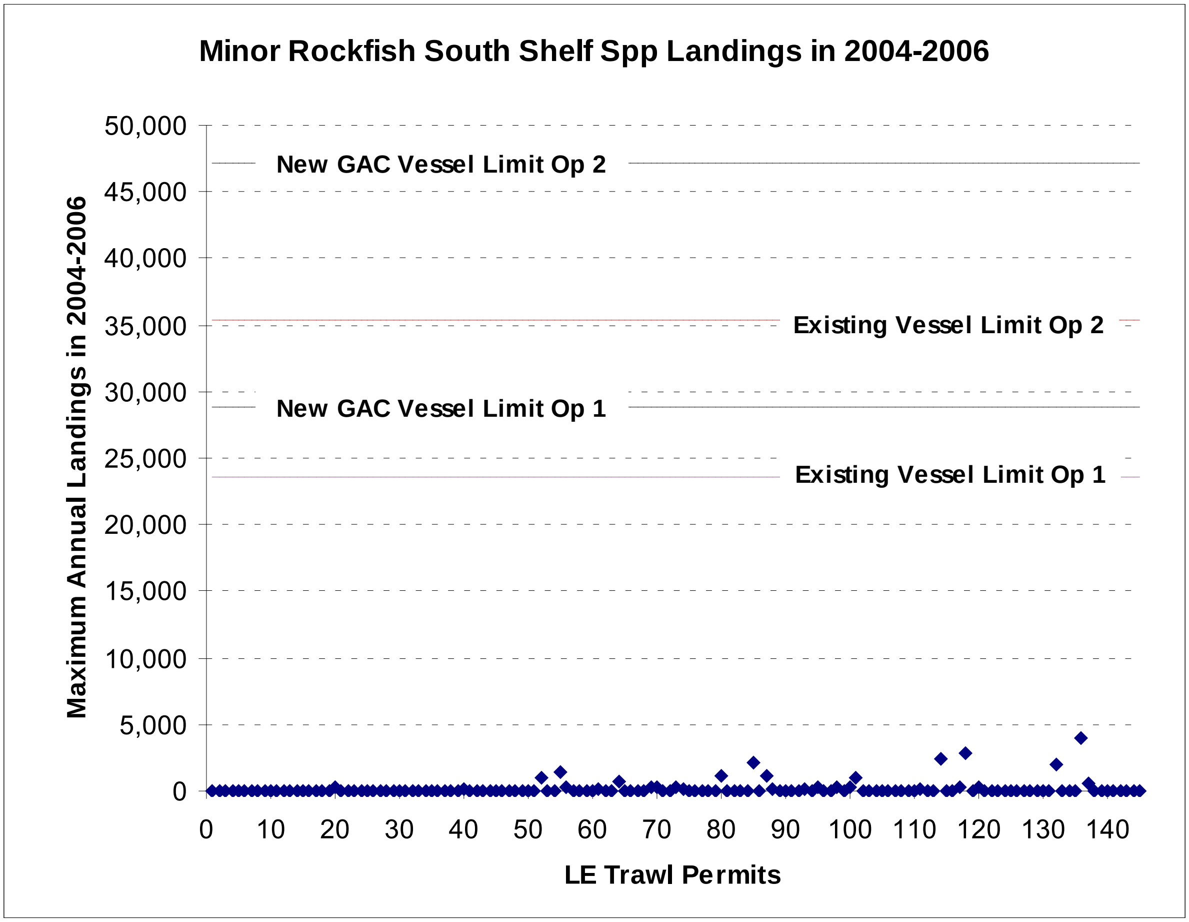


Figure 65. Maximum annual landings by permit of minor southern rockfish shelf species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

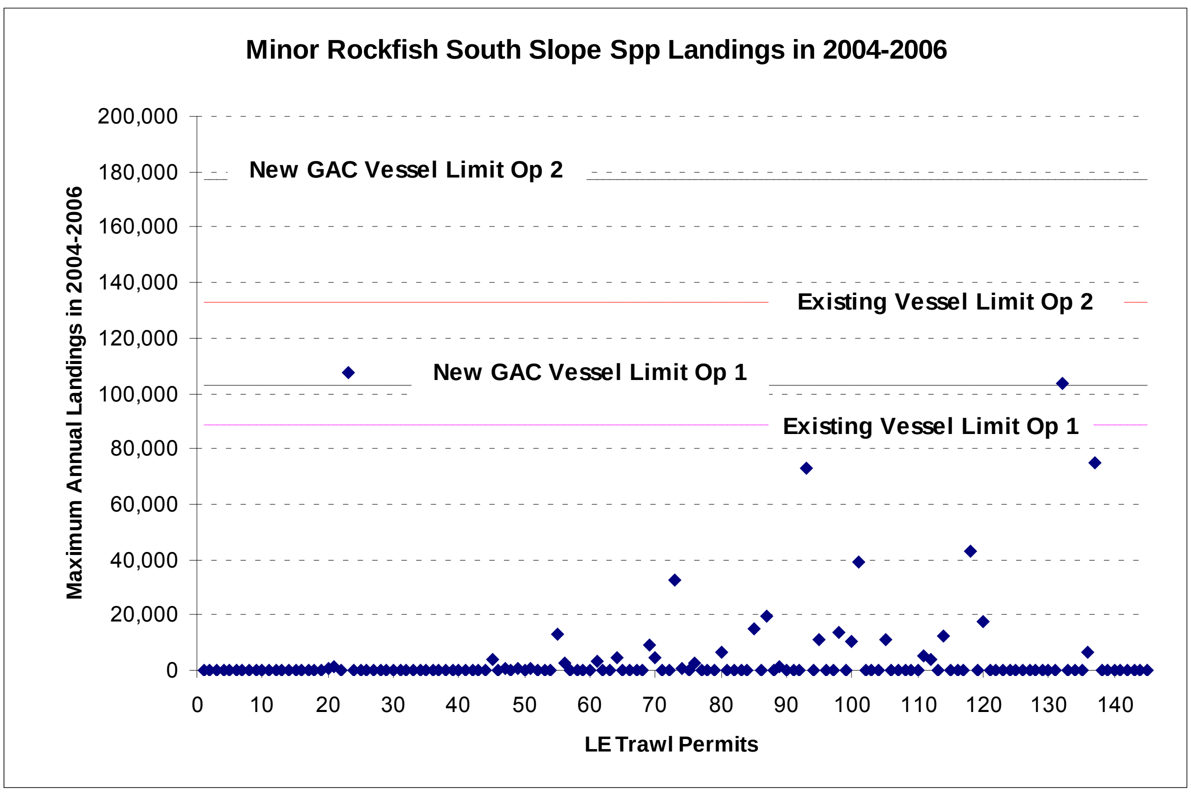


Figure 66. Maximum annual landings by permit of minor southern rockfish slope species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

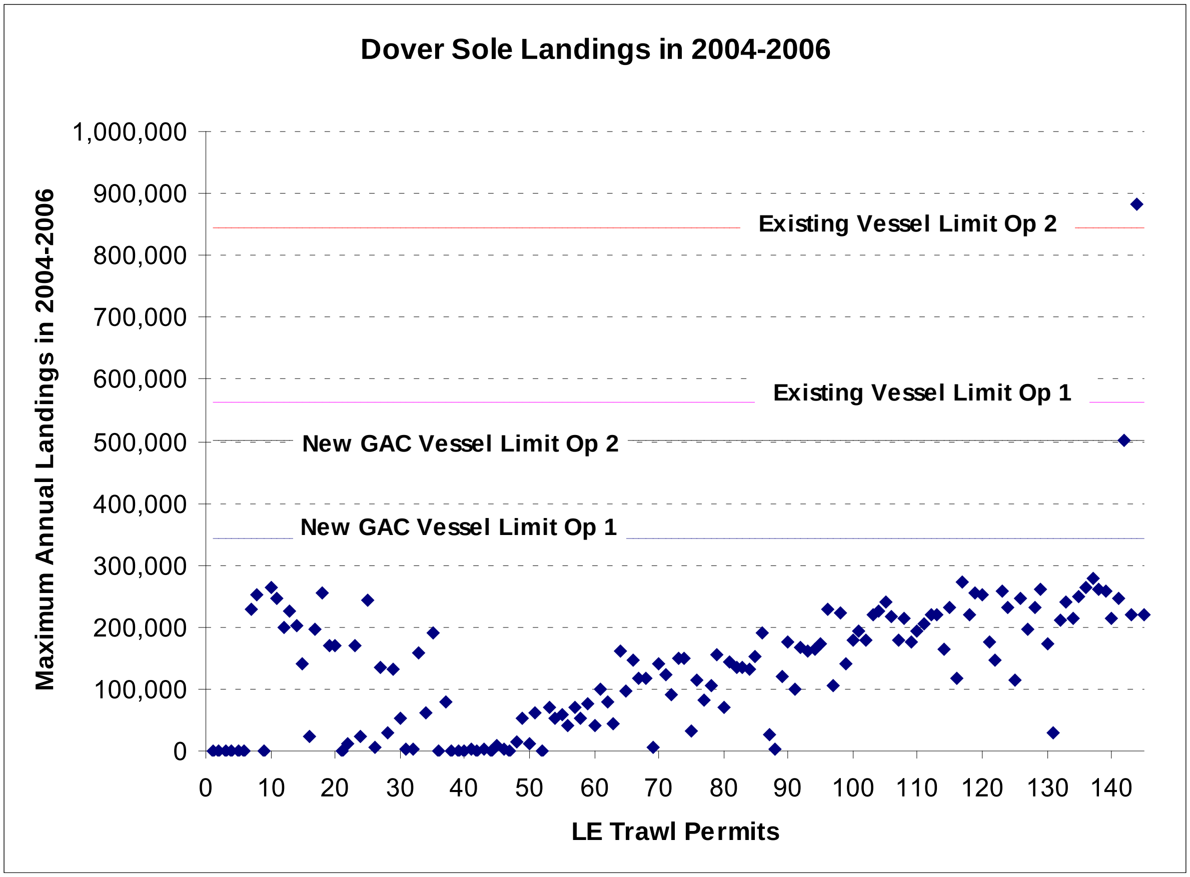


Figure 67. Maximum annual landings by permit of Dover sole for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

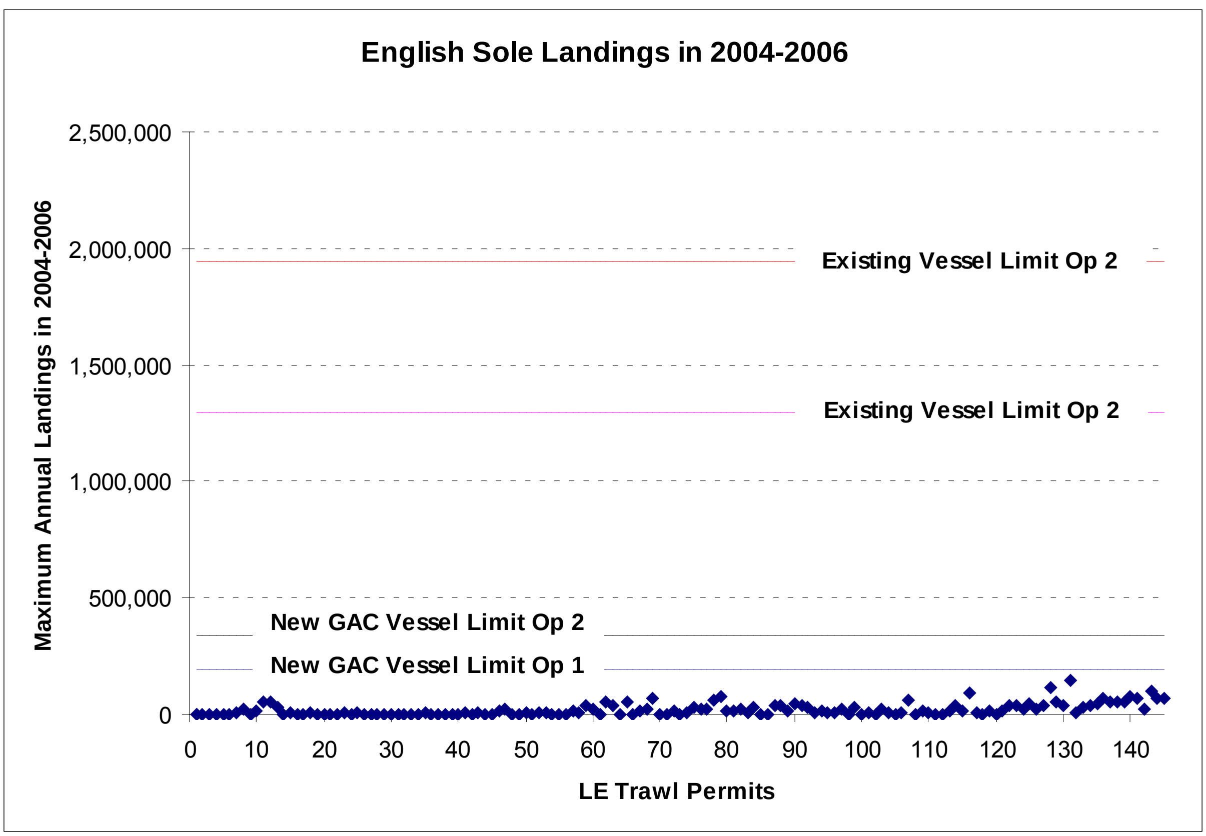


Figure 68. Maximum annual landings by permit of English sole for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

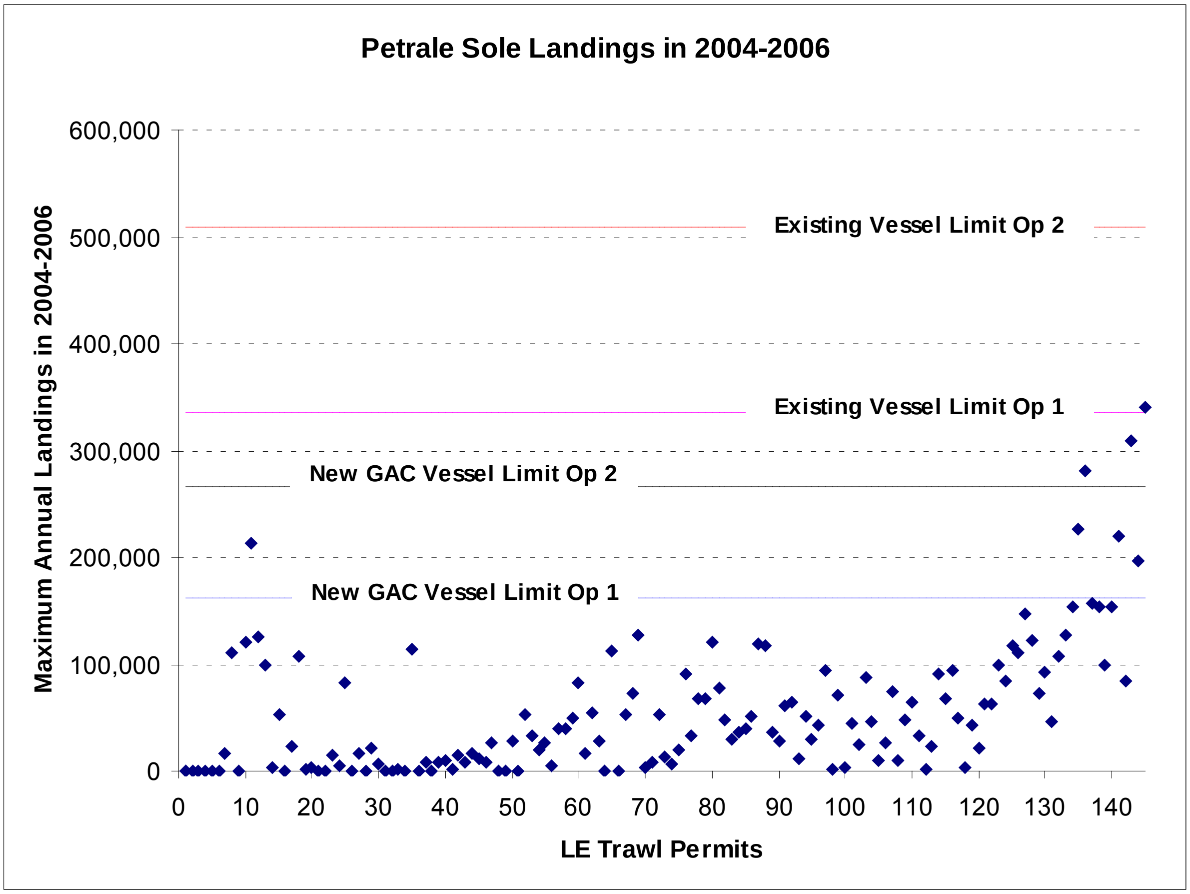


Figure 69. Maximum annual landings by permit of Petrale sole for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

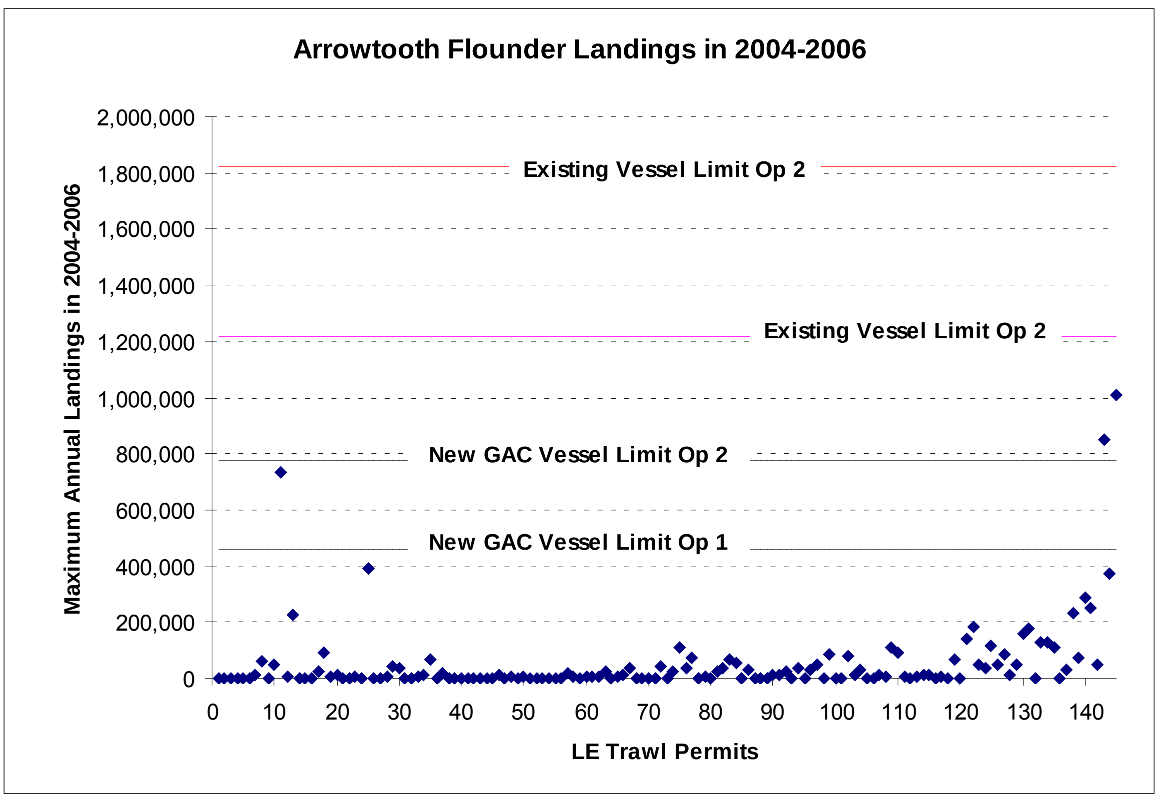


Figure 70. Maximum annual landings by permit of arrowtooth flounder for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

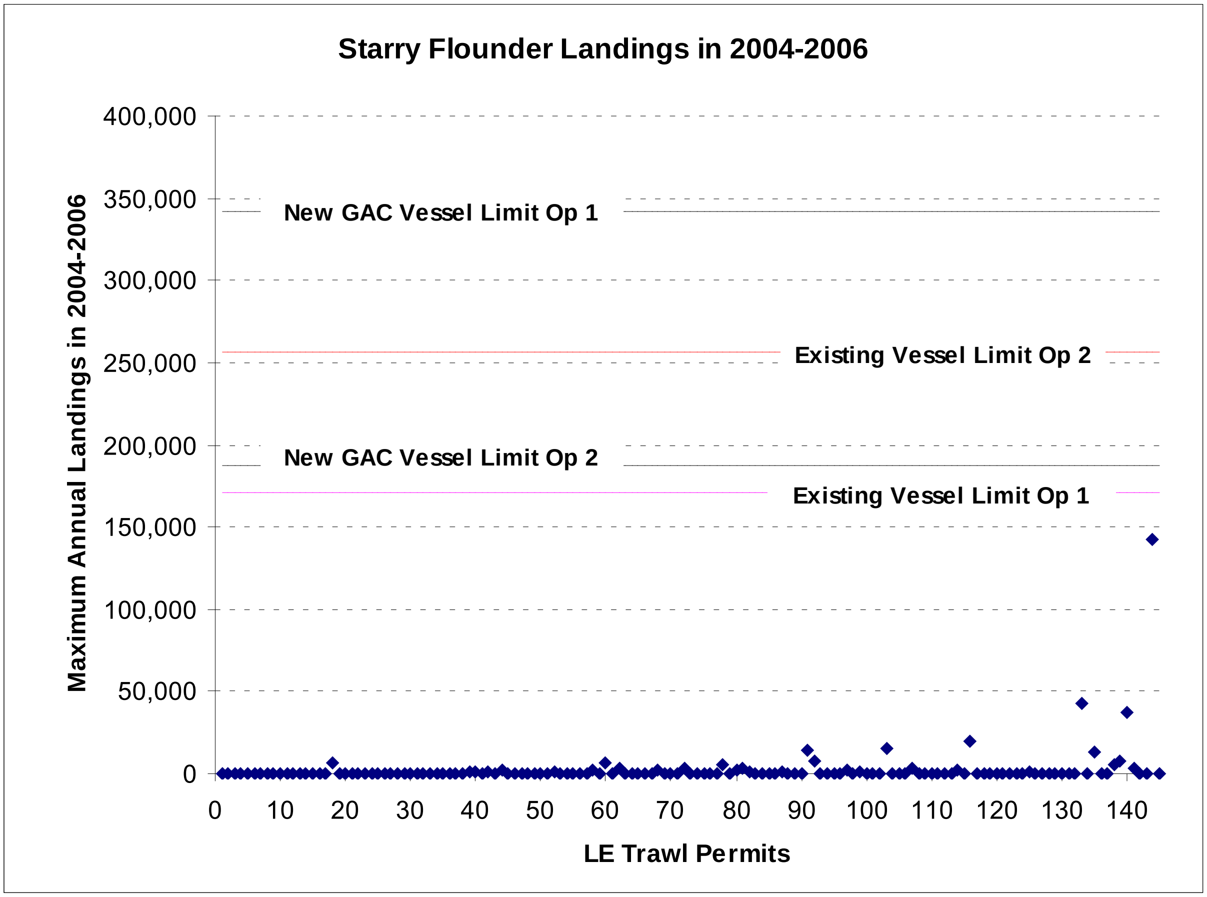


Figure 71. Maximum annual landings by permit of starry flounder for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

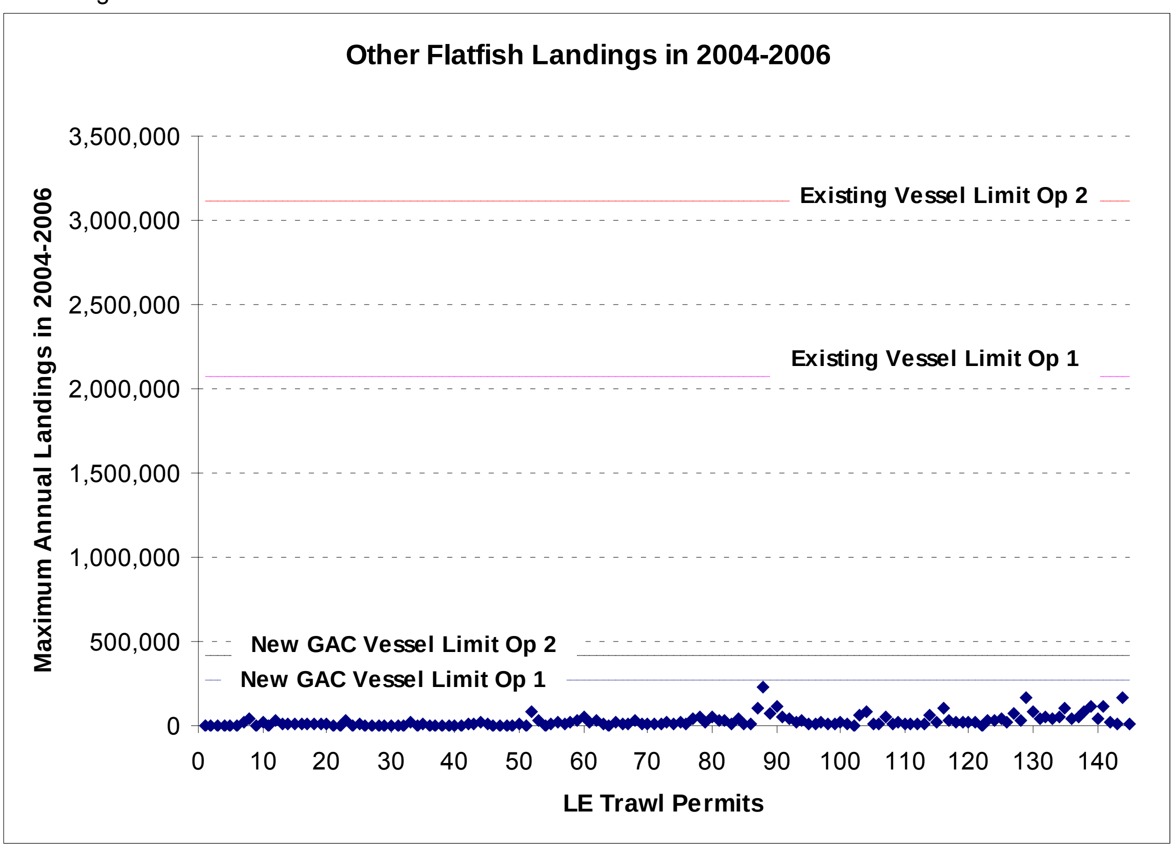


Figure 72. Maximum annual landings by permit of other flatfish species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

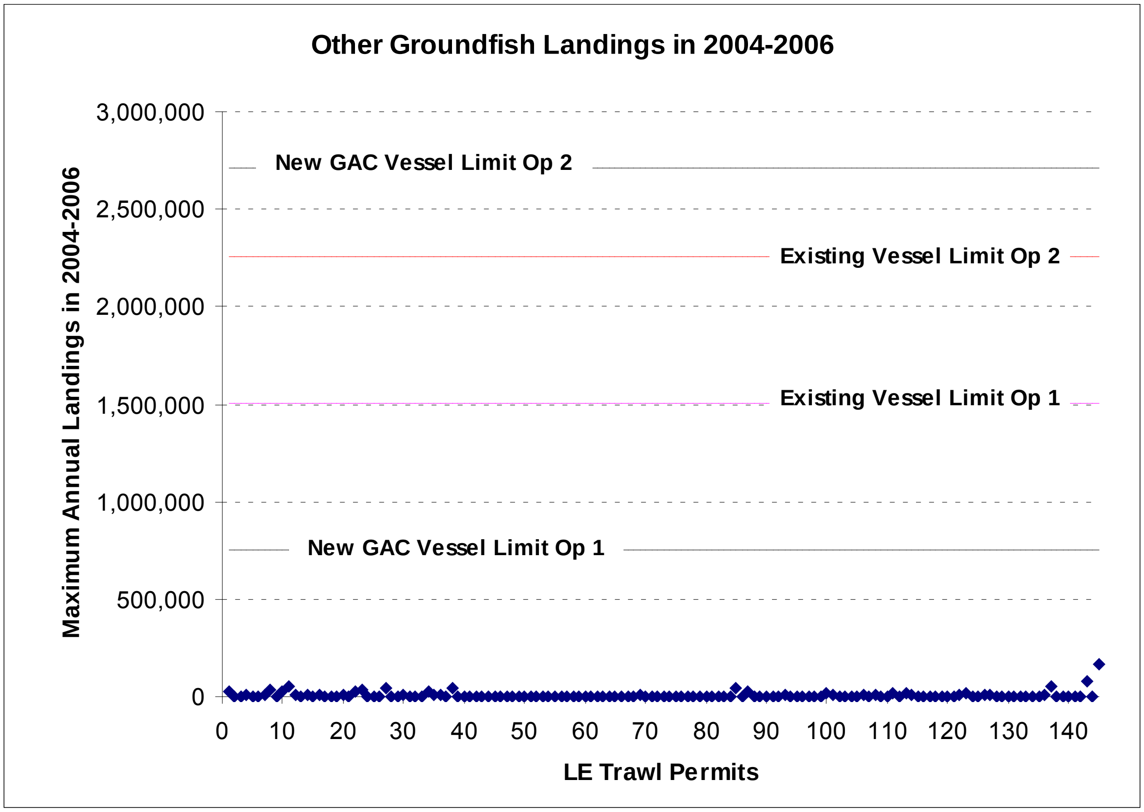


Figure 73. Maximum annual landings by permit of other groundfish species for permits active in the shoreside whiting or nonwhiting fisheries from 2004-2006.

APPENDIX C: The British Columbia System and Accumulation Limits

In 1997, the British Columbia (BC) Groundfish Trawl Individual Vessel Quota (IVQ) Program was implemented. As of 2006, the trawl fishery consisted of approximately 135 active vessels (142 limited entry vessels in all) that range from 50 to 120 feet in length. The BC IVQ system manages 27 stocks of fish. This includes 55 different IVQ allocations due to area specifications. A total of 77 species of fish are landed in the groundfish fishery. The species not included under the IVQ program are managed through trip limits and other means or are not regulated.

There are caps placed on quota ownership so that no one person or small group of persons owns an amount of quota that is deemed “too large”. The maximum amount of each species a vessel owner can own varies by species from 4-10 percent of the TAC. There is also a vessel specific cap on the total amount of quota of all species an individual vessel owner can hold. These caps were calculated at the time of initial allocation and range from 0.62 percent up to 5.36 percent.

An important element of the BC system is that only vessel/permit owners can hold IVQ. This may impact the effectiveness of the program in maintaining distribution of a mix of species among all vessels If a vessel owner were to sell off all of a particular species needed to harvest a complex he/she would substantially diminish the earnings security for the fishing business. In contrast, under the Council recommended West Coast system persons who are not vessel owners may own QS. These individuals may benefit from holding QS in a mix that does not match the species needed for a particular targeting strategy. Because of this, over time, there might be more potential than in the BC system for the ownership of QS for key incidental catch species to be separated out from the ownership of the main target species.

BC Individual Vessel Quota Species Caps

The following species caps are set on a BC coast-wide basis for all IVQ species, except hake. Only temporary quota reallocations (temporary quota is equivalent to our QP) are permitted to exceed the individual permanent species cap (equivalent to a QS accumulation limit) and only up to the temporary species cap level (equivalent to a QP accumulation limit). Temporary vessel caps may be subject to adjustment in season.

Table 22. Accumulation caps in the BC trawl fishery.		
	Permanent Species Cap	**Temporary Species Cap**
Analogous to	The Amount of QS Associated With a Vessel	The Amount of QP Associated with a Vessel
Yellowtail Rockfish	5	7
Widow Rockfish	5	7
Canary Rockfish	4	6
Silvergrey Rockfish	4	6
Pacific Ocean Perch	5	5
Yellowmouth Rockfish	5	5
Rougheye Rockfish	7	10
Shortraker Rockfish	7	10
Redstripe Rockfish	5	7
Shortspine Thornyheads	10	10
Longspine Thornyheads	10	10
Yelloweye Rockfish	4	4
Quillback, Copper, China and Tiger Rockfish Combined	4	4
Pacific Cod	4	6
Dover Sole	5	5
Rock Sole	5	7
Lemon Sole	6	8
Petrale Sole	4	6
Lingcod	5	7
Dogfish	10	10
Sablefish	5	7
Pollock	10	15
Hake (Gulf of Georgia)	15	15
Hake (Offshore)	10	10
Big Skate	7.5	7.5
Longnose Skate	7.5	7.5
Arrowtooth Flounder	8	15

Total IVQ Holdings Cap (Aggregate Limit)

Each groundfish trawl license is subject to a total holdings cap for all species, set at a level which allows vessel owner(s) to adjust their IVQ holdings to a viable level while ensuring that operators cannot accumulate an unreasonably large amount of IVQ. IVQ holdings caps were calculated for each groundfish trawl license, during the first year of the IVQ program. The total IVQ holdings cap for each groundfish trawl license was measured in "groundfish equivalents" (see following paragraph) as a percentage of total groundfish equivalents. These holdings caps, determined in 1997, continue to remain in effect. The aggregate holding caps for vessels range from 0.62 percent up to 5.36 percent.

To determine an individual's aggregate IVQ holdings, the BC system weights the IVQ based on price relative to Pacific Ocean Perch. For example, if the price of POP is four times the price for Dover sole, the IVQ for POP would count for four times as much as a similar amount of QS held for Dover sole when calculating an individual's aggregate holdings. In the BC system, the price ratios are used to calculate a "groundfish equivalent" for each species, which are then totaled to determine aggregate holdings. Under our system it is proposed that the aggregate QS holdings be calculated by weighting an individual's holding of each type of QS by the trawl allocation for that QS. For example, if the trawl allocation for lingcod is 3,000 mt and the allocation for Dover sole is 12,000 mt, then when calculating an individual's aggregate holdings, the QS for lingcod would count for one quarter as much as a similar amount of QS held for Dover sole. This will be discussed further in Section D.6.b.

GMT/Council Staff analysis on Accumulation Limits

A presentation on Agenda Item G.4.b, GMT Report.

Purpose: *to evaluate GAC accumulation limit options against actual vessel target strategies and ex-vessel earnings.*

The GMT’s Approach

- Set limits for the key non-whiting target species first.
- Use exvessel revenues as a guide.
- Start with a “one vessel, one owner” scenario.
- Examine importance of the aggregate groundfish accumulation limit.

Why Accumulation Limits?

Basic Policy Rationales

What is the Council trying to achieve?

Accumulation Limits

The MSA LAPP provisions require the Council to set accumulation limits or other measures to:

- Ensure that no one acquires "an ***excessive*** share"

- "prevent an ***inequitable concentration.***"

-MSA 303A(c)(5)(D)

Accumulation Limits

ex·ces·sive: exceeding what is usual, proper, necessary, or normal.

excessive implies an amount or degree too great to be reasonable or acceptable.

in·eq·ui·ta·ble: not equitable : unfair.

-Merriam-Webster Online Dictionary

Two Limits

Separate but related policy rationales:

1. **Control Limits (QS):**

   How much quota should an entity be able to own?

   - Meant to ensure that no person captures an unreasonable share of a public resource.
   - Buffer against anticompetitive effect of concentrated ownership.

2. **Vessel Usage Limits (QP):**

   How much fish should one boat be able to catch?

   - Aimed at keeping a minimum number of vessels in the fleet, maintaining some of the character and geography of today’s fleet.

Control Limits

What's a reasonable or acceptable amount of QS for one person or entity to own?

- What level of ownership is "unreasonable"; "unacceptable"; or beyond what is "necessary" or "normal" in the Councils vision for the fishery?
- How much profit should one entity be able to extract from the limited public groundfish resource?

What level of concentration might risk unfair results?

- To fishing communities? To other quota holders? To new entrants?

Vessel Limits

At what point is fleet consolidation unacceptable?

An "acceptable" fleet size would:

- Maintain some character of current fleet.
- Create more crew employment, economic benefit to communities.
- Maintain geographic dispersion of the fleet.

Fundamental Tradeoff

If set too high, there could be more consolidation than desired in ownership or fleet size.

If set too low, limits might hamper needed improvements in fleet efficiency and profitability.

Vessel Usage Limits

The GMT has focused on vessel usage limits because they relate more directly to fleet behavior.

We proposed looking at revenues because revenues drive fleet behavior.

Yet we had some questions:

- *How much revenue is enough?*
- *How do you combine revenues associated with species specific accumulation limits in a meaningful way?*
- *What was the proper relationship between control limits and vessel limits?*

The One Vessel, One Owner Scenario

Can an independent owner-operator hold enough QS to operate a vessel profitably without having to lease QP from others?

In this scenario, control limits converge with vessel limits.

The GMT Approach

The GAC Options

Use 90th percentile values from either the 1994-2003 window period (Option 1) or the 2004-2006 baseline (Option 2) to establish control limit. Set vessel usage caps at twice the control limit.

Some major benefits of the TIQ program are expected from:

- Improved catch accounting
- Individual accountability for bycatch
- *A more efficient, more profitable trawl fleet.*

Vessel profitability can be improved by either:

Increasing revenues

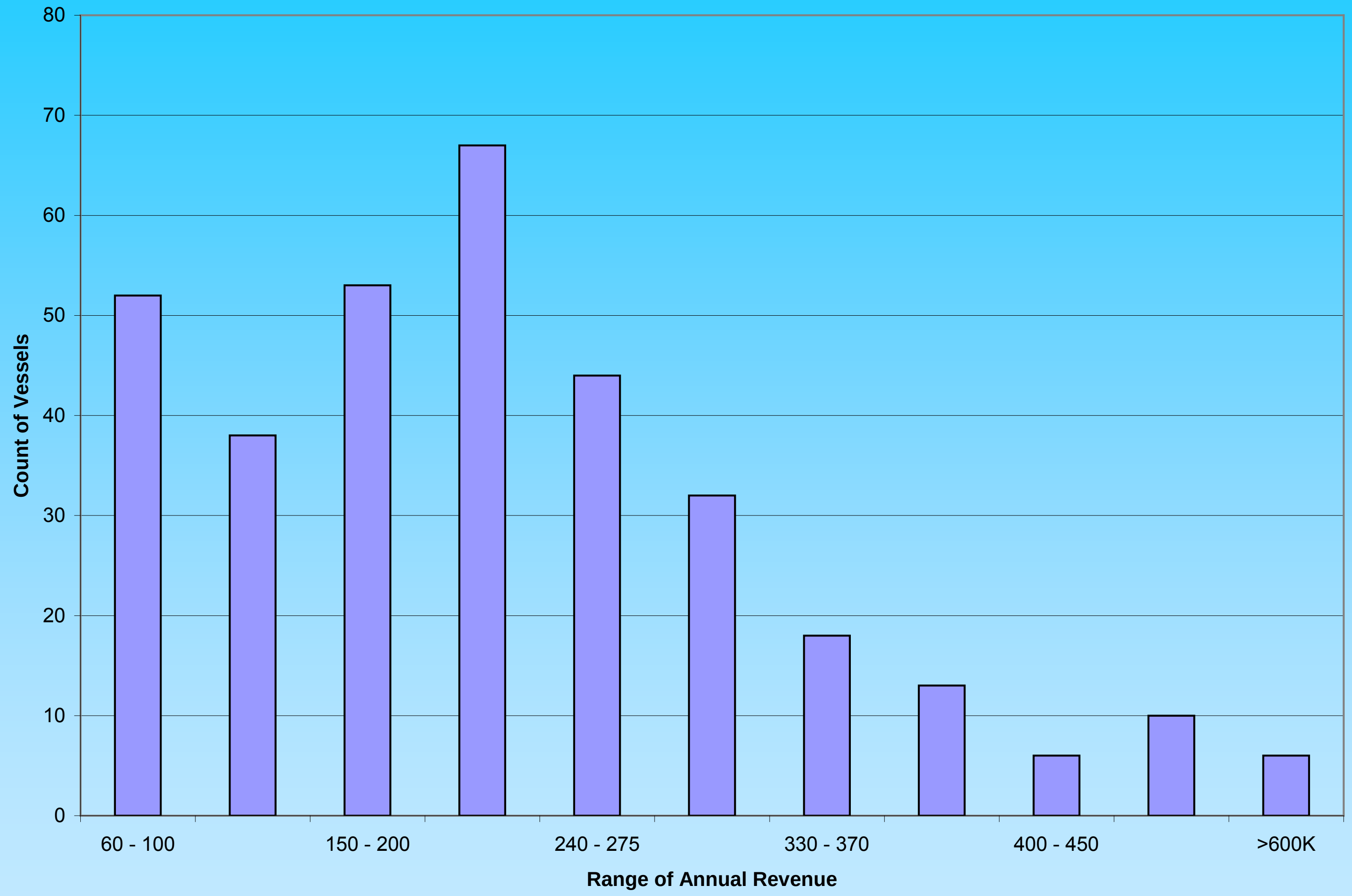
and/or

Decreasing costs

Under the TIQ program, it will be more expensive to operate a vessel because of increased tracking and monitoring costs.

At the same time, fleet consolidation is expected to decrease fixed costs and increase average per-vessel revenues.

This makes it possible to cover higher operating costs and increase revenues, potentially returning the fleet to profitability.



Annual non-whiting vessel revenues ($K, 2004-2006)

Profitability Under Status Quo

EIS indicates that the average vessel generates wages and covers costs, but does not necessarily make a profit

Most vessels currently generate less than $300K per year, but some have earned more than $600K.

Profitability Under TIQ

What revenues would be necessary to achieve profitability and expected economic efficiencies under the TIQ program?

The analysis submitted to the Council by Lian, Weninger, and Singh suggests that the average vessel will need to generate somewhere on the order of ***$700K*** annually.

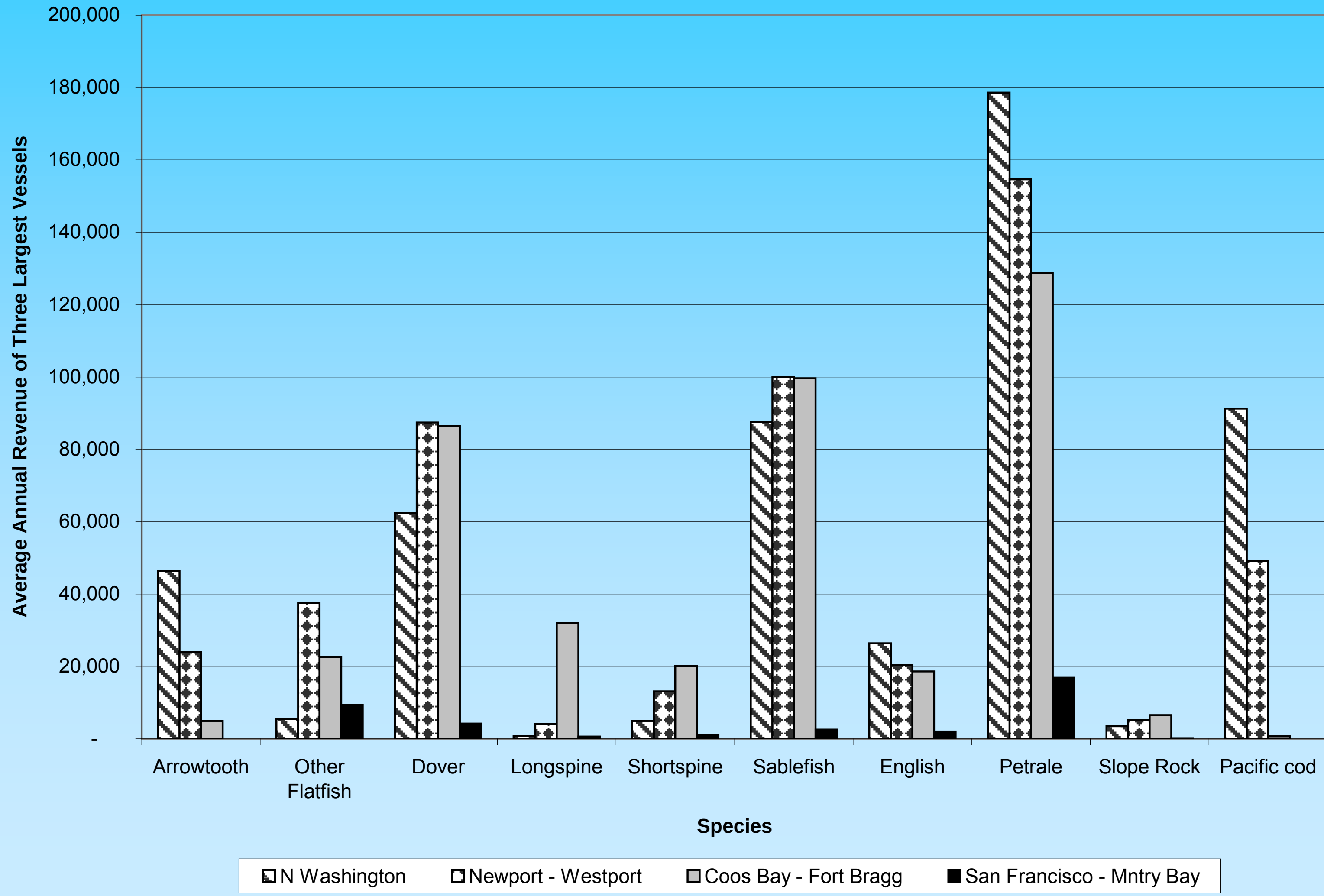
How do vessels fish under status quo?:

The non-whiting trawl fishery is a multi-species fishery with multiple target strategies.

There are known regional differences in target strategies and species landed.

Would 90th percentile control limit values accommodate these differences?

Regional Target Strategies
(top 3 vessels in each region)



The Big Three

Petrale and sablefish are major revenue earners in almost all regions.

Dover sole is also widely fished.

Region	Other Important Species*
N. Washington	–Arrowtooth –Pacific cod –English sole (marginal)
Newport – Westport	–Other Flatfish (for some vessels) –Pacific cod (for some vessels) –Arrowtooth (for some vessels) –English sole (marginal)
Coos Bay – Fort Bragg	–Longspine –Shortspine –Slope rock (if regulations allowed)
San Francisco–Monterey Bay	–Other flatfish
[illegible]	[illegible]

*other than sablefish, petrale, or Dover sole

Potential Exvessel Revenue Associated with the GAC 90th Percentile Options

		Maximum Potential Revenues	
Regional Strategy	Market Bundle	GAC Option 1	GAC Option 2
N WA	Arrowtooth, Dover, Sablefish, Petrale, P cod, English	$ 493,888	$ 733,167
S WA - C OR	Other Flat, Dover, Petrale, Sablefish, Arrowtooth, English	$ 471,918	$ 743,690
S OR - N CAL	Dover, Longspine, Shortspine, Sablefish, Petrale, Slope Rock	$ 364,874	$ 559,097
SF South	Other Flat, Dover, Sablefish, Petrale	$ 329,682	$ 499,317

Highly unlikely that an independent owner operator would generate the indicated revenues

- To reach a $700,000 figure, some flexibility is necessary
- $700,000 may or may not make a relatively large vessel profitable

Estimated revenues associated with regional strategies should be viewed as highly optimistic

- An example using the northern Washington strategy:
  - Pacific cod is often unavailable to the fishery
  - Arrowtooth may still be discarded in heavy amounts due to spoilage issues, and because markets often do not exist

- To make up for these issues, QS owners need the flexibility to focus more heavily on different species during different years

GMT concept for control limits

- Begin to establish limits such that an independent owner operator could be profitable without having to acquire quota pounds from another source (can be scaled up if the goal is more than one vessel per entity)
- Allow for flexibility in attaining regional target strategies and responding to varying conditions by setting species limits higher than the GAC 90th percentile limits
- Cap overall control by keeping the aggregate limit relatively low
- Use principal target species (sablefish and petrale sole) and regional fishery dependence as benchmarks/considerations in setting species specific limits

How Much Revenue Will Independent Owner-Operators Need?

- Existing data indicates that some vessels make over $600,000 in some years
  - Objective in Groundfish FMP to “minimize disruption”
- EIS modeling indicates a vessel may need to generate $700,000 to reach predicted efficiency gains
- “A vessel of 60 – 70 feet needs to make over $600,000 a year to make it work”
  - Public comment
- Ensure that non-whiting vessels are not out-competed financially by SS whiting trawlers for bycatch quota
  - Speaks to the need to increase per-vessel revenues

Several species are regionally distinct

- Pacific cod is caught exclusively off Washington (typically northern Washington)
- Thornyheads appear most abundantly in the fishery from south-central Oregon to north-central California
- When combined with estimated fleet consolidation, a relatively few number of entities should be expected to focus on those regionally distinct species

Species specific limits can be developed by using petrale sole and sablefish as benchmarks

Those species which have many substitutes, may be regionally distinct, and which may be underutilized would have larger limits

Petrale as benchmark for English sole

GAC 2004 – 2006 90th percentile option sets petrale sole control limit at 2.3% and English sole at 2.6%

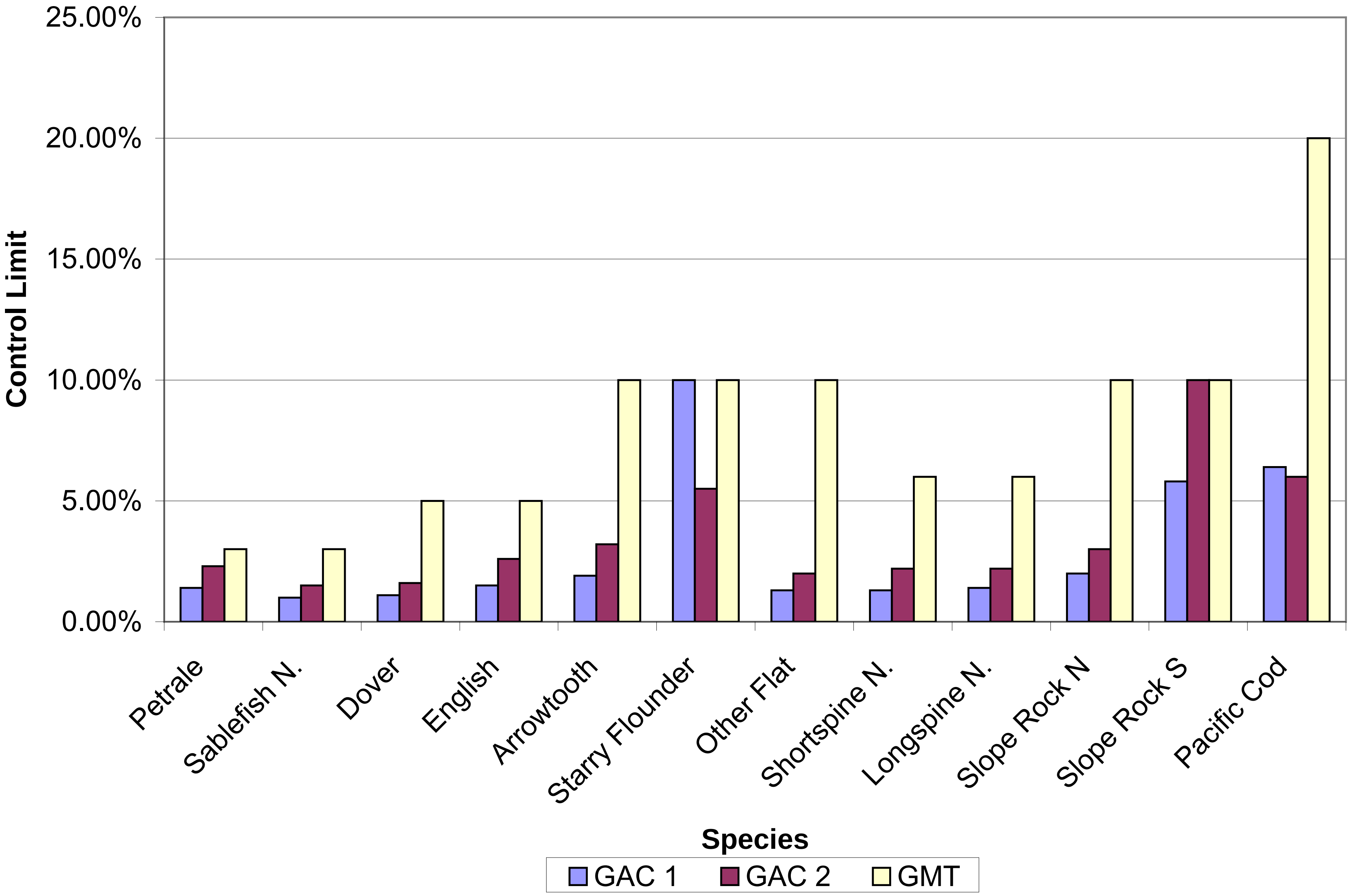
- highly similar limits

Petrale is caught by almost every trawler and is highly important to the fishery. An entity with petrale QS could use that to leverage favors from others

English sole is underutilized, has many substitutes, and has few markets. Few will care if someone has some English sole QS.

To allow development of English sole markets and stock utilization, limits on English sole should be set notably higher than petrale sole

- highly unlikely an entity could use English sole QS as leverage toward others


25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Control Limit
Petrale
Sablefish N.
Dover
English
Arrowtooth
Starry Flounder
Other Flat
Shortspine N.
Longspine N.
Slope Rock N
Slope Rock S
Pacific Cod
Species
GAC 1
GAC 2
GMT

Regional Strategy Revenue from GMT Suggested Limits (before aggregate limits are imposed)

Regional Strategy	Regional Strategy Exvessel Revenue
N WA	$ 1,785,667
S WA - C OR	$ 1,953,518
S OR - N CAL	$ 1,414,053
SF South	$ 1,394,197

The Aggregate Limit

Aggregate limits are used to counter the effect of the relatively high GMT limits

The effect of the aggregate limit is highly dependent on how it is estimated

- Existing option is a weighted average based on trawl allocation: changes every time OY changes
- Compare the existing aggregate limit formula with two other possibilities

The sensitivity of the aggregate IFQ estimate to the aggregate limit formula

- Assumes everyone maxed out on each species specific control limit

Existing option -->

	Option 1	Option 2
Trawl allocation weighting formula	1.95%	3.02%
Equal weighting of each species	3.53%	4.76%
Weighting that uses 2004 - 2006 sector revenues by species	1.64%	2.28%

Result of aggregate IFQ formula sensitivity

- Because the aggregate IFQ calculation formula is sensitive, the GMT recommends that the Council carefully consider the manner in which it is calculated

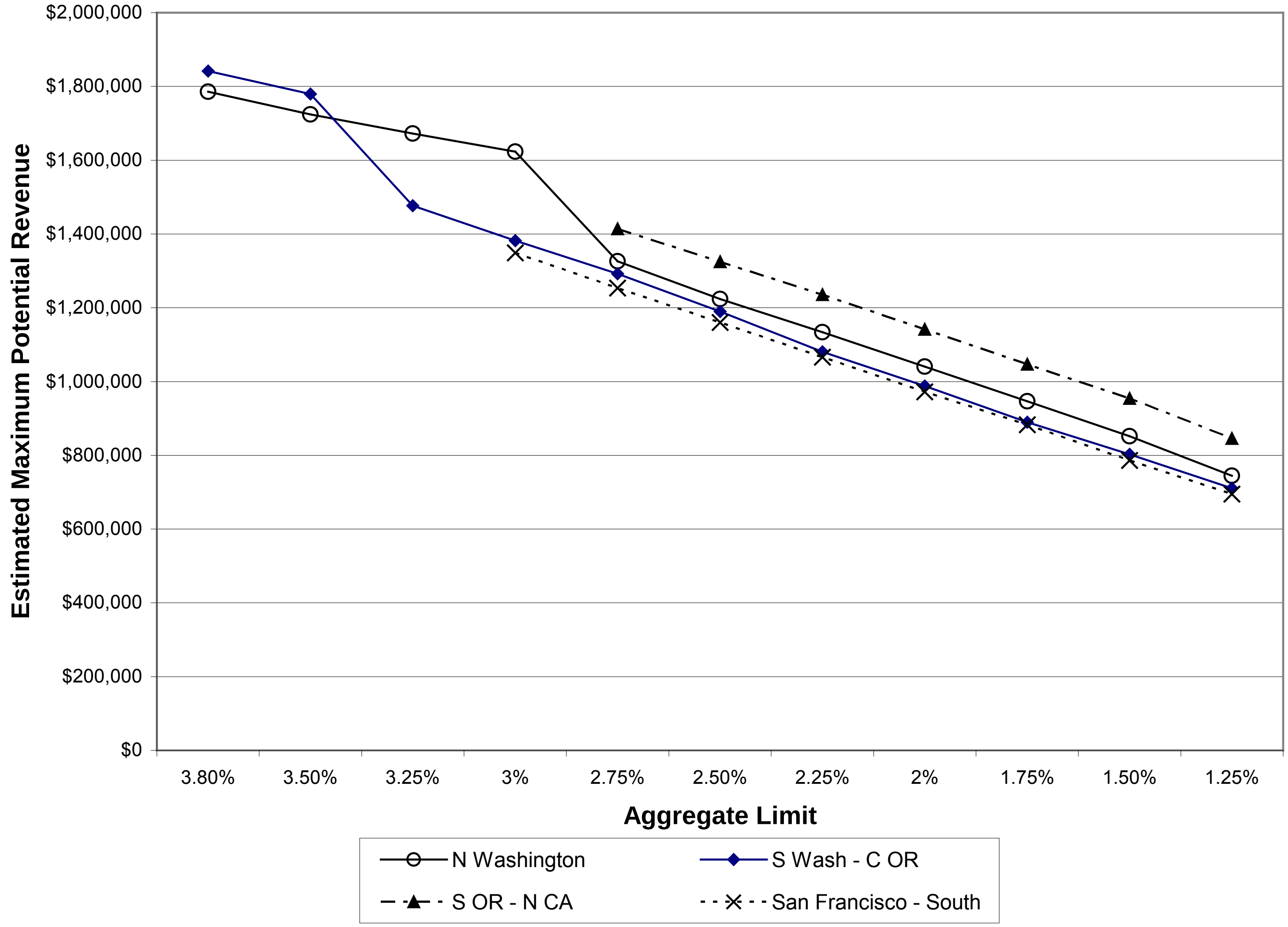
Fluctuations in the Aggregate Control Formula

- As currently stated in the alternatives, the aggregate control formula changes each time OYs change
  - Because it’s a weighted average based on the trawl allocation
- This biennial variation reduces the ability to develop expectations about the future.
  - One does not know where he/she will stand next to the aggregate control limit if the aggregate control formula is only good for two years
- Biennial variation therefore makes it difficult to make long term investment decisions, which leads to some benefits of the benefits of an IQ program
  - A fixed formula that does not change every two years would be much more conducive to an IQ program

Interaction between Aggregate Control Limit and the Species Specific Limits

- Aggregate limit counters the effect of relatively high species limits
- We show the effect of reducing the aggregate limit on potential entity revenues
  - Assume GMT species limits
  - Assume entities divest their least valuable species first to stay under the aggregate limit

Regional Strategy Revenues when Aggregate Limits are Applied to GMT Suggested Species-Specific Limits



Conclusions

- The ability to engage in regionally specialized strategies is important to ensuring a healthy fishery that is found coastwide
- The 90th percentile control limits do not appear to accommodate such regional strategies (if we intend to accommodate independent owner-operators)
- Higher species-specific limits can accommodate regional strategies. We counter the effect of higher species specific limits with relatively small aggregate limits
- If the amount of revenue necessary to support an independent owner operator is on the order of $700,000, control limits should allow for somewhat larger amounts
  - Aggregate limit of 2.25 to 2.75% may be appropriate if we stick with existing aggregate limit formula
- Do not allow the aggregate limit formula to vary every time our OYs change. Instead, make changes in the weighting formula a conscious Council action

G.4. Accumulation Limits

Decisions Made

- Have Accumulation Limits
- No Grandfather Clause

Decisions Open

- Percent by Species
- Vessel Usage Limits (QP) and/or Control Limits (QS/QP)
- Exceptions (e.g. communities)

Other Issues of Possible Concern

- Disposition of QS in excess of control limits, on initial allocation
  - redistribution or divestment
- Disposition of excess QS with OY changes
  - applies only to
    - aggregate nonwhiting control limit

Decide

- Species and percentages for vessel and control limits
  - Species
    - Target species
    - Overfished species
    - Whiting (shoreside and mothership)
    - Halibut IBQ
  - Adjust policy for vessel usage limits above control limits
  - Special situation limits (e.g. communities)
- Disposition of excess QS

Control Limits (QS/QP)	Vessel Usage Limits (QP)
Existing Option 1: Key species used max avg share, nonbuyback permits (1994-2003)	**2 x control limit options**
Existing Option 2: 1.5 x Option 1.	
GAC Option 1: 90^{th} percentile permit performance **(1994-2003) (Exclude Overfished)**	
GAC Option 2: 90^{th} percentile permit performance **(2004-2006) (Exclude Overfished)**	

New GAC Options

- Control Limits Based on 90^{th} Percentile
  - single permit/vessel owner able to perform at 90^{th} percentile level of the recent fleet without buying QP from someone else.
  - less accommodation for entities owning multiple vessels.
  - doubling for vessel usage limits means vessels able to perform at greater than 90^{th} percentile but through external QP sources

GAC Control Limit Options Do Better than 90^{th} Percentile

- 90th percentile based on **vessel landings** implies more when applied to allocation

Example Based on Northern Slope Rockfish

- Trawl sector harvest = 200 mt
- 90th percentile harvest = 4 mt
- Percent for control limit (4/200) = 2.0%
- Trawl sector allocation. = 800 mt
- 2% of allocation = 16 mt
  - (or 2% of allocation is same as 8% of recent trawl landings)

Comparing New GAC Options to Existing Options (Table 3)

- New GAC Options, more restrictive than existing options.
- New GAC Option 1 (1994-2003), more restrictive than Option 2 (2004-2006)

General Pattern in Results (Existing and GAC Options)

- Vessel limit options generally accommodate **individual vessel** activity.
- Control limit options are substantially less accommodating of **individual vessel** activity, QP must be purchased.
- Control limit options when compared to **entity** activities and allocations are even more restrictive.

Overfished Species

- Vessel usage limits –
  - little good incentive to accumulate excessive amounts on a vessel (incentive is to avoid catch and not use)
  - need to cover high bycatch events
- Control limits –
  - Might consider setting in relation to needs for accessing to target species control limits.
    - Difficult because of many different strategies in which some overfished species are taken.
  - But also, don't set too high or too low.
    - too high: too much control – choke points
    - too low: market may not function well

Other Individual Species to Address

- Shoreside Whiting
- Mothership Whiting
- Pacific halibut

Shoreside Whiting

	Vessel	Control
Option 1 (GAC)	15.0	10.0
Option 2	22.5	15.0
Option 3	37.5	25.0

Historic stats and allocations.	Vessel/Processor
Max percent of landings 1994-2003	9.1%
2004-2006	7.3%
Max allocation (w/ 80/20 split)	8.6%

Mothership Whiting

- Control limit option not selected in November.
- Vessel usage limits were not a feature of the package.

Mothership Control Options

- Control stated in terms of amount of history represented by permits owned.
- Existing control options
  - Option 1: 10%
  - Option 2: 15% (GAC Recommendation)
  - Option 3: 25%
  - Option 4: the amount of the largest current owner (no grandfather clause)
- Measurement of control. Same rules as for IFQs, i.e. individual and collective rule?

Mothership Whiting Data

- GAC Recommends 15% control limit

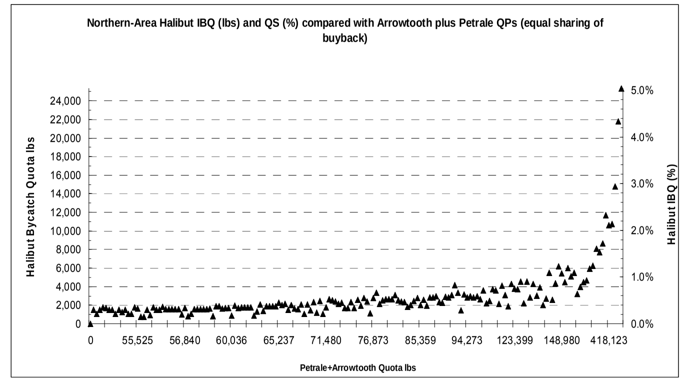
Historic stats and allocations.	Vessel/ Processor
90^{th} percentile landings 1994-2003	11.3%
2004-2006	16.4%
Max percent of landings 1994-2003	18.5%
2004-2006	28.9%
Max allocation to permit	9.4%

Maximum allocation to an entity is same as for a permit.

Halibut IBQ

- Accumulation limits have not been addressed.
  - Vessels Limits
    - little good incentive to accumulate excessive amounts on a vessel (incentive is to avoid catch and not use)
  - Control Limits
    - Look at initial allocations of IBQ
    - Initial IBQ allocations proportional to Petrale and arrowtooth
      - Consider developing halibut IBQ control limits in relation to the range of control limits for these species.
      - Petrale (e.g. 3%) and arrowtooth (e.g. 10%)

Initial Allocation of IBQ Compared to Target Species (2006 fisheries)



Inconsistency to Resolve

- QS and QP count against the control limits
- Vessel usage limits higher than control (ownership) limits
- Vessel cannot put QP into its account to achieve higher vessel limit without the vessel owner violating control limits.

Counting QP Against Control Limits Rationale and Implication

- Proposed as a way to make it more difficult to circumvent control limits.
  - Concern: An entity owning multiple vessels might indirectly control QS held by others (violating control limits) and each year transfer the QP to its vessels.
- Counting QP against control limits would prevent
- Implication for Processors (from EIS)
  - Likely require them to divest themselves of vessels (no way to put QP on vessels without exceeding control limits)

Resolution to Inconsistency

1. Leave the way it is (QS and QP count against control) and set vessel and control limits the same.
2. Don't count QP in vessel QP accounts against control limits.
   Leaves the vessel limit as a backstop.
   People could buy up to the control limit, or if they had a vessel, up to the vessel limit, but not more.
3. Don't count any QP against control limits. (GAC Recommendation)
   No limit on amount of QP an entity might buy up (e.g. purchasing large amounts at start of year).

Disposition of Excess from Changes in OY

- Changes in OY
  - will not change person's position relative to individual species limits.
  - can cause someone to go over their aggregate nonwhiting limit.
- Calculation of aggregate average weights each species by the pounds represented by the QS.

Resolution

- Require those pushed over aggregate limit to divest.
- Allow those pushed over the limit to retain (grandfather in their holdings).
- Change the rules for calculation.
  - Do not change the weighting with changes in OY
  - Weight all QS equally. (1% Dover sole same as 1% Pacific cod)

Decide

- Species and percentages for vessel and control limits
  - Species
    - Target species
    - Overfished species
    - Whiting (shoreside and mothership)
    - Halibut IBQ
  - Adjust policy for vessel usage limits above control limits
  - Special situation limits (e.g. communities)
- Disposition of excess QS

GROUNDFISH ALLOCATION COMMITTEE REPORT ON AMENDMENT 20 – TRAWL RATIONALIZATION – ACCUMULATION LIMITS

The Groundfish Allocation Committee (GAC) met in Portland, Oregon on January 28, 2009 to discuss aspects of Amendment 20 - Trawl Rationalization program including accumulation limits. The following written GAC recommendations to the Council were vetted by the committee members at the GAC meeting and via email. The rationale was compiled from staff notes and GAC members reviewed the rationale via email.

Amendment 20 – Trawl Rationalization

- The GAC recommends the Council utilize control limits on quota shares, and have vessel accumulation limits on quota pounds (QP). There should be no control limits on QP[1].
- The GAC recommends the Council develop a trailing amendment to look at accumulation limits that could be different for regional fishing associations (RFA), community fishing associations, and insurance risk pools[2].

New Control Accumulation Limit Options

- The GAC recommends the Council 1) establish two new control limit options using the 90th percentile annual landings history for 1994 through 2003 and for 2004 through 2006; 2) establish corresponding vessel cap options that are twice the control limits (however, the maximum control cap should not exceed 10 percent and the maximum vessel cap should not exceed 20 percent); and 3) ask the Groundfish Management Team (GMT) to evaluate results of the options for the briefing book.
- The GAC recommends the Council adopt Option 1 as a preferred option for shoreside whiting accumulation limits, which would be 15 percent vessel limit and 10 percent control limit.
- The GAC recommends the Council adopt a mothership (MS) co-op program catcher vessel control accumulation limit of 15 percent, and no vessel usage limit[3]. [Staff Note: The Council had previously decided to not have a vessel usage limit for the catcher vessels in the MS sector.]
- The GAC recommends the Council adopt vessel and control accumulation limits for halibut individual by-catch quota (IBQ), and requests that staff bring forward additional analysis to help inform that decision.

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[1] The vessel accumulation limit serves a similar purpose to control limits on quota pounds.

[2] An example of an insurance risk pool might include a voluntary pooling of quota pounds together to help cover higher than anticipated catches of a given species.

[3] This means an entity cannot own vessels that combined own more than the 15 percent control limit. There is no limit on the amount an individual vessel can harvest or process.

Rationale

GAC members indicated that accumulation limits should be addressed now, and not left to be dealt with every couple of years because that would add instability for business planning. The Magnuson-Stevens Act says “excessive shares” must be prevented by establishing a limit on shares by a holder, and establishment of any other measure necessary to prevent an “inequitable concentration” of limited access privileges.

Setting vessel limits higher than control limits would allow crew, as one example, to buy small amounts of quota, put it in a vessel account, and harvest their own quota shares from their employer’s vessel; however, it also makes it easier to get around the control limit. One entity might in fact control the quota shares (QS) nominally owned by crew members without NMFS knowing about it. The question was raised as to whether this might be partially addressed through additional disclosures. By recommending that QP count against the vessel accumulation limit and QS count against the control limit, the Council would decouple the two limits and this simplifies the issue greatly.

The GAC passed a motion regarding different accumulation limits for certain entities, such as RFAs, in order to get the discussion started. At this point in time, the GAC did not feel it had the information available to define an RFA or identify the full complement of other entities that may warrant different accumulation limits and, therefore, could not decide whether any of those entities should have an exception to the standard accumulation limits. However, the motion to consider this issue at a future time will allow further discussion regarding RFAs to move forward.

Dates to be considered in establishing accumulation limits could be chosen to 1) reflect the current fishery (2006 to present), 2) mirror the “status quo” years (2004-2006) used in the trawl rationalization environmental impact statement, or 3) utilize the control date (2003). Regardless of which timeframe is chosen, it may be necessary for the Council to consider what it would like the future fishery to look like. Keep in mind; however, the current data available to us does not necessarily reveal the actual ownership of all the permits, so any control limit could underestimate the actual historical control level. Nonetheless, the known ownership information is helpful for making the accumulation limits decisions.

Previously, the GAC developed straw-man control limits and simply doubled those values to set the amounts for the vessel limits as a placeholder until specific vessel limits could be identified. This doubling approach might or might not be retained. If accumulation limits are set below the amount a recent harvester has caught, a reasonable rationale should be provided, especially if that harvest level is in the reasonable range. Control accumulation limits that accommodate all recent harvest levels could be a starting point for the discussion, even though we may not necessarily want the future fleet to resemble pre-rationalization times. The various methods for determining accumulation limits meet different objectives and goals of the program.

The approach for determining accumulation limits in the at-sea whiting sector would not necessarily be the same as the approach for shoreside. Limits in the shoreside fishery would ensure an individual or entity did not gain excessive control, and maintain a fleet size sufficient to meet market demands coastwide benefiting shoreside communities, which is not as much of a consideration in the at-sea fishery. Additionally, the smaller fleet participating in the at-sea whiting fishery is considerably vertically integrated; therefore, the at-sea accumulation limits would need to start out with a higher percentage to accommodate recent performance.

There was a concern that having accumulation limits for Pacific halibut that were too high could result in QS concentration that constrains participation. This was of particular concern because nearly all vessels targeting flatfish (e.g., arrowtooth flounder and Petrale) encounter halibut bycatch and would need access to IBQ. To address this concern, it was suggested that the vessel and control caps be set at fairly low levels and could be the same amount. While there may be incentives to accumulate control of halibut IBQ, because this species is not a target, there would not be incentive for a vessel to accumulate more halibut pounds than would be required to cover its bycatch.

PFMC
2/24/2009

Agenda Item G.4.b
GMT Report
March 2009

GROUNDFISH MANAGEMENT TEAM (GMT) AND COUNCIL STAFF REPORT ON AMENDMENT 20 – A FRAMEWORK APPROACH FOR SETTING CONTROL AND VESSEL USAGE LIMITS FOR NON-WHITING TARGET SPECIES

A. Introduction

At its January meeting, the Groundfish Allocation Committee (GAC) asked the GMT to evaluate the four options for setting accumulation limits, and if appropriate, to propose any alternative options that might aid the Council in its final recommendations (Agenda Item G.4.b, GAC Report).

This report summarizes the GMT's analysis of the GAC's recommendations and outlines a suggested framework approach for the Council to use in setting accumulation limits.[1] This report also applies the suggested framework to produce a set of accumulation (Table 4). This set of "GMT Option" accumulation limits is intended only to solicit more meaningful feedback for the Council by illustrating how the team's suggested framework might be applied and for

[1] The GMT developed this approach with significant involvement from Council staff. For the sake of ease, the report will refer to "the GMT" or "the team" throughout the report as has been our convention.

comparison to the existing four options. The GMT is not a policy making body and does not wish to advocate for particular accumulation limits.

Lastly, the framework approach described in this report was developed specifically for the major non-whiting target stocks. In the limited time available for discussion and writing of this report, the GMT could only conclude that accumulation limits for overfished stocks and more minor, potentially non-target stocks (e.g. lingcod) most likely involved additional considerations. The team could discuss those additional considerations and report to the Council at a future Council meeting, if requested.

B. Overview of the GMT's Suggested Framework

In summary, the GMT's suggested framework involves:

- Setting limits for keystone non-whiting target species first and postponing consideration of overfished and more minor stocks;
- Using exvessel revenues as a primary means of gauging what might constitute an "excessive share" or "inequitable concentration" of quota;
- Focusing on a "one vessel, one owner" scenario to equate control and vessel limits;
- Identifying maximum potential revenues associated with accumulation limits based on regionally important target strategy "bundles" and landings in the fishery (2004-2006);
- Using sablefish and petrale sole, the two key economic target stocks in the non-whiting trawl fishery, as benchmarks to set limits for the remaining target species;
- In general, setting limits for target species higher than what is contemplated by the GAC recommended options to provide for operational flexibility and increases in harvesting efficiency;
- Employing relatively small aggregate groundfish accumulation limits to counter the effect of the relatively higher species limits.

C. Accumulation Limits – General Policy and Management Objectives

The GMT began its evaluation of the GAC recommended options for setting accumulation limits by reviewing: (1) the general policy considerations in the Magnuson Stevens Fishery Management and Conservation Act ("Magnuson-Stevens Act" or MSA); and, (2) the Council's specific management objectives for setting accumulation limits. This section provides a brief summary of the team's understanding of those considerations and objectives.[2]

1. The Magnuson-Stevens Act Mandate

The MSA provisions on limited access privilege programs (LAPPs) require the Council to:

> ensure that limited access privilege holders do not acquire an *excessive* share of the total limited access privileges in the program by—

[2] *See* Appendix A, sec. A-2.2.3.e of the preliminary Draft Environmental Impact Statement ("Trawl Rationalization Decision Document") for a more thorough treatment of the policy rationales for accumulation limits.

> (i) establishing a maximum share, expressed as a percentage of the total limited access privileges, that a limited access privilege holder is permitted to hold, acquire, or use; and
>
> (ii) establishing any other limitations or measures necessary to prevent an *inequitable concentration* of limited access privileges.[3]

The MSA does not define the terms "excessive share" or "inequitable concentration" or provide the Council with additional criteria to use in "establishing a maximum share … or other limitations or measures." It thus remains up to the Council to determine levels that might be "excessive" or "inequitable" in the particular context of the west coast groundfish trawl fishery.[4]

As articulated in a non-binding NMFS guidance document, the MSA affords the Council broad discretion to define what might be "excessive" or "inequitable" in terms of the overall management objectives for the TIQ program.[5] Antitrust concerns define the upper extreme of where limits can be set, yet accumulation limits are as much a tool for balancing the Council's social objectives against the undesired effects of the TIQ's drive toward increased economic efficiency.

2. The Council's Specific Management Objectives

The Council has been contemplating two sets of accumulation limits: (1) control limits; and, (2) vessel usage limits. The two involve separate but related policy rationales.

Under the GAC's recommendation, control limits would apply only to quota share (QS) and would be intended to limit ownership as well as other indirect forms of control. In setting control limits, an important consideration is how much any one entity should be able to profit or otherwise benefit from having the exclusive privilege to harvest a specified portion of the public groundfish resource. Control limits serve two fundamental purposes: (a) they act as preventive measures against anticompetitive market conditions; and, (b) they ensure that the benefits (or "rents") arising from the public fishery resource accrue to a minimum number of QS owners.

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[3] Sec. 303A(c)(5)(D) (16 U.S.C. § 1853a(c)(5)(D)) (emphasis added). *See also* National Standard 4, which requires the allocation of fishing privileges to be "carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges." Sec. 301(a)(4) (16 U.S.C. § 1851(a)(4)).

[4] Looking to the ordinary meaning of the words, the *Merriam-Webster Online Dictionary* (2009) defines *excessive* as "exceeding what is usual, proper, necessary, or normal;" and *inequitable* as "not equitable: unfair." To distinguish *excessive* from its synonyms, *Merriam-Webster* states that it "implies an amount or degree too great to be reasonable or acceptable."

[5] *See* discussion of "market power limits" and "management objective limits" in Part 2.1.F (p. 50-60) of:

> NOAA Fisheries Service – Office of Policy (2007). The Design and Use of Limited Access Privilege Programs. Ed. Lee G. Anderson and Mark C. Holliday. NOAA Technical Memorandum NMFS-F/SPO-86.*

*Agenda Item F.3.d, "Supplemental LAPP Guidelines" in the online version of the Council's November 2008 Briefing Book.

In contrast, vessel usage limits may apply only to the quota pounds (QP) that could be placed in a vessel's account in a given year (regardless of whether the QP is used or not). Vessel usage limits are aimed at ensuring that a minimum number of vessels remain active in the TIQ fishery as a means of preventing unchecked fleet consolidation.[6] The Council has made it clear that optimal harvesting efficiency is not the only goal of the TIQ program and that vessel limits are important tools for promoting the social benefits that result from having a fleet size larger than may be optimal for harvesting efficiency. These social benefits include increased economic activity in coastal communities from increased crew employment and demand for supplies, equipment, and other vessel support infrastructure. A larger fleet size would also be expected to increase the likelihood that landings would remain geographically dispersed.

In setting control and vessel limits, the Council is taking into account the full suite of potentially competing goals, objectives, requirements, and constraints contained in the groundfish fishery management plan (FMP), Amendment 20 (A-20), and the MSA.[7] Some of the more directly related goals and objectives include:

- Provide for a viable, profitable fishery (A-20 Objective 2);
- Minimize adverse effects on fishing communities and other fisheries to the extent practical (A-20 Objective 5);
- Promote measurable economic and employment benefits throughout the seafood industry (A-20 Objective 6);
- Accomplish change with the least disruption of current fishing practices, marketing procedures, and the environment (FMP Objective 14);
- Promote sustained participation of small owner-operated fishing vessels and fishing communities that depend on the fishery (MSA § 303A(c)(5))
- Address concerns over excessive geographic or other consolidation in the harvesting or processing sectors (MSA § 303A(c)(5))

D. A Revenue-Based Framework for Setting Accumulation Limits

The Council's consideration of accumulation limits to date has focused on landings during different window periods (1994-2003 and 2004-2006) or on the projected initial allocation to permits and to entities. The Council has looked primarily at maximum and the 90th percentile values as a means of gauging the impact of accumulation limits on current fishery participants.

The approach described here is aimed at supplementing the Council's current options for setting accumulation limits. It is offered more as a means of evaluating the current options and

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[6] The absolute minimum fleet size associated with a vessel limit can be calculated by dividing the limit into 100 and then adding 1 vessel for any remainder. For example, a vessel limit of 3 percent (100/3) results in an absolute minimum of 34 vessels in the fishery—33 vessels could hold up to the maximum, leaving 1% for an additional vessel.

[7] *See* Table 6-1 in Chapter 6 of the Amendment 20 - Trawl Rationalization DEIS for an accounting of the Council's policy guidance.

providing a complementary perspective to aid the Council in developing its rationale than as a competing option meant to replace all others.

The perspective we take is different from that of the existing options in two major regards. First, we use a vessel-based target strategy approach instead of the species-based 90th percentile values relied upon so far.[8] Second, we attempt to explore the question of what might be an "excessive share" or "inequitable concentration" by looking to the potential revenues possible earned in the TIQ fishery. Ultimately, this perspective is meant to be "forward looking" in nature and aimed at promoting discussion of the tradeoff between economic efficiency and the Council's competing management objectives for accumulation limits.

1. Accumulation Limits and the Independent Vessel Owner

In past discussions of accumulation limits, the GMT focused on vessel usage limits because they relate most directly to harvesting activity. The team has shied away from control limits on the belief that they principally involve policy considerations beyond the team's purview.

However, in developing this report the GMT found it useful to discuss the relationship between control and vessel limits. In short, control limits could potentially affect the nature of vessel and quota ownership in the fishery because they ultimately determine whether a single entity, like an owner-operator, will be able to own sufficient QS to operate a vessel independently.

To elaborate, although control limits apply to QS and not QP, they could potentially bar an entity that owns a vessel from controlling enough quota to operate its vessel efficiently. In such a case, the entity will be forced to either: (a) lease QP from another owner quota owner to place on its vessel, or, (b) lease or sell the QP to another vessel to fish. There are several reasons why it may be beneficial for quota owners to fish their quota in partnership with other quota and vessel owners; yet, as we understand the Council's objectives, control limits that require quota holders to find partners in order to operate a profitable venture would be too restrictive.

For the reason described below, the GMT believes this "one vessel, one owner" or "independent vessel owner" scenario can provide the Council with a useful reference point to aid the setting of both control and vessel limits.

2. Advantages of a Revenue-Based Approach

With vessel limits, the GMT has encouraged the Council to consider exvessel revenues as a method of judging the fundamental tradeoff between fleet consolidation and improved harvesting efficiency.[9] In brief, if limits are set too low, they might prevent needed gains in overall

[8] The unit of focus for the 90th percentile values analyzed to date are historical catch records on a species by species basis. This means that 90th percentile values are derived from different years and different vessels. It is most likely the case that any combined suite of 90th percentile values would not be representative of any particular fishing operation. The GMT approach instead focuses on the vessel as an operation and variable of interest, and therefore as a more appropriate unit of measurement. We therefore focus on the distribution of species and revenues associated with a vessel in a given year.

[9] PFMC Briefing Book, Agenda Item F.3.f, Supplemental GMT Report, November 2008.

harvesting efficiency. If they are set too high, then the fleet might consolidate more than the Council desires.

To gauge this tradeoff for a given set of vessel usage limits, the Council can use the GMT's suggested approach to compare the absolute minimum fleet size and maximum potential revenues possible by a set of vessel limits.[10]

Fishing behavior is driven by profit, not by poundage. This means that a vessel limit for a low-value species like arrowtooth flounder would likely have a different impact on the fishery than an equivalent percentage limit on a high-value species like sablefish. Profit is also a function of a stock's volume, meaning that species of similar value but different abundance might also warrant different accumulation limits.[11] The GMT's approach is advantageous because revenues offer the Council a method of standardizing across these differences in value and volume.

3. Applying a Revenue-Based Approach to Control Limits

The GMT recommends that the Council could also take a revenue-based approach to setting control limits using the "one vessel, one owner" scenario described above. Specifically, the team suggests identifying control limits that would permit a single entity to own QS sufficient to operate a single vessel a chance at generating a reasonable profit in the TIQ fishery.

Given the history of independent "small entity" vessel owners in the fishery, this "one vessel, one owner" approach would establish a reference point at which control limits would most likely not qualify as "excessive." In fact, several objectives in Amendment 20 and the FMP suggest to the GMT that the Council would not wish to set control limits below this level.[12]

However, gaps in economic data combined with uncertain projections about profitability under the TIQ program, mean that the "one vessel, one owner" scenario functions more as a "fuzzy baseline" than a "bright-line" reference point. Nonetheless, by working from this "fuzzy baseline" the Council might be able to distinguish between levels that would reasonably support independent vessel owners and those levels at which control limits become "unnecessary" or "unacceptable" in terms of the maximum potential revenues they make possible or the increased risks they pose to management objectives.[13]

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[10] The *absolute minimum fleet size* and *maximum potential revenue* levels identify the outer boundaries of what a set of limits would make possible (e.g., a floor on fleet size and a ceiling on revenues). However, as discussed below, given the complexity of the fishery, they almost certainly *do not* describe the expected (i.e., most likely) fleet size or average vessel revenues.

[11] For example, there are two stocks of sablefish on the coast divided at 36º N latitude. The trawl OY for the northern stock is considerably higher than for the southern stock. Assuming the exvessel prices are comparable, a given percentage limit will provide for a higher potential profit in the north than in the south.

[12] E.g., "minimize disruption" (FMP Objective 14) and "promote small owner-operated fishing vessels" (§ 303A(c)(5)). *See* section C above.

[13] QS profits are derived from exvessel revenues and profits and so, albeit not identical, they should be proportionately related to the maximum potential revenues identified below.

At the same time, concerns about control go beyond revenues and QS profits to other issues such as bargaining, market power, and types of relationships that may influence the operation of the fishery. In other words, allowing owners to hold an excessive amount of QS not only grants them a large share of profits from the public resource but might also allow them to exert undue influence over other aspects of the fishery. In some cases, control over particular species may equate to influence over the fishery as a whole if those species are highly important to the fishery and have little or no substitutes. Two aspects of substitutability important for considering species-specific control limits include: species with a lack of market substitutes (where only a single species can satisfy a given market demand); and fishery access substitutes (where one species may limit access to other types of species in the fishery). For this reason, substitutability of species in markets and target strategies is another important factor for the Council to consider in setting control limits. An increase in substitutability tends to decrease the likelihood of exerting control and is discussed more specifically below in the context of specific species limits.

4. Exvessel Revenues – Status Quo vs. TIQ

The GMT's framework requires the Council to have some sense of what revenues will be necessary and possible in the TIQ fishery. To recap, for control limits, setting the "one vessel, one owner" baseline requires some idea of what revenue would be needed by an independent vessel owner to earn a reasonable profit. For vessel limits, the inquiry is similar but different in that it is focused more on identifying the average vessel revenue needed to achieve the desired increase in the fleet's harvesting efficiency, rather than the revenue necessary for a single, independent entity to remain reasonably profitable.

To help delineate some boundaries, the GMT turned to status quo revenues and the fleet consolidation model in Chapter 4 of the DEIS. Given the lack of economic data and uncertain outcomes of the TIQ fishery, the GMT's estimates can only provide the Council with "fuzzy" targets.

Figure 1 identifies the distribution of annual exvessel revenues earned by vessels in the non-whiting trawl fishery during the 2004-2006 period. This distribution shows that although most vessels generated less than $300,000 per year, some vessels were able to generate more than $600,000.

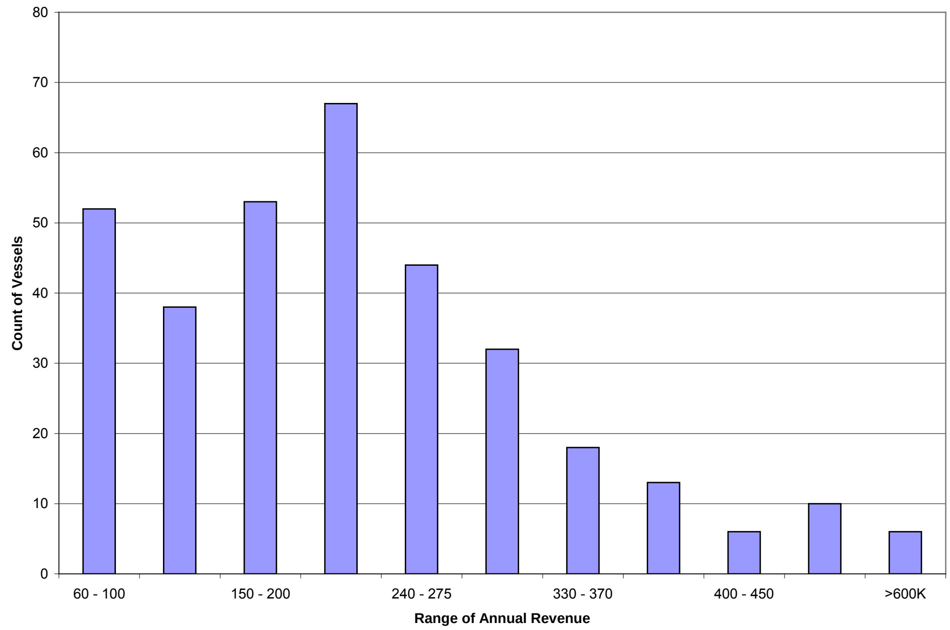

Figure 1. Count of Vessel-Year Combinations by Annual Revenue Category (2004 - 2006)

Using this distribution of revenues to make predications about necessary revenues in the TIQ fishery is problematic for several reasons. First, the DEIS suggests that most vessels merely generated enough revenue to cover costs and pay wages without generating an appreciable profit. The GMT does not have the data to identify whether the vessels in the upper ranges of this distribution actually generated reasonable profits. Likewise, because smaller vessels require less revenue, it may be that smaller vessels were able to turn a profit in the mid- or lower- ranges of this distribution. Further complicating the matter is the fact that this distribution includes vessels that spend part of the year fishing in Alaska or other west coast fisheries (e.g., Dungeness crab, pink shrimp, or whiting fisheries). Many vessels are not able, or chose not, to participate in the non-whiting groundfish trawl fishery full time

The modeling work done by Lian, Singh, and Weninger predicts that, had the fishery been rationalized in 2004, approximately 40 full time non-whiting trawl vessels would have been active in the fishery. That fleet of 40 vessels would have been primarily made up of vessels in the 60 to 70 foot in length category as these vessels appear to be the most economically efficient at catching non-whiting groundfish. This analysis indicates that the average vessel would have generated gross revenues on the order of $700,000, compared to a status quo value that is closer to $200,000. This finding is directly related to accumulation limits because the estimated gross revenues and associated profitability are necessary to cover increased monitoring costs. These values were also discussed in the context of three versus four trawl sectors. Advocates of a four sector option maintained that shoreside Pacific whiting vessels would have greater financial capacity than a non-whiting vessel and, should the two shoreside sectors be merged into one, the Pacific whiting vessels would out-bid non-whiting vessels for overfished species quota. The work by Lian, Singh, and Weninger suggests that the revenues generated by non-whiting vessels could become similar to those revenues generated by whiting vessels, putting both non-whiting and shoreside Pacific whiting vessels on a more equal financial playing field when trading IFQ. This logic appears to have been at least partially responsible for the decision to create a single shoreside trawl sector by merging both shoreside sectors into one. If non-whiting accumulation limits are set at a level that is too restrictive, it might compromise the ability for non-whiting vessel owners to financially compete with Pacific whiting vessel owners over quota.

5. Combining Maximum Potential Revenues Based on Target Strategies

As a first step in assessing the effects of existing accumulation limit alternatives, the GMT estimated the potential amount of revenues associated with the GAC 90th percentile options. To make this calculation, the GMT calculated maximum potential revenue using the GAC recommended intersector allocation to the trawl sector, 2010 optimum yields, and average exvessel prices from 2004-2006 (Table 1).

Table 1. Species limit maximum potential revenues associated with GAC options (see text for assumptions)

	GAC ISA Amt (applied to 2010)	Jan-2009 GAC Pref Control Lim Op 1	GAC Opt 1 Rev	Jan-2009 GAC Pref Control Lim Op 2	GAC Opt 2 Rev
Lingcod N	1,765	2.4%	$ 59,755	3.0%	$ 74,693
Lingcod S	277	4.3%	$ 16,830	8.0%	$ 31,312
P Cod	1,089	6.4%	$ 73,754	6.0%	$ 69,144
Sablefish N	2,689	1.0%	$ 72,917	1.5%	$ 109,376
Sablefish S	527	10.0%	$ 197,512	10.0%	$ 197,512
Chilipepper	1,944	6.2%	$ 143,488	10.0%	$ 231,432
Splitnose	437	5.7%	$ 20,868	10.0%	$ 36,610
Yellowtail	3,920	2.8%	$ 120,990	5.2%	$ 224,695
Shortspine N	1,498	1.3%	$ 34,776	2.2%	$ 58,851
Shortspine S	238	4.2%	$ 17,850	8.8%	$ 37,401
Longspine N	2,043	1.4%	$ 32,159	2.2%	$ 50,535
Slope north	909	2.0%	$ 20,040	3.0%	$ 30,060
Slope south	392	5.8%	$ 25,062	10.0%	$ 43,211
Dover	15,260	1.1%	$ 140,626	1.6%	$ 204,546
English	8,988	1.5%	$ 98,085	2.6%	$ 170,014
Petrale	2,172	1.4%	$ 64,357	2.3%	$ 105,729
Arrowtooth	9,582	1.9%	$ 44,151	3.2%	$ 74,359
Starry Flounder	923	10.0%	$ 81,395	5.5%	$ 44,767
Other Flat	4,517	1.3%	$ 51,783	2.0%	$ 79,666

The revenues in Table 1 should be considered maximum potential revenues, not expected or likely revenues. It is highly unlikely that a vessel owner will be paid for every QP in his or her vessel account. This could be due to several reasons, such as the possibility of there being insufficient market demand for certain species, limited access to certain species because of bycatch constraints, discard due to spoilage, some species may be unavailable in some years, etc.

After examining the potential amount of revenue associated with the existing options, the GMT examined the likely effect these accumulation limits would have on particular operations. The approach taken to examine particular operations was to identify specific regions along the west coast and make an attempt at identifying particular target strategies within each of those regions.

The GMT was able to identify four regions with different fishery characteristics: (1) northern Washington; (2) Westport to Newport; (3) Coos Bay to Fort Bragg; and, (4) San Francisco south.[14] Within each of these regions we focused on the top-three producers based on the notion that vessels in a rationalized fishery are more likely to be more similar to the existing larger producers rather than the smaller producers. From this examination we identify a representative set of particular target, or focus, species that vessels in each region tend to rely upon. It is important to note that there are undoubtedly other target bundles that vessels will rely upon in a rationalized fishery, and that are relied upon under status quo. The intention is to identify a representative set of various target strategy bundles to provide an indication for how the accumulation limits will affect fishing operations.

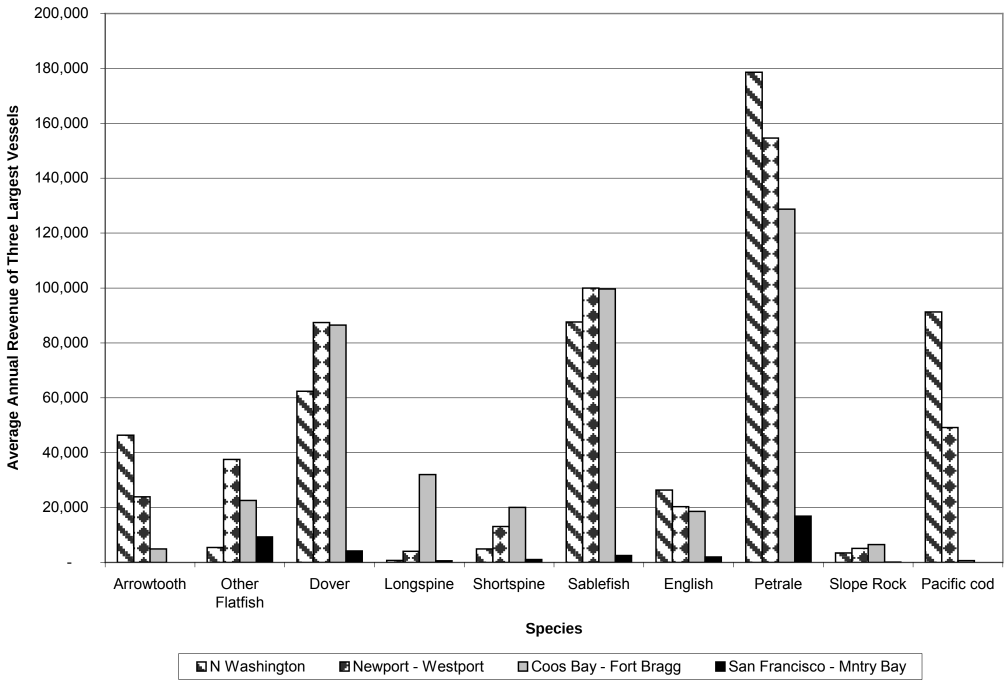

Figure 2. "Top Producer" average annual exvessel revenues by region and target species (2004-2006).

Several reasons appear to be responsible for the various target and market strategies, including regional variations in bathymetry, markets, and species availability. The northern Washington area is characterized by relatively high abundance of arrowtooth flounder and periodic availability of Pacific cod, while much of the fishing grounds extending from Coos Bay to Fort Bragg are comprised of continental slope grounds, making thornyheads relatively more important to fishing activity in that area.

[14] Avila-Morro Bay port group was combined with San Francisco-Monterey Bay because of a lack of data for the area.

Table 2. "Top Producer" target strategies by region (excluding petrale and sablefish).

Region	Regionally Important Species
Northern Washington	• Arrowtooth • English sole (marginal) • Pacific cod
Newport – Westport	• Other Flatfish (for some vessels) • Pacific cod (for some vessels) • Arrowtooth (for some vessels) • English sole (marginal)
Coos Bay – Fort Bragg	• Longspine • Shortspine • Slope rock (if regulations were more favorable)
San Francisco–Monterey Bay	• Other Flatfish
Morro Bay / Avila	• Not specifically identified due to lack of data. Limited data seems to indicate a fairly general strategy

We use the target strategy bundles identified above in concert with the maximum potential revenues associated the GAC 90th percentile options (Table 3).[15] The results suggest that the 90th percentile options might make it difficult for an independent owner-operator to prosecute opportunities in a profitable manner, especially considering the likelihood that quota holders are highly unlikely to harvest and land all of their QP. More elaboration is included in the next section.

Table 3. Maximum implied revenues by target strategy for 2004-2006 GAC and Max. Value Options

		Maximum Potential Revenues	
Regional Strategy	Market Bundle	GAC Option 1	GAC Option 2
N WA	Arrowtooth, Dover, Sablefish, Petrale, P cod, English	$ 493,888	$ 733,167
S WA - C OR	Other Flat, Dover, Petrale, Sablefish, Arrowtooth, English	$ 471,918	$ 743,690
S OR - N CAL	Dover, Longspine, Shortspine, Sablefish, Petrale, Slope Rock	$ 364,874	$ 559,097
SF South	Other Flat, Dover, Sablefish, Petrale	$ 329,682	$ 499,317

E. Applying the Framework

1. Species limits using the GMT Suggested Approach – The "GMT Option"

The GMT applied the suggested framework and arrived at the species limits identified in Table 4. The limits identified as the "GMT Option" are intended as an illustration of how to apply the framework and for relative comparison to the other options being considered. In other words, the team's framework is meant as another aid for the Council to use in articulating its rationale for setting specific accumulation limits. The framework is not meant to, or capable of, producing "black and white" answers. Given the flexibility of the framework approach, and the discretion afforded to the Council by the MSA to define what is needed to prevent "excessive shares" and

[15] To create this table, we simply summed the maximum potential revenues from Table 1 for each species in the "market bundle" of each target strategy.

"inequitable concentration" of TIQ, the team fully expects that the Council could apply the framework and derive a different set of limits.

Table 4 lists species limits in a different order than tables previously considered by the Council because of the team's "benchmark" approach (which is explained in detail in a subsequent section). This order, and the rationale behind each species limit, is described in detail below in section E.3. Table 5 translates the GMT Option species limits into maximum potential revenues for each of the four target strategy bundles.

Table 4. Species limits developed using the GMT's suggested approach ("GMT Option") compared to the GAC recommended options and maximum value scenarios.

	GAC Option 1	GAC Option 1 Revenue	GAC Option 2	GAC Option 2 Revenue	GMT Option	GMT Option Revenue[1]		Max Entity Allocation[2]
Petrale	1.4%	$64,357	2.3%	$105,729	3.0%	$137,907		3.8%
Sablefish N.	1.0%	$72,917	1.5%	$109,376	3.0%	$218,751		3%
Shortspine N.	1.3%	$34,776	2.2%	$58,851	6.0-10%	$160,503		3.7%
Longspine N.	1.4%	$32,159	2.2%	$50,535	6.0-10%	$137,824		3.5%
Slope Rock N.	2.0%	$20,040	3.0%	$30,060	6.0-10%	$60,120		4.1%
Slope Rock S.	5.8%	$25,062	10.0%	$43,211	6.0-10%	$25,926		7.8%
Arrowtooth	1.9%	$44,151	3.2%	$74,359	10.0%+	$232,371		6.2%
Starry Flounder	10.0%	$81,395	5.5%	$44,767	10.0%+	$81,395		30.5%
Other Flat	1.3%	$51,783	2.0%	$79,666	10.0%+	$398,331		9.2%
Dover	1.1%	$140,626	1.6%	$204,546	5.0%+	$639,208		3%
English	1.5%	$98,085	2.6%	$170,014	5.0%+	$326,950		3.5%
Pacific Cod	6.4%	$73,754	6.0%	$69,144	20.0%	$230,480		10%
Chilipepper	6.20%	$143,488	10.0%	$231,432	10.0%	$231,432		14.8%
Splitnose	5.70%	$20,868	10.0%	$36,610	10.0%	$36,610		10.4%
Yellowtail	2.80%	$120,990	5.2%	$224,695	5.0%	$216,053		3.7%

1) In cases where the GMT option includes a range of limit percentages, the potential revenue estimate is based on the lower end of the range.
2)Unlike the GAP and GMT options, the Max Entity Allocation formula is calculated as a percentage of fleet-wide landings during the window period (i.e., not as a percentage of the total OY or trawl allocation). In addition, it is important to note that this column is an estimate of the max initial allocation level as if no accumulation limits existed (and based on entity ownership as of January 2004)

Table 5. Maximum potential revenues for GMT and GAC 90th Percentile Options (GMT Option revenues are derived from the limits in Table 4).

		Maximum Potential Revenues		
Regional Strategy	Market Bundle	GAC Option 1	GAC Option 2	GMT Option
N WA	Arrowtooth, Dover, Sablefish, Petrale, P cod, English	$ 493,888	$ 733,167	$ 1,785,667
S WA - C OR	Other Flat, Dover, Petrale, Sablefish, Arrowtooth, English	$ 471,918	$ 743,690	$ 1,953,518
S OR - N CAL	Dover, Longspine, Shortspine, Sablefish, Petrale, Slope Rock	$ 364,874	$ 559,097	$ 1,414,053
SF South	Other Flat, Dover, Sablefish, Petrale	$ 329,682	$ 499,317	$ 1,394,197

2. Quota Holdings vs. Limit & Substitutability

Before examining the rationale behind deriving the individual species limits, it is important to consider a couple of different concepts. First, it is improbable that each entity participating in the fishery will hold quota share up to the control limit of each species. In other words, it is highly unlikely that the fishery would contract down to the absolute minimum number of owners or vessels permitted by a given species-specific control limit (e.g., a 2% species-specific accumulation limit with 50 entities/vessels).

Consider sablefish and petrale sole. Given that these two stocks are “at the core” of the industry’s economic activity, it would be expected that they would be the most vulnerable to full contraction to the absolute minimum number of owners. Although it is reasonable to expect more entities than average will hold quota share at the accumulation limit, it is with near certainty that several entities will not reach the limit. With petrale sole, we can explain this reasoning by comparing entities that participate in the groundfish trawl fishery year round to those that participate in other fisheries. Those that participate in the Dungeness crab fishery, for example, are likely to forego much of the opportunity that exists for winter petrale, and it is during the winter where most of the petrale sole volume tends to be caught. That may change to some degree in a rationalized fishery, but nevertheless, entities engaged in multiple fishery strategies will be less likely to acquire quota share up to the control limits, simply because they will have a diversified operation and will rely less on trawl groundfish than full time groundfish vessels.

A second issue associated with the species specific limits is the concept of substitutability. In the simplest terms, if a good can be substituted with another good in a marketplace, then market control may not be possible. If an entity was attempting to exert control over the marketplace for coffee in order to raise prices, a consumer could simply purchase another brand and avoid those high prices. The same considerations hold true for fish products in the marketplace. Very few species have no easy substitute. Several species of red rockfish exist along the west coast, and it is reasonable to expect that there is very little preference in the marketplace for one type of red rockfish species over another, though there are circumstances where preferences may exist. The same appears true for flatfish. Therefore, it is reasonable to state that issues of control do not appear to be a relatively large concern for red rockfish species and most flatfish species. Where substitutability may be an issue is for sablefish and petrale sole. Each of these species is highly desirable in the marketplace, meaning they are preferred over other types of west coast seafood products. This preference can be reasonably equated with a lack of substitutes, meaning control issues at the species level may exist for these two species.

3. Explanation of Species Specific Limits

The following table serves as an executive summary that utilizes the GMT suggested framework to derive species specific limits. The rationale for these species specific limits is provided next to the derived accumulation limit percentages.

Table 6. Summary of rationale used to derive species specific limits

Species	Control Limit	Rationale
• Sablefish • Petrale sole	3%	• Lack of market substitutes combined with high importance to the fishery argues for relatively low control limits • Limits less than 3% may cause some disruption to existing activity, while limits higher may not be necessary for owner-operators
• Slope rockfish • Shortspine N • Longspine N	6% to 10%	• More substitutable in the marketplace than sablefish and petrale sole, meaning limits do not need to be as low • Thornyheads seem less substitutable than slope rockfish (thornyhead limits should arguable be less than slope rockfish limits) • Regionally important, which may necessitate limits that are somewhat higher than petrale and sablefish to accommodate regional strategies • A 6% limit may accommodate regional strategy bundles, while a 10% limit may allow for thornyhead and slope rock specialists
• Arrowtooth • Starry Flounder • Other Flatfish	10% or greater	• More substitutable in the marketplace than slope rockfish or thornyheads, meaning limits could be higher than those species • Regionally important species, which may necessitate higher limits to accommodate those activities • Relatively underutilized stocks. Increasing utilization may rely on an entity controlling sufficient quota to build markets
• Dover sole • English sole	5% or greater	• Substitutable in the market place, meaning relatively higher limits may not lead to control issues • Widely distributed and widely fished stocks, meaning higher limits are not necessary to accommodate regional strategies • Relatively underutilized stocks. Increasing utilization may rely on an entity controlling sufficient quota to build markets • Large OYs mean substantial fishing activity could occur with a low accumulation limit. Independent owner-operators may not "need" large limits to accommodate operations. If OYs are reduced, higher limits that are similar to other types of flatfish may be more appropriate
• Pacific cod	Up to 20%	• Regionally distinct • Heavily relied upon by a small number of entities • Generally substitutable in the market • Limits lower than 20% may disrupt recent activities of independent owner operators
• Yellowtail • Chilipepper • Splitnose	• 5%? • 10%? • 10%?	• Stocks are generally not targeted under existing conditions making it difficult to assess in terms of accumulation limits • All stocks are highly underutilized. Increased utilization may necessitate an entity holding relatively large amounts of quota to build markets • Stocks are regionally distinct • Yellowtail has sufficient overlap between non-whiting and SS whiting activity, meaning careful consideration should be given to this species • All three species are substitutable with other rockfish in the market, meaning their control limits could be higher than petrale and sablefish
• Sablefish south • Shortspine south	No specific suggestion	• Existing conditions make it difficult to fit these species into the framework. Different rationale may be more appropriate for these stocks

Petrale sole and Sablefish N. – The Benchmark Stocks

The GMT's application of the framework approach begins with sablefish N. and petrale sole. These two are the key economic stocks and are relied upon to a large degree by nearly every trawler along the coast. Moreover, under status quo the two stocks have few, if any close substitutes and are highly desirable. In other words, an entity that holds quota share for petrale and/or sablefish could use that to its advantage in order to secure favors from others. For these reasons, we assume that control limits for these two stocks should be set the lowest relative to other stocks.

Based on the regional target strategies and maximum potential revenues above in Tables 4 and 5, we settled on the following control limits:

- Petrale sole = 3%
- Sablefish North = 3%

While the petrale sole limit would truncate the activities of entities operating over the 2004 to 2006 period, it would only truncate those entities operating in 2005.[16] During the 2005 season, exceptional weather allowed for much greater than expected (and intended) harvests of petrale sole during the first period. Therefore, those 2005 petrale sole records are not considered representative relative to the 2004 to 2006 period. The elimination of such records appears to make the 3% limit non-constraining on existing activity.

The 3% sablefish limit results in revenues that are slightly higher than recent activity. However, it is important to note that during recent years the sablefish resource has been underutilized to some degree due to regulatory constraints. If entities would have been able to harvest the full trawl sablefish allocation, it is likely that the larger producers would have attained a level near 3%. In order to accommodate the forecasted utilization of sablefish in the IFQ program, while also keeping control limits low so as to protect against market influence potential, a 3% control limit appears reasonable.

Thornyhead and Slope Rockfish Control Limits

Control limits for thornyheads and slope rockfish can be considered next to the benchmark species of sablefish and petrale sole. The region stretching from Coos Bay to Fort Bragg is heavily reliant on a slope-based strategy, and thornyheads and slope rockfish comprise a large portion of that strategy (though existing regulations may limit that focus to a large degree – especially for slope rockfish). Other regions undoubtedly target these species, but it appears that this southern Oregon to north-central California region relies on those stocks to a much greater degree. Therefore, it is safe to assume that slope rockfish and northern thornyheads have a regional focus.

Slope rockfish are sold in a market that can be substituted with other types of rockfish species. This substitutability reduces potential issues of control. For example, an entity which holds

[16] To accommodate activity from 2005, a limit of 8% may be necessary.

quota share of slope rockfish may attempt to use that to his advantage when dealing with others, but to some degree one may be able to focus on a different species if they do not wish to negotiate with the holder of slope rockfish, thereby circumventing attempts at market control. Furthermore, the value of slope rockfish is less than that of petrale and sablefish, and this would tend to reduce the effectiveness of using slope rockfish quota as a leverage piece in negotiation/discussion, so control issues are also reduced due to the relative price per pound. Thornyheads have fewer substitutes, meaning control issues may be a somewhat greater concern for thornyheads than for slope rockfish. In addition to the above factors, both the thornyhead and slope rockfish resources are under-utilized. If we expect the resource to be more fully utilized – and wish to allow independent owner-operators the ability to expand operations to more fully utilize that resource – then opportunities will need to be increased. It may be necessary to allow entities to hold relatively large amounts of quota to build markets for under-utilized stocks.

For the above reasons, it appears that thornyhead and slope rockfish control limits should be set higher than petrale and sablefish control limits. The GAC option (90th percentile) would result in control limits that are lower than petrale and sablefish for some species/option combinations. The particular control limit for these species can be informed through existing data (including current fishing activity). It can also be informed by taking a forward looking approach which considers the fact that fleet consolidation is likely, and that a portion of that to-be-consolidated fleet will exist in the southern Oregon to north-central California region.

By starting with existing data, we find that the 90th percentile options result in revenue opportunities that are similar to status quo. However, for some species these control limits are smaller than petrale and sablefish. In addition, when combined with the regional bundle approach, the Coos Bay to Fort Bragg area will need to derive substantial portions of revenue from northern thornyheads and slope rockfish. In order to accommodate sufficient opportunity for owner operators in this southern Oregon to north-central California area, it appears that a 6 percent control limit would be appropriate, but a control limit up to 9 or 10 percent may still be reasonable. Given the relative lack of substitutes for thornyheads, it appears appropriate to set thornyhead control limits at a somewhat lower level than slope rockfish.

- Shortspine North = 6% to 10%
- Longspine North = 6% to 10%
- Slope Rockfish = 6% to 10%

<u>Arrowtooth, Starry Flounder, and Other Flatfish Control Limits</u>

Flatfish control limits can be approached similarly to the thornyhead and slope rockfish species as described above. However, flatfish arguably have even greater substitutability among one another, have lower prices, and are more under-utilized than the slope rockfish and thornyhead stocks. The fact that they appear more substitutable among one another, and have lower prices than the core species of petrale and sablefish, as well as slope rockfish and thornyheads, suggests that the control limits for flatfish species could be set higher than petrale and sablefish and also higher than the control limits for thornyheads and slope rockfish.

We consider flatfish control limits in the context of the slope rockfish and thornyhead limits and also the existing options for control (maximum share and 90^{th} percentile truncated at 10%). The thornyhead and slope rockfish control limits discussion suggested a limit of up to 9% would be appropriate, however the GAC recommended a cap on control limits of 10%. These factors suggest that control limits for the largely underutilized, or regionally distinct flatfish stocks could be set at 10%, though additional considerations may warrant a larger limit. These stocks include arrowtooth flounder, starry flounder, and Other Flatfish.

- Arrowtooth = 10%+
- Starry Flounder = 10%+
- Other Flatfish = 10%+

Dover Sole and English Sole Control Limits

Dover sole is a widely targeted stock, but it is underutilized, has a low price per pound, and can be substituted on the market with other types of flatfish. English sole is not as widely targeted, but has a fairly wide distribution of catch, and has the same issues with relative substitutability and price. Accumulation limits for these two species can be viewed somewhat differently than the accumulation limits for the flatfish stocks mentioned above. This difference is derived from the consideration of "need", or necessary volume to accommodate independent owner-operator activities. The magnitude of the OY for both of these stocks (English and Dover) is substantially higher than for other types of flatfish, meaning a relatively small accumulation limit could accommodate relatively large amounts of fishing activity. We examine control limits for these two species using the concept of setting accumulation limits at a level that would accommodate independent owner operators engaged in regional strategies, while at the same time benchmarking those limits against petrale and sablefish. From these considerations, it appears a 5 percent control limit would be appropriate for both Dover sole and English sole. This limit is higher than petrale and sablefish because issues over market control do not appear to exist for Dover and English like they do for sablefish and petrale. However, this limit is smaller than for some of the other types of flatfish stocks because there does not appear to be a "need" for limits as high as those stocks if the intention is to accommodate an independent owner operator. However, if OYs for these stocks become more similar to OY levels for other types of flatfish, it may be more appropriate to set Dover and English accumulation limits at levels similar to those other types of flatfish.

- Dover sole = 5%+
- English sole = 5%+

Sablefish South and Shortspine South

The control limits for both sablefish and shortspine south appear to be a special case. There was limited data available for this region and it is believed that a single entity would be the recipient of the vast majority of the quota. It is unclear whether new entities would move to fill the place of that entity if it was forced to divest of quota (or did not receive quota in the first place, if divesting was not allowed). Because of this reason, the consideration for control limits that would allow independent owner operators to operate profitably does not seem relevant. Therefore, the GMT does not have particular comment on these species.

Pacific Cod

The Pacific cod species distribution is regionally distinct (northern Washington) and may also be one of the least reliable target species along the coast. Pacific cod are simply unavailable to fishermen during some years. During years when it is available, it typically appears in a relatively small location off northern Washington where there are relatively few LE trawl vessels.

It may be reasonable to assume that Pacific cod is weakly substitutable in the market place by other types of whitefish. The price for Pacific cod is somewhat lower than that for shortspine thornyhead (over the 2004 – 2006 period), but is on par with slope rockfish. This means that control may be more of an issue for Pacific cod than for flatfish. However, independent owner operators in the area may tend to rely heavily on this stock during years when it is available. This relative reliance may argue for a higher control limit than other species, even though doing so would represent a slight departure from the approach taken for other species. The rationale for departing from the approach above (which may tend to put Pacific cod control limits on par with thornyhead and slope rockfish limits) is that doing so would heavily restrict some of the recent activity on Pacific cod. In recent years, several vessels operating in the area have generated between \$100,000 and \$150,000 on Pacific cod. When combined with fleet consolidation and the consideration for allowing an owner operator to remain profitable, control limits may need to allow for greater amounts of revenue. To allow this type of activity, a control limit of 20 percent may be reasonable.

Chilipepper, Yellowtail, and Splitnose

Chilipepper and yellowtail are highly under-utilized under existing conditions due to the need to protect weak stocks. It is envisioned that access to these species will change in a rationalized fishery as individuals become accountable for their catch and bycatch and change behavior. Due to the lack of recent information on how these species may play out in terms of regional dependence, markets, etc., it is difficult to put these species into the framework outlined above which uses petrale sole and sablefish as benchmarks. Furthermore, yellowtail will continue to interact heavily with the shoreside whiting fishery, and will interact much differently with non-whiting activity. Therefore, it is important to consider yellowtail in the context of both shoreside whiting operations and non-whiting operations.

The GAC 90th percentile options result in two very different results. One option would result in a yellowtail control limit that is less than sablefish and petrale sole, which does not seem appropriate given the relatively less reliance of the industry on yellowtail, the lower price per pound, and the fact that yellowtail can be substituted in the market with other rockfish. However, it is difficult to put yellowtail into this benchmark framework. One consideration is to place yellowtail limits at a level that results in opportunities that are on par with other types of target species. It appears that a control limit of 5 percent would allow vessels the same scale of opportunity as other target species. However, this limit should also be thought of in context of incidental encounters in shoreside whiting activity, which would take additional analysis.

Chilipepper can be thought of in a similar context to yellowtail, although it has no interaction with the whiting fishery so it is somewhat easier to consider. Both 90th percentile options would result in control limits that are higher than petrale sole and sablefish, and that appears reasonable. The larger 90th percentile option results in a 10 percent control limit. When viewed in the context of other target species limits, a 10 percent control limit provides for a level of opportunity that is on par with many other target species.

Splitnose is a somewhat difficult species to assess as well. Substantial opportunity exists for this species under existing conditions, yet interest appears relatively minor. In order to allow for focus to continue to exist on this stock by independent owner operators, it may be reasonable to set a control limit for splitnose at 10 percent, or possibly higher. Furthermore, to increase utilization of such underutilized species, it may be necessary to allow an entity to control relatively large amounts of quota in order to build markets.

F. The Aggregate Limit

The GMT's suggested approach would set species limits substantially higher than either of the GAC 90th percentile options with the purpose of accommodating a diversity of target strategies. On its own, this set of relatively higher species limits could increase control and consolidation of quota ownership in the fishery. To counter such consolidation, the relatively higher species limits would be accompanied by a relatively low aggregate control limit. Before describing this in more detail, we first discuss how the aggregate limit is calculated.

1. The Importance of the Aggregate Limit Formula

As currently described in the DEIS, the aggregate quota holding estimate would be calculated based on a weighted average with each species weighted according to its relative tonnage (i.e., metric tons of species "X" / total metric tons in the trawl sector allocation). There are two issues with this current formulation.

First, the formula is dynamic and would produce different results each biennial cycle when OYs change. For example, an increase in the OY for species X would increase the total tonnage in the trawl sector allocation (i.e., the denominator), and in all likelihood, would change the relative weight of species X to the other species. As a result, quota holders will face a change in their aggregate quota holdings each cycle, potentially placing them above an aggregate accumulation limit through no action on their part. On this issue, the team simply notes the dynamic nature of the formula and questions whether it might cause market uncertainty. Unable to reliably predict where OYs may go, quota holders may be unable to judge where they might stand against the aggregate limit beyond the next biennial cycle, complicating the type of longer-term investment decisions needed to improve the economic status of the industry. Static formulas are possible.[17]

[17] Static does not mean permanent. The formula could remain static until altered by Council action.

Second, consistent with the revenue-based approach, the team discussed basing the aggregate quota formula on a revenue-based weighted average. In doing so, it became evident that estimating aggregate control is highly sensitive to how it is calculated.

Table 7 illustrates this sensitivity. To create Table 7, the team used the GAC recommended control limit options and assumed a scenario where the fishery consolidated to the absolute minimum number of entities (i.e., every entity acquired QS up to the limit for each individual species). We then calculated the resulting aggregate quota share holdings for both GAC options using: (1) a simple average approach ("equal weighting"); (2) the weighted average based on tonnage ; and, (3) a weighted average based on the amount of exvessel revenue generated by each species over the 2004-2006 time period.

Table 7. Comparing three alternatives for calculating aggregate quota share holdings

		Option 1	Option 2
Existing option -->	Trawl allocation weighting formula	1.95%	3.02%
	Equal weighting of each species	3.53%	4.76%
	Weighting that uses 2004 - 2006 sector revenues by species	1.64%	2.28%

The three formulas not only produce different estimates of aggregate control, they also differ in their degree of change between GAC Option 1 and Option 2 (Table 7).

Because of this sensitivity, we recommend that the Council give careful consideration to the current formula and its underlying rationale. The team could only give brief attention to the possible rationales, yet offers this summary to stimulate feedback from other advisory bodies and the public:

- Trawl allocation weighting formula (tonnage): The amount of catch and delivery activity in the trawl fishery will be related to the amount of fish available to the trawl sector. Thus, the aggregate control limit should be based on the tonnage of each species allocated to the trawl sector to best prevent excessive control within the sector.

- Equal weighting of each species: Simplicity generally helps markets function effectively. Simplicity makes it easier to develop expectations about the future, and this is important for making longer-term investment decisions.

- Exvessel revenue weighting formula: The amount of revenue associated with each species is a measure of its economic importance to the fishery. Therefore, placing more weight to species that generate more value would more relate the aggregate control estimate to activity and importance of species to the fishery.

2. Interplay between the Aggregate Limit and Species Specific Limit

In this section we explore in more detail how a relatively low aggregate limit interacts with species limits using the independent vessel owner scenario and the regional target strategies.

To analyze the relationship between aggregate limits and species limits, we plotted the GMT Option maximum potential revenues for each of the four regional target strategies against a decreasing aggregate limit, with the aggregate limit calculated using the DEIS ("status quo") formula (Figure 3).

The plot for each target strategy begins at the aggregate limit that would accommodate the full maximum potential revenue allowed by the GMT Option species-specific limits. We then envisioned how the independent vessel owner would respond if the aggregate control limit was decreased. We assumed that the entity would choose to divest itself of the lowest price per pound species until its portfolio lowered to the limit and then recalculated the maximum potential revenue associated with that new portfolio. The assumption, supported by substantial literature, is that fishermen chase prices and the highest value species draw the most effort and interest. Repeating this exercise for successively smaller aggregate limits produced the trends in Figure 3.

At the relatively higher aggregate limits, we notice a fairly non-linear relationship between the limit and exvessel revenue because of the species that are being divested, their price per pound, and their weighting relative to the aggregate control calculation. The relationship becomes more linear as the lowest value species disappear from the portfolios. The trend is clearly related to the aggregate limit formula and would differ if the formula were changed.

The major point the team keyed into is that the aggregate control limit lowers the maximum potential revenue level without altering the species limits. With the species limits the same, the independent vessel owner has the choices of which limits to pursue in attempting to reach the maximum revenue possible under the aggregate limit. In other words, this makes it possible for operations to pursue a regional/specialty-type of strategy, while maintaining an overarching level of control over individual operations.

Also of note is how the aggregate limit affects the regional strategies somewhat differently. For example, if the goal is to allow an entity to engage in activities that could potentially allow them $1,000,000 in exvessel revenue, then a 1.6% limit may be large enough for those entities operating in the southern Oregon to northern California region. In contrast, a 2% limit would be needed to create that same potential for entities operating in the San Francisco to Morro Bay region.

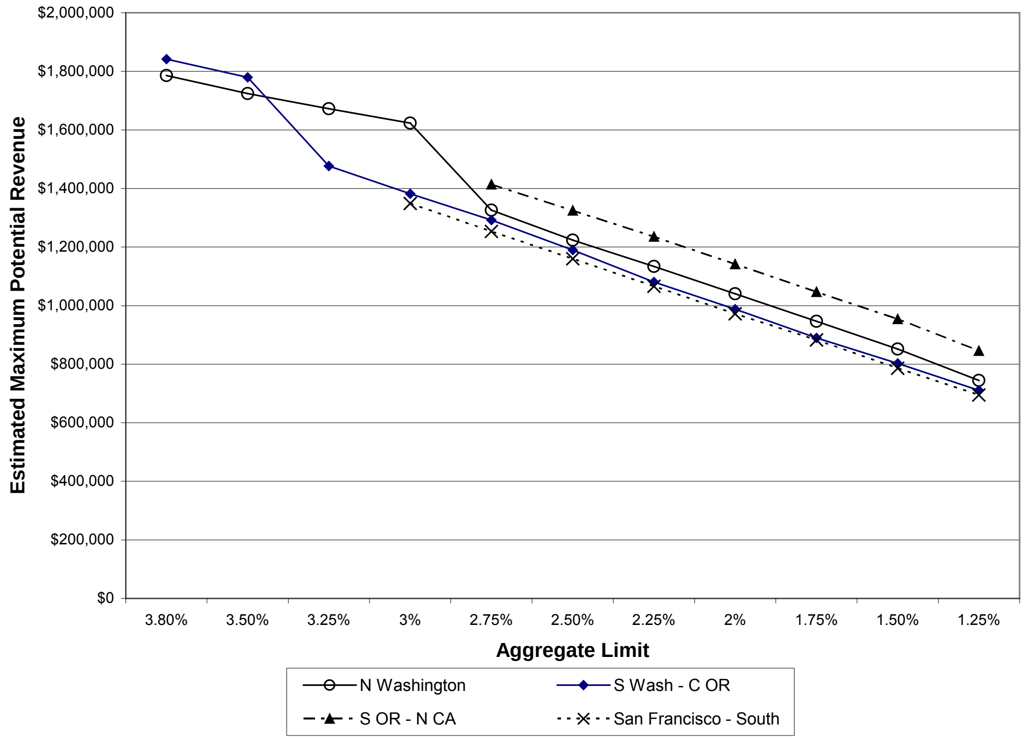

Figure 3. Estimated maximum potential revenue by regional target stratgey and aggregate control limit.

4. The Aggregate Control Limit Beyond the GMT Approach

The individual accountability and transferability at the core of the TIQ program are expected to lead to needed change in vessel operations and efficiency. The GMT Option and revenue-based framework are focused on identifying species limits that favor promoting this reorganization over restricting entities to existing practices. In this case, the aggregate limit would be a vital safeguard for achieving the Council's other management objectives for accumulation limits.

The team did not have time to thoroughly discuss the aggregate limit in the context of the other approaches to setting accumulation limits, yet we presume the aggregate level could continue to serve an important role no matter which approach the Council uses to derive species limits. We offer the following observations on how the aggregate limit fits with some of the alternative rationales being considered by the Council:

- If the intention is to allow each entity to acquire their potential initial allocation, then: *an aggregate limit of 2.7% appears to accommodate this consideration (based on ownership from Fall 2006).*

- If the intention is to cap the initial allocation of quota share at a level that is consistent with the control date, then
  An aggregate limit of 2.7% appears to achieve this consideration.

- If the intention is to retain limits similar to status quo vessel shares, then:
  An aggregate limit of 2.3% would achieve this consideration.

- If the intention is to have more consolidation than exists under current conditions, then:
  An aggregate limit in excess of 2.3% may be necessary.

G. Results Under A Different Set of OYs

The analysis presented in this document assumes 2010 OYs. These OYs were used because they represent the best known set of allowable catch levels when a rationalized fishery is intended to go in place (2011). Undoubtedly allowable catch levels will vary through time, and at times such variation may be significant. When there are large variations in OY levels, it may be appropriate to consider a revision to accumulation limits either upward or downward. It may also be appropriate to reconsider the formula for calculating the aggregate control limit. We identify two sets of non-overfished species that are contained in this analysis for which this has recently occurred. Both English sole and Dover sole have experienced substantial increases in OY levels compared to what existed in 2005. If these OY levels were to be reduced back to a level that is more similar to Other Flatfish and arrowtooth flounder, for example, it may be appropriate to alter the accumulation limits of Dover and English so that they more closely match other types of under-utilized, easily substitutable flatfish. For other types of species or situations, other types of considerations may be more appropriate.

H. Conclusion

The GMT expects to further elaborate on this framework approach at the March Council meeting in partnership with Council staff via a presentation or supplemental report to the Council. There are many issues related to this approach that time did not permit us to discuss or report on here (e.g., the vessel limits as twice the control limit approach, entities that own multiple vessels).

Agenda Item G.4.b
Supplemental GAP Report
March 2009

GROUNDFISH ADVISORY SUBPANEL REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20 – TRAWL RATIONALIZATION—ACCUMULATION LIMITS

The Groundfish Advisory Subpanel (GAP) received a presentation from Mr. Jim Seger and Mr. Merrick Burden on species' accumulation limits in the trawl rationalization program and provides the following comments and recommendations.

The GAP believes that the revenue-based approach provided by the Groundfish Management Team (GMT) in Agenda Item G.4.b, GMT Report for considering quota share control limits is a useful conceptual approach for deciding this issue. The GAP also paid attention to the recommendations of the Groundfish Allocation Committee (GAC) in Agenda Item G.4.b, GAC Report and the maximum initial quota share allocations in recommending the control limits for species individual fishing quota (IFQ) shares in Table 1. The maximum landings as a share of trawl allocation was another important consideration.

The GAP recognizes the trade-off between preventing excessive market control of the groundfish fishery with overly high control limits for single entities and the lower revenues and efficiency associated with control limits that are set too low. The GAP also agrees with the GMT that control limits for some species that tend to be targeted by fewer vessels in the fleet should be set relatively higher than those for species that tend to be caught by more vessels in the fleet to allow continuance of these specialized fishing opportunities. For this reason, higher control limits are recommended for species such as Pacific cod and arrowtooth flounder than for more commonly caught species such as sablefish and petrale sole.

The GAP agrees with the GAC recommendation that the Council apply control limits to quota shares and apply vessel use limits to quota pounds. In general, the GAP is recommending vessel use limits that are approximately 1.5 times higher than control limits. This will promote efficiency of fishing operations that will help absorb the higher overhead costs associated with IFQ management (e.g., observer costs borne by permit holders). The GAP felt that using 1.5 instead of the previously discussed factor of 2 for the vessel limit use cap multiplier was appropriate since it would set a larger minimum number of vessels in the fishery. The GAP does recommend slightly higher vessel limits relative to control limits for Pacific cod, arrowtooth flounder, and starry flounder to allow greater access to these species by specialists in the fishery when needed to meet fluctuating market demand or availability of these species for harvest.

The GAP recommends overall market control of the groundfish fishery should be limited by setting an aggregation limit of 2.7 percent on quota shares for non-whiting groundfish species. This recommendation is a mid range of the data presented on page 23 of the GMT report. The GAP agreed there would not be an overall vessel limit because the panel felt the individual species limits will achieve that purpose. Further, the GAP recommends fixing the weighting scheme for calculating the aggregation limit based on the trawl allocation of 2010 optimum yields (OYs) specified for IFQ species. The GAP believes that fixing this weighting scheme for the long term will promote stability and long range business planning much better than a more dynamic process that contemplates re-calculating the aggregation limit every two years in the biennial management decision process. If the future mix of IFQ species OYs changes to such a degree that the aggregation limit causes excessive market control or other unanticipated problems, then, and only then, should a different weighting scheme be considered.

Species	Vessel use limit	Control limit	Rationale for control limits
Pacific Whiting	15%	10%	Complies w/ GAC recommendation
Lingcod	3.8%	2.50%	Exceeds highest initial allocation and allows growth for the entity
Pacific cod	20%	12%	Exceeds highest initial allocation and allows growth for the entity
Sablefish N	4.5%	3%	Complies w/ GMT recommendation
Sablefish S	15%	10%	Complies w/ GAC recommendation
Chilipepper	15%	10%	Complies w/ GAC and GMT recommendation
Splitnose	15%	10%	Complies w/ GAC and GMT recommendation
Yellowtail	7.5%	5%	Complies w/ GMT recommendation
Shortspine N	9%	6%	Complies w/ GMT recommendation
Shortspine S	9%	6%	Complies w/ GMT recommendation
Longspine N	9%	6%	Complies w/ GMT recommendation
Shelf Rockfish N	7.5%	5%	Doubles the maximum initial allocation and allows growth for the entity
Slope Rockfish N	7.5%	5%	Doubles the maximum initial allocation and allows growth for the entity
Shelf Rockfish S	13.5%	9%	Exceeds highest initial allocation and allows growth for the entity
Slope Rockfish S	13.5%	9%	Exceeds highest initial allocation and allows growth for the entity
Dover sole	3.9%	2.6%	Doubles the maximum initial allocation and allows growth for the entity
English sole	7.5%	5%	Exceeds highest initial allocation and allows growth for the entity
Petrale sole	4.5%	3%	Complies w/ GMT recommendation
Arrowtooth	20%	10%	Complies w/ GMT recommendation
Starry Flounder	30%	15%	Will cover expected landings and market demand
Other Flatfish	15%	10%	Exceeds highest initial allocation and allows growth for the entity
Other Fish	7.5%	5%	Exceeds highest initial allocation and allows growth for the entity

Overfished species

For overfished species, the GAP recommends that control limits be set at the maximum initial allocation of overfished species QS given to any single permit. Vessel limits would be set equal to control limits. Following the GMT approach, the GAP recommends that only the unused pounds in the account would count towards the vessel limit.

Halibut

Consistent with our statement on agenda item G.3, the GAP recommends the Council not move forward with control and vessel limits for halibut IBQ at this time.

Table 2. GAP recommendations together with GMT, GAC and Existing options and other information used to develop the GAP recommendations.

Species Category	Existing Option 1		Existing Option 2		GAC Option 1[1]		GAC Option 2		GMT	**GAP Recom-.mendation**[2]		Maximums Historic and Initial QS Allocation			
														Max Annual Share of Trawl Fleet Landings	
Species Category	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Vess Lim	Cntrl Lim	Control Limits Identified in GMT Report	GAP Vessel Limit Option	GAP Control Limit Option	Max Annual Share of Trawl Fleet Allocation "04-'06	Max Initial Permit QS Allocations	'94-'03	'04-'06
Nonwhiting Groundfish Species	3.0%	1.5%	4.4%	2.2%	2.0%	1.0%	3.0%	1.5%		**None**	**2.7%**	1.8%	1.6%	4.1%	4.9%
Lingcod - coastwide	10.0%	5.0%	15.0%	7.5%	3.6%	1.8%	4.4%	2.2%		**3.8%**	**2.5%**	1.1%	2.2%	9.0%	3.7%
Pacific Cod	10.0%	5.0%	15.0%	7.5%	12.8%	6.4%	12.0%	6.0%	20.0%	**20.0%**	**12.0%**	7.2%	10.0%	22.7%	21.1%
Pacific whiting (shoreside)	20.0%	10.0%	22.5%	15.0%	15.0%	10.0%	15.0%	10.0%		**15.0%**	**10.0%**	6.9%	8.6%	9.1%	7.3%
Sablefish															
N. of 36° (Monterey north)	4.0%	2.0%	6.0%	***3.0%***	2.0%	1.0%	***3.0%***	1.5%	3.0%	**4.5%**	**3.0%**	4.3%	1.4%	2.4%	5.7%
S. of 36° (Conception area)	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	20.0%	10.0%		**15.0%**	**10%**	22.0%	15.0%	38.4%	60.3%
PACIFIC OCEAN PERCH	10.0%	5.0%	15.0%	7.5%	5.4%	2.7%	7.4%	3.7%		**3.3%**	**3.3%**	3.1%	3.0%	7.3%	10.1%
WIDOW ROCKFISH	6.8%	3.4%	10.2%	5.1%	9.0%	4.5%	12.0%	6.0%		**2.5%**	**2.5%**	6.7%	5.4%	28.7%	31.9%
CANARY ROCKFISH	10.0%	5.0%	15.0%	7.5%	7.0%	3.5%	7.6%	3.8%		**5.2%**	**5.2%**	0.0%	2.8%	12.6%	45.7%
Chilipepper Rockfish	***10.0%***	5.0%	15.0%	7.5%	12.4%	6.2%	20.0%	***10.0%***	10.0%	**15.0%**	**10.0%**	0.5%	9.6%	46.8%	26.5%
BOCACCIO	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	20.0%	10.0%			**15.0%**	0.0%	12.4%	78.9%	53.4%
Splitnose Rockfish	***10.0%***	5.0%	15.0%	7.5%	***11.4%***	5.7%	20.0%	***10.0%***	10.0%	**15.0%**	**10.0%**	8.5%	9.2%	19.9%	26.9%
Yellowtail Rockfish	10.0%	***5.0%***	15.0%	7.5%	***5.6%***	2.8%	10.4%	***5.2%***	5.0%	**7.5%**	**5.0%**	0.7%	3.7%	9.9%	11.5%
Shortspine Thornyhead															
N. of 34°27'	***9.6%***	4.8%	14.4%	***7.2%***	2.6%	1.3%	4.4%	2.2%	6%-10%	**9.0%**	**6.0%**	4.0%	1.9%	5.0%	8.7%
S. of 34°27'	9.4%	4.7%	14.2%	7.1%	8.4%	4.2%	17.6%	8.8%		**9.0%**	**6.0%**		3.3%	7.0%	16.0%
Longspine Thornyhead															
N. of 34°27'	4.0%	2.0%	***6.0%***	3.0%	2.8%	1.4%	4.4%	2.2%	6%-10%	**9.0%**	**6.0%**	2.0%	1.3%	2.0%	8.7%
COWCOD	10.0%	5.0%	15.0%	7.5%	20.0%	10.0%	0.0%	0.0%		**20.0%**	**20.0%**	0.0%	44.4%	100.0%	0.0%
DARKBLOTCHED	10.0%	5.0%	15.0%	7.5%	4.0%	2.0%	6.2%	3.1%		**2.0%**	**2.0%**	3.7%	4.4%	15.8%	5.6%
YELLOWEYE	10.0%	5.0%	15.0%	7.5%	18.8%	9.4%	20.0%	10.0%		**5.2%**	**5.2%**	0.0%	6.0%	35.8%	35.5%
Minor Rockfish North															
Shelf Species	8.0%	4.0%	12.0%	6.0%	5.8%	2.9%	4.4%	2.2%		**7.5%**	**5.0%**	3.1%	2.6%	30.6%	49.1%
Slope Species	***10.0%***	***5.0%***	15.0%	***7.5%***	4.0%	2.0%	***6.0%***	3.0%	6%-10%	**7.5%**	**5.0%**	3.5%	2.4%	11.9%	15.7%
Minor Rockfish South															
Shelf Species	10.0%	5.0%	15.0%	7.5%	12.2%	6.1%	20.0%	10.0%		**13.5%**	**9.0%**	1.7%	7.5%	46.6%	30.9%
Slope Species	***10.0%***	***5.0%***	15.0%	***7.5%***	11.6%	***5.8%***	20.0%	***10.0%***	6%-10%	**13.5%**	**9.0%**	12.1%	6.4%	24.8%	21.7%
Dover sole (total)	3.6%	1.8%	***5.4%***	2.7%	2.2%	1.1%	3.2%	1.6%	5%+	**3.9%**	**2.6%**	5.7%	1.3%	2.0%	5.6%
English Sole	20.0%	10.0%	30.0%	15.0%	3.0%	1.5%	**5.2%**	2.6%	5%+	**7.5%**	**5.0%**	2.3%	3.5%	13.9%	7.7%
Petrale Sole	5.8%	**2.9%**	8.8%	4.4%	**2.8%**	1.4%	4.6%	2.3%	3%	**4.5%**	**3.0%**	5.9%	1.7%	6.2%	8.0%
Arrowtooth Flounder	***10.0%***	5.0%	***15.0%***	7.5%	3.8%	1.9%	6.4%	3.2%	10%+	**20.0%**	**10.0%**	8.3%	6.2%	25.5%	19.1%
Starry Flounder	***10.0%***	5.0%	***15.0%***	7.5%	***20.0%***	***10.0%***	***11.0%***	5.5%	10%+	**30.0%**	**15.0%**	8.3%	30.5%	65.7%	54.5%
Other Flatfish	***20.0%***	***10.0%***	***30.0%***	***15.0%***	2.6%	1.3%	4.0%	2.0%	10%+	**15.0%**	**10.0%**	1.6%	9.2%	16.4%	8.1%
Other Fish	10.0%	5.0%	15.0%	7.5%	5.0%	2.5%	18.0%	9.0%		**7.5%**	**5%**	1.5%	3.9%	10.2%	21.3%

[1] Under the GAC option, the numbers provided for overfished species are for reference only and not part of the GAC option.

[2] Finer scale method used for calculating maximum control limit for overfished species.

GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20-TRAWL RATIONALIZATION-ACCUMULATION LIMITS

In addition to the proposed methodology outlined by the Groundfish Management Team (GMT) for setting control limits for target species, the GMT also discussed the issues surrounding setting accumulation limits for overfished species and offers the following thoughts for Council consideration.

The proposal for setting control limits for important target species outlined in Agenda Item G.4.b, GMT Report, focused on the revenue needed for an independent owner-operator to conduct an economically viable business in addition to considerations of "excessive share" and "inequitable concentration" as they relate to market control. In considering accumulation limits for overfished species, many of the same variables were under consideration, but with considerably more focus on the possibility of market control. Following the criteria described in that report, control would seem to be of particular concern for overfished species, even more so than for important target species such as sablefish and petrale sole. Overfished stocks limit access to target stocks, and in this regard, are not substitutable. Bycatch quota share could thus grant a quota holder leverage over a greater portion of the fishery than suggested by the percentage of their holding.

Although control limits for overfished species are vital to achieving the Council's overall vision for the fishery, they are not needed to change fleet fishing behavior. The primary tool for that purpose is the individual fishing quota mechanism itself, which increases flexibility for individual operations and creates market-based incentives for bycatch reduction. Instead, control limits for overfished species are intended more to balance access to target species with the need to prevent concentration of "excessive shares" that could result in forms of market disruption. In other words, accumulation limits for overfished species should allow for an opportunity for fishermen to prosecute target strategies while realizing the economic benefits of a more efficient marketplace.

Given the unavoidable constraints of harvest levels for species under rebuilding, the amount of overfished quota pounds available fleet-wide will necessarily be low. Likewise quota pound amounts distributed broadly across the fleet will result in levels that would not allow for most individuals to prosecute either traditional or innovative strategies.

The GMT discussed the possibility of using a combination of low control limits for quota share with high vessel use limits for quota pounds that might balance concerns of market control for any one entity with the need to cover high bycatch events. While this approach might prove feasible, there may still be concerns that an entity could arrange to circumvent control rules by accumulating quota pounds through surreptitious arrangements with other entities. With these thoughts in mind, the GMT envisions another model for accumulation limits that apply to overfished species.

This alternative approach would set vessel limits equal to control limits for unused pounds, but suspend the vessel limit for pounds needed to cover landings in excess of the accumulation limit

(Figure 1). Likewise, a vessel that used quota pounds from its account to cover a landing would then be allowed to accumulate quota pounds up to the vessel limit once more in order to insure against future bycatch events.

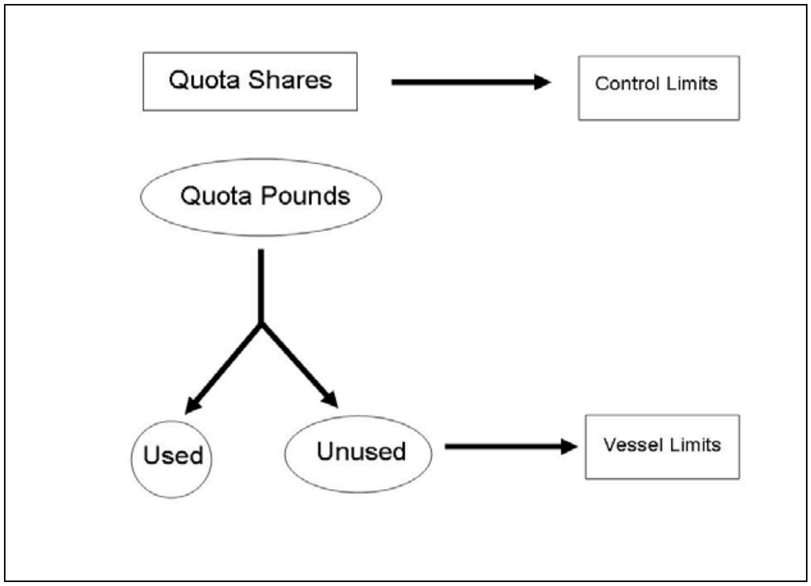

Figure 1. Flow chart outlining the relationship between quota shares, quota pounds, and associated accumulation limits under the GMT model for overfished species accumulation limits.

Given the constraining nature of overfished species across the fleet, the price to acquire quota pounds to cover a high bycatch event in order to resume operations will be considerable. This provides a financial incentive to avoid bycatch above the accumulation limit. Likewise there is also an incentive to avoid bycatch within the accumulation limits with the hope of selling unused quota pounds to another vessel that needs them.

The GMT notes that this is merely a conceptual approach for Council consideration. We did not have sufficient time to fully explore the consequences of this concept at this meeting. Furthermore, additional analyses would be needed to develop appropriate options for the actual amounts of accumulation limits for each overfished species taking into account the association of overfished species with target species/strategies balanced against the market control issues discussed above. The Council might also want to consider the geographic distribution of overfished species and the relative constraint of various harvest levels (for example cowcod have a very low optimum yield and are relatively isolated geographically, while darkblotched have a relatively higher optimum yield and are distributed more broadly along the coast).

<u>GMT Recommendation:</u>

Consider analyzing an approach for setting overfished species accumulation limits where vessel limits are equal to control limits for unused quota and limits are not applied to landed pounds.

PFMC
3/11/09

Agenda Item G.4.b
Supplemental GMT Report 2
March 2009

GROUNDFISH MANAGEMENT TEAM REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20-TRAWL RATIONALIZATION-ACCUMULATION LIMITS

The Groundfish Management Team (GMT) conducted a very preliminary review of the overfished species accumulation limits, adopted by the Council under Agenda Item G.4. The GMT did not have sufficient time to analyze all of the individual overfished species limits nor did we have sufficient time to fully explore the consequences. However, in the limited time available, the GMT identified several areas of concern and believes that the existing overfished species accumulation limits will likely result in several unintended consequences that conflict with the trawl rationalization objectives (Preliminary Draft Environmental Impact Statement, page 4). Specifically, the limits recommended by the Council may prohibit the development of a viable, profitable, and efficient groundfish fishery. Further, the restrictive vessel limits may dramatically reduce operational flexibility, which conflicts with another objective of the rationalization program.

The effect of the overfished species accumulation limits taken from the spreadsheet in the main motion for accumulation limits adopted under Agenda Item G.4 are shown in the following table. The implications of some of these numbers are also included.

		Percentage		Metric Tons		Pounds	
Species	Assumed Trawl Sector Allocation (MT)	Vessel	Control	Vessel	Control	Vessel	Control
Canary	9.4	0.078	0.052	0.7	0.5	1,616	1,078
Widow	163.0	0.038	0.025	6.2	4.1	13,655	8,984
POP	137.5	0.05	0.033	6.9	4.5	15,156	10,003
Bocaccio	48.0	0.1	0.075	4.8	3.6	10,582	7,937
Cowcod	2.8	0.1	0.1	0.3	0.3	617	617
Darkblotched	257.6	0.03	0.02	7.7	5.2	17,037	11,358
Yelloweye	0.4	0.039	0.026	0.0	0.0	34	23

If the widow rockfish accumulation limits were to apply to an overfished widow rockfish stock, substantial hardship would be placed upon the shoreside whiting fishery. In recent years, for example, several vessels have incidentally caught over 15 mt while operating under bycatch caps – conditions that are similar to the constraints posed by individual fishing quota for those species. If the existing accumulation limits remain in place and the stock is overfished, the tonnage associated with the control limit may be on the order of 4 mt, while the tonnage associated with the vessel limit may be on the order of 5 mt. If past catch data in the shoreside whiting fishery is any indication, these limits will have the effect of highly restricting multiple entities to the extent that some may not be able to substantially participate in the fishery.

In the event that widow rockfish is rebuilt at the start of the rationalization program, the existing accumulation limits do not appear to be conducive to target opportunities. Widow rockfish opportunities may be a relatively specialized type of strategy, and if that is the case, vessel and control limits may need to be set higher to accommodate target opportunities.

Under the yelloweye rockfish accumulation limits, vessels operating off particular areas of the Washington and Oregon coasts may not be able to acquire enough quota to operate in those areas. However, this ultimately depends on the size of the sector allocation. The effect of the control and vessel limits adopted by the Council under potential sector amounts of 0.1 to 0.4 mt are 8 to 34 lbs for the vessel limit, and 5 to 23 lbs for the control limit. Data from the West Coast Groundfish Observer Program (WCGOP) indicates several observed discard events larger than 30 lbs and some as large as 100 lbs. Examining landings data does not provide a very helpful picture due to lack of yelloweye landings events, however, on an annual basis, some vessels have landed in excess of 40 lbs during a year. Given the high degree of importance and potential effect of a yelloweye accumulation limit, it appears difficult to establish a yelloweye limit without knowing the sector allocation.

The existing darkblotched limit would result in an 11,000 lbs and 17,000 lbs control and vessel limit, respectively. While this scale is substantially larger than some other overfished species, the control limit is very similar to the landed catch (not including discard) of vessels in recent years. When discard is taken into account, the existing limits may not be as close to current catch levels, and when fleet consolidation is taken into account, it may be necessary to allow for greater amounts of darkblotched per entity and vessel. However, existing information indicates that darkblotched are not as "patchily" distributed as some other rockfish stocks, meaning the risk of "disaster tows" is somewhat less. This type of species distribution may make it easier to avoid darkblotched and would tend to reduce the risk of a disaster tow, meaning the effect of a lower accumulation limit may not be as pronounced as for some other species. The types of effects listed here should be carefully considered.

The Pacific Ocean perch (POP) limit can be viewed somewhat similarly to darkblotched, but there are some notable differences. POP appear to be distributed over a smaller distribution, meaning that it may be appropriate to have a relatively greater number of entities and vessels for this species compared to darkblotched. The existing POP limit would result in poundage that is also somewhat similar to recent fishery patterns (like darkblotched), but would not be large enough to accommodate some of the higher catches in recent years.

There is insufficient, readily available data to provide much insight into bocaccio and cowcod. However, these stocks are regionally distinct, meaning that it may be reasonable to have a relatively small number of entities and vessels associated with these species.

GMT Recommendation

In conclusion, the GMT has identified some concerns with the adopted overfished species limits. The GMT recommends that the Council submit a range of control and vessel usage limits for analysis, with refinement and final adoption in June 2009.

PFMC
3/13/09

Agenda Item G.4.b
NMFS Report
March 2009

Notes on from informal discussion with fishing industry representation on rationale related to the GAP Statement

Species	Vessel use limit	Control limit	Rationale for limits	Vessel/ Control Ratio (1.5:1.0) (+ =Yes)	Control Limit Greater than (+ =Yes)		
					Max share of fleet allocation ('04-'06)	Max Initial Permit QS Allocation	In line with GMT Report (+ =Yes)
Pacific Whiting	15.0%	10.0%	Similar to GAC recommendation	+	+	+	
Lingcod	3.8%	2.5%	Limits relatively low because it is a coast wide species the catch of which is widely distributed among the fleet.	+	+	+	
Pacific cod	20.0%	12.0%	Higher vessel limits because the distribution is geographically limited, participants few, and opportunities intermittent. Keep the control limits down to prevent excess control. On this basis provide vessel limits that are greater than the 1.5 to 1 ratio used for other species.	0	+	+	
Sablefish N	4.5%	3.0%	Control limit lower than max share because of high dependence on a coast wide basis. Vessel limit is high enough to allow the vessel to achieve the recent maximum share of allocation.	+	0	+	+
Sablefish S	15.0%	10.0%	Underutilized, very few vessels operating there now. Potential for gear switching. 10% control limit, in line with GAC 90th percentile recommendation.	+	0	0	
POP	3.3%	3.3%	*Overfished species rationale.	+	+	+	
WIDOW	2.5%	2.5%	*Overfished species rationale.	+	+	+	
CANARY	5.2%	5.2%	*Overfished species rationale.	+	+	+	
Chilipepper	15.0%	10.0%	On the higher end because its taken in a smaller area, its not a coast wide fishery, and its under harvested. Similar to GAC recommendations.	+	+	+	+
BOCCACIO	15.0%	15.0%	*Overfished species rationale.				
Splitnose	15.0%	10.0%	Rationale similar to chilipepper.	+	+	+	+
Yellowtail	7.5%	5.0%	Control limit quite a bit higher than initial allocation because it has not been fully utilized in recent years. However, limits should not be too large because the stock is widely distributed and used in a lot of strategies along the coast.	+	+	+	+

Species	Vessel use limit	Control limit	Rationale for limits	Vessel/ Control Ratio (1.5:1.0) (+ =Yes)	Control Limit Greater than (+ =Yes)		
					Max share of fleet allocation ('04-'06)	Max Initial Permit QS Allocation	In line with GMT Report (+ =Yes)
Shortspine N	9.0%	6.0%	Control limits somewhat higher than for Dover and sablefish, for example, because it is underutilized but at the same time need to maintain widespread availability to provide opportunity for many vessels over the majority of the coast.	+	+	+	+
Shortspine S	9.0%	6.0%	The same as limits set for other thornyheads.	+	0	+	+
Longspine N	9.0%	6.0%	Similar to shortspine in the north.	+	+	+	+
COWCOD	20.0%	20.0%	*Overfished species rationale.				
DARKBLOTCHED	2.0%	2.0%	*Overfished species rationale.				
YELLOWEYE	5.2%	5.2%	*Overfished species rationale.				
Shelf Rockfish N	7.5%	5.0%	Control limit is twice the maximum initial allocation because the stock has been substantially underutilized in recent years. (Note: While the control limit is less than what is in the GMT report, the vessel limit is in the report's range.)	+	+	+	
Slope Rockfish N	7.5%	5.0%	Rationale similar to shelf.	+	+	+	
Shelf Rockfish S	13.5%	9.0%	South, limits slightly higher than northern rockfish because of fewer vessels participating.	+	+	+	
Slope Rockfish S	13.5%	9.0%	Rationale similar to shelf.	+	0	+	
Dover sole	3.9%	2.6%	Lower limit than for many species, because its widely distributed and caught by many vessels. A large control limit would creates opportunities for a few vessels with a relatively lower amount of QS to completely supply the limited market. Even though relatively lower, the control limit is still over twice the maximum intitial allocation.	+	0	+	
English sole	7.5%	5.0%	Similar to Dover sole (widespread and soft markets) but it is underutilized and more important to a small subset of the fleet (beach boats). Therefore the limits are larger.	+	+	+	
Petrale sole	4.5%	3.0%	The control limit is similar to sablefish and in line with the GMT report. The limit would constrain the maximum share, however, this maximum occurred in a year in which the OY was exceeded. similar to sablefish.	+	0	+	+

Species	Vessel use limit	Control limit	Rationale for limits	Vessel/ Control Ratio (1.5:1.0) (+ =Yes)	Control Limit Greater than (+ =Yes)		
					Max share of fleet allocation ('04-'06)	Max Initial Permit QS Allocation	In line with GMT Report (+ =Yes)
Arrowtooth	20.0%	10.0%	A larger vessel limit is needed because of the smaller number of vessels involved in the fishery and to allow for expansion of harvest on this underutilized species. Similar to Pacific cod, a control limits is needed that is lower than what is would be if the standard 1.5:1.0 ratio is applied.	0	+	+	+
Starry Flounder	30.0%	15.0%	Higher limits because it is one of the fisheries with the lowest number of participants. However, control limit is lower than the maximum initial allocation (30%) because that level would not accommodate enough of the beach draggers.	0	+	0	
Other Flatfish	15.0%	10.0%	This is a catch all category which includes sanddabs, rex sole, and true turbots. It has a fairly large aggregate OY. However, a larger control limit is recommended because of the need to specialize in single species within the complex.	+	+	+	
Other Fish	7.5%	5.0%	Lower end of the range of limits because this is a catch all category that everyone might need a little of.	+	+	+	

* Rationale for overfished species control and vessel limits: (1) Control limits are set at the maximum initial allocation under the formula adopted by the Council at this meeting. Of all the species, it is most important to minimize the chance of excessive control of the overfished species QS. The maximum initial allocation level is a reasonable level at which to set the control limit for this purpose. (2) There is significant incentive for vessels to avoid overfished species. The proposed rules for applying the vessel limits will allow any vessel to cover its catch regardless of the level at which the vessel limit is set, if it can find the QP to do it. Therefore, it is recommended that the vessel limit be set at the control limit.

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 20 – TRAWL RATIONALIZATION – ACCUMULATION LIMITS

Messrs. Jim Seger and Merrick Burden briefed the Scientific and Statistical Committee (SSC) on species-specific non-whiting control limits and vessel limits being considered for non-overfished species as part of the trawl individual quota (TIQ) program. Control limits are intended to prevent excess concentration of shares, while vessel limits are intended to influence overall fleet size.

In January 2009, the Groundfish Allocation Committee (GAC) proposed two control limit options based on landings shares associated with 90th percentile landing histories for 1994-2003 and 2004-2006. The GAC options also include a requirement that vessel limit options be twice the control limits, with the control limit capped at 10 percent and the vessel limit capped at 20 percent of quota shares. Agenda Item G.4.a, Staff Report summarizes the GAC options and two other options previously identified by the Council in terms of quota shares, minimum number of entities needed to exhaust quota share, maximum revenue per entity, and total number of entities and total quota share over the limit. Agenda Item G.4.b, GMT Report compares the GAC options to a new option developed by the Groundfish Management Team (GMT). The GMT option focuses on identifying accumulation limits that would provide a "one vessel, one owner" entity with sufficient quota share to operate efficiently in the TIQ fishery. The option was developed by characterizing regional differences in target strategies (based on the behavior of the top three producers in each of four regions), setting control limits to regional peaks, and using post-TIQ annual revenue of $700K as a benchmark for an efficient vessel (based on a previous TIQ analysis conducted by Lian, Singh and Weninger).

Both the Staff Report and GMT Report are informative regarding differences among the accumulation limit options. The GMT's approach is particularly instructive, in that it accounts for regional differences in historical fishing strategies rather than statistical distributions of historical catch. It is important to note that the focus of the GMT Report is the control limit. For instance, maximum revenues by region projected in the report (Table 3, p 11) pertain to total landings taken under the control limit; the vessel limit would be twice as large so the GAC options are not as restrictive as indicated in the Table. It would be instructive to have a similar analysis of vessel limit options. With regard to both reports, it is important to note that percentages of accumulation limits assigned to individual species should not be used to estimate the number of vessels in operation, as limits are not necessarily fully utilized.

The SSC views accumulation limits as a policy decision to be made by the Council that reflects trade-offs between economic efficiency and wider distribution of fishing opportunity. The analyses provided in the Staff Report and GMT Report are useful contributions to the Council's consideration of the options.

PFMC
03/09/09

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW) REPORT ON AMENDMENT 20: TRAWL RATIONALIZATION ACCUMULATION LIMITS

With regard to the motions in November 2008 relative to accumulation limits in the mothership whiting sector, the Washington Department of Fish and Wildlife would like to offer the following recommendations:

Whiting Catcher Vessel (CV) Ownership Limit in the Mothership (MS) Sector

The CV ownership limit addresses the issue of an entity owning an "excessive share" and the need to provide some room for growth, new entrants, and to promote efficiency. The motion adopted by the Council in November did not address this.

The following data was excerpted from Table A-74 in Appendix A. (p. A-260):

Stock	1994-2003		2004-2006	
	90th Percent	Max	90th Percent	Max
Pacific Whiting - Mothership Sector	11.3	18.5	16.4	28.9

These data indicate that the maximum amount landed by a CV during the qualifying period (1994-03) was 18.5% of the MS total and that a limit of 11.3% would accommodate 90% of the CV activity. For the more recent time period, it is our understanding that a CV landed 28.9% of the MS total in one year between 2004 and 2006 and that 16.4% would accommodate 90% of the CV activity during that time.

It is important to note that while one of the CVs has landed quite a bit more than the others, the amount that that CV permit will receive for initial allocation is considerably less than the percentage it has landed recently. In reviewing Figure B-2 in Appendix B. (p. B-56), it would appear that, in terms of initial allocation, the maximum that any entity would receive is 9.5%, based on the qualifying period.

Therefore, WDFW would recommend that the CV permit ownership limit be set at 15%. We believe that this would prevent an entity from owning a share of whiting that would be considered "excessive," while providing some room for growth by all CV permit holders from their respective initial allocation amounts.

Whiting Catcher Vessel Usage Limit in the Mothership Sector

The CV usage limit issue is slightly different as it attempts to strike a balance among three factors: 1) efficiency in the fleet; 2) minimum number of vessels needed to prosecute the fishery; and 3) the potential effect of the usage limit on price negotiations. Having a higher limit provides for more efficient harvest practices; however, having a limit that is too high could result in too few CVs available for MS operations and could provide leverage for CVs to negotiate higher prices. In talking with some of the MS companies, there seemed to be agreement that each MS needed a minimum of two CVs to operate continuously.

The MS usage (processing) limit adopted by the Council in November was 45%, which ensures that there would be a minimum of three MS processors participating in the fishery in a given year. This would translate into a minimum of six CVs (two CVs for each of the three MS processors), which would suggest a limit of 17% if all CVs achieved the maximum usage amount. However, given the diversity of the fleet, it is not anticipated that this would occur. Also, 17% would likely be too restrictive since one CV has used up to 29% in the recent time period.

Therefore, based on the data in Table A-74 and Figure B-2, WDFW would recommend a CV usage limit of 25%, which would strike a reasonable balance of promoting efficiency and ensuring that there would be a minimum amount of vessels available for harvest.

food&watercwatch

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February 17, 2009

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Groundfish Fishery Management Plan Amendment 20: Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery

Honorable Pacific Fishery Management Council (PFMC) members,

Food & Water Watch (FWW) is a national consumer action organization that defends, and advocates for robust public management of essential resources, including fish.

For the consideration of Council, prior to taking final action on trailing actions related to the above matter, please find below FWW's general and specific comments and conclusion.

General Comments:

As you are aware, wild fish stocks in the U.S. are a public property resource. The government bears the significant responsibility for managing this resource on behalf of all U.S. people. Successful management means maintaining ecologically sustainable wild fish stocks, and allocating harvesting privileges in an equitable manner: providing for broad societal objectives, viable fishing industries, and management improvement over time.

FWW asserts that the preferred trawl rationalization alternative selected by the PFMC in November 2008, to be recommended to the Secretary of Commerce for implementation, will not allocate harvesting privileges in an equitable manner, or optimize social benefits from, or stewardship of, the valuable Pacific coast groundfish resource.

Contrary to the public interest, we have been given ample cause to believe that the unstated objective of the rationalization program is to secure, essentially in perpetuity, the economic position of the bigger incumbent companies, to lead directly to the creation of a feudal system in relation to groundfish harvesting.

Bigger initial beneficiaries will: consolidate quota shares and thus fishery participation; continue to fish for free by paying no resource rents to the public; lease quota pounds to 'sharecroppers' at exorbitant rates; attain massive cross-subsidies as taxpayers continues to pay the bulk of increased management costs; and sell their privilege and quota share when ready – pocketing the substantial unearned economic windfall.

Once in place, this system of guarded extraction of benefits from a public resource will be very difficult to reverse.

To be clear, IFQs are primarily an economic allocation tool, not a true conservation tool. It is the Total Allowable Catch (TAC) - the harvest cap - that is responsible for ending overfishing, not the way the TAC is divided and allocated. If a TAC is set above biological limits, over-fishing will still occur - even under an IFQ program.

This critical distinction was pointed out in the National Research Council (1999) report Sharing the Fish, Towards a National Policy on Individual Fishing Quotas: …*'IFQs are not primarily a biological conservation tool; the TAC and other management measures are the main conservation tools in IFQ-managed fisheries.'*[1]

FWW applauds the National Marine Fisheries Service (NMFS) for recognizing the primary conservation role of harvest caps through the January 15, 2009, issue of final guidance on Annual Catch Limits (ACLs) designed to help restore federally managed marine fish stocks and end overfishing. Federal managers clearly understand that catch limits are their primary conservation tool – not how the catch is divided.[2]

Now that overfishing is to be addressed robustly, FWW will soon urge Congress to revisit controversial fish stock allocation issues.

The need for congressional attention to fish stock allocation issues is urgent. Whilst Congress included in the reauthorized Magnuson-Stevens Act (2007) many innovative ways to allocate fishing privileges - such as auctions or direct quota grants to communities - many of the eight regional fishery management councils, including the PFMC, have not rigorously explored equitable allocation options, and are charging ahead to protect and solidify private vested interests through the implementation of IFQs and related de facto privatization schemes. In the words of the late President Truman: *'Such raids on our natural resources are not examples of enterprise and initiative. They are an attempt to take from all people just for the benefit of a few.'* [3]

The Environmental Defense Fund and others that have pushed the present 'catch share' stampede have presented the public with a disingenuous characterization of the problems facing U.S. fisheries. These groups have forced the notion that a policy dichotomy exists: a choice between completely fictitious unregulated fisheries (all U.S. are now heavily regulated) leading to a "tragedy of the unmanaged commons" situation, or a quasi-private property IFQ regime that, if applied broadly, will purportedly *'…restore abundant oceans'*[4].

The National Marine Fisheries Service has not adequately challenged or attempted to clarify the above inaccurate characterization, nor developed guidelines to direct councils

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[1] National Research Council, Committee to Review individual Fishing Quotas, *Sharing the Fish: Toward a National Policy on Individual Fishing Quotas* (Commission on Geosciences, Environment and Resources Washington, D.C: National Academy Press, 1999), p.105

[2] National Marine Fisheries Service "Magnuson-Stevens Act Provisions; Annual Catch Limits; National Standard Guidelines, 50 CFR part 600" National Marine Fisheries Service website. http://www.nmfs.noaa.gov/msa2007/docs/acl_final_rule_as_signed_version.pdf

[3] Harry. S. Truman, "Address on conservation at dedication of Everglades National Park", December 6, 1947, podcast, Harry. S. Truman. Library and Museum site, http://www.trumanlibrary.org/audio/audio.htm

[4] Environmental Defense Fund, "Oceans of Abundance", Environmental Defense Fund website. http://www.edf.org/documents/8795_OceansOfAbundance.pdf

on the development of IFQs programs or other more socially desirable catch privilege allocation options.

With respect to catch privilege allocation, FWW asserts that in circumstances where quota shares are to be granted to individual entities, a mechanism of payment for the constrained (e.g. fixed term, non-transferable, eligible active fisherman only, cleaner gear, etc.) privilege of catching fish should be instituted. Once policy firmly establishes that commercial fishing entities must pay the public resource owners to catch fish in accord with a defined set of social values and objectives, the central issues then becomes: how contract agreements between the government steward and fishing entities should be structured; how revenue held in trust accounts should be managed and disbursed; and how the transition to and continual improvement of this system can be best undertaken.

Importantly, a contract system is easily understood as an endorsement and assertion of public control of public resources. Moreover, a contract system offers management flexibility for an uncertain future, and is consistent with the public policy approach used to manage many other natural resources.

FWW believes that such an equitable allocation approach would allow independent conservation minded fishermen to thrive through operational level community-based cooperative catching and marketing business models. Strategic analysis would reveal the greater value of these business models and the related value chains that produce low volume high value sustainable products for eager U.S. consumers.

Unfortunately, the PFMC has missed a critical opportunity to provide strategically informed leadership in relation to the balancing of economic, social and ecological systems possible through a well-crafted allocation system suited to the twenty-first century and the challenges foreseeable ahead. Amendment 20 has created groundfish royalty instead of equitable access, conservation and social benefits, management flexibility, and public royalties to fund management excellence.

<u>Specific Comments:</u>

With respect to outstanding elements of the rationalization program FWW notes that three elements of the shoreside sector IFQ program are still open for refinement:

1. IFQ ownership and use caps
2. Ownership eligibility
3. Mechanisms for the use of the ‘adaptive management’ set-aside, in which 10% of the non-whiting groundfish IFQ is to be used to address impacts of the new program.

On these issues, FWW asserts:

- Ownership and control of quota share and pounds should be restricted to owner-operators, defined as active seafaring fishermen - captains and crew that meet reasonable eligibility criteria.

- Accumulation caps should be conservative, and structured to optimize social results as opposed to economic efficiency.

- The adaptive management set-aside should be used to mitigate one-off transition impacts including the one time resolution of proven stranded capital issues. It should then be held, to provide an incentive pool for conservation results and for further transitions as required to improve the program.

Conclusion:

In summary, the preferred trawl rationalization alternative privatizes profit and socializes loss. FWW asserts that the lasting imprint of Amendment 20 will be job losses, the preclusion of small business and small coastal community participation in groundfish fishing and processing, and the creation of a feudal class of quota 'owners'. Taxpayers will get the displeasure of addressing negative impacts, whilst paying the significant and ongoing costs of program management.[5]

FWW recommends PFMC members support options in respect to the outstanding elements of the rationalization program that minimize adverse societal impacts to the extent possible.

Sincerely,

Ben Bowman

Ben Bowman
Policy Analyst
Food and Water Watch

[5] FWW notes council's request to the Secretary of Commerce for as yet unspecified additional funds to implement the preferred trawl rationalization alternative if approved.

The Nature Conservancy
Protecting nature. Preserving life.™

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February 18, 2009

Mr. Don Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Dear Chairman Hansen:

At the November 2008 meeting of the Pacific Fishery Management Council, The Nature Conservancy proposed that the Council make certain changes to the preliminary preferred alternative to remove barriers to the formation of Community Fishing Associations, for the purpose of mitigating the projected negative effects of trawl rationalization on some west coast fishing communities. A Community Fishing Association (CFA) or other such community-based entity would provide an *opportunity* for communities to maintain their participation in the fishery, and would not require an allocation of quota share.

Experience in other fisheries that have undergone rationalization has shown that the first 3 to 5 years after initial allocation of an individual fishing quota (IFQ) system is the period when most of the upheaval in the fishery and traditional fishing communities is likely to occur. After that period it becomes increasingly difficult for new participants or entities – including traditional fishing communities - to enter or re-enter the fishery. It will be important to establish measures to help mitigate community disruption prior to initial allocation such as rules for CFAs.

As explained in our previous submission, a CFA is a new entity that could hold quota share on behalf of a community. In the Central Coast of California, TNC intends to establish such an entity that would build on our existing efforts and eventually hold the permits TNC recently purchased from trawlers in this area and the associated quota share. We will strive to work with communities on the central coast to ensure that fishermen and communities are vested in the fishing entity and that the entity provides tangible benefits and enhances the future of the groundfish fishery. TNC has no intention or desire that its fishing privileges be "retired" or used to constrain the west coast groundfish fishery.

The Council's final action on trawl rationalization in November 2008 was supportive of the CFA approach. The final motion package identified the need to consider the effect of individual accumulation limits – to be established through a trailing action - on the ability of communities and individuals to work together to establish community based entities that could hold and manage quota following rationalization, such as CFAs.

The Conservancy and its partners appreciate the Council's continuing attention to the need for maintaining traditional fishing community access to the fishery and understand that establishing an appropriate accumulation limit for a community entity is likely to be difficult without a clear understanding of the need, purpose, and guidelines for such an entity. We offer this second proposal for specific guidelines for a CFA option to assist the Council in taking action on this important need. The recommendations here are based on experience we have had implementing an Exempted Fishing Permit to test a community based approach in Morro Bay and Port San Luis, California and research into similar efforts in other U.S. fisheries.

The benefits of a CFA-type approach are being tested and documented now in the Exempted Fishing Permit the Council approved for 2008 and 2009 and these encouraging results can inform the Council's plan. In order to offer any real opportunity for communities to act to preserve their access to the resource – federal guidelines for establishing community entities *must be in place at the time the IFQ program is implemented.* To ensure that this opportunity is available to communities, we request the Council take the following actions:

- Develop a framework for CFAs in the current set of trailing actions to be completed by June 2009, including specific accumulation limit rules for CFAs that meet the requirements.
- Allow entities that qualify for quota share in excess of individual accumulation limits the opportunity to divest of the excess after initial allocation. Low individual accumulation limits without a grandfather or divestiture provision could lead to a major redistribution of access with serious impacts on communities.

Thank you for your consideration of this request.

Sincerely,

Margaret Spring

Margaret Spring, Director
California Coastal & Marine Program

Proposed Framework for Establishment of Community Fishing Associations

February 18, 2009

Summary of CFA Proposal:

1. Problem Statement

As the Council's evaluation of the proposed groundfish trawl rationalization program indicates, rationalization and consolidation of the trawl fleet is likely a net benefit to the fishery as a whole, but projections of its effects at the individual and community scales are more varied and dislocation is predicted in some communities. Experts recommend advance planning and measures to prevent or mitigate these likely impacts.[1] This change in the management of the fishery arrives at a time when many west coast groundfish ports are struggling to adjust to changes in markets, infrastructure, and recent trawl capacity reduction efforts.

As permits migrate away from historic ports, and consolidation occurs, some communities will be left without trawl access to groundfish, and new entrants from these communities will have little opportunity to become active participants as the fishery recovers. Many groundfish ports on the west coast rely upon diverse fishing opportunities. Groundfish trawling has often been the foundation of these local economies, providing deliveries of fish in quantities that support local processors and other parts of the shoreside fishery infrastructure that in turn support other fisheries in the community. Loss of trawl access as a result of quota or permit migration and consolidation is a high economic and social price for these communities and fishing families to pay.

The Magnuson-Stevens Fishery Conservation and Management Act ("MSA"), 16 U.S.C. § 1801–1891d, as amended in 2006, contains several provisions requiring that fishery management decisions take into consideration and seek to minimize the impact on fishing communities. For example, National Standard #8 requires the government to consider and limit

[1] *See*, [1999 NRC Report]; GAO, "Individual Fishing Quotas: Methods for Community Protection and New Entry Require Periodic Evaluation" (GAO-04-277, February 2004); 2004 U.S. COP Report, Chapter 19 (*noting that concerns about community impacts led to establishment of the IFQ moratorium in 1996).*

the possible impacts on fishing communities from any proposed management plans or regulations.[2] Section 303A, which specifically allows for creation of an IFQ, directs the Council to "include measures to assist, when necessary and appropriate, entry-level and small vessel owner-operators, captains, crew, and fishing communities . . ." include provisions to prevent excessive consolidation, and recognize the current and historical participation of fishing communities.[3]

The Council's analysis of the rationalization program[4] has identified several anticipated impacts on fishing communities. The MSA requires that the rationalization program be implemented in a manner that minimizes such adverse impacts on fishing communities and provides for sustained participation of such communities. The preliminary draft Environmental Impact Statement (pdEIS) suggests that several provisions could be used to mitigate such impacts: (1) broad eligibility for QS, (2) a moratorium on transfer of QS, and (3) an adaptive management program (AMP). However, it is unclear how such provisions would work in practice to mitigate for local and community-based impacts, particularly because existing local government administrative structures lack the capacity, authority, expertise and focus to readily take advantage of these opportunities.

What is missing is a community-based entity that can fulfill this role and take advantage of these opportunities at the local level. The establishment of CFAs can help fill this gap and create a mechanism for communities to obtain future economic and social benefits (including jobs and revenues) that will follow the recovery of the groundfish fishery. Further, there is demand for allowing such entities, as seen by the fact that several ports have expressed an interest in pursuing the CFA approach.[5]

2. CFAs Can Help Meet National and Regional Fishery Goals and Objectives

Appropriate accumulation limits and a framework that allows establishment and operation of CFAs or other community entities to prevent or mitigate impacts on fishing communities will support not only the goals and objectives of the trawl rationalization process, but also those set forth in the Pacific Coast Groundfish Fishery Management Plan (PCGFMP) and the MSA. Such approaches are also strongly recommended by expert reports of the National Research Council, the U.S. Commission on Ocean Policy, and the Government Accountability Office.[6]

Such provisions for CFAs in the trawl rationalization process are also needed to meet existing management goals. The Council's goal in rationalizing the west coast groundfish trawl fishery is to increase net economic benefits from the fishery, promote economic stability, reduce waste and

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[2] 16 U.S.C. § 1851(a) (8).
[3] 16 U.S.C. § 1853a.
[4] Chapter 4; Section 4-14 of the pdEIS
[5] *See*, *e.g.*, Resolution No. 61-08, City Council of Morro Bay, October 13, 2008; Resolution No. 21-08, San Mateo County Harbor District, October 15, 2008; Letter from Chuck Della Salla, Mayor of Monterey, to Mr. Donald K. Hansen, October 24, 2008; Resolution No. 08-15, Port San Luis Harbor District, October 28, 2008.
[6] Cite to 1999 NRC Report, 1994 GAO Report, USCOP.

promote full utilization of the resource, and improve accountability. One of the objectives supporting this goal is to minimize adverse effects from an IFQ program on fishing communities and other fisheries to the extent practical. Further, the objective of the PCGFMP[7] is to provide for the sustained participation of fishing communities and minimize adverse economic impacts. Including provisions that would promote community stability and improved management through establishment of voluntary Community Fishing Associations would clearly serve these goals.

Moreover, such community-based approaches have proven critical to preventing disruption and political opposition in other fisheries, and as a result are specifically required by the MSRA and recommended by the Natural Research Council[8] and other expert panels.[9]. Such community-based approaches were specifically adopted in both the pollock cooperative and halibut and sablefish IFQ programs in the North Pacific Council, as well as in other nations (e.g., see GAO 1994).

3. Benefits of Community Fishing Associations to Fishery Stakeholders

The MSA defines the term "fishing community" to mean a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.[10] Factors which affect individuals within a fishing community have a significant effect on the whole fishery economy. For example, market changes that diminish processing capacity or a management change or buyout that reduces fishing vessel capacity in a port impact the entire community. These effects have been seen clearly in the Morro Bay Port San Luis Area where the possibility of establishing a community-based entity is currently being tested under an Exempted Fishing Permit (EFP) in the Central Coast of California.

The benefits of the members of a fishery working cooperatively to address shared needs are well-established – and have been clearly evident in the Morro Bay/Port San Luis EFP demonstration project. We envision a CFA as a new entity that can permanently hold groundfish quota share (QS) and permits on behalf of a fishing community as defined in the MSA and that can manage and distribute quota pounds (QP) each year for the benefit of that community.

Creating rules that would allow the creation and operation of CFAs would provide a number of benefits for communities, fishermen, processors, and fishery managers:

- Local Access and Opportunity: By acquiring, holding and distributing an amount of quota share on behalf of one or several communities the entity is able to anchor access to the resource in a particular area for the benefit of the local fishing economy;

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[7] See Section 2.1, Objective 16. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery. July 2008.
[8] National Research Council. Sharing the Fish: Toward a National Policy on Individual Fishing Quotas. 1999.
[9] GAO 1994 (pages 8-9); USCOP 2004 (p. 289-290; Recommendation 19-15)
[10] 16 U.S.C. 1802(17)

- Fishing Participants: Providing a mechanism for pooling of risks (e.g. depleted species) and sharing costs (e.g. observers/monitoring) can benefit fishermen by mitigating the risks and reducing the costs of the new IFQ program to their businesses;
- Fishing Businesses: Ensuring deliveries of fish caught using community held quota share will benefit those who own fish processing or fish receiving businesses in the community;
- Crew and New Entrants: Offering a local source of access to quota share for individuals seeking to move up in the fishery, a fishing association can provide opportunity for crew members and new entrants;
- Fishery Managers: By sharing responsibility and accountability for abiding by fishery regulations with fishermen, a community fishing association can benefit fishery managers by improving accountability and aiding in compliance and enforcement;
- Shoreside Services: Sustaining fishing activity in a particular community will benefit other providers of shoreside services used by fishermen (fuel docks, bait services, haul-out facilities and boat yards, fabrication facilities, etc.).

Importantly, a CFA that provides these multiple benefits would also operate as a co-management entity that provides management services – as opposed to simply a risk pool or other agreement among fishery participants. It is possible that additional benefits for the conservation and management of the resource may become apparent as these entities are established. For example, the entity may be able to form partnerships with research institutions to undertake fishery research, or undertake private fundraising to support specific projects. The partners in the Morro Bay/Port San Luis EFP are interested in exploring these possibilities for a Central Coast CFA entity.

4. Requirements for Community Fishing Associations

Requirements for a Community Fishing Association (CFA) should be tailored to meet the conservation and management goals of the PCGFMP, including community impact concerns, but can also build on approaches used in other fisheries that have undergone rationalization. As envisioned for this fishery, a CFA may be a corporation, partnership, voluntary association, or other entity established under the laws of the United States.

A CFA could hold QS and each year distribute QP to its members. In order to hold quota share, it must comply with all of the requirements of the MSA, the PCGFMP, and the rules governing the trawl rationalization program generally. The Council and NMFS should consider also establishing specific eligibility and approval criteria for CFAs, as well as additional requirements specific to CFAs.

4.1. Eligibility criteria

The Council could consider some or all of the following conditions for eligibility:

- A single CFA may represent multiple communities, but a community may be represented by only one CFA. This requirement will eliminate the potential confusion caused by multiple CFAs attempting to represent a single community or an overlapping set of communities.

- A CFA must demonstrate support from the eligible community(ies) it seeks to represent (e.g., letter from the mayor, or a city council resolution). This requirement ensures that the CFA is acknowledged as an entity that supports the community and that the community supports the CFA.
- A CFA must be able to demonstrate the participation of at least two fishermen and one fish receiver or fish processor. This requirement will ensure that the CFA represents and engages diverse fishing community sectors, not only a single sector.
- An application must be prepared and submitted to NMFS that includes the following:
    - Articles of incorporation and by-laws;
    - Organizational chart and explanation of management structure;
    - Information required by the agency regarding ownership, relationships, roles and responsibilities for staff and board members to be used to assess compliance with control limits and the individual and collective rule;
    - Statement describing procedures that will be used to distribute QP each year to members of the community;
    - Formal statements of support from governing body(ies) of the communities it seeks to represent; and,
    - An estimate of the amount of QS the CFA will seek to acquire and will identify the number and identities of fishermen and processor(s) that will participate in the CFA.
    - A description of the roles and responsibilities of the members of the association, including dispute resolution mechanisms.

4.2. Other Approval Criteria

In addition to the required elements described above, the applicants should also describe how the CFA will contribute to the social, economic development, and conservation and monitoring needs of the fishery locally, including the needs of entry-level and small vessel owner-operators, captains, and crew. These could include efforts to address potential community impacts identified in the IFQ analysis[11]:

- The amount of trawl vessel activity in the community – and other groundfish fishing effort;
- The number of jobs as crew, in processing facility, seasonality of employment;
- The amount of local processing activity;
- Municipal or community needs or interests – e.g., revenues;
- Investments in local fishery infrastructure; or
- Factors that affect non-trawl fisheries in the community.

4.3. Reporting Requirements

[11] Based on Table 4-61- Overview of impacts, mechanisms, and metrics used to assess community impacts. Trawl Rationalization Decision Document.

Each CFA must file an Annual Report on behalf of its communities by a specified deadline each year. The report should be provided to the communities served by the CFA and to NMFS and the Council. The report should contain information to ensure it is meeting the goal and objectives of the PCGFMP and the trawl rationalization program:

- Description of criteria used to distribute QP among community members;
- Description of process used to identify recipients of CFA QP from among community members;
- Description of efforts undertaken to ensure local employment in the fishery or in fishery related businesses, sale of fish to local receivers and processors, and other local benefits.
- Summary of management changes, including changes in key personnel, board members, and corporate by-laws;
- Copies of relevant decision documents and minutes from CFA Board meetings.

5. Accumulation Limit

A CFA should be able to acquire and hold sufficient QS to provide opportunity for several harvesters and have a material community benefit. There is precedent in other rationalized fisheries for granting a higher limit for community entities. For example, the Bering Sea crab rationalization program granted a higher limit for QS held by Community Development Quota entities for the benefit of Alaska native communities.[12]

There are two options for establishing a CFA accumulation limit:

Option 1 – A CFA may control up to a specified cap (e.g., 10%) of groundfish QS with corresponding caps for individual species. The cap is easy for potential applicants to understand. However, there are likely significant challenges associated with conducting the analysis to justify a particular set of individual species caps up front in the rationalization process.

Option 2 –A CFA may control an amount of quota share (up to a specified cap or "budget" established by the PFMC or NMFS) that is justified based on its location, the number of fishermen likely to participate, the needs of the community, the species available and desired by the local fishery. Different communities may have different goals for their CFAs that would justify different approaches. For example,

Community 1 may have a history of trawling but has lost much of its access in the last decade. It sees its best future in taking advantage of gear switching to encourage continued trawling as well as a greater proportion of hook and line fishing. Because of

[12] See, Section 1.6 Bering Sea Crab Rationalization Program Alternatives adopted by the North Pacific Fishery Management Council. June 9, 2004. We also note that the California Department of Fish and Game, in its October 15, 2008, submittal for the November meeting Briefing Book, agreed that high accumulation limits for associations may be needed when it wrote that for Associations managing quota, "exemptions from accumulation limits may be necessary." *Report on Adaptive Management*, California Department of Fish and Game (October 15, 2008).

impacts on their community from other fishery management decisions (e.g., closure of open access, closure of salmon fishing) they want the CFA to provide opportunity for displaced fixed gear fishermen. The CFAs quota "budget" would provide for leasing permits and QP each year to support these operations.

Community 2 may have a number of trawl IFQ holders resident who are concerned about their ability to cover costs of monitoring, pool depleted species quota, and desire to increase their opportunity or attract other trawl IFQ holders to the port. The port would like to increase the number of jobs in the fishing sector. They may establish a CFA that can offer fishermen a "bonus" for fishing out of and delivering to that port or the local processor. The CFAs quota "budget" would be justified as providing an additional percentage for these fishermen.

The Applicant would bear the burden of describing the goals of its CFA and requesting and justifying the desired QS budget of QS. This would be subject to the review process and must be approved by the agency. It may be simpler to cap the amount that a CFA may be allowed to hold overall and then review specific requests on a case-by-case basis. This would be only an authorization for the CFA to participate in the market to purchase QS up to a limit; this is not a direct allocation of QS. The Council and NMFS could develop more specific limits as the program matures.

6. Avoiding Excessive Control

CFAs would hold QS on behalf of the community for the use by multiple fishery participants, in order to function meaningfully on behalf of the fishery participants within a community. Consequently, a CFA must be allowed to control an amount of QS greater than the limits that apply to individual participants[13]. However, other than this exception, the CFA and those involved should be held subject to the rules of the trawl rationalization program designed to prevent excessive control. In particular, this refers to the own and control limit for individual ownership of QS.

The IFQ Alternatives Analysis states that the "individual and collective" control rule requires that the QS or QP that counts toward a person's accumulation limit will include (1) the QS or QP owned by them, and 2) a portion of the QS or QP owned by any entity in which that person has an interest. The person's share of interest in that entity will determine the portion of that entity's QS or QP that counts toward the person's limit.[14]

To avoid any person gaining excessive control in the fishery through a CFA, this rule may be augmented by the following requirements that could be made specific to CFAs.

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[13] The need for a different accumulation limit for CFAs is more fully described in Section IV.A of our October 29, 2008 letter.

[14] The full description and analysis may be found in the Analysis of the Components, Elements, and Options for the IFQ Alternative, Section A-2.2.3.e Accumulation Limits (Vessel and Control), p. A-226.

- The specific nature of what constitutes an individual's "interest" in the CFA must be specified in guidelines[15] and described in the CFA application.
- If any individual controls or owns more than, for example, 10% of a CFA then 100% of the QS owned by the CFA is attributed to that individual. This is intended to serve as a barrier to excessive control over the operations of a CFA by an individual – if 100% of a CFA quota share is attributed to an individual, that individual would be in violation of the control rule and forced to divest. This should provide a strong disincentive for inappropriate arrangements in a CFA.
- The "individual and collective" rule should not be a barrier to fishermen working together to share costs and mitigate risks. This would allow the CFA model to benefit fishermen who hold trawl QS who might be barred by the rule from developing a formal partnership with other QS owners.
- Any management changes, including changes in key personnel, board members, and corporate by-laws - of a CFA must be reported to NMFS within a set period of time. This would provide transparency for the agency to monitor on an ongoing basis any management changes that could lead to excessive control.
- Failure to abide by these rules will result in sanctions and eventual revocation of approval of the CFA.

7. Approval Process

Because a CFA comprising multiple participants would need a higher accumulation limit to operate and provide community benefits, the specific nature of the approval should be a certificate that specifies the amount of QS the CFA is authorized to acquire and hold. The certificate may specify other terms and conditions, if necessary.

The application and approval process should be clear and minimize the administrative burden of reviewing applications and monitoring CFAs. The burden must be on the applicant to provide a complete application. Incomplete applications should not be moved forward in the process. States should have a role in reviewing complete, viable applications, but that role should be optional and subject to capacity and resource constraints. The Council may want to consider what its appropriate role would be in reviewing CFA applications.

NMFS should exercise its authority to recover permitting expenses (beyond IFQ program cost recovery) by requiring an application fee be paid. Such a fee would discourage insincere applications and could be waived for communities that can demonstrate hardship and inability to pay.

[15] Comparable regulations have been developed to govern several Alaska fisheries – see 50 CFR 679.2

Marine Interests Group
San Luis Obispo County

Working Committee

Dan Berman
Dir., Morro Bay National Estuary Program
Tom Capen
Port San Luis Comm. Fishermen's Assn.
Mel de la Motte
Central Coast Fisheries Cons. Coalition
Ray Fields
Aquaculture
Matt Fleming
SLO Surfrider Foundation
Mary Fullwood
Sierra Club
Bruce Gibson
SLO County Supervisor
Monica Hunter
Environmental Center SLO
Ermina Karim
SLO Chamber of Commerce
Carolyn Moffatt
Commissioner, Port San Luis Harbor Dist.
Marla Morrissey
conservation
Jeremiah O'Brien
M.B. Commercial Fishermen's Organization
Janice Peters
Mayor, City of Morro Bay
Henry Pontarelli
Morro Coast Audubon Society
John Rowley
Virg's Fishing & Whale Watching
Dave Sears
at large, ret'd California State Parks
Debrah Stakes
Cuesta College
Margaret Webb
MBNMS Advisory Council
Dean Wendt, Ph.D.
Assoc. Prof., Cal Poly State University
Patricia Wilmore
PG&E Company
[pending]
sport fishing

Web site:
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independent facilitator
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February 26, 2009

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

RE: Support for Community Fishing Associations (CFAs) in IFQs

The Marine Interests Group of San Luis Obispo County (MIG), consisting of elected officials, scientists, fishermen, conservationists, and business interests, urges the Pacific Fishery Management Council to provide for the development of Community Fishing Associations (CFAs) within the IFQ process by taking the following actions:

1. Develop a framework for CFAs in the current set of trailing actions to be completed by June 2009, including specific accumulation limit rules for CFAs that meet the requirements.
2. Allow entities that qualify for quota share in excess of individual accumulation limits the opportunity to divest of the excess after initial allocation. Low individual accumulation limits without a grandfather or divestiture provision could lead to a major redistribution of access with serious impacts on communities.

CFAs encourage good stewardship. When fishermen, the communities dependent upon them, and the fish stocks have strong linkages together, it encourages shared efforts for effective stewardship. In order to sustain viable fishing communities, communities and individuals need to be able to work together to establish community-based organizations, such as CFAs, that can hold and manage quota following rationalization. A CFA or other such community-based entity would provide an *opportunity* for communities to maintain their participation in the fishery, and would not require an allocation of quota share. Importantly, CFAs provide a foundation for effective ecosystem-based management as called for in the Pew and U.S. Ocean Commissions Reports and the Magnuson-Stevens Reauthorization Act.

Action to permit CFAs <u>prior</u> to initial allocation is critical. Experience indicates that if PFMC waits until after the initial allocation to address the CFA issue, it will become increasingly difficult for new participants or entities--including traditional fishing communities--to enter or re-enter the fishery.

Groundfish are at the core of the Central Coast fishery and have deep ties to our history as well as our contemporary culture and economy. We need PFMC support for CFAs in the IFQs to continue our commitment to sustainable fish stocks and sustainable fishing communities.

Sincerely yours,

Marine Interests Group of San Luis Obispo County ecotrust

NORTH PACIFIC
FISHERIES TRUST

March 9, 2009

Agenda Item G.4.c
Supplemental Public Comment 3
March 2009

Mr. Donald K. Hansen
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Re: Agenda Item G. 4. Fishery Management Plan Amendment 20 - Trawl Rationalization - Accumulation Limits;

Dear Chairman Hansen:

Ecotrust and the North Pacific Fisheries Trust strongly endorse the Proposed Framework for the Establishment of Community Fishing Associations presented to the Council February 18, 2009 by The Nature Conservancy. This proposal would amend the preferred alternative (Rationalization of the Groundfish Trawl Fishery) such that it becomes conducive to the creation of Community Fishing Associations (CFA) or similar community-based entities for the purpose of mitigating the projected negative effects of trawl rationalization on some west coast fishing communities. Section 303A (Limited Access Privilege Programs) of the Magnuson-Stevens Fishery Conservation and Management Act, authorizes that fishing communities and regional fishery associations may organize to hold limited access privileges (quota).

We concur with The Nature Conservancy's (TNC) assessment (which is borne out by analyses of the impacts of quota systems on fishing communities in Alaska, British Columbia and elsewhere[1]) that it is the first 3 to 5 years after initial allocation of an individual fishing quota (IFQ) system are typically the period where most community upheaval is likely to occur. As noted in TNC's proposal, "after that period it becomes increasingly difficult for new participants or entities—including traditional fishing communities—to enter or re-enter the fishery."

The Alaska Community Quota Entity (CQE) program is a case in point: by the time the program was established, some 10 years after the inception of the IFQ program, the market for quota had matured to such an extent that very little quota is available, and only at very high prices. In 2006 Ecotrust formed the North Pacific Fisheries Trust, capitalized with $6 million, as a partial remedy to this problem, making low interest loans available to CQEs that are purchasing quota. The PFMC has the opportunity to obviate the need for such expensive "tail pipe" fixes by creating the space for community entities from the inception.

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[1] Catch-22: Conservation, Communities and the Privatization of BC Fisheries, Ecotrust Canada and Ecotrust, November 2004 (http://www.ecotrust.ca/files/Catch-22-November2004.pdf) and;
Lowe, M.E. and C. Carothers, editors. 2008. Enclosing the fisheries: people, place, and power. American Fisheries Society, Symposium 68, Bethesda, Maryland.

In distinct contrast, the Community Development Quota program of Alaska is the precedent for a fishery management council establishing this type of community entity and allocating quota to them.

There are several nascent community quota entities on the west coast that would benefit from these provisions. Since they are typically organized around multiple sectors and fisheries, and since groundfish traditionally has been an important part of the portfolio of diverse fishing communities, the Council has the unique opportunity to shape the trawl IFQ program in ways that fulfill the spirit and intent of the Magnuson-Stevens Act, creating and meeting the conditions for economic and ecological sustainability, and our responsibilities under National Standard Eight (8).

To reiterate the core of the TNC proposal in terms of requested actions of the Council;

- federal guidelines for the establishing community entities ***must be in place at the time the IFQ program is implemented.***

To ensure that this opportunity is available to communities, we request the Council take the following actions:

- Develop a framework for CFAs in the current set of trailing actions to be completed by June 2009, including specific accumulation limit rules for CFAs that meet the requirements.
- Allow entities that qualify for quota share in excess of individual accumulation limits the opportunity to divest if the excess after initial allocation.

A divestiture policy would create a supply of quota available during the same time period in which community entities would likely be most active in seeking quota acquisition; sale of this excess quota share could be constrained to benefit community entities, for example, through a price penalty in proportion to the distance from his/her home port that a quota holder wants to sell (thus creating an incentive to sell "close to home") or a right of first refusal for community entities in the home port. Such differences in asset classes are not unusual in other quota programs (e.g. blocked and unblocked halibut quota in Alaska and their differential pricing structures.)

Sincerely,

Edward H. Backus
Vice President, Fisheries
Board Chair, North Pacific Fisheries Trust

Agenda Item G.4.c
Supplemental Public Comment 4

Trawl IFQ Accumulation Limits
Environmental Defense Fund
March 11, 2009

Control and vessel accumulation limits are important parameters that will influence both the shape of the trawl fishery in the future and the success of the IFQ program in meeting the Council's adopted goals and objectives. EDF commends the work of the analysts, the GAC, the GMT and the GAP in continuing to refine the information and conversation on this design issue.

The Council and its advisory bodies have pored over numerous graphs and tables over the past months related to the topic of accumulation caps. Most recently, the GMT has provided a thoughtful framework to relate caps to potential ex-vessel value and fishing strategies. The GAP put considerable thought into developing a set of accumulation cap recommendations with accompanying rationale.

In order to assure that we complete the IFQ package in a timely fashion, we support having the Council develop the final set of accumulations limits with associated rationale. These elements can be integrated into the trawl rationalization package and the preliminary draft regulations that will be reviewed in June.

Control and Vessel Limits

First, EDF supports the recommendations of both the GAC and GAP that control caps apply to Quota Share while governing the use of annual quota pounds through vessel use caps.

The principal challenge in setting accumulation caps is balancing the need for improved efficiency and operational flexibility with the objective of maintaining a reasonable coastwide distribution of vessels. Overarching these needs is the legal mandate of the MSA that no quota holder can acquire an "excessive share"; however, as pointed out by the GMT and others, the Council is left with the task of defining "excessive" in the context of the trawl groundfish fishery and the goals of the program. EDF shares the Council's interest in finding the right balance, so that the IFQ program can succeed in achieving its objectives, and will not lead to undue consolidation or dislocation.

In refining the various options on the table into a single set of limits, EDF recommends that the Council take the following considerations into account:

- Set the accumulation caps with an eye to the future; that is, what should the fishery look like in 10 years?
- As discussed by the GMT, be careful that caps for species that could limit access to other species are set low enough so that QS holders for these "limiting" species could not have undue control
- At the same time, avoid setting individual species control limits so low that (1) traditional full time groundfish vessel owners would not be able to control enough QS to cover their normal operations or (2) specialization is not possible.
- It will be easier in the future to raise accumulation caps, than to lower them. Therefore if significant uncertainty exists over where to set the limit, it would be advisable to start at the lower end of the range being considered.
- The vessel control caps will define the minimum number of vessels that could conceivably harvest the quota. While it is unlikely that all vessels will operate at the maximum cap level, this cap does most directly address the need for sufficient vessels to provide for social objectives related to employment opportunities and minimizing disruption in coastal communities. Another rationale for setting vessel limits higher than control limits has been to provide opportunities for crew to purchase QS and then put them on a vessel to fish. Therefore, if control caps are set higher than originally discussed, then vessel limits should be only slightly above the control caps.

Definition of Control

EDF recommends that the Council further define what they mean "**controls through other means**". The control rule is described in Appendix A of the Council's decision documents as follows:

> "A person, individually or collectively, may not control QS or QP in excess of the specified limited.... QS or QP controlled by a person shall included those registered to that person, plus those controlled by the other entities in which the person has a direct or indirect ownership interest, as well as shares that the person controls *through other means* (emphasis added).
>
> > Individual and Collective rule: The QS or QP that counts toward a person's accumulation limit will include: (1) the QS or QP owned by them, and 2) a portion of the QS or QP owned by any entity in which that person has an interest. The person's share of interest in that entity will determine the portion of that entity's QS or QP that counts toward that person's limit"[1]

Concern has been raised that this very broad definition could constrain some usual business arrangements in the trawl fishery. We suggest that the Council provide guidance to the analysts and regulation writers regarding what kinds of activities should be prohibited by this reference to indirect control as well as the kinds of business arrangements that should not be unduly constrained.

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[1] Appendix A Page 230-31

Divestiture

EDF recommends that the Council provide a window period for entities whose permit ownership in November 2008 would result in initial allocation greater than the control caps to divest down to the control limits. Post initial allocation divesture would provide more opportunity to track transactions and resulting ownership/control while at the same time providing entities over the control caps the ability to recoup some of their prior investment in the fishery. EDF believes this will result in a smoother transition to implementing the IFQ program since it may remove potential litigation obstacles.

Halibut Bycatch Quota

As approved by the Council in November 2008, the IFQ program should include a provision for transferable individual bycatch quota for halibut at the time of implementation. We recognize that changes in fishing strategies may require some participants to lease or purchase additional IBQ to cover their bycatch needs. However, we do not see this as a reason to delay implementation of this program. We have reviewed the recommendation of WDFW for clarifying the methodology for calculation of IBQ quota pounds and support its adoption.

Community Fishing Associations

There has been strong interest expressed in providing for community fishing associations that could help achieve a variety of community related goals. The GAC recognized this in their recommendation that a trailing amendment be developed to examine different accumulation limits for community fishing associations, regional fishing associations, and insurance risk pools.

Groups interested in establishing such associations have put considerable effort recently in trying to examine how CFA provisions might be included in the IFQ program. EDF supports having the Council make a commitment to developing CFA provisions that would be implemented at the start of the IFQ program.

BARBARA BOXER
CALIFORNIA

COMMITTEES:
COMMERCE, SCIENCE, AND TRANSPORTATION
ENVIRONMENT AND PUBLIC WORKS
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Agenda Item G.4.c
Supplemental Public Comment 5
March 2009

March 11, 2009

Mr. Donald K. Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Chairman Hansen:

I am writing regarding the Pacific Fishery Management Council's ongoing efforts to implement an individual fishing quota (IFQ) system for the Pacific groundfish fishery. I urge you to provide for the development of Community Fishing Associations (CFAs) within the IFQ process by taking the following actions:

1. Develop a framework for CFAs in the current set of trailing actions to be completed by June 2009, including specific accumulation limit rules for CFAs.
2. Allow entities that qualify for quota share in excess of individual accumulation limits the opportunity to divest of the excess after initial allocation. This could help retain quota within communities rather than redistributing resources throughout the fishery.
3. Restrict ownership of quota, after initial allocation, to individuals actively engaged in fishing (i.e., fishermen or crew on board of fishing vessels) or to CFAs. CFAs can protect processors and communities without the need for processor quotas.

Fishermen, fishing related businesses, community leaders, and Council members have repeatedly expressed concern that an IFQ system will result in consolidation of resources within a few large fishing ports. This could be very detrimental to West Coast communities whose economies and culture depend on the groundfish fishery.

Other fisheries that have implemented an IFQ system have experienced this consolidation, typically within the first three to five years after initial allocation. Therefore, it is important to establish measures to mitigate community disruption prior to any initial allocations. CFAs would limit consolidation and help West Coast communities preserve the local fishing industry.

Thank you for your efforts to improve the management of the Pacific Coast trawl fishery. I look forward to working with you to ensure that the benefits of a healthier fishery are shared among West Coast communities.

Sincerely,

Barbara Boxer

Barbara Boxer
United States Senator

Proxy testimony; Groundfish Agenda Item G4.

Ecotrust – North Pacific Fisheries Trust

Edward Backus, Vice President – Fisheries, Ecotrust
Board Chair – North Pacific Fisheries Trust

Ecotrust has submitted a letter to the Council on this Agenda Item, Accumulation Limits. We strongly endorse the Proposed Framework for the Establishment of Community Fishing Associations presented to the Council February 18, 2009 by The Nature Conservancy and in your briefing book. We believe it is a well thought out document, which is a valuable contribution to the process of defining what Community Fisheries Associations are and how they could operate.

- Specifically we ask the Council to develop guidelines for CFA before the trawl IFQ program is implemented.
- We ask for the following actions by the Council,
  - Develop a framework for CFAs in the current set of trailing actions to be completed by June 2009, including specific accumulation limit rules for CFAs that meet the requirements.
  - Allow entities that qualify for quota share in excess of individual accumulation limits the opportunity to divest if the excess after initial allocation.

Why?

The North Pacific Fisheries Trust is a $6 million revolving loan fund operating in Alaska and on the West Coast. Our goal is to support community fisheries efforts such as Community Quota Entities (CQE) in the Gulf of Alaska. We also have investments in west coast fisheries that this Council manages.

Two experiences in Alaska with CFA like entities are instructive: Community Quota Entities and Community Development Corporations (CDQ). The NPFT (Trust) works with both types.

CDQs were established 15 years ago and were allocated 10% of overall quota in many species. Today they are vibrant community based economic development engines. Our loan fund is working with one of them to repatriate salmon permits to local communities.

Community Quota Entities were formed 10 years into the Alaska IFQ program and were not allocated any QS and must buy it on the open market. They are both examples of CFAs. One system is healthy, one is not. CQEs hold and lease quota shares to community residents only. Lessees qualify as “owners on board”.

The management processes of both organizations create a sense of cohesion and cooperation at the community(ies) level.

Lesson: Establish CFA type institutions immediately when starting an IFQ program.

How can this work on the west coast?

The problems that CFAs can address (operating like community trusts):

- hold quota at the community level to help reduce debt loads of new entrants (aka intergenerational buyouts)
- users of any gear type can access the quota by leasing for 8% overhead.
- reduce quota mobility (stickiness to the community – aka stability.)
- Take some portion of overall quota off the market which reduces trading volatility.
- Reduces capital requirements for in season needs to cover overages

<u>Having higher accumulation limits for CFAs would help with all these issues!</u>

The Council is about to monetize catch history so it is the "Central Bank". But it should also act as a "Federal Reserve" (aka 10% adaptive management holdback).

This "reserve" could be allocated to CFAs in each port as a hedge for all the issues mentioned.

In addition, the $46M trawl buyout used a $10M appropriation from the federal treasury and a $36M guaranteed loan which remaining fleet members are paying off. That means however that 22% of the "buyout quota" is still financed/"held" by the public domain.

This could be an additional part of the "reserve" that can be held back for some prudent period while the Council observes the unfolding of the IFQ program. Then it could be allocated to CFA type organization (no gear bias implied). This allows us to continue down the program path but create options to diversify the future fisheries economy.

In conclusion:
We feel that CFA ownership options are an important tool to address various economic and geographic issues (relevant to National Standard 8) and that higher accumulation limits for these entities would amplify their positive effects.

The Council must address these issues in the Trailing Actions process as proposed by the TNC proposal.

Thank you.

Please note: This motion was modified by several amendments; which will be available in the Final March 2009 Council Meeting Minutes and Voting Log

MOTION BY ROD MOORE

I move that the Council approve a Preliminary Preferred Alternative on accumulation limits for final action in June as follows:

Non-whiting Groundfish Species Aggregate Limit

- Set the Control Limit to 2.7% (GAP recommended)
- Set a Vessel Limit of 3.2% to ensure a minimum number of boats (this is the mid-point of the available options).

Control Limit for Non-overfished species

- Adopt GMT recommended control limits; where a range is present, adopt the low end of the range, except for the following

Species	Control Limit
Lingcod – coastwide	2.5%
Pacific cod	12%
Pacific whiting (Shoreside)	15%
Sablefish (s 36)	10%
Shortspine (s 34'27)	6%
Minor rockfish (n) -shelf	5%
Minor rockfish (n) -slope	5%
Minor rockfish (s) -shelf	9%
Minor rockfish (s) -slope	6%
Dover sole	2.6%
Arrowtooth flounder	10%
Other fish	5%

Vessel Limit for Non-overfished species

- 1.5 times the control limit with the following exceptions

Species	Vessel Usage Limit
Pacific cod	20%
Pacific whiting (Shoreside)	15%
Arrowtooth flounder	20%
Starry Flounder	20%

Halibut IBQ

- Analyze a control limit range for quota share from 1-8%
- Analyze a vessel usage limit equal to control, up to 1.5 times control with a maximum of 10%

Overfished species

For vessel limits, analyze:

- Set vessel limit (QP) = control limit (QS)
- Set vessel limit (QP) <u>greater than</u> control limit (QS); with vessel limits 1.5 times the control limit but not to exceed10%

Control limits:

- POP = 3.3% (GAP)
- Darkblotched rockfish = 2.0% (GAP)
- Widow = 2.5% (GAP)
- Canary rockfish = 5.2% (GAP)
- Bocaccio rockfish = 7.5% = 50% of GAP
- Yelloweye rockfish = 2.6% = 50% of GAP
- Cowcod = 10% = 50% of GAP

Task the GMT with analyzing the options in the GMT reports under Agenda Item G.4 and with exploring any additional options for control and vessel limits, with results to be made available for the May GAC meeting.

PFMC
03/12/09

Species Category	Preliminary Prefered Alternative: Vess Lim*	Preliminary Prefered Alternative: Cntrl Lim	GMT: Control Limits Identified in GMT Report	GAP: GAP Vessel Limit Option	GAP: GAP Control Limit Option
Nonwhiting Groundfish Species	3.2%	2.7%		None	2.7%
Lingcod - coastwide	3.2%	2.5%		3.8%	2.5%
Pacific Cod	20.0%	12.0%	20%	20.0%	12.0%
Pacific whiting (shoreside)	15.0%	15.0%		15.0%	10.0%
Pacific whiting (mothership)					
Sablefish					
N. of 36° (Monterey north)	4.5%	3.0%	3%	4.5%	3.0%
S. of 36° (Conception area)	15.0%	10.0%		15.0%	10%
PACIFIC OCEAN PERCH*	5.0%	3.3%		3.3%	3.3%
WIDOW ROCKFISH*	3.8%	2.5%		2.5%	2.5%
CANARY ROCKFISH*	7.8%	5.2%		5.2%	5.2%
Chilipepper Rockfish	15.0%	10.0%	10%	15.0%	10.0%
BOCACCIO*	10.0%	7.5%			15.0%
Splitnose Rockfish	15.0%	10.0%	10%	15.0%	10.0%
Yellowtail Rockfish	7.5%	5.0%	5%	7.5%	5.0%
Shortspine Thornyhead					
N. of 34°27'	9.0%	6.0%	6%-10%	9.0%	6.0%
S. of 34°27'	9.0%	6.0%		9.0%	6.0%
Longspine Thornyhead					
N. of 34°27'	9.0%	6.0%	6%-10%	9.0%	6.0%
COWCOD*	10.0%	10.0%		20.0%	20.0%
DARKBLOTCHED*	3.0%	2.0%		2.0%	2.0%
YELLOWEYE*	3.9%	2.6%		5.2%	5.2%
Minor Rockfish North					
Shelf Species	7.5%	5.0%		7.5%	5.0%
Slope Species	7.5%	5.0%	6%-10%	7.5%	5.0%
Minor Rockfish South					
Shelf Species	13.5%	9.0%		13.5%	9.0%
Slope Species	9.0%	6.0%	6%-10%	13.5%	9.0%
Dover sole	3.9%	2.6%	5%+	3.9%	2.6%
English Sole	7.5%	5.0%	5%+	7.5%	5.0%
Petrale Sole	4.5%	3.0%	3%	4.5%	3.0%
Arrowtooth Flounder	20.0%	10.0%	10%+	20.0%	10.0%
Starry Flounder	20.0%	10.0%	10%+	30.0%	15.0%
Other Flatfish	15.0%	10.0%	10%+	15.0%	10.0%
Other Fish	7.5%	5.0%		7.5%	5%

* Vessel limits for overfished species range from being equal to the control limit to 1.5 times the control limit, up to a max of 10%

Agenda Item G.5
Situation Summary
March 2009

FISHERY MANAGEMENT PLAN AMENDMENT 22: OPEN ACCESS LICENSE LIMITATION

The groundfish Federal limited entry program was established in 1994 and did not include all vessels and their catch histories that landed groundfish during the qualification period. Participation in the "open access" (OA) portion of the fishery was left unlimited to ensure that vessels active in state-managed fisheries and/or landing groundfish incidentally in federally-managed fisheries, would continue to have access to that resource. Conversion of the open access groundfish fishery to limited entry management has been discussed several times in Council meetings since April 1998 (71 FR 64216) and was established as a Council priority with the adoption of the Groundfish Strategic Plan in 2000.

Limitation of the groundfish OA fishery was last considered by the Council at its September 2008 meeting. At that time, the Council considered a preliminary Draft Environmental Assessment (EA) entitled: Preliminary Draft Environmental Assessment for Pacific Coast Groundfish Fishery Management Plan Amendment 22: Conversion of the Open Access Fishery to Federal Permit Management. The report analyzed five permitting alternatives and issues that the Council approved at its March 2008 meeting. The alternatives included a no action alternatives (A-1), a vessel registration alternative (A-2), and three limited entry (B permit) alternatives: two with specific fleet size objectives (A-3 and A-5) and one which examined a wide range of qualification criteria for B permit issuance (A-4). A registration (C permit) requirement was included under the B permit alternatives for vessels seeking to retain small amounts of B permit species groundfish[1] taken incidentally to fishing for non-groundfish species. Other issues addressed in the alternatives included permit transferability, use of a limited entry permit (A permit) and B permit on the same vessel, previous year landing requirement, and use of state-specific landing permits (endorsements). At that meeting the Council adopted a preliminary preferred alternative (PPA) as follows: (1) vessels that landed ≥100 lbs of B species groundfish in the directed fishery during the window period (April 9, 1998-September 13, 2006) with at least one directed fishery landing during January 2004-September 13, 2006 would qualify for the general B permit and (2) species-specific permits (endorsements) would be considered for sablefish and lingcod from within the following alternatives, determined separately for each species ≥1 lb, ≥100 lbs, and ≥500 lbs based on the highest year during the window period. Also under the PPA vessels would be able to use A and B permits alternately in the same year (but not in the same landing period) and B permits would be fully transferable between vessels after the first program year.

Since the September 2008 meeting, a simple, one page announcement (flyer) was sent to potentially affected vessel owners regarding progress of the open access license limitation initiative (Agenda Item G.5.a, Attachment 1). The flyer was sent in response to Council direction at the September 2008 meeting. The flyer mailing list, which consisted of about 6,000 unique addresses, was supplied by the state agencies. The telephone response to the flyer has been relatively light (about 50 calls, <1 percent).

The Groundfish Allocation Committee (GAC) met January 29, 2009 and received a preliminary report on the PPA, which is included as Appendix I to the updated Draft EA. At the meeting,

[1] B species groundfish include all Federal groundfish not including nearshore species (cabezon, kelp greenling, California scorpionfish, and nearshore rockfish).

the GAC made two recommendations, including a recommendation for a new PPW; the GAC also requested an analysis (Agenda Item G.5.b, GAC Report) of a B permit criterion that would qualify equal proportion of vessels based on their target species strategy while fixing the fleet at 713 vessels (2006 fleet size). The report (Agenda Item G.5.a, Attachment 2) shows that such an approach could qualify more lingcod, shelf rockfish and other species vessels and fewer sablefish vessels than under the approach used in most of the existing alternatives, which qualify vessels based on their landings without regard to fishing strategy.

The Draft EA has been updated (Agenda Item G.5.a, Attachment 3) and includes an analysis of the PPA as Appendix I. The Council proposed action for this meeting is *to take final action on the open access fishery license limitation initiative.* An updated timeline is attached for Council information (Agenda Item G.5.a, Attachment 4). The Council's website has been updated with open access fishery license limitation documents presented at and since the September 2008 meeting, including the January, 2009 GAC meeting.

Council Action:

1. Take final action.
2. Discuss the attached Amendment Development and Implementation Schedule (Agenda Item G.5, Attachment 4).

Reference Materials:

1. Agenda Item G.5.a, Attachment 1: Open Access Fishery License Limitation Informational Flyer
2. Agenda Item G.5.a, Attachment 2: Open Access Fishery License Limitation Qualification Criteria Report requested by Groundfish Allocation Committee
3. Agenda Item G.5.a, Attachment 3: Draft Environmental Assessment (Updated) for Pacific Coast Groundfish Fishery Management Plan Amendment 22: Conversion of the Open Access Fishery to Federal Permit Management.
4. Agenda Item G.5.a, Attachment 4: Possible Open Access Groundfish Fishery Conversion to Limited Entry and Permit Implementation Schedule.
5. Agenda Item G.5.b: GAC Report.
6. Agenda Item G.5.c, Public Comments.

Agenda Order:
a. Agenda Item Overview — LB Boydstun
b. Reports and Comments of Agencies and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt a Final Preferred Alternative for Implementation

ATTENTION

GROUNDFISH OPEN ACCESS COMMERCIAL FISHERY PARTICIPANTS

In March 2009, the Pacific Fishery Management Council is scheduled to make a decision that may substantially change this fishery.

You may lose your privilege to fish commercially for groundfish.

The Pacific Fishery Management Council is considering changes to the groundfish open access commercial fishery, including limiting participation in the fishery and, further, specifying who may target sablefish and lingcod.

If you are involved in the directed open access groundfish fishery
OR
if you incidentally catch groundfish in the open access commercial fishery, this may affect you.

HISTORICAL BACKGROUND

A limited entry program for the West Coast groundfish fishery went into effect in 1994. The program restricted the number of vessels allowed to target groundfish in order to better align the fishery with the available harvest. To make sure that vessels landing groundfish incidentally while fishing for other species (like salmon) could continue to catch and sell groundfish, and to allow small amounts of groundfish to be landed as a target species, the "open access" commercial groundfish fishery was created. However, the percentage of the catch set aside for the open access fishery was relatively small, and landing rates were relatively low. Participation in this fishery has been unlimited.

RECENT BACKGROUND

The Pacific Fishery Management Council has been considering this issue since 1998. Limiting the open access fishery is a priority listed in the Groundfish Strategic Plan adopted in 2000. The Council has been considering and refining specific alternatives since June 2007. The Council adopted a preliminary preferred alternative at the September 2008 meeting, and scheduled final action for their March 2009 meeting.

WHY LIMIT ACCESS TO THIS FISHERY?

There are several reasons; however, the main reason is that the current open access fishery has too many participants pursuing too few fish, and allows more people to join the fishery, leading to smaller landing limits for each participant.

THE CURRENT PROPOSAL

The current preliminary preferred alternative has two main parts:

- Convert the directed (target) open access fishery component to limited entry management. **Only those with the proper landing history would be allowed to remain in the fishery.** Vessels with valid permits would be allowed to directly fish for, and land, specified groundfish species. This would be called the "B" permit program. Permits with sufficient catch history for sablefish and lingcod would be able to continue targeting those species.
- Convert the incidental (non-target) fishery component of the open access groundfish fishery to a license registration program. This would be called the "C" permit program. **Only commercial vessels with state licenses would be eligible for the C permit program.**

The Council's preliminary preferred alternative was drawn from six alternatives that addressed the following issues:

- Total fleet size goal
- Coastal community impacts
- Qualification criteria
- Permit transferability
- Previous year landing requirement
- Coastal state permit endorsement
- Use of A (current limited entry) and B permits on vessels in the same year (A permits fish in the groundfish primary limited entry fishery)
- Landing endorsements for sablefish and lingcod

HOW TO GET INVOLVED

- Get more information by visiting the Pacific Fishery Management Council's website, which includes links to frequently asked questions, a projected timeline, a description of the alternatives, qualification criteria, the full analytical document (environmental assessment), and more.
  http://tinyurl.com/OAfishery
- Submit comments for Council consideration (by February 18) at **pfmc.comments@noaa.gov**
- Attend the March 2009 Council meeting in person and testify with your opinion (see reverse).

WHY THIS NOTICE?

Notices in accordance with all Federal and state legal requirements for this type of action have been issued throughout the ten-year process that has led to this decision point. This notice goes beyond legal requirements as a courtesy to those who, for personal or other reasons, may not have been tracking the proceedings in the Pacific Fishery Management Council forum.

This is a very complicated regulatory matter that involves a Federal- and state-managed fishery extending from the shoreline out to the 200-mile limit of the Exclusive Economic Zone. This is only a brief notice providing a way for you to acquire detailed information on this potential action.

SCHEDULED FINAL DECISION:

Pacific Fishery Management Council
March 8-13 2009
Seattle Airport Marriott
(see http://www.pcouncil.org/events/future.html)

FOR MORE INFORMATION:

Briefing materials on this matter will be included in the advance Briefing Book available on the Council website by February 26, 2009.
See http://www.pcouncil.org/bb/bbarchives.html

Visit the Pacific Fishery Management Council web page on open access limitation:

http://tinyurl.com/OAfishery
(or http://www.pcouncil.org/groundfish/gffmp/gfa22.html)

QUESTIONS?

Email Mr. LB Boydstun at lbboydstun@comcast.net, or call (916) 844-4358

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Open Access Fishery License Limitation Qualification Criteria Report requested by Groundfish Allocation Committee[1]

Introduction

The Groundfish Allocation Committee (GAC) requested an additional B permit qualification criteria analysis at its January 27-29, 2009 meeting. The intent of the request was to develop a set of B permit qualification criteria that would (1) achieve a directed fishery fleet size of 713 vessels (the fleet size the last year of the window period, 2006), and (2) to qualify vessels based on target species strategy in the same proportion as occurred in the 2004-2006 directed fishery.

The GAC concern was that nearly all of the vessel qualification criteria contained in the September 2008 preliminary draft Environmental Assessment (EA) was based on total B species pounds landed without regard to target species strategy. It was noted that the total pounds landed approach favors vessels that target species with relatively high trips limits (e.g., sablefish and sharks) and excludes a high proportion of vessels that target species with relatively low trip limits (e.g., lingcod and shelf rockfish). This situation was explained and analyzed in EA Appendix E.

Additional instructions for the analysis included (1) use Qualification Framework 3 (QF-3) for basic permit qualification (total landings during the 1998-2006 window period years with at least one directed fishery landing during 2004-2006) (2) vessels should be sorted into Target Species Vessel Groups (TSVGs) as used in Appendix E[2] and (3) qualification criteria should be developed giving equal weight to each TSVG over the entire Washington, Oregon, and California (WOC) management area (i.e., do not include sub-area constraints).

The analysis showed that a more "balanced" assemblage of vessels could be achieved by setting qualification criteria based on a vessel's target species strategy. The geographic distribution of vessels by this approach would favor permitting of vessels from some areas over others. The analysis showed potentially reduced sablefish landings due to non-qualification of a relatively large number of sablefish vessels. However, the redistribution of fish from non-permitted vessels to permitted vessels (i.e., higher trip limits) or redirection of effort (from sablefish inactive to sablefish active vessels) would likely result in full attainment of the open access fishery sablefish allocation under the GAC request.

Methods

Vessel-specific open access fishery directed fishery data from the window period in combination with hindcast analysis of 2004-2006 window period landings were used to analyze the potential impact of the GAC request. The analyses done for the GAC request were previously done for EA Alternatives 1 (A-1, no action) and Alternative 4, criterion 713v-3 (hereafter, A-4) (see **Appendix E**). The A-4 analysis was very similar to the GAC request, but used the conventional approach of qualifying vessels based on total B species groundfish landed during the 1998-2006 window period with at least one directed fishery landing during 2004-2006 window period (QF-3 approach).
The economic impact analysis used the species-specific expansion factors reported in Appendix E. As in the previous analyses no attempt was made to redistribute fish from non-qualifying vessels to qualify in

[1] Prepared by LB Boydstun, CDFG Retired, February 5, 2009.
[2] Vessels were assigned to TSVGs using a >50% revenue criterion for landings during 2004-2006 window period years for the following species groups: lingcod, shelf rockfish, slope rockfish, sablefish, federal sharks (sharks), and other species (e.g., flatfishes, grenadiers). Vessels that did not meet the >50% revenue criterion for a single group were assigned to the non-TSVG.

vessels or to estimate the amount of fish that would be allowed for landing by non-qualifying vessels under incidental fishery regulations.

Results

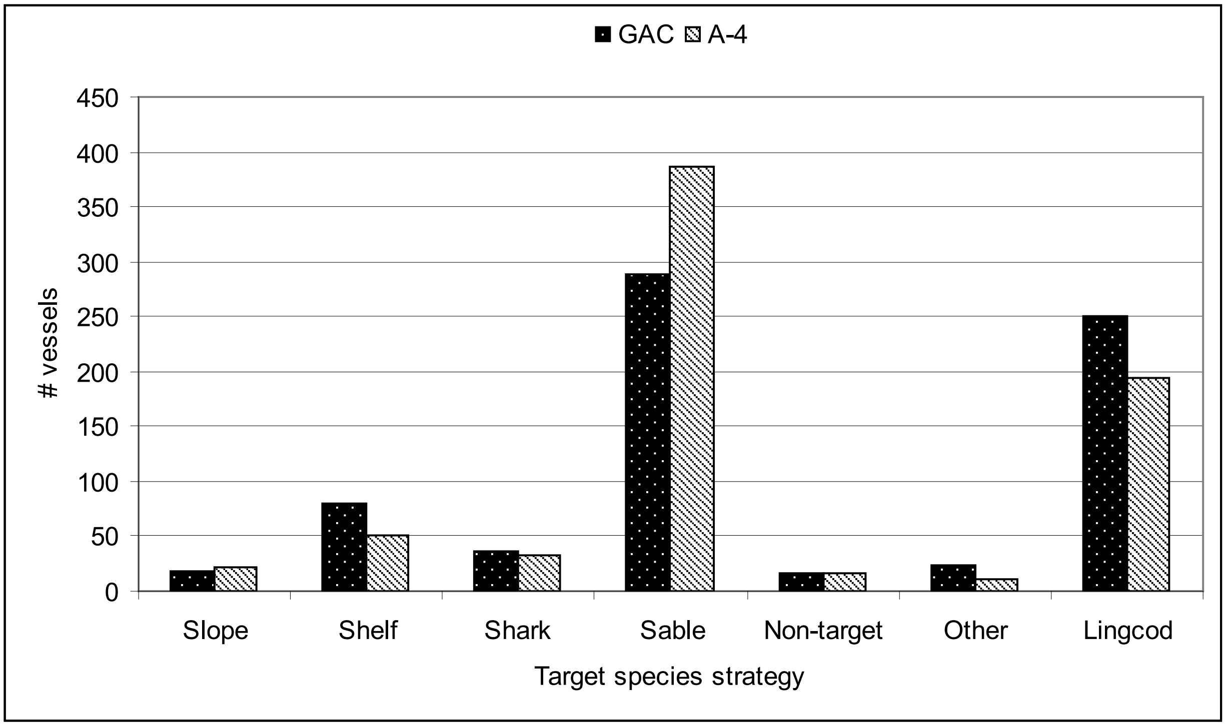
It was determined that about 65 percent (713 of 1,103 vessels) of each TSVG would be needed to meet the GAC request for balanced TSVG representation based on 2004-2006 window period data **(GAC Table 1).** This resulted in as few as 16 vessels for the non-TSVG to 289 vessels for the sablefish TSVG. The B species qualifying poundage ranged from as few as 127 lbs for the Other species TSVG to 3,816 lbs for the sablefish TSVG **(GAC Table 1).** The comparative data for A-4 ranged from 10 vessels (27.8 percent of A-1) for the other species TSVG to 387 vessels (86.6 percent of A-1) for the sablefish TSVG. The A-4 data showed relatively high fleet proportions for the sablefish, slope rockfish and non-target TSVGs, which is consistent with the results produced in Appendix E showing relatively large catch histories for vessels in these TSVGs.

GAC Table 1. Number of vessels that made directed B species fishery landings during 2004-2006 window period by target species vessel group (TSVG) and comparative data for GAC request and A-4 B permit qualification criteria for 713v-3 (A-4) (see Appendix E)

	A-1		GAC Request			A-4 1/	
TSVG	# vsls	Prop 2/	# vsls	Prop 3/	Qualify lbs	# vsls	Prop 3/
Slope	29	2.6%	19	65.5%	1,972	21	72.4%
Shelf	123	11.2%	79	64.2%	283	51	41.5%
Shark	57	5.2%	37	64.9%	640	33	57.9%
Sable	447	40.5%	289	64.7%	3,816	387	86.6%
Non-target	25	2.3%	16	64.0%	2,154	17	68.0%
Other	36	3.3%	23	63.9%	127	10	27.8%
Lingcod	386	35.0%	250	64.8%	576	194	50.3%
Total	1,103	100.0%	713	64.6%	NA	713	64.6%

1/ Data from Appendix E Table E-14; 1,071 lbs to qualify
2/ Proportion of Total
3/ Proportion of TSVG under A-1

The GAC request resulted in proportionately more lingcod and shelf rockfish vessels (250, 35 percent and 79, 11 percent, respectively) than the A-4 approach (194, 27 percent and 51, 7 percent)(**GAC Table 1; GAC Figure 1).** The Other species TSVG also fared better under the GAC approach (23, 3.2 percent) than under A-4 (10, 1.4 percent)(**GAC Table a; GAC Figure 1)**. For sablefish the GAC request resulted in a fleet of 289 vessels (41 percent) compared to 387 vessels (54 percent) under A-4 (**GAC Table 1; GAC Figure 1)**. These results could be expected because of generally larger catch histories of sablefish vessels compared to lingcod, shelf rockfish and other species vessels, as reported in Appendix E. There were other relatively small differences in number of qualifying vessels among the other TSVGs between A-4 and the GAC request (**GAC Table 3; GAC Figure 1)**.



GAC Figure 1: Number of vessels that would qualify for B permits under the GAC request and A-4 by vessel target species strategy. Fleet size goal=713 vessels.

The qualifying vessels under A-4 and the GAC request landed very high proportions (≥95 percent) of total B species landings (shown under A-1), either in terms of pounds or revenues, during 2004-2006 window period years (**GAC Table 2**). A slightly higher proportion of the landings were made under A-4 that under the GAC request (98 percent compared to 95-96 percent, respectively) (**GAC Table 2**). The non-qualifying vessels for both groups were highly dependent (≥91 percent) on associated species landings for their total commercial fishery revenues (**GAC Table 2**). Associated fisheries include Dungeness crab, salmon, and albacore in particular.

More California vessels qualified under the GAC request (423, 59 percent) than under A-4 (374, 53 percent), while both Washington and Oregon qualified fewer vessels under the GAC request (213, 30 percent and 11, 11 percent, respectively) than under A-4 (228, 32 percent and 111, 16 percent, respectively) (**GAC Table 3).** These differences indicate generally larger catch histories of California vessels compared to Oregon and Washington vessels within individual TSVGs.

GAC Table 2. Landings data from 2004-2006 for vessels that WOULD qualify for a B permit under A-1 (no action), A-4 (713v-3) and the GAC request 1/

				Directed fishery metrics				Associated fishery metrics				Total fishery metrics			
				BGF				Total				Total		Total	
Option	B criterion	Criterion	# vsls	lbs	P 2/	Rev	P 2/	lbs	P 3/	Rev	P 3/	lbs	P	Rev	P
A-1	N/A	N/A	1,103	6,163,951	1.000	$8,531,439	1.000	94,180,993	0.939	$116,160,405	0.932	100,344,944	1.00	$ 124,691,844	1.00
A-4	713v-3	Top lbs	713	6,058,802	0.983	$8,339,657	0.978	77,687,112	0.928	$93,037,615	0.918	83,745,914	1.00	$ 101,377,272	1.00
GAC	TSVG	65%	713	5,906,740	0.958	$8,104,979	0.950	64,574,005	0.916	$76,743,055	0.904	70,480,745	1.00	$ 84,848,034	1.00

GAC Table 2. Landings data from 2004-2006 for vessels that WOULD NOT qualify for a B permit under A-1 (no action), A-4 (713v-3) and the GAC request 1/

				Directed fishery metrics				Associated fishery metrics				Total fishery metrics			
				BGF				Total				Total		Total	
Option	B criterion	Criterion	# vsls	lbs	P 2/	Rev	P 2/	lbs	P 3/	Rev	P 3/	lbs	P	Rev	P
A-1	N/A	N/A	0	0	NA	$0	NA	0	NA	$0	NA	0	NA	0	NA
A-4	713v-3	Top lbs	390	105,149	0.017	191,783	0.022	16,493,881	0.994	23,122,790	0.992	16,599,030	1.00	$ 23,314,573	1.00
GAC	TSVG	65%	390	257,212	0.042	426,461	0.050	29,606,988	0.991	39,417,350	0.989	29,864,200	1.00	$ 39,843,811	1.00

1/ Abbreviations: BGF=B species groundfish; P=proportion; lbs=pounds; Rev=revenues

2/ Proportion of 2004-2006 B species groundfish landings (BGF)

3/ Proportion of total commercial fishery landings (Total fishery metrics)

GAC Table 3. Number of Qualfying Vessels by Alternative, Port group and State

	A-1								A-4								GAC Request							
State/Port	Lingcod	Shelf RF	Sablefish	Slope RF	Sharks	Other	Non-targ	Total	Lingcod	Shelf RF	Sablefish	Slope RF	Sharks	Other	Non-targ	Total	Lingcod	Shelf RF	Sablefish	Slope RF	Sharks	Other	Non-targ	Total
SPS	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	2
NPS	4	0	7	2	5	0	1	19	2	0	7	0	5	0	1	15	3	0	5	0	5	0	1	14
CWA	0	0	52	0	0	0	0	52	0	0	48	0	0	0	0	48	0	0	28	0	0	0	0	28
CLW	0	0	53	0	0	0	0	53	0	0	46	0	0	0	0	46	0	0	33	0	0	0	0	33
WA	4	0	114	2	5	0	1	126	2	0	103	0	5	0	1	111	3	0	68	0	5	0	1	77
CLO	0	0	45	0	0	0	0	45	0	0	35	0	0	0	0	35	0	0	23	0	0	0	0	23
TLA	35	3	12	0	0	0	0	50	14	3	6	0	0	0	0	23	22	3	2	0	0	0	0	27
NPA	14	1	36	0	0	0	0	51	5	0	23	0	0	0	0	28	8	0	13	0	0	0	0	21
CBA	38	0	52	0	0	0	0	90	16	0	47	0	0	0	0	63	22	0	36	0	0	0	0	58
BRA	71	5	33	0	0	0	0	109	44	3	32	0	0	0	0	79	51	3	30	0	0	0	0	84
OR	158	9	178	0	0	0	0	345	79	6	143	0	0	0	0	228	103	6	104	0	0	0	0	213
CCA	28	1	7	0	0	0	1	37	19	0	6	0	0	0	1	26	22	0	2	0	0	0	1	25
ERA	12	0	33	0	1	0	0	46	5	0	33	0	1	0	0	39	7	0	26	0	1	0	0	34
BGA	32	4	50	0	0	0	1	87	20	1	46	0	0	0	1	68	23	2	43	0	0	0	1	69
BDA	15	9	2	0	0	2	0	28	10	3	0	0	0	0	0	13	10	4	0	0	0	1	0	15
SFA	31	13	16	0	11	1	4	76	15	2	13	0	7	0	2	39	18	7	9	0	7	0	2	43
MNA	37	15	33	0	1	7	5	98	13	10	33	0	0	3	4	63	20	11	29	0	0	3	4	67
MRA	52	29	5	10	1	0	7	104	27	13	3	9	0	0	5	57	37	21	2	8	0	0	4	72
SBA	12	23	0	5	10	10	3	63	4	7	0	4	7	2	1	25	7	15	0	4	7	7	1	41
LAA	5	11	4	4	20	14	1	59	0	3	3	1	7	5	1	20	0	6	2	1	11	11	1	32
SDA	0	9	5	8	8	2	2	34	0	6	4	7	6	0	1	24	0	7	4	6	6	1	1	25
CA	224	114	155	27	52	36	24	632	113	45	141	21	28	10	16	374	144	73	117	19	32	23	15	423
Total	386	123	447	29	57	36	25	1,103	194	51	387	21	33	10	17	713	250	79	289	19	37	23	16	713

Under the GAC request, the economic impacts of the lingcod, shelf rockfish, shark and other species fisheries were increased by 1 percent-33 percent while the remaining fisheries were reduced by 1 percent-4 percent **(GAC Table 4).** Overall the GAC request resulted in 97 percent ($14.7 million) the economic impact of A-4 ($15.1 million) and 95 percent the impact of A-1 ($15.5 million) **(GAC Table 4).** The major difference between A-4 and the GAC request was in sablefish impact, which was -$565,789 (-4.5 percent) under the GAC request **(GAC Table 4).**

GAC Table 4. Estimated West Coast economic impacts (using species expansion factors) by alternative, species group, and state. 1/

Alternative	Species	WA	OR	CA	Total
A-1	Lingcod	$12,438	$445,912	$734,918	$1,193,268
	Shelf RF	$0	$13,885	$263,789	$277,674
	Sablefish	$2,954,253	$3,739,317	$5,837,187	$12,530,757
	Slope RF	$207	$0	$375,454	$375,661
	Sharks	$328,810	$0	$298,387	$627,197
	Other	$0	$0	$71,254	$71,254
	Non-target	$33,376	$0	$345,232	$378,608
	Total	$3,329,084	$4,199,113	$7,926,222	$15,454,419
A-4	Lingcod	$11,666	$381,533	$644,910	$1,038,110
	Shelf RF	$0	$13,740	$214,543	$228,283
	Sablefish	$2,943,156	$3,686,597	$5,824,193	$12,453,946
	Slope RF	$0	$0	$370,833	$370,833
	Sharks	$328,810	$0	$283,186	$611,997
	Other	$0	$0	$52,494	$52,494
	Non-target	$33,376	$0	$338,888	$372,265
	Total	$3,317,009	$4,081,870	$7,729,048	$15,127,927
GAC request	Lingcod	$12,319	$419,311	$691,263	$1,122,893
	Shelf RF	$0	$13,740	$250,667	$264,408
	Sablefish	$2,707,363	$3,470,186	$5,710,608	$11,888,157
	Slope RF	$0	$0	$365,273	$365,273
	Sharks	$328,810	$0	$291,879	$620,690
	Other	$0	$0	$69,783	$69,783
	Non-target	$33,376	$0	$334,792	$368,169
	Total	$3,081,869	$3,903,238	$7,714,266	$14,699,372

1/ No attempt was made in this analysis to shift fish from non-qualifying vessels to qualifying vessels or to estimate the amount fish that would have been landed by non-qualifying vessels under incidental fishery regulations

Discussion

The GAC request, which was aimed at a species balanced fleet of 713 vessel, resulted in more lingcod, shelf rockfish and Other species vessels (97, 38 percent, **GAC Table 3**) qualifying for B permits than under the A-4 approach of issuing permits based on total B species poundage landed without regardless to vessel target species strategy. The GAC request resulted in fewer sablefish vessels (89, 23 percent, **GAC Table 3**) qualifying for permits compared to A-4. The GAC request (using A-4 for comparison) resulted in a shift of vessels from Washington and Oregon to California (+49, 7 percent) as a result of generally larger catch histories of California vessels within individual TSVGs **(GAC Table 3**).

The economic analysis indicated the GAC request had a potentially higher negative economic impact compared to A-4 (-3 percent, **GAC Table 4**). This was largely due to reduced sablefish landings by permitted vessels during the 2004-2006 window period years (-5 percent, **GAC Table 4)** used for the hindcast analysis. However, the hindcast analysis did not attempt to redistribute fish from non-qualifying vessels to qualifying vessels or to estimate the amount of fish that would be taken by non-qualifying vessels under incidental fishery regulations. Because of the relatively small amount of fish involved (about 3 percent) it is highly likely that the permitted fleet under the GAC request would have been able to harvest the full sablefish allocation through inseason regulation adjustments. Also, redistribution of permits between vessels in future years could further ensure that the available fish would be harvested under the GAC request (or under A-4).

Agenda Item G.5.a
Attachment 3
March 2009

Notes to readers of Updated Open Access Permit Program Preliminary Draft Environmental Assessment (EA) dated March 2009

1. Appendix I has been added to the EA, which analyzes the Council's Preliminary Preferred Alternative.
2. The major additions or changes to the EA are underlined and appear in red type (to those of you that receive a computer file).
3. Additional specifics are provided on the proposed B and C permit application and permit issuance processes.
4. A new analysis is include in subsection 3.3.3.6 regarding directed fishery vessel participation in other commercial fisheries.
5. A cumulative effects section has been added (subsection 4.7).

The document changes have NOT been reviewed by all of the writing team members. Their input will be used in the next document update following the March 2009 Council meeting. Public, agency, and tribal comments will also be welcome for the next document update.

LB Boydstun
February 13, 2009

PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT
FOR
PACIFIC COAST GROUNDFISH FISHERY MANAGEMENT PLAN AMENDMENT 22:
CONVERSION OF THE OPEN ACCESS FISHERY TO FEDERAL PERMIT MANAGEMENT

INCORPORATING THE REGULATORY IMPACT REVIEW
AND
INITIAL REGULATORY FLEXIBILITY ANALYSIS

PREPARED BY
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MARCH 2009

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This document is published by the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number NA05NMF4410008.

COVER SHEET
March 2009

Title of Environmental Review: Environmental Assessment of a Program to Limit Entry into the Open Access Sector of the Pacific Coast Groundfish Fishery (Amendment 22 to the Pacific Coast Groundfish Fishery Management Plan)

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Legal Mandate: Magnuson-Stevens Fishery Conservation and Management Act, 50 CFR Part 660

Location of Proposed Activities: The Exclusive Economic Zone (3-200 nautical miles offshore) off the states of Washington, Oregon, and California

Abstract: This Environmental Assessment examines a program to limit participation in the open access sector of the Pacific Coast groundfish fishery. Since implementation of a limited entry program in 1994, participation in the open access sector has been unlimited to ensure that vessels participating in state-managed fisheries and landing groundfish incidentally to other fisheries would continue to have access to the groundfish resource. The fishery was also left unlimited to allow vessels that did not qualify for the limited entry program in 1994 to directly target groundfish at lower landings rates than in the limited entry fishery. Allowable groundfish landings have been constrained in recent years to protect overfished groundfish species. Despite these overall harvest restrictions, participation in the open access sector of the groundfish fishery remains unrestricted. A limited entry program is being considered because of the overcapitalization that exists in the directed (targeted) component of the open access fishery and because of fishery informational needs associated with other important groundfish management issues, bycatch reduction and overfished species management. The purpose of this Environmental Assessment is to provide decision makers and the public with an evaluation of the environmental and economic impacts of the regulations that would be implemented under the proposed limited entry program.

EXECUTIVE SUMMARY

This document analyzes the environmental and socioeconomic impacts of proposed Amendment 22 to the Pacific Coast Groundfish Fishery Management Plan (Groundfish Fishery Management Plan; FMP), which is proposed to convert the open access sector of the groundfish fishery to limited entry management. Participation in the open access fishery has been unlimited since it began in 1994 to ensure that vessels participating in state-managed fisheries and landing groundfish incidentally to other fisheries would continue to have access to the groundfish resource and to allow vessels that did not qualify for the limited entry program to directly target groundfish at a rate lower than in the limited entry fishery.

DOCUMENT ORGANIZATION

The National Environmental Policy Act (NEPA) and the Regulatory Flexibility Act (RFA) require a description of the purpose and need for the proposed action as well as a description of alternative actions that may address the problem. These issues are covered in Chapters One through Eleven. Chapter Twelve contains appendices that provide information in support of comments made or conclusions reached in the text**.**

PROPOSED ACTION

Conversion of the open access fishery to limited entry management has been under discussion since April 1998 and was listed in 2000 as a management priority under the Council's Groundfish Strategic Plan. The proposed program is intended to compliment the existing limited entry or A permit program. The proposed action has two parts:

1) Conversion of the directed (target) fishery component to limited entry management wherein vessels with valid registrations or permits would be allowed to directly fish for and land specified groundfish species. This is called the B permit program.
2) Conversion of the incidental (non-target) fishery component of the open access groundfish fishery to a license registration program for all state-registered open access vessels that do not receive a B permit and that seek to retain incidental amounts of specified groundfish. This is called the C permit program.

NEED FOR LIMITED ENTRY

The majority of groundfish stocks are now fully harvested by domestic fishermen in the Pacific coast groundfish fishery (PFMC 2008a) and expectations of future productivity of most groundfish have been lowered (PFMC 2008a) along with estimated OYs since the mid 1990s, particularly for rockfish stocks (PFMC 2006). The proposed action is needed because:

1. The number of vessels in the fishery needs to be limited to ensure that capacity and/or effort is maintained consistent with resource availability and limited entry is an important step in the process. Closing the open access nature of the groundfish fishery and preventing additional entrants is an important step in managing fishery capacity.
2. The open access directed fishery is highly diverse and some species may require additional protective measures to sustain local fisheries while povinding flexibility for future fishery expansion to harvest currently depressed stocks.
3. Restrictive landing limits have been necessary for some species because of high fishing capacity, which has reduced the economic potential of the fishery and increased fishery discards and limited entry has the potential to provide for less restrictive regulations and reduced fishery discards.
4. Restrictive salmon fishing regulations combined with the states' nearshore management programs have likely pushed vessels into federal waters, increasing fishing pressure in those waters.

5. Registration of all vessels is important to meeting fishery management goals and efficiently allocating sampling resources among coastal ports.

TIMELINE AND RESPONSIBLE ENTITIES

The expection is that the Council will take final action at its March 2009 meeting. If a B permit alternative is recommended, NMFS would be able to start regulatory and permit issuance actions, which would allow for permit program implementation effective January 1, 2011. This would give vessel owners about six months to submit permit applications and NMFS about six months to issue permits and consider appeals.

HISTORY OF OPEN ACCESS FISHERY

The history of the open access fishery, including information on the major reductions in rockfish harvest opportunity during the 1990s, is tracked in **Section 1.4.1.**

GROUNDFISH STRATEGIC PLAN

The 2000 Strategic Plan noted that the groundfish resource could not support the number of vessels catching and landing groundfish. Fishing fleet overcapitalization had been a major factor in fish stock depletions and led to economic and social crises in the industry and in coastal communities. The Plan reported that "...allowing an open access fishery with a total absence of limits on capacity is a serious management problem." The number of open access vessels that would be needed to harvest the 2000 open access groundfish OY of 2,207 mt was estimated to be in the ranged from 47 to 105 boats which yielded an open access capital utilization rate of 6 percent-13 percent. The Plan recommended that the Council consider deferring management of nearshore rockfish, and other species such as cabezon, kelp greenling and California scorpionfish to the states, and that all commercial fisheries should eventually be limited through federal or state license or permit limitation programs.

STRATEGIC PLAN IMPLEMENTATION OVERSIGHT COMMITTEE (SPOC)

The SPOC developed a list of 15 groundfish action priorities, which included two "critical" elements (science and Council process action items) for Council consideration. The open access permitting issue was ranked seven below: two critical operational elements, Limited Entry (A permit) buyback, trawl permit stacking, observers, groundfish process, and fixed gear stacking, most of which have been completed or are being adddressed.

PUBLIC SCOPING

Public scoping of the open access permitting issue has taken place in Council and state meeting since April 1998. Public comments and Council discussion were generally in favor of consideration of open access fishery conversion to federal permit management. Public and Council discussions are summarized in **Section 1.5**. The decision to move forward with the open access permitting analysis was made at the Council's September 2006 meeting.

DESCRIPTION OF THE ALTERNATIVES

The Council has approved six alternatives for EA analysis. Note: *while each alternative reads as a complete program option, the components of each alternative could potentially be mixed and matched to create an open access licensing program.*

Alternative 1 (No action)
Alternative 1 would continue to allow commercial fishing vessels to prosecute federal groundfish species allocated to open access fisheries without federal registration, except as required under the VMS program. The No-action alternative does not limit participation in the open access fishery.

Alternative 2
This alternative establishes an annual federal license requirement for vessel owners that intend to participate in the open access groundfish fishery. The purpose of this alternative is to identify all vessels and vessel owners that participate in the open access fishery and to aid managers in estimating fishery impacts to target and non-target species. This alternative would not limit fishery participation and the registration would be valid for directed or incidental fishing operations.

B and C Permit Alternatives
Alternatives 3-6 are the open access fishery permitting alternatives each of which call for issuance of B (directed fishery) and C (incidental fishery) permits. There are various conditions and assumptions under the B and C permit alternatives. These are presented in **Table ES-1**. Some issues that Alternatives 3-6 have in common are as follow:

1. Alternatives 3, 4 and 6 allow for B permit transfer between vessels, while permits are non-transferable under Alternative 5.
2. Alternative 3 has a state landing endorsement provision with each B permit, which is based on the single state in which the most directed fishery deliveries (acts) were made to qualify for the permit.
3. Alternative 5 has a previous year landing requirement, which would have to be completed by November 30 for the permit to be renewed by December 31.
4. Alternatives 3, 4 and 6 allow for alternate use on a vessel of A and B permits, but not in the same cumulative landing period.
5. Alternative 5 prohibits B permit registration to any vessel with an A permit in the same year.
6. Alternative 6 has six species endorsement alternatives, three each for sablefish and lingcod separately as follow: $\geq$1 lb, $\geq$100 lbs and $\geq$500 lbs landed in any year during the 1998 -2006 window period[1].

C permits are proposed to be available for registration to any West Coast commercial fishing vessel except that state-issued nearshore permits may be used in lieu of obtaining a C permit.

Alternative 3
This is one of two alternatives that have a specific initial fleet size goal for B permits. There are two goal options under Alternative 3: A-3 (a) is based on the average number of vessels that made directed B species landings in the WOC area during 2004-2006 window period years, which computes to be 680 after rounding; and A-3 (b) is the number of B species directed fishing vessels that made a landing in the WOC area in 2006, which is 713. The long-term fleet size goal would be the same as the initial fleet size goal.

Alternative 4
This alternative was developed to analyze the fishery impacts of a wide range of B permit qualification criteria. There would be no initial fleet size or long-term goal under under of the criteria contained in this alternative, but no new permits would be issued after the first year. There are 22 qualification criteria

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[1] Window period means April 9, 1998-September 13, 2006. These dates are inclusive of the two control dates published in the *Federal Register* notifiying the public of Council intent to consider limited entry for the open access fishery.

contained in this alternative, which range from 1-lb landed during 2004-2006 window period years to 47,900 lbs landed during 1998-2006 window period years with at least one landing during 2004-2006.

Alternative 5

The initial fleet size goal under Alternative 5 is 390 vessels, which is 91 percent of the average number of vessels (after rounding) that fished at least three years for federal groundfish species, including nearshore species, during 1994-1999**.** The 91 percent adjustment factor is an extrapolation of fishery data for 2000-2006 used to estimate the proportion of vessels that fished for nearshore species only during 1994-1999 when nearshore rockfish were often recorded as "rockfish unspecified." The long-term fleet size goal in this alternative is, 170 vessels, which is based on the Groundfish Strategic Plan.

Alternative 6 (Preliminary Preferred Alternative)

This alternative was identified by the Council as its preliminary preferred alternative at its September 2008 meeting. Vessels that landed ≥100 lbs of B species groundfish in the directed fishery during the 1998-2006 window period and made at least one directed fishery landing during 2004-2006 would qualify for a B permit. Other elements of the alternative are explained above.

B AND C PERMIT APPLICATION AND ISSUANCE ISSUES

B permits would be registered by NMFS to qualifying vessels after vessel owners have submitted completed applications, required fees, and specified government documents showing proof of current vessel ownership. Late applications for permits will be denied and expired permits will not be renewed. C permits would be available for registration to state-registered commercial fishing vessels year round.

PHYSICAL AND BIOLOGICAL CHARACTERISTICS OF THE AFFECTED ENVIRONMENT

Information is provided in **Section 3.1** on ocean currents, physical and biological conditions, and essential fish habitat within the Pacific Coast groundfish area. In the Biological Characteristics section (**Section 3.2**) information is provided on federal groundfish species including (1) overfished and precautionary zone groundfish and (2) non-overfished and unassessed groundfish species. Information is also provided on non-groundfish species and prohibited and protected species that may be caught or impacted when targeting groundfish.

MANAGEMENT STRUCTURE OF THE OPEN ACCESS FISHERY

The management structure of the open access fishery is described in **Section 3.3.1.**

Table ES-1: Basic conditions and assumptions of B and C permit programs

1) The B permit program is intended to better match fleet capacity with resource availability.

2) B permits will apply to the directed taking and landing of all federal groundfish not including (i) nearshore rockfish, cabezon, kelp greenling and California scorpionfish (nearshore groundfish, which are protected under state regulations) and (ii) for non-endorsed vessels, species for which a species endorsement may be required. B permits also apply to the taking and possession of small amounts of any B species groundfish for which a species endorsement may be required.

3) A directed open access fishery landing is defined for data analysis and permit issuance purposes as one in which >50% of the total revenue was of B species groundfish, and directed fishery gear was used. 1/ All other landings of B species groundfish are treated as incidental fishery landings. Only landings of B species of groundfish during April 1998 - September 2006 will be considered for permit issuance. 2/

4) State nearshore permits may not be used in lieu of obtaining a B permit to take B species groundfish.

5) A C permit must be registered to a vessel to land small amounts of federal groundfish taken incidental to fishing for non-groundfish species. A vessel registered to an A or B permit or a state-issued nearshore permit is exempt from the C permit requirement.

6) Valid A, B or C permits or state-issued nearshore permits will be required when fishing for, possessing and landing permitted species in U.S. waters off the coasts of Washington, Oregon and California (3-200 miles from shore). The expectation is that the states will apply the same requirement to vessels fishing inside 3 miles.

7) B and C permit landing limits will be set based upon attainment of open access fishery allocations, harvest guidelines, and overfished species rebuilding objectives. C permit and non-endorsed B permit vessel landing limits may take into account target species landings (nearshore, non-endorsed B species groundfish, and non-groundfish species) with the aim of preventing directed fishing for B species groundfish by C permit vessels and endorsed species by non-endorsed B permit vessels.

8) State regulations will continue to conform to federal regulations.

1/ For this report, directed fishery gear types were limited to non-salmon hook and line, fishpot and setnet. All other gear types (used by non-A permit vessels) were treated as incidental fishery gear types. For fishery management purposes, it is assumed that separate trip limits will be established for (1) B and C permit vessels, (2) vessels with and without species endorsements and (3) directed fishery and incidental fishery gear types.

2/ April 1998-September 2006 is inclusive of the two open access fishery permit program control dates.

Alternatives Considered but Rejected for Further Analysis

The rejected alternatives included permit stacking (to increase trip limits), sablefish tiering, permit transferability conditions, allocations between B and C permit vessels, sub-area endorsements for sablefish or for other species, gear or vessel length endorsements, permit consolidation requirement (to accelerate fishery attrition), and market-based management (e.g., individual fishing quotas). These issues were considered outside the scope of the proposed action, could lead to increased fishery discards, or were not considered a management concern at this time.

CATCH CHARACTERISTICS—AMOUNTS AND FISHERY VALUES

The open access B species groundfish fishery is very small compared to other Pacific Coast commercial fisheries. B species directed fishery landings expressed as a proportion of total WOC commercial fishery landings in 2004-2006 window period years showed a negligible (<0.3 percent) contribution based on tonnage landed and 1 percent based on ex-vessel value of fish landed. For individual ports, B species directed fishery landings exceeded 3 percent of total commercial fishery landings either in terms of weight or ex-vessel value of fish landed at six port groups (tonnage and ex-vessel values, respectively, shown in parentheses): Fort Bragg (7 percent and 9 percent), Brookings (3 percent and 4 percent), Morro Bay (3 percent and 3 percent), South Puget Sound (2 percent and 3 percent) and Monterey (1 percent and 3 percent).

A total of 809 different fish buyers, distributed among 70 ports, purchased B species directed fishery groundfish during window period years. In 2006, the comparative figures were 214 buyers among 55 ports. A large majority of buyers (79 percent) operated from California ports, particularly between the San Francisco and San Diego port groups (471). Fishermen landing and selling their own catches likely contributed to the large number of California fish buyers.

The open access groundfish fishery (inclusive of nearshore groundfish) has been small when compared to the A permit and recreational groundfish fisheries averaging 5 percent of total groundfish landings during the window period. A large majority (88 percent) of the open access harvest was in the directed fishery. The number of vessels that participated in the open access fishery declined from 1,483 in 1999 to 905 in 2006. The number of directed fishery vessels declined from 1,004 in 1998 to 677 in 2004 then increased to 744 in 2006**.**

The incidental fisheries were projected to take 1 percent-2 percent of bocaccio, canary and yelloweye rockfish optimum yield specifications and neglible impact to other overfished groundfish species in 2007. The impact of B species directed fishing vessels to overfished groundfish species in 2007 was estimated to be neglible (<0.5 percent of optium yield specifications) for canary, darkblotched and widow rockfish and Pacific Ocean perch and 3 percent -5 percent for overfished bocaccio, cowcod and yelloweye rockfish based on 2007 optimum yield specifications. Most of the directed fishery impact was in the sablefish daily trip limit fishery, except for bocaccio, which was estimated to be caught primarily in “other” fisheries (such as those for lingcod and shelf rockfish).

The most valuable directed fishery species or species groups on average annually to the fishermen (ex-vessel value) during the window were nearshore species, $2.8 million (55 percent); and sablefish, $1.5 million (29 percent) annually. All other species (shelf and slope rockfish, lingcod, sharks and others) averaged $800,000 annually (16 percent)**.** In 2005-2006 revenues from sablefish surpassed those from nearshore species.

The number of vessels making a directed sablefish landing increased during 1998-2006 except for 2004. The trend in sablefish fishery resource impact (based on landings expressed as a proportion of annual harvest guidelines) followed the vessel participation trend very closely, which contributed to the fishery in the Monterey-Vancouver management area exceeding its sablefish allocation by over 40 percent in 2005 and being closed during October-December of 2006 (**Figure ES-**1).

A total of 2,587 different vessels made a B species directed open access fishery landing during the window period, and 69 percent (1,484) that made a landing during 1998-2003 (2,157) did not make a landing during 2004-2006. A total of 1,103 vessels made a B species directed fishery landing during 2004-2006. A total of 71 (2.7 percent) vessels made a landing every year of the window period.

Total B species revenue frequencies for vessels that made B species landing during the window period showed that 50 percent of vessels (1,283) landed <$1,000 worth of B species groundfish and 4 percent (105) landed over $100,000 worth of fish during the window period. The remaining 1,199 vessels (46 percent), landed between $1,000 and $100,000 in B species groundfish during the nine-year window period (**Figure ES-2**).

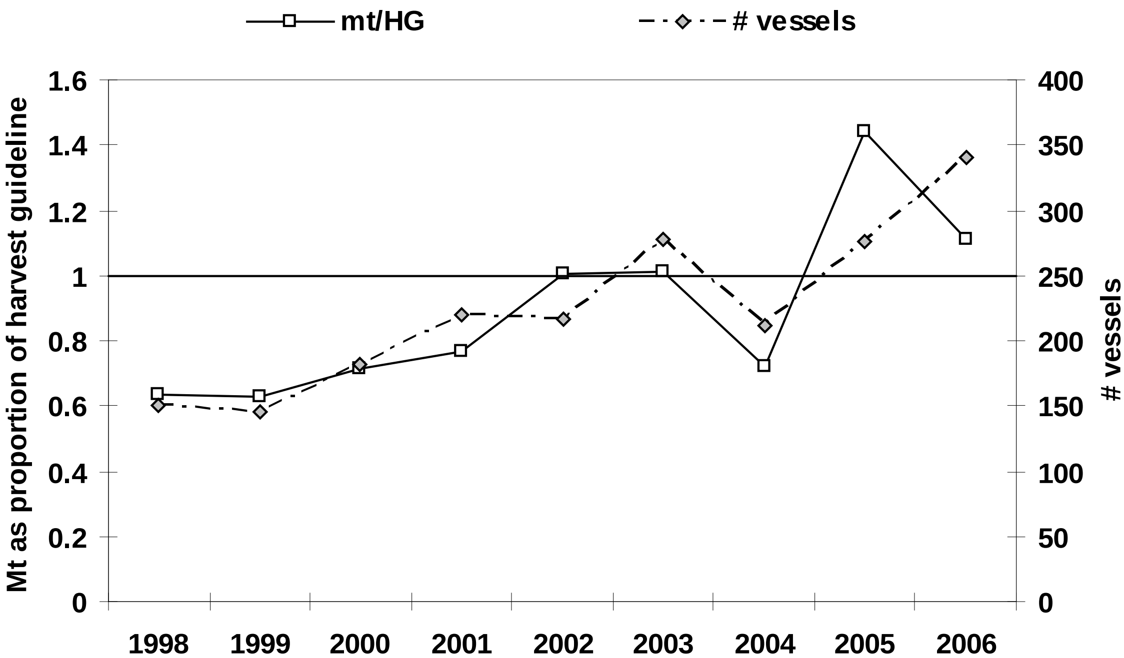

Figure ES-1. Directed open access sablefish fishery trends: number of directed fishery vessels and landings shown as a proportion of annual harvest guideline, Monterey-Vancouver area, 1998-2006 seasons

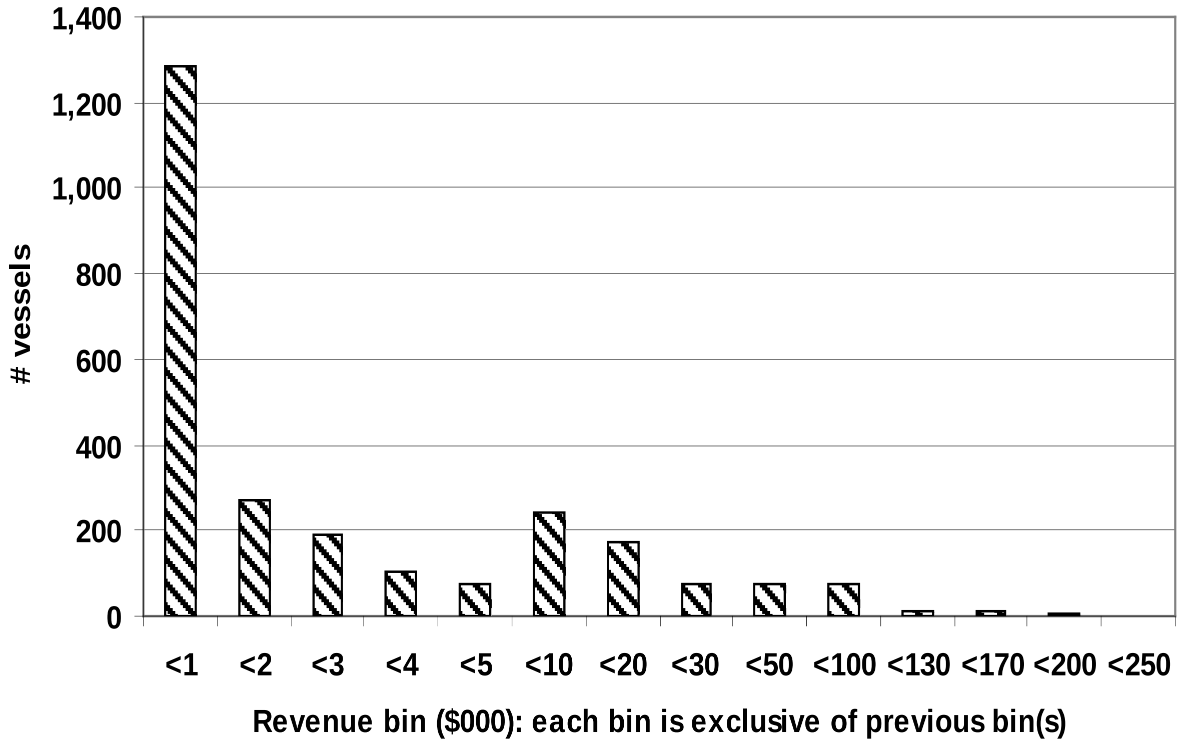

Figure ES-2. Revenue frequencies for WOC vessels that made B species landings during the window period (2,587 vessels)

A total of 2,587 vessels had directed B species groundfish landings during the window period and 66 percent primarily delivered to California port groups and 26 percent and 8 percent made landings at Oregon and Washington port groups, respectively. The top three port groups for number of vessels making landings were Morro Bay (11 percent), Monterey (10 percent), and Brookings (9 percent). The San Francisco port group was very close to the Brookings port group at slightly less than 9 percent. The large majority (87 percent) of vessels used hook-and-line gear, followed by pot gear (10 percent) on average during the window period.

California, Oregon and Washington B species directed fishery vessels averaged 28 ft, 32 ft, and 39 ft in length, respectively. The modal length of Washington vessels was 40-49 ft while the modal length in California and Oregon vessels was 21-24 ft, although there was a second modal length for Oregon vessels at 35-39 ft.

B species directed fishery vessels in Washington and California derived similar proportions of their total commercial fishery revenues from B species directed fishery groundfish landings (7.8 percent and 7.9 percent, respectively) during 2004-2006. Oregon vessels had a slightly lower dependence at 5.2 percent of total revenues**.** Crabpot landings were the major source of commercial fishing revenues by B species directed fishery vessels in all three states, followed by salmon in California and Oregon and HMS in Washington (**Figure ES-3).** Note: this analysis is based on vessels that made B species directed fishery landings, thus does not include vessels that did not make directed fishery landings, which, if included, would show lower proportions of B species revenues compared to total commercial fishery revenues.

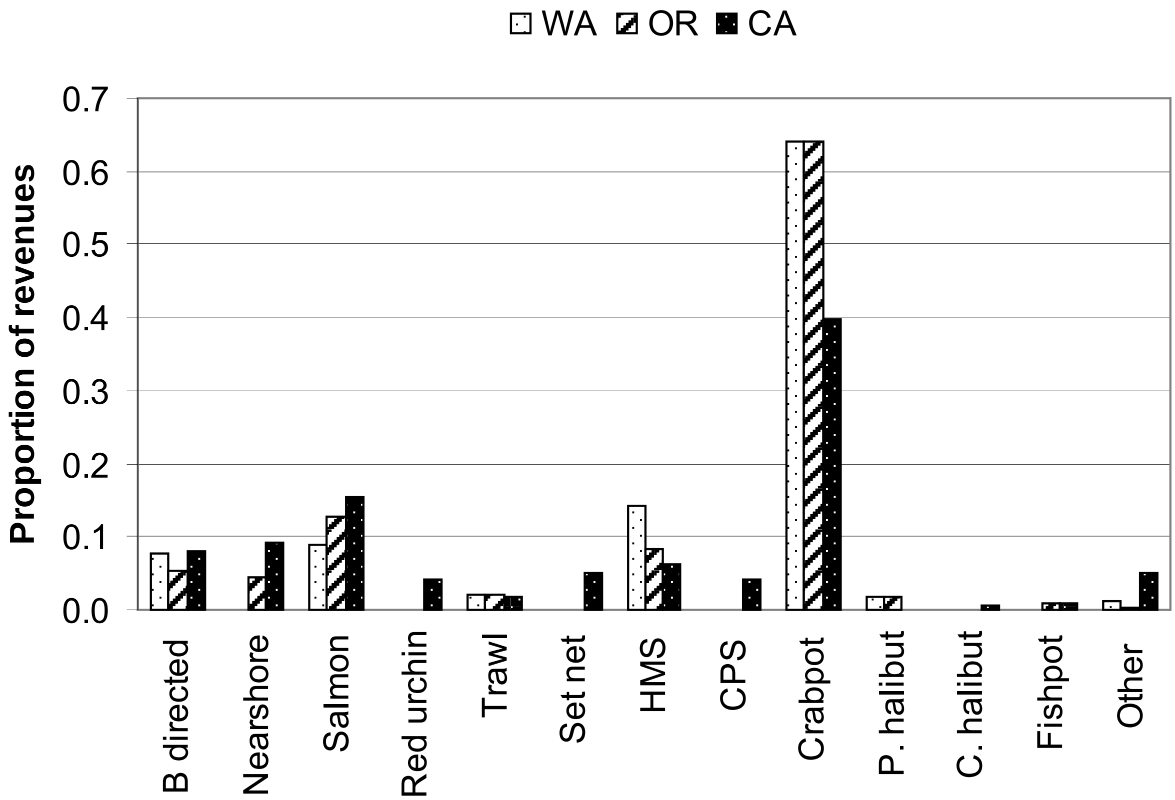

Figure ES-3 Proportion of commercial fishery revenues received by vessels that made B species directed fishery landings by fishery and state during 2004-2006

Directed fishery vessels were assigned to target species groups based on B species landing revenues. Vessels that received >50 percent of B species from a single species or species group for landings during 2004-2006 (1,103 vessels) were assigned to that species or species group as follows: sablefish, shelf rockfish, slope rockfish, lingcod, sharks and rays (sharks), and other species. Vessels that could not be assigned to a target species group were assigned to a non-target species vessel group. All except 25 vessels (98 percent) were assigned to a target species group.

The sablefish target species vessel group (447 vessels) landed 98 percent of the sablefish and 78 percent of the B species groundfish landed by directed fishery vessels during 2004-2006 (**Figure ES-4).**

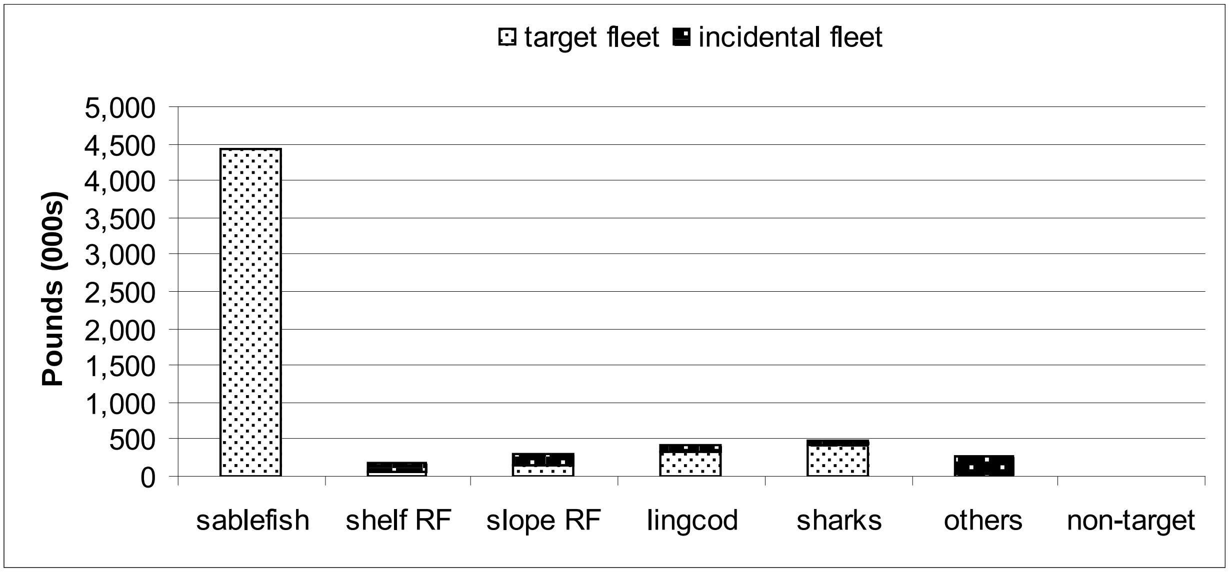

Figure ES-4. Pounds of B species groundfish landed by vessels that derived their primary (>50 percent) B species fishery revenues from specified species or species groups (target fleet) and those that derived secondary (≤50 percent) revenues from those same groups (incidental fleet) during 2004-2006

There were major differences in the median catch histories of vessels within state- and species-specific target species vessel groups during 2004-2006. These ranged from over 30,000 lbs for Washington shark vessels to 37 lbs for Oregon shelf rockfish vessels (**Figure ES-5).** These data show that vessels that targeted lingcod and shelf rockfish in Oregon and California and other species and sharks in California would be less likely to qualify for B permits than vessels than targeted sharks and lingcod in Washington, slope rockfish in California, and sablefish in all three states if B permit qualification is based on pounds of B species groundfish landed during window period years (or any subset of years).

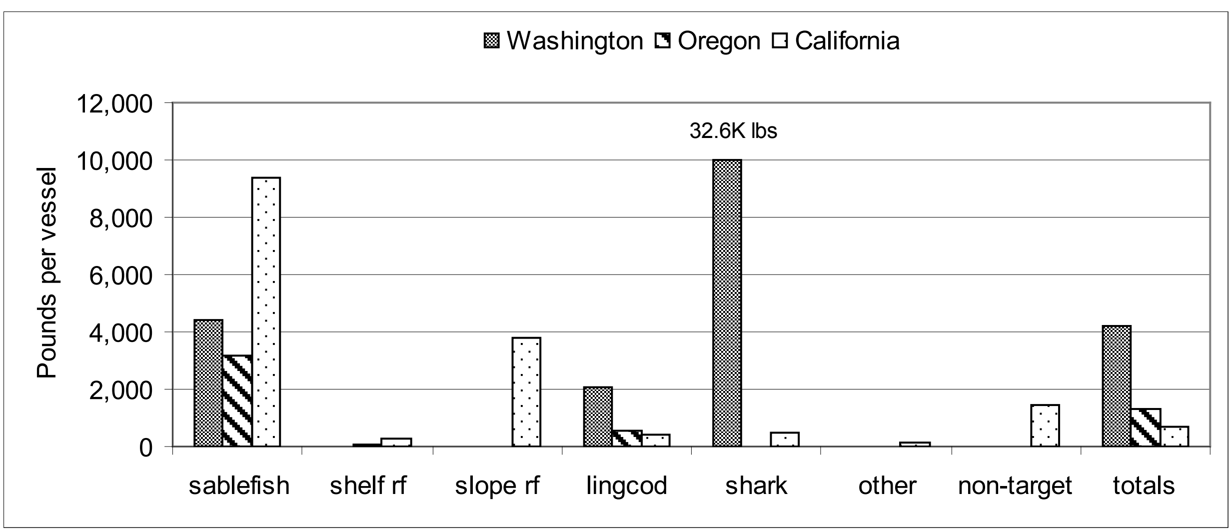

Figure ES-5. Median pounds per vessel by target-species vessel group and state during 2004-2006

REVENUE/COSTS TO THE PARTICIPANTS AND TO STATE AND FEDERAL GOVERNMENTS

Current license renewal and registration costs or web sites where they can be found are presented in **Section 3.3.6.**

ANALYSIS OF ALTERNATIVES--ENVIRONMENTAL CONSEQUENCES

Commercial fishery catch history data were available from the PacFIN data base for all vessels that made B species directed fishery landings during the window period. Those data were used in analyzing impacts of the 31 B permit qualification criteria contained in Alternatives 3-6 and the 6 species endorsement alternatives in Alternative 6 on 2004-2006 WOC fishery landings (B species directed and other commercial species landings) by vessels that would have qualified and not qualified for B permits in those years (hindcast analysis). The analysis was limited to the window period years of 2004-2006 because of regulation and optimum yield differences in earlier years compared to 2004-2006 and that can be expected in near term future years.

Each of the 31 qualificiation criteria contained in Alternatives 3-6 and the 6 species endorsement alternatives in Alternative 6 was composed of a qualification standard (QS) and a qualification framework (QF). There were 21QSs and 5 QFs among the B permit critieria and 3 QSs and 1 OF among the species endorsement alternatives in Alternative 6. Any alternative that seeks to implement a B permit program (with or without a species endorsement alternative) will require adoption of a qualification criterion for use by NMFS in determining which vessels qualify for a permit(s).

An analysis was done to show the number of vessels that landed specified proportions of B species directed fishery groundfish under each QF during 2004-2006 window period years. The vessels were ranked in descending order of their landings consistent with the metric used for vessel qualification (**Table ES-2)**. The harvest retention proportions used for the analysis were 50 percent, 80 percent, 90 percent and 95 percent.

Table ES-2 Qualification frameworks used for B permit issuance in Alternatives 3-6

Framework	Years	Metric
QF-1	2004-2006	Pounds landed
QF-2	1998-2006	Pounds landed
QF-3	1998-2006 w/ 2004-2006 landing	Pounds landed
QF-4	2004-2006	Landing in 2 yrs
QF-5	2004-2006	Maximum lbs landed in any one year

Results follow:

- QF-4 did not qualify enough vessels to retain 95 percent of landings during 2004-2006 and required more vessels at the 90 percent level than any other QF **(Figure ES-6)**. This was because many vessels that qualified for permits under this criterion had relatively low catch histories.
- QF-2 required substantially more (44 percent-71 percent) vessels than the remaining three criteria in order to retain 95 percent of landings during 2004-2006 **(Figure ES-6)**. This was because many vessels that qualified for permits did not make landings during 2004-2006.
- QF-3 required 10 percent-12 percent more vessels to retain 95 percent of landings during 2004-2005 compared to the remaining two criteria **(Figure ES-6)**. This was because some of the vessels that qualified for permits had relatively low catch histories during 2004-2006 compared to their previous (1998-2003) catch histories.
- QF-1 and QF-5 were within 3 percent of each other in terms of number of vessels required to retain 95 percent of landings during 2004-2006 **(Figure ES-6)**.

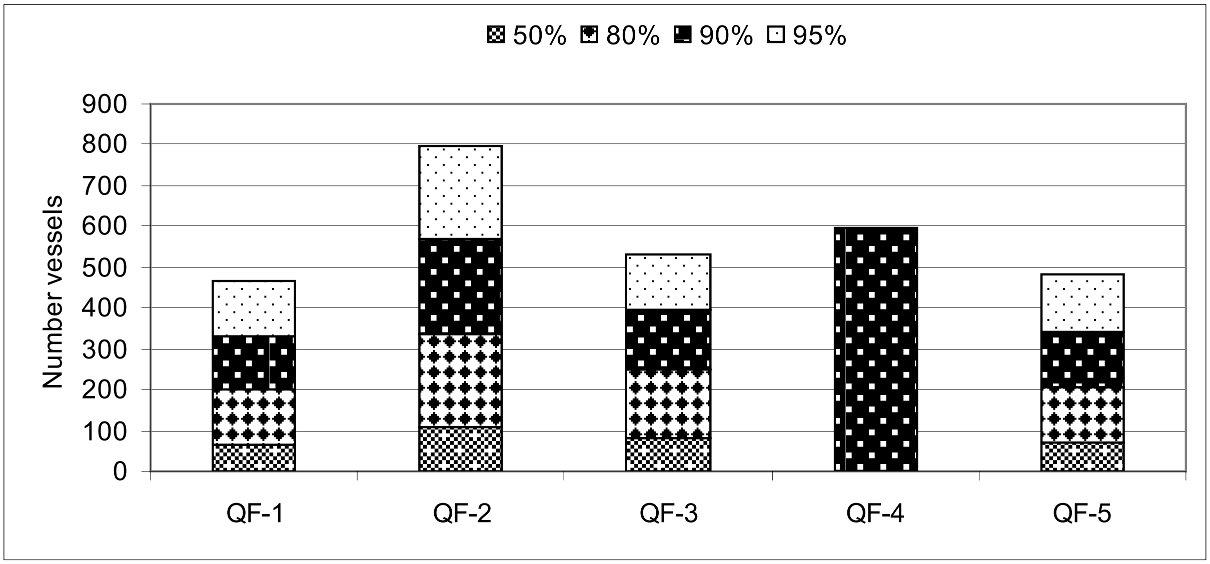

Figure ES-6: Number of vessels that landed specified proportions of B species landings in the WOC area during 2004-2006 that would qualify for B permits under QF-1, 2, 3, 4 and 5. Vessels were ranked from high to low based on framework parameters except for QF-4, which is explained in the text.

The commercial fishery impact analysis (**Appendix E**) facilitated projection of quantitative impact of the alternatives on (1) the groundfish and non-groundfish biological environments; and (2) the groundfish, non-groundfish, vessel, processor and community socioeconomic environments. Data sets were not available or limited for quantitative evaluation of the alternatives with regard to the following issues: Fishery Management, Prohibited Species, Protected Species, Participation Requirements, and Government Cost. For these issues, a general or qualitative assessment was made using comparative information or through deductive reasoning. These assessments are shown in **Table ES-3**.

The factors to be considered in the application of the principals of Environmental Justice are explained in **Section 3.3.9.** It is concluded that all of the alternatives have low potential for significant impact as none of them target low income or minority communities, thus they would affect all population segments equally.

Alternative 1

There would no significant impact to the environment under this, the No-action, alternative because no change in management is proposed under this alternative. This alternative would not affect the increased demand for directed fishery sablefish and the more restrictive landing and trip limits that are associated with providing for year-round sablefish fishing opportunity. Continued use of restrictive landing and cumulative limits, compared to previous recent years, may lead to further depressed fisherman revenues and community impacts and increased fishery discards due to trip limit overages and high grading to keep the more valuable fish. The no-action alternative does not provide for identification of fishery participants.

Table ES-3 Summary of registration requirements, fleet size goals, fleet size expectations, and environmental consequences associated with permit program alternatives

Issue	Reference	A-1	A-2	A-3	A-4	A-5	A-6
Registration requirement?	§ 2.0	No	Yes	Yes	Yes	Yes	Yes
Fleet size goal							
Initial	§ 2.0	none	none	680 or 713	none	390	none
Long-term	§ 2.0	none	none	none	none	170	none
Initial fleet size expectation **1/**	Tab 4-1b	<713	<713	468-680	65-<713	286-390	<713
Long-term fleet size expectation	Tab 4-1b	<713	<713	468-680	65-<713	170	<713
Consistent with "Needs Statement"?	Tab 4-1b	no	partially	partially	yes & no	yes	partially
Environmental impact							
Physical environment	§ 3.1, and § 4.0	N/C	N/C	N/C	N/C	N/C	N/C
Biological environment							
Groundfish	§ 3.2.1	N/C	N/C	N/C	N/C	N/C	N/C
Non-groundfish	§ 3.2.2	N/C	N/C	N/C	N/C	N/C	N/C
Prohibited species	§ 3.2.3	N/C	N/C	N/C	N/C	N/C	N/C
Protected species	§ 3.2.4	N/C	N/C	N/C	N/C	N/C	N/C
Socioeconomic environment							
Fishery mgmt **2/**	§ 2.0	N/C	+	+	+ to >	>	+
Catch comp.							
Groundfish **3/**	Tab E-4a or I-1a	N/C	N/C	+1% to +9%	N/C to +64%	+9% to +20%	+0.1% to +0.8%
Non-groundfish 4/	Tab E-4b or I-1b	N/C	N/C	N/C to -2%	N/C to -5%	-1% to -2%	-0.1% to -1.5%
Vessels char.	§ 3.3.3.4, § 3.3.3.5	N/C	N/C	> size possible	> size possible	N/C	> size possible
Processors 5/	Tab E-12a, E-12b & I-4b	N/C	N/C	-1% to -7% lbs	-1% to -12% lbs	-7% to -17% lbs	N/C to -1% lbs
Licensing, etc.	§ 3.3.5, § 3.3.6	N/C	new requirement	new requirement	new requirement	new requirement	new requirement
Costs	§ 2.0	N/C	~$125/yr	~$125/yr	~$125/yr	~$125/yr	~$125/yr
Communities 6/	Inferred from Tabs E-4b, E-20 & E-22	N/C	N/C	-1% to -8%	N/C to -~64%	-9% to -20%	~0%
Environmental Justice	§ 1.5, § 3.3.8	N/C	N/C	N/C	N/C	N/C	N/C

1/ The A-1 and A-2 value is the number of vessels that made a B species landing in 2006. Fewer vessels can be expected in the near term because of VMS requirement and elevated fuel price starting in 2008; A-3, A-4 and A-5 values are numbers of vessels eligible for permits and that were active during 2004-2006.

2/ + means improved management; > means substantially improved management (but cannot be quantified).

3/ Impacts are for B species groundfish revenues. Ranges show proportion of B species harvest made by non-qualifying vessels during 2004-2006. Some or all of these fish would have been available for harvest by qualifying vessels and by non-qualifying vessels under incidental fishery regulations. See Appendix E for port group and state specific estimates.

4/ Ranges show proportions of total WOC fishery revenues received by non-qualifying vessels during 2004-2006. These values indicate the amount of increase in revenues that would be needed to make up for lost B species groundfish landings by non-qualifying vessels. These are worst-case estimates because some fish would have been allowed in landings by non-qualifying vessels under incidental landing allowances for C permit and nearshore permit holders. See Appendix E for port group and state specific estimates.

5/ Proportions show the range in overall WOC pounds landed by vessels that did not meet qualifying criteria during 2004-2006. These are worst-case estimates because some fish would have been shifted from non-qualifying vessels to qualifying vessels or landed by non-qualifying vessels under incidental fishery regulations. See Appendix E for port group and state specific estimates

6/ Values shown are personal income impact estimates for 2004-2006 for vessels that did not meet qualifying criteria. These are worst-case estimates because some fish would have been shifted to qualifying vessels and landed by non-qualifying vessels under incidental landing allowances for C permit and nearshore permit holders. See Appendix E for port group and state-specific estimates.

Alternative 2

This alternative has the same environmental impact as Alternative 1, but provides for licensing of all open access fishery participants, which would provide for identification of fishery participants and improve the ability of managers to project fishery impacts.

Alternative 3

Alternative 3 would provide for the issuance of B and C permits and has an initial fleet size goal of either 680 or 713 vessels. B permit vessels could have 1 percent to 9 percent more B species groundfish (depending on qualification criterion) to harvest due to exclusion of previous fishery participants that had lower catch histories (**Table ES-3)**. Personal income economic impacts were nearly identical under this alternative to B species groundfish landing impacts **(**columns 7 and 6, respectively, **Table ES-4).** The small increase in fish to permitted vessels would likely have no impact on B species trip or cumulative landing limits. Moreover, non-qualifying vessels might be allowed to land small amounts of fish caught incidental to fishing for non-groundfish species, which would offset some of the potential gains to permitted vessels.

An average of 276 vessels fished for sablefish during 2004-2006, thus the issuance of 680 or 713 permits has the potential for major effort shift of vessels to the sablefish fishery. The distribution of permits between states under this alternative would change by between +6 percentage points (Washington) to -8 percentage points (California) compared to the distribution of vessels making directed fishery landings during the 2004-2006. The excluded vessels would have to increase revenues from other commercial fisheries or revenue sources by ≤2 percent, on average, to make up for lost B species revenues (**Table ES-3**). The environmental consequences of this alternative would be similar to Alternative 1 (No-action), but would provide for identification of fishery participants and improve the ability of managers to project fishery impacts.

Alternative 4

Alternative 4 would provide for B and C permits. A wide range of minimum landing criteria was developed to analyze potential fishery and personal income impacts under this alternative (**Table ES-4**). The criteria contained in this alternative would permit between 65 and 1,103 vessels **(Table ES-4).** Criterion 47.9K-3 would eliminate vessels that accounted for 64 percent of B species directed fishery revenues received during 2004-2006 (**Table ES-3).** This amount of fish would substantially increase the amount of fish available for harvest by permitted vessels with associated decreases in target species discards and potentially reduced impacts to over fished groundfish and protected species. The criteria contained in Alternative 4 would increase revenues to permitted vessels ranging from over 40 percent under four criteria, over 20 percent under six criteria and over 10 percent under nine criteria based on 2004-2006 window period landings. The other 13 criteria would effect <10 percent of B species revenues based on 2004-2006 landings.

Table ES-4 Assessment of qualification criteria impacts relative to permit program needs statement (§1.3.1)

Alternative	Criterion	Fleet size 3/	Need 1: Better match between fleet and fish? (<680 vsls)	Need 2: Added species or fishery protection?	Need 3: Regulation and effort shift relief (+) 2/	Need 5 and 6: Personal income economic impact (-) 4/	Need 7: Improved monitoring program?
1	n/a	<713	1/		0%	0%	
2	n/a	<713			0%	0%	Y
3 (a)	680v-1	680	Y		2%	2%	Y
	680v-2	468	Y		9%	8%	Y
	680v-3	680	Y		3%	3%	Y
3 (b)	713v-1	713			1%	1%	Y
	713v-2	486	Y		8%	8%	Y
	713v-3	713			2%	2%	Y
	47.9K-3	65	Y		64%	no est.	Y
	36.1K-3	95	Y		52%	no est.	Y
	21.8K-3	139	Y		41%	no est.	Y
	14.4K-3	209	Y		29%	no est.	Y
	6.1K-3	341	Y		15%	no est.	Y
	3.5K-3	474	Y		8%	8%	Y
	1.6K-3	629	Y		4%	4%	Y
	1lb-1	1,103			0%	no est.	Y
4	1 trip-1	1,103			0%	no est.	Y
	2 in 3 yrs-4	595	Y		12%	12%	Y
	100 max-5	939			0%	no est.	Y
	500 max-5	655	Y		2%	2%	Y
	1000 max-5	499	Y		6%	no est.	Y
	2000 max-5	343	Y		13%	no est.	Y
	100 lbs-1	950			0%	no est.	Y
	500 lbs-1	701			2%	1%	Y
	1000 lbs-1	577	Y		3%	3%	Y
	2000 lbs-1	420	Y		8%	8%	Y
	100 lbs-3	1,003			0%	no est.	Y
	500 lbs-3	827			1%	no est.	Y
	1000 lbs-3	727			2%	2%	Y
	2000 lbs-3	581	Y		5%	5%	Y
5	390v-1	390	Y		9%	9%	Y
	390v-2	286	Y		20%	19%	Y
	390v-3	390	Y		13%	12%	Y
6 (preferred) 5/	100 lbs-3	1,003		Y 6/	0%	no est.	Y

1/ blank means "no" 588

2/ values shown are proportions of B species revenues received during 2004-2006 by non-qualifying vessels (Table E-4b). This is the ex-vessel value of fish that potentially would have been available to qualifying vessels (through in-season regulation adjustment) if the non-qualifying vessels did not land any B species groundfish during 2004-2006. In reality, non-qualifying vessels would have been allowed to land "incidental" amounts of B species groundfish under a C permit or a nearshore permit, thus the values shown reflect a "best-case" scenario for the qualifying vessels. Port group and state specific estimates are found in Appendix E.

3/ these values are near-term fleet size expectations or number of potentially qualifying vessels.

4/ This is the same analysis described in footnote 2/ but adjusted using the economic impact factors shown in the Appendix E methods section. The economic analysis was limited to criteria that qualified between 390 and 713 vessels (see Appendix E Tables E-20 and E-22). However, the missing values in column 6 can be reasonably inferred based on revenue impacts shown in column 5. These values represent worst-case scenarios in terms of negative economic impacts of the criteria. Port and state-specific estimates are found in Appendix E.

5/ This alternative (A-6) was identified by the Council in September 2008 as its preferred alternative.

6/ The sablefish and lingcod endorsement alternatives under A-6 are, for any year during the 1998-2006 window period and separately for each species: (a) ≥1 lb, (b) ≥100 lbs, and (c) ≥500 lbs.

An average of 276 vessels fished for sablefish during 2004-2006, thus the issuance of about 400 or more permits could allow for major effort shift of permitted vessels to the sablefish fishery. The distribution of permits between states would change by between +14 percentage points (Washington and California) to negative (-)17 percentage points (Oregon) compared to the distribution of vessels that made directed fishery landings during the 2004-2006. The non-permitted vessels would need to increase revenues from other commercial fisheries by 1 percent-2 percent, on average, to make up for lost B species revenues based on 2004-2006 landings (**Table ES-3**). The environmental consequences of this alternative would be highly variable between the criteria contained in this alternative. However, all of them would provide for identification of fishery participants and improve the ability of managers to project fishery impacts.

Alternative 5

Alternative 5 provides for the issuance of B and C permits and has an initial fleet size goal of 390 vessels and a long term goals of 170 vessels. There is a previous year landing requirement under this alternative that would accelerate permit attrition. Permitted vessels would have 9 percent-20 percent more fish to harvest under this alternative based on 2004-2006 landings by vessels that would not qualify for a permit under this alternative (**Table ES-3)**. Fishery revenue and personal income impacts were similar under this alternative to B species groundfish landing impacts **(Table ES-4).** The amount of fish available to permitted vessels would likely have minimal impact to B species trip or cumulative landing limits. Non-qualifying vessels would likely be allowed to land small amounts of fish caught incidental to fishing for other species, which would offset some of the potential gains to permitted vessels.

An average of 276 vessels fished for sablefish during 2004-2006, thus the issuance of 390 permits would help in preventing effort shift to the sablefish fishery. The distribution of initial permits between states under this alternative would change by between +11 percentage points (Washington) to -12 percentage points (California) compared to the distribution of vessels making B species directed fishery landings during the 2004-2006 window period. The non-qualifying vessels under this alternative would have to increase revenues from other commercial fisheries or revenue sources by 1 percent-2 percent, on average, to make up for lost B species harvest opportunity (**Table ES-3**).

The long-term fleet size goal under this alternative could increase B species groundfish revenues for permitted vessels by 44 percent based on landings data for non-qualifying vessels under criteria 14.4K-3 and 6.1K-3 contained in Alternative 4. These latter criteria would initially permit 139 and 211 vessels, respectively (**Table ES-4**). There is no timeline for long-term fleet size goal attainment under this alternative, but the the previous year landing requirement and the prohibition on permit transfers between vessels would likely accelerate permit attrition.

The initial environmental consequences of this alternative would be similar to Alternative 1 (No-action), but substantial when the long-term fleet size goal is met due to substantially reduced fleet size. Such a large reduction in fleet size would potentially reduce the overall amount of gear required to meet landing limits thus result in reduced target species discards and protected species interactions, particularly marine mammals and seabirds. This alternative (along with Alternatives 2, 3 and 4) would provide for identification of fishery participants and improve the ability of managers to project fishery impacts.

Alternative 6 (Council Preliminary Preferred Alternative)

This alternative would qualify 1,003 vessels and disqualify 100 vessels (9 percent) that made B species directed fishery landings during 2004-2006. From 464-541 vessels would receive a sablefish endorsement and 337-674 vessels would receive a lingcod endorsement under the species endorsement alternatives contained in Alternative 6 (**Figure ES-7**).

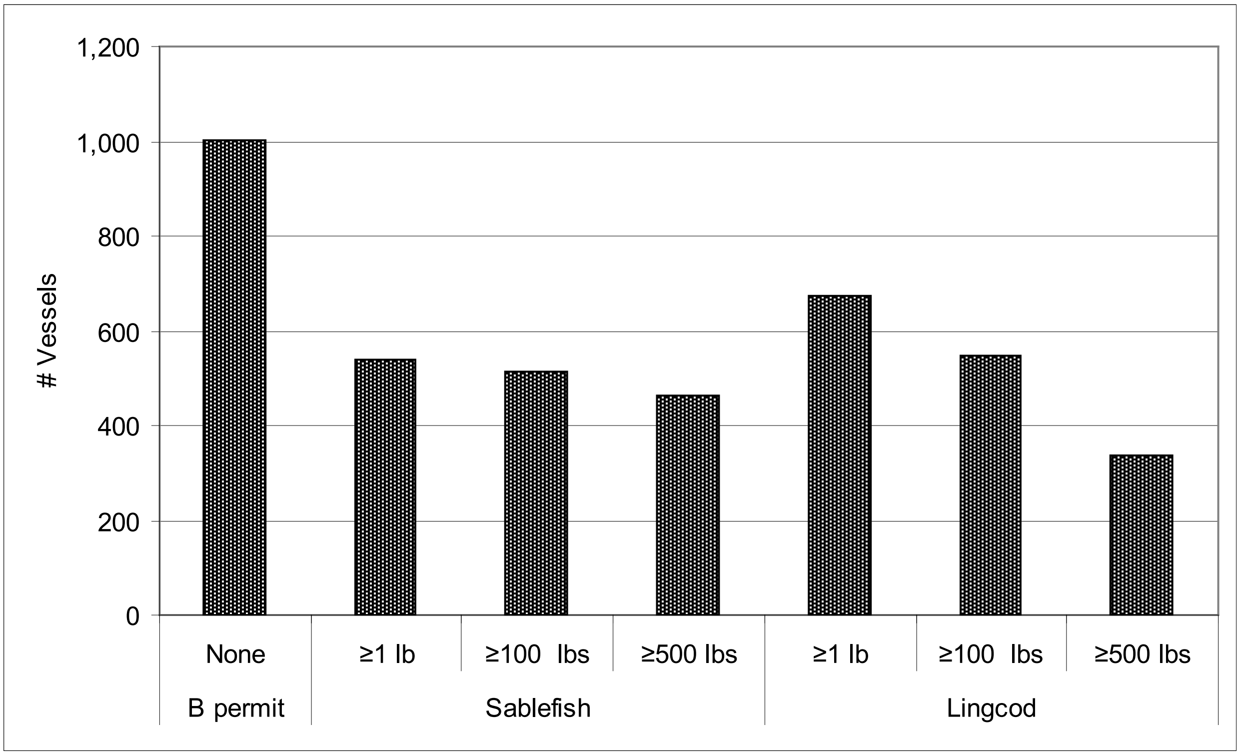

Figure ES-7 Number of vessels that would qualify for a sablefish or lingcod endorsement under Alternative 6 including number of vessels that would qualify for a B permit.

B permit vessels could have 1 percent-9 percent more B species groundfish to harvest, depending on species endorsement alternative, due to non-permitting of previous fishery participants based on 2004-2006 landings data (**Table ES-3**). The small increase in fish available to permitted vessels under this alternative would likely have no impact on B species, sablefish or lingcod trip or cumulative landing limits.

An average of 276 vessels fished for sablefish during 2004-2006, thus the issuance of 464-541 sablefish endorsements has the potential for significant effort increase in the sablefish fishery. Increased effort in the sablfish fishery could lead to further reduction in trip limits and vessel revenues. The issuance of 337-674 lingcod endorsements has the potential, depending on alternative, for effort increase in the lingcod fishery, which averaged 339 vessels during 2004-2006. Increased effort in the lingcod fishery could lead to further reduction in trip limits and vessel revenues. The non-permitted and non-species endorsed vessels would have to increase revenues from other commercial fisheries or revenue sources by 0.1 percent-1.5 percent, on average, under this alternative to make up for lost B species groundfish revenues based on 2004-2006 landings (**Table ES-3**).

A maximum of about 244 vessels would require C permits to land small amounts of B species groundfish caught incidental to fishing for non-groundfish species under this alternative. This estimate includes 54 vessels that did not appear to have a state-issued nearshore permit. Landings data for 2004-2006 show that <8 percent of total B species allocations would need to be set aside for incidental fishery landings. The comparable estimates for the northern sablefish and lingcod allocations are 3 percent and 14 percent, respectively.

The environmental consequences of this alternative would be similar to Alternative 1 (No-action), but would provide for identification of fishery participants and improve the ability of managers to project fishery impacts.

Cumulative Effects

Reduced salmon fishing opportunity during 2006-2008 adversely impacted WOC fishermen and coastal communities, particularly off California and most of Oregon in 2008 when the fishery was closed. The United States Congress authorized funds in 2007 and 2008 in an attempt to offset those loses. Some salmon fishermen likely shifted effort to other commercial fisheries in an attempt to maintain their incomes. Commercial fishery data for 2006-2008 show that fishermen revenues for Dungeness crab, highly migratory species (albacore) and nearshore groundfish were at or above average during those years (**Figure ES-8**). However, the ability of fishermen and their vessels to prosecute those other species likely varied between ports, years and individuals.

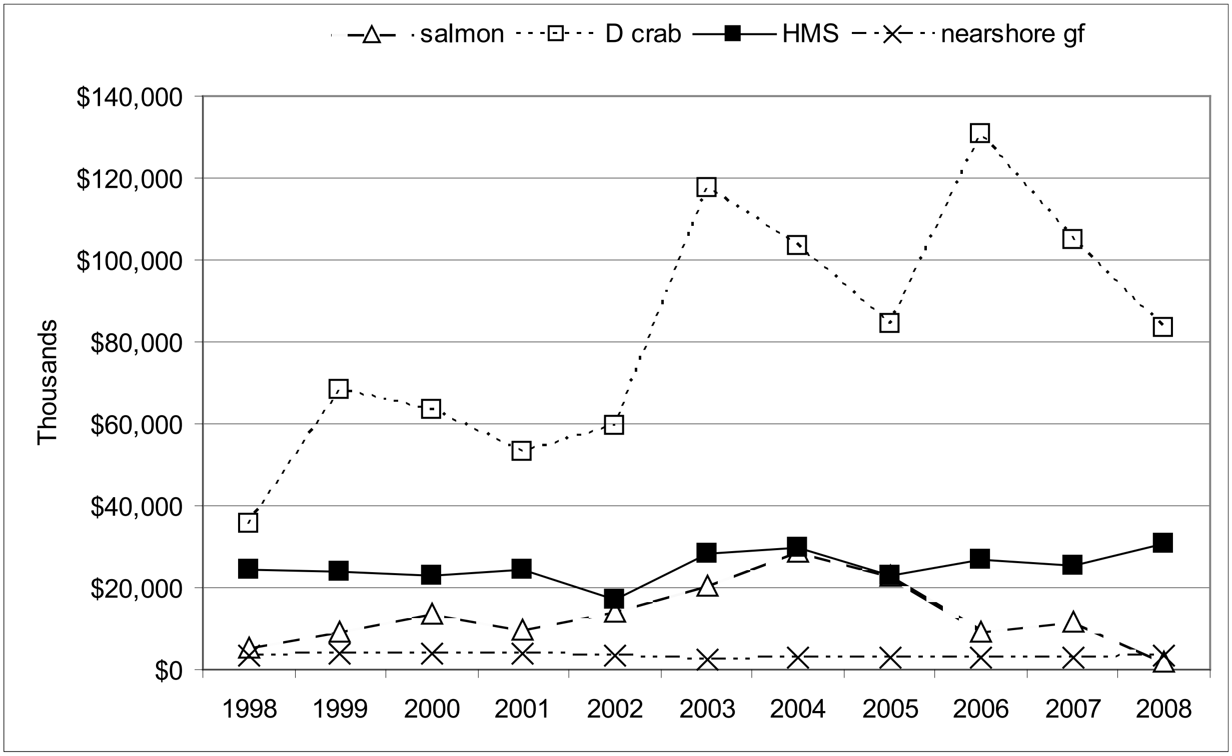

Figure ES-8: WOC fisherman revenues for species of major importance to B species directed fishery vessels, 1998-2008

Other issues identified for consideration include: (1) possible redistribution over time of permits between port groups and states, (2) program interaction with the federal VMS and observer programs, and (3) further complication of the groundfish regulatory process.

Other NEPA Issues

These will be addressed in the final EA.

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ACRONYMS

CDFG .... California Department of Fish and Game

Council .... Pacific Fishery Management Council

EC........ Enforcement Consultants

EEZ .... Exclusive economic zone

EFH .... Essential fish habitat

EIS........ Environmental Impact Statement

ESA .... Endangered Species Act

FMP .... Fishery management plan

GAP .... Groundfish Advisory Subpanel

GAC .... Groundfish Allocation Committee

GMT .... Groundfish Management Team

IAC........ Intersector Allocation Committee

LE .... Limited entry or A permit program

Magnuson-Stevens Act (MSA) .... Magnuson-Stevens Fishery Conservation and Management Act

NEPA .... National Environmental Policy Act

NMFS .... National Marine Fisheries Service

ODFW .... Oregon Department of Fish and Wildlife

OY .... Optimum yield

Plan........ Groundfish Strategic Plan

PSMFC .... Pacific States Marine Fisheries Commission

RCA .... Rockfish Conservation Area

Secretary .... United States Secretary of Commerce

SFA .... Sustainable Fisheries Act

SSC .... Scientific and Statistical Committee

USFWS .... United States Fish and Wildlife Service

VMS .... Vessel monitoring system

WOC.. Washington, Oregon, and California

WDFW ....Washington Department of Fish and Wildlife

ABBREVIATIONS AND SPECIES GROUP DEFINITIONS

Port Groups (principal ports)
NPS: North Puget Sound (Neah Bay, Port Angeles, Sequim, Port Townsend, Blaine, Bellingham Bay, Anacortes, La Conner, Friday Harbor)
SPS: South Puget Sound (Everett, Seattle, Tacoma, Olympia, Shelton)
CWA: Coastal Washington (La Push, Copalis Beach, Grays Harbor, Westport, Willapa Bay)
CLW: Columbia River, Washington (Ilwaco, Chinook)
CLO: Columbia River, Oregon (Astoria, Gearhart-Seaside, Cannon Beach)
TLA: Tillamook (Tillamook/Garibaldi, Nehalem Bay, Netarts Bay, Pacific City, Salmon River)
NPA: Newport (Depoe Bay, Siletz Bay, Newport, Waldport, Yachats)
CBA: Coos Bay Area (Winchester Bay, Charleston, Bandon, Florence)
BRA: Brookings Area (Port Orford, Gold Beach, Brookings)
CCA: Crescent City Area (Crescent City Harbor)
ERA: Eureka Area (Eureka, Fields Landing, Trinidad)
BGA: Fort Bragg Area (Fort Bragg, Albion, Point Arena)
BDA: Bodega Bay Area (Bodega Bay, Point Reyes, Tomales Bay)
SFA: San Francisco Area (San Francisco, Sausalito, Oakland, Princeton/ Half Moon Bay, Alameda, Berkeley, Richmond)
MNA: Monterey Area (Monterey, Moss Landing, Santa Cruz)
MRA: Morro Bay Area (Morro Bay, Avila)
SBA: Santa Barbara Area (Santa Barbara, Port Hueneme, Oxnard, Ventura)
LAA: Los Angeles Area (Terminal Island, San Pedro, Wilmington, Newport Beach, Dana Point, Long Beach)
SDA: San Diego Area (San Diego, Oceanside)

Species (PacFIN codes)
Crab (Dungeness, king, tanner, rock, blue, golden)
Salmon (Chinook, coho, pink, sockeye, chum)
Groundfish (see text)
Shellfish (clams, oysters, cockles, geoduck, scallops)
Shrimp (pink, ghost and mud shrimp; golden, ridgeback and spotted prawns)
HMS (highly migratory species: Dorado; blue and striped marlin; blue shark; basking shark; shortfin mako shark, bigeye, common and pelagic thresher sharks; albacore, blue, yellowfin, bigeye, skipjack tunas; swordfish)
CPS (coastal pelagic species: Pacific and round herring; chub and jack mackerel; market squid; northern anchovy; Pacific bonito; Pacific sardine)
Others (white seabass; Pacific and California halibut; yellowtail; sea urchin; sea cucumber; barracuda; non CPS squid, croakers, eels, surfperch; wahoo, hagfish, non-groundfish sharks and skates; ocean whitefish, octopus, smelt; pomfret, non-groundfish greenlings, and all others do not fit the above species groups)

Gear Types
Hkl: hook-and-line
Pot: pot or trap gear
Net: set net gear

Miscellaneous
Vsl: vessel
$$: dollars
000s or Ks: thousands
mt: metric ton(s)
lb: pound(s)

1.0 PURPOSE OF AND NEED FOR THE ACTION

The groundfish fishery in the Exclusive Economic Zone (EEZ), offshore waters between 3 and 200 nautical miles (nm), off the coasts of Washington, Oregon, and California (WOC) is managed under the Pacific Coast Groundfish Fishery Management Plan (FMP). The Pacific Coast Groundfish FMP was prepared by the Pacific Fishery Management Council (Council) under the authority of the Magnuson Fishery Conservation and Management Act (subsequently amended and renamed the Magnuson-Stevens Fishery Conservation and Management Act). The FMP has been in effect since 1982.

Actions taken to amend FMPs or to implement regulations to govern the groundfish fishery must meet the requirements of several Federal laws, regulations, and executive orders. In addition to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA), these Federal laws, regulations, and executive orders include: National Environmental Policy Act (NEPA), Regulatory Flexibility Act (RFA), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Coastal Zone Management Act (CZMA), Paperwork Reduction Act (PRA), Executive Orders (E.O.) 12866, 12898, 13132, and 13175, and the Migratory Bird Treaty Act.

NEPA regulations require that NEPA analysis documents be combined with other agency documents to reduce duplication and paperwork (40 CFR§§1506.4). Therefore, this EA will ultimately become a combined regulatory document to be used for compliance with not only NEPA, but also E.O. 12866, RFA, and other applicable laws. NEPA, E.O. 12866, and the RFA require a description of the purpose and need for the proposed action as well as a description of alternative actions that may address the problem.

- Chapter One describes the purpose and need of the proposed action.
- Chapter Two describes a reasonable range of alternative management actions that may be taken to meet the proposed need.
- Chapter Three contains a description of the socioeconomic, biological, and physical characteristics of the affected environment.
- Chapter Four examines changes in the socioeconomic, biological, and physical environments resulting from the alternative management actions.
- Chapter Five addresses consistency with the FMP and other applicable laws.
- Chapter Six is the regulatory impact review and regulatory flexibility analysis.
- Chapter Seven lists the Federal and State agencies consulted.
- Chapter Eight is a list of individuals who helped prepare this document.
- Chapter Nine provides a list of references.
- Chapter Ten contains the Finding of No Significant Impact.
- Chapter Eleven describes the groundfish fishery management terms used in the text
- Chapter Twelve contains appendices that provide additional information in support of comments or conclusions made in the text

1.1 Introduction

In 1994, NMFS implemented a limited entry program for the Pacific Coast groundfish fisheries, which created a permitting program to restrict the number of vessels allowed to directly target groundfish. The Council had discussed and developed this limited entry program as Amendment 6 to the FMP in the early 1990s. At that time, Pacific Coast fisheries as a whole were perceived as overcapitalized, meaning that fishing effort (number of vessels participating and fishing power of individual vessels) far exceeded potential Pacific Coast fish and shellfish biological yields. In the Environmental Impact Statement (EIS) for Amendment 6, the Council expressed concern that vessels looking for opportunities to expand their fishing operations would begin to enter the groundfish fishery, which had only recently converted from partial foreign harvest to complete domestic harvest. To prevent this anticipated migration to the groundfish fisheries, the Council adopted the Amendment 6 limited entry program, which essentially capped the number of groundfish fishery participants to those vessels with historic participation in the groundfish fisheries at a qualifying level

The limited entry program did not reserve all groundfish for the limited entry fleet, which allowed for the development of the open access fisheries. Amendment 6 specified that percentages of annual allowable groundfish catch that had been taken by vessels that did not qualify for limited entry permits would be set aside for an open access fishery. This fishery was left unlimited in participation to ensure that vessels participating in state-managed fisheries and landing groundfish incidentally would continue to have access to the groundfish resource. The fishery was also left unlimited to allow smaller vessels to directly target groundfish at lower landings rates than in the limited entry fishery. Since 1994, any vessel without a limited entry permit and using gear other than trawl gear has been allowed to directly target and land groundfish under open access fishery regulations and limits. Additionally, vessels using trawl gear in non-groundfish fisheries, such as shrimp and prawn fisheries, have been allowed to land groundfish taken incidentally in those fisheries under open access fishery regulations and limits (**NMFS 2003**)

Allowable groundfish landings have been declining in recent years, primarily in response to the Magnuson-Stevens Act that requires NMFS and the fishery management councils to implement measures to rebuild overfished fish stocks. As of 2007, seven groundfish species have been declared overfished and are managed under strict rebuilding guidelines. All of these species co-occur with more abundant groundfish stocks, which mean that harvest of both the overfished stocks and their more abundant co-occurring stocks has been severely restricted to protect the overfished stocks. Despite these overall harvest restrictions, participation in the open access sectors of the groundfish fisheries remains unrestricted.

The open access fishery is characterized by frequent turnover in participants and no fishery registration requirement. This complicates projection of fishery impacts on target species and non-target species such as overfished groundfish species. The large number of vessels that typically participate in the directed fishery component far exceeds the capacity of the resource to sustain harvest on a year round basis. Thus, restrictive trip and cumulative landing limits have been used to ensure year-round fisheries. Restrictive landing limits can lead to trip limit overages and high grading, which exacerbates fishery discard mortality of target and non-target species. The Council first discussed limiting entry in the directed fishery sector of the open access fishery in 1998 and resumed discussion of the issue in 2000 as a management priority under its Groundfish Strategic Plan. On April 9, 1998 the Council announced a fishery control date to notify the public of intent to consider further limiting access to certain species within the Pacific Coast groundfish complex to discourage fishers from amassing catch history for any additional limited access program (63 FR 53636, October 6, 1998). The open access fishery license limitation matter has been delayed because of higher priority groundfish issues including the need to develop and implement rebuilding plans for overfished groundfish stocks. In September 2006, the Council revived the open access permitting issue. It determined at that meeting that the resources were available to move forward with FMP Amendment 22 to convert the open access fishery to federal permit management, in part based on an offer by the California Department of Fish and Game (CDFG) and the other member states to assist in the process. At this same meeting, they set a fishery control date of September 13, 2006 to notify the public of its intent to consider open access fishery permitting (71 FR 64216, November 1, 2006).

1.2 Description of the Proposed Action

The proposed action is for the open access sector of the Pacific Coast groundfish fishery and is intended to compliment the existing limited entry or A Permit Program established under Amendment 6 to the FMP. The proposed action has two parts:

1. Conversion of the directed (target) fishery component of the open access groundfish fishery for specified groundfish species to limited entry management wherein vessels with valid registrations or permits would be allowed to directly fish for and land specified groundfish species consistent with the OYs and trip limits established for the open access sector of the Pacific Coast groundfish fishery. For Alternatives 3-6, this is called the B permit.
2. Conversion of the incidental (non-target) fishery component of the open access groundfish fishery to a registration program for all open access vessels that do not receive a directed fishery permit and that seek to retain small amounts of specified groundfish species incidental to another directed fishery consistent with the trip limits established for the incidental (C Permit) sector of the Pacific Coast groundfish fishery. For Alternatives 3-6, this is called the C permit.

1.2.1 Action Area

The open access sector of the groundfish fishery takes place in waters between 0 and 200 nautical miles (nm) off the coasts of Washington, Oregon, and California (WOC). However, federal authority for this fishery is from 3 to 200 nm, the Exclusive Economic Zone (EEZ), off of WOC. State authority is from 0 to 3 nm.

1.2.2 Scope of the Action

The proposed action relates to the open access sector of the Pacific Coast groundfish fishery and is proposed to compliment the existing limited entry or A permit program established under FMP Amendment 6. The proposed action extends to all groundfish species harvested or impacted directly or incidentally by open access fishing operations with the exception of certain nearshore species, explained in Chapter 2, Alternatives. The analysis of alternatives is proposed to focus on fishery data for open access vessels that used directed fishery gear types during the window period of April 1998 to September 2006.

1.3 Purpose of and Need for the Action

1.3.1 Need

The majority of groundfish stocks are now fully harvested by domestic fishermen in the Pacific Coast groundfish fishery (PFMC 2008) Changes in the Magnuson-Stevens Act coupled with new information indicating much lower productivity for many groundfish species has resulted in the determination that several stocks are overfished (PFMC 2008). Expectations of future productivity of several groundfish species have been lowered along with estimated OYs since the mid 1990s (PFMC 2006). The Council has determined that the groundfish fishery is overcapitalized and its Groundfish Strategic Plan (PFMC 2000) calls for more than a 50 percent reduction in fishing effort. Further, there is a general level of excess (i.e., “too much”) harvest capacity in many United States managed commercial fisheries, ranging from Northeast Atlantic monkfish to Alaska groundfish and halibut) (NMFSc 2008).

The Council and NMFS are considering bringing the open access fishery under a limited entry program to limit overall capacity directed towards groundfish. Without incorporating open access users into a limited entry program, allocation issues will become more acute and additional, more restrictive measures will be needed to prevent overharvest of stocks and increased fishery discards.

Limited entry (aka, limited or restricted access) fishery programs have been established for one or more of the following purposes: (1) to promote resource sustainability; (2) to create an orderly fishery; (3) to promote conservation among fishery participants; and (4) to maintain the long-term economic viability of fisheries (CFGC 2008). Limited entry is the most common approach for managing harvesting capacity in a fishery (NMFS 2008c). The Council managed limited entry fisheries include the non-open access groundfish fishery and the California coastal pelagic finfish fishery (see: http://www.pcouncil.org/). The states administer over 50 individual species or species/gear-based limited entry programs (**Appendix C**). It is recognized that the rules to obtain and renew a permit, to upgrade a fishing vessel and to transfer a permit to a replacement vessel need to be sufficiently restrictive to have lasting reduction in fishery capacity (NMFS 2008c). The basic problem with limited entry in other commercial fisheries has been their failure to address the common underlying management problem; i.e., they have not been sufficiently restrictive to prevent increases in excess capacity (NMFS 2008c).

The proposed action is needed because:

1. The number of vessels fishing ~~Fishing capacity~~ for federal groundfish species needs to be ~~carefully managed~~ limited to ensure that capacity and/or effort is maintained consistent with resource availability. Allowing unlimited open access to continue creates problems for tracking and monitoring the fishery and creates the potential for expansion of additional target fisheries. Closing the open access nature of the groundfish fishery and preventing additional entrants is an important step in managing fishery capacity.
2. The directed open access fishery has diverse community impacts, which may require additional protective measures for some species or fisheries in order to maintain future fishery viabilities and to allow for possible fishery expansion or redirection of effort in the event of improved species abundance and/or protective status.
3. Restrictive landing limits have been necessary for some groundfish species because of high fishing capacity. Low landing limits reduce the economic potential of the fishery to local communities, and can exacerbate fishery discards due to trip limit overages and species high grading and capacity reduction has the potential to increase fishery profits.
4. Registration of all open access fishery vessels is important to meeting fishery management goals to facilitate projecting fishery catches and discards and efficiently allocating sampling resources to collect fishery biological and economic data among ports.
5. The Pacific Coast states have management programs for their nearshore groundfish fisheries, which have likely pushed ~~unlicensed~~ vessels into federal waters, increasing fishing pressure there and reduced economic viability of affected groundfish fisheries.
6. Salmon fishing restrictions have likely resulted in effort shifts by salmon vessels to directed open access groundfish fisheries, which put added pressure on overfished groundfish stocks and reduced economic viability of affected groundfish fisheries.
7. Management measures to protect overfished groundfish species have, in recent years, included large area closures and reduced harvest limits. Enforceability of these and other management measures would be improved by managers and enforcement officials being able to identify which vessels are permitted to participate in the groundfish fisheries. It would also facilitate dissemination of fishery information including fishery regulations.

1.3.2 Purpose of the Proposed Action

The open access fishery is composed of a diversity of fishers. Some fishers participate in more than one fishery while others are solely dependent on the groundfish fishery as an income source. Some occasionally land groundfish caught incidentally with other gears such as shrimp trawl and salmon troll. Strong market incentives for groundfish (e.g., live and fresh fish markets) have encouraged participation by fixed gear/hook and line limited entry and open access fishers even though groundfish trip limits have been severely restrained. A large number of recent participants fish in nearshore fisheries for groundfish, but only land a small amount of fish on an annual basis. There is not much opportunity for the development of new fisheries given the constraints on the current fisheries to reduce bycatch of overfished stocks. The purpose of the proposed action is to:

1. Meet the Council's Strategic Plan goals of reducing capacity in the groundfish fisheries and the Council's commitment to an open access permitting program.
2. Meet the FMP's Objective #2, as revised by Amendment 18 to the FMP: Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group. Achieve a level of harvest capacity in the fishery that is diverse, stable, and profitable. This reduced capacity should lead to more effective management for many other fishery problems.
3. Ensure that federal management of the open access fisheries is compatible with state license limitation programs for nearshore and other state-managed fisheries.

1.3.3 Timeline and Responsible Entities

Conversion of the open access groundfish fishery to federal permit management has been under consideration by the PFMC and NMFS since April 1998, when the first notification of possible fishery conversion to federal permit management was published by the Council and NMFS (63 FR 53636, October 6, 1998). The notice was done to notify fishers that any future fishery landings might not be considered for limited entry program qualification. A summary of completed and proposed actions on the open access fishery permit progam initiative follows:

Step	Dates
Control date set (first) for OA fishery permit program	April 1998
Groundfish Strategic Plan recommends OA fishery permit program	October 2000
OA fishery permit program planning	January 2001-April 2002
Council discussion continues on need for OA fishery permit program in the context of other groundfish issues	November 2002-June 2006
Control date set (second) for OA fishery permit program	September 2006
Overview, scoping and Council direction for OA permit program	June 2007
Evaluation of alternatives and preparation of preliminary draft environmental assessment (EA)	June 2007-February 2008
Council meeting to review EA and amend alternatives	March 2008
Analyze amended alternatives and prepare updated draft EA	April-August 2008
Groundfish Allocation Committee meeting	July 2008
Council meeting to review updated EA and adopt preliminary preferred alternative	September 2008
Groundfish Allocation Committee meeting	January 2009
Council meeting to review updated EA and consider final adoption	March 2009
Implementation phase and initial permit issuance	April 2009-December 2010
B and C permits required	January 2011

The above timeline is sensitive to the timing of final Council action and the ability of NMFS to begin issuing permits. The requirement for possession of B and C permits would be expected to start on the first day of the year following completion of the permit issuance process, explained below. Final Council action at the March 2009 would likely allow for program implementation effective January 1, 2011.

The implementation phase and initial permit issuance items in the above table cover the following actions: (1) preparation of proposed B and C permit regulations, development of a B and C permit administrative program and process, and preparation of B and C permit application forms by NMFS-NWR, (2) submittal of the preliminary draft EA by the PFMC Executive Officer to the NMFS-NWR, (3) review by NMFS of the preliminary draft EA for content, adequacy and consistency, and (4) determination by NMFS of the significance of the proposed action relative to NEPA and other relevant federal policies. Depending on (4) NMFS would provide notice of availability of the draft EA and publish the proposed rule in the *Federal Register*, which would provide for a 30-day public comment period. Once the rule is finalized, NMFS-NWR with assistance from state management agencies would provide a public notice that details: (1) B and C permit qualification criteria, (2) identification numbers of vessels that appear to qualify for B permit issuance, (3) required fee amounts for B and C permit application processing; (4) locations where B and C permit applications can be obtained and a description of documents required to demonstrate meeting the landing requirements; (5) the deadline date for making a permit application; and (6) description of the basis for appeal requirements.

To expedite the application process, NMFS may identify potentially qualified vessels and mail a B permit application package to the vessel owners to confirm landings/participation in qualifying years. Other vessel owners who are not initially identified as qualified would be allowed to apply for a B permit. However, they would be required to provide verifiable landing documentation as specified by NMFS. The application form would require such information needed to verify vessel landings during qualifying years, current vessel owner and vessel identification. Applicants will be given six months from the time the public notice is published to submit a completed application form and a valid check or money order to cover the application fee. Late applications would not be accepted by NMFS after the deadline date and the issuance of B permits will be limited to those applications that have been received during the application period. The B permit application fee will be non-refundable. After receipt of completed application forms and supporting documents during the application period the NMFS-NWR Fisheries Permit Office will issue B permits to qualifying vessel owners.

The scope and complexity of the open access permit program will directly impact the time required to draft, revise and review the regulatory package and determine the incremental resources required by NMFS-NWR to implement the initiative. Also, NMFS anticipates that there will be a number of other high priority management initiatives requiring staff resources, including Pacific Coast groundfish trawl rationalization. To undertake these initiatives, NMFS may be required to hire additional staff which is subject to federal budgeting and personnel hiring.

1.4 Background

1.4.1 History of the Open Access Fishery

At the request of members of the Groundfish Advisory Panel (GAP), the Council appointed a diverse committee to begin studying options for limited entry in the groundfish fishery in the spring of 1987. By that summer, the Council had adopted a July 11, 1987 control date, with the intention that landings made after that date would not be used in evaluating qualification for a limited entry program. Because this control date was not published in the *Federal Register*, a subsequent control date of August 1, 1988 was adopted by the Council and published along with a date of July 11, 1984, which would serve as the beginning of the qualifying window.

Early plans for limiting entry included gear endorsements for groundfish trawl, longline and pot gears within the limited entry fishery, with a remaining open access fishery only for what were termed "exempted" gears--consisting primarily of gill net, shrimp trawl, salmon troll, and other line gears not meeting the longline definition. This collection of open access gears included some for which groundfish was caught as bycatch while targeting other species, and some for which groundfish was often the target species.

The public voiced concern regarding the potential impact of this structure on small line and pot vessels, many of whom had only recently shifted much of their effort to groundfish as a result of the depressed fishery for salmon. To address this concern, the list of gears available for use in the open access fishery was expanded to include the use of the non-trawl gears included in limited entry--pot and longline. However, an additional stipulation was added, whereby only landings of more than 500 pounds of groundfish would count towards meeting the minimum landing requirement for a limited entry permit. This transformation increased the opportunities for open access vessels to target sablefish, and some rockfish species, for which longline/pot gears were more effective than exempted gears. Although enlarging the suite of gears available for targeting groundfish--relative to the original plan--addressed many of the concerns of small-boat fishers interested in targeting groundfish, it also eventually brought traditional bycatch users into greater conflict with those targeting groundfish under the same open access allocations.

While the Council approved the limited entry program (Amendment 6 to the FMP) in 1991, it was not implemented until the 1994 fishing season. During the interim, participation in some segments of the groundfish fishery increased considerably. Some of those who expanded their ability to harvest groundfish during this period, but did not initially qualify for permits, purchased permits following the program's implementation. The vast majority did not, and either continued as part of the open access fishery, or discontinued fishing groundfish.

Implementation of a limited entry program for Pacific Coast groundfish in 1994 effectively froze participation in the limited entry fishery, but effort continued to shift in and out of the open access fishery. The commercial open access groundfish fishery consists of vessels that do not necessarily depend on revenues from the fishery as a major source of income. Many vessels that predominately fish for other species inadvertently catch and land groundfish. Or, in times and areas when fisheries for other species are not profitable, some vessels will transition into the groundfish open access fishery for short periods. The commercial open access fishery for groundfish is split between vessels targeting groundfish (*directed fishery*) and vessels targeting other species (*incidental fishery*).

Overall levels of fishing effort and catch are dependent on stock availability, which is used to establish overall harvest limits for all sectors called optimum yields (OYs). These are used to allocate between sectors, which are called harvest guidelines (HGs). In establishing OYs for Pacific Coast groundfish, an initial step is to calculate allowable biological catches (ABCs) for major stocks or management units (groups of species). ABC is the estimated maximum sustainable yield (MSY) harvest level associated with the current stock abundance. The term “overfishing” is used to denote situations where catch exceeds or is expected to exceed the ABC or maximum sustainable yield (MSY) proxy. This can also be expressed as where catch exceeds or is expected to exceed the maximum fishing mortality threshold (MFMT). The term “overfished” describes a stock whose abundance is below its overfished/rebuilding threshold, or minimum stock size threshold (MSST). Overfished/rebuilding thresholds, in general, are linked to the same productivity assumptions that determine the ABC levels (PFMC 2008).

There were indications of stock depression for bocaccio and canary rockfish in the early and mid-1990s, which resulted in the Council and NMFS taking action to reduce ABCs, OYs, and HGs (**Appendix F)**. Harvest shares by the limited entry and open access sectors have been computed based on historical landings, which have been established as fishery allocations since 1994. Between 1994 and 1997 the open access fishery HGs were reduced from over 9,000 mt to 5,600 mt (39 percent) for all species combined and from 6,300 mt to 3,900 mt (38 percent) for the rockfish (*Sebastes*) complex (**Table 1-1**). The reductions were based on conservation concerns for these and other groundfish species

Table 1-1 Open access fishery allocations by species or species complex in metric tons, 1994-2006 1/

Species (allocation)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004 2/	2005-06 2/
Lingcod (19%)	700	290	290	290	76	80	31	48	48	54	29	54
Sablefish-north (9.4%) 3/	590	463	463	463	278	423	600	537	367	542	629	627
Sablefish-Conception (HG)	425	425	425	425	425	425	425	212	229	294	276	275
Widow (3%)	250	240	240	240	158	184	128	68	26	23	8	9
Canary (12.3%)			70	90	77	71	15	5	5	3	3	3
Chilipeper (44.3%)						1,190	866	879	879	879	879	870
Bocaccio-south (44.3%) 4/	460	490	490	108	62	49	24	19	19	6	48	33
Yellowtail (8.3%) 5/	700	650	600	270	279	327	286	256	260	226	356	303
Shortspine TH (0.27%) 6/			4	4	4	3	3	2	3	3	3	27
Darkblotched (2.3%)								3	5	4	3	2
Sebastes -north (9.6%) 7/	1,360	1,130	1,080	640	651	555	253	222	203	190	179	180
Slope							10	7	10	--	--	--
Shelf							50	34	30	--	--	--
Nearshore							193	181	163	--	--	--
Sebastes -south (44.3%) 7/	4,640	4,240	4,240	3,030	2,738	455	588	414	569	621	616	676
Slope							97	164	142	--	--	--
Shelf							258	176	320	--	--	--
Nearshore							233	74	107	--	--	--
Sebastes	6,250	5,610	5,560	3,910	3,547	2,831	2,160	1,866	1,966	1,952	2,092	2,076
All species total	7,965	6,788	6,742	5,092	4,330	3,762	3,219	2,665	2,613	2,845	3,029	3,059

1/ Sources: PFMC 2002 SAFE; NMFS-NWR web site.

2/ There were no specific allocations for widow, canary, bocaccio and darkblotched in 2004-2006 and for lingcod in 2005-2006. These values were calculated based on commercial fishery OYs and open access fishery allocation proportions for comparison to earlier years.

3/ North of Conception statistical area

4/ Eureka, Monterey and Conception statistical areas

5/ Vancouver and Columbia statistical areas

6/ The shortspine thornyhead allocation was for the area north of Pt. Conception during 1994-1999 and north of the Conception statistical area in later years.

7/ The dividing line for *sebastes* north and south during 1994-1998 was the Columbia-Eureka statistical area border (43 N lat.), the yellowtail and canary HGs were apportioned between and are included in the northern and southern *Sebastes* OYs, and the bocaccio OY was included in the southern *Sebastes* OY. The *Sebastes* OYs were inclusive of all species excluding widow and chilipepper rockfish. Beginning in 1999 the dividing line between north and south was near Cape Mendocino and the two *Sebastes* categories (used in this table) were for rockfish species other than those shown in the table (i.e., other and remaining categories).

www references:

1994-2001: http://www.pcouncil.org/groundfish/gfsafe1000/tables.pdf

2002: http://www.nwr.noaa.gov/Publications/FR-Notices/2002/upload/67FR1555.pdf

2003:http://www.nwr.noaa.gov/Publications/FR-Notices/2003/upload/68FR936.pdf

2004: http://www.nwr.noaa.gov/Publications/FR-Notices/2004/upload/01-08-04_Measures04Mar-Dec_PropRule.pdf

2005-2006: http://www.nwr.noaa.gov/Publications/FR-Notices/2004/upload/69FR77012_2005-2006MgmtMeasures.pdf

Trip and cumulative landing limit management for vessels have long been used by the Council to achieve HGs. However, there were no notable changes in open access fishery landing limits as a result of HG reductions during 1994-1997 (**Table 1-2).**

Groundfish stock assessments during 1998-2001 resulted in the following stocks being declared overfished: lingcod, southern bocaccio, Pacific Ocean perch, canary rockfish, cowcod, darkblotched rockfish, widow rockfish and yelloweye rockfish. In response additional reductions were made in ABCs and HGs for these and associated groundfish species. During 1998-2006, the open access fishery HG for all species combined was reduced from 4,700 mt to 2,800 mt (40 percent) and for the rockfish complex from 3,500 mt to 1,900 mt (46 percent) (**Table 1-1; Figure 1-1**). The corresponding landing limit reductions went from 40,000 lbs of rockfish per vessel-month in 1998 to a low of 575 lbs per vessel-month depending on area in 2006, a reduction of 86 percent. Prohibition on fishery take and landing was extended to canary, cowcod and yelloweye rockfish, and the southern bocaccio landing limit could be no larger than the total shelf landing limit for an individual vessel for the entire month (**Table 1-2).**

In 2000, rockfish species management was partitioned into ecological zones base on water column depth contours wherein individual species were normally found, as follows: nearshore species, shoreline to 20 fathoms (fms); shelf rockfish, 20 fms to 100 fms and slope rockfish, >100 fms. The species within these ecological zones are discussed in subsection 3, Affected Environment. Historically, shelf rockfish was the mainstay of the open access directed fishery and included such high volume species as bocaccio, canary, chilipepper, widow, and yellowtail rockfish. Beginning in 2000 the fishery for shelf rockfish was closed during some two-month cumulative landing periods or reduced to an equivalent of 100 lbs of fish per month **(Table 1-2).**

The directed open access fishery historically targeted groundfish in the "dead" and/or "live" fish fishery using a variety of gears. The terms dead and live fish fisheries referred to the state of the fish when they were landed. The dead fish fishery was historically the most common way to land fish. Beginning in the late 1990s, the higher market value for live fish resulted in increased landings of live groundfish. Most of the fish harvested in the live fish fishery were taken in the nearshore ecosystem and included nearshore rockfish species. The states have dealt with management of their nearshore commercial fisheries in different ways, which will be discussed in subsection 3.3.3.4.2.

Fishing opportunity for *Sebastes* was greatly reduced during 1994-2006 while fishing for sablefish was relatively stable with HGs in the Monterey-Vancouver area (northern area) ranging from 278 mt in 1998 to 629 mt in 2004 and averaging 499 mt. The same was true for the Conception area, except for a precautionary commercial fishery HG adjustment in 2001. The Conception area HG ranged from 212 mt in 2001 to 425 mt during 1994-2000 and averaged 355 mt (**Table 1-1).**

Table 1-2 (page 1). Daily limits (pounds/day), trip limits (pounds/trip) and monthly-equivalent limits (pounds/month) for groundfish open access participants using open access gear by species category and year, 1994-2006 1/

Species Category	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Monthly equivalent units for *Sebastes* North and South Taken with Open Access Gear 2/													
Sebastes north (Cape Mendocino)	40,000	35,000	35,000	40,000	40,000	5,700	3,850	5,950	3,600	2,700	3,250	3,300	3,425
Canary						1,000	50	50	0	0	0	0	0
Yellowtail						2,600	100	100					
Yelloweye									0	0	0	0	0
Widow (add-on)						2,000	3,000	3,000					
POP (add-on)						100	100	100	100	100	100	100	100
Minor *Sebastes*						3,600 max							
Minor slope rockfish							250	250	300	400	450	450	375/ 625
Minor shelf rockfish							100	100	200	200	200	200	0-150
							max	max	max	max	max	max	max
Minor nearshore							250	1,000	1,500	600	600	600	600
Black and blue rf (add-on)							250	1,500	1,500	1,400	1,900	1,950 3/	1,950 3/
Sebastes south (Cape Mendocino-Pt. Conception)	40,000	40,000	40,000	40,000	40,000	10,100	3,925	6,500	6,700	1,175	1,350	1,350	1,525
Canary						1,000	50	0/50	0	0	0	0	0
Bocaccio				2,000	1,000	500	200	0/200	0/200	0	0/100	0/100	0/100
Bocaccio-set/trammel net (add-on)				4,000	2,000	1,000							
Yelloweye									0	0	0	0	0
Widow (add-on)						2,000	3,000	0/3,000					
Chilipepper						6,000	2,000	0/2,500	0/500				
Splitnose (add-on)						100	200	200	200	200	200	200	200
Cowcod							1 fish	0	0	0	0	0	0
Minor *Sebastes*						2,000 max							
Minor slope rockfish 6/							250	2,500	5,000	400	450	450	625
Minor shelf rockfish							max	max	max	max	max	max	max
Minor nearshore rockfish							275	600	0/600	200-450	0-550	0-550	0-550

Table 1-2 (page 2). Daily limits (pounds/day), trip limits (pounds/trip) and monthly-equivalent limits (pounds/month) for groundfish open access participants using open access gear by species category and year, 1994-2006 1/

Species Category	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Sebastes south (S of Pt. Conception)	40,000	40,000	40,000	40,000	40,000	10,100	3,925	6,500	6,300	6,175	6,250	6,375	6,375
Canary						1,000	50	0/50	0	0	0	0	0
Bocaccio				2,000	1,000	500	200	200	0/200	0	0/50	0/50	0/50
Bocaccio-set/trammel net (add-on)				4,000	2,000	1,000							
Yelloweye									0	0	0	0	0
Widow (add-on)						2,000	3,000	0/3,000					
Chilipepper						6,000	2,000	0/2,500	0/2,500				
Splitnose (add-on)						100	200	200	200	200	200	200	200
Cowcod							1 fish	0	0	0	0	0	0
Minor *Sebastes*						2,000 max							
Minor slope rockfish							250	2,500	5,000	5,000	5,000	5,000	5,000
Minor shelf rockfish							max	max	max	max	max	max	max
Minor nearshore rockfish							275	600	0/600	200-850	0-800	0-800	0-800
Daily Limits for Thornyheads Taken with Open Access Gear													
North (Monterey and north)	-	50	0	0	0	0	0	0	0	0	0	0	0
South (Conception)	-	50	50	50	50	50	50	50	50	50	50	50	50
Daily and Cumulative Monthly Equivalent Limits for Sablefish Taken with Open Access Gear													
Daily North (Monterey-Vancouver)	250	300	300	300	300	300	300	300	300	300	300	300	300
Monthly cumul equiv limits	7,500	9,000	9,000	1,500	900	900	1650	2,400	1,200	1,600	1,800	1,800	2,500
Daily South (Conception)	350	350	350	350	350	350	350	350	300	350	350	350	350
Monthly cumul equiv limits	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	3,600	4,200	4,200	4,200	4,200

Table 1-2 (page 3). Daily limits (pounds/day), trip limits (pounds/trip) and monthly-equivalent limits (pounds/month) for groundfish open access participants using open access gear by species category and year, 1994-2006 1/

Species Category	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Monthly Equivalent Limits for Other Groundfish Taken with Open Access Gear													
Lingcod		20,000	10,000	10,000	0-500	0/250	0/400	0/400	0/300	0/300	0/300	0/300	0/300
Dover sole						100	300	300					
Pacific sanddab (flatfish add-on)							300	300	2,700	2,700	2,700	2,700	2,700
Arrowtooth flounder						200	200	300					
Flatfish (all species)						300	300	300	300	300	300	300	300
Pacific whiting						100	100	300	300	300	300	300	300
Trip Limits for Groundfish Taken with Non-groundfish Trawl Gear													
Pink shrimp	1,500	1,500	1,500	500	500	500	500	500	500	500	500	500	500
Spot/ridgeback prawn	1,000	1,000	1,000	500	500	300	300	300	300	300	300	300	300
CA halibut/sea cucumber	500	500	500	500	500	300	300	300	300	300	300	300	300
Monthly Cumulative Limit for Yellowtail Rockfish Taken with Salmon Troll Gear 4/													
North of Cape Mendocino											200	200	200

1/ These are January-February adopted landing limits and do not reflect in-season change to keep within harvest guidelines; "max" means limit applies to all shelf species, excluding widow.

2/ Separate *Sebastes* limits were set north and south of Point Lookout OR in 1994, and north and south of Cape Mendocino, CA since 1995. In addition to being subject to cumulative landings limits, *Sebastes* north and south were subject to a 10,000 pound trip limit.

3/ An additional 500 lbs of black and blue rockfish was allowed in the area between Cape Mendocino and the CA/OR border, which is not shown in the table.

4/ 1 lb of yellowtail could landed with every 2 lbs of salmon up to the monthly limit.

www references:

1994-2001:http://www.pcouncil.org/groundfish/gfsafe0702/tbl29.pdf

2002: http://www.nwr.noaa.gov/Publications/FR-Notices/2002/upload/67FR1555.pdf

2003:http://www.nwr.noaa.gov/Publications/FR-Notices/2003/upload/68FR936.pdf

2004: http://www.nwr.noaa.gov/Publications/FR-Notices/2004/upload/01-08-04_Measures04Mar-Dec_PropRule.pdf

2005-2006: http://www.nwr.noaa.gov/Publications/FR-Notices/2004/upload/69FR77012_2005-2006MgmtMeasures.pdf

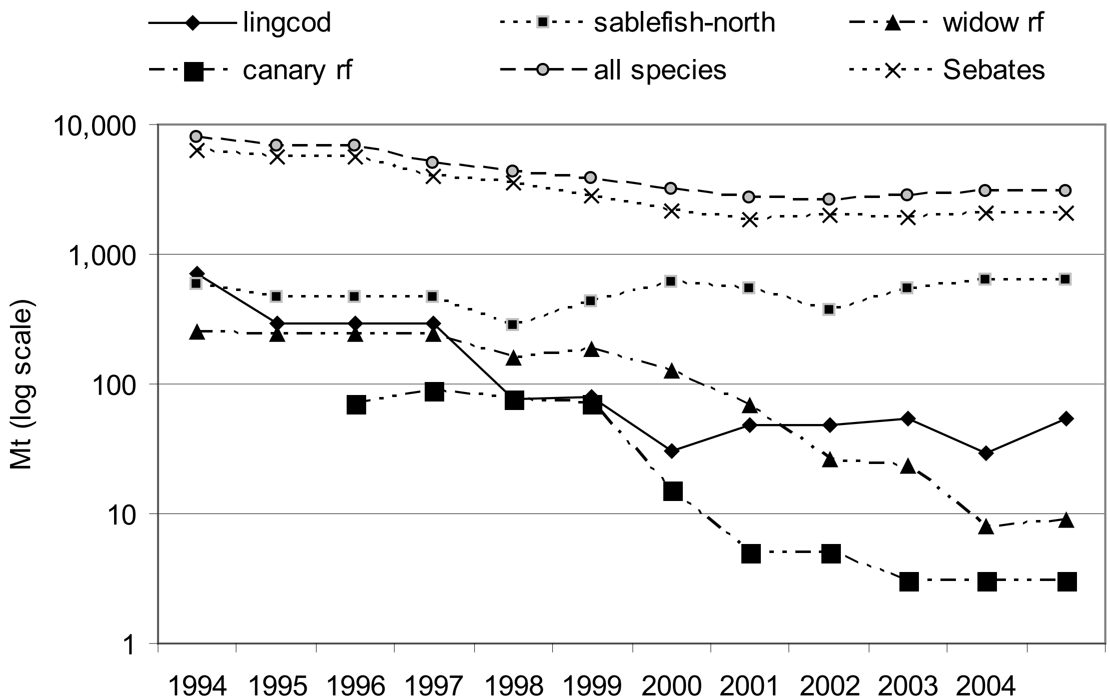

Figure 1-1 Open access fishery harvest guidelines for key groundfish stocks and in total, 1994-2006

The sablefish fishery was typically managed using a daily trip limit of 300 lbs in the northern area and 350 lbs in the Conception area. Two-month cumulative landing limits were used in both areas as a way of slowing the harvest. The monthly equivalent sablefish limits in the northern area at the start of the season ranged from 900 lbs in 1998 to 2,500 lbs for a period in 2006. The comparable limits at the start of the season in the Conception area ranged from 10,500 lbs during 1994-2001 to 4,200 lbs in 2006 (**Table 1-2).** Weekly landing limits were implemented as a way of further slowing the harvest in the northern fishery beginning in 1998 and in the Conception area in 2002

In season actions were routinely taken in both sablefish management areas to stay within HGs. The adjustments were usually made during October-December and usually involved increases in two-month or monthly cumulative landing limits. A major exception was in 2006 when action was taken to reduce the daily/once weekly/two-month cumulative landing limits in the northern area fishery of from 300 lbs/1000 lbs/5000 lbs to 300 lbs/1000 lbs/ 3000 lbs. This was done in May in anticipation of effort shift from the salmon fishery to the directed sablefish fishery because of highly restrictive salmon fishing regulations (see: http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf). However, beginning in October the directed sablefish fishery in the northern area had to be closed due to sablefish HG attainment. This was the only year since the fishery began in 1994 that the directed open access sablefish fishery had to be closed because of HG attainment. The salmon fishery had less restrictive regulations in 2007, which in combination with restrictive sablefish landing limits during summer months of 300 lbs/700 lbs/2100 lbs, may have deflected salmon fleet effort shift to the directed sablefish fishery that year because the sablefish fishery remained open all year.

Lingcod was declared over fished in 1999 and declared rebuilt in 2005. Except for large OY adjustments in 1995 and 1998, the open access fishery lingcod HG ranged from 29 mt in 2004 to 80 mt in 1999 and averaged 53 mt during 1998-2006 (**Table 1-1).** Since 1998 there have been season closures to protect spawning fish. When the season was open for lingcod since 1998 the monthly equivalent landing limit ranged from 250-500 lbs and was typically 300 lbs per vessel-month. There has been a continuing problem with lingcod HG overage ranging from 3 percent-179 percent in years since 1995 with a 41 percent average overage since 1994-**(Table 1-3).**

Landing limit management of all groundfish in the non-groundfish trawl fisheries went through three phases of landing limit reduction during 1994-2006. The first was in 1997 when the pink shrimp and prawn fishery limit were each reduced from 1,500 lbs and 1,000 lbs per month, respectively, to 500 lbs per month each, which made them the same as the California halibut and sea cucumber fishery limits. The second change was in 1999 when the prawn fishery and halibut and sea cumber limits were reduced to 300 lbs per vessel per month. In all years, the non-groundfish trawl fisheries could not land more groundfish than the target species. A yellowtail rockfish incidental landing allowance of up to 200 lbs per vessel per month was allowed in the salmon troll fishery north of Cape Mendocino beginning in 2004 (**Table 1-2).**

The Council and NMF have used a two prong approach to protecting depleted and overfished groundfish stocks: 1) reductions in ABCs and OYs of overfished stocks and associated species, as discussed above, and 2) adoption of large conservation areas wherein fishing methods or allowable gear types are regulated in order to protect particular species or species groups of fish and their habitats. Pacific Coast groundfish fisheries and fisheries that may take groundfish incidentally, are managed with a variety of closed areas intended to either minimize the bycatch of overfished groundfish species, or to protect groundfish habitat. Many of the closed areas are gear-specific, meaning that they are closed to some particular gear types, but not others. In addition, the states of Washington, Oregon and California have marine areas closed to fishing that provide addition protection to depleted groundfish stocks. The Yelloweye Rockfish Conservation Areas off the northern Washington Coast was the first large conservation area adopted by the Council to provide added protection to depleted yelloweye rockfish. This was in 1998. The next large groundfish closure areas were the southern California Cowcod Conservation Areas in 2001; followed by the coastwide Rockfish Conservation Areas in 2002, the Farallon Islands Closed Area off Central California in 2004; and the Cordell Banks Closed Area off Central California and the Stonewall Banks closure to recreational fishing off Oregon in 2005. These closed areas have differing fishery impacts depending on gear type used. **Appendix G** provides details on the regulations for the groundfish conservation areas. The effect of declining rockfish OYs, associated reductions in rockfish landing limits and the use of conservation areas to provided added protection to overfished rockfish stocks are discussed in **Section 1.4.1.**

The majority of open access fishery allocations for individual groundfish species since 1999 (when they were established separately for each species) have been for sablefish-north, chilipepper and yellowtail rockfish, bocaccio, and lingcod (**Table 1-1**). There have been major underages in attainment of HGs for chilipepper and yellowtail rockfish and bocaccio since 1999 **(Table 1-3; Figure 1-2).** These can be attributed to efforts aimed at protecting overfished groundfish species, which are explained in the previous paragraph. Efforts aimed at protecting overfished groundfish stocks have not affected fishing opportunities for lingcod and sablefish-north -based on the attainment of HGs for these species in most years since 1999 (**Table 1-3; Figure 1-2).**

Table 1-3 Open access fishery landed catches expressed at proportions of annual OYs, 1994-2006 1/

Species (allocation)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	AVG
Lingcod (19%)	0.68	1.18	1.03	1.09	1.33	1.25	1.81	1.50	1.65	1.31	2.79	1.37	1.33	1.41
Sablefish-north (9.4%) 3/	1.02	1.17	1.38	1.17	0.63	0.63	0.71	0.77	1.01	1.01	0.72	1.44	1.11	0.98
Sablefish-Conception (HG)	0.16	0.19	0.10	0.01	0.01	0.02	0.03	0.07	0.13	0.11	0.09	0.06	0.43	0.11
Widow (3%)	1.10	0.70	0.22	0.41	1.35	0.25	0.13	0.22	0.04	0.04	0.00	0.11	0.11	0.36
Canary (12.3%)			2.66	2.59	2.27	1.31	1.00	1.40	0.20	0.00	0.00	0.00	0.00	1.04
Chilipeper (44.3%)						0.09	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.02
Bocaccio-south (44.3%) 4/	0.99	0.71	0.31	0.67	1.18	0.49	0.21	0.26	0.11	0.00	0.04	0.03	0.09	0.39
Yellowtail (8.3%) 5/	1.10	0.64	0.67	1.31	1.48	0.34	0.23	0.21	0.10	0.03	0.03	0.03	0.03	0.48
Shortspine TH (0.27%) 6/			3.50	4.00	0.25	1.00	0.67	1.00	0.33	0.00	0.33	0.00	0.00	1.01
Darkblotched (2.3%)								0.00	0.20	0.00	0.33	1.00	1.50	0.51
Sebastes -north (9.6%) 7/	0.19	0.08	0.13	0.13	0.10	0.11	0.17	0.24	0.22	0.15	0.16	0.25	0.22	n/a
Slope							0.80	1.14	0.20					
Shelf							0.14	0.21	0.17					
Nearshore							0.15	0.21	0.23					
Sebastes -south (44.3%) 7/	0.23	0.23	0.18	0.20	0.23	0.57	0.29	0.41	0.31	0.25	0.25	0.19	0.21	n/a
Slope							0.09	0.15	0.42					
Shelf							0.09	0.07	0.03					
Nearshore							0.59	1.80	0.97					
Sebastes	0.26	0.22	0.17	0.20	0.26	0.25	0.17	0.18	0.13	0.10	0.09	0.09	0.09	0.17
All species total	0.35	0.32	0.29	0.33	0.28	0.29	0.27	0.31	0.28	0.30	0.25	0.39	0.35	0.31

1/ see Table 1-1 for footnotes

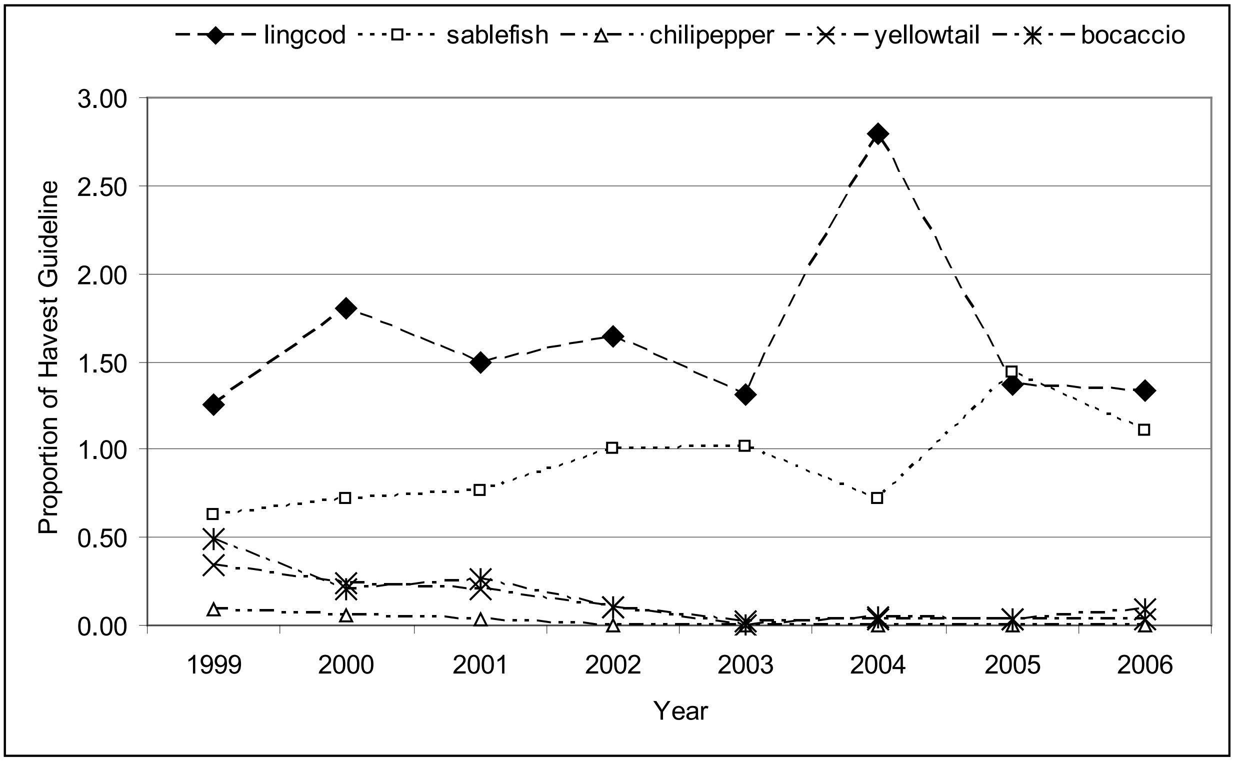

Figure 1-2 Open access fishery landings expressed as a proportion of annual harvest guidelines for lingcod, sablefish-north, chilipepper and yellowtail rockfish, and bocaccio, 1999-2006 seasons.

1.4.2 Groundfish Strategic Plan

The Council's Groundfish Strategic Plan (Plan) was adopted in 2000. The Plan noted that the groundfish resource could not support the number of vessels catching and landing groundfish, which numbered over 2,000 commercial fishers, and many thousands of recreational anglers. To bring harvest capacity in line with resource productivity, the number of vessels in most fishery sectors needed to be reduced by at least 50 percent. Fishing fleet overcapitalization was cited as a major factor in fish stock depletions and led to economic and social crises in the industry and in coastal communities. The Plan reported that

> "...allowing an open access fishery with a total absence of limits on capacity is a serious management problem. Decreased participation in non-groundfish fisheries such as salmon, improved prices for some groundfish species like sablefish, and the development of the live rockfish fishery had transformed the open access fishery from a primarily bycatch fishery with a small directed fishery component, to a much larger fishery with many more participants relying on the fishery for large portions of their annual incomes. Reducing capacity in the fishery is fundamentally necessary to reducing overfishing, minimizing bycatch and improving the economic outlook for the Pacific Coast fishing industry. Capacity reduction should not be seen as just another type of management measure. Capacity reduction must be a key element of any plan to ensure management effectiveness and economic viability of the Pacific Coast groundfish fishery. Without significant capacity reduction, the Council will continue to find it difficult, if not impossible, to achieve many of the conservation and economic objectives of the Groundfish FMP. Current capital utilization rates are quite low for all sectors of the commercial groundfish fishery."

The Council's Scientific and Statistical Committee (SSC) compared potential harvest capacity for the fish actually available for harvest in 2000 and calculated a measure of overcapitalization in several different fishery sectors which they called "current capital utilization rate." This parameter was used to describe the percentage of vessels in the current fleet that could harvest the available groundfish. They sorted vessel landings data by fishery sector for each year during 1984-1992 in descending order of total annual and cumulative groundfish landings and counted down the vessel list from the more to less productive vessels to determine the number of vessels needed each year to harvest the available groundfish. They used 1984-1992 for this comparison because vessel harvest constraints were much less restrictive in those earlier years and catches from those years seemed to be a better indicator of what vessels were able to harvest. The number of open access vessels needed to harvest the 2000 open access groundfish OY of 2,207 mt ranged from 47 to 105 boats (**Table 1-4**). Based on these results, 50 and 100 were used as lower and upper estimates of the number of open access boats needed to harvest the 2000 open access groundfish allocation. Dividing the lower and upper limits of the number of vessels needed to harvest the 2000 open access OY by 794 vessels (the number of active directed open access fishery participants in 2000) yielded an open access capital utilization rate of 6 percent-13 percent

Table 1-4. Estimates of number of open access directed fishery "highliners" needed to harvest the 2000 non-whiting groundfish OYs. Source: SSC 2000

Year	# Vessels	Cumulative Mt
1984	13	2,222
1985	25	2,218
1986	52	2,222
1987	53	2,208
1988	83	2,214
1989	83	2,212
1990	105	2,215
1991	69	2,224
1992	47	2,218

Since the SSC analysis was done the number of vessels participating in the directed open access fishery has either been higher than or about the same level as it was in 2000 (see **sections 2 and 3)**. However, the open access fishery OY for all species has substantially declined which indicates that fishery overcapitalization is even greater today than it was in 2000 (**Table 1-1)**. Updated vessel participation and harvest data are presented in **Section 3.3**.

"Excess capacity is the difference at a point in time between what a fisherman can actually produce and what could potentially be produced if all restrictions on his operation were removed. Overcapacity may be defined as the difference between the fishing firm's potential level of production (individual vessel's catch) and the target level of production (total allowable harvest) that has been established for that particular fishery" (Kirkley et al June 2002)

The Plan also recommended that the Council consider deferring management of nearshore rockfish, and other species such as cabezon, kelp greenling and California scorpionfish to the states, and that all commercial fisheries should eventually be limited through federal or state license or permit limitation programs.

1.4.3. 2008 NMFS Report to Congress

NMFS prepared an analysis of harvest capacity in 44 federally managed fisheries in 2004. They used fishery vessel landings data (rather than vessel physical data) and concluded that the West Coast limited entry groundfish fishery ranked 20th in terms of excess harvest capacity with an estimated excess capacity rate of 26 percent (meaning there was 26 percent more fleet harvest capacity than the actual landed catch). The most disparate groundfish fishery was for sablefish with an estimated excess capacity rate of 59 percent (NMFS 2008c). The open access groundfish fishery was not included in the analysis (based on the species and tonnages listed in Appendix A), but the findings support the Strategic Plan analysis that the open access directed fishery, like the limited entry fishery, has far more fishing capacity than the available resources can support.

1.4.4 Strategic Plan Implementation Oversight Committee

Following adoption of its Strategic Plan, the Council convened the Strategic Plan Oversight Committee (SPOC) to monitor the Council's progress toward the goals of the Strategic Plan. The SPOC developed a list of 15 groundfish action priorities, which included two "critical" elements (science and Council process action items) for Council consideration. The open access permitting issue was ranked seven below the two critical operational elements, buyback, trawl permit stacking (a provision to allow for the use of two or more permits to provide for increased landings by a single vessel), observers, groundfish process, and fixed gear stacking. A subcommittee of the SPOC was formed to look at open access capacity reduction issues, the Ad-Hoc Open Access Permitting Subcommittee (OAPS).

The OAPS first met in January 2001 and continued with a series of meetings through March 2002. These meetings ceased for the remainder of 2002 due to increased Council's workload on other higher priority issues. However, the Council reviewed its progress with Strategic Plan recommendations in November 2002 and decided at that point that it would begin development of an open access permitting program and drafted the associated analysis for such a program in 2003. The proposed FMP amendment was intended to meet the Strategic Plan goal of reducing capacity in the open access fisheries landing groundfish and to meet the Council's commitment to an open access permitting program. Considerable advisory body and public input was provided in response to meetings of the OAPS (subsection 1.5, Scoping Process). A summary of findings from the analysis of 1990-2001 open access groundfish fishery data provided to the OAPS is presented in Appendix A. Based on groundwork laid by the SPOC and OAPS, NMFS staff led a joint Council/NMFS working session to identify key issues and concerns that would need to be addressed in developing a plan amendment for conversion of the open access fishery to limited entry management. Based on those discussions, the NMFS staff began initial drafting of an EIS to support deliberations on the issue. The first chapter of that document was provided to the Council at its November 2003 meeting (PFMC 2003). That draft "first step" document was used in preparing this preliminary draft Environmental Assessment (EA).

1.5 Scoping Process

The Council has been conducting scoping on the issue of requiring permitting in the open access fisheries since January 2001. Both the scoping activities and public issues and concerns regarding this action that were conducted or expressed prior to the preparation of this EA are described below.

1.5.1 Council Meetings

JANUARY 2001

The Open Access Permitting Subcommittee (OAPS) of the Strategic Plan Oversight Committee (SPOC) had its first meeting via teleconference on January 18, 2001. The OAPS initially identified two fishery strategies wherein open access vessels were directly targeting groundfish: directed hook-and-line fisheries and directed setnet fisheries. Additionally, the OAPS identified the following gear types as being used to take groundfish incidentally in the open access fisheries: exempted trawl gear (non-groundfish trawl gear), salmon troll, halibut longline, non-directed setnet fisheries. The OAPS also noted that several of these fisheries are geographically distinct, which should be taken into account when developing initial permitting and allocation strategies. Finally, the OAPS recommended that the Council form a policy group to explore developing a restricted access program for the open access fisheries.

APRIL-MAY 2001

At the April 2001 Council meeting, the Council provided guidance for the SPOC on capacity reduction issues, but only briefly discussed license limitation in the open access fisheries. The OAPS met in April 2001 and the SPOC in May 2001, with both groups providing minutes to the Council at the Council's June 2001 meeting. At this meeting, the OAPS discussed setting a priority for introducing permitting for the directed fisheries for groundfish, with permitting for the incidental fisheries being a lower priority. The OAPS also reviewed Dr. James Hastie's "Analysis of Open Access Fishery," an analysis of groundfish landings data, which provides a profile of groundfish catches occurring in the open access fisheries (Hastie 2001). Following this review of Hastie's fleet profile, the OAPS composed six questions that it felt the Council should consider before embarking on a permitting program for the directed open access fisheries. OAPS recommendations from this meeting were reviewed by the SPOC at its May 2001 meeting, but the SPOC made no recommendations on this issue other than that the OAPS material should be provided to the Council and public at the June 2001 Council meeting.

JUNE 2001

At the June 2001 Council meeting, the Council discussed the results of the meetings of the OAPS and the SPOC and the various priority actions in the Strategic Plan. During Council discussions, members of the Council recommended that the Council proceed first with developing a directed groundfish permit for those vessels currently in the open access fisheries that target groundfish directly, and then look at fisheries that take groundfish incidentally. Council members further commented that one of the most important issues in considering a license limitation program for the open access fisheries is allocation between the different fisheries. There was some concern from Council members that this program might take too much time in an already overburdened schedule. The Council's Groundfish Advisory Subpanel (GAP) also commented on this issue at this meeting, noting that limiting access in the open access fisheries will take a lot of time and effort and that the states are already proceeding with license limitation in their nearshore fisheries. However, both of the open access fishery representatives on the GAP were in favor of proceeding with license limitation for the open access fisheries.

JULY-AUGUST 2001
The OAPS met on July 31, 2001 to discuss the Council's recommendations from their June meeting. At that meeting, the OAPS reviewed Dr. Hastie's analysis of historical fishing activities within the open access fleets, discussed whether the states could help with developing this program by providing state-level profiles of their open access fisheries, discussed whether it would be more or less complicated to include fisheries that incidentally take groundfish in the whole-fleet profile, discussed whether the program should include an allocation between directed and incidental open access groundfish fisheries, and provided outlines of nearshore groundfish management off each of the three states. The SPOC met on August 30, 2001, and discussed all of the Strategic Plan's priorities, including license limitation in the open access fisheries and the July OAPS meeting. The SPOC made the following recommendations for the Council's consideration at its September meeting: Council staff's Executive Director to provide a report on funds available for Strategic Plan implementation at the Council's October/November meeting; a meeting of the OAPS should be held after the October/November meeting; Dr. Hastie should continue development of a historical analysis of participation and catch in open access fisheries; the SPOC will re-consider whether to develop an incidental groundfish permit (for nontargeting open access fisheries) after the historical analysis is complete.

SEPTEMBER 2001
The Council discussed the results of the OAPS and SPOC meetings held over the summer, but did not address open access license limitation beyond recommending that the OAPS hold another meeting after the October/November Council meeting. The Council's GAP commented only that work on this issue should be delayed until after the October/November Council meeting.

JANUARY 2002
The OAPS met January 30-31, 2002 and reviewed the FMP's goals for the original limited entry fishery, modifying it for license limitation in the open access fisheries so that it reads, "The primary objective of the limited entry program will be to match harvest capacity in the Pacific Coast groundfish fishery with the productivity of the resource." The OAPS also detailed objectives for a new license limitation program: to allow sustainable prosecution of fisheries for non-groundfish species without groundfish waste; and to set qualification criteria for a license limitation program high enough to reduce the number of vessels being licensed, then to bring both the current open access harvest allocations and the newly licensed vessels into the limited entry program. The OAPS also provided further data requests to NOAA Fisheries analysts for dividing historical open access landings data by fishery, geographic area, and gear type.

MARCH 2002
At its March 2002 meeting, the Council discussed Strategic Plan implementation, including license limitation in the open access fisheries. The OAPS report to the March Council meeting was intended to be a draft report, with the final available at the April 2002 Council meeting.

APRIL 2002
During its April 2002 meeting, the Council again discussed Strategic Plan implementation, with a more full report from the OAPS January meeting. At this meeting, a Council member recommended including a qualification criteria option proposed by a member of the public: that open access vessels be allowed to join the limited entry fishery based on landings made by gears other than the three limited entry gears (trawl, fishpot, longline) during the limited entry qualifying period of 1984-1988. At this meeting, the GAP commented only that the issues and alternatives associated with open access license limitation had not been fleshed out well enough for a comprehensive analysis on the effects of a new license limitation program.

NOVEMBER 2002
At its November 2002 meeting, the second anniversary of the Council's adoption of the Strategic Plan, the Council reviewed all of its Strategic Plan priorities. On the issue of open access license limitation, the Council recommended that an open access permitting development team meet to develop options for a moratorium permit for directed open access groundfish fisheries. Permits would be based on minimum historic participation, non-transferable, renewable, interim until a formal limited entry program were developed. At this meeting, the Council's Groundfish Management Team (GMT) commented that converting the directed open access fishery to a limited entry fishery has been a priority of the GMT for many years; however, the GMT also noted that there were ongoing state efforts to limit commercial groundfish fisheries participation. With state license limitation programs in place, only groundfish occurring outside of the three-mile state boundary, primarily sablefish and southern slope rockfish, would remain directed open access fisheries. Finally, the GMT noted that converting open access vessels to a permitted fleet would offer other management benefits, particularly because it would allow managers and enforcement agencies to better identify fleet participants for vessel monitoring system and observer program coverage. The GAP noted the state license limitation efforts could reduce open access directed groundfish fisheries participation coastwide and recommended that the Council continue regular meetings of its OAPS.

MARCH 2003
No discussion of OA permitting (except under workload priorities). (http://www.pcouncil.org/minutes/2003/0303min.pdf).

SEPTEMBER 2003
Under agendum B.7.c. Council Member Robinson reported he will have comments on open access at the November meeting. Council Member Vojkovich noted resolving the open access problem is imperative in CA. Dr. McIsaac said this item is moving up in the priorities and suggested taking the open access agenda item update and turning it into a planning session. (http://www.pcouncil.org/minutes/2003/0903min.pdf).

NOVEMBER 2003
Agendum D.15 addressed Open Access Limitation Discussion and Planning. Council staff presented the overview. Council Member Brown noted we still need to define the "directed" open access fishery. Council Member Vojkovich suggested working on the issue over the winter and to have a phone call in January (agendum I.4.). NMFS staff presented an initial start at a NEPA document (see: http://www.pcouncil.org/bb/2003/1103/exd15.pdf). Open Access Limitation update was proposed for April and June 2004 meetings (http://www.pcouncil.org/bb/2003/1103/exi4.pdf). Council members expressed concern about continuation of unrestricted participation in the open access fishery and displacement of open access effort onto the shelf with implementation of the state nearshore limited entry system. There are several ways to approach the problem. One would be to move forward with a moratorium permit. It was also agreed it was premature to discuss a new control date at this point and the issue needed to be addressed in terms of staff workload.

APRIL 2004
The Council discussed elevating the OA permitting issue but noted there were still other high priority issues to deal with, such as inseason management policies

SEPTEMBER 2004
Under B.8.d. Council Member Vojkovich asked if NMFS policy for handling fishing capacity had funds with it to support the OA permitting initiative. It is noted under C.11.d that identification of open access vessels is not possible in the VMS system. (http://www.pcouncil.org/minutes/2004/0904min.pdf).

APRIL 2005
The Council discussed whether the open access VMS requirement would reasonably address the need for permitting the OA fisheries. It was noted that most vessels that target groundfish operate in state waters which would be exempt from the VMS requirement. The Council considered adopting a control date for the longline spiny dogfish fishery which led to a discussion about the overall need for OA fishery permitting.

SEPTEMBER 2005
Motion was passed to look at fishery impacts from expanded fishing on spiny dogfish by longliners under open access landing limits. Support was expressed to find time to work on OA permitting.

NOVEMBER 2005
The Council discussion regarding regulatory streamlining led to OA permitting issues and that it may be useful to begin documenting the steps that would be involved and develop a concrete plan, which would be like the groundfish harvest specifications planning schedule, but more fleshed out. Thus it could be a candidate for this regulatory streamlining exercise. The Council also discussed OA permitting in the context of groundfish work planning, bycatch reduction and the need to identify OA vessels and estimate their catches.

MARCH 2006
OA Permitting suggested for June 2006 meeting. http://www.pcouncil.org/bb/2006/0306/agb5a_supp_att1.pdf

APRIL 2006
OA Permitting issue moved from June to September 2006 meeting: http://www.pcouncil.org/bb/2006/0406/agb5a_supp_att1.pdf

JUNE 2006
Council member Moore stated that the open access limitation issue needs to be done to be able to complete trawl individual quota and intersector allocation issues.

SEPTEMBER 2006
The Council and NMFS discussed the effectiveness of the November 1999 open access permitting control date. Legal Council noted that control dates are public notices of possible Council action and have no regulatory effect. Also, control dates do not preclude the use of earlier catch histories for issuing permits. The Council moved to set a new control date of September 13, 2006 to give people notice that landings after that date may not apply to catch history used to qualify for an OA limited entry permit. Council member Vojkovich, California, offered staff to undertake the plan amendment analysis and paperwork because a full-time Council member staff position would be needed to do the work. The GMT reported that they are in favor of reducing the size of the OA fleet and that a federal permit is recommended. The GAP prioritized open access limitation behind trawl individual quotas, intersector allocation and Amendment 15. The Enforcement Consultants (EC) reported that VMS will not identify all open access participants because VMS only applies in federal waters. The Council members expressed a wish for a simple program but noted public input will likely be substantial which could complicate the matter. The Council expressed support to get the process started in 2007. NMFS noted the observer program would be more effective with all sectors under a federal permit. Legal Council noted a NEPA analysis would be required, but it may not need to be an environmental impact statement.

MARCH 2007
Open Access Limitation issue tentatively placed on June 2007 agenda, described as “Next Steps.” (http://www.pcouncil.org/bb/2007/0307/Ag_D1.pdf).

APRIL 2007
CDFG Report (Agendum C.1.a, supplemental CDFG report) submitted requesting June 2007 agenda item for Open Access Permitting. Issue is on June 2007 agenda for "Direct Development of Alternatives." (http://www.pcouncil.org/bb/2007/0407/C.1a_CDFG_sup.pdf).

JUNE 2007
The Council and NMFS heard a CDFG report on the status of open access fisheries and recommendations for the implementation of B and C permit programs for directed and incidental fisheries, respectively (http://www.pcouncil.org/bb/2007/bb0607.html#groundfish0. A menu of permitting alternatives was recommended, each of which required differing degrees of directed fishery fleet size reduction (Agenda Item E.4.a, Attachment 2). The recommendations were based on a combination of sources including an open access fishery capacity analysis produced by the Economic Subcommittee of the Council's SSC (PFMC 2000), public scoping at Council meetings since 1998, input from Council advisory committees, and member states' and NMFS input at those same meetings. NMFS reported that the proposed Purpose and Need statement for the initiative appeared to be adequate, and that an Environmental Assessment should be the appropriate NEPA path for regulation adoption. The Council received advisory body and public input at the meeting and expanded upon the range of alternatives for further analysis. The Council adopted an FMP amendment schedule with a 2009-2010 management cycle target implementation date (Agenda Item E.4.a, Attachment 1), the CDFG recommendations menu, three additional fleet size alternatives (including a GAP socio-economic recommendation), and a provision for less restrictive permit transfer conditions. (http://www.pcouncil.org/decisions/currentdec.html#groundfish).

SEPTEMBER 2007
Further action on open access permitting was postponed from the November 2007 Council meeting agenda until 2008 because of Council workload.

MARCH 2008
The Council received input on a preliminary draft environmental assessment that described and analyzed the Council's June 2007 alternatives. Advisory body comments were generally incorporated into instructions to the report writing team to use in improving the next document for consideration at the September 2008 meeting. The Council directed the writing team to remove previous Alternative 5 (the permit consolidation alternative) and to include some additional management considerations, including a 2006 fleet size goal alternative, additional minimum landing or participation standards, a no permit transfer provision, and a state landing endorsement option. The Council also directed removal of the gear or vessel length endorsement option from further consideration (see **Section 2.7** for explanation).

JULY 2008
The Groundfish Allocation Committee met to receive a preliminary report of the updated EA that was proposed to be presentation at the September 2008 meeting. The GAC voted to narrow the range of qualification criteria for consideration in the final action on this initiative, which was anticipated to occur at the March 2009 meeting.

SEPTEMBER 2008
The updated Environmental Assessment presented at this meeting included Council and NMFS directions from the March 2008 Council meeting and Groundfish Advisory Committee recommendations from its July 2008 meeting. The Council considered final action at this meeting but decided to develop a preliminary preferred alternative (Alternative 6) for issuance of B permits and defer final action until March 2009. The delayed action would likely mean permit program implementation would not be possible until the 2010 season. A-6 used Qualification Framework 3 (2004-06 activity) with a minimum landing criterion of 100 lbs of B species groundfish; allow for B permit transferability after the first

program year; and allow for alternate use of B and A (limited entry) groundfish permits from single vessels between cumulative landing periods. They also adopted six species endorsement alternatives, three each for sablefish and lingcod, as follows: 1lb, 100 lbs, and 500 lbs, maximum landing separately for each species in any year during the window period of April 1998-September 2006. The species landing endorsements would be used to provide added protection to those species, which together accounted for nearly 88 percent of the community economic impact of the B species directed fishery during 2004-2006.

JANUARY 2009
The Groundfish Allocation Committee (GAC) met and recommended added wording to the EA on the need for limited entry management of the open access fishery and directed staff to analyze an additional B permit qualification alternative aimed a balancing fleet composition based on vessel target species strategy. Tenative approval was given to the preliminary preferred alternative from the September 2008 meeting with specific recommendations for species endorsement criteria. The GAC discussed the difficulty of tracking species endorsements if they were allowed to be severed from the main permit.

1.5.2 Public Comments from Council Meetings

APRIL - MAY 2001
The Council held a discussion and public comment session at its April 2001 meeting for the activities of the SPOC, which included discussions of license limitation for the open access fisheries. Public comment during that session included: an offer by a non-profit organization to create a fleet effort profile of where fishing activities take place; concern expressed that reduction of the groundfish fleet as a whole would require allocation between different users; observation that, under the Strategic Plan, all sectors of the fleet are to be reduced by 50 percent; comment that Council's current advisory committee structure might not be the most useful for moving the Council forward through SPOC priorities. Public comment at the May 2001 SPOC meeting was limited to a request that OAPS materials be provided to the Council's advisory bodies and the public prior to the June Council meeting.

JUNE 2001
During the public comment session at the Council's June 2001 meeting, public comment addressed open access fisheries license limitation: participation in the open access fisheries be not merely capped, but be reduced by 50 percent, as recommended in the Strategic Plan; if effort is only capped in the open access fisheries, not reduced, groundfish trip limits will remain at such low levels that groundfish will not provide reasonable income levels for participants; people come and go in open access fisheries all the time, many part-timers get involved who then fail; a license limitation program will be politically challenging for the Council and the fishing communities, but it is essential nevertheless; permits should be issued to vessels, rather than to persons as is done in the California nearshore plan; qualification criteria should be sufficiently high enough to cut the fleet down to about 300-350 boats, with consideration for the years before the control date, 1994-1999, perhaps some combination of annual or cumulative landings levels along with participation in at least 4 out of 6 years, or similar; salmon fishermen do encounter groundfish and they would like to continue to have access to groundfish, regardless of how the open access license limitation program comes out, perhaps by limiting groundfish take by allowing so many pounds of groundfish per pounds of salmon taken.

JULY-AUGUST 2001
Public comment at the OPAS meeting in July 2001: Concern was expressed about 1) providing for a directed groundfish fishery 2) allocation of open access groundfish between the directed and incidental sectors which could result in lower landings limits and in increased discards, and 3) permitting of vessels with small catch histories. Members of the public attending the August 2001 SPOC meeting did not comment on the open access license limitation issues.

SEPTEMBER 2001 - MARCH 2002

At the September 2001 Council meeting, the public did not have specific recommendations on license limitation in the open access fishery, although there were comments on other aspects of the Strategic Plan. Similarly, the public did not specifically provide comments on open access license limitation at the March Council meeting, except that one commenter expressed disappointment that capacity reduction issues seem to be falling lower and lower on the Council's priority list.

APRIL 2002

Public comments at the April 2002 Council meeting on license limitation for the open access fisheries: 1) knowing the time it took to implement the original limited entry permit program, it doesn't seem possible to implement a new license limitation program for another five years; 2) if there's going to be a new license limitation program for the boats now in the open access fisheries, all of the fish allocated to the open access fisheries with the original limited entry program should be shifted to the limited entry fisheries; 3) failing to eliminate the open access fishery in 1994 was a mistake and fixing it with another limited entry program would be a bigger mistake; 4) the Council should consider the option of closing the directed portion of the open access fleet by 2004, allocating the necessary portion of the open access quota to the open access incidental fisheries and redistribute the remainder of the open access quota to the existing limited entry fleet and recreational fisheries; 5) he alternative of eliminating the directed open access fleet altogether would be an FMP amendment that would allow vessels using gears other than the three limited entry gears to purchase a limited entry permit and convert that permit's gear endorsement to their non-limited entry gear, additionally; 6) new "A" permits should be issued to groundfish directed fishing vessels that met the original limited entry qualifying criteria during the qualifying period with gear other than the three limited entry gears; finally, 7) the goals and objectives that you've set for yourself cannot be met with limited entry programs and trip limit management alone.

NOVEMBER 2002

At the November 2002 Council meeting, the public did not have specific recommendations on license limitation in the open access fishery, although there were comments on other aspects of the Strategic Plan.

JUNE 2005

Public comment was made during Public Comment that the time is right to revisit the open access permitting issue**.**

JUNE 2007

Public comments were received on the CDFG recommendations for open access permitting alternatives: Need to protect "drop-in" fishermen; Support initiative, but no big fleet size reduction is necessary, reductions will adversely affect communities, cap fishery at reasonable number; Industry should have prepared document not biologists, support GAP statement, not possible to match capacity with resource because resource abundance is not known; add one meeting to adoption process and move issue forward, allow A boats to use B permits; B permits will result in ports w/o fishermen, permits should be assigned to ports; No need for permits, more fish than you think, give 20-yr fishermen permits; Give permits to all vessels since 1994, make permits non-transferable and give property rights based on historic catches.

MARCH 2008

Public comments were received on the preliminary draft environmental assessment that the Council received at this meeting. There was some discussion about the pros and cons on moving directly to individual transferrable quotas for the OA fleet. There was one suggestion to move lingcod into state nearshore permits and the comment made that the B fleet must never be added to the A fleet.

JULY 2008
The Groundfish Advisory Committee advisors generally supported: (i) a fleet size of around 400 vessels, (ii) allowance for B permit transferability, (iii) a recent year fishery participation requirement (like QF-3), (iv) allowance for alternate use of A and B permits on vessels in the same year (using declaration process), (v) elimination of state landing endorsement provision, and (vi) length endorsement for B permits.

SEPTEMBER 2008
Public comments were supportive of delaying final action until March 2009; allowing full transferability of B permits; providing special attention to small, local fleets, and to consider take and landing endorsement for sablefish. Several fishermen asked that landings since September 2006 be considered for B permit consideration.

JANUARY 2009
Public comment at the Groundfish Advisory Committee AC meeting included several statements asking for "meaningful action" to limit the open access fishery.

1.5.3 State Meetings

CALIFORNIA
The California Department of Fish and Game (CDFG) held four small focus group meetings in July and August 2007 to discuss the federal open access permitting process and get a better understanding of the needs and perspectives of California fishermen. The concerns were very similar among the groups. Several individuals wanted the catch history to go the individual instead of the vessel because state permits are issued to the individual as opposed to the vessel. Many individuals preferred status quo management without any changes to the current fishery, but if changes had to be made they preferred capping the fleet size at the current level and any qualifying criteria be set low enough to allow most participants to qualify. Other individuals felt that the sablefish fishery should be permitted and other species left alone.

OREGON
Oregon held three public meetings in September of 2007 and one in October at which the possibility of an Open Access limitation program was mentioned however specific details and alternatives were not discussed at any length. Oregon will conduct meetings prior to final action to inform and receive public input about the Open Access limitation program.

WASHINGTON
Washington held a public meeting on January 9, 2008. The primary purpose of the meeting was to review the options and process being considered by the Pacific Fishery Management Council (PFMC) for converting the open access groundfish fishery to a federal limited entry permitted fishery.

1.6 Related NEPA Analyses

Other recent NEPA documents prepared for the Pacific Coast groundfish fishery provide detailed information pertaining to the open access groundfish fishery. These NEPA documents are listed below. Rather than repeat information detailed in the other NEPA documents, the information has been summarized in this document and the reader is referred to the appropriate sections in the other NEPA documents for further detail.

- Expanded Coverage of the Program to Monitor Time-Area Closures in the Pacific Coast Groundfish Fishery, Final Environmental Assessment (NMFS 2006)

- The Pacific Coast Groundfish Fishery Management Plan, Essential Fish Habitat Designation and Minimization of Adverse Impacts, Final Environmental Impact Statement (NMFS 2005)

- Proposed Acceptable Biological Catch and Optimum Yield Specifications and Management Measures for the 2007-2008 Pacific Coast Groundfish Fishery and Amendment 16-4: Rebuilding Plans for Seven Depleted Pacific Coast Groundfish Species; Final Environmental Impact Statement Including Regulatory Impact Review and Initial Regulatory Flexibility Analysis (PFMC and NMFS 2006)

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section details the alternatives analyzed in subsections 2.1 [Alternative 1 (No-action)] through subsection 2.6 (Alternative 6) and describes those that were rejected from further analysis in subsection 2.7 (Alternatives Considered but Rejected for Further Analysis). *While each alternative reads as a complete program option, the components of each alternative could potentially be mixed and matched to create an open access licensing program.*

The key issues to be considered in the alternatives for permit management of the open access fishery include: (1) limitation on the number of fishery participants in the directed open access fishery and (2) registration of all other open access fishery participants. Limiting the number of vessels in the directed fishery is important for stabilizing harvest opportunity in the permitted fleet and to prevent fishing effort increases during times of increased groundfish availability or demand. Registration of all open access fishery participants is important for projecting fishery impacts and providing for year-round fishing opportunity. Alternative 1 would maintain current management of the open access fishery. Alternative 2 considers a licensing system for all open access fishery participants but does not limit participation. Alternatives 3 through 6 consider a limited entry program with a B permit program for the directed fishery participants and a C permit program for vessel owners that do not qualify for a B permit and that may want to retain small amounts of B species groundfish caught incidentally to fishing operations for non-federal groundfish species or nearshore groundfish, which are not part of the proposed B permit program, as explained below. Basic conditions and assumptions regarding issuance and application of B and C permits are explained in **Table 2-1a**. The proposed application, issuance and transfer conditions for B and C permits appear in **Tables 2-1b and 2-1c.**

A directed open access fishery landing is defined for analytical and permit qualification purposes as one in which directed fishery gear (non-salmon hook and line, fishpot, and setnet) was used and specified groundfish revenue was >50 percent of the total revenue from all fishery products on the same trip as recorded in the PacFIN data base of the Pacific States Marine Fisheries Commission. Landings data were used as a proxy for actual fisherman harvest strategy. This definition is consistent with previous open access fishery studies (**Goen and Hastie 2002; Burden 2005**) but is not the same as the approach used by the Council's Intersector Allocation Committee (IAC). The IAC uses weight of fish in the landing rather than revenue as the metric for defining a directed open access fishery landing. The IAC also uses different criteria for assigning landings to the Limited Entry and open access sectors (**John DeVore 2007**). Open access fishery data were analyzed to compare the weight and revenue based approaches for defining directed fishery landings. The weight-based and revenue-based approaches produced nearly identical results for all B permit groundfish species except for sharks and rays in the California setnet fishery. The latter are relatively high volume, low ex-vessel price groundfish species (**Appendix B).** Based on that analysis, the work group concluded that a revenue-based criterion is appropriate for the purpose of the current document and should not compromise the findings and recommendations of the IAC.

As discussed above in subsection 1.5, Scoping Process, the Council has a long history of evaluating excess capacity in the open access fisheries and making recommendations on the levels of capacity that might be suitable to ensure that ongoing vessel participation levels in the fishery are more compatible with available harvest. Alternatives 3 through 6 collectively consider a window period of April 9, 1998—September 13, 2006[2] for permit qualification, as approved by the Council at its June 2007 meeting. These

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years were chosen because April 9, 1998 was the initial open access fishery control date (63 FR 53637, October 6, 1998) and September 13, 2006 was the second ans most recent control date (71 FR 64216, November 1, 2006).

Table 2-1a. Basic conditions and assumptions of B and C permit programs for harvesting open access fishery groundfish allocations

1) The B permit program is intended to better match fleet capacity with resource availability.
2) B permits will apply to the directed taking and landing of all federal groundfish not including (i) nearshore rockfish, cabezon, kelp greenling and California scorpionfish (nearshore groundfish, which are protected under state regulations) and (ii) for non-endorsed vessels, species for which a species endorsement may be required. B permits also apply to the taking and possession of small amounts of any B species groundfish for which a species endorsement may be required.
3) A directed open access fishery landing is defined for data analysis and permit issuance purposes as one in which >50% of the total revenue was of B species groundfish, and directed fishery gear was used. 1/ All other landings of B species groundfish are treated as incidental fishery landings. Only landings of B species of groundfish during April 1998 - September 2006 will be considered for permit issuance. 2/
4) State nearshore permits may not be used in lieu of obtaining a B permit to take B species groundfish.
5) A C permit must be registered to a vessel to land small amounts of federal groundfish taken incidental to fishing for non-groundfish species. A vessel registered to an A or B permit or a state-issued nearshore permit is exempt from the C permit requirement.
6) Valid A, B or C permits or state-issued nearshore permits will be required when fishing for, possessing and landing permitted species in U.S. waters off the coasts of Washington, Oregon and California (3-200 miles from shore). The expectation is that the states will apply the same requirement to vessels fishing inside 3 miles.
7) B and C permit landing limits will be set based upon attainment of open access fishery allocations, harvest guidelines, and overfished species rebuilding objectives. C permit and non-endorsed B permit vessel landing limits may take into account target species landings (nearshore, non-endorsed B species groundfish, and non-groundfish species) with the aim of preventing directed fishing for B species groundfish by C permit vessels and endorsed species by non-endorsed B permit vessels.
8) State regulations will continue to conform to federal regulations.

1/ For this report, directed fishery gear types were limited to non-salmon hook and line, fishpot and setnet. All other gear types (used by non-A permit vessels) were treated as incidental fishery gear types. For fishery management purposes, it is assumed that separate trip limits will be established for (1) B and C permit vessels, (2) vessels with and without species endorsements and (3) directed fishery and incidental fishery gear types.

2/ April 1998-September 2006 is inclusive of the two open access fishery permit program control dates.

[2] Throughout this document "window period" means April 9, 1998-September 13, 2006; 2004-2006 window period years means January 1, 2004-September 13, 2006. The window period is inclusive of the two open access fishery license limitation control dates.

Table 2-1b Proposed B permit application, issuance, renewal, and transfer conditions 1/ 2/

1) NMFS will make a reasonable effort to contact current owners of vessels that are projected to be eligible for initial permit issuance. This may include, but not limited to, a notification letter to owners of vessels that appear to meet B permit qualification criteria. NMFS will rely on the states to provide vessel owner addresses. The PacFin data base will be used to determine which vessels meet program qualification criteria for the B permit and any species endorsements that may be assigned to the permit 3/
2) Owners of vessels that meet permit program qualification criteria and that submit required fees and any documentaion deemed necessary by NMFS by the deadline date will be eligible to receive program permits.
3) Appropriate government-based documentation must be provided at the time of permit application to show proof of current vessel ownership. This may include current United States Coast Guard (USCG) documentation or state-issued vessel registration papers. Other documentation may be required as deemed necessary by NMFS.
4) Only current owners of vessels as documented with the USCG or the states are eligible to apply for a B permit. The application fee must be submitted in full with a completed application. Failure to provide the fee renders the application to be incomplete and will be returned to the applicant without further review.
5) Permit applications for initial permit issuance received after the application deadline will not be accepted for initial permit consideration.
6) NMFS will make an initial permit issuance for each completed permit application registering the qualifying vessel to the permit.
7) Permits must be renewed annually by November 30 to be effective January 1 of the following year. Expired permits will not be renewed. Permits will be valid only for current state-registered commercial fishing vessels; thus state registration must be renewed each year in order for the permit to remain vaild.
8) Permit transfers will be allowed in the calendar year after the initial B permit issuance. The initial B permits are expected to be effective January 1, 2011.
9) The NMFS will accept permit transfer requests from permit owners in the 4th quarter of the first program year to be effective on January 1 of the following year and throughout the year beginning in the second program year to be effective at the start of the next cumulative landing period.

1/ The proposed conditions are consistent with original or current A program conditions. The proposed permit types are General Permit (B permit) Species Endorsement Permits (Species Specific). A species endorsement is a designation on a B permit that authorizes the use of the permit to directly fish for a particular species, in addition to the other (non-endorsed) species covered under the General Permit. Vessels without a species endorsement will be limited to directly fishing for the non-endorsed species covered under the General Permit.

2/ There may be exceptions to these conditions as determined appropriate by NMFS (e.g., replacement vessel for an accidentally lost vessel, death of vessel owner in the first year of permit issuance, sale of permitted vessels),

3/ State-issued fish receipts or management agency reports may be used to appeal PacFin records.

Table 2-1c. Proposed C permit application, issuance and transfer conditions

1) The NMFS will make a reasonable effort to contact current owners of vessels that are expected to potentially need a C permit. This assessment will be based on recent years' landings data contained in the PacFin data base. The NMFS will rely on the states to provide vessel owner addresses.

2) Application for C permits will be accepted year-round by NMFS from owners of state-registered commercial fishing vessels.

3) Owners of vessels that submit required fees and any documentaion deemed necessary by the NMFS will be eligible for C permit issuance (e.g., state-issued commercial fishing vessel registration). Failure to submit the required fee will render the application incomplete and will be returned to the applicant without further review.

4) C permits will be will be effective either (i) the date specified on the permit by NMFS and the balance of the fishing year for which the permit was issued, or (ii) the following fishing year for applications received in the fall and requested for use the following year.

5) C permits will be valid only for the vessels for which they were registered by NMFS; thus, they are non-transferable between vessels.

These dates reflect participation in the fishery for about a decade. Each of these alternatives is based on one or more Council assessments of appropriate fishery participation levels. Alternative 3 would capture the fleet size set by market forces during some of the years when the overall groundfish fisheries were most constrained by overfished species rebuilding measures. Alternative 5 is based on a 2000 fishery capacity socio-economic analysis by the Council's SSC of what groundfish fleet sizes might be if they were better matched with then-available harvest levels. By contrast, Alternative 4 requires an analysis of various minimum landing or participation criteria to qualify for a directed fishery permit. Alternative 6 was selected in September 2008 as the preliminary preferred alternative based on qualification criteria and permit use provisions contained in Alternative 4.

Nearshore rockfish, cabezon, kelp greenling and California scorpionfish (nearshore species) are removed from any federal license or permit requirement in Alternatives 2 through 6. This was done because these species predominately occur in state waters, and because the states manage and regulate or affect the take of those species (see **Appendix D** for information on the states' nearshore management efforts). Therefore, removal of these nearshore species avoids duplicate licensing or permitting requirements between state and federal agencies for fishermen or vessels. The remaining groundfish species include species groups that are identified in Federal regulation at 50 CFR Part 660 as shelf and slope rockfish, roundfishes, flatfishes, sharks, and other species (**Table 2-2).**

Table 2-2. Listing of Federal groundfish species including ones proposed for open access fishery license limitation program (B Species Program)

Nearshore rockfishes: All proposed for exclusion from federal B permit program

Overfished species: None identified

Minor Nearshore Species: black rockfish (*Sebastes melanops*), black-and-yellow rockfish (*Sebastes chrysomelas*), blue rockfish (*Sebastes mystinus*), brown rockfish (*Sebastes auriculatus*), calico rockfish (*Sebastes dalli*), California scorpionfish (*Scorpaena guttata*), China rockfish (*Sebastes nebulosus*), copper rockfish (*Sebastes caurinus*), gopher rockfish (*Sebastes carnatus*), grass rockfish (*Sebastes rastrelliger*), kelp rockfish (*Sebastes atrovirens*), olive rockfish (*Sebastes serranoides*), quillback rockfish (*Sebastes maliger)*, and treefish (*Sebastes serriceps*)

Shelf rockfishes: All proposed for inclusion in federal B permit program

Overfished species: bocaccio (*Sebastes paucispinis*) (South of Cape Mendocino), canary rockfish (*Sebastes pinniger*), cowcod (*Sebastes levis)* (South of Pt. Conception), widow rockfish (Sebastes entomelas), and yelloweye rockfish (*Sebastes ruberrimus*)

Minor Shelf Species: bronzespotted rockfish (*Sebastes gilli*), chameleon rockfish (*Sebastes phillipsi)*, chilipepper rockfish (*Sebastes goodei*), dusky rockfish (*Sebastes variabilis*), dusky rockfish (*Sebastes ciliatus*), dwarf-red rockfish (*Sebastes rufianus*), flag rockfish (*Sebastes rubrivinctus*), freckled rockfish (*Sebastes lentiginosus*), greenblotched rockfish (*Sebastes rosenblatti*), greenspotted rockfish (*Sebastes chlorostictus*), greenstriped rockfish (*Sebastes elongatus*), halfbanded rockfish (*Sebastes semicinctus*), harlequin rockfish (*Sebastes variegatus*), honeycomb rockfish (*Sebastes umbrosus*), longspine thornyhead (*Sebastolobus altivelis*), Mexican rockfish (*Sebastes macdonaldi*), pink rockfish (*Sebastes eos*), pinkrose rockfish (*Sebastes simulator*), pygmy rockfish (*Sebastes wilsoni*), redstripe rockfish (*Sebastes proriger*), rosethorn rockfish (Sebastes helvomaculatus), rosy rockfish (*Sebastes rosaceus*), shortbelly rockfish (*Sebastes jordani)*, shortspine thornyhead (*Sebastolobus alascanus*), silvergray rockfish (*Sebastes brevispinis)*, speckled rockf

(Sebastes hopkinsi), starry rockfish (Sebastes constellatus), stripetail rockfish (Sebastes saxicola), swordspine rockfish (Sebastes ensifer), tiger rockfish (Sebastes nigrocinctus), vermilion rockfish (Sebastes miniatus), and yellowtail rockfish (Sebastes flavidus)

Slope Rockfishes: All proposed for inclusion in federal B permit program

Overfished species: darkblotched rockfish (*Sebastes crameri*) (north of Pt. Arena, CA), Pacific Ocean perch (*Sebastes alutus*) (WA and OR)

Minor Slope Species: Aurora Rockfish (*Sebastes aurora*), Bank Rockfish (*Sebastes rufus*), Blackgill Rockfish (*Sebastes melanostomus*), Redbanded Rockfish (*Sebastes babcocki*), Rougheye Rockfish (*Sebastes aleutianus*), Sharpchin Rockfish (*Sebastes zacentrus*), Shortraker Rockfish (*Sebastes borealis*), Splitnose Rockfish (*Sebastes diploproa*), and Yellowmouth Rockfish (*Sebastes reedi*)

Roundfishes: All proposed for inclusion in federal B permit program except as noted

Overfished species: None identified

lingcod (*Ophiodon elongatus*), cabezon (*Scorpaenichthys marmoratus*) (B permit excluded species), kelp greenling (*Hexagrammos decagrammus*) (B permit excluded species), Pacific cod (*Gadus macrocephalus*), Pacific hake (Pacific Whiting) (*Merluccius productus*), Pacific flatnose (finescale codling) (*Antimora microlepis*), Pacific grenadier (Pacific rattail) (*Coryphaenoides acrolepis*), sablefish (*Anoplopoma fimbria*)

Flatfishes: All proposed for inclusion in B permit program

Overfished species: None identified

arrowtooth flounder (*Atheresthes stomias*), butter sole (*Isopsetta isolepis*), curlfin sole (*Pleuronichthys decurrens*), Dover sole (*Microstomus pacificus)*, English sole (*Parophrys vetulus*), flathead sole (*Hippoglossoides elassodon*), Pacific sanddab (*Citharichthys sordidus*), petrale sole (*Eopsetta jordani*), rex sole (*Glyptocephalus zachirus)*, rock sole (*Lepidopsetta bilineata), northern rock sole (L. polyxystra*), sand sole (*Psettichthys melanostictus*), and starry flounder (*Platichthys stellatus*)

Sharks, Skates, and Chimaeras: All proposed for inclusion in B permit program

Overfished species: None identified

leopard shark (*Triakis semifasciata*), soupfin shark (*Galeorhinus galeus*), spiny dogfish (*Squalus acanthias)*, big skate (*Raja binoculata*), California skate (*Raja inornata*), longnose skate (*Raja rhina*), and spotted ratfish (*Hydrolagus colliei*)

The alternatives are summarized in **Table 2-3** and described in subsections 2.1 through 2.6. NMFS may use combinations of elements within the alternatives, including retention and transfer conditions, in developing its preferred alternative. However, if the B permit program strays from the basic characteristics of the A permit program the added implementation burden and costs will likely be passed back to the industry.

Table 2-3: Summary of Council's license registration and B permit management alternatives

	Alternative					
Issue to be addressed	A-1 (no action)	A-2 (license registration)	A-3	A-4	A-5	A-6 (preferred) 4/
1) Initial fleet size	n/a	n/a	a) 2004-06 avg (680 vessels) or b) 2006 fleet size (713)	based on permit qualification criteria (see Table 2)	1994-99 fleet size (390 vessels)	based on permit criteria (see Table 2)
2) Fleet size goal	n/a	n/a	same as initial fleet size	same as initial fleet size	80% reduction from 2000 fleet size (to 170)	same as initial fleet size goal
3) Permit transferability	n/a	n/a	yes, once per year	yes, once per year	no 1/	yes, after first year
4) Previous year landing requirement	n/a	n/a	no	no	yes	no
5) State landing endorsement	n/a	n/a	yes	no	no	no
6) Species endorsements	n/a	n/a	no	no	no	yes 3/
7) A & B permit usage on same vessel	n/a	n/a	yes, alternately in same yr 2/	yes, alternately in same yr 2/	not in same yr	yes, alternately in same yr 2/
8) B permit qualification criteria	n/a	n/a	see Table 2-4	see Table 2-4	see Table 2-4	see Table 2-4

1/ There may be hardship conditions under which transfer might be allowed.

2/ A pre-fishing declaration would be used to notify NMFS of permit type changes.

3/ The endorsement criteria alternatives for each species associated with this B permit qualification criterion are, for any one year during the 1998-2006 window period: a) ≥1 lb, b) ≥100 lbs and c) ≥500 lbs.

4/ This alternative (A-6) was identified by the Council in September 2008 as its preferred alternative. The sablefish and lingcod endorsement alternatives under A-6 are, for any year during the 1998-2006 window period and separately for each species: a) ≥1 lb, b) ≥100 lbs, and c) ≥500 lbs.

Table 2-4: B permit qualification criteria contained in alternatives 1-6

Alternative	Standard	Framework(s) used for analyses	Abbrev
1 & 2	n/a	n/a	n/a
3 (a)	top 680 vessels	cum lbs, 2004-2006 (QF-1)	680v-1
	top 680 vessels	cum lbs, 1998-2006 (QF-2)	680v-2
	top 680 vessels	cum lbs, 1998-2006, w/ 2004-2006 trip (QF-3)	680v-3
3 (b)	top 713 vessels	QF-1, QF-2 and QF-3	713v-1, 2, 3
	≥ 47,900 lbs	QF-3	47.9K-3
	≥ 36,100 lbs	QF-3	36.1K-3
	≥ 21,800 lbs	QF-3	21.8K-3
	≥ 14,400 lbs GROUP 1	QF-3	14.4K-3
	≥ 6,100 lbs	QF-3	6.1K-3
	≥ 3,500 lbs	QF-3	3.5K-3
	≥ 1,600 lbs	QF-3	1.6K-3
	≥ 1 lb	QF-1 or QF-3	1lb-1
4	≥ 1 trip 1/	QF-1 or QF-3	1trip-1
	≥1 trip in two yrs	trips per year, 2004-2006 (QF-4)	2 in 3 yrs-4
	≥ 100 lbs	max lbs, any yr, 2004-2006 (QF-5)	100 max-5
	≥ 500 lbs GROUP 2	QF-5	500 max-5
	≥ 1000 lbs	QF-5	1000 max-5
	≥ 2000 lbs	QF-5	2000 max-5
	≥ 100 lbs	QF-1 and QF-3	100 lbs-1, 3
	≥ 500 lbs GROUP 3	QF-1 and QF-3	500 lbs-1, 3
	≥ 1000 lbs	QF-1 and QF-3	1000 lbs-1, 3
	≥ 2000 lbs	QF-1 and QF-3	2000 lbs-1, 3
5	top 390 vessels	QF-1, QF-2 and QF-3	390v-1, 2, 3
6 (preferred) 4/	≥ 100 lbs	QF-3	100 lbs-3

1/ Standards are variables that have been fixed as part of each qualification criterion, but could be varied to achieve a particular outcome

2/ Frameworks consist of fixed variables, including a base period and unit of measure (metric) that are used to determine which vessels meet the standard specified under each criterion.

3/ n/a means not applicable because no limited entry permit is proposed under A-1 or A-2

4/ This alternative (A-6) was identified by the Council in September 2008 as its preferred alternative. The sablefish and lingcod endorsement alternatives under A-6 are, for any year during the 1998-2006 window period and separately for each species: a) ≥1 lb, b) ≥100 lbs, and c) ≥500 lbs.

2.1 Alternative 1 (No action)

Alternative 1, No-action, would continue to allow commercial fishing vessels to prosecute federal groundfish species allocated to open access fisheries without federal registration, except as required under the Vessel Monitoring System (VMS) program (72 FR 69162, December 7, 2007). The VMS program requires commercial vessels to register with NMFS and utilize VMS equipment if they intend to take federal groundfish in federal waters in the WOC area. The No-action alternative does not limit participation in the open access fishery.

2.2 Alternative 2

This alternative establishes an annual federal license requirement for vessel owners that intend to participate in the open access groundfish fishery. The purpose of this alternative is to identify all vessels and vessel owners that participate in the open access fishery and to aid managers in estimating fishery impacts to target and non-target species. This alternative would not limit fishery participation. To be eligible for an open access license, the vessel owner must have a valid commercial fishing license with Washington, Oregon, or California and the vessel must be currently documented by the United States Coast Guard (USCG) or state registered. As with A permits, NMFS would require that the applicant/vessel owner certify that he/she is eligible to own a US-documented vessel. NMFS would issue a single open access license that would authorize the vessel to participate in both the directed and incidental components of the open access fishery. NMFS would mail open access license applications to vessel owners prior to the calendar year and would encourage submission of applications at least 30 days prior of the calendar year (and start of the open access fishery). However, a vessel owner may apply for an open access license at any time during the year.

2.3 Alternative 3

Alternative 3 is one of two alternatives that have a specific initial fleet size goal for issuance of B permits. The goal for Alternative 3 is based on either: (1) the average number of vessels that made directed B species landings in the WOC area during the recent years of 2004-September 2006 [3]which computes to be 680 vessels, after rounding or (2) the number of vessels that participated in the directed fishery in 2006, which is 713 (**Table 2-5; Figure 2-1**). The long-term fleet size goal is the same as the initial fleet size goal. The purpose of this alternative is to limit participation in the directed open access fishery and to register all other vessels that encounter groundfish on an incidental basis. This alternative would aid managers in projecting fishery impacts for target and non-target species. B permits would be issued to those in the directed open access fishery and C permits would be issued to those vessels that incidentally land groundfish, excluding nearshore species, for all vessels that do not have an A or B permit or state-issued nearshore permit. Three different qualification criteria (QF-1, QF-2 and QF-3) were used to determine which vessels would qualify for B permits under this alternative (**Table 2-4).**

Under this alternative, a B permit could be transferred to a different vessel and vessels could be registered to both an A and B permit and used alternately during the year, but not in the same cumulative landing period. The permit holder would be required to notify NMFS prior to leaving port of the permit type that would be in use. B permits would have a state landing endorsement, based on the state in which the majority of qualifying fishing trips was landed in the most recent year of fishery participation, and there would be no previous year landing requirement**.**

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[3] "Recent years" in this EA refers to the period January 2004-September 2006. The selection of years for defining recent participation was restricted to 1) two or more successive years in order to compute an "average" participation level and 2) one of the three recent three successive year periods (2003-2006, 2004-2006 and 2005-2006) because the selection of any period prior to 2003 would represent "most" of the window period. The period 2004-2006 was selected over the other possible periods because the period 2004-2006 encompassed 1) the longest period of increasing participation in the WOC directed open access fishery during the 1998-2006 window period and 2) 2004 was the nadir in terms of vessel participation in the directed open access fishery for the window period (**Figure 2-1**; **Table 2-5).** There were also major regulation differences in the earlier years that are discussed in the text.

Table 2-5. Directed B species open access fishery participation and landing statistics by species group, year, state and total, 1998-2006 window period

		Sablefish			Shelf RF			Slope RF			Lingcod			Sharks			Others 1/			Total Directed		
Yr		vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s
1998	CA	92	94.6	$219.0	433	797.3	$1,161.0	171	192.3	$220.0	257	46.2	$105.0	54	25.2	$34.0	71	29.0	$43.0	654	1,185.1	$1,782.0
	OR	30	16.3	$45.0	135	178.5	$272.0	3	4.4	$6.0	103	20.7	$47.0	0	0.0	$0.0	44	21.0	$38.0	200	240.8	$409.0
	WA	29	25.6	$79.0	10	12.4	$9.0	0	0.0	$0.0	17	5.6	$7.0	0	0.0	$0.0	20	57.0	$65.0	46	100.7	$160.0
	sum	151	136.5	$343.0	578	988.2	$1,442.0	174	196.7	$226.0	377	72.5	$159.0	54	25.2	$34.0	135	107.0	$146.0	900	1,526.6	$2,351.0
1999	CA	102	176.9	$454.0	479	264.1	$538.0	72	16.9	$29.0	293	39.9	$119.0	52	25.2	$37.0	105	49.0	$86.0	677	571.9	$1,263.0
	OR	15	20.6	$65.0	132	93.3	$194.0	8	1.2	$2.0	125	27.1	$74.0	0	0.0	$0.0	58	13.0	$43.0	180	155.4	$377.0
	WA	28	36.0	$115.0	7	9.1	$7.0	0	0.0	$0.0	14	4.8	$6.0	2	4.8	$2.0	15	9.0	$11.0	44	63.2	$141.0
	sum	145	233.5	$634.0	618	366.5	$739.0	80	18.1	$31.0	432	71.8	$199.0	54	30.0	$39.0	178	71.0	$140.0	901	790.5	$1,781.0
2000	CA	115	299.0	$944.0	403	96.3	$282.0	65	8.5	$22.0	221	19.8	$64.0	55	22.3	$31.0	127	81.0	$118.0	642	526.7	$1,460.0
	OR	34	43.6	$159.0	103	7.3	$19.0	1	0.5	$1.0	89	12.3	$45.0	2	0.1	$0.0	0	0.0	$0.0	154	63.9	$224.0
	WA	32	51.9	$202.0	9	1.7	$3.0	2	1.5	$2.0	12	4.8	$6.0	1	1.5	$1.0	2	1.0	$2.0	49	62.8	$215.0
	sum	181	394.5	$1,305.0	515	105.3	$304.0	68	10.5	$25.0	322	36.9	$115.0	58	23.9	$32.0	129	82.0	$120.0	845	653.4	$1,899.0
2001	CA	112	273.7	$820.0	301	66.7	$177.0	41	25.9	$52.0	244	29.0	$97.0	49	24.4	$34.0	96	48.0	$106.0	518	467.5	$1,286.0
	OR	64	58.9	$199.0	89	5.5	$15.0	1	0.6	$1.0	119	24.1	$82.0	0	0.0	$0.0	2	0.0	$0.0	180	89.3	$296.0
	WA	44	60.3	$218.0	8	0.8	$1.0	2	1.4	$1.0	12	3.6	$5.0	0	0.0	$0.0	0	1.0	$1.0	54	66.8	$225.0
	sum	220	392.9	$1,237.0	398	73.0	$193.0	44	27.9	$54.0	375	56.7	$184.0	49	24.4	$34.0	98	49.0	$107.0	752	623.6	$1,807.0
2002	CA	119	268.3	$798.0	222	19.7	$72.0	45	60.7	$133.0	244	37.2	$132.0	40	16.0	$24.0	68	49.0	$80.0	480	451.4	$1,238.0
	OR	53	49.7	$180.0	61	3.6	$9.0	1	0.1	$0.0	126	27.4	$94.0	0	0.0	$0.0	8	0.0	$0.0	176	81.2	$283.0
	WA	44	65.2	$237.0	0	0.6	$0.0	0	0.9	$1.0	9	2.9	$4.0	1	4.2	$1.0	0	1.0	$0.0	47	74.4	$244.0
	sum	216	383.2	$1,215.0	283	23.9	$81.0	46	61.7	$134.0	379	67.5	$230.0	41	20.2	$25.0	76	50.0	$80.0	703	607.0	$1,765.0
2003	CA	118	312.6	$946.0	169	8.7	$39.0	46	82.4	$194.0	240	32.5	$131.0	47	28.1	$37.0	50	55.0	$50.0	445	519.6	$1,398.0
	OR	96	134.3	$492.0	52	3.3	$8.0	13	0.8	$1.0	123	28.9	$91.0	0	0.0	$0.0	0	1.0	$0.0	202	168.1	$593.0
	WA	64	118.2	$450.0	0	0.2	$0.0	0	1.5	$2.0	4	2.1	$3.0	1	43.9	$18.0	0	2.0	$1.0	68	167.7	$473.0
	sum	278	565.1	$1,888.0	221	12.2	$47.0	59	84.7	$197.0	367	63.5	$225.0	48	72.0	$55.0	50	58.0	$51.0	715	855.4	$2,464.0
2004	CA	92	288.3	$831.0	189	23.9	$104.0	48	52.2	$130.0	215	39.9	$158.0	43	23.6	$48.0	60	57.0	$52.0	402	484.9	$1,323.0
	OR	67	73.6	$225.0	66	2.9	$7.0	3	1.0	$1.0	120	31.1	$97.0	0	0.2	$0.0	3	0.0	$0.0	177	109.1	$330.0
	WA	53	96.4	$326.0	1	0.5	$1.0	2	1.4	$1.0	4	1.7	$3.0	4	86.1	$38.0	0	1.0	$1.0	57	187.3	$369.0
	sum	212	458.3	$1,382.0	256	27.3	$112.0	53	54.6	$132.0	339	72.7	$258.0	47	109.9	$86.0	63	58.0	$53.0	636	781.3	$2,022.0
2005	CA	101	458.3	$1,312.0	170	21.2	$99.0	46	30.8	$84.0	192	35.8	$145.0	44	21.9	$31.0	49	39.0	$34.0	367	607.5	$1,704.0
	OR	107	257.6	$916.0	54	3.4	$9.0	4	5.1	$7.0	150	29.4	$101.0	2	0.2	$0.0	2	5.0	$2.0	232	300.5	$1,035.0
	WA	68	182.2	$678.0	2	0.4	$1.0	2	6.5	$8.0	5	2.4	$4.0	2	3.2	$2.0	0	1.0	$1.0	78	195.5	$693.0
	sum	276	898.1	$2,906.0	226	25.0	$109.0	52	42.4	$99.0	347	67.6	$250.0	48	25.3	$33.0	51	45.0	$37.0	677	1,103.5	$3,432.0
2006	CA	122	279.9	$942.0	165	21.3	$103.0	35	33.0	$85.0	192	26.8	$113.0	41	22.9	$43.0	29	15.0	$32.0	382	399.3	$1,318.0
	OR	132	250.8	$984.0	42	3.0	$9.0	3	5.1	$7.0	135	27.6	$109.0	0	0.0	$0.0	2	4.0	$2.0	241	290.1	$1,111.0
	WA	86	157.5	$612.0	0	0.2	$0.0	1	0.8	$1.0	4	2.7	$5.0	2	59.8	$31.0	0	1.0	$0.0	90	221.6	$649.0
	sum	340	688.2	$2,538.0	207	24.5	$112.0	39	38.9	$93.0	331	57.1	$227.0	43	82.7	$74.0	31	20.0	$34.0	713	911.0	$3,078.0
AVG	CA	108	272.4	$807.3	281	146.6	$286.1	63	55.9	$105.4	233	34.1	$118.2	47	23.3	$35.4	73	46.9	$66.8	507	579.3	$1,419.1
	OR	66	100.6	$362.8	82	33.4	$60.2	4	2.1	$2.9	121	25.4	$82.2	0	0.1	$0.0	13	4.9	$9.4	194	166.5	$517.6
	WA	50	88.1	$324.1	4	2.9	$2.4	1	1.6	$1.8	9	3.4	$4.8	1	22.6	$10.3	4	8.2	$9.1	59	126.7	$352.1
	sum	224	461.1	$1,494.2	367	182.9	$348.8	68	59.5	$110.1	363	62.9	$205.2	49	46.0	$45.8	90	60.0	$85.3	760	872.5	$2,288.8

1/ others species includes unspecified rockfish, flatfishes, rays and chimeras

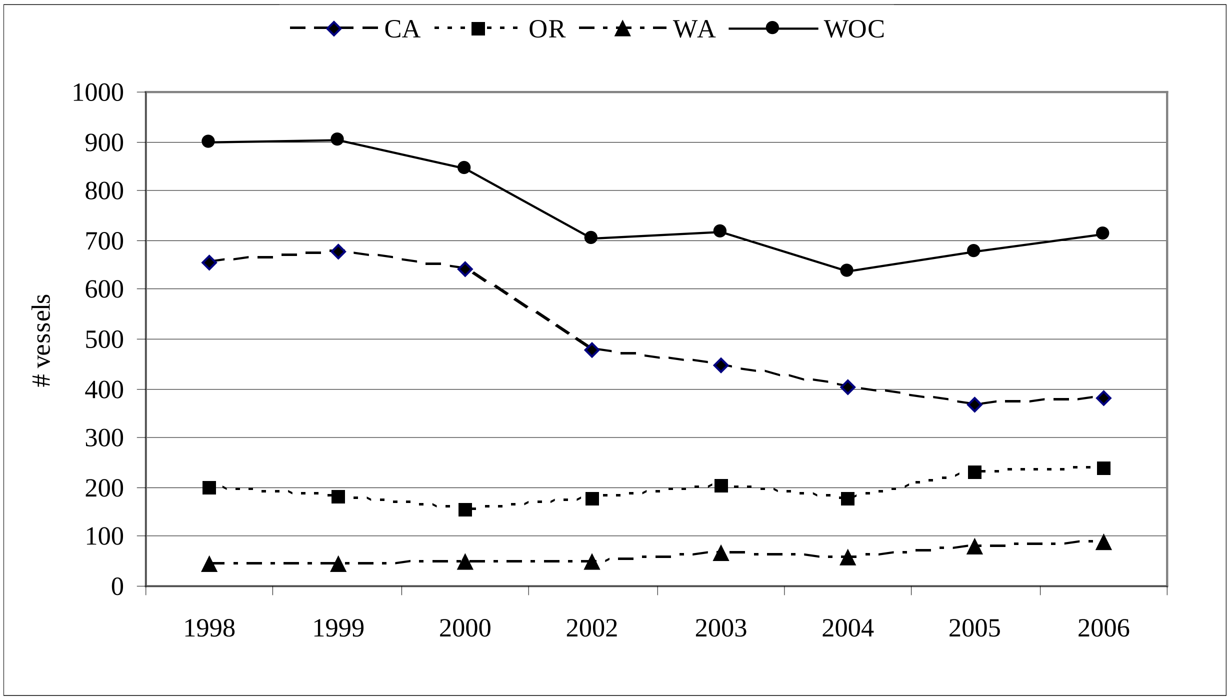

Fig 2-1. Directed fishery trends in number of vessels for B species groundfish by state and overall, 1998-2006 window period.

C permits would be required to land groundfish excluding nearshore species for all vessels that do not have an A or B permit or a state-issued nearshore fishery permit. C permits would be available year-round and would be available to all state-registered commercial fishing vessels. A state-issued nearshore permit registered to the vessel or a fisherman on board the vessel could be used in lieu of a C permit registration to the vessel, but could not be used in lieu of a B permit registration.

2.4 Alternative 4

Alternative 4 was expanded by the Council at its March 2008 meeting. Under this alternative there would be no specified initial or long-term fleet size goal, but no new permits would be issued after the first program year. The first set of qualification standards under this alternative range from 47,100 lbs to one lb. These values represent the minimum lbs of B species groundfish landed by vessels that took 50 percent, 60 percent, 70 percent, 80 percent, 95 percent and 100 percent of the B species groundfish during the window period. The remaining qualification standards have a minimum participation level of one landing in two years during 2004-2006 or four minimum landing levels of 100, 500, 1000 and 2000 lbs. The qualifications frames used to analyze these qualification standards are defined in **Table 2-4.**

The B permit program would operate similar to the current limited entry permit program (A permits) under this alternative. Permits would be transferable throughtout the year and effective at the start of the next two-month cumulative limit period. In addition, vessels could be registered to A and B permits simultaneously and the vessel owner would be able to use the two permit types alternately during the year, but not in the same cumulative landing period. The permit holder would be required to notify NMFS of the permit type that would be in use prior to leaving port. There is no state landing endorsement or previous year landing requirement under this alternative (**Table 2-3)**.

C permits would be required to land groundfish excluding nearshore species for all vessels that do not have an A or B permit or a state-issued nearshore fishery permit. C permits could be applied for at any time of year. A state-issued nearshore permit registered to the vessel or a fisherman on board the vessel, could be used in lieu of a C permit registration, but could not be used in-lieu of a B permit registration.

2.5 Alternative 5

Under Alternative 5, the initial fleet size goal is 390 vessels, which is 91 percent of the average number of vessels that fished at least three years for federal groundfish species, including nearshore species, during 1994-1999 **(Appendix A).** The 91 percent adjustment factor is extrapolated from the relationship between total number of vessels that had directed fishery landings of federal groundfish and those that had directed fishery landings of B species groundfish during 2000-2006 **(Tables 2-5 and 3-5)**. This period of time was used because specificity of landings data was much lower in the earlier years, compared to the latter years. In the earlier years a high proportion of rockfish were recorded as "unspecified rockfish" (Gerry Kobylinski 2007). The long-term fleet size goal is170 vessels, which is approximately 80 percent of the 2000 directed fishery fleet size, the same year the Council's Strategic Plan was adopted. The 80 percent reduction figure is based on the capitol utilization rate estimate for the directed open access fishery developed by the Council's Scientific and Statistical Committee based on 1984-1992 fishery data Three different qualification criteria (QF-1, QF-2 and QF-3) were used to determine which vessels would qualify for B permits under this alternative (**Table 2-4).**

There is a previous year landing requirement and permits would be non-transferable under this alternative. The no transfer provison was added in order to accelerate fishery attrition meet the long-term fleet size goal. To allow that all renewals are completed by December 31, the previous year landing requirement must occur by November 30. A vessel owner could own single or multiple A and B permitted vessels, but a single vessel could not be registered to both permit types in the same year. (So if a vessel is registered to an A permit on January 1, that vessel would not be eligible to be registered to a B permit for the remainder of the year).

C permits would be required to land groundfish excluding nearshore species for all vessels that do not have an A or B permit or a state-issued nearshore fishery permit under this alternative. C permits could be applied for at any time of year. A state-issued nearshore permit, registered to the vessel or a fisherman on board the vessel, could be used in lieu of a C permit registration to the vessel.

2.6 Alternative 6 (Preliminary Preferred Alternative)

Alternative 6 (A-6)–the Preliminary Preferred Alternative—was adopted from within the range of qualification criteria contained in Alternative 4 (A-4) by the Council at its September 2008 meeting. Under A-6 vessels that landed a total of ≥100 lbs of B species groundfish in the directed fishery during the 1998-2006 window period and with at least one directed fishery landings during 2004-2006 would be eliglible for a B permit. Also, the Council would consider species take and landing permits (endorsements) for sablefish and lingcod based on the following criteria: ≥1 lb, ≥100 lbs or ≥500 lbs for each species separately in any year during the 1998-2006 window period.

The B permit program would operate similar to the current limited entry permit program (A permit). Permits would be transferable after the first program year and throughout the year each year thereafter. Species endorsements would be permanently affixed to the original B permits and would not transferable between vessels without ownership of the original B permit. In addition, vessels could be registered to A and B permits simultaneously and the vessel owner would be able to use the two permit types alternately during the year, but not in the same cumulative landing period. The permit holder would be required to notify NMFS of the permit type that would be in use prior to leaving port.

C permits would be required of all vessels that are not registered to an A or B permit under this alternative to land small amounts of groundfish excluding nearshore species caught incidentally when fishing for non-groundfish species. C permits could be applied for at any time of year. A state-issued nearshore permit, registered to the vessel or a fisherman on board the vessel, could be used in lieu of a C permit registration to the vessel.

2.7 Alternatives Considered but Not Analyzed in Detail

Several alternatives were considered but not accepted for full analysis:

Permit stacking
This concept was considered to be outside the scope of the proposed permit management program.

Sablefish tiering and integration with A permit program:
This concept was considered to be outside the scope of the proposed permit management program.

Allocations between B and C permit fisheries
Additional allocations of fish could lead to increased fishery discards due to allocation attainment with potentially negative impacts to overfished groundfish species.

Sub-area endorsements for sablefish or other species
Cross-over of vessels between management areas is not a problem under current management, thus the need for additional fishery regulation is not warranted.

Gear type or vessel length endorsement
The Council initially considered having a gear type or vessel length endorsement but decided against either or both provisions because 1) a gear endorsement would limit a fisher's ability to switch to more efficient or less destructive gear types, and 2) fishing regulations in the directed OA fishery generally have a greater role in determining vessel landings than vessel size.

Permit consolidation requirement
This option was removed from the first draft environmental assessment at the March 2008 meeting because of the complexity and uncertainty of requiring B permit holders to obtain permits from other permit holders at specified yearly increments in order to reduce the fleet size to meet a particular long-term fleet size goal

Market-based Management (e.g., Individual Fishing Quotas, fishing cooperatives, community quotas, collectively termed Limited Access Privilege Programs [LAPPs]):
LAPPs have been shown to reduce the incentive to maintain or increase fishery capacity. License limitation or limited entry is the common first step to the cessation of capital expansion and the implementation of more effective and lasting measures. Limited entry does not preclude eventual adoption of market-based tools (NMFS 2008c).

3.0 AFFECTED ENVIRONMENT

This section describes the Pacific Coast groundfish fishery and the resources that would be affected by the alternatives. Physical resources are discussed in Section 3.1, biological resources are described in Section 3.2, and socioeconomic resources are described in Section 3.3. Other recent NEPA documents prepared for the Pacific Coast groundfish fishery provide detailed information pertaining to the physical, biological and socioeconomic environment (See subsection 1.6, Related NEPA Analyses, of this EA).

3.1 Physical Characteristics of the Affected Environment

3.1.1 General Characteristics

3.1.1.1 Ocean currents

In the North Pacific Ocean, the large, clockwise-moving North Pacific Gyre circulates cold, sub arctic surface water eastward across the North Pacific, splitting at the North American continent into the northward-moving Alaska Current and the southward-moving California Current. On the Pacific Coast, the California Current flows southward through the United States Pacific Coast EEZ. The California Current is known as an eastern boundary current, meaning it draws ocean water along the eastern edge of an oceanic current gyre. The northward-moving California Undercurrent flows along the continental margin and beneath the California Current. Influenced by the California Current system and coastal winds, waters off the United States Pacific Coast are subject to major nutrient upwelling, particularly off Cape Mendocino. Shoreline topographic features such as Cape Blanco and Point Conception, and bathymetric features such as banks, canyons, and other submerged features, often create large-scale current patterns such as eddies, jets, and squirts. The effect of El Niño-Southern Oscillation (ENSO) events on climate and ocean productivity in the northeast Pacific is relatively well-known. In the past decade a still longer period cycle, termed the Pacific Decadal Oscillation or PDO, has been identified. Although similar in effect, instead of the one-year to two-year periodicity of ENSO, PDO events affect ocean conditions for 15 years to 25 years (PFMC 2004).

3.1.1.2 Physical and biological conditions

There are distinct large-scale patterns of biological distribution along the Pacific Coast that provide for a first-order characterization of habitat into large zoogeographic provinces: the Oregonian and San Diego. The Oregonian Province extends from the Straight of Juan de Fuca in the North to Point Conception in the South. The San Diego Province begins at Point Conception in the north and runs south past the terminus of the EEZ (NMFS 2005). Cape Mendocino represents an important ecological break in the distribution of many groundfish species (particularly rockfish) (PFMC 2004).

The United States Pacific Coast is characterized by a relatively narrow continental shelf. The 200 m depth contour shows a shelf break closest to the shoreline off Cape Mendocino, Point Sur, and in the Southern California Bight; and widest from Central Oregon north to the Canadian border, as well as off Monterey Bay. Deep submarine canyons pocket the EEZ, with depths greater than 4,000 m south of Cape Mendocino (PFMC 2004).

Estuaries such as San Francisco Bay and Pugent Sound are important habitats for many fish and wildlife species and some groundfish species. Other important smaller estuaries include Gray's Harbor, Washington and Yaquina Bay, Oregon. Kelp forest communities are found relatively close to shore along the open coast. These subtidal communities provide vertically structured habitat through the water column on the rocky shelf from the waterline to a depth of up to 10 meters. Surfgrass beds are found on hard-bottom substrates along higher energy coasts. (Studies have shown seagrass beds to be among the areas of highest primary productivity in the world). Tide pool habitats are common along the coasts of all three states and are often inhabited by a variety of attached algae, invertebrates, and small fishes. Unconsolidated bottom habitats are composed of small particles (i.e. gravel, sand, mud, silt, and various mixtures of these particles) and contain little to no vegetative growth due to the lack of stable surfaces for attachment. Such areas are scattered along nearshore and coastal shelf zones. Coastal unconsolidated bottom habitats are utilized by a number of managed fish species. Hard bottom habitats in the coastal zone may be composed of bedrock, boulders, cobble, or gravel/cobble. Hard substrates are one of the least abundant benthic habitats off the respective states, yet they are among the most important habitats for fishes. There are a number of species and life stages of groundfish that occur in the water column, but do not have any association with benthic substrate. Structure-forming invertebrates (such as corals, basketstars, brittlestars, demosponges, gooseneck barnacles, sea anemones, sea lilies, sea urchins. sea whips, tube worms, and vase sponges) have created important ocean bottom habitats in the shelf and slope zones. Offshore, unconsolidated bottom habitats are composed of small particles (i.e. gravel, sand, mud, silt, and various mixtures of these particles) and contain little to no vegetative growth due to the lack of stable surfaces for attachment. A large number of managed groundfish species utilize offshore unconsolidated bottom habitat during at least part of their life. Hard bottom habitats in the offshore zone may be composed of bedrock, boulders, cobble, or gravel/cobble. Many managed species are dependent on hard bottom habitat during some portion of their life cycle (NMFS 2005).

3.1.2 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires NMFS and the Council to describe Essential Fish Habitat (EFH) and enumerate potential threats to EFH from both fishing and nonfishing activities for the managed species.

> "EFH is defined at 50 CFR 600.10 as: those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle."

The EFH EIS contains detailed information on the Pacific Coast marine habitat and physical oceanography (Section 3.2, NMFS 2005). In response to the EFH EIS, NMFS implemented regulations designating EFH for Pacific Coast groundfish (50 CFR 660.395) and closing several areas to fishing with bottom trawl gear and bottom contact gear (50 CFR 660.306(h)).

3.2 Biological Characteristics of the Affected Environment

3.2.1 Groundfish Species

There are over 90 species of groundfish managed under the groundfish FMP. These species include over 60 species of rockfish in the family Scorpaenidae, 7 roundfish species, 12 flatfish species, assorted sharks, skates, and a few miscellaneous bottom-dwelling marine fish species. The groundfish species occur throughout the EEZ and occupy diverse habitats at all stages in their life history. Information on the interactions between the various groundfish species and between groundfish and non-groundfish species varies in completeness. While a few species have been intensely studied, there is relatively little information on most (PFMC 2005). Table 4-1 in the 2007-2008 Specifications EIS lists the latitudinal and depth distributions of adult groundfish species (NMFS 2008).

The Acceptable Biological Catch (ABC) is an estimate of the amount of stock that may be harvested each year without jeopardizing the continual sustainability of the resource. The Council and NMFS use the results of quantitative stock assessment to develop annual ABCs for major groundfish stocks. For groundfish species where there are little or no detailed biological data available to develop ABCs, rudimentary stock assessments are prepared using the best available data, or the ABC levels are based on 50 percent of historical landings. The ABC may be modified with precautionary adjustments to account for uncertainty. A stock's optimum yield (OY) is its target harvest level, and is usually lowered from its ABC. ABCs and OYs for groundfish species are published in Federal regulation at 50 CFR Part 660, Tables 1a-1c and 2a-2c.

The Magnuson-Stevens Act requires an FMP to prevent overfishing. Overfishing is defined in the National Standards Guidelines (63 FR 24212, May 1, 1998) as exceeding the fishing mortality rate needed to produce maximum sustainable yield on a continuing basis. For Pacific Coast groundfish, overfishing occurs if total mortality estimates exceed the ABC in a given year. The term "overfished" describes a stock whose abundance is below its overfished/rebuilding threshold. Overfished/rebuilding thresholds are generally linked to the same productivity assumptions that determine the ABC levels. The default value of this threshold for the groundfish FMP is 25 percent of the estimated unfished biomass level. In 2007, seven groundfish species continue to be designated as overfished: bocaccio (south of Monterey), canary rockfish, cowcod (south of Point Conception), darkblotched rockfish, Pacific Ocean perch, widow rockfish, and yelloweye rockfish.

The following section presents a brief summary of the biological characteristics of the most common federally-managed groundfish species encountered in the open access fishery, including overfished and precautionary zone stocks, non-overfished stocks and unassessed stocks.

3.2.1.1 Overfished and Precautionary Zone Groundfish Species

Seven species of Pacific Coast groundfish, all rockfish species, are currently declared overfished by NMFS. They are:

- Cowcod (*Sebastes levis*)
- Canary Rockfish (*Sebastes pinniger*)
- Darkblotched Rockfish (*Sebastes crameri*)
- Pacific Ocean Perch (*Sebastes alutus*)
- Bocaccio (*Sebastes paucispinis*)
- Widow Rockfish (*Sebastes entomelas*)
- Yelloweye Rockfish (*Sebastes ruberrimus*)

Rockfish are long-lived, late maturing, and slow-growing species. These traits make them particularly vulnerable to overfishing. "Overfishing" and "overfished" are defined in the Pacific Coast Groundfish FMP for each species or species complex. According to the FMP's definition, a stock (or fish population) is overfished when its spawning stock abundance declines to 25 percent of its estimated "unfished biomass" (the spawning population size if the stock had never been fished; biomass is the weight of a population of fish). Once a stock is declared overfished, measures must be taken to rebuild stock abundance to a level that supports maximum sustained yield (MSY). For most Pacific Coast groundfish stocks, that level is defined as 40 percent of the stock's virgin, unfished abundance. "Overfishing" is defined as a harvest rate that is predicted to cause a stock to decline to an overfished level. The FMP further defines overfishing as fishing at a rate that exceeds Fmsy. The Magnuson-Stevens Act and FMP require management measures that end overfishing. The Magnuson-Stevens Act also requires that the Council rebuild an overfished stock within ten years, if the stock's biology allows it to be rebuilt within this relatively short timeframe. Rebuilding the currently overfished rockfish species will probably take significantly longer. If a stock cannot be rebuilt within ten years, then the maximum allowable time to rebuild the stock is the time to rebuild the stock in the absence of fishing, plus one mean generation time.

(Mean generation time is the time it takes for a sexually mature female to replace herself in the population). Historically, these species were taken by trawl, hook and line, and sport gear. Overfished shelf rockfish species are still incidentally caught with commercial and sport line gear. Depth-based restrictions have been adopted to reduce harvest of overfished groundfish, to end overfishing, and to rebuild these stocks. Estimates of recent open access fishery impacts to overfished groundfish species are provided in sections 3.3.2.3 (incidental fishery) and 3.3.3.6 (directed fishery)

The following species are considered to be precautionary zone species:

- Cabezon (*Scorpaenichthys marmoratus*) (California only)
- Petrale sole (*Eopsetta jordani*)
- Sablefish (*Anoplopoma fimbria*)

Some assessed species, including some of the most important target species such as sablefish (*Anoplopoma fimbria*), are below the target biomass, B_{MSY}, although not overfished. These species are classified as precautionary zone species and OYs for these stocks are set according to a precautionary formula that progressively reduces the OY below the ABC as the estimated stock size is lower. This precautionary reduction provides surplus production to allow the stock to increase to the target biomass over time.

Biological, life history and available stock status information on overfished and precautionary zone species are presented in Appendix F.

3.2.1.2 Non-overfished and Unassessed Groundfish Stocks

The following Groundfish FMP species are considered non-overfished or unassessed stocks.

<u>Non-over fished stocks</u>
California Skate (*Raja inornata*)
Longnose Skate (*Raja rhina*)
Pacific Whiting (Pacific Hake) (*Merluccius productus*)
Bank Rockfish (*Sebastes rufus*)
Black Rockfish (*Sebastes melanops*)
Blackgill Rockfish (*Sebastes melanostomus*)
California Scorpionfish (*Scorpaena guttata*)
Chilipepper (*Sebastes goodei*)
Gopher Rockfish (*Sebastes carnatus*)
Lingcod (*Ophiodon elongatus*)
Longspine Thornyhead (*Sebastolobus altivelis*)
Shortbelly Rockfish (*Sebastes jordani*)
Shortspine Thornyhead (*Sebastolobus alascanus*)
Splitnose Rockfish (*Sebastes diploproa*)
Yellowtail Rockfish (*Sebastes flavidus*)
Arrowtooth Flounder (*Atheresthes stomias*)
English Sole (*Pleuronectes vetulus*)
Starry Flounder (*Platichthys stellatus*)

<u>Unassessed Stocks</u>
Aurora rockfish (*Sebastes aurora*)
Big skate (*Raja binoculata*)
Black-and-yellow rockfish (*Sebastes chrysomelas*)
Blue rockfish (*Sebastes mystinus*)
Bronzespotted rockfish (*Sebastes gilli*)
Brown rockfish (*Sebastes auriculatus*)
Butter sole (*Isopsetta isolepis*)
Calico rockfish (*Sebastes dalli*)
California skate (*Raja inornata*)
China rockfish (*Sebastes nebulosus*)
Copper rockfish (*Sebastes caurinus*)
Curlfin sole (*Pleuronichthys decurrens*)
Dusky/dark rockfish *(Sebastes. variabilis)* (dusky rockfish) and *S. cilliatus* (dark rockfish)
Finescale codling (*Antimora microlepis*)
Flag rockfish (*Sebastes rubrivinctus*)
Flathead sole (*Hippoglossoides elassodon*)
Grass rockfish (*Sebastes rastrelliger*)
Greenblotched rockfish (*Sebastes rosenblatti*)
Greenspotted rockfish (*Sebastes chlorostictus*)
Greenstriped rockfish (*Sebastes elongatus*)
Harlequin rockfish (*Sebastes variegatus*)
Honeycomb rockfish (*Sebastes umbrosus*)
Kelp greenling (*Hexagrammos decagrammus*)
Kelp rockfish (*Sebastes atrovirens*)
Leopard shark (*Triakis semifasciata*)

Mexican rockfish (*Sebastes macdonaldi*)
Olive rockfish (*Sebastes serranoides*)
Pacific cod (*Gadus macrocephalus*)
Pacific grenadier (*Coryphaenoides acrolepis*)
Pacific sanddab (*Citharichthys sordidus*)
Pink rockfish (*Sebastes eos*)
Quillback rockfish (*Sebastes maliger*)
Spotted ratfish (*Hydrolagus colliei*)
Redbanded rockfish (*Sebastes babcocki*)
Redstripe (*Sebastes proriger*)
Rex sole (*Glyptocephalus zachirus*)
Rock sole (*Lepidopsetta polyxystra and L. bilineata*),
Rosethorn rockfish *(Sebastes helvomaculatus)*
Rosy rockfish (*Sebastes rosaceus*)
Rougheye rockfish (*Sebastes aleutianus*)
Sand sole (*Psettichthys melanostictus*)
Sharpchin rockfish (*Sebastes zacentrus*)
Shortraker rockfish (*Sebastes borealis*)
Silvergray rockfish (*Sebastes brevispinis)*
Soupfin shark (*Galeorhinus galeus*)
Spiny dogfish (*Squalus acanthias*)
Speckled rockfish (*Sebastes ovalis*)
Squarespot rockfish *(Sebastes hopkinsi*)
Starry rockfish *(Sebastes constellatus)*
Stripetail rockfish *(Sebastes saxicola)*
Tiger rockfish *(Sebastes nigrocinctus)*
Treefish (*Sebastes serriceps*)
Vermilion rockfish *(Sebastes miniatus)*
Yellowmouth rockfish (*Sebastes reedi*)

Biological, life history and available stock status information on non-overfished and unassessed groundfish species are presented in **Appendix F**.

3.2.2 Non-groundfish Species (State-managed or under other FMPs)

The following non-groundfish species may be caught incidentally in fisheries targeting groundfish. Thus, changes in fishing regulations in groundfish fisheries could increase or decrease fishing mortality on incidentally caught species. Alternatively, those fisheries targeting nongroundfish species may be affected by management measures intended to reduce or eliminate incidental catches of overfished groundfish species in these fisheries.

California halibut (*Paralichthys californicus*)
California sheephead (*Semicossyphus pulcher*)
Coastal Pelagic Species (CPS) as follows:
- Northern anchovy (*Engraulis mordax*)
- Pacific sardine (*Sardinops sagax*)
- Pacific (chub) mackerel (*Scomber japonicus*)
- Jack mackerel (*Trachurus symmetricus*)
- Market squid (*Decapoda sp*

Dungeness crab (*Cancer magister*)
Greenling species other than kelp greenling (*Hexagrammos decagrammus*) as follows:
- Rock greenling (*H. agocephalus*)
- Painted greenling (*Oxylebius pictus*)
- White spotted greenling (*H. stelleri)*

Highly migratory species (HMS) as follows:
- Striped marlin *Tetrapturus audax*
- Swordfish *Xiphias gladius*
- Common thresher shark *Alopias vulpinus*
- Pelagic thresher shark *Alopias pelagicus*
- Bigeye thresher shark *Alopias superciliosus*
- Shortfin mako (bonito shark) *Isurus oxyrinchus*
- Blue shark *Prionace glauca*
- North Pacific albacore *Thunnus alalunga*
- Yellowfin tuna *Thunnus albacares*
- Bigeye tuna *Thunnus obesus*
- Skipjack tuna *Katsuwonus pelamis*
- Northern bluefin tuna *Thunnus orientalis*
- Dorado (a.k.a. mahi mahi, dolphinfish) *Coryphaena hippurus*

Ocean whitefish (*Caulo latilus princeps*)
Pacific pink shrimp (*Pandalus jordani*)
Pacific halibut (*Hippoglossus stenolepis*)
Ridgeback prawn (*Sicyonia ingentis*
Sea cucumber species as follows:
- California sea cucumber *(Parastichopus californicus*)
- Warty sea cucumber (*P. parvimensis*

Spot prawn (*Pandalus platyceros*)
White seabass (*Atractoscion nobilis)*

Biological, life history and available stock status information on non-overfished and unassessed groundfish species are presented in **Appendix F**.

3.2.3 Prohibited Species

Under the Pacific Coast groundfish FMP, prohibited species are those groundfish species or species groups for which quotas have been achieved and/or the fishery closed. Prohibited species are also any species of salmonid, Pacific halibut, or, seaward of Washington or Oregon, Dungeness crab. Regulations at 50 CFR 660.306 prohibit retention of prohibited species and they must be returned to the sea as soon as practicable with a minimum of injury when caught and brought on board. This section focuses on the later definition of prohibited species: salmon, Pacific halibut and Dungeness crab.

3.2.3.1 Pacific salmon

Salmon are anadromous which means they hatch in freshwater streams and rivers, migrate to the ocean for feeding and growth, and return to their natal streams to spawn. Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon *(O. kisutch*) are the main salmon species managed by the Council. In odd-numbered years, the Council may manage special fisheries near the Canadian border for pink salmon (O. *gorbuscha*). Sockeye (*O. nerka*) and chum (*O. keta*) salmon and steelhead trout (*O. mykiss*) are rarely caught in the Council's ocean fisheries. Salmon are affected by a wide variety of factors in the ocean and on land, including ocean and climatic conditions, dams, habitat loss, urbanization, agricultural and logging practices, water diversion, and predators (including humans). Salmon are an important source of spiritual and physical sustenance for Indian tribes, and they are symbolically important to many other residents of the Pacific Coast. Because salmon migrate so far when in the ocean, managing the ocean salmon fisheries is an extremely complex task.

The West Coast Groundfish Observer Program (WCGOP) has primarily focused on sampling limited entry (A permit) vessels since it began in 2001 (66 FR 20609). The data collected from fixed gear vessels are the best available for inferring the approximate discard rates for prohibited species in the directed B species groundfish fishery. The landing limits for groundfish in the limited entry fisheries have been higher than in the open access fishery, and the two fisheries generally operate in different areas with the open access vessels operating closer to port because of lower operating cost and lower landing limits. However, it seems likely that the relative abundance of fish species in the catch should be somewhat similar between the two fisheries.

WCGOP data collected in the sablefish endorsed and non-sablefish endorsed limited entry fixed gear fisheries in 2006 showed no bycatch of Pacific salmon. Sampling was conducted aboard vessels that used longline gear in the non-sablefish endorsed fishery and longline or pot gear in the sablefish endorsed fishery. Sample sizes consisted of 118 trips (185 sets) in the non-sablefish endorsed fishery, all off California (mostly off Los Angeles), and 104 trips (675 sets) in the sablefish-endorsed fishery, which was conducted coastwide and included 65 longline trips (452 sets) and 39 pot trips (288 sets) (NMFS 2007a; NMFS 2007b).

3.2.3.2 Pacific halibut

Pacific halibut (*Hippoglossus stenolepis*) is described in **Section 3.2.2** on non-groundfish fisheries that incidentally catch groundfish. Pacific halibut is a prohibited species for all groundfish fisheries except for the limited entry fixed gear primary sablefish fishery north of Pt. Chehalis, WA, as provided for in groundfish and halibut regulations.

WCGOP data collected in the sablefish endorsed and non-sablefish endorsed limited entry fixed gear fisheries in 2006 showed considerable catch of Pacific halibut in the sablefish-endorsed fishery, discussed below. Sampling was conducted aboard vessels that used longline gear in the non-sablefish endorsed fishery and longline or pot gear in the sablefish endorsed fishery. Sample sizes consisted of 118 trips (185 sets) in the non-sablefish endorsed fishery, all off California (mostly off Los Angeles), and 104 trips (675 sets) in the sablefish-endorsed fishery, which was conducted coastwide, but mostly off Washington and Oregon, and included 65 longline trips (452 sets) and 39 pot trips (288 sets) (**NMFS 2007a; NMFS 2007b**). No Pacific halibut were observed in the non-sablefish endorsed fishery, which was conducted mostly in southern California. The discard rate of Pacific halibut in the sablefish-endorsed fishery was 46.5 lbs/100 lbs of retained sablefish in the longline fishery samples and 3.65 lbs/100 lbs of retained sablefish in the pot fishery samples.

3.2.3.3 Dungeness crab

Dungeness crab (*Cancer magister*) is described in **Section 3.2.2** on non-groundfish fisheries that incidentally catch groundfish. Dungeness crab is a prohibited species for all groundfish fisheries.
WCGOP data collected in the sablefish endorsed and non-sablefish endorsed limited entry fixed gear fisheries in 2006 showed no bycatch of Dungeness crab. Sampling was conducted aboard vessels that used longline gear in the non-sablefish endorsed fishery and longline or pot gear in the sablefish endorsed fishery. Sample sizes consisted of 118 trips (185 sets) in the non-sablefish endorsed fishery, all off California (mostly off Los Angeles), and 104 trips (675 sets) in the sablefish-endorsed fishery, which was conducted coastwide and included 65 longline trips (452 sets) and 39 pot trips (288 sets) **(NMFS 2007a; NMFS 2007b**).

3.2.4 Protected Species

Marine species listed as endangered or threatened under the Endangered Species Act (ESA) include marine mammals, seabirds, sea turtles, salmon, and green sturgeon. Under the ESA, a species is listed as "endangered" if it is in danger of extinction throughout a significant portion of its range and "threatened" if it is likely to become an endangered species within the foreseeable future throughout all, or a significant portion, of its range. Marine mammals and seabirds are also protected under other laws described below.

3.2.4.1 Pacific Salmon

Several species of salmon found along the Pacific Coast have been listed under the ESA (see Insert, below). ESA-listed species are managed under ESA regulations. “Take” (a term that covers a broader range of impacts than just mortality) of listed species may be allowed as long as it is not the primary purpose of the activity. (Therefore, catches of ESA-listed stocks are termed incidental take.) As part of the process authorizing such take, regulatory agencies must consult with NMFS in order to ensure fisheries conducted in the Council area do not “jeopardize the continued existence of the species” (or in the case of salmon, the listed ESUs). Because of the Council’s central role in developing fishery management regimes, it must take the results of such consultations into account. Typically this process, termed a “Section 7 consultation” after the relevant section in the ESA, results in a biological opinion (BO) that applies a set of consultation standards to the subject activity and mandates those actions that

ESA Listed Salmonids

Endangered

Chinook salmon (*Oncorhynchus tshawytscha)*
Sacramento River Winter; Upper Columbia Spring
Sockeye salmon (*Oncorhynchus nerka)*
Snake River
Steelhead trout (*Oncorhynchus mykiss)*
Southern California; Upper Columbia River

Threatened

Coho salmon (*Oncorhynchus kisutch)*
Central California; Lower Columbia River,
Southern Oregon, and Northern California Coasts
Chinook salmon (*Oncorhynchus tshawytscha*)
Snake River Fall, Spring, and Summer;
Puget Sound; Lower Columbia; Upper Willamette;
Central Valley Spring; California Coastal
Chum salmon (*Oncorhynchus keta)*
Hood Canal Summer; Columbia River
Sockeye salmon (*Oncorhynchus nerka)*
Ozette Lake
Steelhead trout (*Oncorhynchus mykiss)*
South-Central California; Central California Coast;
Snake River Basin; Lower Columbia;
California Central Valley; Upper Willamette;
Middle Columbia River; Northern California

must be taken in order to avoid such jeopardy. In addition to the Section 7 consultation, actions that fall under the jurisdiction of the ESA may also be permitted through ESA Section 10 and ESA Section 4(d). Section 10 generally covers scientific, research, and propagation activities that may affect ESA-listed species. Section 4(d) covers the activities of state and local governments and private citizens. Section 4(d) of the ESA requires NMFS and the U.S Fish and Wildlife Service to promulgate "protective regulations" for threatened species (Section 4(d) is not applicable to species listed as endangered) whenever it is deemed "necessary and advisable to provide for the conservation of such species." "Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1) of this title ..." These protective rules for threatened species may apply to any or all of the ESA Section 9 protections that automatically prohibit take of species listed as endangered. The rules need not prohibit all take. There may be an "exception" from the prohibitions on take, so long as the take occurs as the result of a program that adequately protects the listed species and its habitat. In other words, the 4(d) rule can restrict the situations to which the take prohibitions apply. Sec 9(a)(1) includes the take prohibition. The U.S Fish and Wildlife Service adopted a blanket regulation automatically applying the take prohibition to all threatened species upon listing. NMFS has no comparable blanket 4(d) regulation. Instead, NMFS promulgates 4(d) regulations on a species-by species basis once a species is listed as threatened. In proposing and finalizing a 4(d) rule, NMFS may establish exemptions to the take prohibition for specified categories of activities that NMFS finds contribute to conserving listed salmonids. Other exemptions cover habitat-degrading activities (and tribal and recreational fishing activities) that NMFS believes are governed by a program that adequately limits impacts on listed salmonids. As part of the process for developing annual management measures, NMFS summarizes the current consultation standards and may provide additional guidance to the Council on minimizing the take of listed species.

3.2.4.2 Marine Mammals

The waters off Washington, Oregon, and California support a wide variety of marine mammals. Approximately thirty species, including seals and sea lions, sea otters, and whales, dolphins, and porpoise occur within the EEZ. Many marine mammal species seasonally migrate through Pacific Coast waters, while others are year round residents.

The Marine Mammal Protection Act (MMPA) and the ESA are the Federal legislations that guide marine mammal species protection and conservation policy. Under the MMPA, NMFS is responsible for the management of cetaceans and pinnipeds, while the U.S. Fish and Wildlife Service manages sea otters. Stock assessment reports review new information every year for strategic stocks (those whose human-caused mortality and injury exceeds the potential biological removal (PBR)) and every three years for non-strategic stocks. Marine mammals whose abundance falls below the optimum sustainable population are listed as "depleted" according to the MMPA.

ESA Listed Marine Mammals

Endangered

Sperm whale (*Physeter macrocephalus*)
Humpback whale (*Megaptera novaeangliae*)
Blue whale (*Balaenoptera musculus*)
Fin whale (*Balaenoptera physalus*)

Threatened

Steller sea lion (*Eumetopias jubatus*) Eastern Stock
Guadalupe fur seal (*Arctocephalus townsendi*)
Southern sea otter (*Enhydra lutris*) California Stock

MMPA Listed Marine Mammals

Depleted

Northern fur seal (*Callorhinus ursinus*)
Eastern Pacific Stock
Killer whale (*Orcinus orca*)
Eastern North Pacific, Southern Resident Stock

Fisheries that interact with species listed as depleted, threatened, or endangered may be subject to management restrictions under the MMPA and ESA. NMFS publishes an annual list of fisheries in the *Federal Register* separating commercial fisheries into one of three categories, based on the level of serious injury and mortality of marine mammals occurring incidentally in that fishery. The categorization of a fishery in the list of fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. The Pacific Coast groundfish fisheries are in Category III, indicating a remote likelihood of, or no known serious injuries or mortalities, to marine mammals.

3.2.4.3 Seabirds

The California Current System supports more than two million breeding seabirds and at least twice that number of migrant visitors. Tyler et al. (1993) reviewed seabird distribution and abundance in relation to oceanographic processes in the California Current System and found that over 100 species have been recorded within the EEZ including: albatross, shearwaters, petrels, storm-petrels, cormorants, pelicans, gulls, terns and alcids (murres, murrelets, guillemots, auklets and puffins). In addition to these "classic" seabirds, millions of other birds are seasonally abundant in this oceanic habitat including: waterfowl, waterbirds (loons and grebes), and shorebirds (phalaropes). There is considerable overlap of fishing areas and areas of high bird density in this highly productive upwelling system. The species composition and abundance of birds varies spatially and temporally. The highest seabird biomass is found over the continental shelf and bird density is highest during the spring and fall when local breeding species and migrants predominate.

ESA Listed Seabirds

Endangered
Short-tail albatross (*Phoebastria albatrus*)
California brown pelican (*Pelecanus occidentalis*)
California least tern (*Sterna antillarum browni*)

Threatened
Marbled murrelet (*Brachyramphs marmoratus*)

USFWS Listed Seabirds

Birds of Conservation Concern
Black-footed albatross (*Phoebastria nigripes*)
Ashy storm-petrel (*Oceanodroma homochroa*)
Gull-billed tern (*Sterna nilotica*)
Elegant tern (*Sterna elegans*)
Arctic Tern (*Sterna paradisaea*)
Black skimmer (*Rynchops niger*)
Xantus's murrelet (*Synthliboramphus hypoleuc*

U.S. Fish and Wildlife Service is the primary Federal agency responsible for seabird conservation and management. Under the Magnuson-Stevens Act, NMFS is required to ensure fishery management actions comply with the laws designed to protect seabirds.

3.2.4.4 Sea Turtles

Sea turtles are highly migratory and four of the six species found in U.S. waters have been sighted off the Pacific Coast. Little is known about the interactions between sea turtles and Pacific Coast commercial fisheries. The directed fishing for sea turtles in WOC groundfish fisheries is prohibited, because of their ESA listings. The management and conservation of sea turtles is shared between NMFS and USFWS.

ESA Listed Sea Turtles

Endangered
Green turtle (*Chelonia mydas*)
Leatherback turtle (*Dermochelys coriacea*)
Olive ridely turtle (*Lepidochelys olivacea*)

Threatened
Loggerhead turtle (*Caretta care*

3.2.4.5 Green Sturgeon

The Southern Distinct Population Segment (DPS) of green sturgeon (*Acipenser medirostris*) (71 FR

17757, April 7, 2006) are listed as threatened under the ESA. Green sturgeons are found from Ensenada, Mexico, to Southeast Alaska. Green sturgeons are not abundant in any estuaries along the Pacific Coast, although they are caught incidentally in estuaries while fishing for white sturgeon.

The green sturgeon is a primitive, bottom dwelling fish. It is characterized by its large size and long round body. The sturgeon has no scales, instead it has "scutes" (or plates) located along its body. Scutes are actually large modified scales that serve as a type of armor or protection. The dorsal body color is a dark olive-green, with the ventral surface a lighter whitish green, with the scutes having a lighter coloration than the body. Green sturgeon can reach 7 feet in length and weigh up to 350 lbs.

The green sturgeon is an anadromous fish that spends most of its life in salt water and returns to spawn in fresh water. It is a slow growing and late maturing fish that apparently spawns every 4 to 11 years during the spring and summer months. Feeding on algae and small invertebrates while young, green sturgeon migrate downstream before they are two years old. Juveniles remain in the estuaries for a short time and migrate to the ocean as they grow larger. Adult green sturgeon feed on benthic invertebrates and small fish. The green sturgeon can become highly migratory later in life. They have been documented as traveling over 600 miles between freshwater and estuary environments (**PSMFC 2007**).

3.2.4.6 Protected Species Impacts

The 2007-2008 Groundfish Harvest Specifications and Amendment 16-4 EIS contains the following conclusions regarding impacts of groundfish fisheries (including open access fisheries) to protected species (NMFS 2006).

> “The 2005-06 groundfish harvest specifications EIS did not find that the proposed action would result in significant impacts to protected species, based on a qualitative evaluation of the alternatives. Although there was insufficient spatio-temporal information to predict interactions under different alternatives, projected catch, as a gross proxy for overall fishing effort, was used to comparatively evaluate the alternatives. Groundfish trawl fishing effort as reported in logbooks has fallen over the past few years; for example, 110,512 tow-hours were reported in 2000 while 64,763 tow hours were logged in 2004. Declining groundfish trawl effort is a predictable response to lowered OYs and more restrictive management measures imposed to reduce bycatch of depleted groundfish and it is reasonable to conclude that non-trawl sectors experienced similar declines. Furthermore, because OYs for some depleted species—principally canary and yelloweye rockfish—have not increased, it is likely that fishing effort in 2005 and 2006, and the 2007-08 biennium will continue a declining trend. Combined with the conclusion of no significant impact in the previous EIS, and the lack of new information suggesting otherwise, it is reasonable to conclude that the range of alternatives in the current EIS will not result in significant impacts to protected species. For this reason effects to sea turtles, marine mammals, and seabirds are not evaluated in further detail within this EIS. However, given the new information contained in the 2006 supplemental biological opinion on the groundfish fisheries, this EIS focuses on impacts of the alternatives on the ESA-listed salmon evolutionarily significant units (ESUs) identified in that opinion.”

3.3 Socioeconomic Characteristics of the Affected Environment

3.3.1 Management Structure of the Open Access Fishery

A brief description of the current management of open access groundfish fisheries is presented in this section. A more detailed description of the open access fisheries is provided in the Draft EA entitled “Expanded Coverage of the Program to Monitor Time-Area Closures in the Pacific Coast Groundfish Fishery” (PFMC 2007).

3.3.1.1 Federal Management

The open access component of the groundfish fishery is allocated a portion of the available harvest to fishers targeting groundfish without limited entry permits, and fishers who target non-groundfish fisheries that incidentally catch groundfish (PFMC 2007). The *directed* fisheries are those that harvest (1) shelf rockfish primarily using hook-and-line gear; (2) sablefish, primarily using hook-and-line or pot gear; (3) nearshore species, primarily using hook-and-line or pot gear; and (4) "other" species, primarily using hook-and-line or setnet gear. Groundfish trawl gear may not be used in the open access fishery. Trawl gears for target species such as pink shrimp, California halibut, ridgeback prawns, and sea cucumbers, called non-groundfish trawl gear in Federal regulations, are considered part of the open access fishery if they retain groundfish. Therefore, they may be used to land small amounts of groundfish, consistent with the open access trip limits, incidental to the target fishery.

All sectors of the groundfish fishery, limited entry, open access, recreational and tribal fisheries, are constrained by the need to rebuild groundfish species that have been declared overfished. Groundfish specification and management measures are set on a biennial basis with inseason adjustments made at regularly scheduled Council meetings, when necessary, in order to keep the fisheries within species' harvest limits or rebuilding plans established for overfished species (PFMC 2007).

Trip limits and landing frequency have been designated as routine for many species or species groups, all of which are potentially affected by open access fishers. This means that management measures for these species or species groups can be changed more rapidly. Inseason actions to change management measures can be published after one Council meeting and without full notice and comment rulemaking (i.e., through a final rule with no comment period). Directed open access vessels have harvest opportunities for a variety of groundfish species, including but not limited to sablefish, nearshore rockfish, slope rockfish south of Point Conception, California scorpionfish, cabezon, kelp greenling, Pacific sanddab, and spiny dogfish. A lower harvest opportunity is provided for lingcod coastwide (NMFS 2007). More restrictive salmon fishing opportunities in 2006 likely led those fishers to pursue other species, ultimately causing an increase in open access sablefish landing rates and causing early (October) closure of the directed sablefish fishery in that year (NMFS 2006)

Minor shelf rockfish assemblages are divided north and south of 40°10' N latitude. Access to northern shelf species has been substantially limited since the implementation of Rockfish Conservation Areas (RCAs; **Appendix G**) in 2002 largely to reduce mortalities of canary and yelloweye rockfish. Access to southern shelf species has also been substantially limited since the implementation of RCAs under permanent regulations to reduce catch of depleted species, particularly bocaccio and canary rockfish.

Minor slope rockfish assemblages are also divided north and south of 40°10' N latitude with nine species of rockfish in each assemblage. The bulk of the fishery for these species has been harvested with trawl gear with longline gear impacting the resource to a much lesser degree. Areas have been reopened to hook-and-line vessels under recent management alternatives.

Federal regulations do not currently allow for LE trawl fishery landings of nearshore species except for vessels using selective flatfish trawl gear, which are allowed to take up to 300 lbs per month. Limited Entry and open access fixed gear fisheries currently are allowed to take up to 5,000 and 6,000 lbs per 2-mo landing period north and south of the Oregon-California border to Cape Mendocino, respectively, except no more than 1,200 lb may be species other than black or blue rockfish. Current LE fixed gear regulations allow for the taking and landing of 600-800 lbs per 2-mo cumulative landing period depending on time of year and species south of Cape Mendocino. Pink shrimp trawl vessels are allowed to take up to 1,500 lbs of groundfish per trip depending on number of days in the trip (NMFS 2007). A generalized description of current open access fishery regulations (condensed into a single table, rather than two tables) is provided in Table 3-1a.

Table 3-1a Generalized description of Table 5 to Part 660, subpart G: Trip limits for open access gears dated January 1, 2009 (north and south of 40°10' N. Lat) 1/

Management issue	General regulations
Rockfish Conservation Areas (RCAs)	Boundaries vary by area, time of yr, depth, and gear type used
Minor slope rockfish & darkblotched rockfish	<25% of sablefish landed except for Conception area
Sablefish	Daily/weekly/ 2-mo landing limits apply
Thornyheads	Closed except for Conception area
Flatfishes	300 lb/ mo except for Pac sanddab
Whiting	300 lbs/ mo
Shelf rockfish (minor and specified exceptions)	≤1000 lbs/ mo depending on time and area
Canary and yelloweye rockfish, cowcod (south)	No retention
Bocaccio (south)	≤200 lbs/ 2-mo depending on area and time of year
Minor nearshore rockfish and Black rockfish	Variable between species and areas
Lingcod	400 lbs/ mo (May-Nov only)
Pacific cod	1000 lbs/ 2-mo
Spiny dogfish	100K-200K/ 2-mo
Other fish	Not limited
Non-groundfish trawl groundfish limits	
Pink shrimp	500-1500 lbs/ trip; lingcod, sablefish, and overfished species bans apply
CA halibut, prawn and cucumber	300 lbs/ trip; various other restrictions apply
Salmon troll-yellowtail rockfish (north, not subject RCAs)	1 lb/ 2 lbs salmon; 200 lbs/ mo

1/ Open access gear includes all gear types except (1) long-line or trap gear to which an A permit gear endorsement is attached and (2) groundfish trawl (72 FR 69162, December 7, 2007)

3.3.1.2 State Management

The coastal states have management programs or regulations affecting fishermen and vessels that harvest federal groundfish either as target species or incidental to fishing for federal or state managed species. The state limited entry programs cover a variety of species and gear types (**Appendix C**). Nearshore species management has been addressed by the states in different ways. Washington law prohibits directed commercial fishing for groundfish in state waters. Federal and tribal laws provide for tribal fisheries (Makah, Quileute, Hoh, and Quinault), which may fish for groundfish in the Usual and Accustomed fishing areas. Oregon and California have developed nearshore fishery management plans and associated limited entry programs that are aimed at capping or reducing harvest capacity in their nearshore fisheries (see **Appendix D** for more information on the states' nearshore regulations or management programs).

Federal groundfish species included in California and Oregon Nearshore Management Plans
Cabezon, *Scorpaenichthys marmoratus*
Kelp greenling, *Hexagrammos decagrammus*
Black rockfish, *Sebastes melanops*
Black and yellow rockfish, *S. chrysomelas*
Blue rockfish, *S. mystinus*
Brown rockfish, *S. auriculatus*
Calico rockfish, *S. dalli*
California scorpionfish, *Scorpaena guttata* (CA species only)
China rockfish, *S. nebulosus*
Copper rockfish, *S. caurinus*
Gopher rockfish, *S. carnatus*
Grass rockfish, *S. rastrelliger*
Kelp rockfish, *S. atrovirens*
Olive rockfish, *S. serranoides*
Quillback rockfish, *S. maliger*
Tiger rockfish, *S. nigrocinctus* (not in CA plan)
Treefish, *S. serriceps*
Vermilion rockfish, *S. miniatus* (not in CA plan)

Oregon and California have extraterritorial jurisdiction in the EEZ over fishing vessels that are registered in their respective states. In both states nearshore species may only be taken and landed by permitted vessels or permitted fishermen. State extraterritorial jurisdiction does not extend to fishing activities in the EEZ or beyond by vessels not registered in Oregon or California. Nearshore species are occasionally caught in federal waters, which make them vulnerable to take off Oregon and California and landing in Washington by vessels not registered in the bordering states. NMFS regulations do not allow for the taking of groundfish by foreign vessels. Washington laws allow for the taking and landing of nearshore species taken in federal waters except as prohibited by RCA or other conservation area regulations, which encompass the vast majority of the EEZ.

There has been a virtual absence of nearshore species landings by open access fishermen at Washington ports since before 1998 (shown in Table 3-5 below). This shows there currently is no interest or opportunity for fishermen to take nearshore species off the Washington coast or either of the other two states. Oregon and California nearshore landings, which have been substantial over the years, have been regulated and enforced by the respective states (for California see: 14 CCR §150.16).

In developing a federal license limitation program, the coastal states, tribes, Council and NMFS must ensure that state and federal capacity reduction programs are compatible with each other and that together the programs ultimately achieve the goals of the license limitation program. The Council process will provide a forum for this cooperation.

3.3.1.3 Pacific Coast Observer Programs for Groundfish

The Magnuson-Stevens Act requires that FMPs establish a standardized reporting methodology to assess the amounts and types of bycatch in a fishery, and requires that FMPs identify and rebuild overfished stocks. For the Pacific Coast groundfish fishery, federal observer programs gather information to help manage bycatch and overfished species.

There are currently two Federal observer programs being operated by the NMFS Northwest Fisheries Science Center in the Pacific Coast groundfish fishery: the At-sea Hake Observer Program and the Pacific Coast Groundfish Observer Program (WCGOP). These two programs are very different from each other particularly in how they are funded, the type of sampling and fishery data that are used to derive total catch, and availability of data for inseason management. Participation in the at-sea hake/whiting fishery is restricted to vessels with limited entry trawl permits. Therefore, that program is not relevant to this NEPA document on the open access fishery.

The WCGOP is a year round federally funded program that provides observers for all of the commercial groundfish fisheries, except the Pacific whiting fishery. Because monitoring of the Pacific whiting shoreside sector has been carried out under the EFPs, WCGOP observers have not been used to provide coverage for that sector. The Pacific States Marine Fish Commission is under contract to provide observers who are trained by NMFS. All sampling protocols and coverage strategies are defined by NMFS. Because there are few observers in relation to the number of vessels in the groundfish fishery, observer sampling coverage has focused on obtaining bycatch data at sea which can be combined with state fish ticket data to derive bycatch ratios for different fishing areas and target fishing strategies. Trawl vessel logbook data is used to estimate trawl vessel fishing effort. Using observer, fish ticket, and trawl logbook data, the fishery is modeled to derive estimate of total catch by species. Due to the delayed availability of fish ticket and logbook data, and the time needed to process observer data, the final analysis of estimated total catch by species is typically not finalized until the year after the fishing year has ended (WCGOP 2007).

Currently, WCGOP has two observer program data reports for the open access fisheries (WCGOP 2005 & 2007). Both reports focus on the open access nearshore fisheries in depths of less than 50 fathoms, but include any other open access fixed-gear trips in depths of less than 50 fathoms.

3.3.2 Catch Characteristics - Amounts and Fishery Values

PacFIN data were used to characterize effort and catch in commercial groundfish fisheries during the window period. Recreational data were extracted from the RecFIN web site.

3.3.2.1 Pacific Coast Groundfish Fisheries

Landed weight of groundfish in specified Pacific Coast groundfish fisheries declined from about 46,000 mt to 21,000 mt during the window period. The commercial and recreational portions of the catch averaged 90 percent and 10 percent, respectively, with the commercial portion varying between 86 percent and 93 percent annually. The landing trend in all fisheries was generally downward. The open access portion averaged about 5 percent of the total groundfish landed and ranged from about 4 percent to 7 percent annually (**Table 3-1b; Figure 3-1**).

Table 3-1b: WOC shoreside groundfish landing metrics (excluding tribal, research, shoreside whiting, and at-sea catches) by year and sector, 1998-2006 1/

Year	LE	OA-D	OA-I	OA-T	Recreational	Total
Part 1: metric tons						
1998	31,827	2,152	465	2,617	2,876	39,473
1999	38,895	1,377	449	1,826	3,509	45,607
2000	34,204	1,127	341	1,468	3,110	39,908
2001	27,296	1,134	288	1,422	3,142	32,994
2002	24,000	1,089	130	1,219	3,023	29,331
2003	23,209	1,185	79	1,264	4,040	29,698
2004	22,139	1,153	94	1,247	2,321	26,860
2005	22,181	1,451	103	1,553	2,488	27,673
2006	16,260	1,166	81	1,247	2,551	21,224
AVG	26,668	1,315	226	1,540	3,007	32,530
Part 2: proportion of total for all fisheries						
1998	80.6%	5.5%	1.2%	6.6%	7.3%	100.0%
1999	85.3%	3.0%	1.0%	4.0%	7.7%	100.0%
2000	85.7%	2.8%	0.9%	3.7%	7.8%	100.0%
2001	82.7%	3.4%	0.9%	4.3%	9.5%	100.0%
2002	81.8%	3.7%	0.4%	4.2%	10.3%	100.0%
2003	78.2%	4.0%	0.3%	4.3%	13.6%	100.0%
2004	82.4%	4.3%	0.4%	4.6%	8.6%	100.0%
2005	80.2%	5.2%	0.4%	5.6%	9.0%	100.0%
2006	76.6%	5.5%	0.4%	5.9%	12.0%	100.0%
AVG	81.5%	4.2%	0.6%	4.8%	9.5%	100.0%

1/ Commercial data from PacFIN; recreational from RecFIN

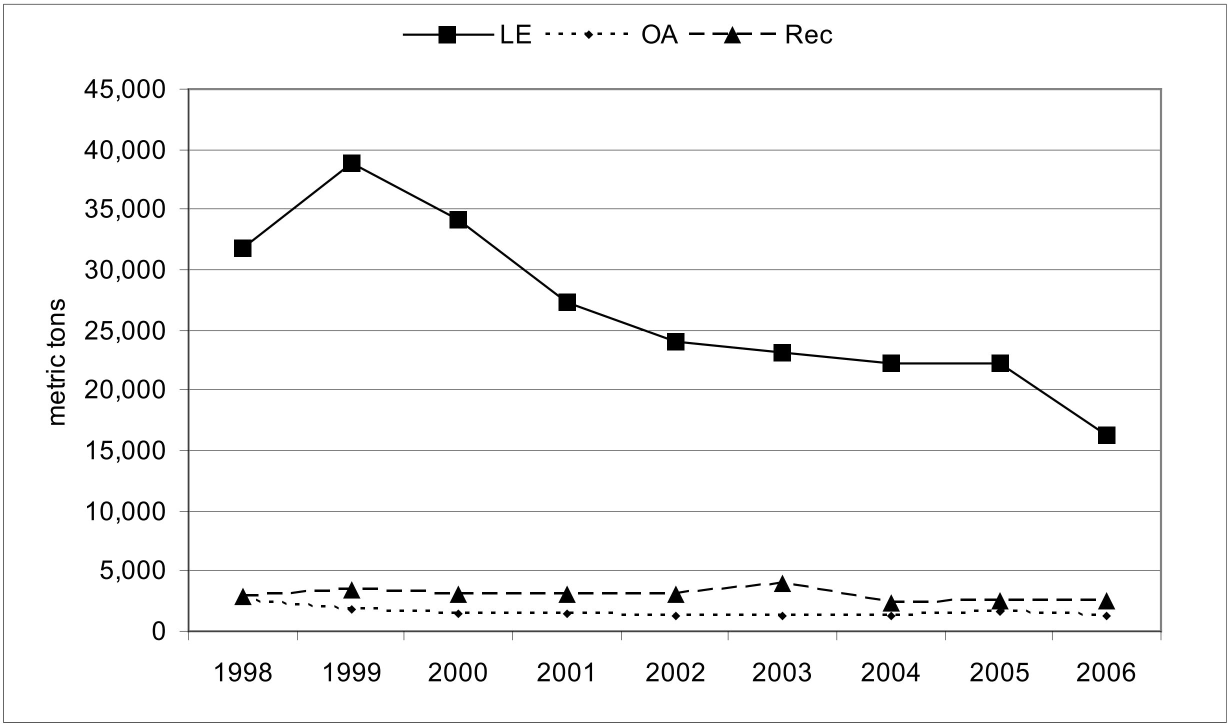

Figure 3-1: Landing trends in WOC groundfish fisheries by sector and year, 1998-2006 window period

3.3.2.2 Open Access Fisheries

Open access fisheries are made up of those vessels landing Federal groundfish species without a federal limited entry groundfish permit (A permits). Participants in the open access fisheries generally fall into two categories: 1) those that target groundfish (directed) and 2) those that catch groundfish while fishing for other species (incidental). The number of vessels that participated in open access fisheries declined from 1,483 in 1999 to 905 in 2006 (**Table 3-2a; Figure 3-2**). The weight of fish landed by open access vessels averaged 1,547 metric tons (mts) and ranged from 2,609 mts to 1,215 mts (**Table 3-2a and Figure 3-3**).

Table 3-2a: Total open access fishery data including incidental catch tonnages and proportions (P) of 1998-2006 totals

		Total OA		Incidental	
Year	State	# vsls	mt	mt	P
1998	CA	987	1,823.2	172.2	0.09
	OR	410	562.2	169.2	0.30
	WA	79	224.0	123.3	0.55
	sub	1,476	2,609.4	464.7	0.18
1999	CA	1,004	1,162.2	191.1	0.16
	OR	380	538.9	207.4	0.38
	WA	99	114.0	50.7	0.44
	sub	1,483	1,815.1	449.2	0.25
2000	CA	967	1,017.2	171.0	0.17
	OR	376	335.7	123.8	0.37
	WA	87	109.1	46.1	0.42
	sub	1,430	1,462.0	340.9	0.23
2001	CA	783	877.7	95.0	0.11
	OR	404	444.4	165.6	0.37
	WA	95	94.7	27.8	0.29
	sub	1,282	1,416.8	288.4	0.20
2002	CA	707	777.6	70.8	0.09
	OR	366	342.8	38.1	0.11
	WA	86	94.9	20.9	0.22
	sub	1,159	1,215.3	129.8	0.11
2003	CA	633	741.5	59.8	0.08
	OR	338	347.9	15.8	0.05
	WA	100	171.3	3.7	0.02
	sub	1,071	1,260.7	79.3	0.06
2004	CA	558	748.1	64.0	0.09
	OR	353	304.8	26.2	0.09
	WA	87	191.4	4.2	0.02
	sub	998	1,244.3	94.4	0.08
2005	CA	501	873.6	71.1	0.08
	OR	374	475.6	24.9	0.05
	WA	101	258.0	6.8	0.03
	sub	976	1,607.2	102.8	0.06
2006	CA	484	596.5	55.1	0.09
	OR	309	423.4	20.6	0.05
	WA	112	275.4	4.8	0.02
	sub	905	1,295.3	80.5	0.06
AVGS	CA	736	957.5	105.6	0.11
	OR	368	419.5	88.0	0.21
	WA	94	170.3	32.0	0.19
	TOTAL	1,198	1,547.3	225.6	0.15

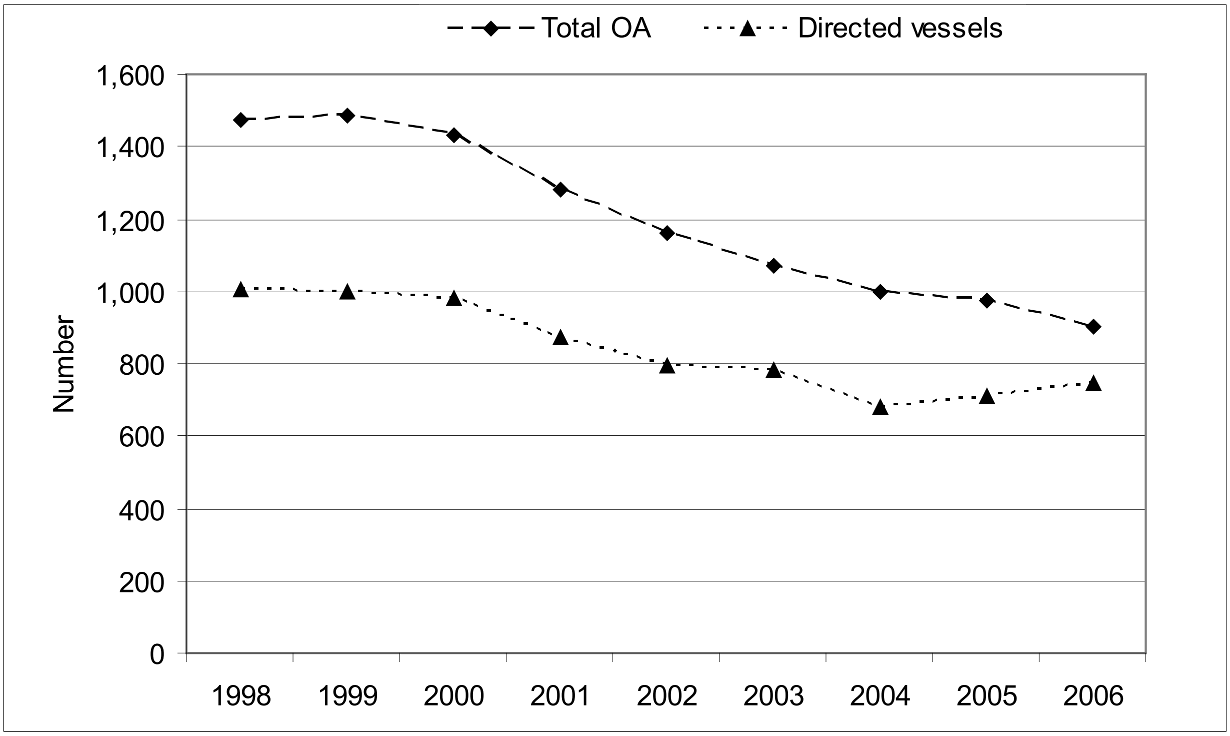

Figure 3-2: Number vessels in total and directed open access fisheries, 1998-2006

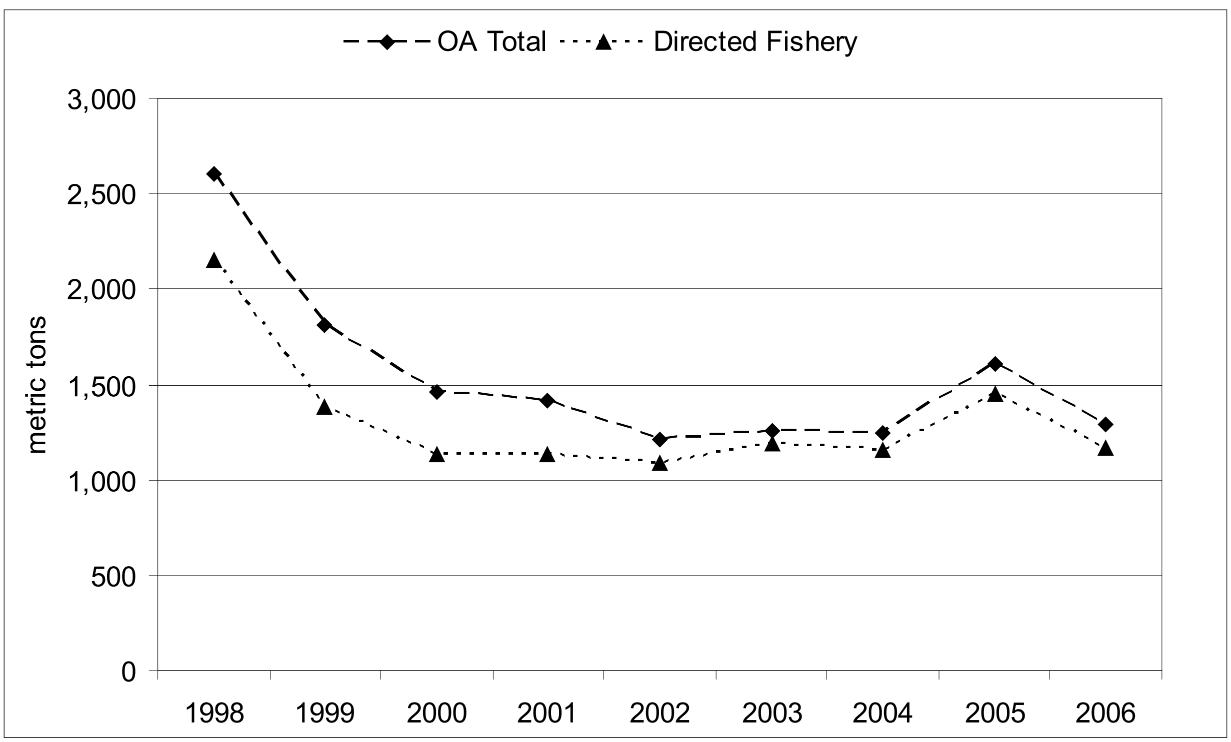

Figure 3-3: Tonnages landed in total and directed open access fisheries, 1998-2006

During 1994-2006, landed catches of allocated groundfish species in open access fisheries declined from 2,767 mt in 1994 to 733 mt in 2002 (74 percent decrease) then increased to 1,181 mt in 2005. The recent years' increase in landings was due to increased landings of sablefish, mostly in the Monterey-Vancouver management area (**Table 3-2b).** During the same period the landed catch of rockfish (*Sebastes)* declined from 1,627 mt in 1994 to 186 mt in 2005 then increase to 196 mt, an overall 88 percent decrease in landings (**Table 3-2b).**

Table 3-2b: Open access fishery landed catches of allocated species in metric tons, 1994-2006 1/

Species (allocation)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Lingcod (19%)	475	342	298	315	101	100	56	72	79	71	81	74	72
Sablefish-north (9.4%) 3/	599	540	641	542	176	266	428	412	370	548	454	904	697
Sablefish-Conception (HG)	66	80	41	5	3	10	14	14	29	32	26	17	117
Widow (3%)	276	168	53	98	213	46	17	15	1	1	0	1	1
Canary (12.3%)			186	233	175	93	15	7	1	0	0	0	0
Chilipeper (44.3%)						108	52	28	3	0	2	1	1
Bocaccio-south (44.3%) 4/	457	346	153	72	73	24	5	5	2	0	2	1	3
Yellowtail (8.3%) 5/	772	418	403	353	414	112	67	54	26	6	11	9	10
Shortspine TH (0.27%) 6/			14	16	1	3	2	2	1	0	1	0	0
Darkblotched (2.3%)								0	1	0	1	2	3
Sebastes -north (9.6%) 7/	264	85	144	83	66	62	43	53	45	29	29	45	39
Slope							8	8	2				
Shelf							7	7	5				
Nearshore							28	38	38				
Sebastes -south (44.3%) 7/	1,087	980	768	613	641	258	168	171	175	156	153	127	139
Slope							9	25	60				
Shelf							22	13	11				
Nearshore							137	133	104				
Sebastes	1,627	1,233	965	794	920	703	367	333	254	192	198	186	196
All species total	2,767	2,195	1,959	1,672	1,201	1,082	867	833	733	843	760	1,181	1,082

1/ see Table 1-1 for footnotes.

3.3.2.3 Incidental Open Access Fisheries

3.3.2.3.1 Fishery Descriptions

Groundfish are caught incidentally in all major Pacific Coast commercial fisheries, including the following non-groundfish trawl fisheries: California halibut, pink shrimp, ridgeback prawn, sea cucumber and spot prawn. The fixed gear fisheries that take incidental amounts of groundfish include California halibut, coastal pelagic species, crab pot, fish pot, highly migratory species, Pacific halibut, salmon, sea urchin, and set net fisheries. Incidental fisheries are described in this section. For more information on individual gear types see: **Recht 2003** and **NMFS 2005**.

3.3.2.3.1.1 California Halibut

California halibut are commercially harvested by three principal gears: otter trawl, entangling nets (set gill net and set trammel net), and hook-and-line, all of which intercept groundfish. Trawling for California halibut is permitted in federal waters from 3 to 200 nautical miles (nm) offshore under specified regulations. Trawling is prohibited in California waters, except in the designated "California halibut trawl grounds," which encompass the area between Point Arguello (Santa Barbara County) and Point Mugu (Ventura County) in waters not less than 1 nm from the mainland shore (**CDFG 2007).** Trawlers annually take about 71 percent of the commercial halibut harvest, followed by 15 percent from entangling nets, and 14 percent from hook-and-line gear in recent years. Approximately 19 percent of the state's total annual catch in recent years was landed in a live condition which can command a premium price about 1.5 times greater than in a dead condition. **(Stephen P. Wertz 2007*).***

3.3.2.3.1.2 Pink Shrimp

The Pacific Coast's pink shrimp fishery began in the 1950s in California and is now concentrated in Oregon and Washington. Regulations have evolved over time, but in 1981 they were changed, based on a three-state agreement, to establish uniform coastwide management measures. The resulting regulations, which are still in effect, include an open season from April 1 through October 31. A minimum mesh size of 1 3/8 inches measured inside the knots (California waters only), and a maximum count per pound of 160 are enforced when landing pink shrimp in a port. The pink shrimp fishery off the Pacific Coast is managed by the states, but trip limits for incidental groundfish catch, a vessel monitoring system beginning in 2008, and area restrictions protecting groundfish EFH are enforced in the federal open access fishery. Additionally, in 2000, the Council determined canary rockfish to be overfished. In response, the three states required fishermen to use approved Bycatch Reduction Devices (BRDs). BRDs were required in California in 2002, and in Oregon and Washington, they were required mid-season in 2001 and 2002; and permanently beginning in 2003. These devices have greatly reduced fish bycatch. The landings of other fin fish species now comprise less than 0.01 percent of the total value. The pink shrimp trawl fishery is exempted from RCA boundaries because of BRDs that effectively reduce rockfish bycatch. Pink shrimp are harvested by trawl vessels using a single net fished from the stern (single rig) or two independent nets set out from the vessel by trawl arms (double rig). Vessels generally work between 75 and 125 fathoms on green mud or muddy-sand substrates (**Adam J. Frimodig 2007 and Kelly Ames 2008*).***

3.3.2.3.1.3 Ridgeback prawn

Ridgeback prawns (*Sicyonia ingentis*) are harvested commercially using bottom trawl gear in California south of Pt. Conception, mostly in the Santa Barbara Channel and off Santa Monica Bay. NMFS regulations allow the ridgeback prawn trawl fishery to operate in the RCA to 100 fm when the shoreward boundary is at 75 fm. A regulation summary and Title 14, California Code of Regulation reference, is available on the CDFG web site at: http://www.dfg.ca.gov/marine/pdfs/commercialdigest2007.pdf. The ridgeback prawn fishery operates primarily between 35 fm and 90 fm, with an average fishing depth of 75 fm. Trawl log data show that 99 percent of ridgeback prawns are caught in depths of 101 fm or less. Trawl data from 2001 showed that 40 percent of the annual catch occurred in depths of 75 fm to 100 fm **(Robert Leos 2007**).

3.3.2.3.1.4 Sea Cucumber

Two sea cucumber species are targeted commercially: the California sea cucumber (*Parastichopus californicus*) and the warty sea cucumber (*P. parvimensis*). Commercial dive fisheries for sea cucumbers take place in Washington, Oregon, Alaska, and the coast of British Columbia, Canada. Additionally, California has a trawl fishery for sea cucumbers. Of the three states, Washington and California are the major producers with only small amounts taken occasionally in Oregon. Oregon's cucumber fishery is classified as a developmental fishery. Washington's sea cucumber fishery takes place in the Strait of Juan de Fuca and Puget Sound. Washington State regulations prohibit the take of sea cucumber by means other than by dive gear, which precludes incidental take of groundfish. California's trawl fishery is subject to groundfish incidental take regulations. California's trawl (and dive) sea cucumber fishery is a restricted access fishery requiring possession of a permit. Trawl landings have remained relatively stable since peaking in 2002 with all but a small fraction (1 percent) taken in southern California ports. Ten trawlers took approximately 30 percent of the state's catch in 2006. Trawl catches also take place when vessels fish for California halibut since there is no limit to the amount that may be taken when trawl vessels are fishing in the California halibut trawl grounds, with trips lasting from one to several days in length. (**Laura Rogers-Bennett and David S. Ono 2007; Michele Culver 2008).**

3.3.2.3.1.5 Spot Prawn

California is the only state with a major spot prawn fishery. Oregon's spot prawn fishery is part of its Developmental Fishery Program, with permits required to harvest this species (permits are not needed to harvest these species as bycatch in other established fisheries). In California, spot prawn is currently caught only with trap gear under specified regulations, although a small amount shows up as bycatch in the ridgeback trawl fishery (< 0.5 mt/year). A 50 lb allowance of spot prawn while trawling for ridgeback prawn is still legal, but spot prawn may not be landed as bycatch when trawling for pink shrimp (**CDFG 2007).** The baited traps are fished in strings at depths of 100 –167 fm along submarine canyons or shelf breaks. Each string consists of a groundline with anchors and a buoy at one or both ends, and 10 to 30 traps attached. No other species may be taken in a prawn trap so all bycatch is returned to the water immediately. Until 2002, spot prawn were harvested in California by trawl and trap gear. In 2003, the use of trawl gear for the take of spot prawn was outlawed because of the bycatch of rockfish, particularly bocaccio, an overfished species. Oregon and Washington banned the use of trawl gear to take spot prawn in 2004 due to concerns about habitat destruction. Both states currently allow the use of pot gear for spot prawn take and landing. Almost all spot prawn harvested is sold live, with ex-vessel prices ranging from $10.00 to $13.50/pound. Fresh dead spot prawn generally sells for half the price of live (**Kristine Barsky 2007 and Kelly Ames 2008**).

3.3.2.3.1.6 Coastal Pelagic Species

Coastal pelagic species (CPS) include northern anchovy, market squid, Pacific bonito, Pacific saury, Pacific herring, Pacific sardine, Pacific (chub or blue) mackerel, and jack (Spanish) mackerel. Coastal pelagic species fisheries are concentrated in California, but fishing also takes place in Washington and Oregon. Management of the CPS is now governed by the CPS Fishery Management Plan including provisions for limited entry management. During the 1940s and 1950s, approximately 200 vessels participated in the Pacific sardine fishery. Some present day CPS vessels are remnants of that fleet. Coastal pelagic species are harvested directly and as bycatch in other fisheries. Generally, they are targeted with "round-haul" gear including purse seines, drum seines, lampara nets, and dip nets. These species are also taken incidentally with midwater trawls, pelagic trawls, gillnets, trammel nets, trolls, pots, hook-and-line, and jigs. CPS finfish are sold as relatively high volume/low value products (e.g., Pacific mackerel canned for pet food, Pacific sardine frozen and shipped to Australia to feed penned tuna, and northern anchovy reduced to meal and oil). In addition to fishing for CPS finfish, many of these vessels fish for market squid, Pacific bonito, bluefin tuna, and Pacific herring. Vessels using round-haul gear account for approximately 99 percent of the CPS landings and revenue per year. Crew sizes vary, with larger purse seiners using between six to 10 crew members. Fishing is usually done in relatively shallow waters (<20 fathoms) with trips of no more than a day in length. Because CPS are harvested mostly with purse seine gears schools relatively near the water's surface, where fish are easily identified, the incidental catch of groundfish is thought to be minimal. However, incidental catch increases when purse seines are set in shallow water, nearshore, such that the seine net comes in contact with the bottom or a rocky outcropping (**Goen and Hastie 2002**).

3.3.2.3.1.7 Crabpot

Dungeness crab (*Cancer magister*) exist in commercial quantities from Alaska to south of San Francisco, California. Dungeness crab lives in the intertidal zone to a depth of 170 m. Washington's coastal commercial crab grounds extend from the Columbia River to Cape Flattery near Neah Bay and include the estuaries of the Columbia River, Grays Harbor, and Willapa Bay. Oregon has consistently been one of the largest producers of Dungeness crab on the Pacific Coast, and its Dungeness crab fishery is the largest single species commercial fishery by value of the state. California's fishery is centered in northern California with the central California fishery taking place around the San Francisco port complex. Washington, Oregon, and California undertake coordinated management of the fishery under the auspices of the Pacific States Marine Fisheries Commission. An average of about 1,700 vessels per year has participated in the coastwide fishery since 1998. Crab pots are used for most all commercial crabbing. Pots must conform to construction guidelines that efficiently minimize their impact on undersize and non-target species. Multiple crab pots are set in rows, each on an individual line. Pots are retrieved using hydraulic “crab blocks” which are essentially power driven winches. An efficient crew can hoist and re-bait as many as 400 pots per day. Pots are predominantly set between 10 and 50 fathoms (60-300 feet) although Dungeness crab commonly occur from intertidal areas to 200 fathoms (1,200 feet). Crabs are stored live in holds on boats that are filled with re-circulating sea water and are delivered every few days to fish processing plants. Groundfish are caught incidentally in Dungeness crab pots off all three states, but can only be landed in California ports (**Robert Leos 2007**).

Lobster fishermen typically use 100-500 traps, although some fishermen may use as many as 750 traps at the peak of the season. Lobster traps are box-like devices usually constructed of heavy wire mesh, although other materials (such as plastic) may be used. Traps are baited with whole or cut fish, and placed on the sea floor using cement, bricks, or steel as ballast. The incidental take of groundfish in this fishery is minimal. For example, in 2006, of the 158 OA vessels that made lobster landings, about 0.25 mt of groundfish was taken with trips where lobster were also landed (**Robert Leos 2007**).

3.3.2.3.1.8 Finfish Pot (California sheephead and hagfish)

Fin fish pot gear is used for targeting sablefish, thornyheads and nearshore species, and for non-groundfish species such as California sheephead and hagfish. Sheephead was not a targeted species until recent years due to the live fish fishery and high demand for this particular species. California sheephead are under state management and are subject to the regulations that govern the state’s nearshore fishery complex. The sheephead total allowable catch has been 75,200 pounds per year. Other regulations include a 13 inch (total length) minimum size limit, and two-month cumulative trip limits per nearshore fishery permit holder. From 2004-2006, trap (pot) gear was used to catch the majority of landed sheephead, accounting for 85 percent (100 mt) of the three-year total of 118 mt in the open access fishery (includes directed and incidental). At least 90 percent of this take was landed in live condition. Of the 45 fishermen who made any sheephead landings using trap gear during this three-year period, 10 of them accounted for approximately 66 percent of the total sheephead take (**Robert Leos 2007**). Only one pot permit is allowed in Oregon’s nearshore fishery (**Kelly Ames 2008**).

In the developing hagfish fishery, the take is made largely with bucket trap gear with no incidental take of other species. Bucket traps are basically modified plastic barrels. Korean traps are permitted but are not generally used because of their smaller size. Oregon has had the largest fishery followed by Washington and California, primarily in the Conception area. The market for this fishery is exports to Korea in a live condition. In Oregon hagfish are under the Developmental Fishery Program. Permits are valid for 90 days from issuance, unless five landings of 1,000 lb or 25,000 lb total is landed within the 90-day time period, in which case the permit is valid for the rest of the year. Currently, there are 25 permits for harvest by pot gear. Roughly 100 pots are fished using 55 gallon plastic drums. In 2007, four permits were issued and roughly 850,000 lbs of hagfish were landed in Oregon. No other open access finfish pot fisheries exist in Oregon (**Robert Leos 2007; Kelly Ames 2008**)

3.3.2.3.1.9 Highly Migratory Species

Highly migratory species (HMS) include tunas, billfishes, dorado, and certain pelagic sharks. The Council’s HMS FMP applies to all U.S. vessels that fish for HMS within the EEZ (3-200 nautical miles) off California, Oregon, or Washington and to U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their fish in California, Oregon, or Washington. There are 5 distinctive gear types used to harvest HMS commercially, with hook-and-line gear being the oldest and most common. Other gears used to target HMS are driftnet, pelagic longline, purse seine, and harpoon. Vessels targeting HMS take groundfish incidentally in small quantities. A notable source of groundfish species mortality within the

HMS fishery has been due to “mixed trips,” in which a vessel operating under a VMS license also targets groundfish during a single trip. The expansion of VMS coverage into the open access fishery, effective February 7, 2008 (72 FR 69162, December 7, 2007), is expected to reduce mixed trip impacts on groundfish, and depleted species in particular **(Steve Wertz 2007)**

3.3.2.3.1.10 Pacific Halibut Longline

Pacific halibut (*Hippoglossus stenolepis*) are managed by the bilateral (United States./Canada) International Pacific Halibut Commission (IPHC) with implementing regulations set by Canada and the United States in their own waters. The Pacific Halibut Catch Sharing Plan for waters off Washington, Oregon, and California (Area 2A) specifies IPHC management measures for Pacific halibut on the Pacific Coast. Implementation of IPHC catch levels and regulations is the responsibility of the Council, the states of Washington, Oregon, and California, and the Pacific halibut treaty tribes. The directed fishery is responsible for most of the non-treaty commercial catch of Pacific halibut, while the treaty catch is approximately 35 percent of the total allowable catch. An incidental halibut fishery occurs within the primary sablefish fishery north of Point Chehalis, Washington (46° 53' 18" N. latitude). To allow landing of these halibut, the Catch Sharing Plan stipulates that when the Area 2A total allowable catch (TAC) is above 900,000 pounds, halibut may be retained in the limited entry primary sablefish fishery Rockfish are also caught in the halibut fishery, particularly yelloweye rockfish. However, encounters have been significantly reduced in the non-treaty commercial fishery in recent years by restricting the fishery to depths greater than 100 fm. Sablefish are commonly intercepted, as they are found in similar habitat to Pacific halibut and are easily caught with longline gear. Landings of halibut are monitored by state fish tickets and through the mandatory logbooks required in the directed commercial halibut fishery. In 2006, the IPHC issued 298 licenses for the directed commercial fishery (including the incidental halibut during the sablefish fishery) for Area 2A. The directed commercial fishery consisted of three 10-hour fishing periods with fishing period limits. Fishing periods are set up using vessel size classes (Jamie Goen 2007 and Kelly Ames 2008)

3.3.2.3.1.11 Salmon Troll

Salmon are targeted with troll gear off of all three states. Troll gear consists of heavily weighted main troll lines from which multiple leaders with attached lures or baited hooks are used to catch Chinook salmon off all three states and coho salmon off Oregon and Washington. The ocean commercial salmon fishery, both nontreaty and treaty, is under federal management with a suite of seasons, gear restrictions, and total allowable harvest levels. The Council manages commercial fisheries in federal waters, while the states manage fisheries in territorial waters, which are usually in close conformance to the federal regulations. Annual average salmon troll vessels for the window period were 634 in California, 422 in Oregon and 66 in Washington. Bycatch of fish other than salmon is generally limited by regulation. The EIS for 2007-2008 groundfish management measures determined that catch levels for target salmon fisheries would not have a significant impact on overfished groundfish species (**Robert Leos 2007**).

3.3.2.3.1.12 Red sea urchin

Some California dive boats used fixed fishing gear to harvest fin fish species during diving operations for red sea urchin during the window period. Both state and federally managed species may be harvested including federal groundfish. The fixed gear types used during dive operations are not generally recorded on fish tickets and probably include one or a combination of hook and line and fish pot gear types **(Robert Leos 2007).**

3.3.2.3.1.13 California Setnet Fishery

The California setnet fishery uses anchored gill or trammel nets to catch target fish species, including federal groundfish. California regulations limit the fishery to specific times and areas (**CDFG 2007).** The three top species targeted are California halibut, white seabass, and thresher shark. These three species make up approximately 72 percent of all landings. California halibut is the major target species, making up approximately 35 percent of the cumulative window period total. Other species taken in appreciable numbers include: yellowtail, soupfin shark, skates, and leopard shark. Fishery activity has been concentrated in ports south of Point Conception where 87 different vessels made landings during the window period. Thirty made landings in the south-central region with only 6 making landings in the north-central region. The most vessels that fished in any single year was in the south region with 36 in 1999. That region averaged 26 vessels per year. This indicates that many vessels move out and move into the fishery on a year-to-year basis (**Robert Leos 2007**).

3.3.2.3.2 Landings Characteristics of Incidental Fisheries

The overall contribution of incidental fisheries to WOC groundfish fisheries was discussed above. Here we describe the landings in individual fisheries for which landings data are available. There were substantial incidental landings during 1998-2001 window period years that cannot be tied to particular fisheries, and appear to be the result of data coding errors or the inclusion of limited entry data in open access fishery files. The unaccounted for fishery landings in incidental fisheries declined from 58 mt to 96 mt during 1998-2001 to an annual range of 3 mt to 7 mt during 2002-2006 (**Table 3-3).** The available data show that fisheries with the greatest incidental impact on federal groundfish during the window period were the pink shrimp trawl, California set net, California halibut trawl and salmon troll fisheries, which collectively averaged 153.5 mt per year or 81 percent of the total for all fisheries combined. Starting in 2003 there were reductions in incidental fishery landings in several fisheries. The most notable reduction was in the pink shrimp trawl fishery which fell from 47 mt in 2002 to 1.3 mt in 2003 and continued to decline toward zero in most years thereafter (**Table 3-3).** Average annual incidental fishery landings for all fisheries combined during 2003-2006 window period years were 89 mt tons, which was 45 percent of the window period average of 190 mt for landings that can be attributed to individual fisheries.

Table 3-3: Federal groundfish landings in incidental fisheries, 1998-2006 including averages

Fishery	1998	1999	2000	2001	2002	2003	2004	2005	2006	AVG
Non-groundfish trawl										
California halibut	56.6	47.3	22.5	21.7	14.3	10.6	28.1	31.6	22.7	28.4
Pink shrimp	186.5	220.8	153.0	94.2	47.0	1.3	1.8	0.1	0.0	78.3
Ridgeback prawn	1.9	4.1	8.0	9.1	3.8	3.4	0.9	1.2	3.4	4.0
Sea cucumber	3.1	1.6	1.2	1.4	0.9	1.1	0.3	0.1	0.0	1.1
Spot prawn 1/	28.8	16.0	6.0	3.4	2.0	0.2	0.0	0.0	0.0	6.3
subtotal	276.9	289.8	190.7	129.8	68.0	16.6	31.1	33.0	26.1	118.0
California halibut HL 2/	4.7	5.8	5.2	3.7	2.3	3.4	3.0	1.2	1.1	3.4
CPS	6.2	3.6	2.5	2.8	2.0	4.3	2.9	0.8	1.9	3.0
Crabpot	1.5	1.0	1.2	0.7	0.6	0.9	1.2	4.3	6.1	1.9
Fish pot 2/	3.7	3.1	6.8	9.0	3.1	3.9	4.5	2.3	1.2	4.2
HMS	3.8	2.7	2.9	3.4	4.1	1.9	2.1	1.7	1.7	2.7
Pacific halibut LL 2/	2.0	4.6	3.7	5.6	4.1	10.9	15.9	20.3	20.3	9.7
Salmon	37.8	22.5	18.0	13.4	9.3	8.7	13.1	11.5	4.1	15.4
Sea urchin	0.0	0.1	0.5	0.1	0.3	0.3	0.0	0.0	0.0	0.1
Set net 2/	31.9	57.7	46.3	38.8	29.2	25.8	16.8	22.3	14.4	31.5
subtotal	91.6	100.9	87.1	77.5	54.9	60.1	59.6	64.4	50.8	71.9
TOTAL	368.5	390.7	277.8	207.3	122.9	76.7	90.7	97.4	76.9	189.9
Fishery unknown	96.2	58.4	63.1	81.2	6.9	2.7	3.6	5.4	3.6	35.7
TOTAL (2)	464.7	449.1	340.9	288.5	129.8	79.4	94.3	102.8	80.5	225.6

1/ Prohibited in California starting April 2003. Incidental landings are allowed with ridgeback prawn landings

2/ excludes B species directed fishery landings

Landings of target species by fisheries that made incidental groundfish landings averaged about 195,000 mt worth about $149 million ex-value price annually during the window period. The groundfish landings associated with these deliveries contributed ≤0.2 percent in terms of weight or value of the landed catch (**Table 3-4**). Federal groundfish incidental fishery landing contributions varied in importance between fisheries. The fisheries with highest groundfish contributions were the California halibut trawl fishery (26 percent by weight; 9 percent by value), Pacific halibut long-line fishery (16 percent by weight; 10 percent by value), California spot prawn trawl fishery (11 percent by weight; 1 percent by value) and the California set net fishery (9 percent by weight; 3 percent by value). All other fisheries showed average groundfish landings of ≤5 percent by weight or value compared to target species landings (**Table 3-4).**

Table 3-4: Summary of open access fishery incidental fishery landings of federal groundfish, 1998-2006 annual averages

	Target species		Federal groundfish		Federal groundfish % based on	
Fishery	mt	K$$	mt	K$$	mt	K$$
Non-groundfish trawl						
California halibut	111.2	759.4	28.4	66.1	25.5%	8.7%
Pink shrimp	8,244.7	6,254.2	78.3	90.9	0.9%	1.5%
Ridgeback prawn	219.6	625.5	4.0	7.6	1.8%	1.2%
Sea cucumber	91.5	162.4	1.1	2.7	1.2%	1.6%
Spot prawn 1/	57.5	929.7	6.3	11.3	10.9%	1.2%
subtotal	8,724.6	8,731.1	118.0	178.5	1.4%	2.0%
California halibut HL 2/	66.1	467.6	3.4	15.3	5.1%	3.3%
CPS	149,012.7	31,799.8	3.0	5.3	0.0%	0.0%
Crabpot	15,428.1	60,653.2	1.9	7.2	0.0%	0.0%
Fish pot 2/	288.8	542.0	4.2	41.7	1.4%	7.7%
HMS	12,194.8	22,361.4	2.7	4.9	0.0%	0.0%
Pacific halibut LL 2/	62.0	308.3	9.7	31.8	15.6%	10.3%
Salmon	3,196.3	13,655.2	15.4	24.1	0.5%	0.2%
Sea urchin	5,618.8	9,336.6	0.1	1.0	0.0%	0.0%
Set net 2/	351.5	1,356.7	31.5	37.8	9.0%	2.8%
subtotal	186,219.0	140,480.8	71.9	169.1	0.0%	0.1%
TOTAL	194,943.6	149,212.0	189.9	347.6	0.1%	0.2%
Unknown	NA	NA	35.7	NA	NA	NA
Total (2)	194,943.5	149,211.9	225.6	NA	NA	NA

1/ spot prawn trawling prohibited in California starting April 2003. Incidental landings allowed with ridgeback prawn landings
2/ excludes B species directed fishery landings

The Council's Groundfish Management Team (GMT) makes projections of groundfish regulation impacts to overfished groundfish species. This is done for the biennial specifications and whenever inseason regulation changes are proposed. The open access fishery incidental groundfish fishery impacts estimated for 2007, updated with June 2007 inseason adjustments, were as follow:

2007 Projected mortality impacts (mt) of overfished groundfish species under current regulations. Updated with June 2007 inseason adjustments, whiting bycatch of widow rockfish through July 26, and new research catch projections. a/

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Open Access: Incidental Groundfish							
CA Halibut	0.1	0.0		0.0	0.0		
CA Gillnet c/	0.5			0.0	0.0	0.0	
CA Sheephead c/				0.0	0.0	0.0	0.0
CPS- wetfish c/	0.3						
CPS- squid d/							
Dungeness crab c/	0.0		0.0	0.0	0.0		
HMS b/		0.0	0.0	0.0			
Pacific Halibut c/	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pink shrimp	0.1	0.1	0.0	0.0	0.0	0.1	0.1
Ridgeback prawn	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Salmon troll	0.2	0.8	0.0	0.0	0.0	0.3	0.2
Sea Cucumber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot Prawn (trap)							
2007 OY	218	44.0	4.0	290	150	368	23
B species incidental fishery impact	1%	2%	0%	0%	0%	0%	1%

a/ All numbers reflect projected annual total catches except that the non-tribal "Limited Entry Trawl- Whiting" numbers are the total bycatch caps for canary and darkblotched rockfish.

b/ South of 40°10' N. lat.

c/ Mortality estimates are not hard numbers; based on the GMT's best professional judgment.

d/ Bycatch amounts by species unavailable, but bocaccio occurred in 0.1% of all port samples and other rockfish in another 0.1% of all port samples (and squid fisheries usually land their whole catch).

The estimates show the open access incidental fisheries were estimated to take a neglible (<0.5 percent) amount of over fished cowcod, darkblotch and widow rockfish, and Pacific Ocean perch and 1 percent or 2 percent of overfished bocaccio, canary and yelloweye rockfish based on 2007 estimtes of optimum yield (OY). The single largest imact was to bocaccio in the California gillnet fishery; the salmon troll fishery impacted several species including bocaccio, canary, widow and yellowtail rockfish.

3.3.2.4 Directed Open Access Fishery

3.3.2.4.1 Fishery Descriptions

Directed fishery groundfish catches are made using hook and line, fish pot and set net gear. The directed fisheries are described in this section. For more specific information on individual gear types, see**: Recht, F. 2003 and NMFS 2005.**

3.3.2.4.1.1 Groundfish Hook-and-Line

Open access hook-and-line gears include longline, vertical hook-and-line (Portuguese longline), jigs, handlines, rod and reels, vertical and horizontal setlines, troll lines, cable gear and stick gear. Vessels fishing off Washington, Oregon, and California use these gears to target sablefish, lingcod, nearshore shelf, and slope rockfishes, cabezon, greenlings, spiny dogfish, Pacific sanddab, grenadier, and other federal groundfish. Fish are landed in live or dead condition in Oregon and California but not in Washington where possession of live bottom fish taken under a commercial fishing license is prohibited (**Robert Leos 2007**).

Longline gear is the most common open access hook-and-line gear used by vessels directly targeting sablefish. Both vertical and horizontal long-line types are used. They are generally fished in waters up to 600 fathoms, though sometimes as deep as 760-800 fathoms. Nearly all are landed dead in all three states, but some sablefish are landed live in the Oregon fishery. Lingcod have been a target of commercial fisheries since the early 1900s in California, and since the late 1930s in Oregon and Washington. Longline and hook-and-line gear are used to target lingcod. Lingcod are taken from near the surface to about 60 fathoms, but are found in depths to 200+ fathoms. The longline fishery for spiny dogfish is currently prosecuted by a limited number of vessels specializing in the fishery during the winter and early spring months when dogfish occur in fishable concentrations off the north Washington Coast. During the window period, Washington's fishery accounted for almost all the landings of this species. Pacific grenadier (*Coryphaenoides acrolepis*) are among the most abundant fishes of the continental slope and are found at depths from 155 to 3,825 m, most commonly between 600 and 2,500 m. Since 1998, approximately 300 mt of grenadier have been taken by OA longline vessels with peak landings in 2000 (89 mt). Since then, landings have decreased with four mt landed by OA vessels using longline in 2006. Pacific sanddab (*Citharichthys sordidus*) is taken in the hook-and-line fishery, mostly in California. South of 42° N latitude, when fishing for Pacific sanddab (and "other flatfish") vessels using hook-and-line gear with no more than 12 hooks per line, using hooks no larger than "Number 2" hooks, and up to two 1 pound weights per line, are not subject to the RCA restrictions **(Robert Leos 2007).**

WCGOPdata collected in the sablefish endorsed and non-sablefish endorsed limited entry fixed gear fisheries in 2006 provide estimates of retained and discarded fish catches. Sampling was conducted aboard vessels that used longline gear in the non-sablefish endorsed fishery and longline or pot gear in the sablefish endorsed fishery. Of the 231 LE fixed gear permits in 2006, 164 permits (71 percent) were in the sablefish endorsed fishery and 67 permits (29 percent) were in the non-sablefish endorsed fishery. WCGOPFOP sample sizes in 2006 consisted of 65 longline trips (and 39 pot trips) in the sablefish-endorsed fishery, which was conducted coastwide, but mostly off Washington and Oregon, and 118 trips in the non-sablefish endorsed fishery, all off California (mostly off Los Angeles). The sablefish endorsed longline fishery primarily landed sablefish (92 percent of the total sample) (**Table 3-4a; Table 3-4b).** The non-sablefish endorsed fishery primarily landed shortspine thornhead (58 percent including mixed thornyhead samples), sablefish (25 percent), and blackgill rockfish (11 percent) (**Table 3-4c)** (**NMFS 2007a; NMFS 2007b**).

Data from the sablefish endorsed fishery north of Cape Mendocino, where most of the endorsed fishery observations were made showed a discard rate per 100 lbs of sablefish retained in the longline fishery of 46.5 lbs of Pacific halibut and 13.9 lbs of sablefish (**Table 3-4a; Table 3-4b).** Data from the non-sablefish endorsed longline fishery showed a discard rate per 100 lbs of sablefish retained of 26.1 pounds of shortspine thornyhead and 10.9 pounds of sablefish, while the discard rate per 100 lbs of shortspine thornyhead retained was 11.1 pounds of shortspine thornyhead and 4.6 pounds of sablefish. A relatively high proportion (38 percent) of the longspine thornyhead observed in the non-sablefish endorsed fishery was discarded (**Table 3-4c**).

Table 3-4a: 2006 discard rates (lbs) for species or species groups observed in limited entry sablefish-endorsed fixed-gear sets north of Cape Mendocino (40 10'N. lat) by gear type and in total

		Discarded	Retained	Total	Rate 1/
Bocaccio					
	Longline	12	70	82	0.002
	Pot				0.000
	Total	12	70	82	0.001
Canary					
	Longline	46	9	55	0.007
	Pot				0.000
	Total	46	9	55	0.005
Darkblotched					
	Longline	145	1,486	1,632	0.023
	Pot		627	627	0.000
	Total	145	2,114	2,259	0.015
POP					
	Longline	71	115	186	0.011
	Pot		14	14	0.000
	Total	71	129	199	0.007
Yelloweye					
	Longline	291		291	0.047
	Pot				0.000
	Total	291		291	0.031
Widow					
	Longline		4	4	0.000
	Pot				0.000
	Total		4	4	0.000
Sablefish					
	Longline	86,004	620,315	706,319	13.865
	Pot	52,940	327,348	380,288	16.172
	Total	138,944	947,663	1,086,607	14.662
Whiting					
	Longline	42		42	0.007
	Pot	2		2	0.001
	Total	44		44	0.005
Dover					
	Longline	105	228	334	0.017
	Pot	63	136	199	0.019
	Total	168	364	532	0.018
Longspine					
	Longline		49	49	0.000
	Pot		4	4	0.000
	Total		52	52	0.000
Shortspine					
	Longline	602	3,483	4,085	0.097
	Pot	2		2	0.001
	Total	604	3,483	4,087	0.064

1/ Rate=lbs discarded/ 100 lbs sablefish retained

Table 3-4b: 2006 discard rates (lbs) for species or species groups observed in limited entry sablefish-endorsed fixed-gear sets north of Cape Mendocino (40 10'N. lat) by gear type and in total

		Discarded	Retained	Total	Rate 1/
Arrowtooth					
	Longline	27,623	2,788	30,411	4.453
	Pot	242	2,553	2,795	0.074
	Total	27,864	5,341	33,206	2.940
Petrale					
	Longline	4	37	41	0.001
	Pot		5	5	0.000
	Total	4	42	46	0.000
English					
	Longline		3	3	0.000
	Pot				0.000
	Total		3	3	0.000
Other FF					
	Longline	648		648	0.104
	Pot				0.000
	Total	648		648	0.068
Yellowtail					
	Longline	119	338	457	0.019
	Pot				0.000
	Total	119	338	457	0.013
Other shelf					
	Longline	666	1,427	2,092	0.107
	Pot	9	40	49	0.003
	Total	675	1,466	2,141	0.071
Other slope					
	Longline	1,364	27,638	29,001	0.220
	Pot	9	3,985	3,994	0.003
	Total	1,372	31,623	32,995	0.145
Blackgill					
	Longline		179	179	0.000
	Pot		220	220	0.000
	Total		399	399	0.000
Lingcod					
	Longline	12,339	4,817	17,157	1.989
	Pot	4,219	3,936	8,155	1.289
	Total	16,559	8,753	25,312	1.747
Other RF					
	Longline	356	138	494	0.057
	Pot				0.000
	Total	356	138	494	0.038
Pacific	Halibut				
	Longline	288,694	30,597	319,291	46.540
	Pot	11,991		11,991	3.663
	Total	300,685	30,597	331,282	31.729
All	Longline	419,131	693,721	1,112,853	67.567
	Pot	69,477	338,868	408,345	21.224
	Total	488,607	1,032,588	1,521,195	51.559

1/ Rate=lbs discarded/ 100 lbs sablefish retained

Table 3-4c 2006 discard rates (lbs) for species or species groups observed in limited entry non-sablefish-endorsed longline sets south of Cape Mendocino (40 10'N. lat).

	Discarded	Retained	Total	Sablefish rate 1/	Shortspine rate 2/
Darkblotched	6	1	7	0.0	0.0
Unidentified roundfish	226	837	1,063	1.6	0.7
Sablefish	1,495	13,764	15,259	10.9	4.6
Whiting	188	167	355	1.4	0.6
Dover	367	101	468	2.7	1.1
Longspine	1,054	1,711	2,765	7.7	3.3
Shortspine and mixed	3,595	32,385	35,980	26.1	11.1
Petrale	1	0	1	0.0	0.0
Other FF	0	12	12	0.0	0.0
Other shelf	3	26	29	0.0	0.0
Other slope	9	335	344	0.1	0.0
Blackgill	171	6,131	6,302	1.2	0.5
Lingcod	0	8	8	0.0	0.0
All	7,114	55,477	62,591	51.7	22.0

1/ Rate=lbs discarded/ 100 lbs sablefish retained

2/ Rate=lbs discarded/ 100 lbs shortspine and mixed retained

The nearshore fishery is defined, in part, by the area from the coastal high-tide line offshore to approximately 30 fathoms. The number of species included in the nearshore fishery complex range from 19 in California to 23 in Oregon. The nearshore fishery is a restricted access fishery in that each state has jurisdiction over the number and type of permits issued, the included species, and where those permits may be used. Washington has no commercial nearshore fishery. The primary gears used in the nearshore area are hook-and-line, including rod-and-reel, vertical hook-and-line, cable gear, stick gear, and set longline. Much of the fishing is done by single operators in smaller vessels including kayaks, skiffs, and small boats. Trips generally last only a day because much of the harvest is directed at the live-fish fishery, which yields a higher price per pound. In California, hook and line gear for the live fish fishery has been limited to a maximum of 150 hooks per vessel and 15 hooks per line within one mile of the mainland shore since 1995.

The Oregon nearshore fishery occurs in waters from shore to 30 fm, but mostly in 10 fm (18 meters) or less. Nearshore rockfish and species such as cabezon and greenling are the primary target of the live fish fishery in Oregon. Black rockfish had been the primary target for the fresh fish market through 2004 but now is mostly in the live fish market in southern Oregon (Kelly Ames, pers. comm). . One permit is issued allowing for the use of pot gear (typically targeting cabezon). Dive and trawl gear are not legal while used in conjunction with the Black/Blue/Nearshore permit. Commercial fishing for food fish is prohibited in Oregon bays and estuaries and within 183 meters (200 yards) from a man-made structure.

Nearshore fishing activity peaks during the summer months when sea and weather conditions are more condusive to fishing. This is especially true for fishing activity in Oregon and northern California waters. For the nine-year period, black rockfish was the dominate species landed by OA hook-and-line vessels, making up approximately 41 percent of the total landings (about 4,100 mt). Cabezon was next with 19 percent, followed by greenlings, gopher and grass rockfishes, with 7 percent, 6 percent, and 5 percent, respectively **(Robert Leos 2007; Kelly Ames 2008).**

3.3.2.4.1.2 Groundfish Trap

Approximately 20 percent of federal groundfish landed in the directed OA fishery was made using fish trap (pot) gear during the window period. Traps are highly selective for sablefish and are fished off a long-line in series (a set of traps) in waters up to 600 fathoms, though sometimes as deep as 760-800 fathoms. Up to 50 traps are attached to each main line. The traps are rectangular, trapezoidal or conical in shape. The most common, trapezoidal traps are approximately 6' x 2.5' in size and weigh about 55 pounds. The bigger rectangular traps may be over 100 pounds in weight. Traps are usually baited with Pacific whiting or sometimes whiting and squid. Many sablefish trap fishermen are now using escape rings to allow the escape of smaller fish while the trap is fishing. This reduces the number of fish the fishermen have to handle and reduces fish mortality due to handling in the release of small fish.

Cabezon was a distant second in the OA vessel directed groundfish trap fishery, with 1.8 percent (approximately 120 mt) of the total take of federal groundfish. In this fishery, California fishermen made the majority of the landings, with about 90 percent of the total take of cabezon. A total of 126 California vessels participated in the cabezon fishery with Oregon’s total at three historically, with only one issued an Oregon Limited Entry Nearshore Permit in 2004. There were no Washington OA vessels recorded as having made cabezon landings using trap gear. Other species commonly taken in directed OA landings where cabezon were caught included: California sheephead, lingcod, gopher, kelp, grass, black-and-yellow, and black rockfishes. The majority of California’s cabezon landings in the more recent years has centered on the Morro Bay port complex. Since 2003, California fishermen have been required to possess a nearshore fishing permit to catch and land cabezon since this species is included in the state’s shallow species nearshore complex. Since 2003, fishers in Oregon have been required to possess a nearshore permit to land more than incidental amounts of cabezon **(Robert Leos 2007; Kelly Ames 2008).**

WCFOP data collected in the sablefish endorsed pot fishery in 2006 provide estimates of retained and discarded fish catches. Sample size consisted of 39 trips (288 sets), mostly off Washington and Oregon (**NMFS 2007a; NMFS 2007b**). The data showed a discard rate per 100 lbs of sablefish retained of 3.7 lbs of Pacific halibut and 16.2 lbs of sablefish, which, for Pacific halibut, was considerably below (18 percent) the rate observed in the longline fishery in the same statistical area in 2006. The discard rate of overfished groundfish species in the pot fishery sample was negligible for all species **(Table 3-4a and 3-4b)**.

3.3.2.4.1.3 Groundfish Setnet

Setnet gear is legal to use to target federal groundfish in the open access fishery south of 38° N. lat. only. The fishermen generally target non-groundfish species, but some have made groundfish landings that met the definition used in this report for directed open access groundfish fishing. The set net fishery is generally described in **Section 3.3.2.3.1.13**. The number of vessels that participated in the directed setnet fishery for groundfish species ranged from a high of about 50 in 1999 and 2000 to about one half those amounts in 2005 and 2006. Landings of federal groundfish taken in the directed segment of California’s setnet fishery during the window period were dominated by bank rockfish, soupfin shark, chilipepper and widow rockfishes, and the unspecified rockfishes market category group **(Robert Leos 2007).**

3.3.2.4.2 Directed Groundfish Vessels and Landings (Including Nearshore)[4]

The number of directed groundfish fishery vessels declined from about 1,000 in 1998 to 677 in 2004 then increased to 709 and 744 in 2005 and 2006, respectively (**Table 3-5**). Sablefish and nearshore species accounted for an average of 84 percent with an annual range of 60 percent-91 percent of directed fishery revenues during the window period (**Table 3-5; Figure 3-4**). The sablefish component of revenues increased from 7 percent in 1998 to 50 percent in 2006 (**Table 3-5; Figure 3-4**). The nearshore component increased from 53 percent to 65 percent of revenues during 1998-2001 window period years then declined to 40 percent in 2006 (**Table 3-5; Figure 3-4**). The remaining revenues were from shelf and slope rockfish landings and other species such as lingcod, grenadiers, thornyheads, and specified sharks and rays. The major drop in shelf rockfish landings between 1998 and subsequent years reflects the reduced harvest guidelines and more restrictive rockfish limits that began to be implemented at that time in response to depressed status of certain key rockfish stocks discussed in **Section 1.4.1**. The turnaround in open access revenues that began in 2005 was associated with increased sablefish landings (**Figure 3-4)**.

The trend in vessels making at least one directed sablefish landing in the WOC area steadily increased during the window period except for 2004 when there was a downturn in participation. The trend in sablefish impact, based on landings expressed as a proportion of annual allocations for the Monterey-Vancouver management area (northern area) (**Table 1-1**), followed the directed fishery vessel participation trend very closely (**Table 3-5; Figure 3-5**). In 2005 the northern area fishery exceeded its harvest guideline by over 40 percent (**Tables 1.1 and 3.1.1; Figure 3-5)**. More restrictive sablefish landing and cumulative landing limits were implemented during May-September 2006 in anticipation of a possible effort shift by salmon vessels to the sablefish fishery because of reduced salmon fishing opportunity. However, the restrictions did not work and the fishery had to be closed during October-December because of projected allocation attainment (see: http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/71FR58289.pdf).

It is not clear that reduced salmon fishing opportunity contributed to the high sablefish harvest in 2005. This is because the commercial fishery south of Cape Falcon to the US/Mexico border landed 582,000 Chinook salmon, which was just below the previous 10-year fishery average of 602,000 Chinook salmon, while the fishery between the US/Canada border to Cape Falcon landed 87,000 Chinook salmon, which was substantially above its previous 10-year average of 48,000 Chinook salmon (see: http://www.pcouncil.org/salmon/salbluebook/App_A_Hist_Ocean_Effort_Land.xls).

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[4] Directed fishery landings data, exclusive of nearshore species, appear in Table 2-5.

Table 3-5 Directed open access fishery participation and landings statistics, 1998-2006 Page 1

		Sablefish			Nearshore			Shelf RF			Slope RF		
Yr	State	No. Vsls	mts	(000s)	No. Vsls	mts	(000s)	No. Vsls	mts	(000s)	No. Vsls	mts	(000s)
1998	CA	83	94.6	$218.7	461	471.6	$2,420.7	251	797.3	$1,160.6	90	192.3	$220.3
	OR	29	16.3	$45.4	93	152.2	$276.3	98	178.5	$272.4	1	4.4	$6.4
	WA	29	25.6	$79.5	0	0.0	$0.0	10	12.4	$9.4	0	0.0	$0.0
	Total	141	136.5	$343.6	554	623.8	$2,697.0	359	988.2	$1,442.4	91	196.7	$226.7
1999	CA	97	176.9	$453.8	495	404.4	$2,641.7	281	264.1	$538.5	30	16.9	$28.6
	OR	14	20.6	$64.9	108	176.3	$533.3	90	93.3	$193.6	1	1.2	$1.7
	WA	28	36.0	$114.6	0	0.0	$0.1	7	9.1	$7.3	0	0.0	$0.0
	Total	139	233.5	$633.3	603	580.7	$3,175.0	378	366.5	$739.4	31	18.1	$30.3
2000	CA	112	299.0	$944.2	505	323.9	$2,898.4	197	96.3	$281.5	26	8.5	$21.5
	OR	34	43.6	$158.6	126	147.4	$565.9	36	7.3	$19.4	1	0.5	$0.7
	WA	32	51.9	$201.8	0	0.0	$0.0	9	1.7	$2.6	2	1.5	$1.5
	Total	178	394.5	$1,304.6	631	471.3	$3,464.3	242	105.3	$303.5	29	10.5	$23.7
2001	CA	109	273.7	$820.0	441	319.1	$2,557.8	114	66.7	$177.4	25	25.9	$51.5
	OR	64	58.9	$199.1	137	189.4	$742.4	12	5.5	$14.6	1	0.6	$0.6
	WA	44	60.3	$217.7	1	0.1	$0.1	7	0.8	$1.0	2	1.4	$1.4
	Total	217	392.9	$1,236.8	579	508.6	$3,300.3	133	73.0	$193.0	28	27.9	$53.5
2002	CA	118	268.3	$797.7	344	257.8	$2,059.8	75	19.7	$72.1	38	60.7	$132.7
	OR	52	49.7	$179.7	147	223.4	$1,065.4	5	3.6	$9.1	0	0.1	$0.8
	WA	44	65.2	$236.6	1	0.2	$0.1	0	0.0	$0.0	0	0.0	$0.0
	Total	214	383.2	$1,214.0	492	481.4	$3,125.3	80	23.3	$81.2	38	60.8	$133.5
2003	CA	118	312.6	$945.9	296	164.1	$1,504.2	42	8.7	$39.4	43	82.4	$194.0
	OR	96	134.3	$492.4	126	163.8	$654.0	7	3.3	$7.8	0	0.8	$1.1
	WA	64	118.2	$449.8	0	0.0	$0.0	0	0.0	$0.0	0	0.0	$0.0
	Total	278	565.1	$1,888.1	422	327.9	$2,158.2	49	12.0	$47.2	43	83.2	$195.1
2004	CA	91	288.3	$831.0	224	201.2	$1,837.6	88	23.9	$104.4	38	52.2	$129.7
	OR	67	73.6	$225.0	112	169.5	$750.6	12	2.9	$6.6	3	1.0	$1.3
	WA	53	96.4	$325.8	0	0.0	$0.0	1	0.5	$0.5	2	1.4	$1.3
	Total	211	458.3	$1,381.8	336	370.7	$2,588.2	101	27.3	$111.5	43	54.6	$132.3
2005	CA	101	458.3	$1,312.1	208	195.1	$1,811.0	70	21.2	$98.6	37	30.8	$84.0
	OR	107	257.6	$915.9	114	150.3	$759.3	10	3.4	$8.7	4	5.1	$7.3
	WA	68	182.2	$677.9	0	0.0	$0.0	2	0.4	$0.7	2	6.5	$7.6
	Total	276	898.1	$2,905.9	322	345.4	$2,570.3	82	25.0	$108.0	43	42.4	$98.9
2006	CA	122	279.9	$941.5	201	141.7	$1,463.0	74	21.3	$103.0	29	33.0	$85.4
	OR	132	250.8	$983.6	103	112.6	$580.7	9	3.0	$9.1	3	5.1	$7.3
	WA	86	157.5	$612.2	0	0.0	$0.0	0	0.0	$0.0	1	0.8	$0.8
	Total	340	688.2	$2,537.3	304	254.3	$2,043.7	83	24.3	$112.1	33	38.9	$93.5
AVG	CA	106	272.4	$807.2	353	275.4	$2,132.7	132	146.6	$286.2	40	55.9	$105.3
	OR	66	100.6	$362.7	118	165.0	$658.7	31	33.4	$60.1	2	2.1	$3.0
	WA	50	88.1	$324.0	0	0.0	$0.0	4	2.8	$2.4	1	1.3	$1.4
	Total	222	461.1	$1,493.9	471	440.5	$2,791.4	167	182.8	$348.7	42	59.2	$109.7

1/ others includes unspecified rockfish, flatfish, lingcod, sharks, rays and chimeras

Table 3-5: Directed open access fishery participation and landings statistics, 1998-2006. Page 2

		Lingcod			Sharks			Others 1/			Total Directed		
Yr	State	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	No. Vsls	mts	(000s)
1998	CA	80	54.2	$124.6	53	26.5	$36.8	43	20.2	$20.6	748	1,658.7	$4,208.9
	OR	62	20.8	$47.1	0	0.0	$0.0	39	20.9	$37.7	210	393.0	$685.1
	WA	17	5.6	$6.7	0	0.0	$0.0	20	57.2	$64.8	46	100.7	$160.4
	Total	159	80.6	$178.4	53	26.5	$36.8	102	98.3	$123.1	1004	2,152.4	$5,054.4
1999	CA	108	45.0	$134.0	49	26.9	$38.9	63	42.0	$69.2	764	977.9	$3,910.7
	OR	83	28.0	$76.5	0	0.0	$0.0	49	12.2	$40.5	184	331.7	$910.5
	WA	14	4.8	$6.5	2	8.7	$2.5	15	4.6	$10.4	50	67.1	$142.2
	Total	205	77.8	$217.0	51	35.6	$41.4	127	58.8	$120.1	998	1,376.7	$4,963.4
2000	CA	64	21.7	$70.3	52	23.4	$32.2	85	77.7	$110.4	760	852.4	$4,365.1
	OR	44	12.3	$44.6	2	0.1	$0.2	0	0.1	$0.1	172	211.3	$789.5
	WA	11	4.8	$6.5	1	1.5	$0.6	2	1.3	$2.0	49	63.0	$215.2
	Total	119	38.8	$121.4	55	25.0	$33.0	87	79.1	$112.5	981	1,126.7	$5,369.8
2001	CA	84	32.9	$112.2	43	26.1	$35.5	71	42.2	$89.3	627	788.0	$3,848.3
	OR	51	24.2	$81.9	0	0.0	$0.0	2	0.1	$0.1	194	278.7	$1,038.7
	WA	12	3.6	$4.8	0	0.0	$0.0	0	0.7	$0.5	54	67.0	$225.4
	Total	147	60.7	$198.9	43	26.1	$35.5	73	43.0	$89.8	875	1,133.7	$5,112.4
2002	CA	99	40.7	$159.1	39	16.3	$24.0	44	45.7	$52.1	543	709.9	$3,300.7
	OR	65	27.4	$93.5	0	0.0	$0.0	0	0.4	$0.4	201	304.6	$1,348.3
	WA	9	2.9	$4.2	1	4.2	$1.4	0	0.7	$0.4	48	74.5	$244.0
	Total	173	71.8	$256.8	40	20.5	$25.4	44	46.0	$52.9	792	1,089.0	$4,893.0
2003	CA	106	36.3	$146.6	45	32.2	$41.1	34	47.4	$30.7	502	685.1	$2,908.4
	OR	78	29.7	$91.9	0	0.0	$0.0	0	0.0	$0.0	212	332.0	$1,247.4
	WA	4	2.1	$3.2	1	43.9	$17.7	1	1.8	$0.7	68	167.7	$473.2
	Total	188	68.1	$241.7	46	76.1	$58.8	34	49.2	$31.4	782	1,184.8	$4,629.0
2004	CA	104	43.9	$175.2	40	24.9	$49.9	42	51.9	$33.0	435	686.8	$3,164.0
	OR	73	31.0	$97.3	0	0.2	$0.0	1	0.5	$0.3	185	278.8	$1,081.9
	WA	4	1.7	$2.8	4	86.1	$37.9	0	1.2	$0.6	57	187.3	$369.0
	Total	181	76.6	$275.3	44	111.2	$87.8	43	53.6	$33.9	677	1,152.9	$4,614.9
2005	CA	80	41.8	$173.8	36	26.8	$34.3	32	28.5	$1.2	391	803.4	$3,519.1
	OR	89	31.4	$101.8	1	0.2	$0.2	1	2.8	$1.0	240	450.8	$1,794.2
	WA	5	2.4	$3.9	2	3.2	$1.6	0	0.9	$0.9	78	196.3	$693.5
	Total	174	75.6	$279.5	39	30.2	$36.1	33	32.2	$3.1	709	1,450.5	$6,006.8
2006	CA	92	31.5	$136.4	30	24.1	$44.6	20	9.5	$6.8	405	541.9	$2,784.3
	OR	78	30.5	$110.0	0	0.0	$0.0	0	0.8	$0.4	249	402.8	$1,691.3
	WA	4	2.7	$4.7	2	59.8	$30.9	0	0.6	$0.3	90	221.6	$649.1
	Total	174	64.7	$251.1	32	83.9	$75.5	20	10.9	$7.5	744	1,166.3	$5,124.7
AVG	CA	91	38.7	$136.9	43	25.2	$37.5	48	40.6	$45.9	575	856.0	$3,556.6
	OR	69	26.1	$82.7	0	0.1	$0.0	10	4.2	$8.9	205	331.5	$1,176.3
	WA	9	3.4	$4.8	1	23.0	$10.3	4	7.7	$9.0	60	127.2	$352.4
	Total	169	68.3	$224.5	45	48.3	$47.8	63	52.3	$63.8	840	1,314.8	$5,085.4

1/ others includes unspecified rockfish, flatfish, lingcod, sharks, rays and chimeras

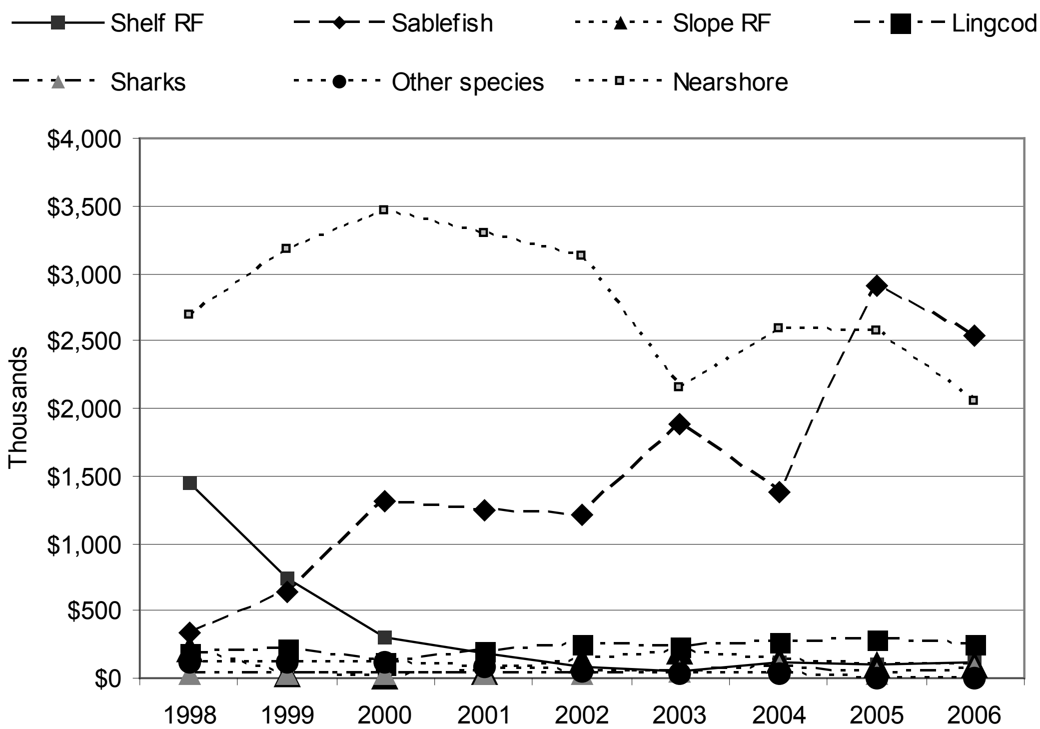

Figure 3-4: Trends in directed fishery revenues by species and year, 1998-2006

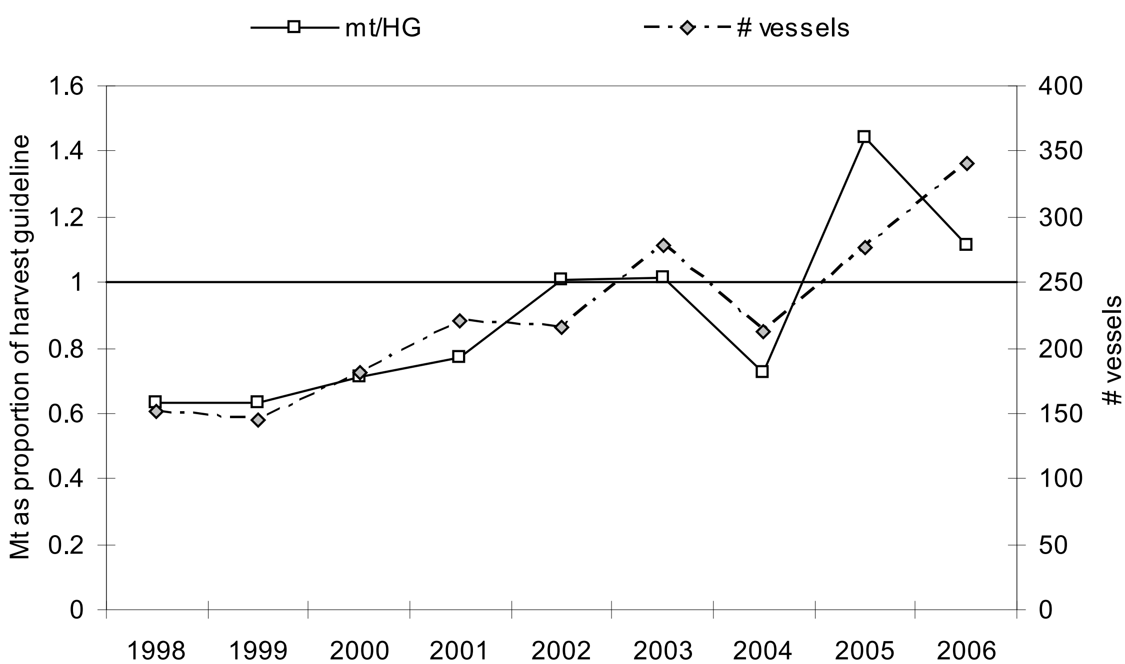

Figure 3-5: Directed open access sablefish fishery trends: number of directed fishery vessels and landings shown as a proportion of annual harvest guideline, Monterey-Vancouver area, 1998-2006 seasons

3.3.3 Vessel and Fisherman Characteristics

B permit species fishery data for the window period were used to characterize fisherman and vessels. Nearshore species landings data have been excluded in following sections. The window period was divided in some analyses into three periods: 1998-2003, 2004-2006 and 1998-2006.

3.3.3.1 Vessel Participation Frequencies

A total of 2,587 different vessels participated in the directed open access fishery during the window period, and 69 percent (1,484) of the vessels that made a landing during 1998-2003 (2,157) did not make a directed fishery landing during 2004-2006. Conversely, 1,103 vessels (31 percent) that made a landing during 2004-2006 also made a landing during 1998-2003. A total of 430 new vessels entered the fishery during 2004-2006. A total of 71 vessels (3 percent) made a landing every year and 443 vessels (17 percent) made a directed fishery landing in most (≥5) years of the window period (**Table 3-6**).

Table 3-6. Vessel participation frequencies by time period, 1998-2006

# yrs	1998-2003	2004-2006	1998-2006
0	430	1,484	0
1	1,009	508	1,117
2	462	287	517
3	265	308	309
4	182		201
5	118		157
6	121		93
7			62
8			60
9			71
Total	2,587	2,587	2,587

3.3.3.2 States' Abilities to Track Vessel Owners and Vessel Ownership Frequencies

The PacFin data base stores catch history information for individual vessels based on United States Coast Guard documentation or state-issued vessel registration number. Personal catch history is not part of the PacFIN database. Individual fisherman or vessel owner information must be tracked at the state level.

3.3.3.2.1 California

California is able to track vessel ownership on an annual basis since before 1998 and assigns landings or revenues to commercial fisherman license number, which is recorded on each commercial dealer receipt. In the following analyses, vessel ownership was assigned to the person or entity that registered the vessel at the start of the year. Thus, the data do not reflect within year ownership changes.

The ownership records of California vessels for 1998-2006 showed that 91 percent (1,557) that landed B species groundfish during the window period had a single owner during the window period through the last year of fishery participation. The remaining 9 percent of vessels (162) had between two and four owners through the last year of fishery participation. The maximum number of owners, assuming all owners did not previously own an open access fishery vessel, was 1,901 for an average of 1.11 owners per vessel (**Table 3-7, sub a**). Note: this analysis went through the last year each vessel made a directed fishery landing and did not track ownership to the end of the window period (which would have resulted in more owners per vessel).

Table 3-7. Owner profile data for California vessels that made one or more B species groundfish directed fishery landings during 1998-2006

a) Vessel-owner frequency data

# owners/vessel	Number vsls	Vessel proportion	Owner proportion
1	1,557	81.9%	90.6%
2	143	7.5%	16.6%
3	18	0.9%	3.1%
4	1	0.1%	0.2%
Total vessels	1,719	100.0%	
Total owners	1,901		100.0%

b) Vessel registration status for 2006

	Documented	Undocumented	Totals
Registered, only owner	127	184	311
Registered, one of 2-4 owners	33	34	67
Registered, first year	2	1	3
Not registered	473	865	1,338
sum	635	1,084	1,719

c) Contribution of current (2006) vessel owners to B species catch history for individual vessels by contribution category

Contribution category	Number vsls	Proportion
>90%	322	84.5%
>50%	352	92.4%
>10%	369	96.9%
>0%	381	100.0%
zero%	0	0.0%
Total vessels	381	100.0%

Registration data for 2006 showed that 22 percent of the vessels that made a B species groundfish directed fishery landing during 1998-2006 were registered in California as commercial fishing vessels ("current owners"). A slightly higher proportion of undocumented vessels (80 percent compared to 74 percent) were not registered in 2006 (**Table 3-7, sub b)**. Analysis of 2006 registration data and 1998-2006 window period B species catch history data showed that 322 (84.5 percent) of current owners were responsible for >90 percent of their vessel's B species catch history and that 12 (3.1 percent) current owners were responsible for ≤10 percent of their vessel's B species catch history **(Table 3-7, sub c).**

3.3.3.2.2 Oregon

Oregon can track commercial fishery landings history at the vessel owner level; landings can not be tracked by individual skippers or crew members. The vessel may be owned by an individual, individuals, or business. In the table below (**Table 3-8a**) the data were analyzed by boat/owner; the same owner may be included multiple times in the table if they owned several different boats. If there were two individuals listed on a license (e.g., married, family members, etc.) these are included as a single owner. Seven of the boats on the list of open access vessels could not be tracked as they were boats that made single deliveries into Oregon and were not required to have an Oregon boat license.

Table 3-8a. Oregon vessel ownerships frequencies, 1998-2006

# owners	Frequency	Proportion	Max owners
1	631	85%	631
2	95	13%	190
3	13	2%	39
4	2	0%	8
Total	741	100%	868

3.3.3.2.3 Washington

Since the mid 1990's the commercial fishing license in Washington has been owned by a person or business with a requirement to designate a vessel to the license. Prior to then, the license was assigned a vessel rather than an individual. Therefore, for the years under consideration for open access limitation, WDFW could track catch history at the level of license owner (**Michele Culver 2008**).

3.3.3.2.4 Possible Ways to Issue Permits to Fishermen or Previous Vessel Owners

The concern regarding issuance of B permits to current owners of qualifying vessels is that (1) vessel operators (i.e., the fishermen) do not get catch history credits for use in qualifying for a permit and (2) previous vessel owners do not receive catch history credits for the time they owned a vessel for use in qualifying for a permit.

The problem in issuing permits to fishermen or previous vessel owners is that the PacFIN data base does not store such information. This means that either major revision to the PacFIN data base would have to be made or the responsibility for recommending individuals or entities for permit issuance would fall back on the states. Revisions to the data base would be very costly and time consuming to complete. Moreover, the changes might not be useful for any other Council or NMFS purpose than for B permit issuance.

For the states to recommend fishermen or previous vessel owners for permit issuance, the Council and NMFS would need to provide specific guidance on how to organize and rank catch history data in a fair and equitable manner and how to deal with fishermen and vessel owners that fished in more than one state (see Section 3.3.3.6 for between state vessel landing frequencies). All three states would need to agree upon a timeline for project completion and commit staff resources to undertake the assignment.

3.3.3.3 Landing Frequencies

Vessel cumulative tonnage landing frequencies showed that 56 percent of vessels (1,443) landed < 0.5 mt and 12 percent (322) landed over 5 mt during the window period. The remaining vessels, 822, landed between 0.5 mt and 5 mt in total. Vessel tonnage frequencies were generally higher on a per vessel basis during 2004-2006 compared to 1998-2003 even though the accounting period was shorter by three years (**Table 3-8b**).

Table 3-8b: Vessel tonnage frequencies by time period, 1998-2006

	1998-2003		2004-2006		1998-2006	
mt bin 1/	# vsls	Prop.	# vsls	Prop.	# vsls	Prop.
zero	434		1,484		0	
<0.5 mt	1,310	60.8%	548	49.7%	1,443	55.8%
<1 mt	231	10.7%	154	14.0%	290	11.2%
<2 mt	194	9.0%	135	12.2%	256	9.9%
< 3 mt	63	2.9%	30	2.7%	77	3.0%
< 4 mt	98	4.6%	59	5.3%	144	5.6%
< 5 mt	42	2.0%	31	2.8%	55	2.1%
> 5 mt	215	10.0%	146	13.2%	322	12.4%
Total	2,153	100.0%	1,103	100.0%	2,587	100.0%

1/ each bin is exclusive of previous bin(s)

Vessel cumulative value landing frequencies show that 50 percent of vessels (1,283) landed < $1,000 worth of B species groundfish and 4 percent (105) landed over $100,000 worth of fish during the window period. The remaining vessels, 1,199 vessels, landed between $1,000 and $100,000 in fish. Vessel value frequencies were generally higher on a per vessel basis during 2004-2006 compared to 1998-2003 even though the accounting period was shorter by three years (**Table 3-9; Figure 3-6a**).

Table 3-9: Cumulative ex-vessel frequencies by time period, 1998-2006

	1998-2003		2004-2006		1998-2006	
$$ 000 bin 1/	# vsls	Prop.	# vsls	Prop.	# vsls	Prop.
<1	1,188	55.0%	441	40.0%	1,283	49.6%
<2	257	11.9%	127	11.5%	270	10.4%
<3	139	6.5%	90	8.2%	188	7.3%
<4	64	3.0%	66	6.0%	103	4.0%
<5	72	3.3%	41	3.7%	76	2.9%
<10	165	7.7%	122	11.1%	241	9.3%
<20	114	5.3%	98	8.9%	170	6.6%
<30	50	2.3%	37	3.4%	77	3.0%
<50	57	2.6%	40	3.6%	74	2.9%
<100	40	1.9%	38	3.4%	73	2.8%
<130	4	0.2%	2	0.2%	14	0.5%
<170	6	0.3%	1	0.1%	12	0.5%
<200	1	0.0%		0.0%	4	0.2%
<250		0.0%		0.0%	2	0.1%
Total	2,157	100.0%	1,103	100.0%	2,587	100.0%

1/ each bin is exclusive of previous bin(s)

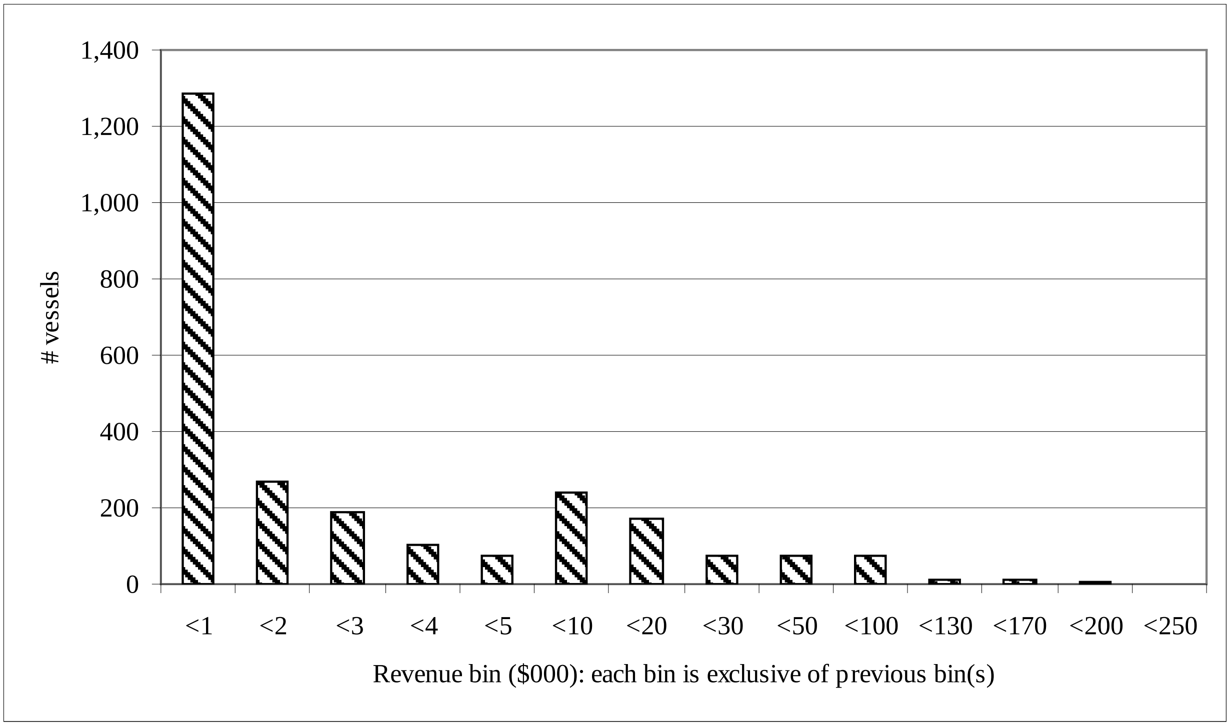

Figure 3-6a: Revenue frequencies for WOC vessels that made B species landings during the window period (2587 vessels).

3.3.3.4 Distribution of Vessels and Primary Gear Types

A total of 2,587 vessels had directed B species groundfish landings during the window period. Their distribution by state and PacFIN port group was estimated based on port group where most B species landings were made by individual vessels. The data showed that 66 percent of vessels delivered to California ports and 26 percent and 8 percent made landings at Oregon and Washington ports, respectively. The top three port groups for numbers of vessels were Morro Bay (11 percent), Monterey (10 percent), and Brookings (9 percent). San Francisco was very close to Brookings at slightly less than 9 percent (**Table 3-10**).

Table 3-10: Distributions of B species vessels and gear types used by port group, state and 1998-2003, 2004-2006 and 1998-2006 time periods

1998-2003							2004-2006							1998-2006						
AGY	Port	Hkl	Pot	Net	Tot	Prop.	AGY	Port	Hkl	Pot	Net	Tot	Prop.	AGY	Port	Hkl	Pot	Net	Tot	Prop.
WA	NPS	40	0	0	40	0.02	WA	NPS	18	1	0	19	0.02	WA	NPS	49	1	0	50	0.02
	SPS	3	0	0	3	0.00		SPS	2	0	0	2	0.00		SPS	3	0	0	3	0.00
	CWA	53	11	0	64	0.03		CWA	41	11	0	52	0.05		CWA	72	17	0	89	0.03
	CLW	32	1	0	33	0.02		CLW	19	34	0	53	0.05		CLW	32	33	0	65	0.03
	sub	128	12	0	140	0.06		sub	80	46	0	126	0.11		sub	156	51	0	207	0.08
	P	0.91	0.09	0.00	1.00			P	0.63	0.37	0.00	1.00			P	0.75	0.25	0.00	1.00	
OR	CLO	36	9	0	45	0.02	OR	CLO	33	12	0	45	0.04	OR	CLO	48	16	0	64	0.02
	TLA	76	1	0	77	0.04		TLA	43	7	0	50	0.05		TLA	93	6	0	99	0.04
	NPA	80	4	0	84	0.04		NPA	40	11	0	51	0.05		NPA	97	10	0	107	0.04
	CBA	103	10	0	113	0.05		CBA	70	20	0	90	0.08		CBA	136	22	0	158	0.06
	BRA	200	1	0	201	0.09		BRA	107	2	0	109	0.10		BRA	230	3	0	233	0.09
	sub	495	25	0	520	0.24		sub	293	52	0	345	0.31		sub	604	57	0	661	0.26
	P	0.95	0.05	0.00	1.00			P	0.85	0.15	0.00	1.00			P	0.91	0.09	0.00	1.00	
CA 1/	CCA	74	6	0	80	0.04	CA 1/	CCA	30	7	0	37	0.03	CA 1/	CCA	85	10	0	95	0.04
	ERA	73	4	0	77	0.04		ERA	44	2	0	46	0.04		ERA	89	5	0	94	0.04
	BGA	138	50	0	188	0.09		BGA	44	43	0	87	0.08		BGA	148	67	0	216	0.08
	BDA	98	1	1	101	0.05		BDA	28	0	0	28	0.03		BDA	110	1	1	112	0.04
	SFA	187	4	4	195	0.09		SFA	72	3	1	76	0.07		SFA	220	6	3	229	0.09
	MNA	206	14	9	229	0.11		MNA	85	12	1	98	0.09		MNA	238	17	8	263	0.10
	MRA	243	10	11	264	0.12		MRA	92	10	2	104	0.09		MRA	262	13	9	284	0.11
	SBA	110	10	15	135	0.06		SBA	53	1	9	63	0.06		SBA	140	9	14	163	0.06
	LAA	104	4	29	137	0.06		LAA	42	0	15	59	0.05		LAA	123	4	32	161	0.06
	SDA	61	9	20	91	0.04		SDA	20	5	9	34	0.03		SDA	70	10	21	102	0.04
	sub	1,294	112	89	1,497	0.69		sub	510	83	37	632	0.57		sub	1,485	142	88	1,719	0.66
	P	0.86	0.07	0.06	1.00			P	0.81	0.13	0.06	1.00			P	0.86	0.08	0.05	1.00	
WOC	Total	1,917	149	89	2,157	1.00	WOC	Total	883	181	37	1,103	1.00	WOC	Total	2,245	250	88	2,587	1.00
	P	0.89	0.07	0.04	1.00			P	0.80	0.16	0.03	1.00			P	0.87	0.10	0.03	1.00	
1/ includes two dive boats BGA,SDA							1/ includes two LAA dive boats							1/ includes four dive boats						

Primary gear types used by individual vessels were estimated based on gear type used to make most B species landings by time period and landing location[5]. The large majority of vessels--87 percent for all areas combined--used hook and line gear[6]. Pot gear [7] was the second most common gear type (10 percent) and was the most common gear type in the Columbia River, Washington area (33 of 65 vessels).

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5[5] Visual inspection of gear type data showed many vessels used more than one gear type to harvest B species groundfish, and the amount of catch taken by individual gear types by individual vessels varied between years and landings made at different ports within the same year. The gear type combinations were too varied to make a succinct (and meaningful) analysis of gear type combinations used to make B species landings during window period years. Thus, an algorithm was applied to vessel landings data to identify primary gear types.

x E.

[6] There is a variety of commercial fishing gear that uses hooks and lines in various configurations to catch finfish. These include longline, vertical hook and line, jigs, handlines, rod and reels, vertical and horizontal setlines, troll lines, cable gear and stick ge
ar.

[7] The words “pot” and “trap” are used interchangeably to mean baited boxes set on the ocean floor to catch various fish and shellfish. They can be circular, rectangular or conical in shape. The pots may be set out individually or fished in strings. On the Pacific Coast, live sablefish, Dungeness crab, spot prawns, rock, box, and hermit crabs, spider crabs, spiny lobster and finfish (California sheephead, cabezon, kelp and rock greenling, California scorpionfish, moray eels, and many species of rockfish) are caught in pots.

Set net gear [8]was used by 3.4 percent of the vessels, all off California. Four California dive boats made directed B species fishery landings (gear type unknown) **(Table 3-10**).

The distribution of the 1,103 vessels that made landings during 2004-2006 showed a northward shift compared to 1998-2003 vessel distributions. The California proportion was lower by 12 points to 57 percent while Oregon increased 7 points to 31 percent and Washington 4 points to 11 percent. The Brookings port group had the most vessels during this more recent period at 10 percent, followed by Morro Bay and Monterey at 9 percent each. Coos Bay, Oregon and Fort Bragg, California each were at 8 percent. The epicenter of the directed fishery fleet (the 50 percent fleet distribution dividing line) shifted from the Bodega Bay port group during 1998-2003 to the Fort Bragg port group during 2004-2006. Hook and line gear was the primary gear type but declined 9 points, while pot gear increased by a corresponding amount compared to the previous period. Pot gear was by far the predominant gear type in the Columbia River, Washington area and was nearly as common as hook and line gear in the Fort Bragg area. Set net gear declined from about 4 percent to 3 percent of the coastwide gear totals during the 1998-2003 and 2004-2006 time periods. Two California dive boats made directed fishery landings during each of the latter periods (**Table 3-10**).

During 1998-2006, 3 vessels (<0.1 percent) made one or more landings in all three states, and 49 (1.9 percent) vessels made one or more landings in two states, as follow: 25 (1.0 percent) in Oregon and California, 23 (0.9 percent) in Washington and Oregon and 1 (<0.1 percent) in Washington and California. During 2004-2006, 2 vessels (<0.2 percent) made one or more landings in all three states, and 27 (2.4 percent) vessels made one or more landings in two states as follow: 12 (1.1 percent) landed in Oregon and California, 14 (1.3 percent) in Washington and Oregon, and 1 (<0.1 percent) in Washington and California.

3.3.3.5 Vessel Size Classes

The lengths of vessels that participated in the B species directed fishery during the window period showed decreasing vessel length from north to south. The average lengths of California, Oregon and Washington vessels were 28 ft, 32 ft, and 39 ft, respectively. The modal length of vessel in Washington was 40-49 ft while the modal length in California and Oregon was 21-24 ft, although there was a second modal length of Oregon vessels at 35-39 ft. (**Table 3-11**). The smaller vessels in California and Oregon may indicate participation in nearshore fisheries wherein smaller vessels may be able to fish more effectively closer to shore than larger vessels. The larger size of Washington vessels may be due to their dependence on sablefish, which are found farther offshore and require more working space to carry longline or pot fishing gear.

Table 3-11: Length frequencies of B species directed fishery vessels by 5-ft bins, 1998-2006

AGY	<10	10-14	15-20	21-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	>69	# vsls	Avg
CA	3	137	256	319	277	252	202	132	73	35	14	8	2	9	1,719	28.5
OR	1	7	54	172	81	80	95	68	45	28	12	4	8	6	661	32.3
WA	1	1	4	31	13	24	22	35	35	18	15	4	1	3	207	39.3
WOC	5	145	314	522	371	356	319	235	153	81	41	16	11	18	2,587	30.3

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[8] Set net is a stationary, buoyed, and anchored gillnet or trammel net

3.3.3.6 Participation in Other Fisheries

Landings data for the 2004-2006 window period were used to assess the dependence of B species vessels on other commercial fisheries. The analysis looked at landings and revenues from all major WOC commercial fisheries for vessels that made at least one directed B species landing during 2004-2006 window period years. The analysis showed that B species groundfish comprised 6.1 percent and 6.8 percent, respectively, of total fishery landings by B species vessels in terms of tonnage and revenues. Total fishery landings represented the sum of all commercial fishery tonnages and revenues by B species vessels during the specified years. Many of the vessels fished for nearshore species (47 percent), salmon and crabpot species (37 percent) and other species (38 percent). HMS was also important to many vessels (31 percent) **(Table 3-12a)**. Tonnage landed was highest in crabpot fisheries (40 percent), followed by CPS (22 percent) and HMS (12 percent). Fisherman revenues were highest by a wide margin in crabpot fisheries at 53 percent of total revenues. Salmon was second at 13 percent of revenues (**Table 3-12a).**

Table 3-12a: Total fishery landings by vessels that made a directed B species landing during 2004-2006 window period years, all years combined. WOC AREA

Fishery	# vsls	mts	000s	#vsls	mts	$$
B directed	1,103	2,796	$8,531	100%	6.1%	6.8%
Nearshore	516	973	$7,164	47%	2.1%	5.8%
Salmon	406	2,666	$16,551	37%	5.9%	13.3%
Red urchin	23	1,788	$2,329	2%	3.9%	1.9%
Trawl	31	1,965	$2,513	3%	4.3%	2.0%
Set net	50	614	$2,790	5%	1.4%	2.2%
HMS	347	5,351	$10,564	32%	11.8%	8.5%
CPS	94	9,795	$2,270	9%	21.5%	1.8%
Crabpot	406	18,237	$66,364	37%	40.1%	53.2%
P. halibut	98	192	$1,165	9%	0.4%	0.9%
C. halibut	149	42	$365	14%	0.1%	0.3%
Fishpot	29	488	$862	3%	1.1%	0.7%
Other	421	609	$3,223	38%	1.3%	2.6%
Total	1,103	45,516	$124,692	100%	100.0%	100.0%

The relative dependence of lower and higher producing vessels on B species commercial fishery revenues was analyzed by dividing the 2004-2006 B species fleet into two equal size groups. Vessels with B species incomes of greater than and less than $1,837.99 were placed in the high and low production groups, respectively. This resulted in 552 and 551 vessels in the high and low groups, respectively. Both groups were found to have a relatively low dependence on B species groundfish, with most vessels (>276) having less than 20 percent dependence on B species revenues (**Table 3-12b; Figure 3-6b).** The mean proportion of B species groundfish to total commercial fishery income was 31 percent for the high production group and 16 percent for the low production group. This difference was statistically significant (using arcsin conversion) at the 1 percent level (t=6.557 and df=1,063). Thus the high production B species vessels were more dependent for their overall commercial fishery incomes on B species groundfish than the low production vessels during 2004-2006 window period years.

Table 3-12b Relative dependence of B species directed fishery vessels on B species revenues for low and high production vessel groups during 2004-2006 1/

	low		high	
bin 2/	# vsls	P	# vsls	P
10%	385	70%	227	41%
20%	56	10%	93	17%
30%	26	5%	59	11%
40%	9	2%	16	3%
50%	10	2%	23	4%
60%	7	1%	16	3%
70%	3	1%	7	1%
80%	3	1%	12	2%
90%	5	1%	9	2%
100%	47	9%	90	16%
Total	551	100%	552	100%

1/ Data are separated into low and high production vessel groups at $1,837.99 of B species revenues and tabulated by 10 percentage point bin

2/ 10% means 0%-10%, 20% means >10%-20%, etc.

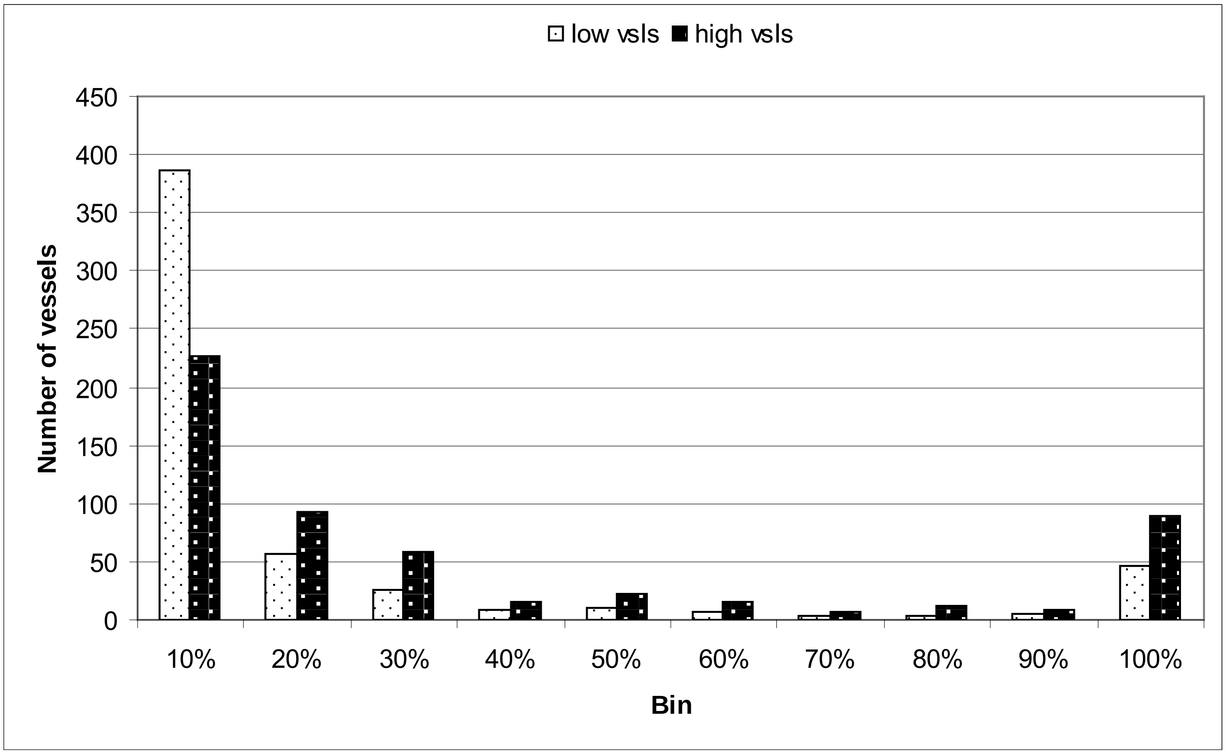

Figure 3-6b Relative dependence of B species directed fishery vessels on B species commercial fishery revenues during 2004-2006. Data are seperated into low and high production groups with B species landings expressed as a proportion of total commercial fishery revenues arranged into 10 percentage point bins

B species directed fishery vessels in Washington and California derived similar proportions of their total commercial fishery revenues from B species groundfish landings (7.8 percent and 7.9 percent, respectively) during 2004-2006. Oregon vessels had a slightly lower dependence at 5.2 percent of total revenues**.** Crabpot was the major source of commercial fishing revenues to B species vessels in all three states, followed by salmon in California and Oregon and HMS in Washington (**Tables 3-12c, 3-12d and 3-12e; Figure 3-7).**

Table 3-12c: Total fishery landings by vessels that made directed B species landing during 2004-2006 window period years, all years combined. WASHINGTON ONLY

Fishery	# vsls	mts	000s	#vsls	mts	$$
B directed	126	608.6	$1,723.1	100.0%	8.1%	7.8%
Nearshore	4	0.7	$0.8	3.2%		
Salmon	37	325.6	$1,957.5	29.4%	4.3%	8.8%
Red urchin						
Trawl	2	575.0	$462.4	1.6%	7.7%	2.1%
Set net						
HMS	60	1,713.1	$3,162.0	47.6%	22.9%	14.3%
CPS						
Crabpot	52	4,117.6	$14,188.7	41.3%	55.0%	64.1%
P. halibut	24	58.2	$367.2	19.0%	0.8%	1.7%
C. halibut						
Fishpot	2	6.4	$8.6	1.6%	0.1%	
Other	21	79.7	$258.7	16.7%	1.1%	1.2%
Total	328	7,484.9	$22,129.0	100.0%	100.0%	100.0%

Table 3-12d: Total fishery landings by vessels that made directed B species landing during 2004-2006 window period years, all years combined. OREGON ONLY

Fishery	# vsls	mts	000s	#vsls	mts	$$
B directed	345	687.1	$2,433.2	100.0%	4.7%	5.2%
Nearshore	180	435.0	$2,099.6	52.2%	3.0%	4.5%
Salmon	172	938.7	$6,022.1	49.9%	6.4%	12.8%
Red urchin						
Trawl	4	1,224.7	$1,047.7	1.2%	8.3%	2.2%
Set net						
HMS	156	2,052.4	$3,903.9	45.2%	14.0%	8.3%
CPS	7	70.5	$6.9	2.0%	0.5%	
Crabpot	136	8,718.1	$30,153.6	39.4%	59.5%	64.2%
P. halibut	73	133.5	$797.5	21.2%	0.9%	1.7%
C. halibut						
Fishpot	5	368.8	$348.3	1.5%	2.5%	0.8%
Other	106	32.4	$147.5	30.7%	0.2%	0.3%
Total	1184	14,661.2	$46,960.3	100.0%	100.0%	100.0%

Table 3-12e: Total fishery landings by vessels that made directed B species landing during 2004-2006 window period years, all years combined. CALIFORNIA ONLY

Fishery	# vsls	mts	000s	#vsls	mts	$$
B directed	632	1,500.2	$4,375.1	100.0%	6.4%	7.9%
Nearshore	332	537.2	$5,063.3	52.5%	2.3%	9.1%
Salmon	197	1,402.1	$8,571.2	31.2%	6.0%	15.4%
Red urchin	23	1,788.1	$2,328.6	3.6%	7.7%	4.2%
Trawl	25	165.0	$1,003.1	4.0%	0.7%	1.8%
Set net	50	613.6	$2,789.7	7.9%	2.6%	5.0%
HMS	131	1,585.6	$3,498.2	20.7%	6.8%	6.3%
CPS	87	9,724.6	$2,262.9	13.8%	41.6%	4.1%
Crabpot	218	5,401.1	$22,021.9	34.5%	23.1%	39.6%
P. halibut	1	0.1	$0.5			
C. halibut	149	42.2	$365.4	23.6%	0.2%	0.6%
Fishpot	22	112.9	$505.4	3.5%	0.5%	0.9%
Other	294	497.0	$2,817.2	46.5%	2.1%	5.1%
Total	2161	23,369.7	$55,602.5	100.0%	100.0%	100.0%

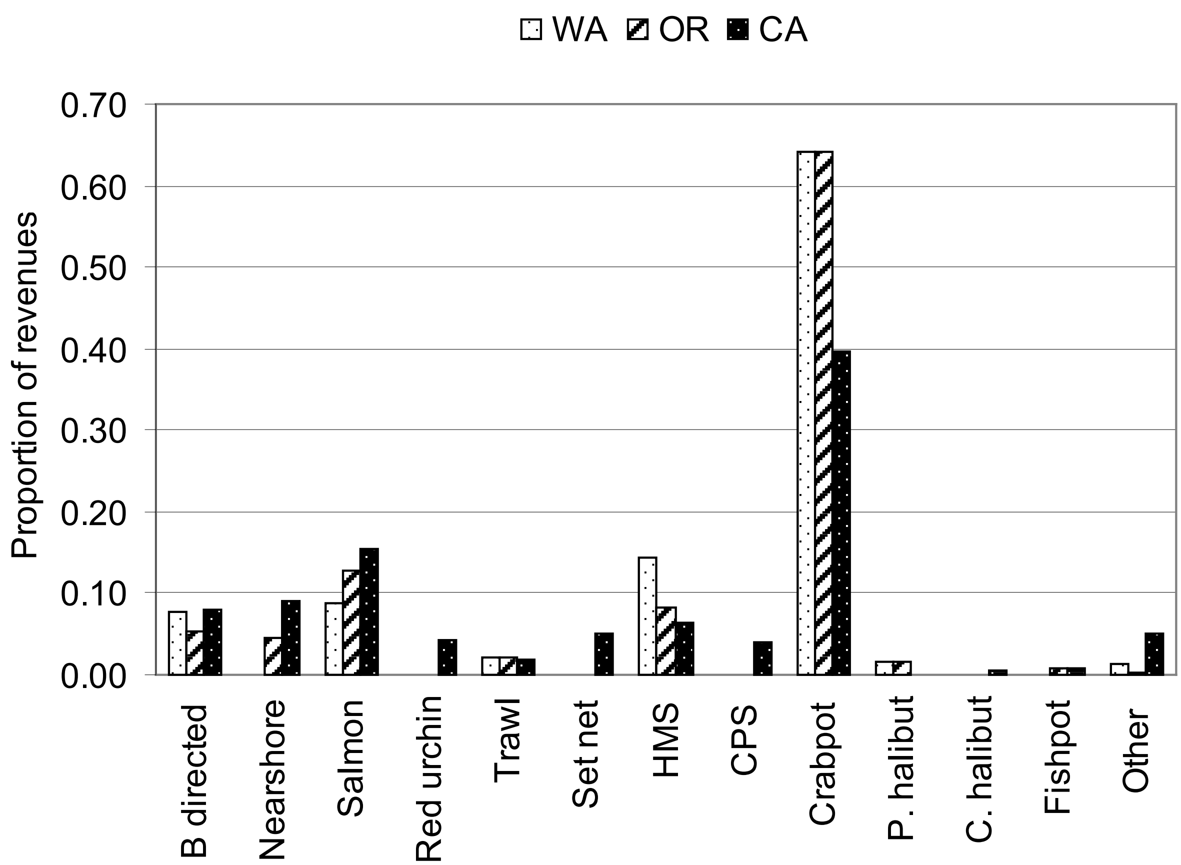

Figure 3-7: Proportion of revenues derived from specified species groups by vessels that made B species landings during 2004-2006 by state.

Note: this analysis did not show the dependence of WOC commercial fishing vessels on B species groundfish. Some of the vessels in associated commercial fisheries likely made no B species groundfish landings during the specified years. If the analysis were done to show the dependence of WOC commercial fishing vessels on B species groundfish the contribution of B species landings would be less than the values shown in the above tables.

3.3.3.7 Impacts to Overfished Groundfish

The PFMC’s Groundfish Management Team (GMT) makes projections of groundfish regulation impacts to overfished groundfish species. This is done for biennial specifications and whenever inseason regulation changes are proposed. The open access fishery directed fishery impacts estimated for 2007 updated with June 2007 inseason adjustments were as follow:

2007 Projected mortality impacts (mt) of overfished groundfish species under current regulations. Updated with June 2007 inseason adjustments, whiting bycatch of widow rockfish through July 26, and new research catch projections. a/

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Open Access: Directed Groundfish							
Sablefish DTL	0.0			0.2	0.1	0.0	0.5
Nearshore (North of 40°10' N. lat.)	0.0	1.7	0.1	0.0	0.0	0.1	2.0
Nearshore (South of 40°10' N. lat.)	0.0			0.0	0.0		
Other	10.6			0.0	0.0	0.0	0.1
2007 OY	218	44.0	4.0	290	150	368	23
B species directed fishery impact	5%	0%	3%	0%	0%	0%	3%

a/ All numbers reflect projected annual total catches except that the non-tribal "Limited Entry Trawl- Whiting" numbers are the total bycatch caps for canary and darkblotched rockfish.

b/ South of 40°10' N. lat.

The estimates show the B species directed fishery (which excludes nearshore species) was estimated to take a negligible (<0.5 percent) amount of over fished canary, darkblotched and widow rockfish and Pacific Ocean perch and 3 percent or 5 percent of overfished bocaccio, cowcod and yelloweye rockfish based on 2007 estimtes of optimum yield (OY). Most of the impact was in the sablefish daily trip limit fishery except for bocaccio which was estimated to be caught in “other” fisheries such those for lingcod and shelf rockfish.

3.3.4 Target Species Vessel Groups

Vessels were assigned to target species groups based on receipt of >50 percent of B species revenues from a single species or species group for landings during 2004-2006 as follows: sablefish, shelf rockfish, slope rockfish, lingcod, federal sharks and rays (sharks), and other species. Vessels that could not be assigned to a target species group were assigned to a non-target species group.

Lingcod was landed by more vessels (599) than any other species group, followed by shelf rockfish and sablefish at 546 and 504 vessels, respectively. Between 109 and 261 vessels landed slope rockfish, other species, and sharks. The non-target fleet numbered 25 vessels (**Table 3-13a**; **Figure 3-8**).

Sablefish was the primary B species groundfish landed during 2004-2006 with landings totaling 4.4million pounds. Of the sablefish total, 98 percent was landed by the target sablefish fleet. The total B species landing by the sablefish fleet of about 4.8 million pounds represented 78 percent of the B species harvest by all directed fishery vessels of 6.2 million pounds (**Table 3-13a; Figure 3-8).**

Table 3-13a Target and B species statistics for WOC vessels during 2004-2006 1/

	Sablefish fleet			Shelf RF fleet			Slope RF fleet			Lingcod fleet		
	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs
WA	114	959,077	999,921	0	0	0	2	156	207	4	8,028	8,467
OR	178	1,249,506	1,340,896	9	3,775	5,818	0	0	0	158	151,885	167,999
CA	155	2,205,421	2,455,166	114	64,512	84,082	27	155,279	190,365	224	170,573	224,555
WOC	447	4,414,004	4,795,982	123	68,287	89,900	29	155,435	190,572	386	330,485	401,021
Fleet 3/	504	4,507,341	98%	546	169,063	40%	261	299,165	52%	599	434,603	76%
lbs/vsl		9,875	10,729		555	731		5,360	6,571		856	1,039
median		4,142	4,422		208	273		2,746	3,658		420	468
high		69,416	75,252		9,038	12,967		38,300	40,880		4,975	6,908
low		16	16		3	3		42	42		5	5
	Shark fleet			Other species fleet			Non-target fleet 2/			Totals for all fleets		
	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs
WA	5	288,169	298,812	0	0	0	1	0	34,379	126	1,255,429	1,341,786
OR	0	0	0	0	0	0	0	0	0	345	1,405,166	1,514,713
CA	52	145,219	150,224	36	16,361	18,837	24	0	184,224	632	2,757,365	3,307,452
WOC	57	433,388	449,037	36	16,361	18,837	25	0	218,603	1,103	5,417,960	6,163,952
Fleet	109	480,175	90%	288	257,926	6%	25	0	n/a	2,332	6,148,274	88%
lbs/vsl		7,603	7,878		454	523		n/a	8,744		4,912	5,588
median		789	789		131	131		n/a	1,480		n/a	n/a
high		175,190	183,801		5,337	5,337		n/a	127,668		175,190	183,801
low		9	14		1	1		n/a	15		0	1

1/ each vessel was assigned to a species group based on a >50% revenue criterion

2/ vessels that landed did not land >50% of revenues of any single species group were placed in this category

3/ number of vessels and lbs landed in B species directed trips are shown in this row including the proportion of the total landed of each species that were made by each target species fleet.

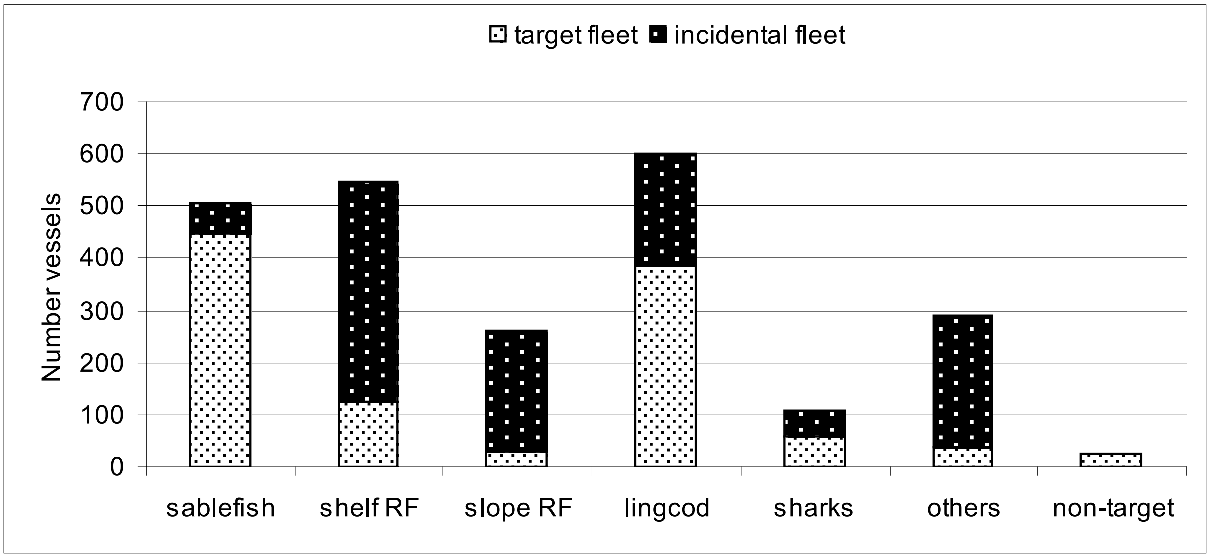

Figure 3-8: Number of vessels that derived their primary (>50 percent) B species fishery revenues from specified species groups (target fleet) and those that derived secondary (≤50 percent) revenues from those same groups (incidental fleet) during 2004-2006. The non-target fleet was comprised of vessels that did not receive >50 percent of revenues from a single species group. Some vessels may be counted more than once in the incidental fleet columns.

The distribution of sablefish was highest at Oregon ports (178, 40 percent), followed by California (155, 35 percent) and Washington (114, 26 percent) (**Table 3-13a).** Sablefish vessels averaged 9,875 lbs of sablefish, which represented 92 percent of the total B species landings by the sablefish fleet. Sablefish vessel B species catch histories ranged from 16 to 75,252 lbs per vessel with a median landing of 4,422 lbs. The vast majority (>91 percent) of B species landings by sablefish vessels was of sablefish (**Table 3-13a; Figure 3-9).**

Total landings by each of the other groups was very small by comparison to sablefish ranging from 258,000 for other species to 480,000 for sharks (**Table 3-13a; Figure 3-9).** The shark fleet took 90 percent of the shark landings, while the lingcod fleet took 76 percent of the lingcod landings. The other species fleet took only 6.3 percent of the other species total, while the shelf and slope rockfish fleets took 40 percent and 52 percent, respectively of those species totals **(Table 3-13a; Figure 3-9).** The average landing per vessel was relatively high for shark and slope rockfish vessels with a range of 6,571-8,744 lbs. Conversely it was low for the shelf rockfish, lingcod and other species vessels with a range of from 523-1,039 per vessel. The high vessel overall landed a total of 183, 801 pounds of B species groundfish, most of which was sharks. The lingcod fleet was almost entirely California and Oregon vessels. The shark, shelf rockfish, slope rockfish, and other species fleets were almost entirely California vessels (**Table 3-13a).**

State-specific target-species data show relatively strong B species catch histories for California sablefish vessels (9,380 lb median), followed by Washington (4,438 lb median) and Oregon (3,140 lb median) vessels (**Table 3-13b**). The few (5) Washington shark vessels have very high B species catch histories of B species groundfish (32,595 lb median), nearly all of which are sharks. California slope rockfish vessels also have relatively large B species catch histories (3,780 lb median) compared to most other target-species vessel groups (**Table 3-13b)**. The Washington lingcod vessels also have relatively strong B species catch histories (2,074 lb median) but there are only four of them. All other state-specific target-species vessel groups have relatively small B species catch histories (1,421 lbs median or less) (**Tables 3-13b and 3-13c).**

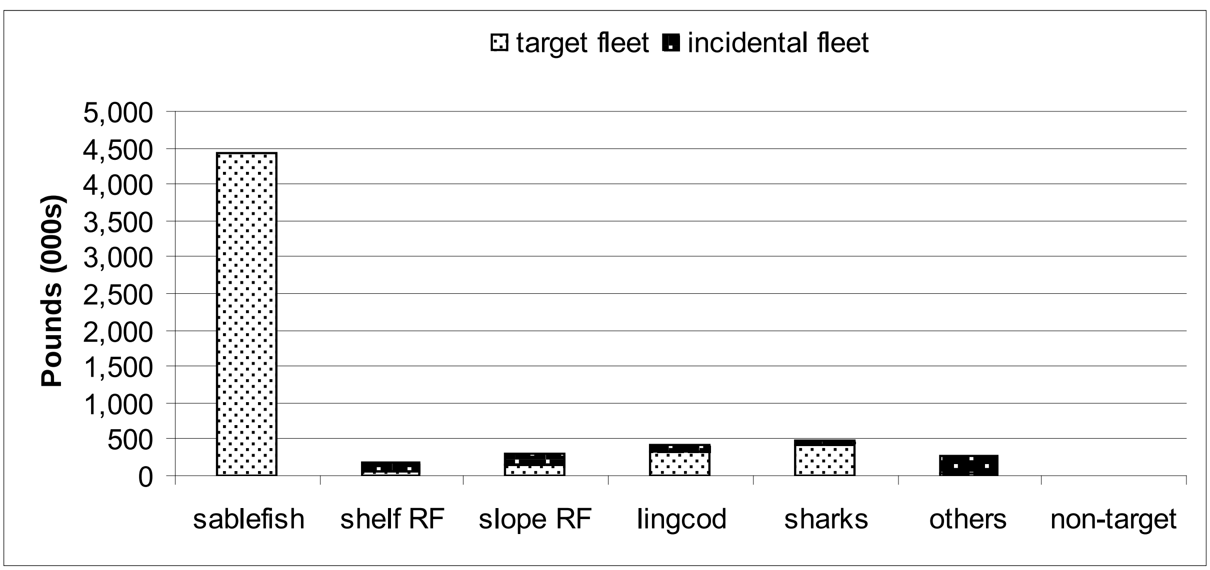

Figure 3-9. Pounds of B species groundfish landed by vessels that derived their primary (>50 percent) B species fishery revenues from specified species groups (target fleet) and those that derived secondary (≤50 percent) revenues from those same groups (incidental fleet) during 2004-2006. The non-target fleet was comprised of vessels that did could not be assigned to a single target species group.

Table 3-13b. State-specific target-species fleet statistics

	Sablefish fleet			Shelf RF fleet			Slope RF fleet			Lingcod fleet		
	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs
WA	114			0			2			4		
lbs/vsl		8,413	8,771		0	0		78	104		2,007	2,117
median		4,079	4,438		0	0		78	104		1,971	2,074
high		43,202	43,912		0	0		89	134		4,056	4,152
low		26	26		0	0		67	73		31	167
OR	178			9			0			158		
lbs/vsl		7,020	7,533		419	646		0	0		961	1,063
median		3,083	3,140		37	37		0	0		556	571
high		56,684	63,208		1,501	2,217		0	0		4,319	5,538
low		41	41		4	4		0	0		12	14
CA	155			114			27			224		
lbs/vsl		14,229	18,005		566	738		5,751	7,051		761	1,002
median		7,026	9,380		213	277		3,192	3,780		385	430
high		69,416	127,668		9,038	12,967		38,300	40,880		4,975	6,908
low		16	1,594		3	3		42	42		5	5

	Shark fleet			Other species fleet			Non-target fleet 2/			Totals for all fleets		
	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs	vsls	target lbs	B lbs
WA	5			0			1			126		
lbs/vsl		57,634	59,762		0	0		0	34,379		10,043	10,649
median		32,063	32,595		0	0		0	34,379		3,750	4,214
high		175,190	183,801		0	0		0	34,379		175,190	183,801
low		3,347	3,347		0	0		0	34,379		26	26
OR	0			0			0			345		
lbs/vsl		0	0		0	0		0	0		4,073	4,390
median		0	0		0	0		0	0		1,235	1,302
high		0	0		0	0		0	0		56,684	63,208
low		0	0		0	0		0	0		4	4
CA	52			36			24			632		
lbs/vsl		2,793	2,889	36	454	523		0	7,676		4,535	5,233
median		427	488		131	131		0	1,421		579	702
high		64,070	64,088		5,337	5,337		0	127,668		69,416	127,668
low		9	14		1	1		0	15		1	1

1/ Each vessel was assigned to a species group based on receipt of >50% of B species revenues from that group

2/ Vessels that did not receive >50% of revenues from a single species group were placed in this category

Table 3-13c: Median B species directed fishery landings during 2004-2006 window period for state-specific target-species vessel groups 1/

State and target-species vessel group	Median lbs	# vsls
WA non-target	34,379	1
WA shark	32,595	5
CA sablefish	9,380	155
WA sablefish	4,438	114
CA slope rockfish	3,780	27
OR sablefish	3,140	178
WA lingcod	2,074	4
CA non-target	1,421	24
OR lingcod	571	158
CA shark	488	52
CA lingcod	430	224
CA shelf rockfish	277	114
CA other species	131	36
WA slope rockfish	104	2
OR shelf rockfish	37	9
Total	-	1,103

1/ Derived from Appendix Table E-15. Vessels were assigned to a target-species groups based on >50% of B species revenues from that group.

3.3.5 Processor Characteristics Over Action Time Period - Number, Size Class, Revenues, Dependence, Other Fishery Participation

Data on the number of fish processing plants and their employees are presented in subsection 6.2, Regulatory Impact Review and Regulatory Flexibility Analysis.

WOC fish buyers and fish processing plants received about 990 thousand metric tons of fishery products during the 2004-2006 window period. The ex-vessel value of the landings was about $784 million. CPS species comprised 42 percent of the landings by weight while crab was the most valuable species group at 37 percent for all species combined. Groundfish represented 39 percent by weight and 20 percent by ex-vessel value of total fishery landings. The leading port groups in terms of weight of fish landed were Oregon-Columbia River (CLO, 20 percent), Los Angeles Area (LAA, 17 percent), Washington-Columbia River (CWA, 15 percent) and Newport (NPA, 14 percent). The leading port groups in terms of ex-vessel value of fish landed were Coastal Washington (CWA, 14 percent), Newport (NPA, 11 percent), Los Angeles Area (LAA, 9 percent), Coos Bay (CBA, 8 percent) and Santa Barbara Area (SBA, 8 percent) (**Table 3-14).**

A total of 809 different fish buyers, distributed among 70 ports, purchased B species groundfish during window period years. In 2006, the comparative figures were 214 buyers among 55 ports. A large majority of buyers (79 percent) operated from California ports, particularly between San Francisco (SFA) and San Diego (SDA) (471). Fishermen landing and selling their own catches likely contributed to the large number of fish buyers at California ports (**Table 3-15**).

Table 3-14. WOC commercial fishery landings by species group, port group and state in number of vessels, tonnage landed and ex-vessel value for 2004-2006 window period years combined. Imports and shipments exluded.

		Groundfish		Salmon		Shellfish		Shrimp		Crab		HMS		CPS		Other		Total	
		mts	$$K	mts	$$K	mts	$$K	mts	$$K	mts	$$K	mts	$$K	mts	$$K	mts	$$K	mts	$$K
WA	NPS	13,786	20,770	1,468	5,378	0	0	1	10	1,804	7,949	1,158	3,524	742	131	527	3,436	19,486	41,198
	SPS	89	385	9	42	0	0	18	129	54	275	48	101	0	0	147	172	365	1,104
	CWA	107,027	19,030	372	2,030	190	624	6,338	5,373	17,546	61,842	8,292	14,743	10,830	1,227	353	1,682	150,948	106,551
	CLW	19,946	4,389	53	363	2	5	1,747	1,489	3,090	10,215	10,835	20,629	8,331	1,259	72	335	44,076	38,684
	WAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	sub	140,848	44,574	1,902	7,813	192	629	8,104	7,001	22,494	80,281	20,333	38,997	19,903	2,617	1,099	5,625	214,875	187,537
OR	CLO	74,965	27,528	228	1,666	59	264	5,276	4,392	6,128	20,188	3,454	7,688	112,394	14,564	318	646	202,822	76,936
	TLA	193	503	216	1,479	128	105	1,595	1,427	1,848	6,425	269	583	203	23	16	53	4,468	10,598
	NPA	117,900	24,225	1,243	8,263	0	1	6,870	6,492	9,941	33,614	4,727	9,229	277	160	443	1,254	141,401	83,238
	CBA	19,696	12,765	1,211	7,670	33	61	3,934	3,597	8,988	31,761	3,050	6,368	57	35	1,043	1,450	38,012	63,707
	BRA	2,768	6,486	265	1,648	3	13	352	412	6,030	20,880	72	161	3	1	346	261	9,839	29,862
	sub	215,522	71,507	3,163	20,726	223	444	18,027	16,320	32,935	112,868	11,572	24,029	112,934	14,783	2,166	3,664	396,542	264,341
CA	CCA	5,735	3,889	170	993	0	0	291	773	11,684	40,341	342	628	0	0	11	9	18,233	46,633
	ERA	15,765	8,855	132	741	0	0	1,219	1,162	6,974	24,474	699	1,354	25	11	433	365	25,247	36,962
	BGA	4,654	7,348	1,295	7,704	1	1	5	38	867	3,036	74	180	0	0	1,445	1,134	8,341	19,441
	BDA	103	317	1,023	6,537	0	0	365	283	1,704	6,563	37	72	253	177	55	185	3,540	14,134
	SFA	2,433	4,156	2,345	13,391	0	1	447	1,200	3,915	16,046	123	349	3,240	1,390	792	4,343	13,295	40,876
	MNA	2,788	5,096	918	5,680	0	0	244	1,213	262	1,162	309	720	55,183	7,556	161	825	59,865	22,252
	MRA	1,517	4,317	125	930	0	0	372	1,887	202	960	104	344	946	468	54	250	3,320	9,156
	SBA	273	1,253	8	54	0	0	122	2,273	1,120	3,063	144	343	67,201	29,368	11,492	22,959	80,360	59,313
	LAA	467	2,430	1	6	3	4	101	2,004	182	503	1,398	2,491	159,060	53,960	2,663	9,753	163,875	71,151
	SDA	240	1,265	0	0	1	5	26	506	157	356	723	2,909	149	92	1,524	6,648	2,820	11,781
	CAU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	sub	33,975	38,926	6,017	36,036	5	11	3,192	11,339	27,067	96,504	3,953	9,390	286,057	93,022	18,630	46,471	378,896	331,699
WOC	Total	390,345	155,007	11,082	64,575	420	1,084	29,323	34,660	82,496	289,653	35,858	72,416	418,894	110,422	21,895	55,760	990,313	783,577

Table 3-15: B species directed fishery buyer data by state and in total for 1998-2006 with 2006 data in parentheses

	Port group	# ports	# buyers	mts	$$K
WA	NPS	4 (3)	15 (4)	405.9 (68.8)	739.6 (62.8)
	SPS	1 (1)	3 (1)	20 (4.7)	77.9 (19.3)
	CWA	4 (2)	14 (4)	419.9 (39.6)	1272.2 (151.9)
	CLW	2 (1)	13 (3)	298.8 (109.6)	1,096.8 (420.1)
	WAU	1 (0)	1 (0)	.3 (0)	.9 (0)
	sub	12 (7)	46 (12)	1,144.9 (222.7)	3,187.4 (654.1)
OR	CLO	1 (1)	9 (4)	198.6 (33.8)	768.8 (131.4)
	TLA	2 (2)	21 (10)	70.9 (14.0)	192.1 (54.9)
	NPA	2 (2)	37 (10)	146.2 (36.0)	426.9 (153.5)
	CBA	4 (4)	28 (11)	392.8 (96.6)	1,207.9 (372.7)
	BRA	3 (3)	28 (6)	706.4 (115.2)	2,117.9 (419.5)
	sub	12 (12)	123 (41)	1,514.9 (295.6)	4,713.6 (1132.0)
CA	CCA	2 (1)	27 (4)	147.3 (12.3)	500.6 (46.4)
	ERA	4 (3)	39 (10)	424.4 (38.8)	1,118.3 (125.1)
	BGA	4 (4)	41 (11)	1,234.6 (157.7)	3,456.7 (483.2)
	BDA	5 (3)	61 (11)	527.9 (3.2)	788.1 (12.2)
	SFA	8 (5)	133 (33)	490.9 (33.1)	1,101.9 (143.6)
	MNA	4 (4)	74 (18)	1,422.9 (72.5)	2,767.8 (192.0)
	MRA	3 (3)	49 (22)	307.8 (36.0)	842.8 (118.7)
	SBA	5 (4)	87 (21)	231.4 (9.6)	655.1 (32.7)
	LAA	7 (6)	71 (15)	187.2 (12.8)	606.2 (49.7)
	SDA	3 (3)	57 (16)	271.3 (25.0)	974.6 (117.3)
	CAU	1 (0)	1 (0)	.4 (0)	1 (0)
	sub	46 (36)	640 (161)	5,246.1 (401.0)	12,813.1 (1,320.9)
WOC	Total	70 (55)	809 (214)	7,905.9 (919.3)	20,714.1 (3,107.0)

Total B species landings for the window period years were 7,906 mt of fish with an ex-vessel value of $20.7 million. The leading state for B species groundfish landings (for directed fishery and incidental fishery landings combined) was California with 66 percent by weight and 62 percent by ex-vessel value of WOC window period totals (**Table 3-15**).

3.3.6 Participation Requirements, Restrictions, Licensing

There is no Federal permitting or licensing requirement to participate in the open access fishery, beyond the requirement to have an operational VMS unit when fishing in federal waters. .

3.3.6.1California

California requires open access vessel owners and fishermen to annually register their vessel and obtain commercial fishing licenses for all persons on the vessel with CDFG. There is no state permit requirement to take federal species except for nearshore species which are managed under three independent types of limited entry permit: 1) shallow nearshore species, 2) deeper nearshore species, and 3) a bycatch permit A permit is required of any person to directly or incidentally take either nearshore species group. California requires commercial fish buyers and processors to obtain appropriate licenses in advance of receiving and processing federal groundfish. There is no restriction on the number of fishermen or vessels that may participate in the groundfish fishery, other than for nearshore species as described above. California commercial fishery registration and license information are available on the CDFG web site at: http://www.dfg.ca.gov/licensing/commercial/commercialinfo.html.

3.3.6.2 Oregon

In Oregon licenses are required for any boat, vessel, or floating craft used in taking of food fish or shellfish for commercial purposes, except clams and crayfish. Boat licenses are not required to take fish for bait under a bait fishing license. A single delivery license may be obtained in lieu of commercial fishing and boat licenses for each separate landing of catch. Oregon commercial fishery license information is available on the ODFW web site at: http://www.dfw.state.or.us/fish/commercial/forms.asp.

3.3.7 Revenue/Costs to the Participants and to State and Federal Governments

3.3.7.1 California

California registration and license fee information are posted on CDFG's web site as follows: http://www.dfg.ca.gov/licensing/commercial/commercialinfo.html. Commercial fees are as high as $1,560 annually for a multi-purpose fish business license. The basic commercial fishing license is $108.25 annually for resident fishermen. The vessel registration fee is $284 annually for a resident vessel owner.

3.3.7.2 Oregon

Oregon registration and license information can be found at http://www.dfw.state.or.us/fish/commercial/forms.asp . Every individual operating or assisting in the operation of any commercial fishing gear or fishing boat must have a commercial fishing license or crewmember license (except for albacore). Every member of the crew on a commercial fishing boat must be licensed. Residential commercial fishing licenses are $50.00, nonresident commercial fishing license are $290, and a crewmember license is $85.00. The Oregon commercial fishing boat annual license fee is $200 (Kelly Ames, ODFW, pers. comm.)

3.3.7.3 Washington

Washington State limited entry licenses (e.g., coastal Dungeness crab or salmon troll) include a delivery permit, which allows for the landing of all state classified species into Washington. If an individual does not have a state limited entry license, then he/she would need to purchase a non-salmon delivery permit to land groundfish (Michele Culver 2008). Washington commercial fishery registration and license information are available on the WDFW web site at: http://wdfw.wa.gov/lic/commercial/index.htm.

3.3.7.4 National Marine Fisheries Service

Currently, NMFS charges only for initial issuance and annual renewal of Pacific Coast Groundfish Limited Entry Permits but it has the authority to charge fees for a broader range of limited entry permit services (i.e.; transfer, permit replacement). In 2008, it is anticipated that the fee for the renewal of a Limited Entry Permit will be about $125. NMFS assessed an initial issuance fee for the A Limited Entry Permit (~$200 in 1993) and a subsequent Sablefish Endorsement (~$800 in 1997). Costs of each alternative would be dependent on the incremental activities and resources required to implement the permit requirements and on the number of permit holders/applicants.

3.3.8 Groundfish-dependent Communities

Landings data for vessels that made directed fishery landings of B species groundfish during 2004-2006 window period years were analyzed to determine the relative importance of B species directed fishery landings to the states and port groups within states[9]. The data showed that Washington, Oregon and

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[9] Community impact analysis of the B species directed fishery during 2004-2006 is presented in Appendix E.

California landings totaled 2,796 mt of fish worth about $8.5 million to the fishermen for all years combined during 2004-2006 window period years (**Table 3-16).**

Table 3-16: B species groundfish directed fishery landings in number of landings, tons, ex-vessel value, and proportion of total commercial fishery landings by port group and state during 2004-2006 window period

	B species data							B species prop. of commercial landings	
Port/AGY	# ldgs	mt	000s	Price/ lb	P ldgs	P mt	P $$	P mt	P $$
SPS	19	7	$30	$1.85	0%	0%	0%	2.0%	2.7%
NPS	208	198	$225	$0.51	1%	7%	3%	1.0%	0.5%
CWA	682	157	$553	$1.60	3%	6%	6%	0.1%	0.5%
CLW	691	242	$903	$1.69	3%	9%	11%	0.5%	2.3%
WA	1,600	604	$1,711	$1.28	8%	22%	20%	0.3%	0.9%
CLO	291	94	$363	$1.75	1%	3%	4%	0.0%	0.5%
TLA	898	31	$107	$1.56	4%	1%	1%	0.7%	1.0%
NPA	245	48	$187	$1.78	1%	2%	2%	0.0%	0.2%
CBA	673	188	$666	$1.60	3%	7%	8%	0.5%	1.0%
BRA	3,953	338	$1,153	$1.55	19%	12%	14%	3.4%	3.9%
OR	6,060	700	$2,476	$1.60	29%	25%	29%	0.2%	0.9%
CCA	1,111	36	$133	$1.67	5%	1%	2%	0.2%	0.3%
ERA	517	126	$395	$1.43	2%	4%	5%	0.5%	1.1%
BGA	3,144	605	$1,706	$1.28	15%	22%	20%	7.3%	8.8%
BDA	381	11	$38	$1.60	2%	0%	0%	0.3%	0.3%
SFA	1,231	81	$304	$1.70	6%	3%	4%	0.6%	0.7%
MNA	1,954	370	$774	$0.95	9%	13%	9%	0.6%	3.5%
MRA	3,006	96	$319	$1.50	14%	3%	4%	2.9%	3.5%
SBA	468	33	$112	$1.55	2%	1%	1%	0.0%	0.2%
LAA	493	36	$133	$1.66	2%	1%	2%	0.0%	0.2%
SDA	1,170	98	$430	$1.99	6%	3%	5%	3.5%	3.6%
CA	13,475	1,492	$4,345	$1.32	64%	53%	51%	0.4%	1.3%
WOC	21,135	2,796	$8,531	$1.38	100%	100%	100%	0.3%	1.1%

Washington received 22 percent, Oregon 25 percent and California 64 percent by weight of the coastwide total of B species directed fishery landings. The respective state proportions in terms of value of catch to the fishermen were 20 percent, 29 percent and 51 percent respectively. The Brookings port group had the greatest activity in terms of number of landings (19 percent), followed by Fort Bragg (15 percent) and Morro Bay (14 percent) port groups. The Fort Bragg port group had the greatest total weight landed (22 percent) followed by Monterey and Brookings port groups (13 percent and 12 percent, respectively). The Fort Bragg port group was also highest in terms of fisherman revenues followed by Brookings and Columbia River, Washington port groups at 20 percent, 14 percent and 11 percent, respectively. The highest price paid for B species groundfish was in the San Diego port group at $1.99 and lowest in North Puget Sound port group at $0.51. The coastwide average price paid per pound was $1.38 **(Table 3-16).**

Landings data for individual groundfish species and year are shown in **Table 3-5.** The primary port of landing by vessels that made B species landings during 2004-2006 window period years and the gear types used are tabulated in **Table 3-10**. B species landings expressed as proportion of total WOC fishery landings in recent years (2004-2006 window period) showed a negligible (<0.3 percent) contribution rate based on tonnage landed and 1.1 percent based on ex-vessel value of fish landed (**Table 3-16**). For individual ports, B species landings exceeded 3 percent of total landings either in terms of weight or value of fish landed at six port groups (tonnage and ex-vessel values, respectively, shown in parentheses): Fort Bragg (BDA, 7 percent and 9 percent), Brookings (BRA, 3 percent and 4 percent), Morro Bay (MRA, 3 percent and 3 percent), South Puget Sound (SPS, 2 percent and 3 percent) and Monterey (MNA, 1 percent and 3 percent) (**Table 3-16; Figure 3-10**).

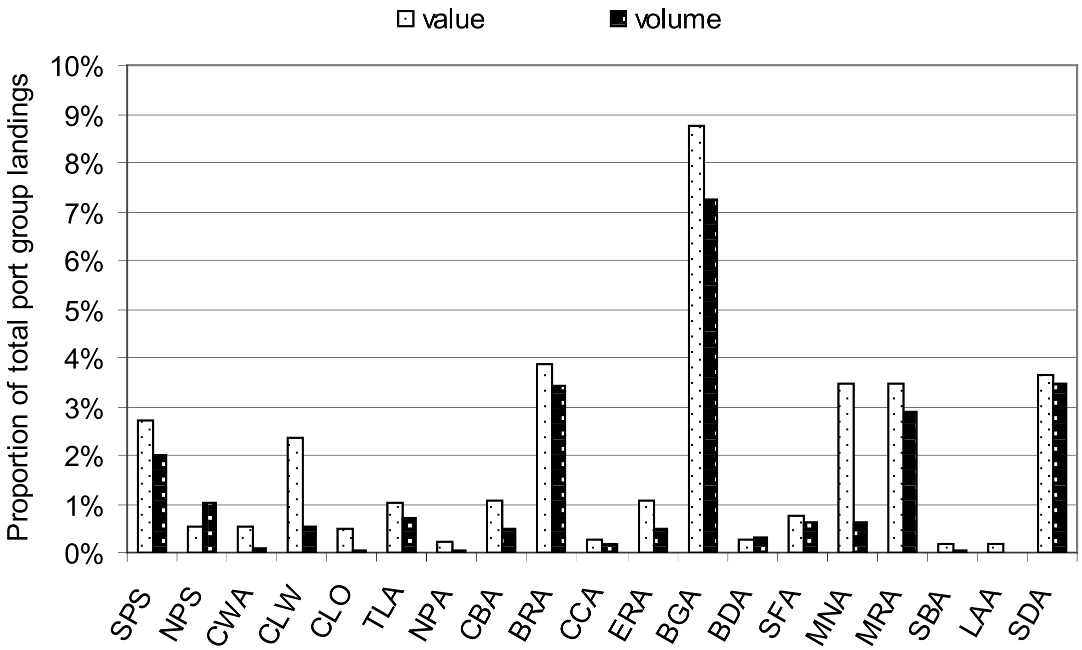

Figure 3-10: B species groundfish landings expressed as a proportion of WOC port group landings, 2004-2006 window period years combined

The "2007-2008 Groundfish Specifications and Management Measures Amendment 16-4: Rebuilding Plans Environmental Impact Statement" Appendix A "Additional Socioeconomic Analysis" contains a study called "Fishing Community Engagement, Dependence, Resilience and Identification of Potentially Vulnerable Communities" in Section A.4.1. This study looked at four categories to categorize communities, which are: engagement, dependency, resiliency and vulnerability. Each category was developed using various indicators. For this analysis, dependence, resilience and vulnerability are applicable indicators. Dependence refers to a community's dependence upon the groundfish fishery. This includes both limited entry and open access fishing. Resilience refers to the ability for a community to adapt to changes in management measures and vulnerability highlights areas that exhibit both high dependence and low resilience. The following table shows the categories and indicators, used for each category. Notice the scale for dependence and resilience range by the number of indicators.

Category	Indicator	Scale
Dependence	• Number of federal and state groundfish permits as a percentage of each state's total number of groundfish permits (based on owner's mailing address) • Groundfish revenue as a percentage of total community fisheries revenue • Groundfish revenue as a percentage of total groundfish revenue coastwide	0-3
Resilience	• Industry diversity index • Unemployment rate • Percentage of the population living below that poverty line • Isolated cities • Population density	0-5
Vulnerable	• Communities that are both relatively highly dependent and have relatively low resilience. These are areas that scored a 1 or greater for both dependence and resilience	Yes/No

The methodology of this study was to comprise the data sets for each indicator by category and community. Then communities were ranked highest to lowest for each indicator value. The top 1/3 communities were identified for each indicator and the number of times a community was listed in the top 1/3 for each indicator was tallied.

This report analyzed 131 communities; 74 communities had a dependence score of one or higher and 18 cities had a score of two or higher, these are: Astoria, Bellingham, Brookings, Coos Bay, Crescent City, Eureka, Fort Bragg, Morro Bay, Newport, Port Orford, San Francisco, which had a score of three and Blaine, Gold Beach, Moss Landing, Neah Bay, Pacific City, Port Angeles, and Westport, which had a score of two. Out of these 18 cities 15 had a resilience score of 1 or greater while Brookings, San Francisco and Blaine had a score of 0 and are therefore had no indicators ranked in the top 1/3 of all areas analyzed. According to this report's definition of vulnerability, the 15 cities identified with a score of 1 or greater in both categories would be considered vulnerable. However, given that the resilience scale is based on 5 criteria, areas with a score of three or greater should be paid particular attention. These are: Moss Landing and Neah Bay.

3.3.9 Environmental Justice

Executive Order (EO) 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance (NAO 216-6) at '7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation--especially by affected communities--during scoping, as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic, or occupational factors that could amplify the adverse effects of the proposed action. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice is developed, health effects are usually considered, and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

Participation in decisions about the proposed action by communities that could experience disproportionately high and adverse impacts is another important principle of the EO. The Council offers a range of opportunities for participation by those affected by its actions and disseminates information to affected communities about its proposals and their effects through several channels. In addition to Council membership, which includes representatives from the fishing industries affected by Council action, the GAP, a Council advisory body, draws membership from fishing communities affected by the proposed action. While no special provisions are made for membership to include representatives from low income and minority populations, concerns about disproportionate effects to minority and low income populations could be voiced through this body or to the Council directly. Although Council meetings are not held in isolated coastal communities for logistical reasons, they are held in different places up and down the Pacific Coast to increase accessibility. In addition, fishery management agencies in Oregon and California sponsored public hearings in coastal communities to gain input on the proposed action. The comments were made available to the Council in advance of their decision to choose a preferred alternative.

The Council disseminates information about issues and actions through several media. Although not specifically targeted at low income and minority populations, these materials are intended for consumption by affected populations. Materials include a newsletter, describing business conducted at Council meetings, notices for meetings of all Council bodies, and fact sheets intended for the general reader. The Council maintains a postal and electronic mailing list to disseminate this information. The Council also maintains a website (www.pcouncil.org) providing information about the Council, its meetings, and decisions taken. Most of the documents produced by the Council, including NEPA documents, can be downloaded from the website.

Sections 8.5.7 in Chapter 8 to the 2005-06 groundfish harvest specifications EIS describes a methodology, using 2000 United State Census data, to identify potential “communities of concern” because their populations have a lower income or a higher proportion of minorities than comparable communities in their region. Pacific Coast ports identified in the PacFIN database were examined in this way. These ports were evaluated using five criteria: the percentage nonwhite population, percentage Native American population, percentage Hispanic population, average income, and the poverty rate. Data were evaluated for both census places and census block groups corresponding to the area around these census places. The values for these statistics were compared to the average value for one of three regions, covering coastal block groups in Washington, Oregon, and northern California; central California; and southern California. For each of the five statistics potential communities of concern were identified. These are communities that have a significantly higher percentage minority population and poverty rate or lower average income than the surrounding reference region.

About two-thirds of the port communities analyzed are above the cutoff threshold for one or more of the statistics, measured either by the census place value or the equivalent block groups. This suggests that additional criteria need to be applied to more realistically identify which ports should be of concern. It should be noted that the population affected by the proposed action, which would be predominantly fishers and those involved in allied industries (e.g., marine supplies, fish processing and equipment) is a small percentage of the population in most communities. It stands to reason that in larger communities and more urban areas, fishery participants are a smaller and potentially less representative component of the population. In isolated rural communities there are usually fewer alternative employment alternatives, making it harder to find work or switch from one occupation to another in response to changes in one economic sector such as fisheries. Given these conditions, another criterion to focus on communities of concern would be population size and urbanization. Eliminating ports with a population greater than

50,000 and of those ports with a population less than 50,000, those for which the block group area is more than 75 percent urban leaves the list of ports shown in Table 7-48 as potential communities of concern.

It should be noted that fishery participants usually make up a small component of the population and fisheries may be a small part of the local economy in many places. Thus, even if a community has a high proportion of minority or low income residents, these people might not participate in fisheries and are thus minimally affected by the proposed action. Furthermore, within the affected population some segments are more likely to be low income and minority than others. For example, employees in a fishing processing plant may be predominantly from a minority group, and crew on vessels are likely to have a lower earnings than the skipper or vessel owner, making them more likely to be low income. Unfortunately, the kind of detailed population data necessary to determine the characteristics of the population affected by the proposed action are not available. For this reason, the ports identified in **Table 3-17** represent an initial screening.

Table 3-17: Environmental Justice—Communities of Concern

State	Community	Qualifying Demographic Criteria
Washington:	Blaine	poverty rate
	La Conner	% Hispanic
	Neah Bay	% nonwhite, % Native American, average income, poverty rate
	La Push	% nonwhite, % Native American, poverty rate
	Copalis Beach	income
	Westport	income, poverty rate
	Willapa Bay	income, poverty rate
Oregon:	Salmon River	% Native American
	Siletz Bay	% Native American
	Waldport	income
	Winchester Bay	income, poverty rate
	Port Orford	income, poverty rate
	Brookings	% Native American, income
California:	Trinidad	% Native American, income, poverty rate
	Fort Bragg	% Hispanic
	Albion	% Hispanic
	Point Arena	% Native American, % Hispanic
	Moss Landing	% Native American, % Hispanic

The direct source of stress on these communities resulting from the proposed action would be any decline in employment and related personal income in response to additional restrictions placed on groundfish fisheries. However, because the open access groundfish fishery has had historically sporadic participation and comprises a small portion of all Pacific Coast groundfish fishing, it is unlikely that fishermen partake in this fishery for their sole income and rather use it as supplementary income. Further, no alternatives analyzed in this EA terminate this fishery, and rather, the alternatives would limit participation. Therefore, the alternatives should have no to limited impacts on communities of concern.

4.0 ENVIRONMENTAL CONSEQUENCES

The terms "effect" and "impact" are used synonymously under NEPA. Impacts include effects on the environment that are ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Direct effects are caused by the action itself and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts are those impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Chapter 4 is organized by alternatives. All resource impacts from a single alternative appear under the discussion for that alternative. Sections 4.1 through 4.6 of this document discuss each alternative and the direct and indirect impacts on the physical, biological, and socioeconomic environment that are likely to occur. Section 4.7 presents the reasonably foreseeable cumulative effects on the environment from the proposed alternatives.

A summary of registration requirements, fleet size goals, fleet size expectations, and environmental consequences associated with the Council's alternatives is presented in **Table 4-1a**. The effects of proposed qualification criteria contained in the B permit alternatives A-3, A-4 ,A-5 and A-6 are evaluated relative to the Permit Program Needs Statement in **Table 4-1b.** The environmental consequences associated with each of the alternatives are discussed in following sections.

4.1 Alternative 1 (No-action)

Alternative 1, which is the No-action Alternative, would continue to allow commercial fishing vessels to prosecute federal groundfish species allocated to open access fisheries without federal registration, except as required under the Vessel Monitoring System (VMS) program (**72 FR 69162, December 7, 2007**). The VMS program requires most vessels to register with NMFS and utilize VMS equipment if they intend to take and retain federal groundfish in federal waters in the WOC area.

A total of 1,103 different vessels participated in the directed open access fishery for B species groundfish during 2004-2006 window period years. The recent VMS requirement for vessels that fish in federal waters for federal groundish is likely to reduce the number of vessels that participate in the B species directed fishery in recent years to <713, which would be less than the number that participated in the B species directed fishery the last year of the window period, 2006.

4.1.1 Effects on the Physical Environment including EFH

The affected environment including EFH is described in **Section 3.1**. The No-action alternative would allow vessel owners to continue to fish for B species groundfish as they have in the past to the extent that future groundfish stock status allows. Fishery impacts to the physical environment include gear loss impacts, habitat alteration caused by fishing gear contact with habitat structures, and water pollution associated with vessel fuel and waste spillage. The directed open access fleet had been increasing during 2004-2006 in the WOC area (**Table 2-5; Figure 2-1**), particularly for sablefish (**Figures 3-4 and 3-5)**. However, continuation of the upward trend in vessel participation in the open access fishery may be stemmed due to the VMS requirement for groundfish fishing in federal waters. Overall, no adverse impact to the environment would be expected because no change in management is proposed under this alternative.

Table 4-1a Summary of registration requirements, fleet size goals, fleet size expectations, and environmental consequences associated with permit program alternatives

Issue	Reference	A-1	A-2	A-3	A-4	A-5	A-6
Registration requirement?	§ 2.0	No	Yes	Yes	Yes	Yes	Yes
Fleet size goal							
Initial	§ 2.0	none	none	680 or 713	none	390	none
Long-term	§ 2.0	none	none	none	none	170	none
Initial fleet size expectation **1/**	Tab 4-1b	<713	<713	468-680	65-<713	286-390	<713
Long-term fleet size expectation	Tab 4-1b	<713	<713	468-680	65-<713	170	<713
Consistent with "Needs Statement"?	Tab 4-1b	no	partially	partially	yes & no	yes	partially
Environmental impact							
Physical environment	§ 3.1, and § 4.0	N/C	N/C	N/C	N/C	N/C	N/C
Biological environment							
Groundfish	§ 3.2.1	N/C	N/C	N/C	N/C	N/C	N/C
Non-groundfish	§ 3.2.2	N/C	N/C	N/C	N/C	N/C	N/C
Prohibited species	§ 3.2.3	N/C	N/C	N/C	N/C	N/C	N/C
Protected species	§ 3.2.4	N/C	N/C	N/C	N/C	N/C	N/C
Socioeconomic environment							
Fishery mgmt **2/**	§ 2.0	N/C	+	+	+ to >	>	+
Catch comp.							
Groundfish **3/**	Tab E-4a or I-1a	N/C	N/C	+1% to +9%	N/C to +64%	+9% to +20%	+0.1% to +0.8%
Non-groundfish 4/	Tab E-4b or I-1b	N/C	N/C	N/C to -2%	N/C to -5%	-1% to -2%	-0.1% to -1.5%
Vessels char.	§ 3.3.3.4, § 3.3.3.5	N/C	N/C	> size possible	> size possible	N/C	> size possible
Processors 5/	Tab E-12a, E-12b & I-4b	N/C	N/C	-1% to -7% lbs	-1% to -12% lbs	-7% to -17% lbs	N/C to -1% lbs
Licensing, etc.	§ 3.3.5, § 3.3.6	N/C	new requirement	new requirement	new requirement	new requirement	new requirement
Costs	§ 2.0	N/C	~$125/yr	~$125/yr	~$125/yr	~$125/yr	~$125/yr
Communities 6/	Inferred from Tabs E-4b, E-20 & E-22	N/C	N/C	-1% to -8%	N/C to -~64%	-9% to -20%	~0%
Environmental Justice	§ 1.5, § 3.3.8	N/C	N/C	N/C	N/C	N/C	N/C

1/ The A-1 and A-2 value is the number of vessels that made a B species landing in 2006. Fewer vessels can be expected in the near term because of VMS requirement and elevated fuel price starting in 2008; A-3, A-4 and A-5 values are numbers of vessels eligible for permits and that were active during 2004-2006.

2/ + means improved management; > means substantially improved management (but cannot be quantified).

3/ Impacts are for B species groundfish revenues. Ranges show proportion of B species harvest made by non-qualifying vessels during 2004-2006. Some or all of these fish would have been available for harvest by qualifying vessels and by non-qualifying vessels under incidental fishery regulations. See Appendix E for port group and state specific estimates.

4/ Ranges show proportions of total WOC fishery revenues received by non-qualifying vessels during 2004-2006. These values indicate the amount of increase in revenues that would be needed to make up for lost B species groundfish landings by non-qualifying vessels. These are worst-case estimates because some fish would have been allowed in landings by non-qualifying vessels under incidental landing allowances for C permit and nearshore permit holders. See Appendix E for port group and state specific estimates.

5/ Proportions show the range in overall WOC pounds landed by vessels that did not meet qualifying criteria during 2004-2006. These are worst-case estimates because some fish would have been shifted from non-qualifying vessels to qualifying vessels or landed by non-qualifying vessels under incidental fishery regulations. See Appendix E for port group and state specific estimates

6/ Values shown are personal income impact estimates for 2004-2006 for vessels that did not meet qualifying criteria. These are worst-case estimates because some fish would have been shifted to qualifying vessels and landed by non-qualifying vessels under incidental landing allowances for C permit and nearshore permit holders. See Appendix E for port group and state-specific estimates.

Table 4-1b Assessment of qualification criteria impacts relative to permit program needs statement (§1.3.1)

Alternative	Criterion	Fleet size 3/	Need 1: Better match between fleet and fish? (<680 vsls)	Need 2: Added species or fishery protection?	Need 3: Regulation and effort shift relief (+) 2/	Need 5 and 6: Personal income economic impact (-) 4/	Need 7: Improved monitoring program?
1	n/a	<713	1/		0%	0%	
2	n/a	<713			0%	0%	Y
3 (a)	680v-1	680	Y		2%	2%	Y
	680v-2	468	Y		9%	8%	Y
	680v-3	680	Y		3%	3%	Y
3 (b)	713v-1	713			1%	1%	Y
	713v-2	486	Y		8%	8%	Y
	713v-3	713			2%	2%	Y
4	47.9K-3	65	Y		64%	no est.	Y
	36.1K-3	95	Y		52%	no est.	Y
	21.8K-3	139	Y		41%	no est.	Y
	14.4K-3	209	Y		29%	no est.	Y
	6.1K-3	341	Y		15%	no est.	Y
	3.5K-3	474	Y		8%	8%	Y
	1.6K-3	629	Y		4%	4%	Y
	1lb-1	1,103			0%	no est.	Y
	1 trip-1	1,103			0%	no est.	Y
	2 in 3 yrs-4	595	Y		12%	12%	Y
	100 max-5	939			0%	no est.	Y
	500 max-5	655	Y		2%	2%	Y
	1000 max-5	499	Y		6%	no est.	Y
	2000 max-5	343	Y		13%	no est.	Y
	100 lbs-1	950			0%	no est.	Y
	500 lbs-1	701			2%	1%	Y
	1000 lbs-1	577	Y		3%	3%	Y
	2000 lbs-1	420	Y		8%	8%	Y
	100 lbs-3	1,003			0%	no est.	Y
	500 lbs-3	827			1%	no est.	Y
	1000 lbs-3	727			2%	2%	Y
	2000 lbs-3	581	Y		5%	5%	Y
5	390v-1	390	Y		9%	9%	Y
	390v-2	286	Y		20%	19%	Y
	390v-3	390	Y		13%	12%	Y
6 (preferred) 5/	100 lbs-3	1,003		Y 6/	0%	no est.	Y

1/ blank means "no" 588

2/ values shown are proportions of B species revenues received during 2004-2006 by non-qualifying vessels (Table E-4b). This is the ex-vessel value of fish that potentially would have been available to qualifying vessels (through in-season regulation adjustment) if the non-qualifying vessels did not land any B species groundfish during 2004-2006. In reality, non-qualifying vessels would have been allowed to land "incidental" amounts of B species groundfish under a C permit or a nearshore permit, thus the values shown reflect a "best-case" scenario for the qualifying vessels. Port group and state specific estimates are found in Appendix E.

3/ these values are near-term fleet size expectations or number of potentially qualifying vessels.

4/ This is the same analysis described in footnote 2/ but adjusted using the economic impact factors shown in the Appendix E methods section. The economic analysis was limited to criteria that qualified between 390 and 713 vessels (see Appendix E Tables E-20 and E-22). However, the missing values in column 6 can be reasonably inferred based on revenue impacts shown in column 5. These values represent worst-case scenarios in terms of negative economic impacts of the criteria. Port and state-specific estimates are found in Appendix E.

5/ This alternative (A-6) was identified by the Council in September 2008 as its preferred alternative.

6/ The sablefish and lingcod endorsement alternatives under A-6 are, for any year during the 1998-2006 window period and separately for each species: (a) ≥1 lb, (b) ≥100 lbs, and (c) ≥500 lbs.

4.1.2 Effects on the Biological Environment

4.1.2.1 Groundfish Species

Groundfish species including overfished groundfish species are described in **Section 3.2.1**.and **Appendix F.** No change in level of groundfish impacts would be expected under this alternative because no change is management is proposed under this alternative. Effort may fluctuate, but allowable impacts would be managed to meet optimum yield specifications. Trip and cumulative landing limits would continue to be

In 2005, the sablefish harvest guideline was exceeded in the northern management area (Monterey-Vancouver) by over 40 percent due to increased level of vessel participation in the fishery (**Figures 3-4 and 3-5)**. In 2006, the directed sablefish fishery in the northern management area was closed during October-December due to attainment of the sablefish harvest guideline (HG). This was the only year since the fishery began in 1994 that the fishery had to be closed and may have been due to effort shift of salmon vessels to the directed sablefish fishery because of restrictive salmon fishing regulations (see**:** http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf.). Salmon regulations were less restrictive in 2007, which, in combination with more restrictive sablefish regulations, may have constrained the effort increase in the directed sablefish fishery (**Section 1.4.1**.)

Continued high level of vessel participation in the directed sablefish fishery may results in more restrictive sablefish landing and cumulative limits than in the past. Further reduction in sablefish limits is likely to increase discards of sablefish and associated groundfish stocks due to trip limit overages and high grading to land the most valuable fish.

4.1.2.2 Non-groundfish Species (State-managed or under other FMPs)

Non-groundfish species are described in **Section 3.2.2** and **Appendix F**. No change in level of non-groundfish landings or impacts would be expected under this alternative because no change in fishery management is proposed.

4.1.2.3 Prohibited Species

Prohibited species are generally described in **Section 3.2.3**. No change in level of impact of open access fishery vessels on prohibited species would be expected because no change is management is proposed under this alternative.

4.1.2.4 Protected Species

Protected species are generally described in **Section 3.2.4**. No change in level of impact of open access fishery vessels on prohibited species would be expected because no change in fishery management is proposed under this alternative.

4.1.3 Effects on the Socioeconomic Environment

4.1.3.1 Management Structure of the Open Access Fishery

The open access fishery management structure is described in **Section 3.3.1**. No change in management structure would be expected because no change in fishery management is proposed under this alternative. The state and tribal fishery agencies maintain data bases on vessels that are eligible to commercially fish for groundfish in state and federal waters. These data are available to the Council and NMFS for use in identifying potential open access fishery participants. Historical open access fishery data could be used to further narrow the field of potential open access fishery participants. Such data could be used for projecting open access fishery impacts on federal groundfish species.

4.1.3.2 Catch Characteristics

Catch characteristics of the open access fisheries are described in **Section 3.3.2**. No change in fishery management is proposed under this alternative. The status quo alternative allows the fishery to expand in a rapid manner in response to the cost of conducting fishing operations and market conditions associated with trip and cumulative landing limits for federal groundfish species. Fishing vessel participation has been increasing off the WOC in recent years **(Table 2-5; Figure 2-1**) and the northern area sablefish fishery exceeded its harvest guideline by over 40 percent in 2005 and had to be closed early in 2006 due to heavy fishing pressure. The recent sablefish effort increase may have been in response to restrictive salmon fishing regulations and low salmon availability. Continued high level of fishing effort in the sablefish fishery will result in reduced daily and cumulative landing limits with increased negative impacts on fisherman revenues and overfished species compared to recent years.

4.1.3.3 Vessel Characteristics

Vessel characteristics are described in **Section 3.3.3**. No change in vessel characteristics would be expected because no change in fishery management is proposed under this alternative.

4.1.3.4 Processor Characteristics

Processor characteristics are described in **Section 3.3.5**. No change in processor characteristics would be expected because no change in fishery management is proposed under this alternative.

4.1.3.5 Participation Requirements, Restrictions, Licensing

Participation requirements, restriction and licensing are described in **Section 3.3.6.** There would be no change in the management of open access fisheries with regard to fishing vessel participation opportunity or federal licensing requirement because no change in fishery management is proposed under this alternative. Participation in the open access fisheries would continue to be unrestricted, except for state or tribal laws requiring fisherman and vessel registration requirements and for federal VMS program requirements. There would be no added paperwork or time management stress for obtaining and completing federal permit applications, providing copies of supporting documents, and meeting federal permit application deadlines.

4.1.3.6 Revenue/Costs to the Participants and to State and Federal Governments

These issues are discussed in **Section 3.3.7**. There would be no added cost to conducting commercial fishing for federal groundfish stemming from federal permit fees because no change is management is proposed under this alternative. There would be no added cost to state and federal governments that can be identified, as a result of this alternative.

4.1.3.7 Groundfish-dependent Communities

Groundfish-dependent communities are described in **Section 3.3.8**. No change in the dependence of fishing communities on groundfish would be expected because no change in fishery management is proposed under this alternative.

4.1.3.8 Environmental Justice

The factors to be considered in the application of the principals of Environmental Justice are explained in **Section 3.3.9.** This regulation process was prosecuted in full view of and in concert with potentially affected ethnic groups, religious sectors, and other interested public members. Public member concerns were recorded and considered in the development and interpretation of the alternatives and subsequent analysis of their impacts on coastal fishing communities and residents. The status quo alternative means no change in the current fishery management, thus there is no expectation of community impact with regard to the factors listed in **Section 3.3.**9

4.2 Alternative 2

This alternative is the same as the No-action Alternative, but establishes an annual licensing requirement in which vessel owners could submit a license application at any time during the year (**Table 2-3)**. There would be no differentiation with regard to whether individual vessel owners intended to fish in a directed or incidental fishing mode or to combine the two modes. This alternative would be expected to have fishery and human impacts comparable to Alternative 1 because no change in current fishery management is proposed under this alternative.

A total of 1,103 different vessels participated in the directed open access fishery for B species groundfish during 2004-2006 window period years. The recent VMS requirement for vessels that fish in federal waters for federal groundish will likely reduce the number of vessels that participate in the directed fishery in near term years to <713, which is the number that participated in the last year of the window period, 2006 (**Tables 4-1-1 and 4-1-2**).

4.2.1 Effects on the Physical Environment including EFH

The affected physical environment including EFH is described in **Section 3.1**. This alternative would allow vessel owners to continue to fish for groundfish as they have in the past to the extent that future groundfish stock status allows. The directed open access fleet has been increasing in recent years in the WOC area (**Table 2-5; Figure 2-1**), particularly for sablefish (**Figures 3-4 and 3-5)**. Continuation of the upward trend in vessel participation in the open access fishery could have a corresponding increase in physical environmental impacts, including gear loss impacts, habitat alteration caused by fishing gear contact with habitat structures, and water pollution associated with vessel fuel and waste spillages. Overall, no adverse impact to the environment would be expected because no change in current fishery management *is proposed in this alternative.*

4.2.2 Effects on the Biological Environment

4.2.2.1 Groundfish Species

Groundfish species are described in **Section 3.2.1** and **Appendix F**. The registration requirement under th is alternative would reduce the likelyhook of groundfish allocation overages and associated discards. Effort levels may fluctuate but allowable impacts would be managed to meet optimum yield specifications. Trip and cumulative landing limits would continue to be used to constrain harvest and to provide for year-round fishing.

In 2005, the sablefish harvest guideline was exceeded in the northern management area (Monterey-Vancouver) by over 40 percent due to increased level of vessel participation in the fishery (**Figures 3-4 and 3-5)**. In 2006, the directed sablefish fishery in the northern management area was closed during October-December due to attainment of the sablefish harvest guideline (HG). This was the only year since the fishery began in 1994 that the fishery had to be closed and may have been due to effort shift of salmon vessels to the directed sablefish fishery because of restrictive salmon fishing regulations (see**:** http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf.). Salmon regulations were less restrictive in 2007, which, in combination with more restrictive sablefish regulations, may have constrained the effort increase in the directed sablefish fishery (**Section 1.4.1**.)

Continued high level of vessel participation in the directed sablefish fishery will result in more restrictive sablefish landing and cumulative limits than in the past. Further reduction in sablefish limits will increase discards of sablefish and associated overfished groundfish stocks due to trip limit overages and high grading to land the most valuable fish.

4.2.2.2 Non-groundfish Species (State-managed or under other FMPs)

Non-groundfish species important to WOC fisheries are described in **Section 3.2.2**.and **Appendix F.** No change in level of non-groundfish landings or impacts would be expected because no change in current fishery management is proposed under this alternative.

4.2.2.3 Prohibited Species

Prohibited species are described in **Section 3.2.3**. No change in level of impact of open access fishery vessels on prohibited species would be expected because no change in current fishery management is proposed under this alternative.

4.2.2.4 Protected Species

Protected species are generally described in **Section 3.2.4**. No change in level of impact of open access fishery vessels on prohibited species would be expected because no change in current fishery management is proposed under this alternative.

4.2.3 Effects on the Socioeconomic Environment

4.2.3.1 Management Structure of the Open Access Fishery

The open access fishery management structure is described in **Section 3.3.1**. Pre-season registration and licensing of open access fishery participants would facilitate projection of open access fishery landings and impacts, which could lead to better utilization of harvestable resources and protection of overfished groundfish species. This alternative would allow NMFS to use historical fishery information to determine whether individual vessels are likely to fish in a directed or incidental fishing mode. This alternative would give fishery managers advance notice of new fishery participants, which would reduce the potential for fishery allocation overages. No change in the current management structure is proposed under this alternative. Fisheries would likely continue to be managed using trip and cumulative landing limits with the aim of providing for year round fishery landings.

4.2.3.2 Catch Characteristics

Catch characteristics of the open access fisheries are described in **Section 3.3.2**. The registration requirement under this alternative would help to more accurately project fishery impacts and landing on a pre-and in-season basis, thus minimizing the need for major late season trip limit changes to stay within or meet fishery allocations. This alternative allows the fishery to expand in a rapid manner in response to the cost of conducting fishing operations and market conditions associated with trip and cumulative landing limits for federal groundfish species. Total fishing vessel participation has risen in recent years in the WOC area **(Figure 2-1)** and the northern area sablefish fishery exceeded its harvest guideline by over 40 percent in 2005 and had to be closed early in 2006 due to heavy fishing pressure. The recent sablefish effort increase may have been in response to restrictive salmon fishing regulations and low salmon availability. Continued high level of fishing effort in the sablefish fishery will result in reduced daily and cumulative landing limits with increased negative impacts on fisherman revenues and to overfished species compared to recent previous years.

4.2.3.3 Vessel Characteristics

Vessel characteristics are described in Section **3.3.3**. No change in vessel characteristics would be expected because no change in current fishery management is proposed under this alternative.

4.2.3.4 Processor Characteristics

Process characteristics are described in **Section 3.3.5**. No change in processor characteristics would be expected because no change in current fishery management is proposed under this alternative.

4.2.3.5 Participation Requirements, Restrictions, Licensing

Participation requirement, restriction and licensing are described in **Section 3.3.6.** This alternative would require all vessels that participate in open access fisheries to register with NMFS before any directed or incidental fishing takes place, which would be a new fishery participation requirement. Any vessel owner that holds a valid commercial fishing registration with one the coastal states would be allowed to register with NMFS to participate in the open access fishery, and there would be no federal limited entry permit requirement.

4.2.3.6 Revenue/Costs to the Participants and to State and Federal Governments

These issues are discussed in **Section 3.3.7**. There would be an added cost to fishermen and governments, associated with annual vessel licensing under this alternative if done through NMFS. The current A permit renewal fee is $125. Vessel owners would be required to register their vessel with NMFS in advance of participating in the fishery. In order to provide NMFS with adequate time to complete a vessel registration, vessel owners would need to submit to NMFS an application at least 30 days in advance of the date the vessel owner wishes to begin participation in the fishery.

Adoption of any alternative that requires federal licensing or permitting of current open access vessels to take and possess specified federal groundfish may require that those vessels participate in the federal groundfish fishery vessel monitoring program (VMS program) when fishing for specified federal groundfish in federal or state waters. Some current open access fishermen may not seek to participate in the VMS program because of program cost, and intend to commercially fish for and take specified federal groundfish in state waters only where VMS program participation may not be required. Federal groundfish registration might compromise that strategy. Registration for a federal groundfish license or permit may require vessel participation in the groundfish VMS program. Furthermore, adoption of any alternative that requires federal licensing or permitting may increase the probability of a vessel being selected to participate in the Pacific Coast Groundfish Observer Program. There is an added cost to vessel owners to carry a federal observer on their vessel.

4.2.3.7 Groundfish-dependent Communities

Groundfish-dependent communities are described in **Section 3.3.8**. No change in dependence of fishing communities on groundfish would be expected because no change is current management structure is proposed under this alternative and the cost of registering their vessel is expected to be nominal (current A permit renewal fee is $125).

4.2.3.8 Environmental Justice

The factors to be considered with regard to environmental justice are described in **Section 3.3.9.** This regulation process was prosecuted in full view of and in concert with potentially affected ethnic groups, religious sectors, and other interested public members. All public member concerns were recorded and considered in the development and interpretation of the alternatives and subsequent analysis of their impacts to coastal fishing communities and their residents. *This alternative basically means no change in* the current fishery management thus there is no expectation of community impact with regard to the factors listed in **Section 3.3.9**.

4.3 Alternative 3

Alternative 3 is one of two alternatives that have initial B species fleet size goals and that provide for issuance of B and C permits. There are two fleet size goals under A-3: (a) 680 vessels, which is the average B species directed fishery fleet size during 2004-2006 window period years, and (b) 713 vessels, which is the number of vessels that made one or more B species directed fishery landing in 2006. The long-term fishery goal under both goals is the same as the initial fleet size goal (**Table 2-3)**. Permits could be transferred once per year and would be endorsed for making B species landings in a single state. There would be no previous year landing requirement for permit renewal (as there is under A-5). A and B permit holders would be able to register their vessels to both permit types and use the two permit types alternately during the year. Vessel owners would be required to notify NMFS of permit usage change prior to leaving port. C permits would be required to land groundfish excluding nearshore species for all vessels that do not have an A or B permit or a state-issued nearshore fishery permit. C permits would be available to any state registered commercial fishing vessel and could be applied for at any time during the year.

Appendix E presents an analysis of the two qualification standards (QSs) and three qualification frameworks (QFs) contained in this alternative. The selection of QF for issuing B permits has allocative as well as biological and economic implications. The QFs used in the analysis of this alternative were:

1) cumulative vessel landings in pounds of B species groundfish during 2004-2006 window period years (QF-1),
2) cumulative vessel landings in pounds of B species groundfish during the 1998-2006 window period (QF-2), and
3) cumulative vessel landings in pounds of B species groundfish during the 1998-2006 window period in combination with a 2004-2006 window period B permit species landing requirement (QF-3).

The proposed qualification criteria used to analyze and compare A-3, A-4 and A-5, the B and C permit alternatives, with A-1 (No-action) and A-2 (federal license) presented in **Appendix E** are described in **Table 2-4** . One of these criteria (or modification thereof) is proposed to be selected as part of the final action on a preferred alternative that limits the initial number of vessels eligible for B permit issuance.

4.3.1 Effects on the Physical Environment

The affected environment, including EFH, is described in **Section 3.1**. This alternative would reduce the number of vessels eligible to target B species groundfish, which could have a beneficial effect by reducing fishing impacts on habitat. Vessels displacement due to permit non-qualification could result in effort shift to associated species such as salmon, HMS or crab to make up for B species revenue loss **(Appendix E**). It is not clear that such effort shifts would result in a net change in impact on marine habitats. The directed fishery open access fleet has been increasing in recent years (**Figure 2-1**), particularly for sablefish (**Figures 3-4 and 3-5)**. Continuation of the upward trend in vessel participation in the open access fishery would stop under the 680 vessel goal alternative because the initial fleet size goal is the same as the 2004-2006 window period average. It would also likely stop under the 713 vessel goal as 713 is the maximum number of vessels that made a directed fishery landing in the last three years of the window period. However, the permit issuance program would not affect the ability of permitted vessels to exert additional fishing pressure in the event of increased groundfish availability, increased market demand for fish, or downturn in associated commercial fishing opportunity (e.g., salmon).

Transfer of permits from latentvessels[10] to new vessels provided under this alternative could further exaccerbate the sablefish situation. Any effort increase by permitted vessels would have a corresponding impact on the physical environmental, including gear loss impacts, habitat alteration caused by fishing gear contact with habitat structures, and water pollution associated with vessel fuel and waste spillages. Overall, the reduction in potential average annual fleet size and effort shift of vessels to other fisheries should not have a significant impact on the physical environment because of the small amount of effort and landings in this fishery compared to other Pacific Coast commercial fisheries (<1 percent based on revenues; see **Section 3.3.8** for fishery comparisons).

4.3.2 Effects on the Biological Environment

4.3.2.1 Groundfish Species

Groundfish species are described in **Section 3.2.1** and **Appendix F**. No change in level of groundfish impacts would be expected under this alternative, thus there is low potential for significant impact to groundfish species, including overfished groundfish species and protected species. Trip and cumulative landing limits would likely continue to be used to constrain impacts based on optimum yield specifications and to provide for year-round fishery landings. These limits could be further constrained depending on market demand for species like sablefish and fishing opportunity in associated fisheries like salmon. The landed B species catch could decline depending on level of estimated discards associated with possible increased fishing effort due these factors.

The vessels that would not qualify for permits under this alternative accounted for between 1 percent and 9 percent of the B species directed fishery revenues and 1 percent-8 percent of the personal income impacts during 2004-2006 (**Table 4-1b**). This is the amount of revenues or personal income impacts that might have been incurred due to adoption of this alternative during 2004-2006. However, it is likely that inseason regulation action would have been taken to allow permitted vessels to harvest these fish and/or allowance made for non-qualifying vessels to land all or some of these fish as incidental fishery catches under a C permit or state-issued nearshore permit.

No change in impact to overfished groundfish would be expected under this alternative because the impact to non-overfished groundfish by qualfying vessels would be no less than 92-98 percent of potential landings based on landings by these vessels during 2004-2006 (**Table E-4b)**. This is because the B species directed fishery takes a very small proportion of the optimum yield specifications for over fished groundfish species (zero to 5 percent depending on species under 2007 regulations, see **Section 3.3.3.6)**.

In 2005, the sablefish harvest guideline was exceeded in the northern management area (Monterey-Vancouver) by over 40 percent due to increased level of vessel participation in the fishery (**Figures 3-4 and 3-5)**. In 2006, the directed sablefish fishery in the northern management area was closed during October-December due to attainment of the sablefish harvest guideline (HG). This was the only year since the fishery began in 1994 that the fishery had to be closed and may have been due to effort shift of salmon vessels to the directed sablefish fishery because of restrictive salmon fishing regulations (see**:** http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf.). Salmon regulations were less restrictive in 2007, which, in combination with more restrictive sablefish regulations, may have constrained the effort increase in the directed sablefish fishery (**Section 1.4.1)**.

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[10] This phrase is used,to recognize the existence of vessels that no longer participate in the fishery but are eligible to reenter it and ones that are active in the fishery but not nearly fishing to their full potential.

Continued high level of vessel participation in the directed sablefish fishery could result in more restrictive sablefish landing and cumulative limits than in the past. Further reduction in sablefish limits would increase discards of sablefish and associated overfished groundfish stocks due to trip limit overages and high grading to land the most valuable fish compared to previous recent years. The number of permits proposed to be issued under this alternative (680 or 713)is 146-158 percent higher than the average number of vessels that participated in the WOC directed sablefish fishery during 2004-2006 window period years (276 vessels; **Table 2-5**). Thus the potential is high under this alternative for continued high effort level in the directed sablefish fishery, particularly if permits are transfered from latent fishing vessels to new vessels or access to associated commercial fisheries (e.g., salmon) is further constrained.

4.3.2.2 Non-groundfish Species (State-managed or under other FMPs)

Open access fishery impacts on non-groundfish species are described in **Section 3.2.2**. Increase in fishing effort and catch of state-managed and federal non-groundfish fisheries from displaced (non-qualifying) vessels would expected to be very small (<0.5-2 percent) (**Appendix Table E-4b**).under this alternative to compensate for lost groundfish revenues, thus no impact to non-groundfish species would be expected under either initial fleet size goal contained in this alternative.

4.3.2.3 Prohibited Species

Prohibited species impacts in open access fisheries are described in **Section 3.2.3**. No change in level of impact of open access fishery vessels on prohibited species (Pacific salmon, Pacific halibut and Dungeness crab) would be expected under this alternative because no substantial change in impact to B species groundfish would be expected under this alternative and low potential for significant effort shift to associated species, as described above.

4.3.2.4 Protected Species

Protected species impacts in open access fisheries are described in **Section 3.2.4**. No change in level of impact of open access fishery vessels on protected species (e.g., listed salmonids, marine mammals, seabirds, turtles) would be expected under this alternative because no substantial change in impact to B species groundfish would be expected under this alternative and low potential for significant effort shift to associated species, as described above.

4.3.3 Effects on the Socioeconomic Environment

4.3.3.1 Management Structure of the Open Access Fishery

The open access fishery management structure is described in **Section 3.3.1**. Permitting of open access fishery participants under this alternative would facilitate projection of open access fishery landings and impacts, which could lead to better utilization of harvestable resources and protection of overfished groundfish species. Fisheries would continue to be managed using trip and cumulative landing limits with the aim of providing for year round fishery landings. The existing regulatory framework for open access fishery regulations would appear to be appropriate for B permit vessels regulations **(Table 3-1a)**, but will depend in part of the degree of reduction that is implemented in the directed fishery fleet. In any case, eparate trip limit regulations would be needed for C permit vessels (i.e., vessels that do not qualify for B permits) to allow for small landings for some or all federal groundfish species that may be caught by C permit vessels incidental to fishing for non-groundfish species (see **Table 4-2).**

Table 4-2. Itemization of possible modifications needed to Table 5 to Part 660, subpart G-Conservation areas and Trip limits for C permit vessels under Alternatives 3, 4 and 5 1/

Rockfish Conservation Areas (RCAs)	Same as B permit vessels
Minor slope rockfish & darkblotched rockfish	NEED TO DETERMINE
Sablefish	NEED TO DETERMINE
Thornyheads	NEED TO DETERMINE
Flatfishes	NEED TO DETERMINE
Whiting	NEED TO DETERMINE
Shelf rockfish (minor and specified exceptions)	NEED TO DETERMINE
Canary and yelloweye rockfish, cowcod (south)	No retention
Bocaccio (south)	NEED TO DETERMINE
Minor nearshore rockfish and Black rockfish	NEED TO DETERMINE
Lingcod	NEED TO DETERMINE
Pacific cod	NEED TO DETERMINE
Spiny dogfish	NEED TO DETERMINE
Other fish	NEED TO DETERMINE
Non-groundfish trawl groundfish limits	
Pink shrimp	Same as B permit vessels
CA halibut, prawn and cucumber	Same as B permit vessels
Salmon troll-yellowtail rockfish (north, not subject RCAs)	Same as B permit vessels

1/ See table 3-1a for generalized description of current open access fishery regulatory tables.

4.3.2.2 Catch Characteristics

Catch characteristics of the open access fisheries are described in **Section 3.3.2**. The permit requirement under this alternative would help to more accurately project fishery impacts and landings on a pre-and in-season basis compared to the no-action alternative, thus minimizing the need for major late season landing limit changes to stay within or meet fishery allocations. The amount of B species groundfish harvested by vessels that would qualify for a permit under this alternative totaled 93-99 percent of the total B species groundfish landed by directed fishery vessels during the 2004-2006 window period (**Appendix E Table E-4b**). These ranges in proportions stem from differences in the qualification frameworks used in ranking vessels for permit qualification.

Reduction in number of vessels eligible to prosecute B species groundfish under this alternative to 680 or 713 would not result in a change in B species fishery trip or cumulative landing limits. This is because of the amount of fish harvested by non-qualifying vessels and that would be available for harvest by the permitted vessels (2-8 percent more) would be too small to impact the fishery. However, if the permitted vessel owners changed fishing strategy or decided to sell their permits to individuals or entities with different fishing strategies, there could be negative impacts on trip limits, fisherman revenues, and overfished species impacts. If, for example, permitted vessels were to increase pressure on sablefish because of their high market value (**Section 3.3.2.4**), trip and cumulative landing limits might need to be further reduced, which would exacerbate the discard situation and increase impacts to overfished species that associate with sablefish. Many of the vessels that would qualify for a permit under this alternative also fish for salmon (**Section 3.3.3.6**). Total fishing vessel participation in the directed B species groundfish fishery has risen in recent years in the WOC area **(Figure 2-1),** and the northern area sablefish fishery exceeded its harvest guideline by over 40 percent in 2005 and had to be closed early in 2006 due to heavy fishing pressure. The recent sablefish effort increase may have been in response to restrictive salmon fishing regulations. Continued high level of fishing effort in the sablefish fishery could result in reduced daily and cumulative landing limits with increased negative impacts on fisherman revenues, person income impats, and overfished species compared to recent years. The number of permits proposed to be issued under this alternative (680 or 713) is146-158 percent higher than the average number of vessels that participated in WOC directed sablefish fishery during 2004-2006 window period years (276 vessels; **Table 2-5**).

Non-qualifying vessels under this alternative would need to increase effort or find alternative revenue sources to make up for revenues lost due to non qualification for B permit issuance. The amount of revenue increase that would be required is estimated to be in the range, on average, of <0.5-2 percent based on the contribution of B species groundfish to total 2004-2006 window period fishery revenues of non-qualifying vessels (**Appendix Table E-4b).**

The estimated distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 16-17 percent (11 percent); Oregon, 29 percent-34 percent (31 percent); and California 49-55 percent (57 percent) (**Table 4-3**). These ranges in proportions stem from differences in qualification framework used in ranking vessels for permit qualification.

The range in potential revenue increase to vessels that would have qualified for B permits during 2004-2006 under the criteria contained in this alternative was from 1 percent (713v-1) to 9 percent (680v-2) **(Table 4-1b).** The range in personal income impact would have been about the same (**Table 4-1b).** However, allowance would have been made for the non-qualifying vessels to land small amounts of these fish under a C permit or state-issued nearshore permit, which would have reduced the amount of fish potentially available for harvest by the permitted vessels. Overall, no change in groundfish fishery catch characteristics would be expected under this alternative.

4.3.3.3 Vessel Characteristics

Vessel characteristics are described in **Section 3.3.3.** The annual number of B species fishery vessels can be expected to decline from recent year levels under this alternative because (1) the initial permit issuance goal is based on a recent year average (680) or last year of window period (713), (2) vessels are not required to participate in the fishery to be eligible for permit renewal and (3) the new VMS requirement may be too expensive for some vessel owners to continue in the fishery. However, permit transfers from latent or low producing vessels to new permit owners, downturn in commercial fishing opportunity in other fisheries (e.g., salmon), or increased demand for fish have the potential to increase overall groundfish effort, which would further constrain landing limits by participating vessels and increase fishery discards.

Vessels that targeted lingcod, shelf rockfish and other species during window period or subset of window period years used for permit qualification are less lkely to receive permits under any alternative that would permit less than the total number of vessels that made one or more directed fishery landing of B species groundfish **(Table 3-13c)**. However, the provision under this alternative to allow for incidental B species landings under a C permit or a state-issued nearshore permit could allow the vessels that do not qualify for B permits to continue to land small amounts of those species. Their landing allowances would be determined as part of the biennial and inseason management process.

Table 4-3. Proportion of WOC vessels that would have qualified for B permits by port group and state during 2004-2006 window period by qualification criterion 1/

Altern	Criterion	# vsls	SPS	NPS	CWA	CLW	WA	CLO	TLA	NPA	CBA	BRA	OR	CCA	ERA	BGA	BDA	SFA	MNA	MRA	SBA	LAA	SDA	CA
	680v-1	680	0.00	0.02	0.07	0.07	0.17	0.05	0.04	0.05	0.09	0.11	0.34	0.04	0.06	0.09	0.01	0.05	0.08	0.08	0.03	0.03	0.03	0.49
A-3 (a)	680v-2	468	0.00	0.03	0.06	0.06	0.16	0.04	0.02	0.03	0.09	0.11	0.29	0.03	0.06	0.11	0.04	0.05	0.12	0.04	0.03	0.04	0.04	0.55
	680v-3	680	0.00	0.02	0.07	0.07	0.16	0.05	0.03	0.04	0.09	0.11	0.33	0.04	0.05	0.09	0.02	0.05	0.09	0.08	0.04	0.03	0.03	0.51
	713v-1	713	0.00	0.02	0.07	0.07	0.16	0.05	0.04	0.05	0.09	0.11	0.34	0.04	0.06	0.09	0.01	0.05	0.08	0.08	0.04	0.03	0.03	0.50
A-3 (b)	713v-2	486	0.00	0.03	0.06	0.06	0.16	0.04	0.02	0.04	0.09	0.11	0.30	0.03	0.06	0.11	0.04	0.05	0.11	0.04	0.03	0.03	0.04	0.54
	713v-3	713	0.00	0.02	0.07	0.06	0.16	0.05	0.03	0.04	0.09	0.11	0.32	0.04	0.05	0.10	0.02	0.05	0.09	0.08	0.04	0.03	0.03	0.52
	47.9K-3	65	0.02	0.03	0.06	0.05	0.15	0.02	0.00	0.00	0.03	0.09	0.14	0.00	0.11	0.31	0.00	0.03	0.18	0.03	0.00	0.02	0.03	0.71
	36.1K-3	95	0.01	0.04	0.06	0.06	0.18	0.01	0.00	0.00	0.05	0.15	0.21	0.00	0.07	0.26	0.00	0.03	0.15	0.03	0.00	0.01	0.05	0.61
	21.8K-3	139	0.01	0.05	0.07	0.07	0.20	0.02	0.00	0.01	0.06	0.14	0.23	0.03	0.08	0.21	0.00	0.04	0.14	0.03	0.00	0.01	0.04	0.57
	14.4K-3	211	0.00	0.03	0.07	0.09	0.20	0.04	0.01	0.03	0.06	0.13	0.28	0.03	0.08	0.17	0.01	0.03	0.12	0.02	0.00	0.01	0.03	0.53
	6.1K-3	343	0.00	0.03	0.06	0.08	0.18	0.04	0.02	0.04	0.09	0.12	0.30	0.04	0.07	0.13	0.02	0.05	0.09	0.03	0.02	0.02	0.04	0.52
	3.5K-3	474	0.00	0.03	0.07	0.08	0.18	0.05	0.03	0.04	0.09	0.13	0.33	0.04	0.06	0.11	0.02	0.05	0.09	0.05	0.03	0.02	0.04	0.50
	1.6K-3	629	0.00	0.02	0.07	0.07	0.16	0.05	0.03	0.04	0.09	0.12	0.32	0.04	0.06	0.10	0.02	0.05	0.09	0.08	0.03	0.02	0.03	0.52
	1lb-1	1,103	0.00	0.02	0.05	0.05	0.11	0.04	0.05	0.05	0.08	0.10	0.31	0.03	0.04	0.08	0.03	0.07	0.09	0.09	0.06	0.05	0.03	0.57
A-4	1trip-1	1,103	0.00	0.02	0.05	0.05	0.11	0.04	0.05	0.05	0.08	0.10	0.31	0.03	0.04	0.08	0.03	0.07	0.09	0.09	0.06	0.05	0.03	0.57
	2 in 3 yrs-4	595	0.00	0.01	0.05	0.05	0.11	0.03	0.05	0.03	0.08	0.13	0.32	0.04	0.04	0.11	0.01	0.05	0.09	0.12	0.04	0.04	0.03	0.56
	100 max-5	939	0.00	0.02	0.05	0.05	0.13	0.05	0.05	0.05	0.09	0.10	0.33	0.04	0.05	0.08	0.02	0.06	0.08	0.09	0.05	0.04	0.03	0.54
	500 max-5	655	0.00	0.02	0.07	0.07	0.17	0.06	0.03	0.05	0.09	0.11	0.34	0.04	0.06	0.09	0.01	0.05	0.08	0.07	0.03	0.03	0.03	0.49
	1000 max-5	499	0.00	0.03	0.09	0.09	0.21	0.06	0.03	0.04	0.10	0.10	0.32	0.03	0.07	0.10	0.01	0.05	0.08	0.05	0.02	0.02	0.03	0.46
	2000 max-5	343	0.01	0.03	0.10	0.11	0.25	0.06	0.01	0.03	0.11	0.09	0.30	0.03	0.06	0.13	0.00	0.04	0.09	0.03	0.02	0.01	0.03	0.44
	100 lbs-1	950	0.00	0.02	0.05	0.05	0.13	0.05	0.05	0.05	0.09	0.10	0.33	0.04	0.05	0.08	0.02	0.06	0.08	0.10	0.05	0.04	0.03	0.55
	500 lbs-1	701	0.00	0.02	0.07	0.07	0.16	0.05	0.04	0.05	0.09	0.11	0.34	0.04	0.06	0.09	0.01	0.05	0.08	0.08	0.04	0.03	0.03	0.50
	1000 lbs-1	577	0.00	0.03	0.08	0.08	0.19	0.05	0.04	0.04	0.09	0.11	0.33	0.04	0.06	0.10	0.01	0.05	0.08	0.07	0.03	0.02	0.03	0.48
	2000 lbs-1	420	0.00	0.03	0.09	0.09	0.22	0.05	0.03	0.04	0.10	0.11	0.32	0.04	0.06	0.12	0.00	0.04	0.08	0.05	0.02	0.01	0.03	0.46
	100 lbs-3	1,003	0.00	0.02	0.05	0.05	0.12	0.04	0.05	0.05	0.08	0.10	0.32	0.04	0.04	0.08	0.02	0.06	0.09	0.10	0.05	0.05	0.03	0.56
	500 lbs-3	827	0.00	0.02	0.06	0.06	0.14	0.05	0.04	0.05	0.09	0.10	0.33	0.04	0.05	0.09	0.02	0.06	0.09	0.09	0.04	0.04	0.03	0.53
	1000 lbs-3	727	0.00	0.02	0.07	0.06	0.15	0.05	0.04	0.04	0.09	0.11	0.32	0.04	0.05	0.09	0.02	0.06	0.09	0.08	0.04	0.03	0.03	0.52
	2000 lbs-3	581	0.00	0.02	0.07	0.07	0.17	0.05	0.02	0.04	0.09	0.12	0.32	0.03	0.06	0.10	0.02	0.05	0.09	0.07	0.03	0.02	0.03	0.52
	390v-1	390	0.01	0.04	0.08	0.10	0.22	0.05	0.03	0.03	0.11	0.11	0.32	0.03	0.06	0.12	0.01	0.04	0.08	0.05	0.02	0.01	0.03	0.45
A-5	390v-2	286	0.00	0.04	0.07	0.06	0.17	0.04	0.01	0.04	0.07	0.11	0.26	0.03	0.07	0.13	0.04	0.05	0.14	0.02	0.03	0.04	0.02	0.56
	390v-3	390	0.00	0.03	0.06	0.08	0.17	0.04	0.02	0.04	0.09	0.13	0.32	0.04	0.07	0.13	0.02	0.05	0.09	0.04	0.02	0.02	0.04	0.51

1/ Derived from Appendix Tables E-5, E-6, E-7 and E-8

Average size of vessel in the fleet could change under this alternative because vessel length would not be a constraining factor in permit transfers; i.e., there is no vessel length endorsement provision. For example, small vessel owners might be inclined to upgrade to a larger vessel or transfer (e.g., sell) their permit to an owner of a larger vessel over time and there is no provision for new permit issuance under this alternative. Gear used to make the catch could potentially change because there would be no restriction on type of gear vessels could use or that future permit holders would be allowed to use with their permit. Pot fishing vessels tend to be larger on average than hook and line vessels because of the greater deck space required to deploy pot gear, thus more pot fishing vessels could be expected if average size of vessel in the fleet increases. There is high potential for average size of vessel and number of pot fishing vessels in the fleet to increase under this alternative.

4.3.3.4 Processor Characteristics

Processor characteristics are described in **Section 3.3.5**. *No change in processor characteristics would be expected under this alternative.* The distribution of B permits could affect fish buying opportunities by commercial fish processors. The estimated distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 16-17 percent (11 percent); Oregon, 29-34 percent (31 percent); and California 49-55 percent (57 percent) (**Table 4-3**). These ranges in proportions stem from differences in qualification framework used in ranking vessels for permit qualification.

Washington port groups were not nearly as sensitive (>20 percent potential landing reduction) to vessel non-qualification under this alternatives as some Oregon and California port groups. Tillamook and Newport were the most sensitive Oregon port groups to vessel non-qualification under this alternative. California port groups most sensitve to vessel non-qualification were, in approximate order: Santa Barbara, Bodega Bay, Morro Bay, Los Angeles, and Crescent City (**Table 4-4).** This was due to the higher dependence of those ports on vessels that targeted lingcod and shelf rockfish **(Appendix E Table E-14).** Some California shark vessels and other species vessels also have relatively small catch histories **(Table 3-13-3)**. However, the provision under this alternative to allow for incidental landings under a C permit or a state-issued nearshore permit would allow the vessels that do not qualify for B permits to continue to land small amounts of those species.

Fish buyers that purchase from vessels that target lingcod, shelf rockfish and other species could receive less fish under any alternative that would permit less than the total number of vessels that made one or more directed fishery landing of B species groundfish during window period or subset of window period years used for permit qualification **(Appendix E, Tables E-13 and E-14**). However, the provision under this alternative to allow for incidental B species landings under a C permit or a state-issued nearshore permit could allow the vessels that do not qualify for B permits to continue to land small amounts of those species. Incidental fishery landing allowances would be part of the biennial and inseason management processes.

Table 4-4. Proportion of port group and states' directed B species landings made by vessels that would have qualified by B permits during 2004-2006 window period by qualification criterion (excluding cells of 80% or greater) 1/

Altern	Criterion	# vsls	SPS	NPS	CWA	CLW	WA	CLO	TLA	NPA	CBA	BRA	OR	CCA	ERA	BGA	BDA	SFA	MNA	MRA	SBA	LAA	SDA	CA
	680v-1	680																						
A-3 (a)	680v-2	468							61%	75%				79%			73%			76%	71%	79%		
	680v-3	680																						
	713v-1	713																						
A-3 (b)	713v-2	486							66%	75%				79%			73%			79%	71%	79%		
	713v-3	713																						
	47.9K-3	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	36.1K-3	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21.8K-3	139	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.4K-3	211	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6.1K-3	343	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3.5K-3	474	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1.6K-3	629	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1lb-1	1,103																						
A-4	1trip-1	1,103																						
	2 in 3 yrs-4	595		64%				70%		63%							74%	71%			64%			
	100 max-5	939	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	500 max-5	655																						
	1000 max-5	499							76%								68%				73%	80%		
	2000 max-5	343							31%	65%				64%			30%	78%		63%	56%	69%		
	100 lbs-1	950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	500 lbs-1	701																						
	1000 lbs-1	577															76%							
	2000 lbs-1	420							67%	77%							46%			80%	69%	72%		
	100 lbs-3	1,003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	500 lbs-3	827																						
	1000 lbs-3	727																						
	2000 lbs-3	581							71%								75%							
	390v-1	390							61%	73%				73%			46%			77%	66%	72%		
A-5	390v-2	286			79%			68%	27%	41%	72%		74%	53%			47%	68%		56%	45%	69%		
	390v-3	390						77%	52%	64%				73%			56%			68%	62%	76%		

1/ "-" means not estimated. See Tables E-12a and E-12b for all cell values

4.3.3.5 Participation Requirements, Restrictions, Licensing

Participation requirements, restrictions, and licensing are described in **Section 3.3.6.** Adoption of this alternative would require vessel owners that qualify for a B permit to submit application to NMFS to obtain their initial permit and to apply for permit renewal each year thereafter, which would be a new requirement. There would be no annual fishery participation requirement. Vessel owners would be allowed to register their B permit to a different vessel once per year. Vessel owners that seek a C permit would be required to submit application for permit issuance, but there would be no federal qualification requirements associated with C permit issuance. Vessel owners would be required to obtain appropriate permit types before any directed or incidental fishing takes place. An alternative approach for issuing C permits would be to allow the states to issue them at the same time the vessel owners renew their vessel registrations. The states would then notify NMFS of the C permit vessels, which could avoid NMFS having to charge a fee for issuing the permits.

Owners of A and B permits would be allowed to use both permit types alternately in the same year, but not in the same cumulative landing period. There would be an advance notice requirement to switch permit type usage between fishing trips. This provision would allow vessels to fish from both A and B permit allocations in the same landing period.

4.3.3.6 Revenue/Costs to the Participants and to State and Federal Governments

These issues are discussed in **Section 3.3.7**. For both B and C permits, NMFS would charge fees for the range of administrative costs incurred by NMFS in issuing, renewing, transferring, appealing and replacing permits, which would be a new added cost to fishery participation. The current A permit renewal fee is $125. Vessel owners would be required to register their vessel with NMFS in advance of participating in the fishery. In order to provide NMFS with adequate time to complete a vessel registration, vessel owners would need to submit to NMFS an application at least 30 days in advance of the date the vessel owner wishes to begin participation in the fishery. An alternative approach for issuing C permits would be to allow the states issue them at the same time the vessel owners renew their vessel registrations. The states would then notify NMFS of the C permit vessels, which could avoid NMFS having to charge a fee for issuing the permits.

Adoption of any alternative that requires federal licensing or permitting of current open access vessels to take and possess specified federal groundfish may require that those vessels participate in the federal groundfish fishery vessel monitoring program (VMS program) when fishing for specified federal groundfish in federal or state waters. Some current open access fishermen may not seek to participate in the VMS program because of program cost, and intend to commercially fish for and take specified federal groundfish in state waters only where VMS program participation may not be required. Federal groundfish registration might compromise that strategy. Registration for a federal groundfish license or permit may require vessel participation in the groundfish VMS program. Furthermore, adoption of any alternative that requires federal licensing or permitting may increase the probability of a vessel being selected to participate in the Pacific Coast Groundfish Observer Program. There is an added cost to vessel owners to carry a federal observer on their vessel.

4.3.3.7 Groundfish-dependent Communities

Groundfish-dependent communities are discussed in **Section 3.3.8**). *No change in the dependence of fishing communities on groundfish would be expected under this alternative.* The fleet size reduction expected under this alternative would consolidate the catch among slightly fewer vessels compared to recent years. The maximum reduction in B species directed fishery groundfish revenues under this alternative is estimated to be 1-9 percent (**Appendix E, Table E-4b**) if there were no regulation adjustment to allow permtted vessels to land fish formerly caught by non-permitted vessels or for non-permitted vessels to land B species groundfish incidental to fishing for other species. Displaced fishers would be expected to shift effort to other fisheries to compensate for lost groundfish revenues, but the amount of effort shift required to make up for lost B species revenues would be small (from <0.5-2 percent based on overall lost commercial fishery revenues **(Appendix E, Table E-4b)**.

The 07-08 Specs EIS completed in 2006 included a comprehensive analysis of Pacific Coast groundfish fishing communities and their engagement in various groundfish fisheries. Most Pacific Coast fishing ports with groundfish landings have some vessels that land open access groundfish. Appendix A to the 07-08 Specs EIS evaluated fishing communities for their dependence on groundfish resources and for their vulnerability to changes in availability of groundfish harvest. This action would not alter the overall available groundfish harvest, but it would affect some vessels in particular ports, either by providing those vessels with a potentially valuable license to participate in the fishery or by eliminating opportunities for those vessels to participate in the fishery. Port cities that Appendix A identified as both having some history of open access groundfish landings and a relatively higher dependency on availability of groundfish resources are: Astoria, Bellingham, Brookings, Coos Bay, Crescent City, Eureka, Fort Bragg, Morro Bay, Newport, Port Orford, and San Francisco. Additional information on the importance of groundfish to fishing communities is provided in **Section 3.3.8.)**

The estimated distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 16-17 percent (11 percent); Oregon, 29-34 percent (31 percent); and California 49-55 percent (57 percent) (**Table 4-3**). These ranges in proportions stem from differences in qualification framework used in ranking vessels for permit qualification.

4.3.3.8 Environmental Justice

The factors to be considered with regard to environmental justice are described in **Section 3.3.9.** This action has low potential for significant impact as it does not target low income or minority communities; it would affect all population segments equally. Some Pacific Coast fishing communities have open access fishery participants that are not native-English speakers, but few of them participate in the fishery management process. Fishing families from these same communities also participate in the limited entry groundfish fishery, so there are within-community networks of translators. NMFS has not historically translated its groundfish fishery regulations from English into other languages. Some of the communities with relatively high open access fishery landings are considered vulnerable to shifts in groundfish fishing opportunity, although open access landings themselves may not make up the majority of groundfish fishing income to the community. This action does not alter or affect tribal treaty rights to or tribal allocations of groundfish.

4.4 Alternative 4

Alternative 4 was developed to analyze a wide range of minimum landing requirements for B permit issuance. C permit provisions would be same as under alternatives 3-3 and 5. There would be no initial B species fleet size or long-term goal under this alternative (**Table 2-3**), but no new permits would be issued after the first year. Under this alternative, permits would be transferable once per year without regard to vessel size or gear used to qualify for the permit, there is no previous year landing requirement as there is under A-5, and there is no state-specific landing endorsement as there is under A-3. A and B permit holders would be able to register their vessels to both permit types and use the two permit types alternately during the year, but would be required to notify NMFS whenever they make a permit usage change before leaving port. C permits would be required to land groundfish, excluding nearshore species, for all vessels that do not have an A or B permit or a state-issued nearshore fishery permit. C permits would be available to any state registered commercial fishing vessel and could be applied for at any time during the year.

Appendix E presents an analysis of the minimum landing requirements for B permit qualification contained in this alternative, which are listed in **Table 2-4**. .One of these criteria (or modification thereof) is proposed to be selected as part of the final action on a preferred alternative that limits the initial number of vessels eligible for B permit issuance. The minimum landing requirement to qualify for a B permit under this alternative ranges from one lb (all vessels qualify) to about 47.9 thousand pounds. The frameworks that were associated with individual criteria were as follows: QF-1, six criteria; QF-3, eleven criteria; QF-4, one criterion; and QF-5, four criteria. A total of twelve criteria were used with the same four qualification standards, which were matched with three different qualification frameworks: QF-1, QF-3 and QF-5. The number of vessels that would have qualified for B permits under the criteria contained in this alternative during 2004-2006 window period years ranged from 65 to 1,103 vessels with a median value of 588 vessels.

4.4.1 Effects on the Physical Environment including EFH

The affected environment, including EFH, is described in **Section 3.1**. This alternative has the flexibility to substantially reduce the number of vessels eligible to target B species groundfish, which could have a beneficial effect by reducing fishing impacts on habitat. Vessel displacement due to permit non-qualification could result in effort shifts to associated species such as salmon, HMS or crab to make up for revenue loss (see **Appendix E Table E-4b** for lost revenue estimates). It is not clear that such effort shifts would result in a net change in impact on marine habitats. The directed open access fleet has been increasing in recent years (**Figure 2-1**), particularly for sablefish (**Figures 3-4 and 3-5)**. Continuation of the upward trend in vessel participation in the open access fishery could possibly stop under this alternative, depending on qualification criteria used for B permit issuance. However, the permit issuance program will not affect the ability of permitted vessels to exert additional fishing pressure in the event of increased groundfish availability, increased market demand for fish, or reduced fishing opportunity in associated fisheries, such as salmon. Transfer of permits from latent vessels, depending on qualification criterion, to new vessels provided under this alternative could further exaccerbate the sablefish situation. Any effort increase by permitted vessels would have a corresponding impact on the physical environmental, including gear loss impacts, habitat alteration caused by fishing gear contact with habitat structures, and water pollution associated with vessel fuel and waste spillages. Overall, this alternative is not likely to significantly affect the physical environment because the small size of the fishery compared to other Pacific Coast fisheries (0.3 percent and 1.1 percent based on weight and revenues, respectively, **Table 3-16**).

4.4.2 Effects on the Biological Environment

4.4.2.1 Groundfish Species

Open access fishery impacts on groundfish species are described in **Section 3.2.1**. The level of change in groundfish landings or impacts under this alternative would depend on the level of fleet harvest capacity that might be retained under this alternative. For example, criterion 47.9K-3 would eliminate vessels that accounted for 64 percent of the B species directed fishery revenues received during 2004-2006 (**Table 4-1b).** This amount of fish would substantially increased the amount of fish available for harvest by permitted vessels with associated decrease in target species discards and reduced impacts to over fished groundfish. The criteria contained in A-4 would increase revenues to permitted vessels ranging from over 40 percent under 4 criteria, over 20 percent under 6 criteria and over 10 percent for 9 criteria. The other 13 criteria contained in A-4 would result in redistribution to permitted vessels during 2004-2006 of less than 10 percent of revenues (**Table 4-1b).** However, non-permitted vessels would likely be allowed to land incidental amounts of B species groundfish caught while fishing for associated commercial species during 2004-2006, thus the transfer proportions would be less than the amounts shown in **Table 4-1b**. Personal income impact estimates were not made for all of the criteria contained in A-4. The estimates that were made by the two approaches (revenue impact and personal income impact) were the same in 11 of 12 comparisons for criteria that qualified between 390 and 727 vessels (**Table 4-1b).**

In 2005, the sablefish harvest guideline was exceeded in the northern management area (Monterey-Vancouver) by over 40 percent due to increased level of vessel participation in the fishery (**Figures 3-4 and 3-5)**. In 2006, the directed sablefish fishery in the northern management area was closed during October-December due to attainment of the sablefish harvest guideline (HG). This was the only year since the fishery began in 1994 that the fishery had to be closed and may have been due to effort shift of salmon vessels to the directed sablefish fishery because of restrictive salmon fishing regulations (see**:** http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf.). Salmon regulations were less restrictive in 2007, which, in combination with more restrictive sablefish regulations, may have constrained the effort increase in the directed sablefish fishery (**Section 1.4.1**.).
Continued high level of vessel participation in the directed sablefish fishery could result in more restrictive sablefish landing and cumulative limits than in the past. Further reduction in sablefish limits would increase discards of sablefish and associated overfished groundfish stocks due to trip limit overages and high grading to land the most valuable fish compared to previous recent years. Discard rate data for the directed fishery are presented in **Section 3.3.2.4.1**.

An average of 276 vessels participated in the WOC directed sablefish fishery in the recent window period years of 2004-2006 (**Table 2-5**). Two criteria contained in this alternative would have qualified between 300 and 400 vessels during during 2004-2006. These included 6.1K-3 and 2000 max-5 (**Table 4-3).** This number of vessels would ensure that the sablefish fishery is protected against permit transfers from vessels that do not target sablefish; i.e., shelf rockfish, lingcod, other species and California shark vessels.

4.4.2.2 Non-groundfish Species (State-managed or under other FMPs)

Open access fishery impacts on non-groundfish species are described in **Section 3.2.2**. A large decrease in groundfish harvest would likely result in effort shift by permitted vessels to associated fisheries. None of the criteria contained in Alternative 4 would have required an effort shift, overall, by non-qualifying vessels to other commercial fisheries during 2004-2006 of ≥5 percent to make up for loss of B species groundfish revenues (**Appendix Table E-4b)**. However, non-qualifying vessels would have been allowed to land low levels of B species groundfish caught incidentally while fishing for other commercial species under a C permit or state-issued nearshore permit, which would have compensated for some of the potential revenue loss.

4.4.2.3 Prohibited Species

Prohibited species impacts in open access fisheries are described in **Section 3.2.3**. No change in level of impact of open access fishery vessels on prohibited species (Pacific salmon, Pacific halibut and Dungeness crab) would be expected under this alternative. The bycatch of salmonids and Dungeness crab is very low in the sablefish endorsed long-line and trap fisheries but significant for Pacific halibut as presented in **Section 3.2.3.** These bycatch rates are likely similar to those that occur in the open access fishery longline and trap fisheries, depending on area of the coast and gear type used. If capacity and participation in the groundfish fishery were reduced by this action, bycatch of Pacific halibut could in turn be reduced depending on gear type used and target species strategy of the non-permitted vessels.

4.4.2.4 Protected Species

Protected species impacts in open access fisheries are described in **Section 3.2.4**. No change in level of impact of open access fishery vessels on protected species (e.g., listed salmonids, marine mammals, seabirds, turtles) would be expected under this alternative because overall groundfish impact would remain the same. However, depending on criterion, less fishing gear and time might be needed because of reduced fleet size, which could have a beneficial effect on marine mammals and seabirds.

4.4.3 Effects on the Socioeconomic Environment

4.4.3.1 Management Structure of the Open Access Fishery

The open access fishery management structure is described in **Section 3.3.1**. Permitting of open access fishery participants would facilitate projection of open access fishery landings and impacts, which could lead to better utilization of harvestable resources and protection of overfished groundfish species. Fisheries would continue to be managed using trip and cumulative landing limits with the aim of providing for year round fishing. The existing regulatory structure for conservation areas and trip limits would likely be appropriate initially for B permit vessels (**Table 3-1a**), but would depend in part of the degree of reduction that is implemented in the directed fishery fleet. However, separate trip limit regulations would likely be needed for C permit vessels (i.e., vessels that do not qualify for B permits) to allow for small landings for some or all federal groundfish species that are allocated to the open access fishery that may be caught by C permit vessel incidental to fishing for non-groundfish species (see **Table 4-2).**

4.4.3.2 Catch Characteristics

Catch characteristics of the open access fisheries are described in **Section 3.3.2**. The permit requirement under this alternative would help to more accurately project fishery impacts and landings on a pre-and in-season basis compared to the no-action alternative, thus minimizing the need for major late season landing limit changes to stay within or meet fishery allocations. For this alternative a wide range of qualification criteria (22 overall) was developed and analyzed. The amount of B species groundfish harvested by vessels that would qualify for a permit under this alternative ranged from 27 percent to 100 percent with a median value of 96 percent of the total B species groundfish landed by directed fishery vessels during the 2004-2006 window period (**Tables 4-1a and 4-1b**). These ranges in proportions stem from differences in vessel target species strategy, state of origin and qualification criteria used in ranking vessels for permit qualification.

The level of change in groundfish landings or impacts under this alternative would depend on the level of fleet harvest capacity that might be retained. For example, criterion 47.9K-3 would have eliminated vessels that accounted for 64 percent of the B species directed fishery revenues received during 2004-2006 (**Table 4-1b).** This amount of fish would have substantially increased the amount of fish available for harvest by permitted vessels with associated decrease in target species discards and, possibly, reduced impacts to over fished groundfish. The criteria contained in A-4 would have increased revenues to permitted vessels ranging from over 40 percent under four criteria, over 20 percent under six criteria and over 10 percent, under nine criteria. The other 13 criteria contained in this alternative would have resulted in redistribution to permitted vessels during 2004-2006 of less than 10 percent of revenues (**Table 4-1b).** However, non-permitted vessels likely would have been allowed to land incidental amounts of B species groundfish caught while fishing for associated commercial species during 2004-2006, thus the transfer proportions would have been less than the amounts shown in **Table 4-1b**. Personal income impact estimates were not made for all of the criteria contained in this alternative. However, the estimates that were made by the two approaches (revenue impact and personal income impact) were the same in 11 of 12 comparisons for criteria that qualified between 390 and 727 vessels (**Table 4-1b).**

In 2005, the sablefish harvest guideline was exceeded in the northern management area (Monterey-Vancouver) by over 40 percent due to increased level of vessel participation in the fishery (**Figures 3-4 and 3-5)**. In 2006, the directed sablefish fishery in the northern management area was closed during October-December due to attainment of the sablefish harvest guideline (HG). This was the only year since the fishery began in 1994 that the fishery had to be closed and may have been due to effort shift of salmon vessels to the directed sablefish fishery because of restrictive salmon fishing regulations (see**:**

http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf.). Salmon regulations were less restrictive in 2007, which, in combination with more restrictive sablefish regulations, may have constrained the effort increase in the directed sablefish fishery (**Section 1.4.1**.).
Continued high level of vessel participation in the directed sablefish fishery could result in more restrictive sablefish landing and cumulative limits than in the past. Further reduction in sablefish limits would increase discards of sablefish and associated overfished groundfish stocks due to trip limit overages and high grading to land the most valuable fish compared to previous recent years. Discard rate data for the directed fishery are presented in **Section 3.3.2.4.1**)

An average of 276 vessels participated in the WOC directed sablefish fishery in the recent window period years of 2004-2006 (**Table 2-5**). Two criteria contained in this alternative would have qualified between 300 and 400 vessels during during 2004-2006. These were 6.1K-3 and 2000 max-5 (**Table 4-3).** This number of vessels would better ensure the sablefish fishery is protected against permit transfers from vessels that do not target sablefish; i.e., those that target shelf rockfish, lingcod, other species and California sharks.

The distribution of vessels that would have met the wide range in qualification criteria contained in this alternative during 2004-2006 were as follows (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) as follow: Washington, 11-25 percent (11 percent); Oregon, 14-34 percent (31 percent); and California 44-71 percent (57 percent) (**Table 4-3**). These ranges in proportions stem from differences in vessel target species strategy and the permitting criteria used in ranking vessels for permit qualification.

The range in potential revenue increase to vessels that would have qualified for B permits during 2004-2006 under the criteria contained in this alternative was from no impact (1lb-1; 1 trip-1) to 64 percent (47.9K-3) **(Table 4-1b).** The range in personal income impact would have been similar based on economic analyses done for 12 criteria by the two approaches (**Table 4-1b).** However, allowance would have been made for the non-qualifying vessels to land small amounts of these fish under a C permit or state-issued nearshore permit, which would have reduced the amount of fish available for transfer to the permitted vessels during 2004-2006.

4.4.3.3 Vessel Characteristics

Vessel characteristics are described in **Section 3.3.3**. Fishery attrition would be low under this alternative because permits would be transferable regardless of criterion adopted for permit qualification. Permit transfers from latent vessels that might receive a permit under criteria with low qualification standards to new permit owners could increase overall groundfish effort because the new permit holders would have greater incentive to use their new permits. Also, many salmon vessels would likely receive permits under criteria with low qualification standards and could increase effort in the B species fisheries to make up for lost salmon revenues due to restrictive salmon fishing regulations, which appeared to happen in 2006. An offsetting factor is the requirement for vessel tracking equipment (VMS) on all vessels that operate in federal waters and take federal groundfish, which may be too expensive for some vessel owners to participate in the fishery.

Vessels that targeted lingcod, shelf rockfish and other species during window period or subset of window period years used for permit qualification are less lkely to receive permits under any alternative that would permit less than the total number of vessels that made one or more directed fishery landing of B species groundfish **(Table 3-13c**). However, the provision under this alternative to allow for incidental B species landings under a C permit or a state-issued nearshore permit could allow the vessels that do not qualify for B permits to continue to land small amounts of those species. Their landing allowances would be determined as part of the biennial and inseason management process.

Average size of vessel in the fleet could change under this alternative because vessel length would not be a constraining factor in permit transfers; i.e., there is no vessel length endorsement provision. In particular, small vessel owners might be inclined to upgrade to a larger vessel or transfer (e.g., sell) their permit to an owner of a larger vessel over time and there is no provision for new permit issuance under this alternative. Gear used to make the catch could potentially change because there would be no restriction on type of gear vessels could use or that future permit holders would be allowed to use with their permit. Pot fishing vessels tend to be larger on average than hook and line vessels because of the greater deck space required to deploy pot gear, thus more pot fishing vessels could be expected if average size of vessel in the fleet increases. There is high potential for average size of vessel and number of pot fishing vessels in the fleet to increase under this alternative.

4.4.3.4 Processor Characteristics

Process characteristics are described in **Section 3.3.4**. No change in processor characteristics would be expected under this alternative. However, the distribution of B permits could affect fish buying opportunities for commercial fish processors. The distribution of vessels that would have met the wide range in qualification criteria contained in this alternative during 2004-2006 were as follows (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) as follow: Washington, 11-25 percent (11 percent); Oregon, 14-34 percent (31 percent); and California 44-71 percent (57 percent) (**Table 4-3**). These ranges in proportions stem from differences in vessel target species strategy and the permitting criteria used in ranking vessels for permit qualification.

Port group impacts based on vessels that would have qualified for B permits during 2004-2006 were highly variable between the criteria contained in this alternative. The most restrictive criterion, 47.9K-3, would have consolidated 51 percent of the B permits in two port groups: Fort Bragg (31 percent) and Monterey (18 percent). Many port groups would have had zero or very few (<0.5 percent) permitted vessels under this same criterion (**Table 4-3).**

Processors that purchase from vessels that target lingcod, shelf rockfish and other species might receive less fish under any alternative that would permit less than total number of vessels that made one or more directed fishery landing of B species groundfish during window period or subset of window period years used for permit qualification **(Appendix Tables E-13 and E-14**). However, the provision under this alternative to allow for incidental B species landings under a C permit or a state-issued nearshore permit could allow the vessels that do not qualify for B permits to continue to land small amounts of those species. Incidental fisher y landing allowances would be part of the biennial and inseason management processes.

4.4.3.5 Participation Requirements, Restrictions, Licensing

Participation requirement, restriction and licensing are described in **Section 3.3.6.** Adoption of this alternative would require vessel owners that qualify for a B permit to submit application to NMFS to obtain their initial permit and to apply for permit renewal each year thereafter, but there would be no annual fishery participation requirement. Vessel owners would be allowed to register their B permit to a different vessel once per year. Vessel owners that seek a C permit would be required to submit application for permit issuance, but there would be no federal qualification requirements associated with C permit issuance. Vessel owners would be required to obtain appropriate permit types before any directed or incidental fishing takes place. An alternative approach for issuing C permits would be to allow the states to issue them at the same time the vessel owners renew their vessel registrations. The states would then notify NMFS of the C permit vessels, which could avoid NMFS having to charge a fee for issuing the permits.

Owners of A and B permits would be allowed to use both permit types alternately in the same year, but not in the same cumulative landing period. There would be an advance notice requirement to switch permit type usage between cumulative landing periods. This provision would allow vessels to fish from both A and B permit allocations but not in the same cumulative landing period.

4.4.3.6 Revenue/Costs to the Participants and to State and Federal Governments

These issues are discussed in **Section 3.3.7**. For both B and C permits, NMFS would charge fees for the range of administrative costs incurred by NMFS in issuing, renewing, transferring, appealing and replacing permits. The current A permit renewal fee is $125. Vessel owners would be required to register their vessel with NMFS in advance of participating in the fishery. In order to provide NMFS with adequate time to complete a vessel registration, vessel owners would need to submit to NMFS an application at least 30 days in advance of the date the vessel owner wishes to begin participation in the fishery. An alternative approach for issuing C permits would be to all the states to issue them at the same time the vessel owners renew their vessel registrations. The states would then notify NMFS of the C permit vessels, which could avoid NMFS having to charge a fee for issuing the permits.

Adoption of any alternative that requires federal licensing or permitting of current open access vessels to take and possess specified federal groundfish may require that those vessels participate in the federal groundfish fishery vessel monitoring program (VMS program) when fishing for specified federal groundfish in federal or state waters. Some current open access fishermen may not seek to participate in the VMS program because of program cost, and intend to commercially fish for and take specified federal groundfish in state waters only where VMS program participation may not be required. Federal groundfish registration might compromise that strategy. Registration for a federal groundfish license or permit may require vessel participation in the groundfish VMS program. Furthermore, adoption of any alternative that requires federal licensing or permitting may increase the probability of a vessel being selected to participate in the Pacific Coast Groundfish Observer Program. There is an added cost to vessel owners to carry a federal observer on their vessel.

4.4.3.7 Groundfish-dependent Communities

Groundfish-dependent communities are discussed in **Section 3.3.8**. No change in the dependence of fishing communities on groundfish would be expected under this alternative because of the relatively low contribution of B species groundfish to local fisheries. The maximum reduction in B species directed fishery groundfish landings under this alternative is estimated to be 74 percent (**Appendix E, Table E4b**) if there were no regulation adjustment to allow permtted vessels to land fish formerly caught by non-permitted vessels or for non-permitted vessels to land B species groundfish incidental to fishing for other species. Any level of fleet size reduction below 680 vessels would be expected to consolidate the catch among fewer vessels compared to recent years with, possibly, no impact on level of groundfish landings. Displaced fishers would be expected to shift effort to other fisheries to compensate for lost groundfish revenues (see **Appendix E, Table E-4b**).

NMFS completed an Environmental Impact Statement (EIS) in 2006 that included a comprehensive analysis of Pacific Coast groundfish fishing communities and their engagement in various groundfish fisheries. Most Pacific Coast fishing ports with groundfish landings have some vessels that land open access groundfish. Appendix A to the EIS evaluated fishing communities for their dependence on groundfish resources and for their vulnerability to changes in availability of groundfish harvest. This action would not alter the overall available groundfish harvest, but it would affect particular vessels in particular ports, either by providing those vessels with a potentially valuable license to participate in the fishery or by eliminating opportunities for those vessels to participate in the fishery. Port cities that Appendix A identified as both having some history of open access groundfish landings and a relatively higher dependency on availability of groundfish resources are: Astoria, Bellingham, Brookings, Coos

Bay, Crescent City, Eureka, Fort Bragg, Morro Bay, Newport, Port Orford, and San Francisco. Additional information on the importance of groundfish to fishing communities is provided in **Section 3.3.8**. A substantial reduction in permits under this alternative has the potential for compaction of permits in a few ports and the absence of permits in other ports depending on the distribution of the more productive boats.

The distribution of vessels that would have met the wide range in qualification criteria contained in this alternative during 2004-2006 were as follows (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) as follow: Washington, 11-25 percent (11 percent); Oregon, 14-34 percent (31 percent); and California 44-71 percent (57 percent) (**Table 4-3**). These ranges in proportions stem from differences in vessel target species strategy, state of origin, and the permitting criteria used in ranking vessels for permit qualification.

4.4.3.8 Environmental Justice

The factors to be considered with regard to environmental justice are described in **Section 3.3.9.** This action has low potential for significant impact as it does not target low income or minority communities; it would affect all population segments equally. Some Pacific Coast fishing communities have open access fishery participants that are not native-English speakers, but few of them participate in the fishery management process. Fishing families from these same communities also participate in the limited entry groundfish fishery, so there are within-community networks of translators. NMFS has not historically translated its groundfish fishery regulations from English into other languages. Some of the communities with relatively high open access fishery landings are considered vulnerable to shifts in groundfish fishing opportunity, although open access landings themselves may not make up the majority of groundfish fishing income to the community. This action does not alter or affect tribal treaty rights to or tribal allocations of groundfish.

4.5 Alternative 5

The initial fleet size goal under this alternative is 390 vessels, which is 91 percent of the average number of vessels that fished at least three years for federal groundfish species, including nearshore species, during 1994-1999 (**Appendix A, Table 3).** The 91 percent adjustment factor is extrapolated from the relationship between total number of vessels that had directed fishery landings of federal groundfish and those that had directed fishery landings of B species groundfish during 2000-2006 window period years. An adjustment factor is used because species composition of rockfish landings was less reliable in years prior to 2000 compared to the latter years and often appeared on tickets as “unspecified rockfish.” The long-term fleet size goal is the same as Alternative 5b, 170 vessels. There is no permit consolidation requirement, but there is a previous year landing requirement, which would require vessels to make a B species landing by November 30 of each year in order to renew the permit by December 31. Permits are non-transferable, which would be expected to accelerate permit attrition to meet the long-term goal under this alternative of 170 vessels. Single vessels could only be registered to either an A or B permit in the same year. Thus A permit vessel owners that own a vessel that would qualify for a B permit would have to decide on retaining one or the other permit type.

Appendix E presents an analysis of the one qualification standard (QS) and three qualification frameworks (QFs) contained in this alternative. The selection of QF for issuing B permits has allocative as well as biological and economic implications. The QFs used in the analysis of this alternative were:

1) cumulative vessel landings in pounds of B species groundfish during 2004-2006 window period years (QF-1),
2) cumulative vessel landings in pounds of B species groundfish during the 1998-2006 window period (QF-2), and

3) cumulative vessel landings in pounds of B species groundfish during the 1998-2006 window period in combination with a 2004-2006 window period B permit species landing requirement (QF-3).

The proposed qualification criteria used to analyze and compare A-3, A-4 and A-5, the B and C permit alternatives, with A-1 (No-action) and A-2 (federal license) presented in **Appendix E** are described in **Table 2-4** . One of these criteria (or modification thereof) is proposed to be selected as part of the final action on a preferred alternative that limits the initial number of vessels eligible for B permit issuance.

C permits would be required to land groundfish excluding nearshore species for all vessels that do not have an A or B permit or a state-issued nearshore fishery permit. C permits would be available to any state registered commercial fishing vessel and could be applied for at any time during the year.

4.5.1 Effects on the Physical Environment

The affected environment, including EFH, is described in **Section 3.1**. This alternative would reduce the number of vessels eligible to target B species groundfish from a recent year average of 680 vessels to 390 vessels (43 percent). Vessel displacement due to permit non-qualification could result in effort shifts to associated species such as salmon, HMS or crab to make up for revenue loss. There would be an attendant increase in habitat impacts in associated fisheries. It is not clear that such effort shifts would result in a net change in impact on marine habitats. Adoption of this alternative would not allow any new vessels in the fishery and would stop the vessel participation increase seen in the WOC area in recent years **(Figure 2-1),** but would not affect the ability of permitted vessels to exert additional fishing pressure in the event of increased groundfish availability, increased market demand for fish, or reduced fishing opportunity in other fisheries.. Any effort increase by permitted vessels would have a corresponding impact on the physical environmental, including gear loss impacts, habitat alteration caused by fishing gear contact with habitat structures, and water pollution associated with vessel fuel and waste spillages. Overall, this alternative is not likely to significantly affect the physical environment because the small size of the fishery compared to other Pacific Coast fisheries (<1 percent based on revenues; see **Section 3.3.8** for fishery comparisons).

4.5.2 Effects on the Biological Environment

4.5.2.1 Groundfish Species

Groundfish species are described in **Section 3.2.1.** No change in level of groundfish landings or impacts would be expected under in the first program year . This alternative aims to reduce fleet fishing capacity and participation in the groundfish fishery, which could have a beneficial effect on overfished groundfish, protected and prohibited species by reducing gear interactions with those species. The vessels that would not have qualified for a B permit under this alternative landed between 9 percent and 20 percent of the B species directed fishery groundfish revenues during 2004-2006, depending on qualification framework (**Appendix E, Table E-4b**). This is the amount of revenue increase possibly available for the permitted vessels in those years. However, a small amount of fish would have been availble for harvest by non-permitted vessels as incidental fishery catches under a C permit or state-issued nearshore permit. Thus, no additional fish may have been available for harvest by the permitted vessels. Attainment of the 170 vessel long-term goal (44 percent of initial fleet size goal) is more likely to have significant economic benefit to the permitted vessels, result in reduced fishery discards, and require less fishing gear due to reduced fleet size.

In 2005, the sablefish harvest guideline was exceeded in the northern management area (Monterey-Vancouver) by over 40 percent due to increased level of vessel participation in the fishery (**Figures 3-4 and 3-5)**. In 2006, the directed sablefish fishery in the northern management area was closed during

October-December due to attainment of the sablefish harvest guideline (HG). This was the only year since the fishery began in 1994 that the fishery had to be closed and may have been due to effort shift of salmon vessels to the directed sablefish fishery because of restrictive salmon fishing regulations (see**:** http://www.nwr.noaa.gov/Publications/FR-Notices/2006/upload/Halibut-Inseason-May06.pdf.). Salmon regulations were less restrictive in 2007, which, in combination with more restrictive sablefish regulations, may have constrained the effort increase in the directed sablefish fishery (**Section 1.4.1**.). Continued high level of vessel participation in the directed sablefish fishery will result in more restrictive sablefish landing and cumulative limits than in the past. Further reduction in sablefish limits will increase discards of sablefish and associated overfished groundfish stocks due to trip limit overages and high grading to land the most valuable fish compared to previous recent years.

The number of permits proposed to be initially issued under this alternative (390) is about 40 percent greater than the average number of vessels that participated in the WOC directed sablefish fishery during 2004-2006 window period years (276 vessels; **Table 2-5**). Thus the potential is greatly reduced for a large effort shift to the directed sablefish fishery under this alternative compared to Alternative 3 and many of the criteria in Alternative 4. The long-term fleet size objective of 170 vessels in this alternative would substantially reduce (or eliminate) the potential for large effort increase in the directed sablefish fishery.

4.5.2.2 Non-groundfish Species (State-managed or under other FMPs)

Open access fishery impacts on non-groundfish species are described in **Section 3.2.2**. Eventual increase in fishing effort and catch of state-managed and federal non-groundfish fisheries from displaced (non-permitted or previously permitted) vessels would be expected to be ≤2 percent under this alternative (**Appendix E Table E-4b**). However, non-qualifying vessels would be allowed to land low levels of B species groundfish caught incidentally while fishing for other commercial species under a C permit or state-issued nearshore permit, which might offset the need to increase effort in other commercial fisheries.

4.5.2.3 Prohibited Species

Prohibited species impacts in open access fisheries are described in **Section 3.2.3**. Pacific halibut is commonly caught in sablefish long-line gear, which is a principal gear type used for sablefish in the open access fishery, and those impacts primarily occur north of Cape Mendocino. Salmon and Dungeness crab are rarely encountered in long-line fisheries (**Section 3.3.2.4.1).** Reduction in number of vessels in the open access directed fishery is not expected to reduce impacts to B species groundfish, thus encounters with prohibited species is likely not to change under this alternative.

4.5.2.4 Protected Species

Protected species impacts in open access fisheries are described in **Section 3.2.4.** These species include listed salmonids, marine mammals, seabirds and turtles. Substantially reduced open access fishery fleet size under the 170 vessel long-term goal of this alternative (44 percent of initial fleet size goal) could substantially reduce the amount of gear used in the fishery. Reduced gear deployment in the fishery would reduce the potential for gear encounters with marine mammals and seabirds in particular.

4.5.3 Effects on the Socioeconomic Environment

4.5.3.1 Management Structure of the Open Access Fishery

The open access fishery management structure is described in **Section 3.3.1**. Permitting of open access fishery participants would facilitate projection of open access fishery landings and impacts, which could lead to better utilization of harvestable resources and protection of overfished groundfish species. Fisheries would likely continue to be managed using trip and cumulative landing limits with the aim of providing for year round fishing. The existing regulatory structure for conservation areas and trip limits would likely be appropriate initially for B permit vessels, but would depend in part of the degree of reduction that is implemented in the directed fishery fleet (see **Table 3-1a**). However, separate trip limit regulations would likely be needed for C permit vessels (i.e., vessels that do not qualify for B permits) to allow for small landings for some or all federal groundfish species that are allocated to the open access fishery that may be caught by C permit vessel incidental to fishing for non-groundfish species (see **Table 4-2).**

4.5.3.2 Catch Characteristics

Catch characteristics of the open access fisheries are described in **Section 3.3.2**. . The permit requirements under this alternative would help to more accurately project fishery impacts and landings on a pre-and in-season basis, thus minimizing the need for major late season landing limit changes to stay within or meet fishery allocations. The initial fleet size goal under this alternative would reduce the average fleet in recent years from 680 vessels to 390 vessels and would bring the fleet size closer to the average directed sablefish fishery fleet size of 276 vessels during the 2004-2006 widow period years. This is an important consideration because of the potential for increased sablefish effort stemming from permit transfers from latent vessels to vessel owners that would be motivated to use their new permits. Also, the potential impact of salmon vessel effort shift by permitted vessels due to low salmon availability or restrictive salmon fishing regulations would be lower than the other alternatives that have a fixed initial fleet size goal.

The amount of B species groundfish harvested by vessels that would initially qualify for a permit under this alternative represented 83-93 percent of the total B species groundfish landed by directed fishery vessels during the 2004-2006 window period (**Appendix E Table E-4a)**. Thus non-qualifying vessels could provide 7 -17 percent more B species groundfish for harvest by permitted vessels. Attainment of the long-term fleet size goal of 170 vessels has the potential based on 2004-2006 window period landings to increase the allowable catch by permitted vessels by about 44 percent. This is based on results for 21.8K-3 and 14.4K-3 criteria, which would have qualified 139 and 211 vessels during 2004-2006 (**Table 4-1b)**. This amount of fish would likely provide for substantially higher landing and cumulative limits for some B species groundfish such as sablefish. Discards and overfished species impacts would also be reduced stemming from increased trip limits. However, non-qualifying vessels would be allowed to land incidental amounts of B species groundfish, which would reduce the amount of additional fish available for harvest by permitted vessels.

The projected initial distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 17 -22 percent (11 percent); Oregon, 26-32 percent (31 percent); and California 45-56 percent (57 percent) (**Table 4-3**). One possbile way to project the approximate distribution of permits under the long-term goal of 170 vessels would be to use the analytical results for criteria that would have provided for initial fleet sizes of 139 and 211 vessels during 2004-2006. Those critieria, 21.8K-3 and 14.4K-3, showed the following distributions: Washington, 20 percent; Oregon, 23 percent and 28 percent, respectively; and California, 57 percent and 53 percent, respectively (**Table 4-3).**

Non-qualifying vessels under this alternative would need to increase effort in other fisheries or find other revenue sources to make up for revenues lost due to non qualification for B permits, discounting the B species groundfish that they would be allowed to land incidental to fishing for other commercial species. The amount of revenue increase that would be required of vessels not meeting the initial permit qualification criteria is estimated to be in the range of 1-2 percent based on the contribution of B species groundfish to total 2004-2006 window period fishery revenues of non-qualifying vessels (**Appendix E: Table E-4b).** The long-term impact of reducing the fleet to 170 vessels in terms of lost revenue would be about 4 percent for vessels that would lose their permits due to failure to make a B species landing every year or for failing to reapply for permit issuance (based on 21.8K and 14.4K-3 criteria shown in **Appendix E: Table E-4b**).

The range in potential revenue increase to vessels that would have qualified for B permits during 2004-2006 under the criteria contained in this alternative was from 9 percent (390v-1) to 20 percent (390v-2) **(Table 4-1b).** The range in personal income impact would have been about the same (**Table 4-1b).** However, allowance would have been made for the non-qualifying vessels to land small amounts of these fish under a C permit or state-issued nearshore permit, which would have reduced the amount of fish available for harvest by the permitted vessels.

4.5.3.3 Vessel Characteristics

The long-term goal under this alternative could lead to larger average size vessel in the fleet. Permit transfer would not be allowed under this alternative, which should accelerate permit attrition. The annual landing requirement provision would further increase the rate of fishery attrition. It is not clear which vessels would be more likely to stop renewing their permits, but it seems likely that the owners with the larger fishery investments would more likely to renew their permits. These generally would be the larger vessel owners. Thus the average size of vessel in the fleet could increase. The gear used in the fishery could also move more toward pot fishing, which has been the trend over time and also because pot vessels tend to be larger vessels (because of the larger deck space required to transport pot gear). Permit non-treansferability precludes owners of smaller vessels from upgrading to a larger vessel or selling their permits to owners of larger vessels.

Vessels that targeted lingcod, shelf rockfish and other species during window period or subset of window period years used for permit qualification are less lkely to receive permits under any alternative that would permit less than the total number of vessels that made one or more directed fishery landing of B species groundfish **(Table 3-13c**). However, the provision under this alternative to allow for incidental B species landings under a C permit or a state-issued nearshore permit would allow vessels that do not qualify for B permits to continue to land small amounts of those species. Their landing allowances would be determined as part of the biennial and inseason management process.

The projected initial distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 17-22 percent (11 percent); Oregon, 26-32 percent (31 percent); and California 45-56 percent (57 percent) (**Table 4-3**). One possbile way to project the approximate distribution of permits under the long-term goal of 170 vessels would be to use the analytical results for criteria that would have provided for initial fleet size of 139 and 211 vessels during 2004-2006. Those critieria, 21.8K-3 and 14.4K-3, showed the following distributions: Washington, 20 percent; Oregon, 23 percent and 28 percent, respectively; and California, 57 percent and 53 percent, respectively (**Table 4-3).**

4.5.3.4 Processor Characteristics

Processor characteristics are described in **Section 3.3.5**. No change in processor characteristics would be expected under this alternative. However, the distribution of permits could affect the ability of commercial fish processors to buy B species groundfish. The projected initial distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 17-22 percent (11 percent); Oregon, 26-32 percent (31 percent); and California 45-56 percent (57 percent) (**Table 4-3**). One possbile way to project the approximate distribution of permits under the long-term goal of 170 vessels would be to use the analytical results for criteria that would have provided for initial fleet size of 139 and 211 vessels during 2004-2006. Those critieria, 21.8K-3 and 14.4K-3, showed the following distributions: Washington, 20 percent; Oregon, 23 percent and 28 percent, respectively; and California, 57 percent and 53 percent, respectively (**Table 4-3).**

Washington had one port group that was sensitive (>20 percent potential landing reduction) to vessel non-qualification under this alternatives, Columbia River. All Oregon port groups, except Brookings were sensitive to non-qualification under criteria that used QF-2 (lbs landed, 1998-2006 window period **(Table 4-3).** The criteria that used QF-1 had the lowest negative impact on Oregon ports (**Table 4-3).** Several California port groups were sensitve to vessel non-qualification regardless of qualification framework, in approximate order from most sensitive to least sensitive: Bodega Bay, Santa Barbara, Crescent City, Los Angeles, and Morro Bay (**Table 4-4).**

4.5.3.5 Participation Requirements, Restrictions, Licensing

Participation requirement, restriction and licensing are described in **Section 3.3.5.** *Adoption of this alternative would require vessel owners that qualify for a B permit to submit application to NMFS to obtain their initial permit and to apply for permit renewal each year thereafter, which would be a new registration requirement.* B permit holders would be required to make a B species landing every year to be eligible for permit renewal. Vessel owners that seek a C permit would be required to submit application for permit issuance, but there would be no federal qualification requirements associated with C permit issuance. Vessel owners would be required to obtain appropriate permit types before any directed or incidental fishing takes place. An alternative approach for issuing C permits would be to allow the states to issue them at the same time the vessel owners renew their vessel registrations. The states would then notify NMFS of the C permit vessels, which could avoid NMFS having to charge a fee for issuing the permits.

Vessel owners would not be allowed to use A and B permits on the same vessel in the same year. Vessel owners that own an A permit and would qualify for a B permit for the same vessel would have to decide on one or the other permit type because A and B permits may not be used on the same vessel in the same year under this alternative.

4.5.3.6 Revenue/Costs to the Participants and to State and Federal Governments

These issues are discussed in **Section 3.3.7**. For both B and C permits, NMFS would charge fees for the range of administrative costs incurred by NMFS in issuing and renewing permits, which would be an added fishery participation cost. The current A permit renewal fee is $125. Vessel owners would be required to register their vessel with NMFS in advance of participating in the fishery. In order to provide NMFS with adequate time to complete a vessel registration, vessel owners would need to submit to NMFS an application at least 30 days in advance of the date the vessel owner wishes to begin participation in the fishery. An alternative approach for issuing C permits would be to allow the states to issue them at the same time the vessel owners renew their vessel registrations. The states would then notify NMFS of the C permit vessels, which could avoid NMFS having to charge a fee for issuing the permits.

Under this alternative, permits may not be transferred between vessels; there is a previous year landing requirement, which must be met by Novem ber 30 of each year; and single vessels may only be registered to either an A or B permit in the same year. Failure to meet the landing requirement or to renew the permit on time annually would result in denial of permit renewal.

Adoption of any alternative that requires federal licensing or permitting of current open access vessels to take and possess specified federal groundfish may require that those vessels participate in the federal groundfish fishery vessel monitoring program (VMS program) when fishing for those specified federal groundfish in federal or state waters. Some current open access fishermen may not want to participate in the VMS program because of program cost, and intend to commercially fish for and take those specified federal groundfish only in state waters where VMS program participation may not be required. Federal groundfish registration might compromise that strategy. Open access vessel owners should be aware that registration for a federal groundfish license or permit may require their participation in the groundfish VMS program. Furthermore, adoption of any alternative that requires federal licensing or permitting may increase the probability of a vessel being selected to participate in the Pacific Coast Groundfish Observer Program. There is an added cost to vessel owners to carry a federal observer on their vessel.

4.5.3.7 Groundfish-dependent Communities

Groundfish-dependent communities are discussed in **Section 3.3.8**. No change in the dependence of fishing communities on groundfish would be expected under this alternative. The proposed level of fleet size reduction would be expected to consolidate the available harvest among fewer vessels with no impact on level of total groundfish landings, but the distribution of landings could change. The maximum reduction in B species directed fishery groundfish landings under this alternative is estimated to be 7-17 percent based on 2004-2006 window period data (**Appendix E Table E4b**) if there were no regulation adjustment to allow permtted vessels to land fish formerly caught by non-permitted vessels or for non-permitted vessels to land B species groundfish incidental to fishing for other species. Displaced fishers would likely shift effort to other fisheries to compensate for lost groundfish revenues.

NMFS completed an Environmental Impact Statement (EIS) in 2006 that included a comprehensive analysis of Pacific Coast groundfish fishing communities and their engagement in various groundfish fisheries. Most Pacific Coast fishing ports with groundfish landings have some vessels that land open access groundfish. Appendix A to the EIS evaluated fishing communities for their dependence on groundfish resources and for their vulnerability to changes in availability of groundfish harvest. This action would not alter the overall available groundfish harvest, but it would affect particular vessels in particular ports, either by providing those vessels with a potentially valuable license to participate in the fishery or by eliminating opportunities for those vessels to participate in the fishery. Port cities identified in Appendix A having both having some history of open access groundfish landings and a relatively higher dependency on availability of groundfish resources are: Astoria, Bellingham, Brookings, Coos Bay, Crescent City, Eureka, Fort Bragg, Morro Bay, Newport, Port Orford, and San Francisco. Additional information on the importance of groundfish to fishing communities is provided in **Section 3.3.8.**

Washington had one port group that was sensitive (>20 percent potential landing reduction) to vessel non-qualification under this alternatives, Columbia River. All Oregon port groups, except Brookings were sensitive to non-qualification under criteria that used QF-2 (lbs landed, 1998-2006 window period) **(Table 4-3).** The criteria that used QF-1 had the lowest negative impact on Oregon ports (**Table 4-3).** Several California port groups were sensitve to vessel non-qualification regardless of qualification framework. These were in approximate order from most sensitive to least sensitive: Bodega Bay, Santa Barbara, Crescent City, Los Angeles, and Morro Bay (**Table 4-4).**

The projected initial distribution of permits by state (with the proportion of vessels making landings by state during the 2004-2006 window period shown in parentheses) would be as follow: Washington, 17-22 percent (11 percent); Oregon, 26-32 percent (31 percent); and California 45-56 percent (57 percent) (**Table 4-3**). One possbile way to project the approximate distribution of permits under the long-term goal of 170 vessels would be to use the analytical results for criteria that would have provided for initial fleet size of 139 and 211 vessels during 2004-2006. Those critieria, 21.8K-3 and 14.4K-3, showed the following distributions: Washington, 20 percent; Oregon, 23 percent and 28 percent, respectively; and California, 57 percent and 53 percent, respectively (**Table 4-3).**

4.5.3.8 Environmental Justice

The factors to be considered with regard to environmental justice are described in **Section 3.3.8.** This alternative has low potential for significant impact as it does not target low income or minority communities; it would affect all population segments equally. Some Pacific Coast fishing communities have open access fishery participants that are not native-English speakers, but few of them participate in the fishery management process. Fishing families from these same communities also participate in the limited entry groundfish fishery, so there are within-community networks of translators. NMFS has not historically translated its groundfish fishery regulations from English into other languages. Some of the communities with relatively high open access fishery landings are considered vulnerable to shifts in groundfish fishing opportunity, although open access landings themselves may not make up the majority of groundfish fishing income to the community. This action does not alter or affect tribal treaty rights to or tribal allocations of groundfish.

4.6 Alternative 6 (Preliminary Preferred Alternative)

Alternative 6 (A-6)–the Preliminary Preferred Alternative—was adopted from within the range of qualification criteria contained in Alternative 4. Under A-6 vessels that landed a total of ≥100 lbs of B species groundfish in the directed fishery during the 1998-2006 window period and with at least one directed fishery landings during the 2004-2006 window period (Qualification Framework 3) would be eligible for a B permit. Also under A-6, the Council would consider species take and landing permits (endorsements) for sablefish and lingcod separately based on the following landings criteria: ≥1lb, ≥100 lbs or ≥500 lbs in any year during the 1998-2006 window period.

The B permit program would operate similar to the current limited entry permit program (A permit). Permits would be transferable after the first program year and throughout the year each year thereafter. Species endorsements would be permanently affixed to the original B permits and would not transferable between vessels without the original B permit. In addition, vessels could be registered to A and B permits simultaneously and the vessel owner would be able to use the two permit types alternately during the year, but not in the same cumulative landing period. The permit holder would be required to notify NMFS of the permit type that would be in use prior to leaving port.

C permits would be required under this alternative to land groundfish excluding nearshore species for all vessels that do not have an A or B permit to land small amounts of B species groundfish when fishing for non-groundfish species. C permits could be applied for at any time of year, and a state-issued nearshore permit, registered to the vessel or a fisherman on board the vessel, could be used in lieu of a C permit registration to the vessel.

Appendix I presents an analysis of A-6. A total of 1,003 vessels would qualify for a B permit under A-6, which means that 100 vessels that made a directed fishery landing during the 2004-2006 window period would not qualify for a B permit (**Tables I-1a and I-1b).** A maximum of about 244 vessels would require a C permit under this alternative (**Appendix I, Discussion).**

4.6.1 Effects on the Physical Environment including EFH

The fish and wildlife species of the United States Pacific Coast are dependent upon a wide variety of habitat types found within the EEZ and state territorial waters of the Council management area. These are generally described in **Section 3.1.** Adoption of any alternative that would affect the amount of effort exerted by fishermen and processors in pursuit of managed species could affect the physical environment upon which managed and associated species depend for their short and long-term productivities. Fishing effort change associated with the adoption of A-6 could, in part, affect amount of fishing-gear lost in pursuit of managed species, habitat alteration caused by gear contact with habitat structures, and water pollution associated with vessel fuel and waste product spillage.

A-6 would qualify more directed fishery vessels (1,003, **Table I-1a**) than participated in the open access directed fishery in any year during the window period by 102 vessels (Table**Table 2-6).** The species endorsement alternatives would qualify between 99 percent and 199 percent as many vessels as actually targeted these two species during 2004-2006 window period years (**Appendix I, Table I-1a; Table 2-5).** As a result, no added impact to the physical environment would be expected short-term under this alternative or any of its species endorsement alternatives because the fleet of potential fishery participants would be unchanged from recent years.

Permit transfers, which would be allowed under A-6, have the potential to increase the the amount of fishing effort long term stemming from low producing vessel owners selling their permits to vessel owners that seek to actively participate in the directed fishery, such as displaced salmon fishing vessels. However, increased fishing effort would likely be met with reduced trip limits to keep within fishery allocations, thus offsetting some or all of the potential effort increase and potential increased negative impact to the physical environment. Also, permit attrition due to permit non-renewal would take place over time, which would further offset any potential effort increase associated with permit transfers. Overall, this alternative is not likely to significantly increase or decrease fishery impacts on the potentially affected physical environment.

4.6.2 Effects on the Biological Environment

4.6.2.1 Groundfish Species

Groundfish includes 60 species of rockfish in the family Scorpaenidae, 7 roundfish species, 12 flatfish species, assorted sharks, skates, and a few miscellaneous bottom-dwelling marine fish species. These are generally described, along with species needing added protection, in **Section 3.2.1.** The level of change in groundfish impact that could be expected under this alternative would depend on the level of fleet harvest capacity that would be retained in the permitted fleet and the effectivness of management measures used to keep the fishery within harvest allocations.

A-6 would qualify more directed fishery vessels (1,003, **Appendix I, Table I-1a**) than participated in the open access directed groundfish fishery in any year during the window period by 102 vessels (**Table 2-6).** The species endorsement alternatives would qualify between 99 percent and 199 percent the number of vessels that harvested sablefish or lingcod during 2004-2006 window period years (**Appendix I, Table I-1a; Table 2-5)**. The B species landings during 2004-2006 window period years by vessels that would qualify of a B permit under this alternative and for each of its species endorsement alternatives ranged from 99.2 percent to 99.9 percent of actual landings during 2004-2006 window period years (**Appendix I, Table I-1a**). As a result, no change in fleet harvest capacity would be expected short-term under this alternative because the fleet of potential fishery participants and their potential fishery impacts would be the same as recent years.

Permit transfers, which would be allowed under A-6 after the first program year, have the potential to increase the amount of harvest demand in the permitted fleet on the long term stemming from lower producing vessel owners transferring their permits and associated species endorsments to vessel owners that seek to actively participate in the directed fishery. However, increased fishing effort by the permitted fleet would likely be met with reduced trip limits to keep the fishery within its allocations, thus offsetting some or all of the potential effort increase and potential increase in B species or species endorsed groundfish landings. Trip limits have been used to stay with fishery allocations since before 1994. Allocation overages have generally not been a problem except for lingcod (in all years since 1995) and sablefish in 2005 and 2006 (**Table 1-3; Figure 1-2**). The vessel registration requirement and species endorsement alternatives under A-6 could help in more accurately projecting fishery harvest levels for both of these species. Overall, no change in impact to groundfish species or protected groundfish species would be expected under A-6 or any of its species endorsement alternatives.

4.6.2.2 Non-groundfish Species (State-managed or under other FMPs)

Open access fishery landings of and participation levels by open access vessels on non-groundfish species are described in **Section 3.2.2**. The non-permitting of previously active B species directed fishery vessels under any of the B permit alternatives would likely result in effort shift by non-permitted vessels to associated fisheries (e.g., Dungeness crab, albacore). Under A-6 only 100 vessels that made a directed fishery landing during 2004-2006 window period years would not qualify for a B permit and between 562 and 766 vessels would not receive a sablefish or lingcod species endorsement (**Appendix I, Table I-1a**). Associated species landings by vessel that would not qualify for a B permit under A-6 represented 98.5 percent and 99.9 percent of their commercial fishery revenues during 2004-2006 window period years (**Appendix I, Table I-1a**). Thus non-qualifying vessel would have had to increase landing revenues of associated commercial fish species by from 0.1 percent to 1.5 percent, depending on species endorsement alternative, to make up for lost B species revenues due to B permit non-qualification. However, non-qualifying vessels might have been allowed to land small amounts of B species groundfish caught incidental to fishing for other commercial species under C permit regulations, which would have compensated for some or all of their potential revenue loss stemming from permit or species endorsement non-qualification. Overall, no change in impact to non-groundfish species would be expected under A-6 or any of its species endorsement alternatives because of the small number of vessels that would not qualify for a B permit and the very low dependence of these vessels on B species groundfish..

4.6.2.3 Prohibited Species

Prohibited species (Pacific salmon, Pacific halibut and Dungeness crab) regulations and relative impacts in open access fisheries are generally described in **Section 3.2.3**. The bycatch and discard of salmonids and Dungeness crab has been shown to be very low in the sablefish endorsed long-line and trap fisheries north of Cape Mendocino, but significant for Pacific halibut in the long-line fishery (46.5 lbs/ 100 lbs of sablefish retained in 2006) **(Table 3-4a and 3-4b).** Observations in the non-sablefish endorsed long-line fishery south of Cape Mendocino in 2006 showed no bycatch of prohibited species (**Table 3-4c).** Limited entry (A permit) bycatch rates are likely similar to those that occur in the open access fishery longline and fishpot fisheries, depending on area of the coast. If capacity and participation in the groundfish fishery were reduced by this action, bycatch of Pacific halibut could in turn be reduced. However, no change in fishery capacity or participation level would be expected under A-6, as described in subsections 4.6.2.1 and 4.6.2.2, thus no change in impact to prohibited species would be expected under A-6.

4.6.2.4 Protected Species

Protected species (listed salmonids, marine mammals, seabirds, turtles and green sturgeon) biological characteristics and fishery management concerns are generally described in **Section 3.2.4**. The 2005-06 groundfish harvest specifications EIS did not find that the proposed regulations (for limited entry and open access fisheries) would result in significant impacts to protected species, based on a qualitative evaluation of the alternatives. No change in level of impact of open access fishery vessels on protected species would be expected under this alternative because overall groundfish effort and groundfish impact is likely to be the same as recent years, as explained in sub-sections 4.6.2.1 and 4.6.2.2

4.6.3 Effects on the Socioeconomic Environment

4.6.3.1 Management Structure of the Open Access Fishery

The open access fishery management structure is described in **Section 3.3.1**. Permitting of open access fishery participants would facilitate projection of open access fishery landings and impacts, which could lead to better utilization of harvestable resources and protection of overfished groundfish species.

It is expected that fisheries would continue to be managed under A-6 using trip and cumulative landing limits with the aim of providing for year round fishing. The existing regulatory structure and regulatory tables would seem to be appropriate for regulating B permit vessels, but would need to be expanded to cover species-endorsed and species non-endorsed vessels (**Table 4-5)**. Separate trip limit regulations would likely be needed for C permit vessels to allow for small landings of some or all federal groundfish species caught incidental to fishing for non-groundfish species (see **Table 4-2).**

Table 4-5. Itemization of possible modifications needed to Table 5 to Part 660, subpart G-Trip limits for B permit vessels under Alternative 6 species endorsement alternatives 1/

Rockfish Conservation Areas	Boundaries vary by area, time of yr, and gear type used
Minor slope rockfish & darkblotched rockfish	<25% of sablefish landed except for Conception area
Sablefish-endorsed vessels	Daily/weekly/ 2-mo landing limits apply
Sablefish-non-endorsed vessels	NEED TO DETERMINE
Thornyheads	Closed except for Conception area
Flatfishes	300 lb/ mo except for Pac sanddab
Whiting	300 lbs/ mo
Shelf rockfish (minor and non-overfished)	≤1000 lbs/ mo depending on time and area
Canary and yelloweye rockfish, cowcod (south)	Closed
Bocaccio (south)	≤200 lbs/ 2-mo depending on time of year and area
Minor nearshore rockfish and Black rockfish	Variable between species and areas
Lingcod-endorsed vessels	400 lbs/ mo (May-Nov only)
Lingcod-non-endorsed vessels	NEED TO DETERMINE
Pacific cod	1000 lbs/ 2-mo
Spiny dogfish	100K-200K/ 2-mo
Other fish	Not limited
Non-groundfish trawl groundfish limits	
Pink shrimp	500-1500 lbs/ trip; lingcod, sablefish, and overfished species bans apply
CA halibut, prawn and cucumber	300 lbs/ trip; various other restrictions
Salmon troll-yellowtail rockfish (north, not subject RCAs)	1 lb/ 2 lbs salmon; 200 lbs/ mo

1/ Open access gear includes all gear types except (1) long-line or trap gear to which an A permit gear endorsement is attached and (2) groundfish trawl (72 FR 69162, December 7, 2007)

4.6.3.2 Catch Characteristics

Catch characteristics of the open access fisheries are generally described in **Section 3.3.2**. The incidental fishery has taken a declining and small (6-25 percent) proportion of the annual open access fishery tonnage during 1998-2006 window period years (**Table 3-2a**). Most of the incidental harvest has been made in the non-groundfish trawl fishery sector (62 percent), except in recent years when it has been fairly equally divided between the Pacific halibut, California setnet and non-groundfish trawl fisheries (**Table 3-3**). The directed fishery has involved a large proportion of the open access vessels (**Figure 3-2**) and has taken a large majority of the fish (**Figure 3-3**). The most valuable species to the fishermen in the directed fishery (which does not include nearshore species) has transitioned from one dependent on shelf rockfish to one dependent on sablefish (**Figure 3-4**). The directed fishery has had a high vessel turnover rate (**Table 3-6**), and most of the individual vessels have accrued very small (<1 mt) B species groundfish tonnage and revenue histories **(Tables 3-8-2 and 3-9**). Most of the directed fishery vessels have been based in California ports (66 percent), followed by Oregon and Washington ports (26 percent and 8 percent, respectively), although the Oregon and Washington proportions increased slightly (3 or 5 percentage points) between the 1998-2003 and 2004-2006 window period years (**Table 3-10**),

A-6 would add an estimated 54 vessels, with very low catch histories of B species groundfish (0.1 percent of 2004-2006 window period directed fishery poundage), to the incidental fishery fleet under A-6. This would bring the incidental fleet to about 224 vessels (**Appendix I).** Thus A-6 is not estimated to have a substantial impact to the catch characteristics of the incidental fishery fleet because of the very low fishery impact of the non-permitted directed fishery vessels.

A-6 would qualify more directed fishery vessels (1,003, **Appendix I, Table I-1a**) than participated in the open access directed groundfish fishery in any year during the window period by 102 vessels (**Table 2-6).** The species endorsement alternatives would qualify between 99 percent and 199 percent the number of vessels that harvested sablefish or lingcod during 2004-2006 window period years (**Appendix I, Table I-1a; Table 2-5)**. The B species landings during 2004-2006 window period years by vessels that would qualify for a B permit under this alternative and for each of its species endorsement alternatives ranged from 99.2 percent to 99.9 percent of actual landings during 2004-2006 window period years (**Appendix I, Table I-1a)**.

A-6 would preclude new fishery entrants except via permit transfers after the first program year. The permit transfers could be quite active beginning in the second program year, but would then likely begin to taper off as the fishery stabilized. The expectation is that A-6 would eventually halt the previous high fishery turnover rate and lead to larger fishery catch history accumulations by the fishery participants. The fishery would likely continue to depend on sablefish as the major source of fisherman revenue for many years because of the depressed statis of key shelf rockfish stocks, which may take many years or decades to rebuild to viable fishery status.

Permit transfers may affect the future distribution of B permits between port groups and states. Future market conditions, for example, may favor some port groups over others because of differing product transportation, offloading and/or vessel operating costs. Fishing regulation and fish stock status changes could also influence the distribution of permits between areas. There is a myriad of potential permit distributional scenarios associated with any new limited entry program.

4.6.3.3 Vessel Characteristics

Vessel characteristics are described in **Section 3.3.3**. The incidental open access fishery has involved vessels with directed fishing effort aimed at a variety of West Coast non-groundfish species using a variety of gear types. The ones having greatest impact on groundfish stocks have been pink shrimp trawl, California halibut trawl, Pacific halibut longline, salmon troll and California set net. There have been several other fisheries with much lower fishery impacts, which are listed in **Table 3-3**.

The vessels used by directed fishery owners have been mostly less than 30 ft in length except in Washington where the median length was 40-44 ft (**Table 3-11)**. The directed fishery participants primarily used hook and line gear (87 percent) except that pot gear increased in importance in recent years (from 7 percent to 16 percent) (**Table 3-10**).

A-6 does not propose to change the make up of vessels that previous took B species groundfish incidental to target fishing for non-groundfish species. However, A-6 may involve a few new vessels in the incidental fishery, ones that previously made directed fishery landings but did not qualify for a B permit and do not possess a state-issued nearshore permit (54, **Appendix I)**. The only new requirement of the incidental fishery would be that incidental fishery vessels become registered to a non-transferable C permit. The C permit registration requirement is expected to improve the accuracy of incidental fishery landing projections on an in-season basis. It is estimated that a maximum of about 224 vessels may need to apply for C permits in order to take small amounts of B species groundfish incidental to fishing for non-groundfish species (**Appendix I).**

The proposed B permit program would not allow for new fishery participants except via permit transfers after the first program year. An estimated 1,003 vessel would qualify for a B permit under A-6. The proposed B permit program does not have a gear endorsement provision, thus it is possible that gear type usage may change in the fishery over time. Recent trend data, for example, indicate that pot gear usage has increased in the fishery. Average size of vessel in the fleet could also change under A-6 because there is no vessel length endorsement provision. Small vessel owners, for example, might be inclined to upgrade to a larger vessel or transfer (e.g., sell) their permit to an owner of a larger vessel who has an overall larger capital investment in commercial fishing. Fishery attrition stemming from permit non-renewal could also affect size of vessel in the fleet if owners of smaller vessels, for example, were more inclined to not renew their permits because of lower capital investment in the fishery (i.,e their vessels do not cost as much as larger vessels). The recent VMS requirement of open access vessels could provide added incentive for smaller vessel owners to sell their permits because of the relatively high cost of VMS operation to a small vessel owner. The increased use of pot gear in the fishery could also contribute to increased average size of vessel in the fleet because larger deck space needed to handle and transport typical fishpot gear used in the fishery.

4.6.3.4 Processor Characteristics

Process characteristics are described in **Section 3.3.4**. B species groundfish buyers have been widely distributed between coastal port groups during window period years. A large majority (75 percent in 2006) were located in California (**Table 3-15**). B species landings have contributed relatively small revenues (<10 percent but usually <4 percent) to coastal port group fishermen. For individual states, fisherman revenues ranged from 0.9 percent to 1.3 percent of total commercial fisherman revenues during 2004-2006 window period years (**Table 3-16)**.

As explained in above sections, A-6 would not substantially affect future participation by vessels that recently participated in incidental or directed fisheries for B species groundfish. However, the potential exists, long-term, for redistribution of vessels between port groups or states due to permit transfers. This redistribution of permits, discussed in subsection 4.6.3.2, could also impact buyers' access to locally caught fish. Because of the relatively small size of the B species directed fishery compared to other commercial fisheries along the coast no substantial impact to fish processor characteristics could be expected under A-6.

4.6.3.5 Participation Requirements, Restrictions, Licensing

Participation requirement, restriction and licensing are described in **Section 3.3.6.** Adoption of this alternative would require vessel owners that qualify for a B permit to submit application to NMFS to obtain their initial permit and to apply for permit renewal each year thereafter, but there would be no annual fishery participation requirement (**Table 2-3**). Vessel owners would be allowed to register their B permit to a different vessel after the first program year. Vessel owners that seek a C permit would be required to submit application for permit issuance, but there would be no federal qualification requirements for permit issuance except for possession of state-issued commercial fishing vessel registration. Vessel owners would be required to obtain appropriate permit types before any directed or incidental fishing takes place.

Owners of A and B permits would be allowed to use both permit types alternately in the same year, but not in the same cumulative landing period. There would be an advance notice requirement to switch permit types between cumulative landing periods.

4.6.3.6 Revenue/Costs to the Participants and to State and Federal Governments

These issues are discussed in **Section 3.3.7**. For both B and C permits under A-6, NMFS would charge a fee to cover the range of administrative costs incurred by NMFS in issuing, renewing, transferring, appealing and replacing permits. The current A permit renewal fee is $125. Vessel owners would be required to register their vessel with NMFS in advance of participating in the fishery. In order to provide NMFS with adequate time to complete a vessel registration, vessel owners would need to submit to NMFS an application at least 30 days in advance of the date the vessel owner wishes to begin participation in the fishery.

Adoption of any alternative that requires federal licensing or permitting of current open access vessels to take and possess specified federal groundfish may require that those vessels participate in the federal groundfish fishery vessel monitoring program (VMS program) when fishing for specified federal groundfish in federal or state waters. Some current open access fishermen may not seek to participate in the VMS program because of program cost, and intend to commercially fish for and take specified federal groundfish in state waters only where VMS program participation may not be required. Federal groundfish registration might compromise that strategy. Adoption of any alternative that requires federal licensing or permitting may increase the probability of a vessel being selected to participate in the Pacific Coast Groundfish Observer Program. There is an added cost to vessel owners to carry a federal observer on their vessel.

4.6.3.7 Groundfish-dependent Communities

Groundfish-dependent communities are discussed in **Section 3.3.8**. Impact of the proposed B and C permit programs on recent fishery participants are discussed in subsection 4.6.2.1 and the reliance of coastal port groups on the directed fishery is discussed in subsection 4.6.3.4. Because of the relatively small size of the B species directed fishery compared to other commercial fisheries in the WOC management area no substantial impact to coastal communities would be expected under A-6.

NMFS completed an Environmental Impact Statement (EIS) in 2006 that included a comprehensive analysis of Pacific Coast groundfish fishing communities and their engagement in various groundfish fisheries. Most Pacific Coast fishing ports with groundfish landings have some vessels that land open access groundfish. Appendix A to the EIS evaluated fishing communities for their dependence on groundfish resources and for their vulnerability to changes in availability of groundfish harvest. A-6 would not alter the overall available groundfish harvest, and would disallow only 9 percent (100 of 1, 103) of the lowest producing vessels from B permit issuance and would offer the remaining vessels a potentially valuable license to participate in the directed fishery in future years. Port cities that Appendix A of the EIS identified as both having some history of open access groundfish landings and a relatively higher dependency on availability of groundfish resources are: Astoria, Bellingham, Brookings, Coos Bay, Crescent City, Eureka, Fort Bragg, Morro Bay, Newport, Port Orford, and San Francisco.

4.6.3.8 Environmental Justice

The factors to be considered with regard to environmental justice are described in **Section 3.3.9.** This action has low potential for significant impact as it does not target low income or minority communities; it would affect all population segments equally. Some Pacific Coast fishing communities have open access fishery participants that are not native-English speakers, but few of them participate in the fishery management process. Fishing families from these same communities also participate in the limited entry groundfish fishery, so there are within-community networks of translators. NMFS has not historically translated its groundfish fishery regulations from English into other languages. Some of the communities with relatively high open access fishery landings are considered vulnerable to shifts in groundfish fishing opportunity, although open access landings themselves may not make up the majority of groundfish fishing income to the community. This action does not alter or affect tribal treaty rights to or tribal allocations of groundfish.

4.7 Cumulative Effects

This section addresses issues that potentially impact open access groundfish fishermen and vessel owners and the proposed open acces license limitation program under qualification criteria contained in alternatives 3-6.

4.7.1 Conservation Area Impacts

These large area closures, described in **Appendix G**, are aimed at protecting overfished groundfish species in federal waters since 2001. They have caused fishermen to leave the fishery or shift effort to other fisheries, most of which are already fully exploited and/or depressed. The closures have greatly reduced open access fishery harvest opportunities for shelf rockfish species, which historically were a mainstay of the B species directed fishery, as shown in **Table 3-5**. Possible non-permitting of previous directed open access fishery participants could have an added impact to coastal communities that have already been impacted by conservation area closures.

4.7.2 Increased Vessel Operating Cost

Vessel fuel cost rose substantially in 2008 (**need to show fuel data, need help here)**, which likely caused vessel owners to reduce or discontinue fishing or to make shorter, less efficient fishing trips. Fuel costs have since declined, but the reduction may be only temporary. Fluctuating fuel prices affect profits of large (>30 ft) vessel owners more than small vessel owners because groundfish trip limits do not differentiate based on vessel size. Alternatives that would increase vessel trip limits would help offset the impact of increased fuel cost, particularly for large vessel owners.

4.7.3 Trawl Buyback Program

This program has reduced the trawl fleet size, but will not affect landings. WOC impacts are expected to be positive because of larger trawl vessel trip limits and improved vessel efficiencies. This is an issue that does not appear to conflict with the proposed B permit program, but is worthy of note (see: http://www.trawl.org/Archived%20Papers/NMFS%20post-Buy-back%20report.PDF)

4.7.4 Salmon Fishery Reductions

Salmon has historically been a mainstay fishery of WOC coastal fishing as far south as the Morro Bay port group. During 1998-2006 WOC salmon fishery revenues averaged $14.8 million (range $5.5 million to $29.9 million) (**Table 4-6; Figure 4-6**). Salmon is also an important species to B species directed fishery vessels involving 37 percent of the vessels and contributing 13 percent to their fishery revenues during 2004-2006 (**Table 3-12a**). Management concerns for endangered or key salmon stocks have reduced salmon fishing opportunities at most coastal ports in a historical context. Beginning in 2006, salmon fishing opportunities off Oregon and California were further reduced or eliminated in some areas due to depressed status of key salmon stocks (PFMC Salmon Preseason Reports for 2006-2008). Salmon fishery revenues in 2006 and 2007 were 59 percent ($9.1 million) and 75 percent ($11.6 million) of the 1998-2005 average; and 2008 revenues were only 12 percent ($1.9 million, mostly off Washington) of the 1998-2005 average (**Table 4-6; Figure 4-6)**.

The 2006-2008 fishery season reductions likely displaced some fishers to other fisheries, such as open access sablefish, and increased their dependence on other mainstay fisheries such as Dungeness crab, Highly Migratory Species (albacore) and nearshore groundfish. In response to the depressed salmon situation, The United States Congress authorized $60.4 in 2007 and additional $170 million in 2008 to aid salmon fishermen and related business that were affected by the 2006-2008 salmon fishery reductions (**Randy Fisher confirmation has been requested**).

Table 4-6. WOC salmon, Dungeness crab, HMS and nearshore groundfish commercial fishery revenues (000s), 1998-2008

	Salmon 1/	D crab 2/	HMS 2/	Nearshore GF 2/
1998	$5,480	$35,709	$24,171	$3,643
1999	$9,226	$68,341	$23,663	$3,670
2000	$13,625	$63,209	$22,783	$3,981
2001	$9,877	$52,997	$24,262	$3,927
2002	$13,924	$59,593	$17,257	$3,521
2003	$20,394	$117,758	$28,223	$2,366
2004	$28,999	$103,182	$29,582	$2,760
2005	$22,706	$84,191	$23,117	$2,714
2006	$9,096	$130,511	$26,825	$2,712
2007	$11,625	$105,000	$25,252	$3,070
2008	$1,903	$83,603	$30,710	$3,242
1998-2005 AVG	$15,529	$73,123	$24,132	$3,323

1/ PFMC, Historical Tables D-4, D-5 and D-6 for 1998-2007; PacFin extract for 2008
2/ PacFin extract for WOC ocean landings for specified groups

4.7.5 Dungeness Crab Revenues

Dungeness crab (DC) is the single-most important fishery resource in most years to WOC coastal fishermen as far south as the Monterey Bay port group. Fisherman revenues averaged $73.3 million (range $35.7 million to $117.8 million) during 1998-2005 (**Table 4-6; Figure 4-6**). DC is an important species to B species directed fishery vessels with participation by 37 percent of directed fishery vessels and contribution of 54 percent to their commercial fishery revenues during 2004-2006 window period years (**Table 3-12a**). DC landings in 2006-2008 were above the 1998-2005 average in all three years by from 14 percent to 78 percent ($10.5 million to $57.4 million) (**Table 4-6; Figure 4-6**).

4.7.6 Highly Migratory Species Revenues

Albacore tuna is the most important highly migratory species available to WOC coastal fishing communities. During 2004-2006 window period years, 32 percent of B species directed fishery vessel landed HMS, which contributed 9 percent to their total commercial fishery revenues (**Table 3-12a**). Fishermen revenues of HMS averaged $24.1 million (range $17.3 million to $29.6 million) during 1998-2005 (**Table 4-6; Figure 4-6**). During 2006-2008, HMS annual revenues were 5 percent to 27 percent ($1.1 million to $6.6 million) above the 1998-2005 average (**Table 4-6; Figure 4-6**).

4.7.7 Nearshore Groundfish Species Revenues

Nearshore groundfish landings are substantially affected by state regulations of the three coastal states. Washington does not allow commercial fishing in state waters where most nearshore species are found while Oregon and California establish landing limits that are generally more restrictive than federal regulations). During 2004-2006, 47 percent of B species directed fishery vessels participated in fisheries for nearshore species, which contributed 6 percent to their total commercial fishery revenues (**Table 3-12a**). Nearshore landings during 1998-2006 were generally declining, from $4.0 million in 2000 to $2.7

million in 2006. Revenues then increased to $3.0 million in 2007 and $3.2 million in 2008. The 2008 revenues were 98 percent of the 1998-2005 average (**Table 4-6; Figure 4-6).**

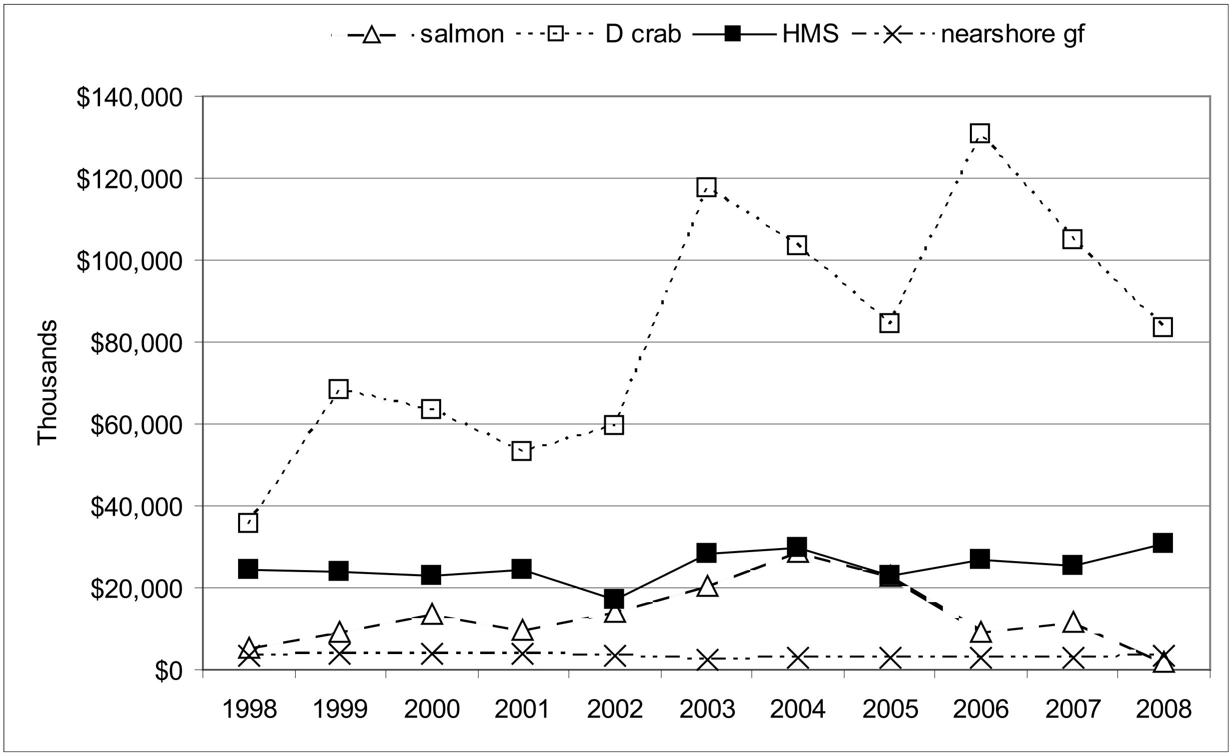

Figure 4-6 WOC fisherman revenues for species of major importance to B species directed fishery vessels, 1998-2008

4.7.8 Possible Long-term Negative Impact of B Permit Redistributions

One possible negative impact of the B permit program would be the redistribution of directed fishery vessels between port groups or states stemming from permit transfers. Permit holders that have low dependence on the fishery or have decided to retire from the fishery may be inclined to sell their permits to vessels owners that seek to actively participate in the fishery. These new permit holders may or may not fish in or deliver fish to the same port groups as the previous owners. Future permit transfers could cause clumping of permits in some port groups and the partial or total loss of permitted vessels in others, with important community impacts associated with either scenario. Also, expiration of permits due to permit non-renewal could exacerbate the situation for port groups that have a high proportion of permit holders that have low dependence on the fishery.

4.7.9 Possible VMS and Observer Program Impacts

Adoption of any alternative that requires federal licensing or permitting of current open access vessels to take and possess specified federal groundfish may require that those vessels participate in the federal groundfish fishery vessel monitoring program (VMS program) when fishing for specified federal groundfish in federal or state waters. Some current open access fishermen may not seek to participate in the VMS program because of program cost, and intend to commercially fish for and take specified federal groundfish in state waters only where VMS program participation may not be required. Federal groundfish registration might require all federally permitted groundfish vessels to participate in the VMS program. Furthermore, adoption of any alternative that requires federal licensing or permitting may increase the probability of a vessel being selected to participate in the West Coast Groundfish Observer Program. There is an added cost to vessel owners to carry a federal observer on their vessel.

4.7.10 Trawl Fishery IQ Program Impact

Implementation timing of the open access groundfish fishery permit program could be very close to implementation timing of the trawl fishery individual quota program, which, together, or separately might have, or perceived to have cumulative negative impacts to some communities. This is because not all fishers and businesses that associate with groundfish management will be receptive of or in agreement with the outcome of one or both initiatives. Fish processors at some ports might feel negatively effected, while processors in other ports might anticipate improved conditions resulting from one or both initiatives. NMFS License Office will be concerned about the complexity of the two new programs and their ability to handle the added work load and cost using existing resources. Additional staff may be needed to handle two new programs, whereas existing staff might be able to handle one or the other program.

4.7.11 Added Groundfish Fishing Regulation Impacts

Open access fishery groundfish management is already complicated because of separate A permit (Limited Entry) and open access fishery regulations coupled with the need to regulate both directed and incidental open access fishery gear types. Open access fishing regulations are broken down by area and depth fished, species or species group targeted, time of year, and gear type used (**Table 4-5).** The proposed B and C permit programs would expand upon an existing tier of open access fishery regulations: incidental fishery regulations for non-groundfish trawl and yellowtail rockfish in the salmon troll fishery. The incidental fishery tier would need to cover vessels that previously were involved in the directed open access fishery and that did not qualify for B permits and that may wish to take small amounts of groundfish incidental to fishing for non-groundfish species. The expanded tier would continue to cover fisheries that were allowed to take small amounts of groundfish using incidental fishery gear types (e.g., non-groundfish trawl and salmon troll).

4.7.12 Assessment of Cumulative Impacts to B permit Program Implementation

Coastal fishermen and communities were negatively impacted by the 2006-2008 salmon season reductions, particularly in 2008 when the coast was closed off California and most of Oregon (PFMC Preseason Salmon Report 3 for 2008). The salmon fishery reductions led to large appropriations of money by the U.S. Congress in 2007 and 2008 to aid the fishermen and related businesses. The 2007 monies were fully expended and the 2008 funds are likewise expected to fully utilized (**need Randy Fisher to confirm).**

The salmon fishery reduction likely caused some fishers to increase their dependence on other fisheries to maintain their fishery revenues, assuming government salmon funds did not mitigate for reduced salmon fishery revenues. Above average Dungeness crab and HMS revenues during 2006-2008 helped in that regard. However it should be noted that not all fishermen hold state-issued salmon, Dungeness crab and nearshore permits, thus may not be able to shift effort to those other fisheries. Also, small boat (<30 ft) fishermen are hindered in fishing for Dungeness crab and albacore because of travel distance, weather condition, deck space, and hold capacity limitations. Distributional or abundance differences of these species likely varied between years and coastal areas with resulting variable affects on local fishing fleets.

The other cumulative impact issues, discussed above, do not appear to have nearly the same impact or relevance, taken separately or in total, to the open access fishery license limitation proposal as the depressed salmon fishery situation. Some salmon fishermen have entered the open access directed fishery since 2006 and do not have catch history credits that would qualify them for a B permit under the criteria contained in alternative 3-6. A turnaround in the status of WOC salmon stocks could result in less dependence of salmon fishermen on open access groundfish. When that might occur is difficult to project based on the available information. **(what about 2009?)**

5.0 CONSISTENCY WITH THE FMP AND OTHER APPLICABLE LAWS

5.1 CONSISTENCY WITH THE FMP

(Under development)

5.2 MAGNUSON-STEVENS CONSERVATION AND MANAGEMENT ACT

(Under development)

5.3 ENDANGERED SPECIES ACT

(Under development)

5.4 MARINE MAMMAL PROTECTION ACT

(Under development)

5.5 COASTAL ZONE MANAGEMENT ACT

(Under development)

5.6 PAPERWORK REDUCTION ACT

(Under development)

5.7 EXECUTIVE ORDER 12866

(Under development)

5.8 EXECUTIVE ORDER 13175

(Under development)

5.9 MIGRATORY BIRD TREATY ACT AND EXECUTIVE ORDER 13186

(Under development)

5.10 EXECUTIVE ORDER 12898 (ENVIRONMENTAL JUSTICE) AND 13132 (FEDERALISM)

(Under development)

6.0 REGULATORY IMPACT REVIEW AND REGULATORY FLEXIBILITY ANALYSIS

(Under development)

6.1 Regulatory Impact Review

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. The RIR provides a review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the alternative action that could be used to solve the problems.

The RIR analysis and the environmental analysis required by NEPA have many common elements, including a description of the management objectives, description of the fishery, statement of the problem, description of the alternatives and economic analysis, and have, therefore, been combined in this document. See Table 6.0.1. above for a reference of where to find the RIR elements in this EA.

6.2 Initial Regulatory Flexibility Analysis

The RFA, 5 U.S.C. 603 et seq., requires government agencies to assess the effects that various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. When an agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an IRFA that describes the impact on small businesses, non-profit enterprises, local governments, and other small entities. The IRFA is to aid the agency in considering all reasonable regulatory alternatives that would minimize the economic impact on affected small entities. To ensure a broad consideration of impacts on small entities, NMFS has prepared this IRFA without first making the threshold determination whether this proposed action could be certified as not having a significant economic impact on a substantial number of small entities. NMFS must determine such certification to be appropriate if established by information received in the public comment period.

The Small Business Administration (SBA) uses the following definitions to identify small businesses:

- Fish Harvesting: ≤ $4.0 million annually
- Fish Processing: ≤ 500 employees
- Wholesale: ≤ 100 employees

Also, the business is not dominant in its field of operation.

Fish Harvesting
In 2006, there were 713 vessels that participated in the open access fishery, excluding incidental catches and nearshore species, which accounted for about $3,100,000. The past five year average (2002-2006) included about 699 vessels, which accounted for about $2,600,000. Therefore, approximately 700 vessels would be affected by this amendment and the vast majority if not all vessels earn less than $4.0 million annually from this fishery and consequently would be considered small businesses. Most fishermen do fish in multiple fisheries and may possibly own more than one vessel. The total revenue, including multiple vessels and various fisheries earned by a fishermen, is what is used to determine small business eligibility. Historically, on the Pacific Coast, most fishermen earn well under $4.0 million annually. In 2004, for example there were a total of 3,622 unique vessels that participated in Pacific Coast commercial fishing with a total revenue of $366 million (Groundfish spex document, October 2006), which averages to about $100,000/vessel. There may be some exceptions, such as if a company owns multiple vessels, but that data is not readily available.

Because, the vast majority, if not all, participants are considered small businesses, there would not be a disproportionate effect on small entities compared to large entities. All of the alternatives presented in this amendment with the exception of the No-action alternative would have an impact on the profitability of the participants; however, as stated previously most vessels participate in various fisheries and because the open access groundfish fishery is a small portion of all other fisheries (<0.3 percent by weight), the impacts should be minor.

Fish Processing and Wholesale
State data from the United States Census Bureau was retrieved in order to estimate how many fish processing and wholesale establishments may be affected by this amendment and which ones would be defined as a small business.

The following table shows number of fresh and frozen seafood processing (**NAICS industry code 311712**) establishments by employment size class.

		Number of Establishments by Employment-size class								
State	Total Estabs	1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000 or more
CA	31	8	2	3	6	4	6	2	0	0
OR	17	5	2	2	3	2	3	0	0	0
WA	72	11	4	5	17	17	16	2	0	0
Total	120	24	8	10	26	23	25	4	0	0

Source: United States Census Bureau 2005 County Business Patterns (NAICS), Year 2005 Data Extracted: 9/27/07

Using the data above, all 120 establishments would be considered a small business. However, all of these processing facilities may not process groundfish. There is no breakdown in the data on which fish species each processing plant works with and further, establishments are defined as:

An establishment is a single physical location at which business is conducted or services or industrial operations are performed. It is not necessarily identical with a company or enterprise, which may consist of one or more establishments. When two or more activities are carried on at a single location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity and all data are included in that classification.

Yet when determining if a business is small based on SBA standards, the employees of the business, including all of its affiliates regardless of the types of other businesses is accounted for. Therefore, 120 would be the maximum number of small fish processing businesses. The Groundfish Spex document, October 2006, provides business descriptions for three of the top ten seafood suppliers in the United States that participate in Pacific Groundfish Fisheries: Pacific Seafood Group, Trident Seafood Corp. and American Seafoods Group. All three of these companies have multiple Pacific Coast facilities. Trident Seafoods has 5 plants in Oregon and Washington combined with over 820 employees (www.tridentseafoods.com) and therefore those 5 plants would not be considered a small business. Further, Pacific Seafood Group has 22 (www.pacseafood.com) locations (processing, distribution and office facilities) located in WA, OR and CA combined, with other facilities beyond the Pacific Coast States. We do not have specific data to show what each facility does and how many employees they have, but www.hoovers.com, shows a total of about 1,000 employees within all of Pacific Seafood Group. These are just two examples of multiple facilities owned by one company that when combined, do not fit the definition of a small business.

Because of data limitations, an exact number of small business processing facilities that would be affected by this amendment cannot be identified; however, as stated previously, the open access groundfish fishery is a small fishery in comparison to all other Pacific Coast fisheries and consequently it is likely that processing companies do not rely on this fishery for the majority of their income.

The following table shows number of fish and seafood merchant wholesalers (NAICS industry code 42446) establishments by employment size class

		Number of Establishments by Employment-size class								
State	Total Estabs	1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000 or more
CA	258	130	45	29	36	13	4	0	1	0
OR	23	16	2	3	1	1	0	0	0	0
WA	126	81	20	10	10	3	2	0	0	0
Total	407	227	67	42	47	17	6	0	1	0

Source: United States Census Bureau 2005 County Business Patterns (NAICS), Year 2005 Data Extracted: 9/27/07

Using the above data, about 400 wholesalers would be considered a small business, but yet again, for reasons identified above this would be a maximum number, because all of the establishments identified in the table may not distribute groundfish obtained in the open access fishery and some establishments may be part of a larger company that when combined would not fit the small business definition.

Because of data limitations, an exact number of small business wholesale facilities that would be affected by this amendment cannot be identified; however, once more, the open access groundfish fishery is a small fishery in comparison to Pacific Coast fishing and it is likely that wholesale companies do not rely on this fishery for the majority of their income.

7.0 AGENCIES CONSULTED

California Department of Fish and Game
National Marine Fisheries Service, Southwest Region
Oregon Department of Fish and Wildlife
Pacific Fishery Management Council
Washington Department of Fish and Wildlife

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10.0 FINDING OF NO SIGNIFICANT IMPACT

(To be completed by NMFS) Example section follows.

See: http://swr.nmfs.noaa.gov/tuna/fonsi.pdf

Finding of No Significant Impact for Regulations Implementing Capacity Management in the Open Access Sector of the Pacific Coast Groundfish Fishery Recommended by the Pacific Fishery Management Council
______2009

The PFMC and NMFS, Northwest Region, prepared a draft Environmental Assessment (E A) for the proposed rule. The draft EA was available for public comment through ____2009. NMFS did not (did) receive any comments on the draft EA during the 30-day comment period. The EA prepared for the final regulations is largely unchanged from the draft EA.

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20,1999) contains criteria for determining the significance of impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity."

Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ context and intensity criteria.

These include:

(1) Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?

The proposed action is not expected to jeopardize the sustainability of any target species. The proposed action would be expected to limit to current levels or decrease the harvest of specified groundfish species by limiting the capacity of the U.S. open access fishery groundfish fleet operating off the U.S West Coast.

(2) Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?

The proposed action is not expected to jeopardize the sustainability of any non-target species. The proposed action may have the effect of decreasing the incidental take of these species by limiting the capacity of the West Coast open access groundfish fleet below past levels. Open access fishery permitting is expected to reduce the number of vessels that will be eligible to participate in the open access fishery, thus, increase the efficiency of the West Coast groundfish observer program, which monitors the take of non-target species.

(3) Can the proposed action be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Fishery Management Plans?

The proposed action is not expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat. The action proposes to limit the number of U.S. open access fishery groundfish vessels operating off the U.S West Coast. Impacts to ocean and coastal habitats associated with the action would be expected to decrease as a result of this limitation.

(4) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

The proposed action is not expected to have a substantial adverse impact on public health or safety. The proposed action is not expected to change current public health or safety conditions.

(5) Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

The proposed action is not expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species. The proposed action may have the effect of decreasing the incidental take of endangered or threatened species by limiting the capacity of the West Coast open access fishery groundfish fleet below past levels. Open access fishery permitting is expected to reduce the number of vessels that will be eligible to participate in the open access fishery, thus, increase the efficiency of the West Coast groundfish observer program, which monitors the take of endangered or threatened species.

(6) Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

The proposed action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. The action does not propose to change the way in which U.S. vessels currently fish. The proposed action would limit the capacity of the fleet operating in the West Coast open access groundfish fishery and may, as a result, limit any impacts on biodiversity and ecosystem function.

(7) Are significant social or economic impacts interrelated with significant natural or physical environmental affects?

Significant natural or physical environmental effects are not expected to result from the proposed action. Further, significant social and economic impacts are not expected to result from natural or physical environmental effects or any aspect of the proposed action.

(8) To what degree are the effects on the quality of the human environment likely to be highly controversial?

The proposed action would not change the way in which the U.S fishery is executed. It would only restrict the aggregate active capacity of U.S. vessels that can participate in the fishery each year. Other aspects of the proposed action are not expected to be controversial.

(9) Can the proposed action be reasonably expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

The proposed action is not expected to result in impacts to unique areas, such as those listed above.

(10) To what degree are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Any effects associated with the proposed action are relatively predictable and not highly uncertain.

(11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

The proposed action is not related to other actions with individually insignificant, but cumulatively significant impacts.

(12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historic resources?

The proposed action is not likely to impact anything listed in or eligible for listing in the National Register of Historic Places, expected to cause loss or destruction of significant scientific, cultural or historic resources.

(13) Can the proposed action be reasonably expected to result in the introduction or spread of a non-indigenous species?

The proposed action is not expected to result in the introduction or spread of a non-indigenous species.

(14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

The proposed action is not likely to establish a precedent for future actions with significant effects or represent a decision in principal about a future consideration.

(15) Can the proposed action be reasonably expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

The proposed action is not expected to threaten or violate Federal, State, or local law or requirements imposed for the protection of the environment. The proposed action implements U.S. laws and includes prohibitions against actions that undermine or impede enforcement of those laws.

(16) Can the proposed action be reasonably expected to result in beneficial impacts, not otherwise identified and described above?

The proposed action is expected to result in the following beneficial impacts: improved enforcement of U.S. laws; greater consumer confidence related to open access groundfish fishery management; and sustainability of target and non-target species as a result of implementing domestic fleet capacity limits.

DETERMINATION

In view of the information presented in this document and the analysis contained in the attached Environmental Assessment prepared for final regulations to implement recommendations of the PFMC it is hereby determined that the final regulations will not significantly impact the quality of the human environment as described above and in the Environmental Assessment. In addition, all impacts to potentially affected areas, including national, regional and local, have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environmental Impact Statement for this action is not necessary.

________________________Assistant Administrator for Fisheries, NOAA

11.0 OPERATIONAL TERMS

Acceptable Biological Catch (ABC): This is a biologically based estimate of the amount of fish that may be harvested from the fishery each year without jeopardizing the resource. It is a seasonally determined catch that may differ from MSY for biological reasons. It may be lower or higher than MSY in some years for species with fluctuating recruitment. The ABC may be modified to incorporate biological safety factors and risk assessment due to uncertainty. Lacking other biological justification, the ABC is defined as the MSY exploitation rate multiplied by the exploitable biomass for the relevant time period.

“A” permit: This is another term for the Council’s limited entry permit program for trawl and fixed gear vessels that was implemented under Groundfish Plan Amendment 6 which took effect in 1994. The limited entry or A permit fishery allocations are determined as part of the biennial management process.

B permit: A proposed new groundfish limited entry program. The program would allow owners of qualified open access vessels to obtain a federal permit to participate in the directed fishery for specified federal groundfish species that are allocated to the open access sector of the Pacific Coast groundfish fishery as part of the biennial specifications and management measures process.

B species groundfish. This is the group of federal groundfish that B permit vessels would be allowed to prosecute in federal and state waters, exclusive of the RCA and other conservation areas. It includes all federal groundfish exclusive of nearshore species (see below).

Biennial fishing period. This period is defined as a 24-month period beginning January 1 and ending December 31.

Biennial management/regulatory process: The Council sets groundfish harvest levels through a biennial regulatory process. This process establishes harvest “specifications”, which are harvest levels or limits such as Acceptable Biological Catches (ABCs,) optimum yields (OYs,) or allocations for different user groups. Management measures, such as trip limits, closed times and areas, and gear restrictions are also set in the annual regulatory process. Management measures are partnered with the specifications in the annual process because these measures are specifically designed to allow the fisheries to achieve, but not to exceed, the specifications harvest levels. Annual development of specifications and management measures, with regulatory review and implementation by NMFS, is authorized the FMP. Certain management measures have been designated as routine for many of the groundfish species managed under the FMP. The Council annually publishes a list of those management measures designated as routine in its Stock Assessment and Fishery Evaluation (SAFE) Report.

Bottom (or flatfish bottom) trawl. This is a trawl in which the otter boards or the footrope of the net are in contact with the seabed. It includes roller (or bobbin) trawls, Danish and Scottish seine gear, and pair trawls fished on the bottom. Bottom-contact gear by design, or as modified, and through normal use makes contact with the sea floor.

Bycatch. Bycatch means fish which are harvested in a fishery, but which are not sold or kept for personal use and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

C permit. A proposed new groundfish permit that would be issued to vessel owners that may want to take and land incidental amounts of B species groundfish.

Closure. When referring to closure of a fishery, means that taking and retaining, possessing or landing the particular species or species complex is prohibited.

Coastal Pelagic Species (CPS). CPS are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. They usually eat plankton and are the main food source for higher level predators such as tuna, salmon most groundfish and humans. Examples are herring squid, anchovy, sardine and mackerel.

Commercial fishing. Commercial fishing is (1) fishing by a person who possesses a commercial fishing license or is required by law to possess such license issued by one of the states or the federal government as a prerequisite to taking, landing, and/or sale; or (2) fishing which results in or can be reasonably expected to result in sale, barter, trade, or other disposition of fish for other than personal consumption.

Council. Council means the Pacific Fishery Management Council, including its Groundfish Management Team (GMT), Scientific and Statistical Committee (SSC), Groundfish Advisory Subpanel (GAP), and any other committee established by the Council.

Daily trip limit (DTL) fishery. The daily trip limit allowed for the sablefish fishery, unless otherwise specified.

Directed open access fishery landing: A directed open access fishery landing is one in which directed fishery gear was recorded as used and specified groundfish revenue was >50 percent of the total revenue from all fishery products on the same state agency landing receipt and recorded in the PacFIN data base of the Pacific States Marine Fisheries Commission.

Delivery. The act of transferring ocean caught fish from a vessel or fisherman to a shoreside location such as a buying station, customer or transportation vehicle.

Endangered Species Act (ESA). An act of federal law that provides for the conservation of endangered and threatened species of fish, wildlife, and plants. Councils are required when preparing FMPs to consult with the NMFS and USFWS to determine whether the fishing under an FMP is likely to jeopardize the continued existence of an ESA-listed species, or to result in harm to its habitat.

Endoresement. A designation on a groundfish permit that authorizes the use of the permit for a particular gear, length of vessel, or in a particular segment of the fishery.

Environmental Assessment (EA). An EA is a concise public document that provides evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact, as provided under the National Environmental Policy Act (NEPA).

Essential fish habitat (EFH). EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Exclusive Economic Zone (EEZ). A zone under national jurisdiction of up to 200 nautical miles wide within which the coastal state has the right to explore and exploit, and the responsibility to conserve and manage the living and non-living resources.

Fishery management plan (FMP). A plan, and its amendments, that contains measures for conserving and managing specific fisheries and fish stocks.

Fishing. Fishing means (1) the catching, taking, or harvesting of fish; (2) the attempted catching, taking, or harvesting of fish; (3) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of fish; or (4) any operations at sea in support of, or in preparation for, any activity described above. This term does not include any activity by a vessel conducting authorized scientific research.

Fishing year. The fishing year is defined as January 1 through December 31.

Fishing community. Fishing community means a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economy needs and includes fishing vessel owners, operators, crew, and recreational fishers and United States fish processors that are based in such community.

Fixed gear. Fixed gear (anchored nontrawl gear) includes longline, trap or pot, set net, and stationary hook-and-line gear (including commercial vertical hook-and-line) gears.

Final Regulatory Flexibility Analysis (FRFA). The FRFA includes all the information from the IRFA. Additionally, it provides a summary of significant issues raised by the public, a statement of any changes made in the proposed rune as a result of such comments, and a description of steps taken to minimize the significant adverse economic impact on small entities consistent with stated objectives.

Finding of No Significant Impact (FONSI). A finding of no significant impact (FONSI) is a document that explains why an action that is not otherwise excluded from the NEPA process, and for which an EIS will not be prepared, will not have a significant effect on the human environment.

Gear. A designation on a permit indicating the gear(s) that a vessel may use in the fishery. Permits may be endorsed for one or more gear types.

Groundfish Advisory Subpanel (GAP). The Council's GAP was established to obtain the input of the people most affected by, or interested in the management of the groundfish fishery. This advisory body is made up of representatives with recreational, trawl, fixed gear, open access, tribal, environmental, and process interests. Their advice is solicited when preparing FMPs, reviewing plans before sending them to the Secretary, reviewing the effectiveness of plans once they are in operation, and developing annual and inseason management recommendations.

Groundfish Management Team (GMT). The GMT prepares groundfish management plans and annual and inseason management recommendations. The GMT consists of scientists and managers with specific technical knowledge of the groundfish fishery.

Groundfish Conservation Area (GCA). This means a geographic area defined by coordinates expressed in degrees latitude and longitude, wherein fishing by a particular gear type or types may be prohibited. GCAs are created and enforced for the purpose of contributing to the rebuilding of overfished Pacific Coast groundfish species. Regulations at §660.390 define coordinates for these polygonal GCAs: Yelloweye Rockfish Conservation Areas, Cowcod Conservation Areas, waters encircling the Farallon

Islands, and waters encircling the Cordell Banks. GCAs also include Rockfish Conservation Areas or RCAs, which are areas closed to fishing by particular gear types, bounded by lines approximating particular depth contours. RCA boundaries may and do change seasonally according to the different conservation needs of the different overfished species. Regulations at §§660.390 through 660.394 define RCA boundary lines with latitude/longitude coordinates; regulations at Tables 3–5 of Part 660 set RCA seasonal boundaries. Fishing prohibitions associated with GCAs are in addition to those associated with 660.G 11 June 8, 2007 Essential Fish Habitat Conservation Areas, regulations which are provided at §660.306 and §§660.396 through 660.399. {revised at 71 FR 78638, December 29, 2006}

Gillnet. Gillnet is a single-walled, rectangular net which is set upright in the water.

Harvest guideline (HG). HG is an specified numerical harvest objective which is not a quota. Attainment of a HG does not require closure of a fishery.

Highly migratory species (HMS). These species have a wide geographic distribution, both inside and outside countries' 200-mile zones, and undertake migrations of significant but variable distances across oceans for feeding or reproduction. They are pelagic species, which means they do not live near the sea floor, and mostly live in the open ocean, although they may spend part of their life cycle in nearshore waters. They are harvested by U.S. commercial and recreational fishers and by foreign fishing fleets. Only a small fraction of the total harvest is taken within U.S. waters. The HMS Fishery Management Plan (FMP) authorizes the Council to actively manage the following species: Tunas (north Pacific albacore, yellowfin, bigeye, skipjack, and northern bluefin; Sharks (common thresher, pelagic thresher, bigeye thresher, shortfin mako, blue);Billfish/swordfish (striped marlin, Pacific swordfish); Other [dorado also known as dolphinfish and mahi-mahi)].

Hook-and-line. Hook-and-line means one or more hooks attached to one or more lines. Commercial hook-and-line fisheries may be mobile (troll) or stationary (anchored).

Hook-and-Line Gear. There is a variety of commercial fishing gear that uses hooks and lines in various configurations to catch finfish. These include longline, vertical hook and line, jigs, handlines, rod and reels, vertical and horizontal setlines, troll lines, cable gear and stick gear.

Initial Regulatory Flexibility Analysis (IRFA). An IRFA is required anytime an agency publishes notice of proposed rule making and the rule may have a significant impact on a substantial number of small entities. It describes the impact of the proposed rule on small entities and includes a description of the action, why it is necessary, the objectives and the legal basis for the action, the small entities that will be impacted by the action, and projected reporting, record-keeping, and other compliance requirements of the proposed rule. Rules that duplicate, overlap, or conflict with the proposed rule are also identified.

Incidental catch or incidental species. These terms refer to groundfish species caught when fishing for the primary purpose of catching a different species.

Individual fishing quota (IFQ). IFQ means a federal permit under a limited access system to harvest a quantity of fish expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person.

Limited entry fishery means the fishery composed of vessels registered for use with limited entry permits.

Limited entry gear means longline, trap (or pot), or groundfish trawl gear used under the authority of a valid limited entry permit affixed with an endorsement for that gear.

Limited entry permit means the Federal permit required to participate in the limited entry fishery, and includes any gear, size, or species endorsements affixed to the permit.

Longline. Longline is a stationary, buoyed, and anchored groundline with hooks attached, so as to fish along the seabed.

Magnuson-Steven Act. The Magnuson-Steven Conservation and Management Act or MSA , sometimes known as the “Magnuson-Stevens Act,” established the 200-mile fishery conservation zone, the regional fishery management council system, and other provisions of US marine fishery law.

Maximum sustainable yield (MSY). MSY is an estimate of the largest average annual catch or yield that can be taken over a significant period of time from each stock under prevailing ecological and environmental conditions. It may be presented as a range of values. One MSY may be specified for a group of species in a mixed-species fishery. Since MSY is a long-term average, it need not be specified annually, but may be reassessed periodically based on the best scientific information available.

Metric ton (mt). A metric ton is 1,000 kilos or 2,204.62 pounds.

Midwater (pelagic or off-bottom) trawl. Midwater trawl is a trawl in which the otter boards may occasionally contact the seabed, but the footrope of the net remains above the seabed. It includes pair trawls if fished in midwater. A midwater trawl has no rollers or bobbins on the net.

National Marine Fisheries Service (NMFS). A division of the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). NMFS is responsible for conservation and management of offshore fisheries and inland salmon. The NMFS Regional Director is a voting member of the Council.

Nearshore groundfish. These are groundfish species that primarily occur in state waters and federal waters less than about 300 ft in depth. The complex includes nearshore rockfish, cabezon and kelp greenling. State management or regulatory programs are in place to protect this important complex of federal groundfish species.

Nontrawl gear. Nontrawl gear means all legal commercial gear other than trawl gear.

Non-target species vessel. Any vessel whose B species revenues during 2004-2006 were ≤ 50 percent for a single species or species group are treated as non-target species vessels. The species categories are: sablefish, shelf rockfish, slope rockfish, lingcod, sharks (federal sharks and rays), and others.

Open access allocation: The total amount of groundfish available for harvest is determined as part of the biennial groundfish regulatory process. The commercial allocation is divided between the limited entry and open access sectors based on historic landing percentages (see Chapter 11.2.2 of the groundfish plan for more specific information).

Open access fishery means the fishery composed of vessels using open access gear fished pursuant to the harvest guidelines, quotas, and other management measures governing the open access fishery. Any commercial fishing vessel that does not have a limited entry permit and which lands groundfish in the course of commercial fishing is a participant in the open access fishery.

Open access gear means all types of fishing gear except:

(1) Longline or trap (or pot) gear fished by a vessel that has a limited entry permit affixed

with a gear endorsement for that gear.
(2) Trawl gear.

Open access gear is gear used to take and retain groundfish from a vessel that is not registered for use with a limited entry permit for the Pacific Coast groundfish fishery with an endorsement for the gear used to harvest the groundfish. This includes longline, trap, pot, hook-and-line (fixed or mobile), setnet (anchored gillnet or trammel net, which are permissible south of 38° N. lat. only), spear and non-groundfish trawl gear (trawls used to target nongroundfish species: pink shrimp or ridgeback prawns, and, south of Pt. Arena, CA (38°57.50' N. lat.), California halibut or sea cucumbers). Restrictions for gears used in the open access fisheries are as follows:

(1) Non-groundfish trawl gear. Non-groundfish trawl gear is any trawl gear other than limited entry groundfish trawl gear as described at §660.381(b) and as defined at §660.302 for trawl vessels with limited entry groundfish permits. Non-groundfish trawl gear is generally trawl gear used to target pink shrimp, ridgeback prawn, California halibut and sea cucumber. Non-groundfish trawl gear is exempt from the limited entry trawl gear restrictions at §660.381(b).

(2) Fixed gear.

(i) Fixed gear (longline, trap or pot, set net and stationary hook-and-line gear, including commercial vertical hook-and-line gear) must be:

(ii) Commercial vertical hook-and-line gear that is closely tended may be marked only with a single buoy of sufficient size to float the gear. “Closely tended” means that a vessel is within visual sighting distance or within 0.25 nm (463 m) as determined by electronic navigational equipment, of its commercial vertical hookand-line gear.

(iii) A buoy used to mark fixed gear under paragraph (b)(2)(i)(A) or (b)(2)(ii) of this section must be marked with a number clearly identifying the owner or operator of the vessel. The number may be either: {revised at 71 FR 78638, December 29, 2006}

(A) If required by applicable state law, the vessel's number, the commercial fishing license number, or buoy brand number; or

(B) The vessel documentation number issued by the USCG, or, for an undocumented vessel, the vessel registration number issued by the state.

(3) Set nets. Fishing for groundfish with set nets is prohibited in the fishery management area north of 38°00.00' N. lat.

(4) Traps or pots. Traps must have biodegradable escape panels constructed with 21 or smaller untreated cotton twine in such a manner that an opening at least 8 inches (20.3 cm) in diameter results when the twine deteriorates.

(5) Spears. Spears may be propelled by hand or by mechanical means.

Optimum yield (OY). OY means the amount of fish which will provide the greatest overall benefit to the United States, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems, is prescribed as such on the basis of the maximum sustainable yield from the fishery as reduced by any relevant economic, social, or ecological factor; and in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overfished. Overfished describes any stock or stock complex whose size is sufficiently small that a change in management practices is required to achieve an appropriate level and rate of rebuilding. The term generally describes any stock or stock complex determined to be below its overfished/rebuilding threshold. The default proxy is generally 25 percent of its estimated unfished biomass; however, other scientifically valid values are also authorized.

Overfishing. Overfishing means fishing at a rate or level that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. More specifically, overfishing is defined as exceeding a maximum allowable fishing mortality rate. For any groundfish stock or stock complex, the maximum allowable mortality rate will be set at a level not to exceed the corresponding MSY rate (FMSY) or its proxy (e.g., F35 percent).

Pacific Coast Groundfish Fishery Management Plan: The Groundfish Plan, which was adopted in 1982, has been amended 18 times. The Plan specifies how the Council develops recommendations for management of the Pacific Coast groundfish fishery.

Partnership is two or more individuals, partnerships, or corporations, or combinations thereof, who have ownership interest in a permit, including married couples and legally recognized trusts and partnerships, such as limited partnerships (LP), general partnerships (GP), and limited liability partnerships (LLP).

Pot and Trap Gear. The words “pot” and “trap” are used interchangeably to mean baited boxes set on the ocean floor to catch various fish and shellfish. They can be circular, rectangular or conical in shape. The pots may be set out individually or fished in stings. On the Pacific Coast, live sablefish, Dungeness crab, spot prawns, rock, box, and hermit crabs, spider crabs, spiny lobster and finfish (California sheephead, cabezon, kelp and rock greenling, California scorpionfish, moray eels, and many species of rockfish) are caught in pots. All pots contain entry ports and escape ports that allow undersized species to escape. Additionally, all pots used must have biodegradable escape panels or fasteners that prevent the pot from holding fish or crab if the pot is lost. All pots are marked at the surface. The markings are set by regulation. Pots fished in a line need to be marked at each terminal end, with a pole and flag, and sometimes, additionally, a light or radar reflector. Dungeness pots must be fished individually and each is marked by a buoy.

Processing or to process. This means the preparation or packaging of groundfish to render it suitable for human consumption, retail sale, industrial uses, or long-term storage, including, but not limited to, cooking, canning, smoking, salting, drying, filleting, freezing, or rendering into meal or oil, but does not mean heading and gutting unless additional preparation is done.

Processor. Processor means a person, vessel, or facility that (1) engages in processing, or (2) receives live groundfish directly from a fishing vessel for sale without further processing.

Prohibited species. Prohibited species are those species and species groups which must be returned to the sea as soon as is practicable with a minimum of injury when caught and brought aboard except when their retention is authorized by other applicable law. Exception may be made in the implementing regulations for tagged fish, which must be returned to the tagging agency, or for examination by an authorized observer.

Quota. Quota means a specified numerical harvest objective, the attainment (or expected attainment) of which causes closure of the fishery for that species or species group. Groundfish species or species groups under this FMP for which quotas have been achieved shall be treated in the same manner as prohibited species.

Recreational fishing. This means fishing for sport or pleasure, but not for sale.

Regulatory Flexibility Act (RFA). The RFA requires federal agencies to consider the effects of their regulatory actions on small businesses and other small entities and to minimize any undue disproportionate burden.

Regulatory Impact Review (RIR). RIRs are prepared to determine whether a proposed regulatory action is "major." The RIR examines alternative management measures and their economic impacts.

Scientific and Statistical Committee (SSC). An advisory committee of the Council made up of scientists and economists. The Magnuson-Stevens Act requires the each Council maintain an SSC to assist in gathering and analyzing statistical, biological, economic, social, and other scientific information that is relevant to the management of Council fisheries.

Secretary. The US Secretary of Commerce

Set net. Set net is a stationary, buoyed, and anchored gillnet or trammel net.

Specification is a numerical or descriptive designation of a management objective, including but not limited to: ABC; optimum yield; harvest guideline; quota; limited entry or open access allocation; a setaside or allocation for a recreational or treaty Indian fishery; an apportionment of the above to an area, gear, season, fishery, or other subdivision.

Stacking is the practice of registering more than one limited entry permit for use with a single vessel.

Sustainable Fisheries Act. See Magnuson-Stevens Act, above.

Target fishing. This means fishing for the primary purpose of catching a particular species or species group (the target species).

Target-species vessel. Vessels whose B species revenues during 2004-2006 were>50 percent for a single species or species group are assigned to that group as follows: sablefish, shelfrockfish, slope rockfish, lingcod, sharks (federal sharks and rays), or other species. All other vessels are treated as Non-target species vessels.

Trammel net. Trammel net is a gillnet made with two or more walls joined to a common float line.

Trap (or pot). Trap is a portable, enclosed device with one or more gates or entrances and one or more lines attached to surface floats.

Trip limits. Trip limits are used in the commercial fishery to specify the maximum amount of a fish species or species group that may legally be taken and retained, possessed, or landed, per vessel, per fishing trip, or cumulatively per unit of time, or the number of landings that may be made from a vessel in a given period of time, as follows:

U.S. Fish and Wildlife Service (USFWS). An agency with the Department of Interior that must be consulted with regard to potential impacts regulations or management plans may have on terrestrial animals and plants, birds, and some marine animals.

Vertical hook-and-line gear (commercial). This is hook-and-line gear that involves a single line anchored at the bottom and buoyed at the surface so as to fish vertically.

Washington/Oregon/California (WOC). The Pacific States that border the Council management area.

12.0 APPENDICES

APPENDIX A: Summary of Findings by the Open Access Permitting Subcommittee of the Strategic Plan Oversight Committee

Incidental Fisheries

Pacific Coast target species and associated federal groundfish data were extracted for PFMC fisheries that targeted non-groundfish species during 1990-2001. Landings data were presented in terms of metric tons and ex-vessel value of fish in the landings. Groundfish were treated as a group and not broken down by species. Most fisheries had very small (<10 mt annual average) groundfish impact. The pink shrimp fishery had by far the greatest groundfish landings and accounted for about 70 percent of the total groundfish landings by all non-target or incidental fisheries. The fisheries with the highest groundfish landings relative to the target species landings were the California halibut trawl, salmon troll (with halibut on board), Pacific halibut, California prawn trawl and California sheephead fisheries with 13 percent or greater groundfish landed catch compared to the target species landed catch (**Table 1**).

Directed Fisheries

Analysis of data provided by Hastie (2001) is included in this report for the directed (targeted) open access fishery during 1994-2001. Whether a trip "targeted" groundfish in his analysis was determined using a combination of gear and revenue information from the trip. Only gears that could legitimately target groundfish in open access were included, and of those, only trips were included where groundfish revenue exceeded the revenue from all other species. It showed that the most valuable species or species group in the directed open access fisheries on an average annual basis were in descending order of importance: dead rockfish ($3.4 million), sablefish ($1.5 million), live rockfish ($1.0 million), cabezon ($0.6 million) and lingcod ($0.4 million). The value of all other species combined was $0.3 million. The most abundant species in the catch based on average annual tonnage landed during 1994-2001 were (in descending order of importance): dead rockfish (2,500 tons); sablefish (600 tons) and lingcod (300 tons). All other species combined averaged 400 tons (**Table 2**).

The primary gear types used to catch the more valuable species were: dead rockfish, line gear (68 percent) and net gear (25 percent); sablefish, longline gear (70 percent) and pot gear (19 percent); live rockfish, in about equal proportions by longline and other line gear; cabezon, by other line gear (45 percent), longline gear (34 percent) and pot gear (21 percent); lingcod, other line gear (52 percent), longline gear (39 percent) and net gear (23 percent; **Table 2**).

The number of vessels that participated in the directed open access fishery during 1994-1999 declined from nearly 1,400 to about 1000. The number of vessels that harvested 80 percent of the directed open access groundfish catch ranged from 175-234 during 1994-1999. The number of vessels that harvested 90 percent of the catch ranged from 302-347 during the same time period (**Figure 1**). This same analysis based on groundfish revenues showed similar numbers of vessels (within 26 percent) landed 80 percent and 90 percent of the directed open access fishery revenues during 1994-1999 (Hastie 2001)

Table 1. Pacific Coast open access non-target groundfish fisheries: Annual target and non-target federal groundfish catch statistics, 1990-2001 (Hastie 2001).

	Number of Vessels		Target Species (mts)		Groundfish (mts)		Groundfish Proportion	
Fishery	AVG	Range	AVG	Range	AVG	Range	AVG	Range
Pink shrimp	97	69-127	9,766	2,876-16,850	415	94-896	4.4%	1%-8%
CA prawn trawl	41	16-60	288	37-701	24	5-53	14.3%	2%-30%
CA prawn pot	30	10-76	33	2-103	1	0-7	4.1%	0%-13%
CA halibut trawl	25	5-40	68	32-135	25	5-40	39.8%	13%-63%
Pacific halibut	149	81-210	54	30-97	12	9-23	23.6%	10%-54%
Dungeness crab (pot)	1,001	800-1,194	10,890	8,274-18,457	7	5-17	0.0%	none
Salmon Troll (w/o halibut)	1,338	969-2,254	2,206	600-4,256	51	11-149	4.5%	0%-25%
Salmon Troll (w halibut)	60	7-128	61	0-149	5	0-19	29.1%	3%-153%
Sea Cucumber	23	13-32	126	31-262	5	0-14	3.4%	0%-8%
Squid	104	67-144	49,059	2,879-89,858	1	0-1	0.0%	none
Coastal Pelagic Finfish	174	107-258	4,730	2,015-9,238	0	none	0.0%	none
CA Sheephead	172	124-245	93	52-140	12	6-16	13.4%	7%-20%
HMS Troll	530	85-973	6,240	703-11,820	2	0-5	0.0%	none
HMS Line	25	1-52	69	1-196	0	0-9	1.9%	0%-1%
HMS Pole	187	91-303	2,350	816-5,200	1	0-1	0.0%	none
HMS Gillnet	76	9-104	102	1-192	2	0-12	2.5%	0%-8%
HMS Seine	24	17-35	6,849	885-12,742	0	none	0.0%	none
CA Gillnet Complex	23	0-54	865	0-1,462	23	0-54	1.9%	0%-4%
Totals	n/a	n/a	93,849	n/a	586	n/a	0.6%	n/a

Table 2. Directed open access gear types that take the most species or species groups of federal groundfish presented as average landed catches and proportion of total landed catch for each species or species group during 1994-2001. Vessel and trip statistics are not presented because of possible gear switching by vessels within and between years (Hastie 2001).

Gear code		Dead Rock 1/ AVG	Dead Rock 1/ Prop.	Sablefish AVG	Sablefish Prop.	Live Rock 2/ AVG	Live Rock 2/ Prop.	Cabezon AVG	Cabezon Prop.	Lingcod AVG	Lingcod Prop.	All Others AVG	All Others Prop.
	Mts	450.3	18%	434.4	70%	62.9	45%	26.0	34%	38.9	15%	138.9	58%
	$1,000s	681.8	20%	1058.4	72%	456.7	44%	201.6	35%	58.4	16%	119.8	41%
	# of ves	244.8	unk	159.3	unk	141.5	unk	111.7	unk	170.6	unk	unk	unk
	# of trips	1906.6	unk	1632.9	unk	1949.0	unk	1181.3	unk	1091.5	unk	unk	unk
Other line													
	Mts	1268.6	50%	37.5	6%	66.0	47%	35.0	45%	139.4	52%	15.2	6%
	$1,000s	1820.1	54%	79.2	5%	505.5	48%	227.8	40%	206.9	58%	59.9	21%
	# of ves	921.4	unk	70.3	unk	278.5	unk	273.0	unk	628.7	unk	unk	unk
	# of trips	8324.9	unk	276.0	unk	2643.8	unk	2038.1	unk	4349.5	unk	unk	unk
Troll													
	Mts	98.6	4%	5.8	1%	0.2	0%	0.2	0%	19.5	7%	0.7	0%
	$1,000s	110.4	3%	9.4	1%	1.7	0%	0.9	0%	23.7	7%	1.1	0%
	# of ves	97.1	unk	9.7	unk	9.8	unk	4.6	unk	56.9	unk	unk	unk
	# of trips	164.2	unk	20.3	unk	12.3	unk	5.4	unk	113.8	unk	unk	unk
Pot													
	Mts	7.1	0%	119.7	19%	6.9	5%	15.9	21%	2.9	1%	3.6	2%
	$1,000s	12.9	0%	291.5	20%	57.6	5%	143.0	25%	6.8	2%	21.4	7%
	# of ves	45.4	unk	33.3	unk	44.9	unk	36.9	unk	27.3	unk	unk	unk
	# of trips	142.4	unk	605.9	unk	289.7	unk	277.6	unk	138.9	unk	unk	unk
Net													
	Mts	643.4	25%	11.6	2%	2.2	2%	0.1	0%	61.0	23%	48.9	21%
	$1,000s	640.3	19%	10.9	1%	19.5	2%	1.1	0%	54.9	15%	59.2	20%
	# of ves	59.8	unk	20.4	unk	8.3	unk	4.4	unk	34.7	unk	unk	unk
	# of trips	431.3	unk	113.5	unk	16.0	unk	4.5	unk	213.7	unk	unk	unk
Misc.													
	Mts	81.2	3%	10.3	2%	1.0	1%	0.3	0%	4.9	2%	30.5	13%
	$1,000s	103.8	3%	13.2	1%	7.4	1%	1.2	0%	5.1	1%	29.1	10%
	# of ves	131.4	unk	15.5	unk	18.3	unk	13.0	unk	57.5	unk	unk	unk
	# of trips	292.2	unk	37.9	unk	27.8	unk	19.2	unk	100.7	unk	unk	unk
Totals													
	Mts	2549.3	100%	619.3	100%	139.2	100%	77.5	100%	266.6	100%	237.8	100%
	$1,000s	3369.1	100%	1462.7	100%	1048.4	100%	575.5	100%	355.8	100%	290.5	100%

1/ Dead rock includes all rockfish species not including fish in the Live Rock group.
2/ Differentiated based on average price per pound. Live rock sold for an average of $2.68-$4.45/lb compared to $0.72-$1.14/lb (Hastie 2001).

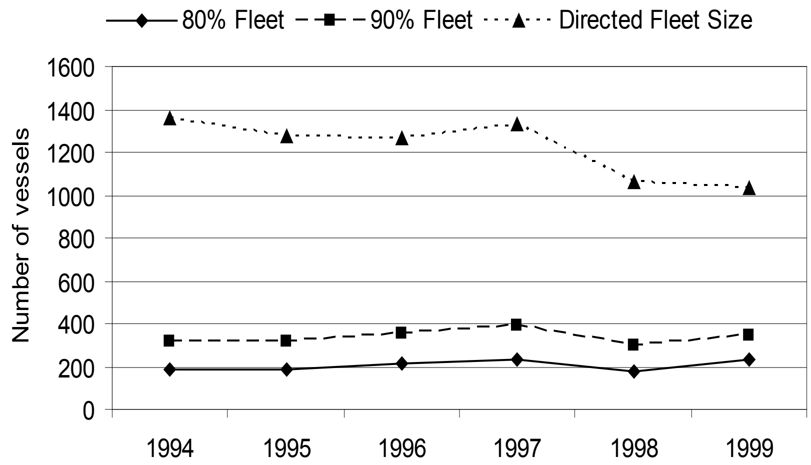

Fig 1. Number of vessels that landed specified proportions of total groundfish tonnage in the directed fishery by year, 1994-1999

Hastie (2001) found that a total of 3,506 different vessels participated in the directed open access groundfish fishery during 1994-1999. Fifty percent of the vessels fished in only one year and only 155 vessels (4 percent) fished all six years (**Table 3**). He also found that the directed fishery vessels had widely different tonnage and revenue histories within and between years. Hastie (2001) analyzed a variety of catch history tonnage and revenue data sets and developed some example participation criteria tables that could possibly be used as a basis for converting open access directed fishery vessels to limited entry management. He developed several tables showing the effect of various qualifying criteria on directed fishery fleet size. One of his tables showed how qualifying criteria can be constructed, based either on tonnage or value of landed catch, to achieve similar fleet size objectives. In this particular example, the qualifying criteria were shown to create qualifying fleet sizes of about 220 and 139 vessels (**Table 4**). Many changes have occurred in the open access directed fishery in recent years that will probably require different considerations in the selection and analysis of qualifying criteria in order to match current open access fishing capacity to open access fishery resource availability. Reduced shelf rockfish availability and the option of deferring nearshore groundfish management to the states may require data stratification, removal of state-managed species from the data base used for qualification, and the creation of species or gear endorsements in order to balance historic species harvest opportunities with current conditions.

Table 3. Number of annual open-access vessels with targeted landings of groundfish grouped by first year and number of years of participation, 1994-99 (Hastie 2001)

	Number of years targeted GF ldgs >0, 1994-99						
1st yr w/ targeted GF ldgs >0	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
1994	483	278	176	132	133	155	1,357
1995	256	125	87	47	49		565
1996	242	127	71	64			503
1997	262	109	92				463
1998	217	95					312
1999	306						306
Total	1,766	734	426	243	182	155	3,506

APPENDIX B: Analysis of Revenue-and Weight-based Criteria for Defining Directed and Incidental Open Access Fishery Fishing Trips[11]

INTRODUCTION

Previous studies of open access groundfish fisheries used gear-type information in combination with landings composition data to infer vessel target fishing strategy (**Goen and Hastie 2002; Burden 2005**). This approach probably results in a reasonable approximation of prefishing strategy for trips in which the landing was predominately 1) non-groundfish species (e.g., non-groundfish trawl fisheries) or 2) federal groundfish caught with groundfish-specific gear types (long-line or fishpot). Catch composition analysis becomes more problematic in terms of defining pre-fishing harvest strategy when directed fishery open access gear was reportedly used and the mix of non-groundfish and groundfish species is similar. Landing receipt coding errors add to the uncertainty of pre-fish harvest strategy assessments.

The previous studies excluded inland waters catches (e.g., Puget Sound and San Francisco Bay), tribal catches, and catches made with various non-groundfish gear types (e.g., non-groundfish trawl, drift gillnet, crabpot). For landings that used directed fishing gear (hook and line, fish pot and set net), they applied a >50 percent revenue criterion for differentiating between directed and incidental fishing trips. A more recent analysis of the directed open access fishery used the same gear type criteria but applied a >50 percent weight-based criterion for differentiating between the two fishing modes (**John DeVore 2007**). In this paper we examine the efficacy of the revenue-and weight-based approaches for characterizing the directed open access groundfish fishery.

We found that both approaches had similar results for B species groundfish, not including federal sharks (federal sharks and rays). California setnet (a variety of gillnet) vessels that fished for the latter species benefited under the weight-based approach for accruing vessel catch history for possible use in obtaining a proposed directed open access fishery permit (B permit). Both methods were found to be inclusive of >95 percent of total directed open access fishery landings by weight and value. The recommendation here is to use the revenue-based approach for defining directed fishery landings for use in qualifying for a B permit for the reasons explained below.

METHODS

Our approach to comparing the two methods was to 1) generate and compare data outputs using a common open access fishery extract from the PacFIN data base and 2) compare impacts of the two approaches on a range of qualification criteria contained in A-3, A-4 and A-5. The extract was limited to the period April 1998-September 2006; was exclusive of nearshore groundfish species; and was restricted to landings made with directed open access fishery gear (hook-and-line, bottom troll, fish pot and gillnet (setnet) gear). The data outputs were as follows: 1) groundfish landing frequencies based on 10 percentage point bins for all years and states combined, 2) catch and effort estimates by species, year, and state and 3) numbers of vessels that would have qualified under selected qualification criteria for B permits by port groups and state during 2004-2006. The qualification criteria included in the analysis by alternative were: A-3 with a 713 vessel fleet size goal; A-4 with a 1000 lb minimum landing requirement (or equivalent requirement), and A-5 with a 390 vessel fleet size goal. Each criterion was analyzed using the weight- and revenue-based approaches in combination with two qualification frameworks (that are further analyzed in Appendix E): QF-1 (2004-2006 lbs landed) and QF-3 (1998-2006 lbs landed with a 2004-2006 landing requirement). This provided for a total of six weight- and revenue-based comparisons.

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[11] Prepared by LB Boydstun and Gerry Kobylinski, California Department of Fish and Game, September 15, 2007 and updated August 18, 2008

RESULTS

Common Data Set Analyses

Landing Frequency Analysis

The revenue based analysis showed that over 92 percent and 93 percent, respectively, of B species landings, in terms of mts and revenues, occurred in landings in which fishery revenues were 90 percent or greater of B species groundfish. For all other 10 percent revenue groups, B species landing contributions were very small individually (≤ 2 percent) or collectively (< 7 percent) compared to the 90 percent group. The 50 percent or greater revenue groups were inclusive of 93 percent by tonnage and 94 percent by revenue of total B species landings. The trend in results was consistent between the states. It is noteworthy that over 96 percent of B species landings in Washington by either method were in the 90 percent revenue category. This probably reflects the relatively high importance of sablefish to that state, and, conversely, the more diverse nature of the open access fisheries in Oregon and California. B species groundfish landings by weight using the revenue method were distributed as follow: 67 percent in California, 19 percent in Oregon, and 14 percent in Washington (**Table B-1; Figure B-1).**

Table B-1. B species groundfish landings in WOC open access fisheries summarized by 10% revenue category, 1998-2006. Directed fishery gear only. >50% revenue analysis.

	Revenue category		Totals		Prop. Total	
State	from	to	mts	$$ (000s)	mts	$$
Ca	90%	100%	5,076	12,452	91.6%	94.0%
Or			1,466	4,536	93.2%	92.6%
Wa			1,136	3,139	97.9%	97.2%
Sub-total			7,678	20,127	92.8%	94.2%
Ca	80%	90%	47	120	0.8%	0.9%
Or			6	23	0.4%	0.5%
Wa			1	3	0.1%	0.1%
Sub-total			54	146	0.7%	0.7%
Ca	70%	80%	39	87	0.7%	0.7%
Or			9	32	0.6%	0.7%
Wa			2	6	0.2%	0.2%
Sub-total			50	125	0.6%	0.6%
Ca	60%	70%	29	68	0.5%	0.5%
Or			9	38	0.6%	0.8%
Wa			2	6	0.2%	0.2%
Sub-total			40	112	0.5%	0.5%
Ca	50%	60%	29	62	0.5%	0.5%
Or			8	30	0.5%	0.6%
Wa			4	18	0.3%	0.6%
Sub-total			41	110	0.5%	0.5%
Ca	40%	50%	35	62	0.6%	0.5%
Or			7	24	0.4%	0.5%
Wa			2	7	0.2%	0.2%
Sub-total			44	93	0.5%	0.4%
Ca	30%	40%	38	67	0.7%	0.5%
Or			11	38	0.7%	0.8%
Wa			4	13	0.3%	0.4%
Sub-total			53	118	0.6%	0.6%
Ca	20%	30%	51	76	0.9%	0.6%
Or			14	49	0.9%	1.0%
Wa			4	15	0.3%	0.5%
Sub-total			69	140	0.8%	0.7%
Ca	10%	20%	72	97	1.3%	0.7%
Or			25	81	1.6%	1.7%
Wa			3	11	0.3%	0.3%
Sub-total			100	189	1.2%	0.9%
Ca	>0%	10%	129	150	2.3%	1.1%
Or			17	47	1.1%	1.0%
Wa			3	12	0.3%	0.4%
Sub-total			149	209	1.8%	1.0%
Ca-Total	>0%	100%	5,544	13,240	100.0%	100.0%
Or-Total			1,573	4,900	100.0%	100.0%
Wa-Total			1,160	3,231	100.0%	100.0%
WOC-Total			8,277	21,371	100.0%	100.0%

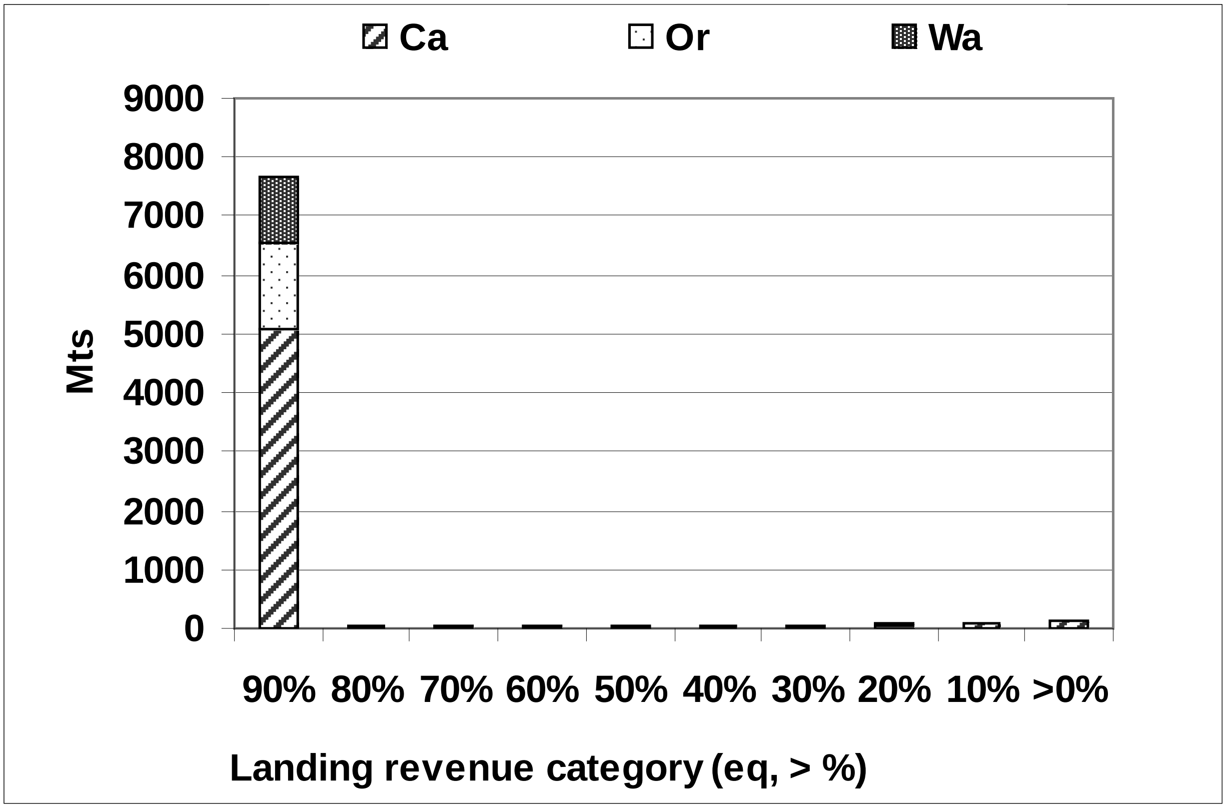

Fig B-1. B species tonnages grouped by landing revenue category and state, 1998-2006 combined landings. >50 percent revenue analysis.

The weight-based analysis showed slightly higher landing tonnages and revenues in each of the 30-90 percent bins (**Table B-2, Figure B-2**) compared to the revenue-based analysis. Tonnage and revenue in the weight-based 90 percent bin was 0.5 and 0.2 percentage points, respectively, higher than the comparative data in the revenue-based analysis. Cumulative total tonnage and revenue in the weight-based analysis for bins ≥ 50 percent were 1.4 and .6 percentage points higher than comparative data in the revenue-based analysis.

Table B-2. B species groundfish landings in WOC open access fisheries summarized by 10% revenue category, 1998-2006. Directed fishery gear only. >50% weight analysis.

	Revenue category		Totals		Prop. Total	
State	from	to	mts	$$ (000s)	mts	$$
Ca	90%	100%	5,115	12,483	92.3%	94.3%
Or			1,466	4,534	93.2%	92.5%
Wa			1,137	3,141	98.0%	97.2%
Sub-total			7,718	20,158	93.2%	94.3%
Ca	80%	90%	62	126	1.1%	1.0%
Or			11	40	0.7%	0.8%
Wa			2	7	0.2%	0.2%
Sub-total			75	173	0.9%	0.8%
Ca	70%	80%	51	98	0.9%	0.7%
Or			10	39	0.6%	0.8%
Wa			3	10	0.3%	0.3%
Sub-total			64	147	0.8%	0.7%
Ca	60%	70%	57	95	1.0%	0.7%
Or			10	35	0.6%	0.7%
Wa			3	14	0.3%	0.4%
Sub-total			70	144	0.8%	0.7%
Ca	50%	60%	41	76	0.7%	0.6%
Or			8	29	0.5%	0.6%
Wa			3	11	0.3%	0.3%
Sub-total			52	116	0.6%	0.5%
Ca	40%	50%	43	80	0.8%	0.6%
Or			12	43	0.8%	0.9%
Wa			3	9	0.3%	0.3%
Sub-total			58	132	0.7%	0.6%
Ca	30%	40%	47	75	0.8%	0.6%
Or			13	45	0.8%	0.9%
Wa			3	11	0.3%	0.3%
Sub-total			63	131	0.8%	0.6%
Ca	20%	30%	49	77	0.9%	0.6%
Or			16	54	1.0%	1.1%
Wa			3	10	0.3%	0.3%
Sub-total			68	141	0.8%	0.7%
Ca	10%	20%	43	69	0.8%	0.5%
Or			17	56	1.1%	1.1%
Wa			2	9	0.2%	0.3%
Sub-total			62	134	0.7%	0.6%
Ca	>0%	10%	36	61	0.6%	0.5%
Or			8	24	0.5%	0.5%
Wa			2	7	0.2%	0.2%
Sub-total			46	92	0.6%	0.4%
Ca-Total	>0%	100%	5,544	13,240	100.0%	100.0%
Or-Total			1,573	4,900	100.0%	100.0%
Wa-Total			1,160	3,231	100.0%	100.0%
WOC-Total			8,277	21,371	100.0%	100.0%

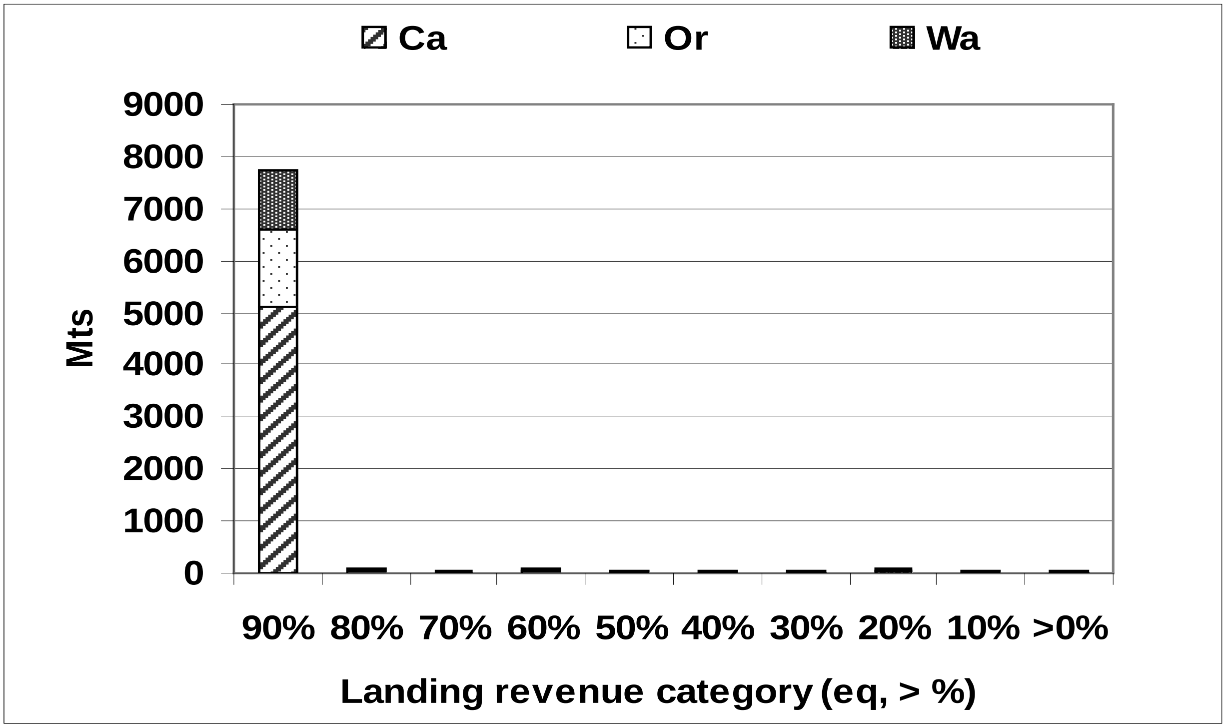

Fig B-2. B species tonnages grouped by landing revenue category and state, 1998-2006 combined landings. >50 percent weight analysis.

Catch and Effort Analysis

The weight-based criterion for determining directed fishery landings produced almost identical results as the revenue-based approach for sablefish, shelf rockfish, slope rockfish and lingcod (≤1 percent difference in mt) (**Tables B-3 and B-4; Figure B-3).** The revenue-based method produced about 19 percent and 5 percent less estimated directed fishery landings of sharks and other species, respectively, compared to the weight-based method(**Tables B-3 and B-4; Figure B-3).** The overall decrease in estimated directed fishery landings of B species groundfish using the revenue-based criterion averaged 13 mt (1 percent) per year. Nearly all of the tonnage decrease was in the California shark fishery (primarily the southern California setnet fishery). The average number of vessels that made a directed fishery landing was higher under the weight-based approach at 772 compared to 760 (<2 percent difference) for the revenue-based approach All of the decrease using the revenue-based criterion for all years combined was in California-based vessels (**Tables B-3 and B-4)**.

Table B-3 Directed B species open access fishery participation and landing statistics by species group, year, state and total, 1998-2006. REVENUE BASED (same as EA Table 2-5)

	Sablefish			Shelf RF			Slope RF			Lingcod			Sharks			Others 1/			Total Directed		
	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K
1998																					
CA	92	95	219	433	797	1,161	171	192	220	257	46	105	54	25	34	71	29	43	654	1,185	1,782
OR	30	16	45	135	179	272	3	4	6	103	21	47	0	0	0	44	21	38	200	241	409
WA	29	26	79	10	12	9	0	0	0	17	6	7	0	0	0	20	57	65	46	101	160
sum	151	137	343	578	988	1,442	174	197	226	377	73	159	54	25	34	135	107	146	900	1,527	2,351
1999																					
CA	102	177	454	479	264	538	72	17	29	293	40	119	52	25	37	105	49	86	677	572	1,263
OR	15	21	65	132	93	194	8	1	2	125	27	74	0	0	0	58	13	43	180	155	377
WA	28	36	115	7	9	7	0	0	0	14	5	6	2	5	2	15	9	11	44	63	141
sum	145	234	634	618	367	739	80	18	31	432	72	199	54	30	39	178	71	140	901	791	1,781
2000																					
CA	115	299	944	403	96	282	65	9	22	221	20	64	55	22	31	127	81	118	642	527	1,460
OR	34	44	159	103	7	19	1	1	1	89	12	45	2	0	0	0	0	0	154	64	224
WA	32	52	202	9	2	3	2	2	2	12	5	6	1	2	1	2	1	2	49	63	215
sum	181	395	1,305	515	105	304	68	11	25	322	37	115	58	24	32	129	82	120	845	653	1,899
2001																					
CA	112	274	820	301	67	177	41	26	52	244	29	97	49	24	34	96	48	106	518	468	1,286
OR	64	59	199	89	6	15	1	1	1	119	24	82	0	0	0	2	0	0	180	89	296
WA	44	60	218	8	1	1	2	1	1	12	4	5	0	0	0	0	1	1	54	67	225
sum	220	393	1,237	398	73	193	44	28	54	375	57	184	49	24	34	98	49	107	752	624	1,807
2002																					
CA	119	268	798	222	20	72	45	61	133	244	37	132	40	16	24	68	49	80	480	451	1,238
OR	53	50	180	61	4	9	1	0	0	126	27	94	0	0	0	8	0	0	176	81	283
WA	44	65	237	0	1	0	0	1	1	9	3	4	1	4	1	0	1	0	47	74	244
sum	216	383	1,215	283	24	81	46	62	134	379	68	230	41	20	25	76	50	80	703	607	1,765
2003																					
CA	118	313	946	169	9	39	46	82	194	240	33	131	47	28	37	50	55	50	445	520	1,398
OR	96	134	492	52	3	8	13	1	1	123	29	91	0	0	0	0	1	0	202	168	593
WA	64	118	450	0	0	0	0	2	2	4	2	3	1	44	18	0	2	1	68	168	473
sum	216	383	1,215	283	24	81	46	62	134	379	68	230	41	20	25	76	50	80	703	607	1,765
2004																					
CA	92	288	831	189	24	104	48	52	130	215	40	158	43	24	48	60	57	52	402	485	1,323
OR	67	74	225	66	3	7	3	1	1	120	31	97	0	0	0	3	0	0	177	109	330
WA	53	96	326	1	1	1	2	1	1	4	2	3	4	86	38	0	1	1	57	187	369
sum	212	458	1,382	256	27	112	53	55	132	339	73	258	47	110	86	63	58	53	636	781	2,022
2005																					
CA	101	458	1,312	170	21	99	46	31	84	192	36	145	44	22	31	49	39	34	367	608	1,704
OR	107	258	916	54	3	9	4	5	7	150	29	101	2	0	0	2	5	2	232	301	1,035
WA	68	182	678	2	0	1	2	7	8	5	2	4	2	3	2	0	1	1	78	196	693
sum	276	898	2,906	226	25	109	52	42	99	347	68	250	48	25	33	51	45	37	677	1,104	3,432
2006																					
CA	122	280	942	165	21	103	35	33	85	192	27	113	41	23	43	29	15	32	382	399	1,318
OR	132	251	984	42	3	9	3	5	7	135	28	109	0	0	0	2	4	2	241	290	1,111
WA	86	158	612	0	0	0	1	1	1	4	3	5	2	60	31	0	1	0	90	222	649
sum	340	688	2,538	207	25	112	39	39	93	331	57	227	43	83	74	31	20	34	713	911	3,078
AVG																					
CA	108	272	807	281	147	286	63	56	105	233	34	118	47	23	35	73	47	67	507	579	1,419
OR	66	101	363	82	33	60	4	2	3	121	25	82	0	0	0	13	5	9	194	166	518
WA	50	88	324	4	3	2	1	2	2	9	3	5	1	23	10	4	8	9	59	127	352
AVG	224	461	1,494	367	183	349	68	60	110	363	63	205	49	46	46	90	60	85	760	872	2,289

1/ others species includes unspecified rockfish, flatfishes, rays and chimeras

Table B-4. Directed open access fishery participation and landings statistics by species group and total, 1998-2006. WEIGHT BASED

	Sablefish			Shelf RF			Slope RF			Lingcod			Sharks			Others 1/			Total Directed		
	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K	No. Vsls	mts	$$K
1998																					
CA	91	95	219	436	797	1,160	178	192	220	256	46	106	66	33	42	77	34	45	672	1,197	1,791
OR	28	16	45	136	179	272	4	4	6	102	21	47	0	0	0	41	21	38	200	241	409
WA	29	26	80	11	12	9	0	0	0	17	6	7	0	0	0	20	57	65	46	101	160
Total	148	137	344	583	988	1,442	182	196	226	375	73	160	66	33	42	138	112	147	918	1,539	2,361
1999																					
CA	103	177	454	485	265	539	75	17	29	297	41	120	70	42	53	116	54	88	693	595	1,282
OR	15	21	66	130	93	194	12	1	2	129	27	74	0	0	0	54	13	43	182	156	378
WA	26	36	115	7	9	7	0	0	0	14	5	7	6	5	2	14	9	11	44	63	141
Total	144	234	634	622	367	740	87	18	30	440	73	201	76	46	55	184	76	142	919	814	1,801
2000																					
CA	114	299	944	405	96	280	64	8	21	229	20	65	71	35	41	143	87	122	646	546	1,473
OR	34	44	159	104	7	19	1	1	1	91	12	45	2	0	0	1	0	0	151	64	224
WA	32	52	203	10	2	3	3	2	2	12	5	7	1	2	1	5	1	2	48	63	216
Total	180	395	1,305	519	105	302	68	10	24	332	37	116	74	37	42	149	89	124	845	673	1,913
2001																					
CA	110	274	820	301	67	177	40	26	51	250	29	98	65	34	42	112	50	108	532	479	1,295
OR	64	59	201	91	6	15	1	1	1	120	24	82	0	0	0	2	0	0	180	90	298
WA	44	61	219	7	1	1	2	1	1	12	4	5	0	0	0	0	1	1	54	67	226
Total	218	394	1,239	399	73	192	43	28	53	382	57	184	65	34	42	114	51	109	766	636	1,819
2002																					
CA	118	268	798	216	20	71	50	61	132	247	37	133	54	24	33	80	51	81	500	461	1,248
OR	53	49	179	61	4	9	1	0	0	126	28	94	0	0	0	8	0	0	176	81	282
WA	44	65	237	1	1	0	0	1	1	9	3	4	2	4	1	0	1	1	47	75	244
Total	215	383	1,213	278	24	81	51	62	133	382	68	231	56	28	35	88	52	81	723	616	1,773
2003																					
CA	116	313	946	170	9	39	45	82	194	243	33	132	53	38	46	60	56	51	454	530	1,408
OR	96	134	492	56	3	8	13	1	1	123	29	92	0	0	0	0	1	0	202	168	593
WA	64	119	451	0	0	0	0	2	2	4	2	3	1	44	18	0	2	1	69	168	474
Total	276	565	1,889	226	12	47	58	85	197	370	64	227	54	82	64	60	59	52	725	866	2,475
2004																					
CA	90	288	830	186	24	105	45	52	130	218	41	160	51	28	45	71	57	52	412	490	1,323
OR	67	75	228	65	3	7	3	1	1	120	31	98	0	0	0	5	1	0	178	110	333
WA	52	97	329	1	1	1	2	1	1	4	2	3	4	86	38	0	1	1	57	188	372
Total	209	460	1,386	252	28	112	50	55	132	342	73	260	55	114	83	76	59	53	647	788	2,028
2005																					
CA	101	458	1,312	168	21	99	44	31	84	192	36	145	51	31	39	59	41	35	375	618	1,714
OR	108	259	920	55	3	9	4	5	7	151	30	101	1	0	0	5	5	2	234	302	1,039
WA	68	183	681	2	0	1	2	7	8	4	2	4	2	3	2	1	1	1	78	196	696
Total	277	900	2,913	225	25	108	50	43	99	347	68	250	54	34	40	65	47	38	687	1,117	3,449
2006																					
CA	123	280	941	166	22	104	35	33	85	191	27	114	44	26	48	34	16	33	390	404	1,326
OR	132	253	994	43	3	9	3	5	7	136	28	109	0	0	0	3	4	2	242	293	1,121
WA	86	158	614	0	0	0	1	1	1	5	3	5	2	60	31	0	1	0	90	222	651
Total	341	691	2,550	209	25	113	39	39	94	332	58	228	46	86	79	37	20	34	722	918	3,098
AVG																					
CA	107	272	807	281	147	286	64	56	105	236	34	119	58	32	43	84	50	68	519	591	1,429
OR	66	101	365	82	33	60	5	2	3	122	25	82	0	0	0	13	5	10	194	167	520
WA	49	88	325	4	3	2	1	2	2	9	3	5	2	23	10	4	8	9	59	127	353
AVG	223	462	1,497	368	183	349	70	59	110	367	63	206	61	55	54	101	63	87	772	885	2,302

1/ others species includes unspecified rockfish, flatfishes, rays and chimeras

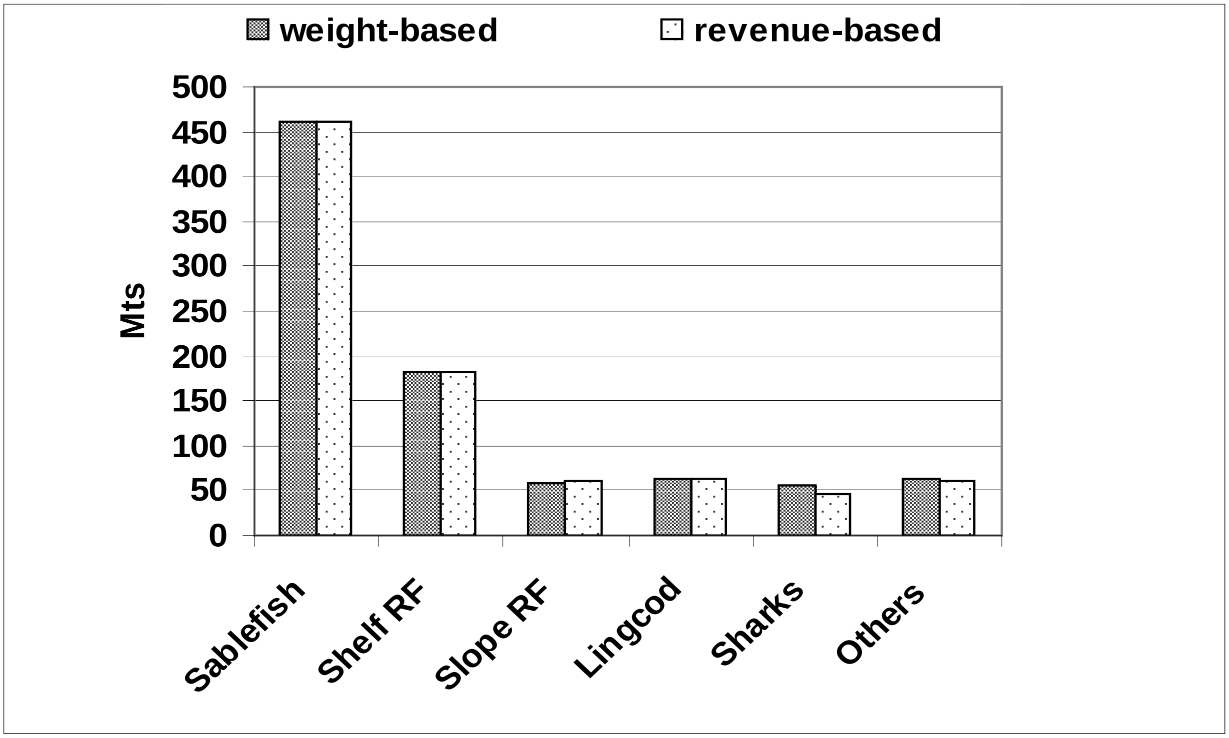

Figure B-3: Estimated average annual directed open access fishery landings by species during 1998-2006 window period years based on >50 percent weight and > 50 percent revenue criteria

Vessel Catch History Analysis

The revenue-based criterion created a data base for the window period of 2,587 vessels, 207 from Washington, 661 from Oregon, and 1,719 from California. These were vessels that made at least one landing of B species groundfish using directed fishing gear in which >50 percent of revenues were of B species groundfish**.** The weight-based approach created a data base of 2,606 vessels, which consisted of 2,584 vessels in common with the revenue-based approach, 23 new vessels and 4 vessels that made a directed revenue-based landing, but did not make a weight-based directed fishery landing (**Table B-5)**. Twenty of the new vessels were from California and three were from Oregon. The 4 vessels that were removed from the weight-based data base were all from California. The origins of vessels using the weight-based approach (compared with the revenue-based approach in parentheses) were as follows: Washington, 207 (no change), Oregon, 664 (4 vessel increase), and California 1,735 (16 vessel increase) (**Table B-5)**. The weight-based criterion changed the catch histories of 437 (17 percent) vessels; 318 (12 percent) that received increased B species catch history credits (to over 10,000 lbs for four vessels, all California setnet vessels) and 199 (5 percent) with decreased B species catch history credits (to over 1000 lbs for one vessel) (**Table B-5)**.

Table B-5. Number of vessels that made B species directed fishery landings by specified catch history category (lbs), gear type and state during 1998-2006 using (a) > 50 percent pounds-based criterion and (b) > 50 percent revenue-based criterion

	(a) Pounds-based Criterion						(b) Revenue-based Criterion					
Gear type	>0	>500	>1000	>2000	>4000	>10000	>0	>500	>1000	>2000	>4000	>10000
VERT HL	76	25	19	7	6	1	76	25	18	7	6	1
POLE	1,014	396	288	174	103	43	1,005	387	276	167	98	40
OTHER HL	409	211	162	106	69	18	409	211	162	106	69	18
LONG L	626	465	399	332	248	164	623	463	396	332	249	163
JIG	38	29	22	18	14	8	38	29	22	18	14	8
GILLNET	86	63	56	48	37	19	82	55	47	37	24	11
FISHPOT	324	277	252	211	166	107	322	276	252	209	165	107
DIVE	8	6	1	1	0	0	8	6	1	1	0	0
B TROLL	25	18	16	11	9	4	24	18	16	11	9	3
	2,606	1,490	1,215	908	652	364	2,587	1,470	1,190	888	634	351
State	>0	>500	>1000	>2000	>4000	>10000	>0	>500	>1000	>2000	>4000	>10000
WA	207	187	166	140	98	61	207	187	166	140	98	61
OR	664	429	351	259	188	92	661	427	351	258	189	91
CA	1,735	874	698	509	366	211	1,719	857	674	491	348	199
	2,606	1,490	1,215	908	652	364	2,587	1,471	1,191	889	635	351

The weight-based approach increased the number of vessels with directed fishing trips by 1 percent and increased the number of vessels with catch histories of >10,000 lbs by 4 percent **(Table B-6**). The most notable increase was in California setnet (gillnet) vessels, which increased in number in specified catch history categories by from 15 percent (>500 lbs) to 73 percent (>10,000 lbs) (**Table B-6**). There were 52 instances of B species catch history increases of over 1,000 lbs using the weight-based approach, and 36 (69 percent) of these were California setnet vessels, although setnet vessels accounted for only 3 percent of the gear-types used by vessels that made at least one directed B species fishery landing during 1998-2006 (**Table B-5)**. California setnet vessels target several non-groundfish species led by California halibut, white seabass, and Pacific angel shark, based on frequency of records [12] made during 1998-2006. Landings of these or other California-managed species were likely supplanted, using the weight-based approach, by several federal groundfish species including soupfin and leopard sharks and skates (**Table B-7**).

Table B-6. Proportion of vessels by gear type and catch history category (lbs) shown in Table B-5 under "(b) Revenue-based criterion" that met specified catch history levels using "(a) Pounds-based criterion"

Gear	>0	>500	>1000	>2000	>4000	>10000
VERT HL	100%	100%	106%	100%	100%	100%
POLE	101%	102%	104%	104%	105%	108%
OTHER HL	100%	100%	100%	100%	100%	100%
LONG L	100%	100%	101%	100%	100%	101%
JIG	100%	100%	100%	100%	100%	100%
GILLNET	105%	115%	119%	130%	154%	173%
FISHPOT	101%	100%	100%	101%	101%	100%
DIVE	100%	100%	100%	100%		
B TROLL	104%	100%	100%	100%	100%	133% 1/
	101%	101%	102%	102%	103%	104%

1/ only 3 vessels

00

[12] Records=landings for individual species, but there may be several species records on the same landing receipt.

Table B-7. Frequency of California setnet fishery records by market category 1998-2006, truncated at 90 percent of cumulative landings

ranked by number of records							
Exspec	Market category	Fed?	MT	% mt	cum	# records	% records
222	Halibut, California		1,028.81	29.05%	29.05%	40,071	44.44%
400	Seabass, white		782.54	22.09%	51.14%	7,739	8.58%
159	Shark, soupfin	F	176.32	4.98%	56.12%	4,399	4.88%
165	Shark, Pacific angel		85.29	2.41%	58.53%	4,229	4.69%
153	Shark, leopard	F	37.61	1.06%	59.59%	3,328	3.69%
155	Shark, thresher		301.98	8.53%	68.12%	3,181	3.53%
175	Skate, unspecified	F	39.73	1.12%	69.24%	3,008	3.34%
174	Guitarfish, shovelnose		39.20	1.11%	70.34%	2,347	2.60%
200	Sole, unspecified	F	9.00	0.25%	70.60%	2,327	2.58%
260	Scorpionfish, California	F	11.03	0.31%	70.91%	2,269	2.52%
040	Yellowtail		153.13	4.32%	75.23%	1,994	2.21%
802	Crab, claws		9.74	0.28%	75.51%	1,926	2.14%
280	Bass, giant sea		20.91	0.59%	76.10%	1,365	1.51%
130	Barracuda, California		88.43	2.50%	78.59%	1,253	1.39%
151	Shark, shortfin mako		61.02	1.72%	80.32%	1,242	1.38%
154	Shark, brown smoothhound		12.37	0.35%	80.67%	1,130	1.25%
803	Crab, spider		28.52	0.81%	81.47%	759	0.84%
250	Rockfish, unspecified	F	64.25	1.81%	83.29%	727	0.81%
435	Croaker, white		75.49	2.13%	85.42%	493	0.55%
145	Sheephead, California		5.67	0.16%	85.58%	444	0.49%
051	Mackerel, Pacific		22.04	0.62%	86.20%	426	0.47%
801	Crab, rock unspecified		4.34	0.12%	86.32%	414	0.46%
800	Crab, Dungeness		4.07	0.11%	86.44%	342	0.38%
190	Sablefish	F	16.91	0.48%	86.91%	326	0.36%
231	Flounder, starry	F	2.36	0.07%	86.98%	306	0.34%
195	Lingcod	F	10.68	0.30%	87.28%	282	0.31%
261	Cabezon	F	0.79	0.02%	87.31%	255	0.28%
230	Flounder, unspecified	F	1.34	0.04%	87.34%	253	0.28%
253	Rockfish, bocaccio	F	31.69	0.89%	88.24%	244	0.27%
152	Shark, spiny dogfish	F	35.57	1.00%	89.24%	239	0.27%

Comparison of Revenue- and Weight-based Approaches using Selected Qualification Criteria

The weight- and revenue-based approaches for defining directed fishing trips produced very similar results with regard to the distribution of permits between states for the six qualifying criteria comparisons that used the QF-1 framework (2004-2006 lbs landed). There were minor permit changes (less than 3) between port groups within states in the analyses that used the QF-1 framework, except in the Los Angeles and Santa Barbara areas where the difference was larger. The permits in these areas were highest when the weight-based approach was use (**Table B-8).** This was due to gillnet vessels qualifying for permits over vessels that used other gear types. However, using the weight based approach qualified slightly more (9; 1.7 percent) vessels under the 1000 lb-1 criterion than the revenue based approach; and all but three of these was in Southern California. The 1000 lb-1 criterion was replaced by a 2045 or 2044 lb qualification criterion for use with QF-3. This was necessary because of the larger number of years used in the latter framework. The 2045 and 2044 minimum landing requirements would qualify the same number of vessels as the 1000 lb criterion when used with QF-1. The 2045 lb-3 (weight) and 2044 lb-3 (revenue) criteria qualified the same number of vessels as their QF-1 counterpart criteria, but the weight-based criterion resulted in more permitted vessels in the Los Angeles area where the gillnet fishery operates. The weight-based approach shifted 11 permits out of Washington and Oregon to California ports in the 390 vessel goal comparisons that used QF-3. Nearly all of the permit increase was in the Los Angeles and Santa Barbara areas (**Table B-8**). Inspection of vessel qualification data showed that the shift of permits to the Los Angeles and Santa Barbara areas was due to gillnet vessels qualifying for permits over vessels that used other gear types.

Table B-8. B permit distributions under specified criteria using weight- and revenue-based criteria for defining directed trips based on landings data during 2004-2006 by qualifying vessels. Three or more vessel differences in paired comparisons are highlighted

	713v-1 (weight) 1/		713v-1 (revenue)		713v-3 (weight)		713v-3 (revenue)		1000 lbs-1 (weight)		1000 lbs-1 (revenue)		2045 lbs-3 (weight) 3/		2044 lbs-3 (rev) 3/		390v-1 (weight)		390v-1 (revenue)		390v-3 (weight)		390v-3 (revenue)	
Grp/State	vsls	P 2/	vsls	P	vsls	P	vsls	P	vsls	P 2/	vsls	P	vsls	P	vsls	P	vsls	P 2/	vsls	P	vsls	P	vsls	P
SPS	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.01	2	0.01	1	0.00	1	0.00
NPS	15	0.02	15	0.02	15	0.02	15	0.02	15	0.03	15	0.03	14	0.02	14	0.02	14	0.04	14	0.04	11	0.03	11	0.03
CWA	47	0.07	47	0.07	48	0.07	48	0.07	46	0.08	46	0.08	39	0.07	39	0.07	32	0.08	33	0.08	21	0.05	24	0.06
CLW	49	0.07	49	0.07	46	0.06	46	0.06	46	0.08	46	0.08	41	0.07	41	0.07	38	0.10	38	0.10	29	0.07	32	0.08
WA	113	0.16	113	0.16	111	0.16	111	0.16	109	0.19	109	0.19	96	0.16	96	0.17	86	0.22	87	0.22	62	0.16	68	0.17
CLO	37	0.05	37	0.05	35	0.05	35	0.05	30	0.05	30	0.05	29	0.05	29	0.05	19	0.05	19	0.05	15	0.04	16	0.04
TLA	29	0.04	31	0.04	23	0.03	23	0.03	21	0.04	21	0.04	14	0.02	14	0.02	10	0.03	10	0.03	8	0.02	9	0.02
NPA	37	0.05	36	0.05	28	0.04	28	0.04	23	0.04	22	0.04	22	0.04	21	0.04	14	0.04	13	0.03	16	0.04	15	0.04
CBA	62	0.09	62	0.09	63	0.09	63	0.09	53	0.09	53	0.09	50	0.09	50	0.09	41	0.11	41	0.11	33	0.08	34	0.09
BRA	75	0.11	75	0.11	79	0.11	79	0.11	66	0.11	66	0.11	67	0.11	68	0.12	43	0.11	43	0.11	46	0.12	49	0.13
OR	240	0.34	241	0.34	228	0.32	228	0.32	193	0.33	192	0.33	182	0.31	182	0.32	127	0.33	126	0.32	118	0.30	123	0.32
CCA	26	0.04	27	0.04	25	0.04	26	0.04	21	0.04	21	0.04	20	0.03	20	0.03	11	0.03	12	0.03	14	0.04	15	0.04
ERA	40	0.06	40	0.06	39	0.05	39	0.05	34	0.06	34	0.06	36	0.06	36	0.06	23	0.06	23	0.06	26	0.07	26	0.07
BGA	62	0.09	64	0.09	66	0.09	68	0.10	55	0.09	55	0.10	60	0.10	60	0.10	48	0.12	48	0.12	49	0.13	49	0.13
BDA	9	0.01	9	0.01	12	0.02	13	0.02	6	0.01	6	0.01	10	0.02	10	0.02	2	0.01	2	0.01	7	0.02	7	0.02
SFA	35	0.05	35	0.05	37	0.05	39	0.05	31	0.05	30	0.05	29	0.05	28	0.05	17	0.04	17	0.04	19	0.05	19	0.05
MNA	58	0.08	59	0.08	61	0.09	63	0.09	49	0.08	49	0.08	50	0.09	50	0.09	30	0.08	31	0.08	36	0.09	37	0.09
MRA	54	0.08	55	0.08	59	0.08	57	0.08	39	0.07	38	0.07	42	0.07	41	0.07	21	0.05	20	0.05	17	0.04	16	0.04
SBA	29	0.04	26	0.04	26	0.04	25	0.04	18	0.03	16	0.03	22	0.04	20	0.03	9	0.02	8	0.02	14	0.04	8	0.02
LAA	25	0.04	22	0.03	27	0.04	20	0.03	15	0.03	11	0.02	20	0.03	14	0.02	3	0.01	4	0.01	13	0.03	8	0.02
SDA	22	0.03	22	0.03	22	0.03	24	0.03	17	0.03	16	0.03	20	0.03	20	0.03	13	0.03	12	0.03	15	0.04	14	0.04
CA	360	0.50	359	0.50	374	0.52	374	0.52	285	0.49	276	0.48	309	0.53	299	0.52	177	0.45	177	0.45	210	0.54	199	0.51
Total	713	1.00	713	1.00	713	1.00	713	1.00	587	1.00	577	1.00	587	1.00	577	1.00	390	1.00	390	1.00	390	1.00	390	1.00

1/ the number following each qualification standard refers to the qualification framework used in the analysis: 1 means QF-1 (2004-2006 lbs landed) and 3 means QF-3 (19989-2006 lbs landed with 2004-2006 landing requirement)

2/ proportion of total

3/ 2045 lbs using QF-3 (weight) produces the same number of vessels as 1000 lbs using QF-1 (weight); 2044 lbs using QF-3 (revenue) produces the same number of vessels as 1000 lbs using QF-1 (revenue)

EXPLANATION FOR USING REVENUE-BASED CRITERION FOR DEFINING B SPECIES FISHING TRIPS

Landings data are used in this and other studies as a proxy for what the fisherman intended to catch. The data presented above support, with one important exception, the use of either of two approaches for defining directed B species fishing trips: (1) revenue-based, wherein trips in which >50 percent of revenues were of B species groundfish are defined as directed fishing trips and (2) weight-based, wherein trips in which >50 percent of pounds landed where of B species groundfish are defined as directed fishing trips. The one exception was for landings of B species groundfish made during window period years in the California set net fishery. The California set net fishery primarily targets state-managed species, California halibut in particular, but also catches federal sharks and rays, primarily as bycatch species. The data presented above showed that the weight-based approach identified many set net trips during window period years as targeted federal species trips. These same landings when analyzed using the revenue-based approach showed that the target species were not the federal sharks and rays but were state-managed species, California halibut in particular. The approach in this report for defining directed fishing trips is based on landing revenues and not weight of B species groundfish landed. In part this is because set net gear is considered an open access fishing gear and landings in that fishery are more accurately characterized using the revenue-based approach than the weight-based approach, but also because revenue is a better indicator of what the fishermen intended to catch in the context of a commercial operation.

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APPENDIX C: State Limited Entry Program Information

Permit Type by State	Date Implemented	Number of Permits
CALIFORNIA		
Deeper Nearshore Species Fishery Permit	2002	249
Drift gill Net (Shark and Swordfish)	1981	88
Dungeness Crab Vessel	1995	602
General Gill/Trammel Net	1980	166
Herring Gill Net	1976	314
Herring Stamp	1997	274
Lobster Operator	1977	214
Market Squid	2005	86
Market Squid Brail	2005	16
Market Squid Light Boat	2005	59
Nearshore Fishery Permit	2003	193
Nearshore Fishery Trap Endorsement	2003	67
Nearshore Fishery Bycatch Permit	2003	22
Northern Pink Shrimp Trawl Vessel	2001	40
Salmon Vessel	1983	1,389
Sea Cucumber Diving	1983	91
Sea Cucumber Trawl	1997	18
Sea Urchin Diving	1974	323
Southern Rock Crab Trap	2005	141
Spot Prawn Trap Vessel (tier 1, tier 2, tier 3)	2000	30
OREGON (2006 figures)		
Black/Blue Rockfish Permit	2004	80/60 1/
Black/Blue Rockfish with a Nearshore Endorsement	2004	50/72
Coast-wide Bay Clam Dive Permit	2006	39731
Columbia River Gillnet Salmon Permit	1979	200/308
Sardine Permit	2006	26/26
Scallop Vessel Permit	1981	25/31
Sea Urchin Permit	1987	30/27
Ocean Dungeness Crab Permit	1995	No max/433
Ocean Pink Shrimp Vessel Permit	1979	150/142
Ocean Troll Salmon Vessel Permit	1979	1200/1129
South-coast Bay Clam Dive Permit	2006	5/5
Yaquina Bay Roe-Herring Permit	1991	6/6
WASHINGTON		
Salmon Licenses:		
Grays' Harbor-Columbia River Gill Net	1991	74
Puget Sound Gill Net	1991	278
Purse Seine	1991	110
Reefnet	1991	11
Salmon Delivery	1991	4
Single Salmon Delivery	?	?
Troll	1991	184
Willapa Bay-Columbia River Gill Net	1991	230
Herring Licenses:		

Permit Type by State	Date Implemented	Number of Permits
Dip Bag Net	1994	16
Drag Seine	1994	3
Gill Net	1994	?
Lampara	1994	18
Purse Seine	1994	2
Shellfish Licenses:		
Dungeness Crab (coastal)	1995	264
Dungeness Crab (Puget Sound)	1994	333
Ocean Pink Shrimp Delivery	1994	91
Ocean Pink Shrimp Single Delivery	?	?
Shrimp Pot Puget Sound	2000	24
Shrimp Trawl Puget Sound Fishery	1994	6
Other limited Licenses:		
Sea Cucumber Dive	1994	51
Sea Urchin Dive	1994	37
Whiting (Puget Sound)	1994	1

1/ maximum number of permits that may be issued/number issued

APPENDIX D: Description of Coastal States' Nearshore Fishery Management and Limited Entry Programs

Washington Nearshore Fishery Management

Washington has prohibited directed commercial fishing for groundfish in state waters since 1995. The open access fishery in Washington is substantially smaller than California and Oregon due to several actions taken to prohibit the take of nearshore species. In 1995, the The Washington Department of Fish and & Wildlife first prohibited the directed non-trawl harvest of groundfish in coastal state waters This was primarily in response to a developing hook-and-line fishery that was in direct competition with the coastal recreational fishery for black rockfish. Trawling (with a maximum footrope diameter of 5 inches) remained open after 1995 to allow targeting of sand sole and starry flounder, but subsequent analyses demonstrated unacceptable levels of rockfish bycatch and as a result, trawling in coastal state waters was fully prohibited beginning in 2000. The Fish and Wildlife Commission also took action at this time to prohibit the live fish groundfish fishery. Nearshore groundfish allowance is now restricted in the salmon troll fishery to incidental yellowtail rockfish. There are also incidental amounts of open access groundfish landed by pink shrimp trawlers without limited entry groundfish trawl permits. Washington groundfish regulations have left the sablefish DTL fishery and dogfish as the only potentially profitable open access fishing opportunities off of Washington with the sablefish DTL fishery being of primary importance

Members of the four groundfish treaty tribes operating off Washington (Makah, Quileute, Hoh, and Quinault) may fish for groundfish within their Usual and Accustomed fishing areas. These areas include both state and federal waters. A tribal vessel's participation in the groundfish fisheries is at the discretion of that vessel owner's tribe and tribal participation in groundfish fisheries would not be managed by this action.

Oregon Nearshore Permit History

During the late 1990, the Oregon nearshore commercial fishery effort increased due to the development of high value-added live-fish markets. By 1999, commercial nearshore fishers were becoming worried that the increase in effort would adversely affect the abundance of some nearshore species. They opened dialog at public meetings to request that the Oregon Department of Fish and Wildlife Commission (OFWC) take precautionary measures to limit the growth of the nearshore commercial fishery.

In 2000, the Oregon Fish and Wildlife Commission (OFWC) directed staff to develop a plan to take precautionary measures to limit the growth of nearshore commercial and recreational fisheries and to protect the nearshore resource, because little wasis known about the status of nearshore fishery stocks.

The plan adopted by the Oregon Fish and Wildlife Commission went into effect on January 1, 2003 and focused on 21 species of nearshore fish (which includeds vermilion rockfish and tiger rockfish) that live predominantly in the Oregon territorial sea. This interim plan was adopted in recognition of this increased harvest trend and in anticipation of further growth of the nearshore commercial fishery due to increasing restrictions and area closures for other commercial fisheries. The primary intent of the interim plan was to protect nearshore groundfish populations, which are primarily reef fish, from over harvest.

Black Rockfish and Blue Rockfish Permit *with* or *without* a Nearshore Endorsement	
Black rockfish	Black rockfish, *Sebastes melanops*
Blue rockfish	Blue rockfish, *Sebastes mystinus*

Nearshore Fish *with* a Nearshore Endorsement	
Greenling	Kelp greenling, *Hexagrammos decagrammus*
	Painted greenling, *Oxylebius pictus*
	Rock greenling, *Hexagrammos lagocephalus*
	Whitespotted greenling, *Hexagrammos stelleri*
Other nearshore rockfish	Black and yellow rockfish, *Sebastes chrysomelas*
	Brown rockfish, *Sebastes auriculatus*
	Calico rockfish, *Sebastes dalli*
	China rockfish, *Sebastes nebulosis*
	Copper rockfish, *Sebastes caurinus*
	Gopher rockfish, *Sebastes carnatus*
	Grass rockfish, *Sebastes rastrelliger*
	Kelp rockfish, *Sebastes atrovirens*
	Olive rockfish, *Sebastes serranoides*
	Quillback rockfish, *Sebastes maliger*
	Treefish, *Sebastes serriceps*
	* Tiger rockfish, *Sebastes nigrocinctus*
	* Vermilion rockfish, *Sebastes miniatus*
Cabezon	Cabezon, *Scorpaenichthys marmoratus*
Buffalo sculpin	Buffalo sculpin, *Enophrys bison*
Brown Irish lord	Brown Irish lord, *Hemilepidotus spinosus*
Red Irish lord	Red Irish lord, *Hemilepidotus hemilepidotus*
* You must have a nearshore endorsement to fish for tiger and vermilion rockfish. Landings of these species apply toward each fisher's federal shelf rockfish trip limit and the annual harvest guideline, and not toward the state trip limits or annual landing caps.	

The adoption of the Oregon Commercial Nearshore Interim Management Plan was the first step in the development of a comprehensive plan for Oregon's nearshore fisheries, while fishery managers gather information needed to determine optimum harvest levels for a sustainable resource.

Following the OFWC action, the Oregon Legislature established a separate commercial black rockfish and blue rockfish limited entry program for the nearshore fishery during the 2003 legislative session (Oregon Revised Statutes 508.945-508.960). This Legislative action also included the adoption into state law, provisions that were similar to the earlier OFWC administrative rule action to limit permits for nearshore species. The nearshore limited entry was incorporated as an "endorsement" on the black rockfish/blue rockfish limited entry permit for those who qualified earlier under the OFWC action. Implementation of the law began on January 1, 2004.

The Legislatively adopted limited entry plan defined qualification criteria for initial permit issuance and permit renewal criteria for black rockfish/blue rockfish permits. The permits were associated with the vessel and were initially issued to applicants owning a vessel that landed a minimum of 750 pounds of non-trawl caught black rockfish, blue rockfish, or nearshore fish defined under the OFWC plan in any one calendar year between January 1, 1995 and July 1, 2001. Additionally, vessels that had received a nearshore endorsement issued by the OFWC in 2003 were granted a nearshore endorsement in legislation.

Under the new law, Oregon limited entry permits for the commercial harvest of black rockfish and blue rockfish and/or nearshore species were issued to 142 of the 214 vessels that initially qualified. Seventy two of the 214 vessels that qualified for the commercial black rockfish and blue rockfish limited entry permit failed to purchase the permit; some fishers were no longer fishing commercially. Nearshore endorsements (for nearshore fish, including nearshore rockfish other than black rockfish and blue rockfish, cabezon, and greenling) were granted to 73 of the 142 vessels that had been issued permits for the black rockfish and blue rockfish limited entry program. In addition, state landing caps and cumulative trip limits (more restrictive than federal trip limits) for black rockfish and blue rockfish, other nearshore rockfish, cabezon, and greenling were enacted following the implementation of the limited entry program.

The tInitial target goals of not less than 80 black rockfish/blue rockfish permits and of which not less than 50 of those include a nearshore endorsement were established by the OFWC. This level of effort was consistent with the goal of reducing the 2002 fleet size by approximately 50 percent (note: 142 vessels landed nearshore fish in 2002; approximately 100 of those vessels had at least one landing of which nearshore fish comprised 50 percent or more of the landing signifying targeting of nearshore fish). The final Legislative limited entry plan provides for a lottery of black rockfish/blue rockfish permits and nearshore endorsements at the time the permit number reaches the above mentioned thresholds, if determined warranted by the OFWC. The target participation goals will be evaluated prior to developing a federal limited entry program.

Oregon has conversed with the affected industries and communities through public meetings and has made changes to the commercial nearshore fishery capacity goals since the original program was implemented.

Changes to the commercial nearshore fishery capacity goals include:

- Oregon landing caps have been implemented. These are more restrictive than the Federal limits for the species included in the state nearshore species list.
- Cumulative commercial trip limits are set more restrictive than Federal levels
- Season length is set by the OFWC in December for the following year (In-season adjustments to the cumulative trip limits are implemented by rule by the OFWC to sustain the fishery through the desired season duration without exceeding the landing caps).
- Gear restrictions: pot gear prohibited (except as permitted by the state commercial nearshore limited entry permit endorsement) and dive gear prohibited. Additional in-season gear restrictions are considered

- **Commercial Black Rockfish Zones**

  Oregon landings of black rockfish with all commercial gear except trawl are limited to 200 pounds per vessel per trip in the following areas (defined by latitude in Oregon regulations):

  - Tillamook Head to Cape Lookout
  - Cascade Head to Cape Perpetua

  - From a point approximately 8-1/2 miles north of the Coos bay north jetty to a point about 4-1/2 miles south of the Bandon south jetty
  - Mack Arch to Oregon-California border

- Size limits:
  - China, Copper, Grass, & Quillback Rockfish —12 inches
  - Greenling—12 inches
  - Cabezon—16 inches

- Logbooks required. Logbooks were implemented in 2003 by the OFWC, and legislatively mandated in 2004.
- Rockfish Conservation Area - Federal regulation compliance

ODFW is implementing the *Oregon Nearshore Strategy* and, as part of implementation, is currently developing a comprehensive Nearshore Fisheries Management Plan (NFMP) for the state of Oregon. The NFMP is to serve as a guide and plan of action for the state's management of nearshore commercial and recreational fisheries. The first phase of the NFMP has been focused on developing a management framework and is scheduled to be completed by summer 2007. The second phase of the NFMP will be a revision of the Interim Management Plan focused on developing a Fishery Management Strategy for the commercial black rockfish/blue rockfish/nearshore groundfish limited entry fishery. Beginning in summer 2007, ODFW will be undergoing a public process to review and revise the commercial black rockfish/blue rockfish/nearshore groundfish limited entry fishery, with an anticipated completion date of fall of 2008. This may result in revisions to the details of the nearshore commercial fishery harvest and season requirements.

Status of Oregon Black rockfish/Blue Rockfish permits and Nearshore endorsements:

	2003	2004	2005	2006	2007
# of B/B permits with NS endorse issued	73	73	73	72	71
# of B/B permits with NS endorse USED	73	73	72	71	NA*
# of B/B permits without NS endorse issued		69	62	60	56
# of B/B permits without NS endorse USED		62	60	56	NA*

* Permits can be renewed (showing use) up to April 30th, 2008 of each year.

References:

1. Oregon Revised Statutes 508.945 through 508.960

2. Marine Nearshore Groundfish Project – Summary of Interim Management Plan for Oregon's Nearshore Commercial Fishery (Interim Management Plan adopted by OFWC 10/11/02)
http://www.dfw.state.or.us/MRP/publications/northshore_comm_fisheries.pdf
(http://www.dfw.state.or.us/MRP/nsgroundfish/plan_summary.asp)

3. Fact Sheet, Oregon Department of Fish and Wildlife – New Commercial Black Rockfish/Blue Rockfish Nearshore Fishery Limited Entry Permit (final 12/10/03 (corrected 6/1/04)) (http://www.dfw.state.or.us/MRP/regulations/commercial_fishing/blackrf/blackblue_factsheet121003.pdf)
4. ODFW. 2005. *Oregon Nearshore Strategy*. Salem: Oregon Department of Fish and Wildlife. http://www.dfw.state.or.us/MRP/nearshore/document.asp.

5. ODFW--*Oregon Nearshore Fisheries Management Plan*. (in prep.). Newport: Oregon Department of Fish and Wildlife, Marine Resources Program.

California Nearshore Permit History

California's nearshore fishery has undergone many changes over the last decade. In 1999, commercial licensing changed with the requirement that a nearshore permit be required by any person landing the following nearshore species: black-and-yellow, gopher, kelp, China, and grass rockfishes, CA scorpionfish, kelp and rock greenling~~s~~, CA sheephead, and cabezon. This licensing requirement was set as the initial step in a permitting program and did not restrict participation. This process was followed by the "Nearshore Fishery Permit Moratorium; Renewal; Restricted Access" in 2002 which made it possible to renew the previously issued permit but disallowed any new entry/permitting. This regulation stated that the moratorium would expire on March 31, 2002 unless extended by the Fish and Game Commission (Commission). In addition, a December 31, 1999 control date was established for the purpose of developing a restricted access nearshore fishery. Only those possessing a valid Nearshore Fishery Permit as of the control date would be considered in a future restricted access nearshore fishery.

In 2002, the newly adopted CDFG Nearshore Fishery Management Plan (FMP) identified the need to restrict the nearshore fishery due to overcapitalization. During the FMP scoping process many aspects of the fishery were considered to ensure that a successful restricted access program was developed. The Commission submitted a policy report to the CDFG in which it voiced the credence of developing and utilizing a restricted access program as a fishery management tool. As a result, in 2003 California implemented a Restricted Access Fishery Permit Program.

Beginning in 2003, the moratorium was reconstructed into what is now the current "Nearshore Fishery Restricted Access Program". This full restricted access program was implemented for the shallow nearshore species to promote the ecological and economic sustainability of the fishery to be consistent with the Marine Life Management Act and Fish & Game Commission policies. The purpose was to reduce the number of participants and move closer to a statewide capacity goal set by the Commission at 61 participants. Transferable and non-transferable "Nearshore Fishery Permits" were issued based on historical fishery participation and were regional:

1. North Coast Region: OR/CA border to 40° 10'
2. North-Central Coast Region: 40° 10' to Año Nuevo
3. South-Central Coast Region: Año Nuevo to Point Conception
4. South Coast Region: Point Conception to CA/Mexico border

One of the requirements of the restricted access policy was establishment of a capacity goal. The nearshore plan analysis determined that 61 vessels would reduce the fishing fleet to reduce over-capitalization and increase sustainability. Title 14 of the California Code of Regulations (CCR) Section 150.01 states, "Until the number of permits in a regional management area equals or falls below the capacity goal for that regional management area a permit may only be transferred if one additional transferable permit for the same regional management area is surrendered to the department for cancellation at the same time the application for the transfer is submitted to the department" This strategy has allowed for the yearly decrease in the number of permittees at a total rate of 13 percent since implementation in 2003.

Table B-1. Regional capacity goals as defined in CCR, Title 14, section 150.

Shallow Nearshore Fishery Permit Regions	Capacity Goal
North Coast	14
North-Central Coast	9
South-Central Coast	20
South Coast	18
Non-transferable for all regions	0
Total	61

Also in 2003, a non-transferable statewide "Deeper Nearshore Species Fishery Permit" was first required to take black, blue, brown, calico, copper, olive, quillback, and treefish rockfishes. This permit, like the nearshore permit, also prevented further expansion of the fishery. The following table documents the issuance level of the nearshore and the deeper permits before and since the restricted access implementation. Additionally it documents the number of permittees that have utilized the permit to land the appropriate species group.

As part of the nearshore restricted access permit program, a Nearshore Fishery Bycatch Permit was provided. This program allowed permittees with vessels using trawl or entangling nets to take and possess small amounts of shallow nearshore species as bycatch. Bycatch permits are non-transferable and allow permittees to take 25 pounds of nearshore species per trip in the south-central region and 50 pounds of nearshore species per trip in the south region. Permit holders are subject to all state and federal cumulative trip limits as defined in regulations.

Table B-2. Total number of permits issued and actual number or permits used

	1999	2000	2001	2002	2003	2004	2005	2006
# of NS permits issued	1,128	1,060	753	504	-------	-------	-------	-------
# of shallow issued	-------	-------	-----	-------	227	208	202	195
# of deeper issued	-------	-------	-----	-------	292	275	257	247
# permits USED	-------	-------	-----	-------	S- 167 D-182	S-158 D-184	S- 145 D-173	S-149 D-173

APPENDIX E: Analysis of B permit Qualification Criteria Contained in the September 2008 Preliminary Draft Environmental Assessment: Allocative, Biological and Economic Implications [13]

Introduction

A range of alternatives is being considered regarding federal permitting of open access groundfish fisheries. Three of the five alternatives contained in the September 2008 Preliminary Draft Environmental Assessment (Draft EA) propose to limit the number of vessels that would initially be allowed to target (directly fish for) specified groundfish species. Two of the latter alternatives have initial fleet size goals associated with them, while the third and fifthalternatives limit the initial fleet size based on the number of vessels meeting one (or more) minimum qualification standards (see **Chapter 2** for details of the alternatives).

Open access fishery participation differs between states and ports. In some ports, the majority of vessels participate only occasionally, often not making open access landings in two consecutive years. In other ports, there may be a core group of regular open access participants who are active in the fishery throughout the year and on a year-to-year basis. Chapter 4 brings together the results of the analyses presented in this appendix.

Fishing regulation changes over time or regulation differences between areas can affect the ability of vessels in some areas to harvest fish compared to vessels in areas with less restrictive regulations. Washington prohibits directed commercial fishing in state waters while fishermen in all three states have to deal with large area closures aimed at protecting sensitive or overfished fish species. Some areas of the coast have been denied open access groundfish fishing opportunity, which has increased fishing effort in the open fishing areas. The number of vessels that have made directed B species [14] landings in the WOC area has increased in recent years (**Table 2-1**).

The open access directed fishery has changed over time from one that harvested large amounts of shelf rockfish to one that now primarily harvests sablefish off of all three states and B species groundfish in association with nearshore species off of Oregon and California. Some vessels no longer participate in the fishery while several new vessels have joined the fleet in recent years. Trends in fishing effort have varied between states and ports over time, likely related to fishing regulation changes aimed at protecting overfished groundfish species, market and operating expense changes, or fluctuations in other fisheries such as salmon and Dungeness crab. The selection of base years for permit qualification is an important decision because it determines, along with associated landings or participation criteria, which vessels will be eligible for permit qualification. A variety of landings criteria have been used in implementing permit programs in other fisheries. Some of these are considered here for use in determining which vessels should be eligible for a directed fishery or B permit. The selection of permit qualification criteria has allocative as well as biological and economic implications. The following analyses are aimed at describing and evaluating the impacts of current permit qualification criteria relative to the issues outlined in **Chapter 4**

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[13] Updated by LB Boydstun and Gerry Kobylinski, California Department of Fish and Game January 6, 2009

[14] B species groundfish include all federal groundfish species excluding nearshore rockfish, cabezon, kelp greenling and California scorpionfish

Methods

The vessel qualification criteria contained in the B permit alternatives, A-3, A-4, and A-5, used two or more of the following fishery standards: (1) one or more years of recent fishery participation; (2) one or more years of long-term fishery participation; and (3) ability to contribute to fishery landings based on weight of fish landed or frequency of fishery participation. The rationales for using these standards are explained in **Table E-1**.

Table E-1. Participation standards used in developing B permit qualification criteria

Standard	Rationale	Action
1: Recent year participation	Vessel owner recently dependent on fishery	Use recent year data for permit qualification
2: Long-term directed fishery participation	Shows historic dependence on the fishery	Use data from earlier window period years for permit qualification
3: Ability to contribute fishery landings	Shows vessel ability to harvest fish	Establish fishery contribution metrics that show vessel owner dependence on B species directed fishery.

Vessel-specific catch history data were downloaded from the PacFIN data base to desktop computers for use in determining vessel qualification relative to the 31 qualification criteria (QC) contained in the four B permit alternatives (A-3, A-4, and A-5) (**Table E-2)**. Only data for vessels that made a directed B species groundfish landing using open access fishing gear during the widow period (April 1998-September 2006) were included. The data downloaded for each vessel landing included: vessel identification number, port group where landed, and pounds and ex-vessel value of B species groundfish landed. Associated fishery landings data, including pounds and ex-vessel value by specified species groups, were extracted and included in the data base for each vessel for the window period years of 2004-2006. Data were then organized for each vessel on an annual basis and each vessel was assigned to (1) a port group and (2) target species group, which were determined as follows:

Port group: PSMFC standard port groups were used to determine geographic locations where vessel landings were made. Vessels were assigned to port groups based on location where the *most* deliveries were made in the last year of B species directed fishery participation (thus, neither pounds nor ex-vessel value was used in this determination).

Target-Species Vessel Group: Vessels were assigned to target-species vessel groups based on B species revenues received during 2004-2006. The target species groups were: sablefish, shelf rockfish, slope rockfish, lingcod, sharks (federal sharks and rays), and other species. Vessels were assigned to species groups based on receipt of >50 percent of B species revenues from a single group. Vessels that could not be assigned to a species group were placed in a non-target species vessel group.

Table E-2. B permit qualification criteria contained in alternatives 1-5

Alternative	Standard	Framework(s) to use for analysis	Abbrev
1 & 2	n/a	n/a	n/a
3 (a)	top 680 vessels	cum lbs, 2004-2006 (QF-1)	680v-1
	top 680 vessels	cum lbs, 1998-2006 (QF-2)	680v-2
	top 680 vessels	cum lbs, 1998-2006, w/ 2004-2006 trip (QF-3)	680v-3
3 (b)	top 713 vessels	QF-1, QF-2 and QF-3	713v-1, 2, 3
4	≥ 47,900 lbs	QF-3	47.9K-3
	≥ 36,100 lbs	QF-3	36.1K-3
	≥ 21,800 lbs	QF-3	21.8K-3
	≥ 14,400 lbs **Group 1**	QF-3	14.4K-3
	≥ 6,100 lbs	QF-3	6.1K-3
	≥ 3,500 lbs	QF-3	3.5K-3
	≥ 1,600 lbs	QF-3	1.6K-3
	≥ 1 lb	QF-1 or QF-3	1lb-1
	≥ 1 trip 1/	QF-1 or QF-3	1trip-1
	≥1 trip in two yrs	trips per year, 2004-2006 (QF-4)	2 in 3 yrs-4
	≥ 100 lbs	max lbs, any yr, 2004-2006 (QF-5)	100 max-5
	≥ 500 lbs **Group 2**	QF-5	500 max-5
	≥ 1000 lbs	QF-5	1000 max-5
	≥ 2000 lbs	QF-5	2000 max-5
	≥ 100 lbs	QF-1 and QF-3	100 lbs-1, 3
	≥ 500 lbs **Group 3**	QF-1 and QF-3	500 lbs-1, 3
	≥ 1000 lbs	QF-1 and QF-3	1000 lbs-1, 3
	≥ 2000 lbs	QF-1 and QF-3	2000 lbs-1, 3
5	top 390 vessels	QF-1, QF-2 and QF-3	390v-1, 2, 3

1/ Not analyzed separately; impact is the same as ≥ 1 lb

Microsoft spreadsheet software (*Excel*) was used to sort, filter and compile vessel landings data based on the parameters specified in the five qualification framework (QFs) contained in alternatives A-3, A-4 and A-5 (**Table E-2)**. Each QF included a base period and unit of measure (metric). The base periods were inclusive of all or some window period years while the metrics used were either pounds landed or frequency of landings (trips) made during specified years. A qualification standard (QS) was specified as part of each QC. These were units of measure or a vessel ranking objective used to determine specifically which vessels would qualify (and not qualify) for permits. QSs and QFs are the adjustable and fixed elements, respectively, of each QC. The model runs for each QC produced listings of vessels that would qualify and not qualify for permits and their associated commercial fishery landings data.

Hindcast analysis was used to assess fishery impacts of QC outputs. The base years for these analyses were 2004-2006. Data prior to 2004 were not used because of major regulation differences in earlier years compared to 2004-2006 and those that can be expected in near term future years. These differences included (1) implementation of nearshore groundfish management programs off Oregon and California starting in 2003 (**Appendix D**), (2) the creation of large area groundfish closures to protect overfished or sensitive fish species off of all three states starting in 2002 (**Appendix G**), and (3) the adoption of more restrictive trip limits for shelf rockfish since 2000 (**Table 1-2)**. Also, 2004-2006 were the years used to compute the initial fleet size goal in A-3 and represented the most recent years of increased B permit species vessel activity in the WOC area (**Figure 2-1)**.

The data sets produced for qualifying and non-qualifying vessels under each QC included: (i) number of vessels, pounds and revenues of B species groundfish and all other commercial species (associated species; e.g., salmon crab) landed, (ii) number of vessels by port group and state, (iii) ex-vessel revenues by port group and state, and (iv) number of permits by target-species group, port group and state.

Community impacts of the QCs were analyzed using income multipliers generated by the Fisheries Economic Assessment Model (FEAM) for non-trawl groundfish fisheries, which were differentiated by species category (see following table). A description of FEAM is found in Jensen 1996 and a recent update to the model is described in Davis 2003. Appendix D of the 2005-06 Groundfish EIS includes a further discussion of income impact estimating methodology.

Community impact multipliers

Non-trawl	Washington	Oregon	California
Lingcod	2.01	1.69	1.65
Rockfish	2.20	1.76	1.62
Sablefish	1.82	1.73	1.85
Sharks (PFMC)	4.19	6.74	2.43
Other species	assumed same as rockfish		
Non-target	assumed same as rockfish		

The above are estimates for personal income impacts from lingcod, rockfish (and perch), sablefish, sharks and other species (including non-target vessel landings) for non-trawl gears in 2003. An example of interpreting the results is, on average, in California for every $1 of ex-vessel revenue generated from sablefish catch, there is $1.85 income generated to the West Coast economy. These estimates are useful to show that there are monetary contributions to the economy from commercial fishing beyond ex-vessel revenue; however, it must be cautioned that the model does make various assumptions and therefore should not be seen as absolute, but as estimates. Further, the number of landings and price for a given year will have an effect on the multipliers obtained.

The selection of a preferred QF is an important part of the public review, regulatory, and permit program implementation process. The five QFs described in **Table E-2** were analyzed using a single set of qualification standards that was developed for this report. This was done to be consistent in the application of a single set of qualification standards across all frameworks and to cover a wide range of harvest reduction scenarios possibly resulting from B permit issuance. The analysis helps to explain some of the impact differences in QCs seen in QC model run outputs. The standards used were based on retaining the following proportions of B species directed fishery landings in the WOC area during 2004-2006: 50 percent, 80 percent, 90 percent, and 95 percent. Vessels were ranked from high to low in each analysis based on QF parameters except for QF-4, which used landing frequency for permit qualification, independent of pounds landed.

The distribution of permits by target-species vessel group was analyzed for three qualification criteria that used a single qualification framework: total B species pounds landed during 2004-2006 (QF-1). This same framework was used to analyze the the impact of a wide range of initial fleet size goals (200-1000 vessels) for vessels that would have qualified for B permits by target species vessel group. This was done to determine if potential revenue impact of B permit non-qualification might be related to target species strategy.

Limited entry (permit) management has the potential for reduced fishery discards stemming from enhanced trip and cumulative landing limits. Trip limit overages and high grading can be associated with restrictive trip limits. The possibility for increased trip and cumulative landing limits under the alternatives are discussed in **Section 4**. Other potential benefits associated with B permit management would accrue in the form of 1) improved fish handling techniques, 2) increased level of fisherman regulation compliance and 3) increased cooperation with fishery sampling programs. *These are recognized attributes of limited entry management, but are not readily quantifiable in terms of future fishery yield (in pounds or revenues) or reduced level of regulation enforcement or fishery monitoring required for effective fishery management.*

Results

Qualification Framework Comparisons

Under QF-4 a total of 595 vessels would qualify for permits based on 2004-2006 fishery participation data. The qualifying vessels landed a total of 88 percent of the WOC B species directed fishery groundfish during 2004-2006 (**Table E-3a; Figure E-1**). A total of 67 Washington vessels (11 percent) met this criterion compared to 192 and 336 for Oregon and California, respectively (32 percent and 56 percent, respectively) **(Table E-3b**). The other frameworks (Q-1, Q-2, Q-3 and Q-5) used weight-based metrics, which allowed for harvest retention analysis for all landings made during 2004-2006.

Table E-3a. Minimum landing metrics (pounds) for permit qualification and number of vessels that landed specified proportions of B species groundfish during 2004-2006 using qualification frameworks 1-5 and vessel ranking based on framework parameters except as noted

	QF-1		QF-2		QF-3		QF-4 1/		QF-5	
	2004-2006 lbs		1998-2006 lbs		1998-2006 lbs w/04-06 trip		active 2 yrs, 04-06		max yr, 04-06	
P 2/	metric	# vsls	metric	# vsls	metric	# vsls	metric	# vsls	metric	# vsls
50%	26,918	67	40,449	106	40,449	82	n/a	n/a	14,895	70
80%	7,571	201	10,472	338	10,472	248	n/a	n/a	5,473	206
90%	3,207	332	4,737	569	4,737	394	n/a	595 3/	1,991	344
95%	1,594	466	2,573	799	2,573	530			1,097	481

1/ vessel ranking not used for this analysis

2/ Proportion of B species harvested during 2004-2006

3/ 88%

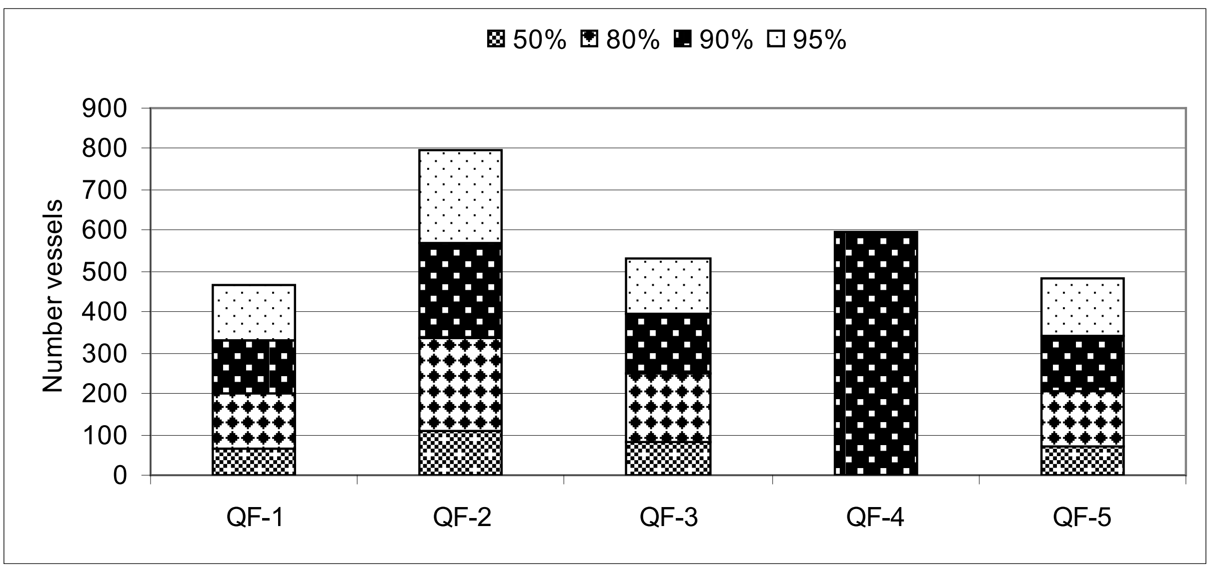

Figure E-1: Number of vessels that landed specified proportions of B species landings in the WOC area during 2004-2006 that would qualify for B permits under QF-1, 2, 3, 4 and 5. Vessels were ranked from high to low based on framework parameters except for QF-4, which is explained in the text.

Analysis of these latter frameworks showed that QF-2 required substantially more vessels than the other frameworks (29-51 percent compared to QF-3) to meet the specified harvest levels, followed in order by QF-3, QF-5, and QF-1 (**Table E-3a; Figure E-1)**. The higher number of vessels required under QF-2 was because a relatively high proportion of vessels (23-34 percent depending on framework) that would qualify for permits did not participate in the fishery during 2004-2006. Most of these were California vessels (**Table E-3b**). QF-3 required more vessels than QF-5 by 10-20 percent depending on harvest level, while QF-5 and QF-1 were within 2-4 percent of each other (**Table E-3a**). The relatively high number of vessels under QF-3 compared to QF-1 and QF-5 is because some of the vessels that would be permitted under QF-3 had lower catch histories during 2004-2006 than some of the vessels that did not qualify for permits.

Table E-3b. Number of vessels by qualification framework and state that landed specified proportions of WOC B species groundfish using vessel ranking based on framework parameters except as noted

		QF-1	QF-2		QF-3	QF-4 1/	QF-5
P 2/	state	# vsls	# vsls	no 04-06	# vsls	# vsls	# vsls
50%	WA	16	15	0	15	n/a	15
	OR	15	17	2	15	n/a	15
	CA	36	74	22	52	n/a	40
	sum	67	106	24	82	n/a	70
80%	WA	47	59	10	49	n/a	48
	OR	59	86	17	69	n/a	63
	CA	95	193	63	130	n/a	95
	sum	201	338	90	248	n/a	206
90%	WA	80	93	24	69	67	87
	OR	101	161	36	125	192	104
	CA	151	315	115	200	336	153
	sum	332	569	175	394	595 3/	344
95%	WA	95	124	34	90		105
	OR	155	235	65	170		155
	CA	216	440	170	270		221
	sum	466	799	269	530	n/a	481
100%	WA	126	207	81	126		126
	OR	345	661	316	345		345
	CA	632	1719	1087	632		632
	sum	1103	2587	1484	1103	n/a	1103

1/ Vessel ranking not used

2/ Proportion of 2004-2006 B species landings

3/ 88%

Washington permit proportions were highest under QF-1 at the 50 percent and 90 percent retention levels (23-24 percent) and QF-5 at the 90 percent and 95 percent levels (22-25 percent). The Washington proportion was maximal across all frameworks at the 90 percent retention level (**Table E-3b)**. Oregon proportions were highest under QF-1 in two comparisons (22-33 percent), under QF-5 in one comparison (31 percent) and under QF-3 in one comparison (32 percent). The Oregon proportion was maximal across all frameworks at the 95 percent retention level (**Table E-3b)**. California received proportionately more permits under QF-2 (55-70 percent) followed by QF-3 (51-63 percent). The California proportion was maximal across all frameworks at the 50 percent retention level (53-70 percent), followed by the 80 percent level (47-57 percent) (**Table E-3b)**.

Potential Fishery Impact: Qualifying Vessels

The number of vessels that would qualify for B permits under the qualification criteria contained in A-3, A-4 and A-5 ranged from 65 to 1,103 vessels. Two of the alternatives would permit every vessel that made a B species groundfish landing during 2004-2006 (1 lb; 1 trip) and two others would permit more vessels that made a directed fishery landing in any year during 2004-2006 (100 max-5; 100 lbs-1). The two most restrictive criteria would qualify 65 and 95 vessels (47.9K-3; 36.1K-3, respectively) **(Table E-4a, Figure E-2**).

Table E-4a. Landings data from 2004-2006 for vessels that WOULD QUALIFY for B permits under criteria contained in A-3, A-4 and A-5, including landings data for 2004-2006 window period 1/

		# Vsls		Directed fishery metrics				Associated fishery metrics				Total fishery metrics			
Altern	Years or Criterion 2/	Base period	Active 04-06	BGF mt	P 3/	BGF 000s	P 3/	mt	P 4/	000s	P 4/	mt	P	000s	P
A-1 & A-2	04-06 WP	1,103	1,103	2,796	1.00	$8,531	1.00	42,720	0.94	$116,160	0.93	45,516	1.00	$124,692	1.00
	98-06 WP	2,587	1,103	2,796	1.00	$8,531	1.00	42,720	0.94	$116,160	0.93	45,516	1.00	$124,692	1.00
A-3	680v-1	680	680	2,757	0.99	$8,379	0.98	34,350	0.93	$87,443	0.91	37,106	1.00	$95,822	1.00
	680v-2	680	468	2,602	0.93	$7,797	0.91	33,105	0.93	$79,296	0.91	35,707	1.00	$87,094	1.00
	680v-3	680	680	2,736	0.98	$8,297	0.97	34,576	0.93	$90,679	0.92	37,313	1.00	$98,976	1.00
	713v-1	713	713	2,765	0.99	$8,408	0.99	35,560	0.93	$91,229	0.92	38,324	1.00	$99,637	1.00
	713v-2	713	486	2,618	0.94	$7,855	0.92	33,940	0.93	$82,002	0.91	36,558	1.00	$89,857	1.00
	713v-3	713	713	2,748	0.98	$8,340	0.98	35,238	0.93	$93,038	0.92	37,987	1.00	$101,377	1.00
A-4	47.9K-3	65	65	1,214	0.43	$3,075	0.36	1,793	0.60	$7,240	0.70	3,008	1.00	$10,315	1.00
	36.1K-3	95	95	1,508	0.54	$4,126	0.48	2,563	0.63	$10,741	0.72	4,071	1.00	$14,866	1.00
	21.8K-3	139	139	1,810	0.65	$5,014	0.59	3,969	0.69	$15,851	0.76	5,779	1.00	$20,865	1.00
	14.4K-3	209	209	2,112	0.76	$6,051	0.71	7,183	0.77	$26,960	0.82	9,294	1.00	$33,011	1.00
Grp 1	6.1K-3	341	341	2,441	0.87	$7,214	0.85	22,773	0.90	$50,741	0.88	25,214	1.00	$57,955	1.00
	3.5K-3	474	474	2,609	0.93	$7,826	0.92	26,852	0.91	$66,144	0.89	29,461	1.00	$73,970	1.00
	1.6K-3	629	629	2,713	0.97	$8,206	0.96	32,829	0.92	$85,012	0.91	35,542	1.00	$93,218	1.00
	1lb-1	1,103	1,103	2,796	1.00	$8,531	1.00	42,720	0.94	$116,160	0.93	45,516	1.00	$124,692	1.00
	1 trip-1	1,103	1,103	2,796	1.00	$8,531	1.00	42,720	0.94	$116,160	0.93	45,516	1.00	$124,692	1.00
	2 in 3 yrs-4	595	595	2,460	0.88	$7,519	0.88	25,925	0.91	$62,334	0.89	28,385	1.00	$69,853	1.00
Grp 2	100 max-5	939	939	2,792	1.00	$8,518	1.00	40,105	0.93	$108,351	0.93	42,898	1.00	$116,869	1.00
	500 max-5	655	655	2,796	1.00	$8,344	0.98	34,018	0.92	$85,684	0.91	36,814	1.00	$94,028	1.00
	1000 max-5	499	499	2,669	0.95	$8,044	0.94	29,197	0.92	$70,448	0.90	31,866	1.00	$78,492	1.00
	2000 max-5	343	343	2,514	0.90	$7,458	0.87	23,811	0.90	$51,241	0.87	26,325	1.00	$58,699	1.00
	100 lbs-1	950	950	2,793	1.00	$8,520	1.00	40,165	0.93	$108,568	0.93	42,958	1.00	$117,089	1.00
	500 lbs-1	701	701	2,762	0.99	$8,399	0.98	35,269	0.93	$90,280	0.91	38,031	1.00	$98,679	1.00
	1000 lbs-1	577	577	2,720	0.97	$8,241	0.97	30,975	0.92	$76,617	0.90	33,696	1.00	$84,858	1.00
Grp 3	2000 lbs-1	420	420	2,619	0.94	$7,853	0.92	24,999	0.91	$56,742	0.88	27,618	1.00	$64,595	1.00
	100 lbs-3	1,003	1,003	2,794	1.00	$8,525	1.00	41,071	0.94	$111,828	0.93	43,865	1.00	$120,353	1.00
	500 lbs-3	827	827	2,777	0.99	$8,455	0.99	38,140	0.93	$100,928	0.92	40,916	1.00	$109,383	1.00
	1000 lbs-3	727	727	2,753	0.98	$8,359	0.98	35,530	0.93	$94,131	0.92	38,283	1.00	$102,490	1.00
	2000 lbs-3	581	581	2,686	0.96	$8,107	0.95	31,350	0.92	$79,666	0.91	34,036	1.00	$87,774	1.00
A-5	390v-1	390	390	2,590	0.93	$7,751	0.91	23,886	0.90	$53,194	0.87	26,476	1.00	$60,945	1.00
	390v-2	390	286	2,330	0.83	$6,802	0.80	13,449	0.85	$48,021	0.88	15,779	1.00	$54,822	1.00
	390v-3	390	390	2,510	0.90	$7,463	0.87	23,636	0.90	$55,005	0.88	26,146	1.00	$62,469	1.00

1/ Abbreviations: WP=window period; BGF=B species groundfish; P=proportion

2/ Frameworks (Frames) QF1=2004-2006 base yrs; QF2=1998-2006 base yrs; QF3=1998-2006 base yrs and active 2004-2006. See Table E-2 for criteria descriptions

3/ Proportion of B species groundfish landed

4/ Proportion of total commercial fishery landings (total fishery metrics)

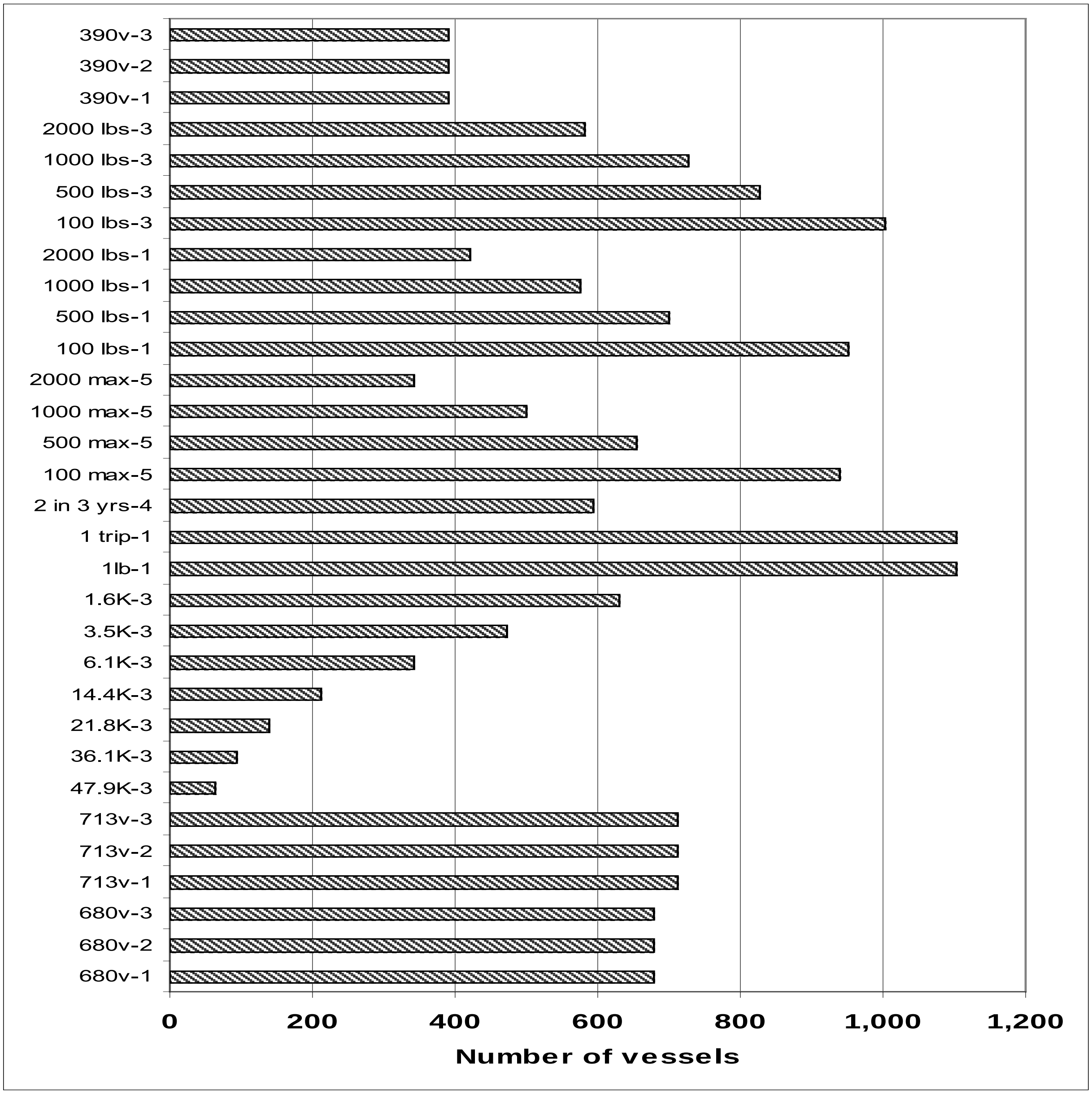

Figure E-2: Number of vessels that would qualify for permits under criteria contained in A-3, A-4 and A-5

B species revenues received by vessels that would qualify for B permits, expressed as a proportion of total B species revenues received during 2004-2006, ranged from 25 percent (47.9K-3) to 100 percent (1lb-1; 1trip-1). Twenty-two criteria (of 31) would award B permits to vessels that landed ≥90 percent of total B species groundfish revenues that were received during 2004-2006, and all except four (47.9K-3, 36.1K-3, 21.8K-3, and 14.4K-3) would award permits to vessels that landed ≥78 percent (**Table E-4a; Figure E-3).**

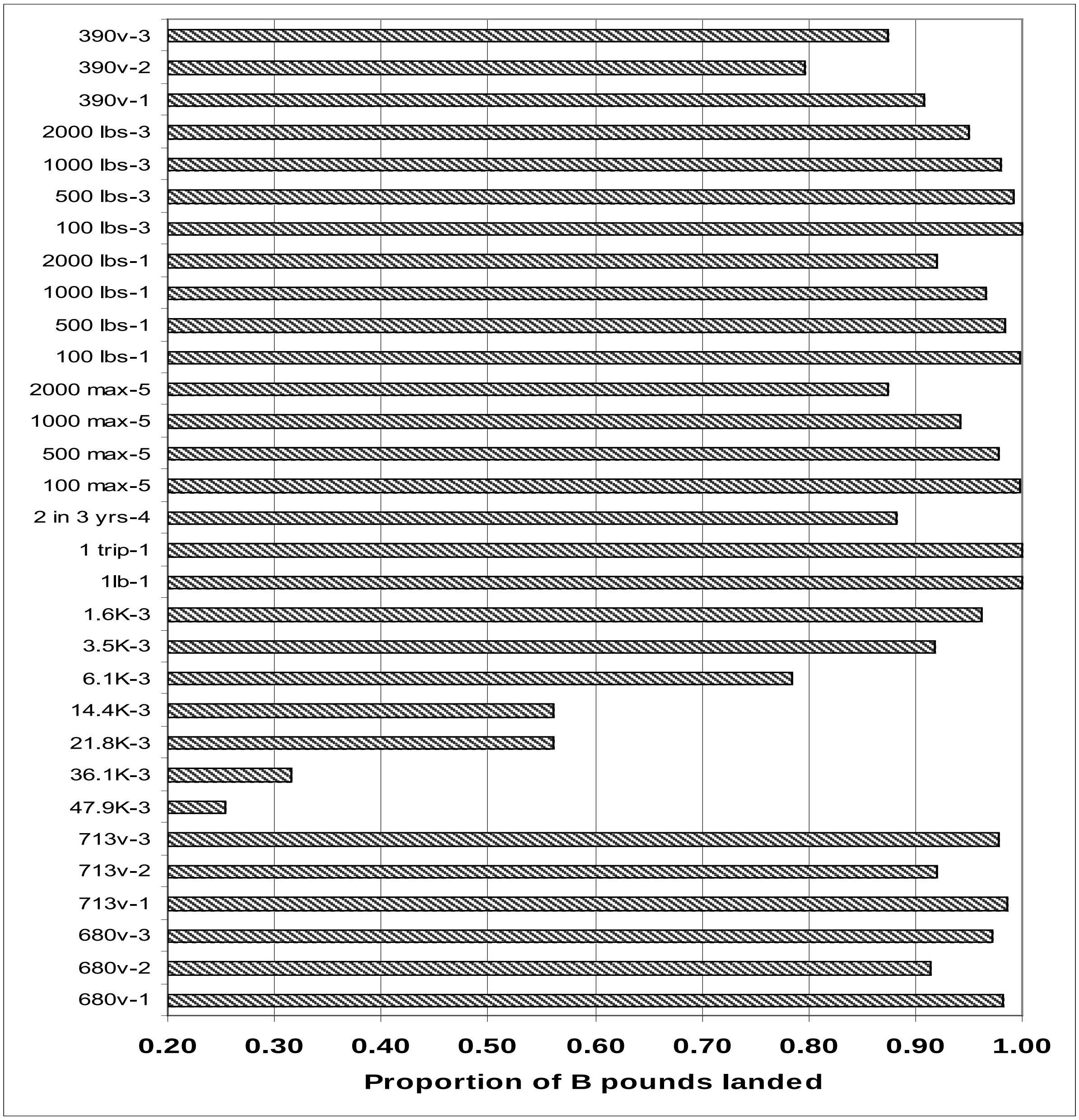

Figure E-3. Proportion of total B species groundfish revenues that were received by vessels that would qualify for B permits by qualification criterion

The proportion of total commercial fishery revenues received during 2004-2006 that were derived from associated species (non-B species groundfish) by vessels that would qualify for B permits was ≥ 87 percent under all criteria except two, which were 73 percent and 78 percent (47.9K-3 and 36.1K-3, respectively) (**Table E-4a; Figure E-4).**

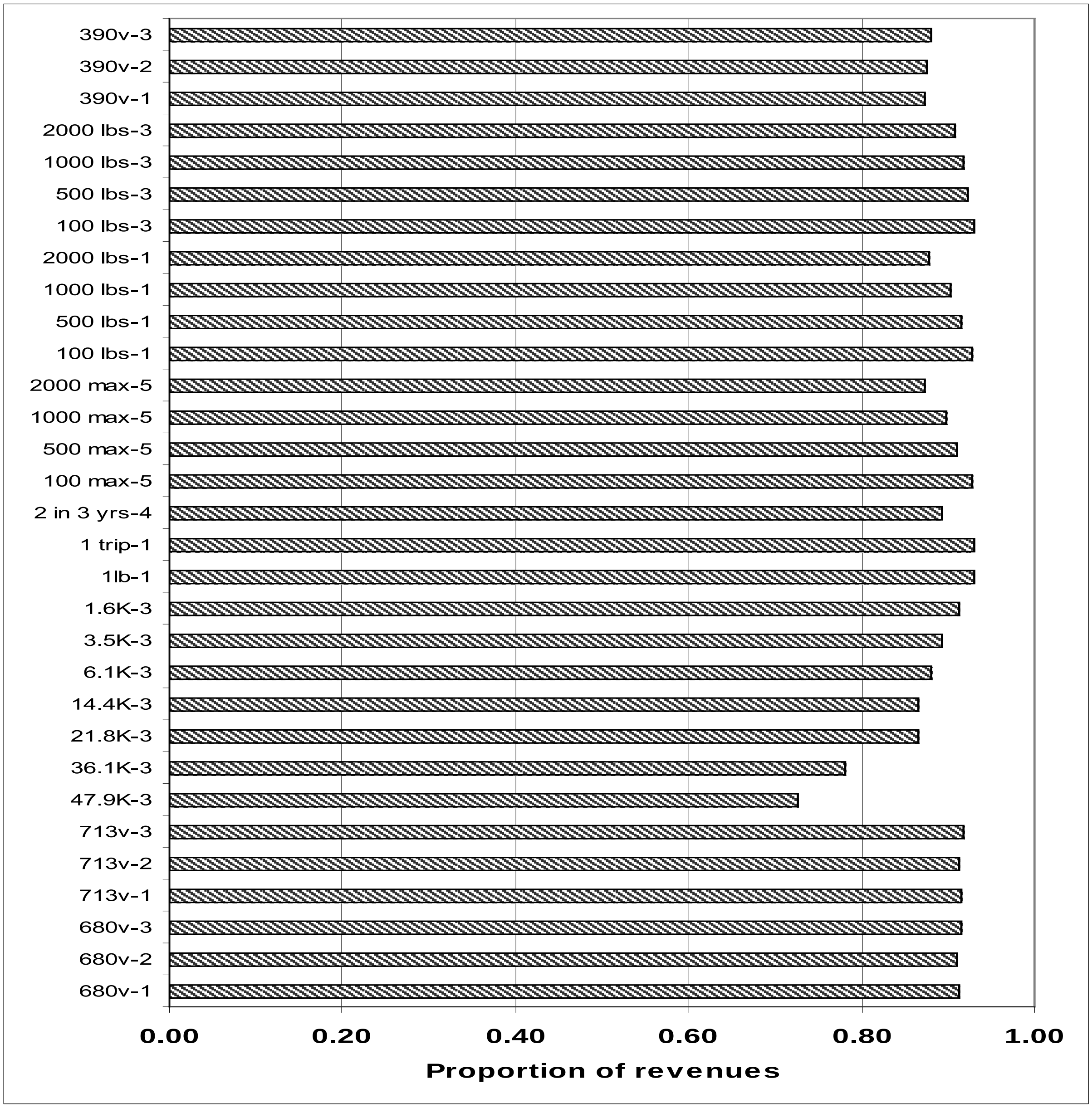

Figure E-4: Proportion of total commercial fishery revenues received by vessels that would qualify for B permits during 2004-2006 that was of associated species (non-B species groundfish) by qualification criterion.

Potential Fishery Impacts: Non-qualifying Vessels

The number of vessels that would not qualify for permits was influenced by the years used for qualification. Criteria that required vessel participation during 2004-2006 had the potential to qualify no more than 1,103 vessels, while those that used the entire window period had the potential to qualify up to 2,587 vessels **(Table E-4b).** Thus the range in number of vessels that would not qualify for B permits under the B permit criteria was quite wide: from 2,197 (390v-2) to zero (1 lb-1; 1 trip-1) (**Table E-4b; Figure E-5).**

Table E-4b. Landings data from 2004-2006 for vessels that WOULD NOT QUALIFY for B permits under criteria contained in A-3, A-4 and A-5 including landings data for 2004-2006 window period 1/

		# Vsls		Directed fishery metrics				Associated fishery metrics				Total fishery metrics			
Altern	Years or Criterion 2/	Base period	Active 04-06	BGF mt	P 3/	BGF 000s	P 3/	mt	P 4/	000s	P 4/	mt	P	000s	P
A-1 & A-2	04-06 WP	1,103	1,103	2,796	1.00	$8,531	1.00	42,720	0.94	$116,160	0.93	45,516	1.00	$124,692	1.00
	98-06 WP	2,587	1,103	2,796	1.00	$8,531	1.00	42,720	0.94	$116,160	0.93	45,516	1.00	$124,692	1.00
A-3	680v-1	423	423	39	0.01	$152	0.02	8,370	1.00	$28,717	0.99	8,410	1.00	$28,870	1.00
	680v-2	1,907	635	194	0.07	$734	0.09	9,615	0.98	$36,864	0.98	9,809	1.00	$37,598	1.00
	680v-3	423	423	59	0.02	$234	0.03	8,144	0.99	$25,481	0.99	8,203	1.00	$25,715	1.00
	713v-1	390	390	31	0.01	$123	0.01	7,160	1.00	$24,931	1.00	7,191	1.00	$25,054	1.00
	713v-2	1,874	617	178	0.06	$676	0.08	8,780	0.98	$34,158	0.98	8,958	1.00	$34,835	1.00
	713v-3	390	390	48	0.02	$192	0.02	7,482	0.99	$23,123	0.99	7,529	1.00	$23,315	1.00
A-4	47.9K-3	1,038	1,038	1,581	0.57	$5,457	0.64	40,927	0.96	$108,920	0.95	42,508	1.00	$114,377	1.00
	36.1K-3	1,008	1,008	1,288	0.46	$4,406	0.52	40,157	0.97	$105,420	0.96	41,445	1.00	$109,826	1.00
	21.8K-3	964	964	986	0.35	$3,517	0.41	38,751	0.98	$100,310	0.97	39,737	1.00	$103,827	1.00
	14.4K-3	894	894	684	0.24	$2,480	0.29	35,537	0.98	$89,200	0.97	36,221	1.00	$91,680	1.00
Grp 1	6.1K-3	762	762	355	0.13	$1,317	0.15	19,947	0.98	$65,420	0.98	20,302	1.00	$66,737	1.00
	3.5K-3	629	629	187	0.07	$705	0.08	15,868	0.99	$50,017	0.99	16,055	1.00	$50,722	1.00
	1.6K-3	474	474	83	0.03	$325	0.04	9,891	0.99	$31,149	0.99	9,974	1.00	$31,474	1.00
	1lb-1	0	0	0	0.00	$0	0.00	0	1.00	$0	1.00	0	1.00	$0	1.00
	1 trip-1	0	0	0	0.00	$0	0.00	0	1.00	$0	1.00	0	1.00	$0	1.00
	2 in 3 yrs-4	508	508	336	0.12	$1,012	0.12	16,795	0.98	$53,827	0.98	17,130	1.00	$54,839	1.00
Grp 2	100 max-5	163	163	4	0.00	$13	0.00	2,614	1.00	$7,810	1.00	2,618	1.00	$7,823	1.00
	500 max-5	448	448	0	0.00	$188	0.02	8,702	1.00	$30,476	0.99	8,702	1.00	$30,664	1.00
	1000 max-5	604	604	127	0.05	$488	0.06	13,522	0.99	$45,712	0.99	13,649	1.00	$46,200	1.00
	2000 max-5	760	760	282	0.10	$1,073	0.13	18,909	0.99	$64,920	0.98	19,190	1.00	$65,993	1.00
	100 lbs-1	154	154	3	0.00	$11	0.00	2,555	1.00	$7,592	1.00	2,558	1.00	$7,603	1.00
	500 lbs-1	402	402	34	0.01	$133	0.02	7,451	1.00	$25,880	0.99	7,485	1.00	$26,013	1.00
	1000 lbs-1	526	526	76	0.03	$290	0.03	11,744	0.99	$39,543	0.99	11,820	1.00	$39,833	1.00
Grp 3	2000 lbs-1	683	683	177	0.06	$679	0.08	17,721	0.99	$59,418	0.99	17,898	1.00	$60,097	1.00
	100 lbs-3	100	100	2	0	$6	0.00	1,649	1.00	$4,332	1.00	1,651	1.00	$4,339	1.00
	500 lbs-3	276	276	19	0.01	$77	0.01	4,580	1.00	$15,232	1.00	4,599	1.00	$15,309	1.00
	1000 lbs-3	376	376	43	0.02	$172	0.02	7,190	0.99	$22,030	0.99	7,233	1.00	$22,202	1.00
	2000 lbs-3	522	522	110	0.04	$424	0.05	11,370	0.99	$36,494	0.99	11,480	1.00	$36,918	1.00
A-5	390v-1	713	713	206	0.07	$780	0.09	18,834	0.99	$62,967	0.99	19,040	1.00	$63,747	1.00
	390v-2	2,197	817	466	0.17	$1,730	0.20	29,270	0.98	$68,140	0.98	29,737	1.00	$69,870	1.00
	390v-3	680	680	286	0.10	$1,068	0.13	19,084	0.99	$61,155	0.98	19,370	1.00	$62,223	1.00

1/ Abbreviations: WP=window period; BGF=B species groundfish; P=proportion

2/ Frameworks (Frames) QF1=2004-2006 base yrs; QF2=1998-2006 base yrs; QF3=1998-2006 base yrs and active 2004-2006. See Table E-2 for criteria descriptions

3/ Proportion of B species groundfish landed

4/ Proportion of total commercial fishery landings (total fishery metrics)

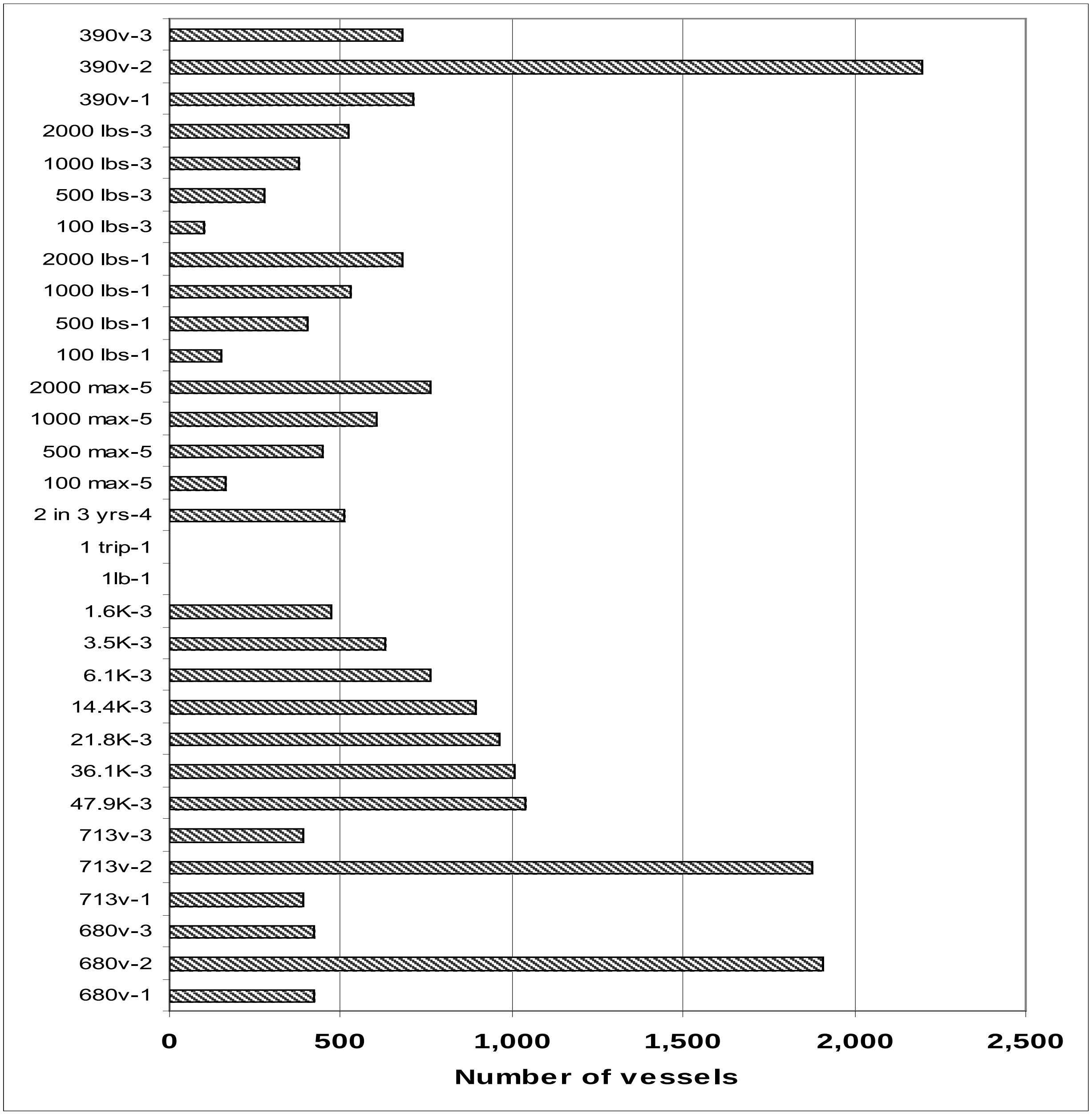

Figure E-5. Number of vessels that would not qualify for B permits under qualification criteria contained in A-3, A-4 and A-5

The B species revenues received by vessels that would not qualify for B permits, expressed as a proportion of total B species revenues received by all vessels during 2004-2006, ranged from zero percent (1 lb-1;1 trip-1) to 64 percent (47.9K-3). Twenty-two (of 31) criteria would award permits to vessels that landed ≤ 10 percent of the total B species groundfish revenues that were received during 2004-2006 (**Table E-4b; Figure E-6).**

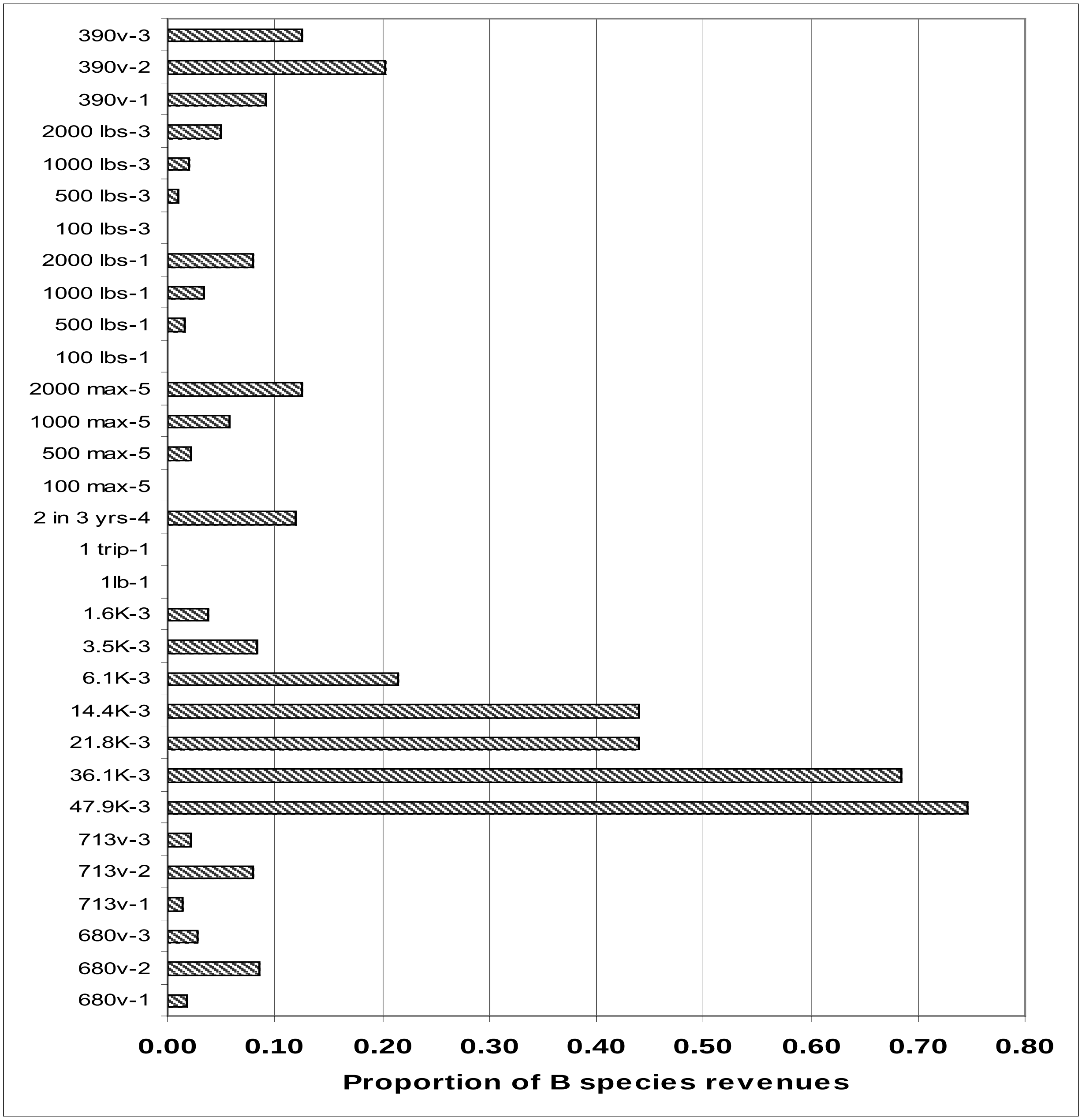

Figure E-6. Proportion of the B species groundfish revenues that were received by vessels that would not qualify for B permits by qualification criterion

The proportion of total commercial fishery revenues received by vessels that would not qualify for B permits that were of associated (non B species groundfish) species ranged from 95 percent (the two most restrictive criteria, 47.9K-3 and 36.1K-3) to 100 percent (the least restrictive criteria, 1lb-1 and 1 trip-1) **(Table E-4b; Figure E-7).**

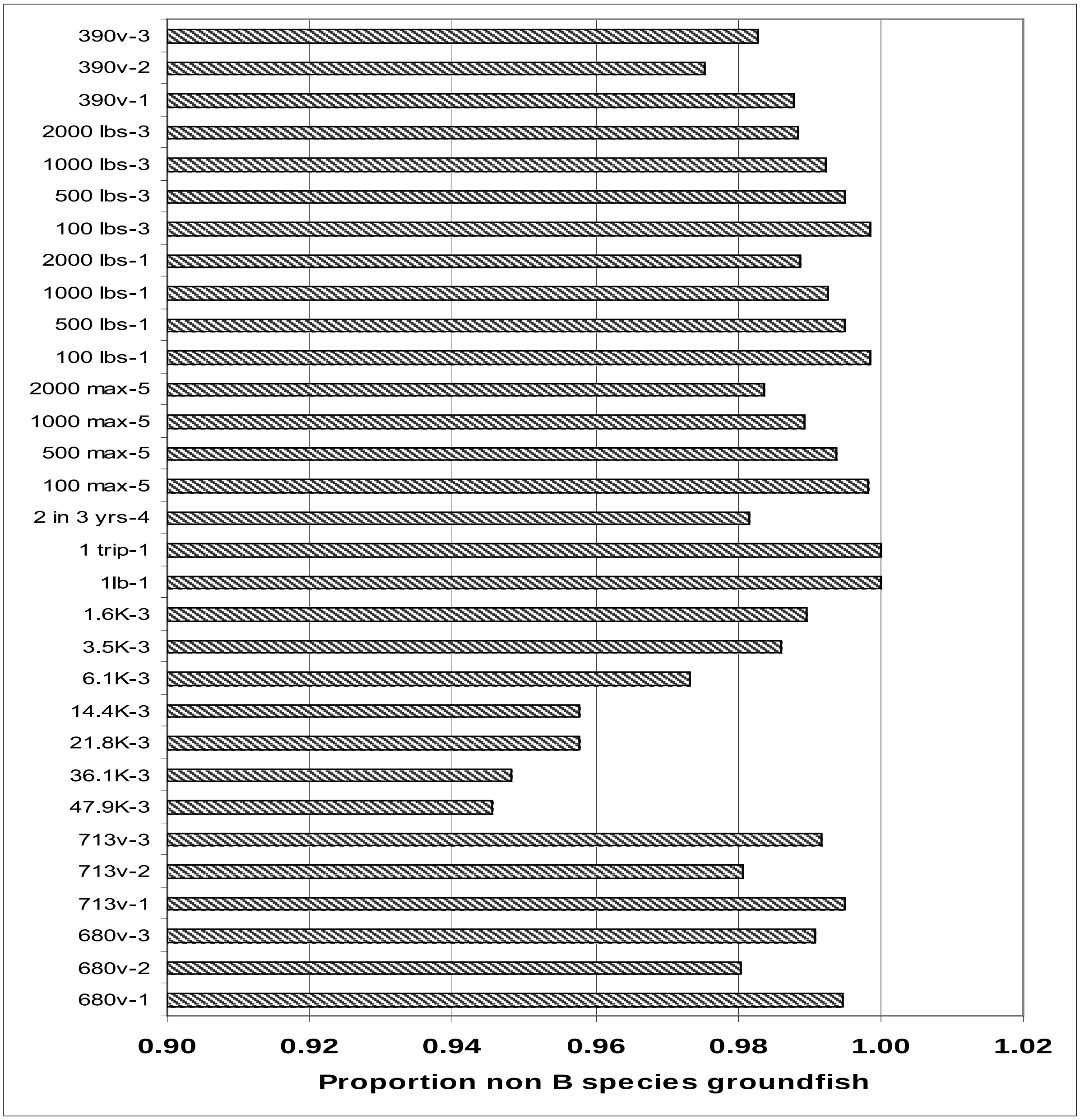

Figure E-7. Commercial fishery revenues received during 2004-2006 by vessels that would not qualify for B permits that were of associated (non-B species groundfish), by qualification criterion

Fishery Impact Summary and Discussion

A wide range in number of vessels that would qualify and not qualify for B permits is possible under the 31 qualification criteria contained in A-3, A-4 and A-5. The range in qualifying vessels, using specified years from within the window period, is from 65-1,103 with a median value of 581 (**Table E-4a).** The proportion of B species groundfish that was landed by directed fishery vessels during 2004-2006 that would qualify for permits was from 25 percent to 100 percent with a median value of 95 percent (thus 5 percent was the median proportion for non-qualifying vessels) (**Table E-4a).** Six criteria would have reduced 2004-2006 directed B species fishery revenues by non-qualifying vessels by over 20 percent and would have resulted in the permitting of 65-390 vessels (**Table E-4b).** The proportion of total commercial fishery revenues during 2004-2006 that was received by vessels that would qualify for B permits and that was comprised of non-B species groundfish (hence, non-groundfish and nearshore groundfish) ranged from 87-93 percent with a median value of 91 percent (**Table E-4a).** The comparative figures for non-qualifying vessels were 98-100 percent with a median value of 99 percent (**Table E-4b).** *These data showed a very low dependence of B species directed fishery vessels on B species groundfish for their total commercial fishery income during 2004-2006*

Distribution of Permits
The B permit license limitation proposal has the potential to affect the distribution of coastal fishing effort and landed catch. This would stem from (1) the criteria used to initially issue permits and (2) fishery attrition or permit transfers that may favor certain port groups or states over others once the program is implemented. Hindcast analysis using 2004-2006 window period data was used to project impact of B permit criteria on the intial distribution of permits. It was not possible to quantify the eventual distribution of permits. However, it can be generalized that once the permit are issued it seems likely that vessels that qualify for permits and that have a low reliance on the fishery will be more apt to let their permits expire or transfer (sell) their permits, compared to vessel owners that have a greater reliance on the fishery. The transfer of permits between vessels has the potential to increase overall fishery demand and to redistribute permits to ports or states with high demand for B species fishery landings. The expiration of permits could have a similar effect by reducing landing potential for B species groundfish at some port groups or states. It seem likely that those port groups that are most sensitive to initial permit non-qualification are the ones most likely to lose permits over time through permit transfer or permit expiration.

A-3 and A-5 have specified initial fleet size goals. Each of these was analyzed using QF-1, QF-2 and QF-3. In these comparisons, California received the highest proportion of permits using QF-2, ranging from 54 percent to 56 percent. Washington and Oregon proportions were highest under QF-1, ranging from 16 percent to 22 percent and 32 percent to 34 percent, respectively. The QF-3 framework results were intermediate for all three states (**Table E-5; Figure E-8**).

A wide range of qualification criteria were included under A-4 (**Table E- 2**). In these comparisons, the California proportion of permits was highest with the higher qualification standards and under QF-3. The overall range for California under A-4 criteria was from 44 percent to 71 percent. The Washington proportions generally increased with each increasing maximum year or cumulative year criterion, while California proportions generally decreased. Oregon proportions were stable or slightly downward trended under these latter criteria (**Tables E-6, E-7, E-8; Figures E-9, E-10, E-11)**.

Table E-5. B permit distributions under qualification criteria contained in alternatives 3 and 5

	Alternative 5						Alternative 3(a)						Alternative 3(b)					
	390v-1		390v-2		390v-3		680v-1		680v-2		680v-3		713v-1		713v-2		713v-3	
Group	vsls	P 1/	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P
SPS	2	0.01	1	0.00	1	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00
NPS	14	0.04	14	0.04	11	0.03	15	0.02	22	0.03	15	0.02	15	0.02	23	0.03	15	0.02
CWA	33	0.08	27	0.07	24	0.06	47	0.07	42	0.06	47	0.07	47	0.07	45	0.06	48	0.07
CLW	38	0.10	25	0.06	32	0.08	49	0.07	41	0.06	45	0.07	49	0.07	42	0.06	46	0.06
WA	87	0.22	67	0.17	68	0.17	113	0.17	107	0.16	109	0.16	113	0.16	112	0.16	111	0.16
CLO	19	0.05	14	0.04	16	0.04	37	0.05	29	0.04	35	0.05	37	0.05	31	0.04	35	0.05
TLA	10	0.03	4	0.01	9	0.02	27	0.04	12	0.02	21	0.03	31	0.04	14	0.02	23	0.03
NPA	13	0.03	14	0.04	15	0.04	33	0.05	23	0.03	27	0.04	36	0.05	25	0.04	28	0.04
CBA	41	0.11	29	0.07	34	0.09	60	0.09	58	0.09	60	0.09	62	0.09	64	0.09	63	0.09
BRA	43	0.11	42	0.11	49	0.13	74	0.11	78	0.11	78	0.11	75	0.11	80	0.11	79	0.11
OR	126	0.32	103	0.26	123	0.32	231	0.34	200	0.29	221	0.33	241	0.34	214	0.30	228	0.32
CCA	12	0.03	11	0.03	15	0.04	24	0.04	23	0.03	24	0.04	27	0.04	24	0.03	26	0.04
ERA	23	0.06	29	0.07	26	0.07	39	0.06	41	0.06	36	0.05	40	0.06	41	0.06	39	0.05
BGA	48	0.12	49	0.13	49	0.13	61	0.09	72	0.11	64	0.09	64	0.09	76	0.11	68	0.10
BDA	2	0.01	16	0.04	7	0.02	8	0.01	26	0.04	12	0.02	9	0.01	26	0.04	13	0.02
SFA	17	0.04	20	0.05	19	0.05	34	0.05	35	0.05	35	0.05	35	0.05	36	0.05	39	0.05
MNA	31	0.08	53	0.14	37	0.09	55	0.08	79	0.12	59	0.09	59	0.08	81	0.11	63	0.09
MRA	20	0.05	8	0.02	16	0.04	51	0.08	27	0.04	56	0.08	55	0.08	32	0.04	57	0.08
SBA	8	0.02	11	0.03	8	0.02	23	0.03	21	0.03	24	0.04	26	0.04	21	0.03	25	0.04
LAA	4	0.01	14	0.04	8	0.02	20	0.03	24	0.04	17	0.03	22	0.03	24	0.03	20	0.03
SDA	12	0.03	9	0.02	14	0.04	21	0.03	25	0.04	23	0.03	22	0.03	26	0.04	24	0.03
CA	177	0.45	220	0.56	199	0.51	336	0.49	373	0.55	350	0.51	359	0.50	387	0.54	374	0.52
Total	390	1.00	390	1.00	390	1.00	680	1.00	680	1.00	680	1.00	713	1.00	713	1.00	713	1.00

P=proportion of total

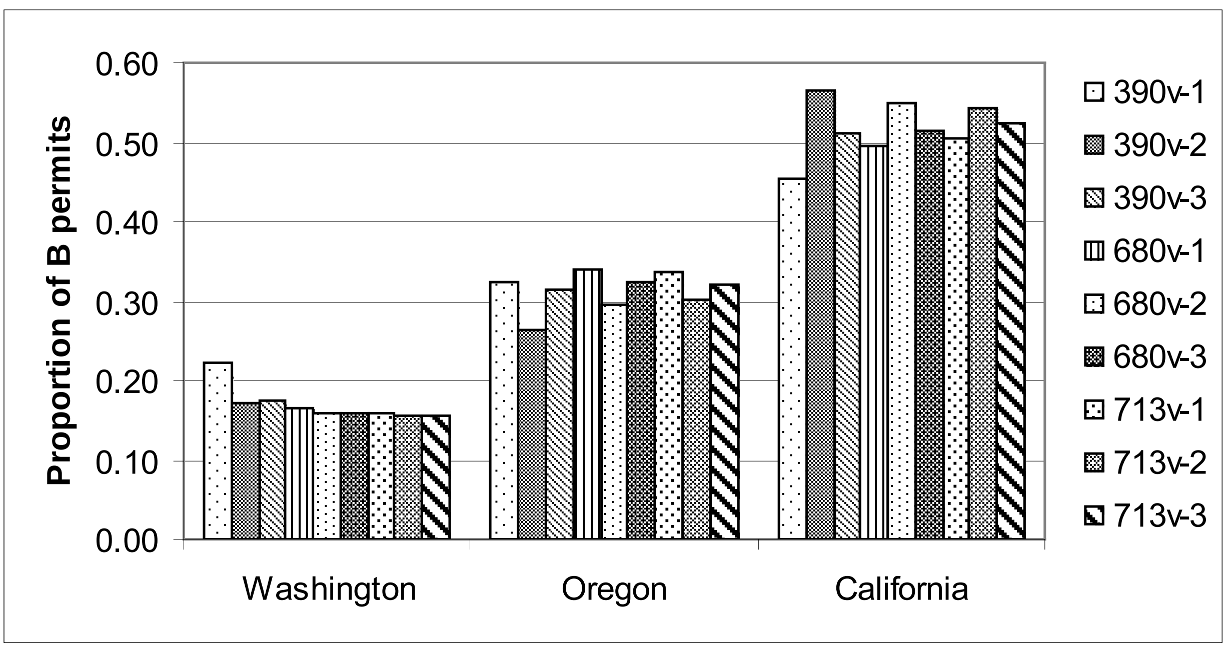

Figure E-8: Distribution of B permits between states under the qualification criteria contained in A-3 and A-5.

Table E-6: B permit proportions by port group and state under group # 1 criteria contained in A-4

	47.9K-3		36.1K-3		21.8K-3		14.4K-3		6.1K-3		3.5K-3		1.6K-3		1lb-1	
Group	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P	vsls	P
SPS	1	0.02	1	0.01	1	0.01	1	0.00	1	0.00	2	0.00	2	0.00	2	0.00
NPS	2	0.03	4	0.04	7	0.05	7	0.03	10	0.03	13	0.03	14	0.02	19	0.02
CWA	4	0.06	6	0.06	10	0.07	15	0.07	21	0.06	31	0.07	43	0.07	52	0.05
CLW	3	0.05	6	0.06	10	0.07	18	0.09	28	0.08	37	0.08	43	0.07	53	0.05
WA	10	0.15	17	0.18	28	0.20	41	0.20	60	0.18	83	0.18	102	0.16	126	0.11
CLO	1	0.02	1	0.01	3	0.02	8	0.04	14	0.04	23	0.05	32	0.05	45	0.04
TLA	0	0.00	0	0.00	0	0.00	3	0.01	7	0.02	12	0.03	18	0.03	50	0.05
NPA	0	0.00	0	0.00	2	0.01	7	0.03	12	0.04	18	0.04	23	0.04	51	0.05
CBA	2	0.03	5	0.05	8	0.06	13	0.06	29	0.09	42	0.09	57	0.09	90	0.08
BRA	6	0.09	14	0.15	19	0.14	27	0.13	42	0.12	60	0.13	73	0.12	109	0.10
OR	9	0.14	20	0.21	32	0.23	58	0.28	104	0.30	155	0.33	203	0.32	345	0.31
CCA	0	0.00	0	0.00	4	0.03	7	0.03	13	0.04	17	0.04	23	0.04	37	0.03
ERA	7	0.11	7	0.07	11	0.08	17	0.08	25	0.07	28	0.06	36	0.06	46	0.04
BGA	20	0.31	25	0.26	30	0.21	35	0.17	46	0.13	54	0.11	61	0.10	87	0.08
BDA	0	0.00	0	0.00	0	0.00	3	0.01	7	0.02	9	0.02	12	0.02	28	0.03
SFA	2	0.03	3	0.03	5	0.04	6	0.03	17	0.05	22	0.05	30	0.05	76	0.07
MNA	12	0.18	14	0.15	19	0.14	26	0.12	32	0.09	41	0.09	55	0.09	98	0.09
MRA	2	0.03	3	0.03	4	0.03	5	0.02	11	0.03	24	0.05	49	0.08	104	0.09
SBA	0	0.00	0	0.00	0	0.00	1	0.00	6	0.02	12	0.03	22	0.03	63	0.06
LAA	1	0.02	1	0.01	2	0.01	3	0.01	7	0.02	11	0.02	15	0.02	59	0.05
SDA	2	0.03	5	0.05	5	0.04	7	0.03	13	0.04	18	0.04	21	0.03	34	0.03
CA	46	0.71	58	0.61	80	0.57	110	0.53	177	0.52	236	0.50	324	0.52	632	0.57
Total	65	1.00	95	1.00	140	1.00	209	1.00	341	1.00	474	1.00	629	1.00	1,103	1.00

Table E-7: B permit distributions under group #2 qualification criteria contained in A-4

	2 in 3 yrs-4		100 max-5		500 max-5		1000 max-5		2000 max-5	
Grp/State	vsls	P 2/	vsls	P	vsls	P	vsls	P	vsls	P
SPS	2	0.00	2	0.00	2	0.00	2	0.00	2	0.01
NPS	8	0.01	18	0.02	15	0.02	15	0.03	12	0.03
CWA	29	0.05	51	0.05	47	0.07	43	0.09	34	0.10
CLW	28	0.05	50	0.05	49	0.07	45	0.09	39	0.11
WA	67	0.11	121	0.13	113	0.17	105	0.21	87	0.25
CLO	17	0.03	44	0.05	37	0.06	28	0.06	20	0.06
TLA	32	0.05	43	0.05	22	0.03	17	0.03	4	0.01
NPA	18	0.03	47	0.05	33	0.05	19	0.04	11	0.03
CBA	47	0.08	81	0.09	59	0.09	50	0.10	38	0.11
BRA	78	0.13	92	0.10	70	0.11	48	0.10	31	0.09
OR	192	0.32	307	0.33	221	0.34	162	0.32	104	0.30
CCA	24	0.04	36	0.04	24	0.04	17	0.03	10	0.03
ERA	24	0.04	43	0.05	39	0.06	33	0.07	22	0.06
BGA	63	0.11	78	0.08	59	0.09	51	0.10	44	0.13
BDA	7	0.01	18	0.02	8	0.01	5	0.01	1	0.00
SFA	28	0.05	58	0.06	32	0.05	25	0.05	14	0.04
MNA	52	0.09	79	0.08	53	0.08	41	0.08	30	0.09
MRA	72	0.12	87	0.09	45	0.07	27	0.05	11	0.03
SBA	23	0.04	44	0.05	22	0.03	11	0.02	6	0.02
LAA	25	0.04	37	0.04	18	0.03	8	0.02	3	0.01
SDA	18	0.03	31	0.03	21	0.03	14	0.03	11	0.03
CA	336	0.56	511	0.54	321	0.49	232	0.46	152	0.44
Total	595	1.00	939	1.00	655	1.00	499	1.00	343	1.00

1/ qualification framework number shown in parentheses (see Table E-2 for details).

2/ proportion of total

Table E-8. B permit distributions under group # 3 qualification criteria contained in alternative 4

	100 lbs-1		500 lbs-1		1000 lbs-1		2000 lbs-1		100 lbs-3		500 lbs-3		1000 lbs-3		2000 lbs-3	
Grp/State	vsls	P 2/	vsls	P	vsls	P	vsls	P	vsls	P 2/	vsls	P	vsls	P	vsls	P
SPS	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00	2	0.00
NPS	18	0.02	15	0.02	15	0.03	14	0.03	18	0.02	17	0.02	15	0.02	14	0.02
CWA	51	0.05	47	0.07	46	0.08	36	0.09	51	0.05	48	0.06	48	0.07	39	0.07
CLW	50	0.05	49	0.07	46	0.08	39	0.09	50	0.05	49	0.06	46	0.06	42	0.07
WA	121	0.13	113	0.16	109	0.19	91	0.22	121	0.12	116	0.14	111	0.15	97	0.17
CLO	44	0.05	37	0.05	30	0.05	22	0.05	45	0.04	39	0.05	35	0.05	30	0.05
TLA	46	0.05	29	0.04	21	0.04	12	0.03	47	0.05	33	0.04	26	0.04	14	0.02
NPA	47	0.05	36	0.05	22	0.04	15	0.04	48	0.05	39	0.05	28	0.04	21	0.04
CBA	81	0.09	61	0.09	53	0.09	41	0.10	83	0.08	72	0.09	63	0.09	51	0.09
BRA	93	0.10	75	0.11	66	0.11	46	0.11	101	0.10	86	0.10	83	0.11	68	0.12
OR	311	0.33	238	0.34	192	0.33	136	0.32	324	0.32	269	0.33	235	0.32	184	0.32
CCA	37	0.04	26	0.04	21	0.04	15	0.04	37	0.04	30	0.04	26	0.04	20	0.03
ERA	43	0.05	40	0.06	34	0.06	25	0.06	43	0.04	41	0.05	39	0.05	36	0.06
BGA	78	0.08	63	0.09	55	0.10	50	0.12	79	0.08	72	0.09	69	0.09	60	0.10
BDA	18	0.02	9	0.01	6	0.01	2	0.00	21	0.02	14	0.02	13	0.02	10	0.02
SFA	58	0.06	34	0.05	30	0.05	18	0.04	62	0.06	46	0.06	40	0.06	28	0.05
MNA	79	0.08	57	0.08	49	0.08	34	0.08	87	0.09	71	0.09	64	0.09	51	0.09
MRA	91	0.10	54	0.08	38	0.07	23	0.05	98	0.10	74	0.09	59	0.08	41	0.07
SBA	45	0.05	25	0.04	16	0.03	9	0.02	51	0.05	37	0.04	26	0.04	20	0.03
LAA	38	0.04	20	0.03	11	0.02	4	0.01	49	0.05	30	0.04	21	0.03	14	0.02
SDA	31	0.03	22	0.03	16	0.03	13	0.03	31	0.03	27	0.03	24	0.03	20	0.03
CA	518	0.55	350	0.50	276	0.48	193	0.46	558	0.56	442	0.53	381	0.52	300	0.52
Total	950	1.00	701	1.00	577	1.00	420	1.00	1003	1.00	827	1.00	727	1.00	581	1.00

1/ qualification framework number shown in parentheses (see Table E-2 for details).

2/ proportion of total

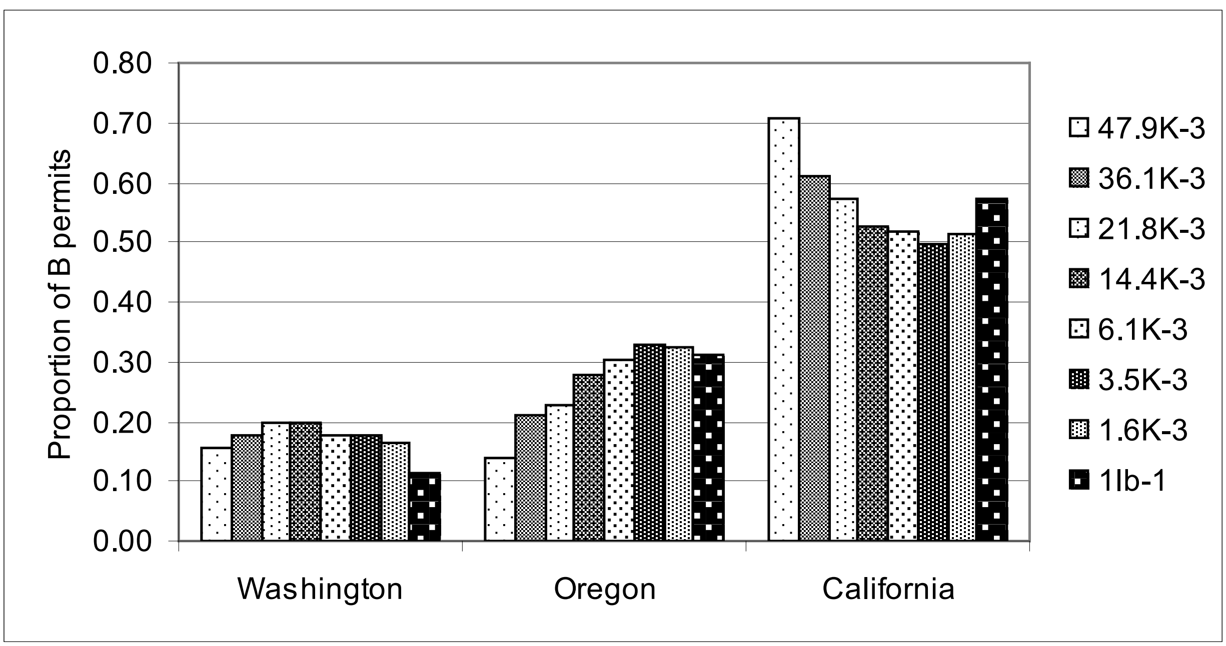

Figure E-9. Distribution of permits between states under specified A-4 criteria (group #1) based on 2004-2006 landings by qualifying vessels

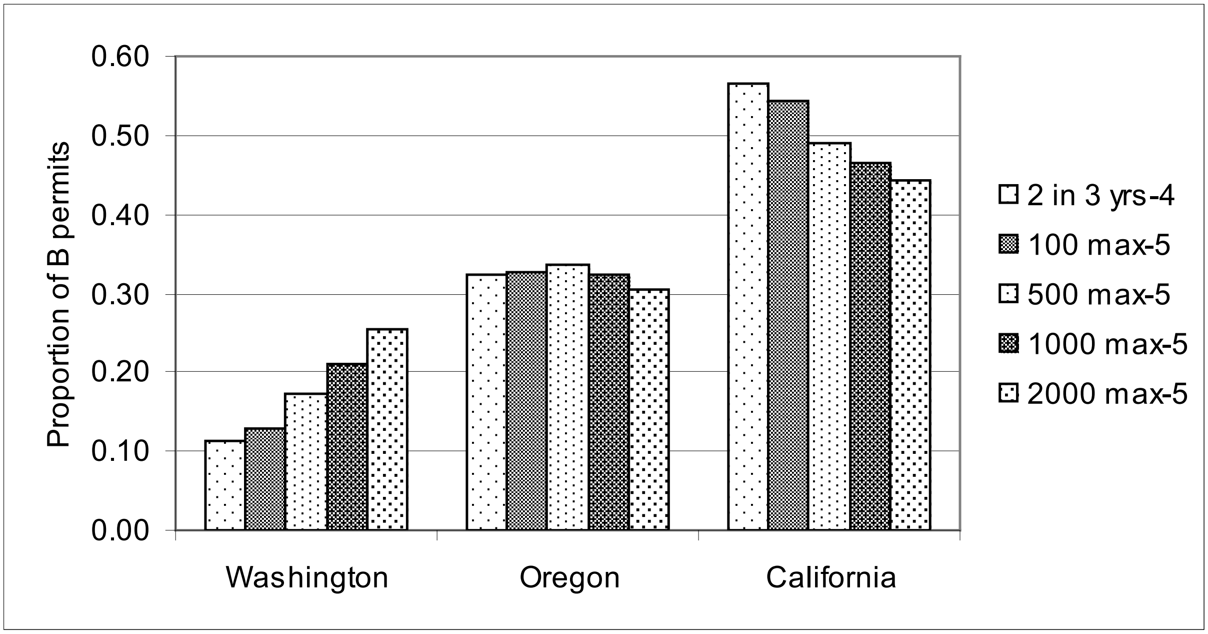

Figure E-10. Distribution of permits between states under specified A-4 criteria (group #2) based on 2004-2006 landings by qualifying vessels

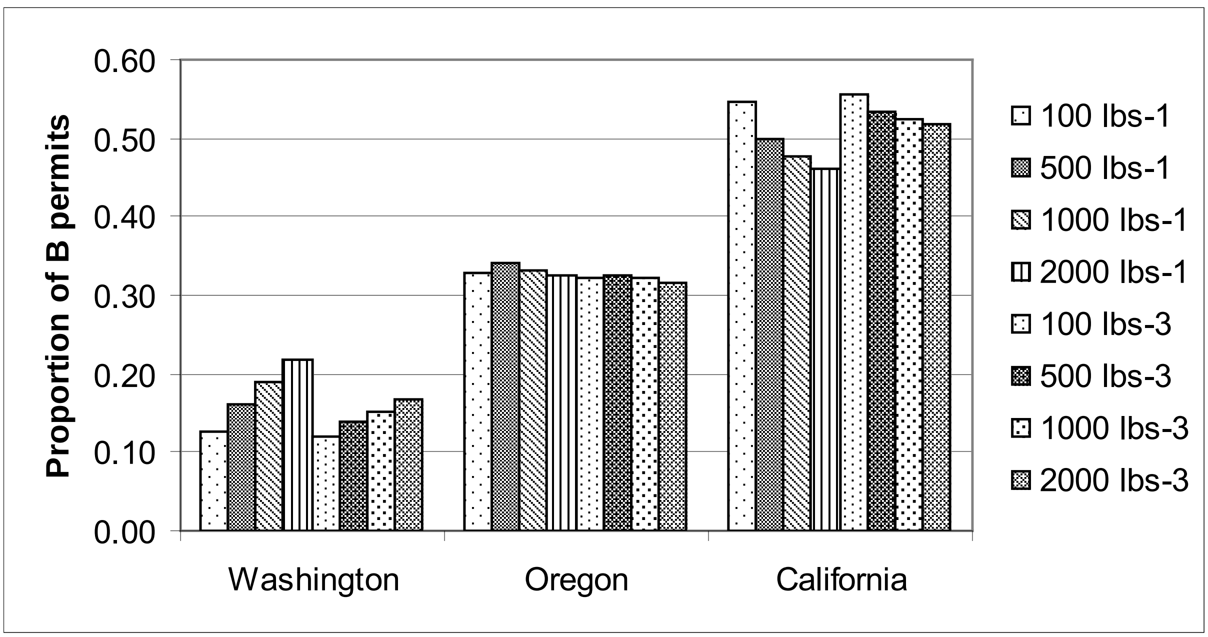

Figure E-11. Distribution of permits between states under specified A-4 criteria (group #3) based on 2004-2006 landings by qualifying vessels

Summary of Qualification Criteria Impacts to States

The relative proportion of permits that would potentially be issued to vessels from the respective states is substantially affected by the qualification criteria contained in A-3, A-4 and A-5. The qualification framework used had variable impact depending on state, which are discussed below.

Washington

Washington would receive a relatively high proportion of permits under 390v-1 and could receive a relatively low proportion (11-20 percent) under A-4 criteria, depending on qualification standard and framework used (**Table E-9**). The Washington proportion was relatively similar at 16-17 percent under all other qualification standards not including A-4 criteria, which could be as low as 13 percent depending on standard **(Table E-9).** Generally, Washington vessels received a higher proportion of permits that used 2004-2006 as the base years for permit qualification and also criteria that used high standards for permit qualification.

Oregon

Oregon vessels would receive a relatively high proportion of permits (34 percent) under QF-1 and QF-5 and the standards contained in A-3 (**Table E-9**). Oregon vessels would also receive a relatively high proportion of permits under A-4 criteria that used the QF-1 framework. Oregon vessels would receive as few as 14 percent of permits under one of the standards in A-4 that used the QF-3 framework (**Table E-9**). Generally, Oregon vessels would receive a higher proportion of permits that used 2004-2006 as the base years for qualification and standards that have relatively low qualification requirements

California

California vessels received their highest proportion of permits under criteria that used QF-2, QF-3 and QF-4 (50-71 percent) and their lowest, with minor overlap, under QF-1 (45-50 percent). The California proportions under A-4 criteria were as high as 54 percent (100-lb-5 criterion). Generally, California vessels received a higher proportion of permits that used 1998-2006 as the base years for permit qualification or criteria that had low qualification standards.

Table E-9. Summary of potential qualification criteria impacts on B permit distributions (proportions)

Frame	Base yrs	Metric	Altern	Standard	WA	OR	CA	Reference
QF-1	04-06	cum lbs	3	680, 713 vsls	.16-.17	0.34	.49-.50	Tab E-5
			4	1, 100, 500, 1000, 2000	.13-.22	.32-.34	.46-.55	Tab E-8 1/
			5	390 vsls	0.22	0.32	0.45	Tab E-5
QF-2	98-06	cum lbs	3	680, 713 vsls	0.16	.29-.30	.54-.55	Tab E-5
			4	none applied	na	na	na	
			5	390 vsls	0.17	0.26	0.56	Tab E-5
QF-3	98-06 w/ 04-06 trip	cum lbs	3	680, 713 vsls	0.16	.32-.33	.51-.52	Tab E-5
			4	1 lb-47.9K lbs	.11-.20	.14-.34	.50-.71	Tab E-6 & E-82/
			5	390 vsls	0.17	0.32	0.51	Tab E-5
QF-4	04-06	1 trip in 2 of 3 yrs	3	680, 713 vsls	(595) 4/	(595) 4/	(595) 4/	Tab E-7
			4	2 in 3 yrs	0.11	0.32	0.56	Tab E-7
			5	390 vsls	na	na	na	
QF-5	04-06	max lbs, any yr	3	680, 713 vsls	0.17 5/	0.34 5/	0.49 5/	Tab E-7
			4	100, 500, 1000, 2000	.13-.25	.30-.32	.44-.54	Tab E-7 3/
			5	390 vsls	0.25 6/	0.30 6/	0.44 6/	Tab E-7

1/ WA proportion increased with lbs required; OR was relatively stable at all levels; CA proportion declined with lbs required.

2/ WA proportion increased thru 21.8K then declined; OR increased thru 3.5K then declined; CA declined thru 3.5K then increased.

3/ WA proportion increased with lbs required; OR increased thru 500 lb then declined; CA declined with lbs required

4/ maximum number of permits possible under this framework
5/ based on 500 lb standard, which qualified 655 vessels
6/ based on 2000 lb standard, which qualified 343 vessels
na=not analyzed

Potential Impacts of Criteria to Port Groups

The port group analysis was based on pounds landed by vessels that would qualify for permits expressed as a proportion of total pounds landed by all vessels (qualifying and non-qualifying) by port group and state during 2004-2006**.** All of the qualification criteria contained in A-3, A-4 and A-5 were included in the analysis except those that would qualify less than 390 or more than about 713 vessels**.** The pounds landed by port group and state were developed based on port assignments for individual vessels (port group where most trips were made in the most recent year of fishery participation) and not on actual pounds landed at individual port groups. The calculated data sets do not exactly agree with the actual pounds landed because of port group switching by vessels both between and within years. However, the differences were <2 percent for states and <8 percent for port groups, with two exceptions: S. Puget Sound and Bodega Bay port groups, which had relatively small landings (**Tables E-10, E-11 and 3-15**).

Table E-10. Estimated pounds landed during 2004-2006 by state and port group for vessels that would qualify under selected qualification criteria contained in A-3 and A-5

	Total lbs	A-3						A-5		
State/Port	n/a	680-1	680-2	680-3	713-1	713-2	713-3	390-1	390-2	390-3
SPS	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	37,349	37,349
NPS	404,733	403,996	399,077	403,996	403,996	402,424	403,996	402,424	388,179	391,752
CWA	337,657	336,502	305,962	335,667	336,502	307,182	336,848	314,700	266,215	281,893
CLW	557,771	557,396	534,741	553,995	557,396	538,299	555,131	542,539	474,970	519,157
WA	1,341,786	1,339,520	1,281,406	1,335,283	1,339,520	1,289,531	1,337,600	1,301,289	1,166,713	1,230,152
CLO	191,728	189,829	166,226	187,408	189,829	171,868	187,408	165,073	130,167	147,748
TLA	68,508	62,698	41,944	57,623	64,783	45,498	59,433	41,584	18,802	35,920
NPA	100,279	95,809	75,117	88,356	97,462	75,117	89,411	73,461	41,154	64,516
CBA	415,212	408,786	371,182	404,923	409,797	378,144	406,946	385,299	300,074	354,180
BRA	738,986	733,455	710,175	730,795	733,995	710,206	731,816	691,849	636,768	685,269
OR	1,514,713	1,490,578	1,364,644	1,469,105	1,495,866	1,380,833	1,475,014	1,357,266	1,126,964	1,287,632
CCA	77,213	72,939	61,272	71,655	74,482	61,272	72,747	56,012	41,000	56,476
ERA	294,304	292,971	275,942	288,956	293,552	275,942	292,398	271,606	250,828	272,880
BGA	1,333,164	1,326,721	1,315,361	1,325,973	1,328,229	1,316,481	1,328,958	1,310,474	1,274,437	1,303,859
BDA	20,773	17,497	15,207	18,257	18,038	15,207	18,500	9,460	9,825	11,728
SFA	173,006	166,044	148,374	164,105	166,527	148,374	166,281	144,951	117,271	138,951
MNA	823,762	815,454	786,237	811,822	817,528	788,946	815,476	782,796	759,914	777,708
MRA	218,029	205,170	166,344	205,167	207,266	173,142	205,591	168,099	122,366	148,078
SBA	71,812	64,497	50,817	62,502	66,050	50,817	62,943	47,562	32,633	44,349
LAA	80,487	74,757	63,650	69,505	75,732	63,650	71,632	58,283	55,540	60,965
SDA	214,903	211,737	207,441	210,555	212,272	208,342	211,662	201,298	178,461	200,681
CA	3,307,452	3,247,786	3,090,644	3,228,497	3,259,676	3,102,172	3,246,187	3,050,540	2,842,274	3,015,674
Total	6,163,951	6,077,884	5,736,694	6,032,885	6,095,062	5,772,536	6,058,802	5,709,095	5,135,951	5,533,458

Table E-11. Estimated pounds landed during 2004-2006 by state and port group for vessels that would qualify under selected qualification criteria contained in A-4

	Total lbs	Group 2				Group 3					
State/Port	n/a	2 in 3 yrs-4	500 max-5	1000 max-5	2000 max-5	500 lbs-1	1000 lbs-1	2000 lbs-1	500 lbs-3	1000 lbs-3	2000 lbs-3
SPS	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,626
NPS	404,733	257,971	403,996	403,996	394,487	403,996	403,996	402,424	404,493	403,996	402,424
CWA	337,657	287,974	336,502	331,511	317,058	336,502	335,505	321,484	336,848	336,848	324,236
CLW	557,771	494,297	557,396	553,916	544,543	557,396	555,131	544,543	557,396	555,131	549,145
WA	1,341,786	1,081,867	1,339,520	1,331,050	1,297,713	1,339,520	1,336,257	1,310,077	1,340,363	1,337,600	1,317,431
CLO	191,728	134,140	189,829	181,217	167,331	189,829	183,971	171,677	190,230	187,408	181,449
TLA	68,508	58,027	58,756	52,234	20,921	63,812	58,502	45,817	64,938	61,793	48,350
NPA	100,279	63,374	95,566	83,653	65,615	97,462	87,010	77,531	98,112	89,411	81,663
CBA	415,212	341,806	407,757	398,376	374,484	409,315	403,340	385,299	412,082	406,946	394,679
BRA	738,986	699,671	729,772	698,517	652,314	733,995	727,084	698,406	735,313	735,065	717,362
OR	1,514,713	1,297,018	1,481,681	1,413,997	1,280,664	1,494,413	1,459,908	1,378,730	1,500,675	1,480,623	1,423,502
CCA	77,213	66,401	72,774	65,063	49,771	73,985	70,708	62,427	75,220	72,747	66,775
ERA	294,304	253,102	292,613	287,533	266,464	293,552	288,692	276,092	293,918	292,398	288,956
BGA	1,333,164	1,280,613	1,325,495	1,315,766	1,297,311	1,327,755	1,322,108	1,314,762	1,330,827	1,329,182	1,323,898
BDA	20,773	15,415	17,497	14,150	6,281	18,038	15,829	9,460	19,204	18,500	15,614
SFA	173,006	122,424	164,625	155,979	135,025	166,044	163,109	147,034	169,173	166,764	156,942
MNA	823,762	796,482	813,135	800,336	778,710	816,532	810,718	789,140	820,061	816,513	803,207
MRA	218,029	197,337	200,448	179,158	137,497	206,769	195,713	174,403	212,775	206,452	191,831
SBA	71,812	46,136	63,512	52,678	40,506	65,575	59,050	49,652	68,285	63,349	57,591
LAA	80,487	71,784	73,054	64,071	55,886	74,757	67,645	58,283	77,222	72,564	66,518
SDA	214,903	195,050	211,483	204,599	197,031	212,272	207,463	203,416	213,800	211,662	209,461
CA	3,307,452	3,044,743	3,234,636	3,139,333	2,964,482	3,255,278	3,201,034	3,084,668	3,280,486	3,250,130	3,180,792
Total	6,163,951	5,423,629	6,055,836	5,884,380	5,542,859	6,089,211	5,997,199	5,773,475	6,121,523	6,068,354	5,921,725

It is likely that most or all of the pounds contributed by non-qualifying vessels during 2004-2006 would have been harvested by qualifying vessels through in-season regulation adjustments or landed incidental to fishing for non-groundfish or nearshore groundfish species by non-qualifying vessels. However, comparison of landing proportions between port groups and states may indicate areas of the coast where it would have been more difficult to make up for lost landings by non-qualifying vessels during 2004-2006.

The analyses for each alternative follow.

A-3 Analysis

Washington landings were 96 percent or greater under all qualification criteria, and individual port group landings were 91 percent or greater (**Table E-12a).** Oregon landings were 90 percent or greater under all criteria (**Table E-12a).** The port groups of Tillamook and Newport had landings of 61-75 percent under 680v-2 and 713-2 **(Table E-12a).** Landings under 680v-3 and 713v-3 were 84-89 percent for these same port groups. California landings were 93 percent or greater under all A-3 criteria (**Table E-12a).** The ports groups of Crescent City, Bodega Bay, Morro Bay, Santa Barbara and Los Angeles had landings of 71-79 percent under 680v-2 and 713v-2**.** Landings were 86-89 percent for these same ports under 680v-3 and 713v-3. One port group, Bodega Bay, had 84 percent of total landings under 680v-1.

A-5 Analysis

Washington landings were lowest under 390v-2 at 87 percent and highest under 390v-1 at 97 percent (**Table E-12a).** Two Washington port groups, Washington Coast and Columbia River, had landings of 79 percent & 85 percent, respectively, under 390v-2 and one port had landings of 83 percent under 390v-3. Oregon landings ranged from 74 percent under 390v-2 to 90 percent under 390v-1 (**Table E-12a).** Tillamook and Newport had landings of 27 percent & 41 percent, respectively, under 390v-2; 52 percent & 64 percent, respectively, under 390v-3; and 61 & 73 percent, respectively, under 390v-1. Oregon-Columbia River had landings ranging from 68-86 percent under A-5 criteria. Calfiornia landings ranged from 86 percent under 390v-2 to 92 percent under 390-1 (**Table E-12a**). Several California port groups where heavily impacted (<60 percent landings retention) under 390v-2 as follows: Crescent City, Bodega Bay, Morro Bay and Santa Barbara (**Table E-12a**). 390v-1 had the lowest impact to individual California port groups except for Eureka, Bodega Bay and Los Angeles which fared better by from one to ten percentage points under 390v-3 (**Table E-12a**).

A-4 Analyses

2 in 3 yrs-4

The states' landing proportions for Washington, Oregon and California under this criterion were 81 percent, 86 percent and 92 percent, respectively (**Table E-12b)**. The port groups of N. Puget Sound, Oregon-Columbia River, Newport, Bodega Bay, San Francisco and Santa Barbara had landing proportions in the range of 63 percent to 74 percent (**Table E-12b)**. Only one port group, S. Puget Sound, had 100 percent of landings under this criterion. All other port groups were in the range of 91 percent to 96 percent (**Table E-12b)**.

500 max-5

The states' landing proportions under this criterion were 100 percent for Washington and 98 percent each for Oregon and California (**Table E-12b)**. Three port groups, Tillamook, Bodega Bay and Santa Barbara, had landings in the range of 84-88 percent. All other port group landings were in the range of 91-100 percent (**Table E-12b)**.

1000 max-5

The states' landing proportions for Washington, Oregon and California under this criterion were 99 percent, 93 percent and 95 percent, respectively (**Table E-12b)**. Three port groups, Tillamook, Bodega Bay and Santa Barbara, had landing ranges of 68-76 percent; three other port groups, Newport, Crescent City, Morro Bay, and Los Angeles, had landing ranges of 80-84 percent. All other port groups had landing ranges of from 90 percent to 100 percent (**Table E-12b)**.

2000 max-5

The Oregon proportion under this criterion was 85 percent compared to 90 percent for California and 97 percent for

Washington. Two port groups, Tillamook and Bodega Bay had landings of only 31 percent and 30 percent, respectively. The port groups of Newport, Crescent City, San Francisco, Morro Bay, and Los Angeles had landings in the range of 64-78 percent (**Table E-12b)**.

500 lbs-1

All states and port groups had 91 percent or greater landings under this criterion with one exception: Bodega Bay which had 87 percent of 2004-2006 landings (**Table E-12b).**

1000 lbs-1

The states' proportions under this criterion were in the range of 96 percent (Oregon) to 100 percent (Washington). The port group most impacted was Bodega Bay at 76 percent. Tillamook, Newport, Santa Barbara had landings in the range of 82-87 percent. All other port groups were in the range of 90-100 percent (**Table E-12b).**

2000 lbs-1

The Oregon and California proportions under this criterion were 91 percent and 93 percent respectively, while the Washington proportion was 98 percent. The Bodega Bay proportion was only 46 percent. Tillamook, Newport, Santa Barbara and Los Angeles port groups were in the range of 67-77 percent and Crescent City, San Francisco and Morro Bay were in the range of 81-85 percent. All other port groups were 90 percent or greater (**Table E-12b**).

500 lbs-3

The state and port group proportions under this criterion were very close to the 500 lbs-1 criterion except Bodega Bay was 92 percent rather than 87 percent (**Table E-12b).** (This is because more vessels qualify for permits when the entire window period and the same pounds for qualification are used, which is the situation for alternatives that use QF-1 and QF-3).

1000 lbs-3

The state and port group proportions under this criterion were six or more percentage points higher than the 1000 lbs-1 criterion, except for Bodega Bay which was 13 points higher under this criterion (**Table E-12b).** (This is because more vessels qualify for permits when the entire window period and the same pounds for qualification are used, which is the situation for alternatives that use QF-1 and QF-3).

2000 lbs-3

Most port groups had higher proportions under this criterion compared to the 2000 lbs-1 criterion (**Table E-12b).** (This is because more vessels qualify for permits when the entire window period and the same pounds for qualification are used, which is the situation for alternatives that use QF-1 and QF-3).

Table E-12a. Proportion of total pounds landed during 2004-2006 for port groups and states for vessels that would qualify under qualification criteria in A-3 and A-5

	Total lbs	A-3						A-5		
State/Port	n/a	680v-1	680v-2	680v-3	713v-1	713v-2	713v-3	390v-1	390v-2	390v-3
SPS	100%	100%	100%	100%	100%	100%	100%	100%	90%	90%
NPS	100%	100%	99%	100%	100%	99%	100%	99%	96%	97%
CWA	100%	100%	91%	99%	100%	91%	100%	93%	79%	83%
CLW	100%	100%	96%	99%	100%	97%	100%	97%	85%	93%
WA	100%	100%	96%	100%	100%	96%	100%	97%	87%	92%
CLO	100%	99%	87%	98%	99%	90%	98%	86%	68%	77%
TLA	100%	92%	61%	84%	95%	66%	87%	61%	27%	52%
NPA	100%	96%	75%	88%	97%	75%	89%	73%	41%	64%
CBA	100%	98%	89%	98%	99%	91%	98%	93%	72%	85%
BRA	100%	99%	96%	99%	99%	96%	99%	94%	86%	93%
OR	100%	98%	90%	97%	99%	91%	97%	90%	74%	85%
CCA	100%	94%	79%	93%	96%	79%	94%	73%	53%	73%
ERA	100%	100%	94%	98%	100%	94%	99%	92%	85%	93%
BGA	100%	100%	99%	99%	100%	99%	100%	98%	96%	98%
BDA	100%	84%	73%	88%	87%	73%	89%	46%	47%	56%
SFA	100%	96%	86%	95%	96%	86%	96%	84%	68%	80%
MNA	100%	99%	95%	99%	99%	96%	99%	95%	92%	94%
MRA	100%	94%	76%	94%	95%	79%	94%	77%	56%	68%
SBA	100%	90%	71%	87%	92%	71%	88%	66%	45%	62%
LAA	100%	93%	79%	86%	94%	79%	89%	72%	69%	76%
SDA	100%	99%	97%	98%	99%	97%	98%	94%	83%	93%
CA	100%	98%	93%	98%	99%	94%	98%	92%	86%	91%
Total	100%	99%	93%	98%	99%	94%	98%	93%	83%	90%

Table E-12b. Proportion of total pounds landed during 2004-2006 for port groups and states for vessels that would qualify under selected qualification criteria in A-4

	Total lbs	Group 2				Group 3					
Grp	n/a	2 in 3 yrs-4	500 max-5	1000 max-5	2000 max-5	500 lbs-1	1000 lbs-1	2000 lbs-1	500 lbs-3	1000 lbs-3	2000 lbs-3
SPS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NPS	100%	64%	100%	100%	97%	100%	100%	99%	100%	100%	99%
CWA	100%	85%	100%	98%	94%	100%	99%	95%	100%	100%	96%
CLW	100%	89%	100%	99%	98%	100%	100%	98%	100%	100%	98%
WA	100%	81%	100%	99%	97%	100%	100%	98%	100%	100%	98%
CLO	100%	70%	99%	95%	87%	99%	96%	90%	99%	98%	95%
TLA	100%	85%	86%	76%	31%	93%	85%	67%	95%	90%	71%
NPA	100%	63%	95%	83%	65%	97%	87%	77%	98%	89%	81%
CBA	100%	82%	98%	96%	90%	99%	97%	93%	99%	98%	95%
BRA	100%	95%	99%	95%	88%	99%	98%	95%	100%	99%	97%
OR	100%	86%	98%	93%	85%	99%	96%	91%	99%	98%	94%
CCA	100%	86%	94%	84%	64%	96%	92%	81%	97%	94%	86%
ERA	100%	86%	99%	98%	91%	100%	98%	94%	100%	99%	98%
BGA	100%	96%	99%	99%	97%	100%	99%	99%	100%	100%	99%
BDA	100%	74%	84%	68%	30%	87%	76%	46%	92%	89%	75%
SFA	100%	71%	95%	90%	78%	96%	94%	85%	98%	96%	91%
MNA	100%	97%	99%	97%	95%	99%	98%	96%	100%	99%	98%
MRA	100%	91%	92%	82%	63%	95%	90%	80%	98%	95%	88%
SBA	100%	64%	88%	73%	56%	91%	82%	69%	95%	88%	80%
LAA	100%	89%	91%	80%	69%	93%	84%	72%	96%	90%	83%
SDA	100%	91%	98%	95%	92%	99%	97%	95%	99%	98%	97%
CA	100%	92%	98%	95%	90%	98%	97%	93%	99%	98%	96%
Total	100%	88%	98%	95%	90%	99%	97%	94%	99%	98%	96%

Summary of Potential Qualification Criteria Impacts to Port Groups

Some port groups were more sensitive than others to permit issuance using the qualification criteria contained in A-3, A-4 and A-5. The qualification framework included with each criterion was particularly important. QF-4, which was created for the 2 in 3 yrs-4 criterion, had inconsistent impacts compared to the other frameworks. N. Puget Sound, for example, was relatively unaffected by any of the other criteria but was substantially affected under QF-4 (**Tables E-12a and E-12b**). This indicates the vessels participated in the fishery less often than vessels in other port groups (but had relatively large catch histories). Conversely, Bodega Bay, a port group that was heavily impacted under several other criteria, was relatively unaffected by this criterion. QF-2 which was used with 390v-2, 680v-2 and 713v-2, had relatively high landing impacts to the following port groups (in descending order of impact): Tillamook, Newport, Santa Barbara, Bodega Bay, Crescent City and Morro Bay (**Table E-12a**). QF-1 appeared to have relatively balanced impacts, based on criteria that used the same qualification standards, compared to QF-3 and QF-5 (**Tables E-12a and E-12b**).

As previously discussed those port groups that are most sensitive to permit issuance (or non-issuance) are the ones most likely to be affected by the long-term impact of the B permit license limitation program. This would stem from transfer of permits from vessel owners to owners with greater interest in fishery participation and who may or may not reside in the same port group or state. Also, vessel owners with low fishery reliance wouldl be more likely to let their permits expire than vessel owners with a higher fishery dependence.

Potential Target-Species Vessel Group Impacts

Fleet Size Reduction Impacts

The criteria used in the analysis of fleet size reduction impacts to target-species vessel groups were 713v-1, 1000 lb-1, and 390v-1. Under the least restrictive alternative, 713v-1, the qualifying vessels were mostly sablefish and lingcod vessels, which numbered 400 and 192, respectively **(Table E-13; Figure E-12).** The number of qualifying vessels by state was: Washington, 113 (16 percent), Oregon, 241 (34 percent), and California, 359 (50 percent). The Washington fleet was comprised of 105 (93 percent) sablefish vessels. The Oregon fleet was mostly (64 percent) sablefish vessels, but also included 84 (35 percent) lingcod vessels **(Table E-13)**. California sablefish and lingcod vessels numbered 141 (39 percent) and 106 (30 percent), respectively. The California fleet also included several other kinds of target-species vessel groups including shelf rockfish, slope rockfish, sharks, and other species. California also had 18 non-target species vessels **(Table E-13)**.

Table E-13. Estimated distribution of vessels during 2004-2006 by port group, state and target species group that would have qualified for B permits under selected qualification standards and using a common qualification framework (QF-1)

Criterion 1/	Species	SPS	NPS	CWA	CLW	WA	CLO	TLA	NPA	CBA	BRA	OR	CCA	ERA	BGA	BDA	SFA	MNA	MRA	SBA	LAA	SDA	CA	Total
	Lingcod	0	2	0	0	2	0	21	8	12	43	84	19	7	18	6	13	13	27	3	0	0	106	192
713 vsls-1	Shelf RF	0	0	0	0	0	0	3	0	0	0	3	0	0	0	2	1	8	8	9	1	5	34	37
(472 lbs)	Sablefish	2	7	47	49	105	37	7	28	50	32	154	7	32	46	1	13	32	3	0	2	5	141	400
	Slope RF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5	1	6	22	22
	Sharks	0	5	0	0	5	0	0	0	0	0	0	0	1	0	0	6	0	0	6	10	3	26	31
	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	7	1	12	12
	Non-target	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	2	4	6	1	1	3	18	19
	Total	2	15	47	49	113	37	31	36	62	75	241	27	40	64	9	35	59	54	26	22	23	359	713
1000 lbs-1	Lingcod	0	2	0	0	2	0	11	4	7	34	56	15	3	12	5	10	8	16	0	0	0	69	127
(1000 lbs)	Shelf RF	0	0	0	0	0	0	3	0	0	0	3	0	0	0	1	0	6	5	6	0	3	21	24
	Sablefish	2	7	46	46	101	30	7	18	46	32	133	5	30	43	0	12	29	3	0	2	4	128	362
	Slope RF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	1	5	19	19
	Sharks	0	5	0	0	5	0	0	0	0	0	0	0	1	0	0	6	0	0	4	4	3	18	23
	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	0	6	6
	Non-target	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	2	4	5	1	1	1	15	16
	Total	2	15	46	46	109	30	21	22	53	66	192	21	34	55	6	30	49	38	16	11	16	276	577
390 vsls-1	Lingcod	0	2	0	0	2	0	7	2	3	14	26	8	2	8	2	3	0	7	0	0	0	30	58
(2370 lbs)	Shelf RF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	2	7	7
	Sablefish	2	6	33	38	79	19	3	11	38	29	100	3	21	40	0	9	27	3	0	2	4	109	288
	Slope RF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	3	1	3	15	15
	Sharks	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	3	0	0	1	1	2	7	12
	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
	Non-target	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	2	2	1	1	0	1	8	9
	Total	2	14	33	38	87	19	10	13	41	43	126	12	23	48	2	17	31	20	8	4	12	177	390

1/ bs landed during 2004-2006 to qualify for a permit shown in parentheses

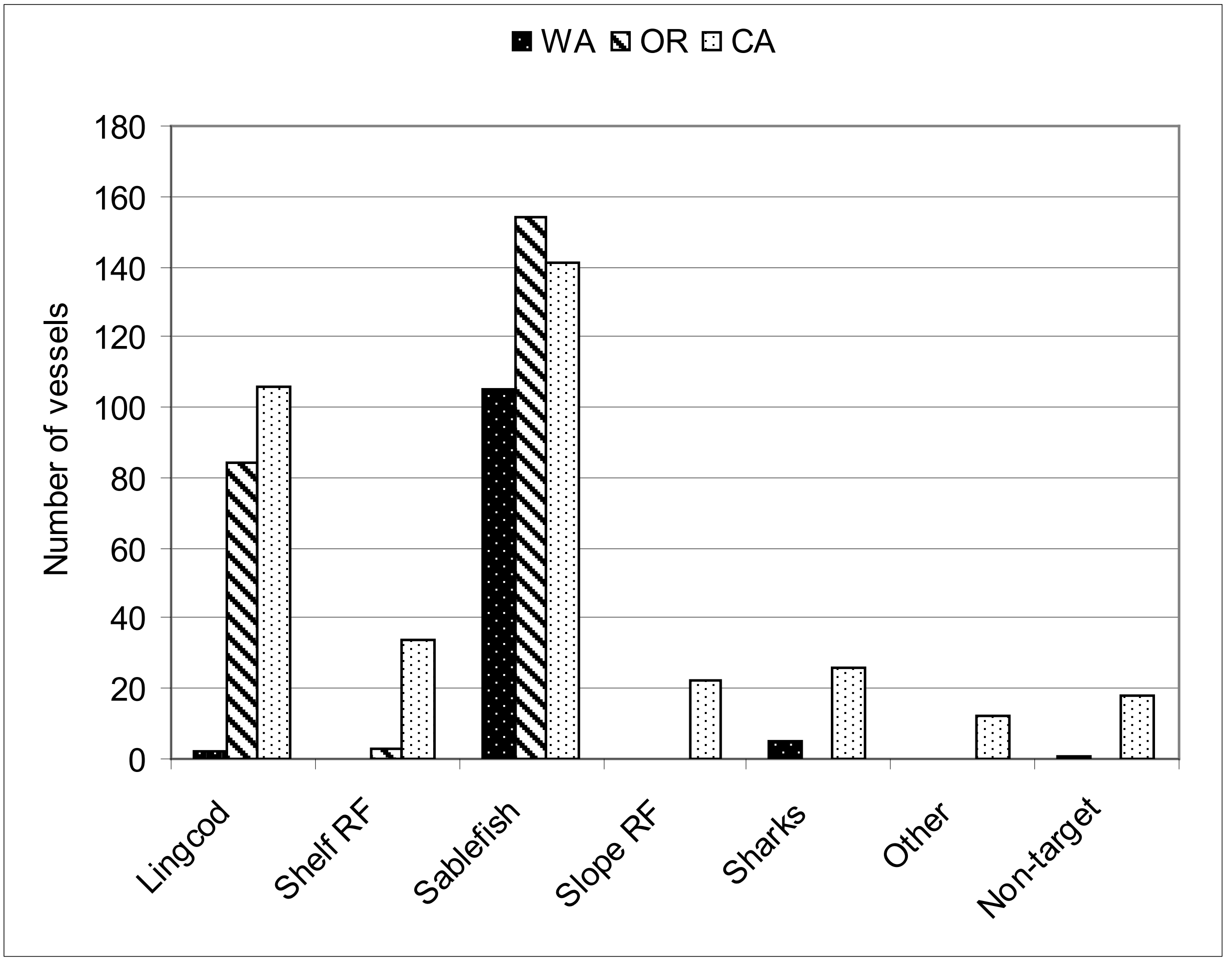

Figure E-12. Distribution of vessels by target-species vessel group during 2004-2006 that would qualify for permits under 713 v-1

Under criterion 1000 lb-1, the number of qualified vessels declined by 19 percent, from 713 to 577 vessels. However, the sablefish vessel decline was only 9.5 percent (from 400 to 362 vessels) **(Table E-13; Figure E-13)**. Larger reductions occurred for lingcod (34 percent), shelf rockfish (37 percent) and other species vessels (50 percent) **(Table E-13)**. The reason for the larger reductions in the latter vessel groups was that they generally had lower catch histories of B species groundfish compared to sablefish vessels during 2004-2006 **(**see **Table 3-13a** for vessel group catch history statistics).

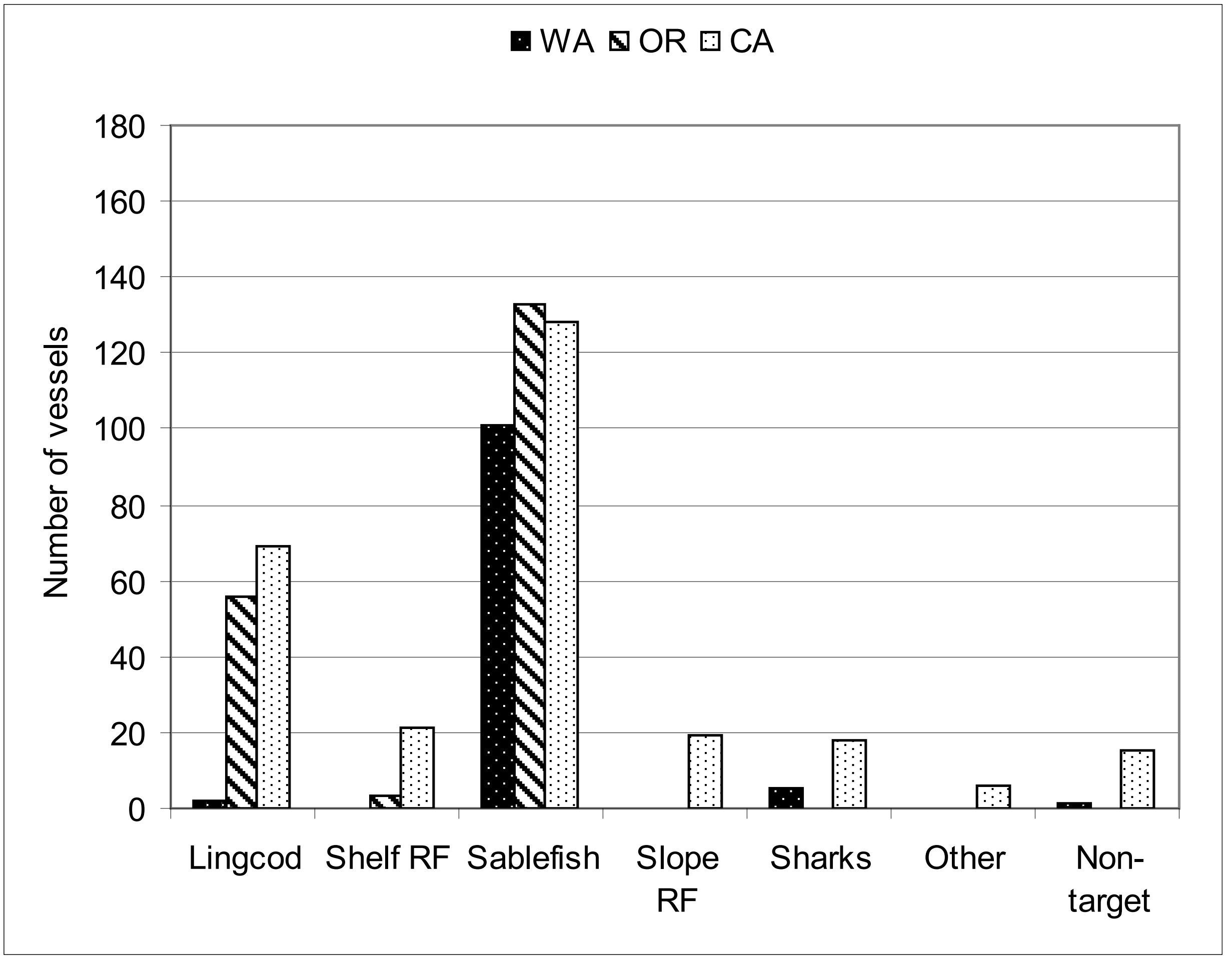

Figure E-13. Distribution of vessels by target species group during 2004-2006 that would qualify for permits under criterion 1000 lbs-1

Under the 390v-1 criterion the fleet was reduced an additional 32 percent, from 577 to 390 vessels (**Table E-13).** Here again, the sablefish fleet reduction was lower at 20 percent (362 to 288 vessels) compared to 54 percent for lingcod vessels, 71 percent for shelf rockfish vessels, and 48 percent for shark vessels (**Table E-13; Figure E-14).** The larger reductions in the latter vessel groups was because they generally had lower catch histories of B species groundfish during 2004-2006 compared to sablefish vessels **(**see **Table 3-13a** for vessel group catch history statistics).

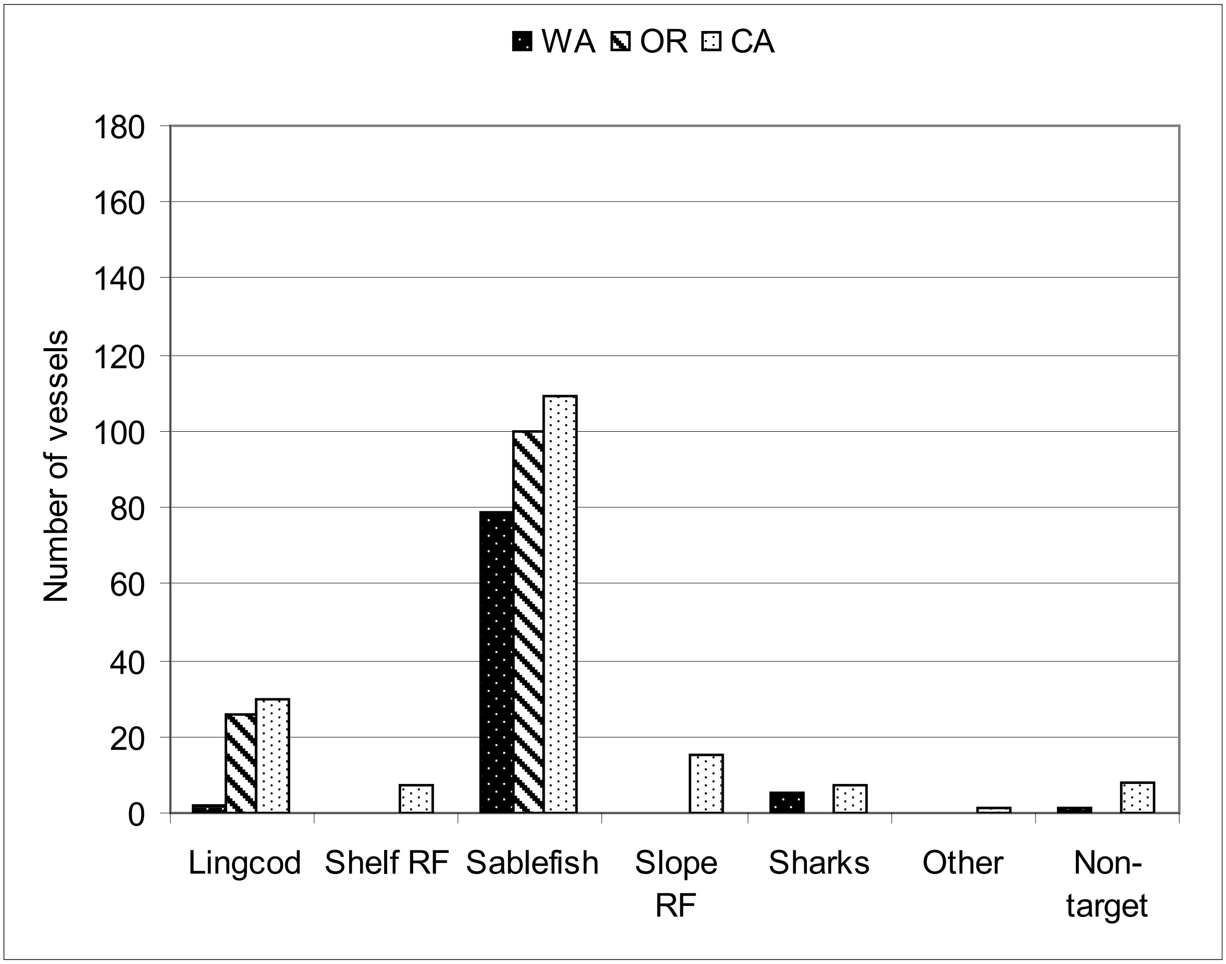

Figure E-14. Distribution of vessels by target species group during 2004-2006 that would qualify for permits under criterion 390v-1

Potential Qualification Framework Impacts to Target-Species Vessel Groups

Qualification frameworks impacts to target-species vessel groups were analyzed, in part, by comparing impacts under 713v-1 and 390v-1 criteria (presented in the previous section), which used QF-1, with impacts to vessel groups under 713v-3 and 390v-3 criteria, which used Q-3.

The major difference between 713v-1 and 713v-3 was that more (18, 2.5 percent) permits would have been issued to lingcod, shelf rockfish and shark vessels under the latter criterion compared to the former criterion during 2004-2006 (**Tables E-13 and E-14; Figure E-15)**. Under 713v-1 more permits (18, 2.5 percent) would have been issued to sablefish, slope rockfish, other species, and non-target species vessels. The lingcod, shelf rockfish and shark vessels that would have benefited under 713v-3 were California-based; while the sablefish vessels under 713v-1 were Washington- and Oregon- based. The California sablefish fleet was the same under either criterion (**Tables E-13 and E-14)**.

Table E-14. Estimated distribution of vessels during 2004-2006 by port group, state and target species group that would have qualified for B permits under selected qualification standards and using qualification framework QF-3: 1998-2006 lbs landed with at least one landing during 2004-2006.

Standard 1/	Species	SPS	NPS	CWA	CLW	WA	CLO	TLA	NPA	CBA	BRA	OR	CCA	ERA	BGA	BDA	SFA	MNA	MRA	SBA	LAA	SDA	CA	Total
	Lingcod	0	2	0	0	2	0	14	5	16	44	79	19	5	20	10	15	13	27	4	0	0	113	194
713 vsls-3	Shelf RF	0	0	0	0	0	0	3	0	0	3	6	0	0	1	3	2	10	13	7	3	6	45	51
(1055 lbs)	Sablefish	2	7	48	46	103	35	6	23	47	32	143	6	33	46	0	13	33	3	0	3	4	141	387
	Slope RF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	1	7	21	21
	Sharks	0	5	0	0	5	0	0	0	0	0	0	0	1	0	0	7	0	0	7	7	6	28	33
	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	5	0	10	10
	Non-target	0	1	0	0	1	0	0	0	0	0	0	1	0	1	0	2	4	5	1	1	1	16	17
	Total	2	15	48	46	111	35	23	28	63	79	228	26	39	68	13	39	63	57	25	20	24	374	713
390 vsls-3	Lingcod	0	2	0	0	2	0	7	3	2	17	29	12	1	8	5	5	5	8	0	0	0	44	75
(4861lbs)	Shelf RF	0	0	0	0	0	0	0	0	0	3	3	0	0	0	2	0	1	1	2	0	3	9	12
	Sablefish	1	5	24	32	62	16	2	12	32	29	91	2	24	41	0	9	28	1	0	2	3	110	263
	Slope RF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	1	4	14	14
	Sharks	0	3	0	0	3	0	0	0	0	0	0	0	1	0	0	3	0	0	1	2	3	10	13
	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	4	4
	Non-target	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	2	2	0	1	1	1	8	9
	Total	1	11	24	32	68	16	9	15	34	49	123	15	26	49	7	19	37	16	8	8	14	199	390

1/ The lbs landed during 1998-2006 to qualify for a permit shown in parentheses

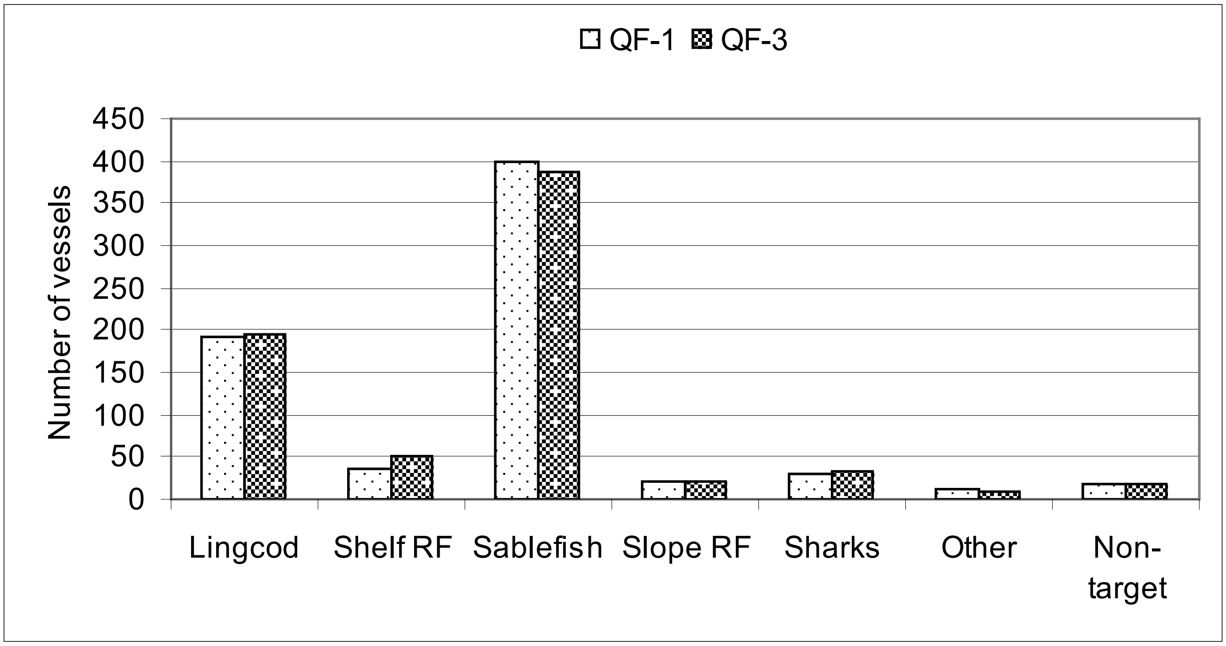

Figure E-15. Distribution of permits among target species vessel groups based on 2004-2006 landings data for the WOC area to produce an initial fleet size of 713 vessels and using QF-1 and QF-3 qualification frameworks.

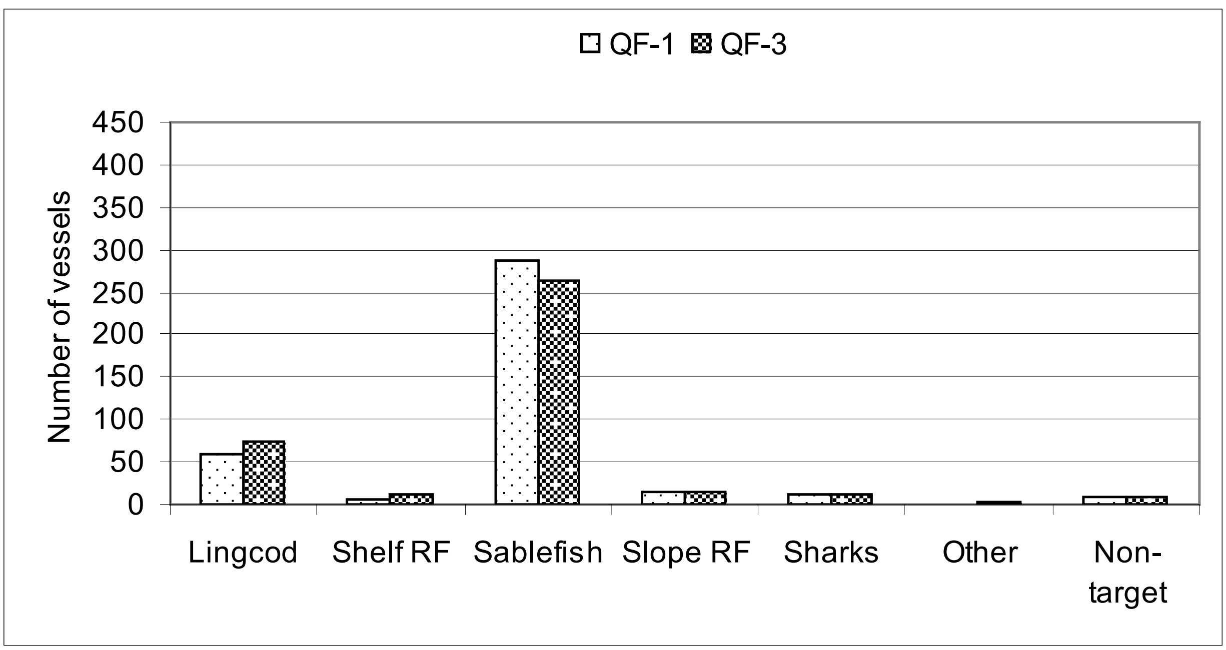

Figure E-16. Distribution of permits among target species vessels based on 2004-2006 landings data for the WOC area to produce an initial fleet size of 390 vessels and using QF-1 and QF-2 qualification frameworks.

Under 390v-3 compared to 390v-1, 26 more (6.7 percent) permits would have gone to lingcod, shelf rockfish, shark, and other species vessels. Under 390v-1 the permit swing would have favored sablefish and slope rockfish vessels. Here again California vessels would have benefited the most under 390v-3, which used the QF-3 framework not including California sablefish and slope rockfish vessels, which would have received more permits under 390v-1 (**Tables E-13 and E-14; Figure E-16)**. Oregon and Washington would have qualified more vessels overall and for individual target-species groups under 390v-1 compared to 390v-3.

Analysis of potential fishery revenue impact on non-qualifying vessels by vessel target species category showed that vessels that would not have qualified for B permits under fleet size goals in the range of 200-1000 vessels during 2004-2006 window period years were heavily dependent (>90 percent generally) for their total commercial fishery revenues on non-B species groundfish, regardless of target species strategy (**Table E-14b)** Under the more restrictive goals (<601 vessels), sablefish vessels made up most of the fleet. However the non-qualifying sablefish vessels were >98 percent dependent on non-B species revenues (**Table E-14b).** Non-qualifying lingcod vessels were 97 percent dependent on other species at the 200 vessel goals level (7,600 lb minimun qualificatio level) and nearly 100 percent dependent on other species at the 1000 goal level (50 lb minimum qualification level) (**Table E-14b).** The target species group that was more dependent on B species revenues than the other groups was the slope rockfish vessels, which on average derived 84 percent of their revenues during 2004-2006 from non-B species groundfish uner the 800 vessel fleet size goal (300 lb minumum landing requirement) but were ≥94 percent under the other fleets size goals (**Table E-14b).**

Table E-14b: B species and total commercial fishery revenues received by B species directed fishing vessels during 2004-2006 window period years by vessel target species category and under various hyphothetical fleet size goals, including B species revenues expressed as a proportion of total commercial fishery revenues for qualifying and non-qualifying vessels

		Qualify				Non-qualify			
Target sp	Fleet goal 1/	# vsls	B $$	Non-B $$	Prop Non-B	# vsls	B $$	Non-B $$	Prop Non-B
All	200	200	$6,431,019	$29,349,512	82.0%	903	$2,100,421	$86,810,893	97.6%
	400	400	$7,788,696	$55,417,250	87.7%	703	$742,744	$60,743,155	98.8%
	600	600	$8,281,441	$79,183,989	90.5%	503	$249,998	$36,976,416	99.3%
	800	800	$8,467,969	$97,779,587	92.0%	303	$63,471	$18,380,818	99.7%
	1000	1000	$8,526,902	$112,204,896	92.9%	103	$4,537	$3,955,509	99.9%
Sablefish	200	177	$5,866,900	$26,292,960	81.8%	270	$1,073,089	$51,496,833	98.0%
	400	294	$6,704,540	$46,531,859	87.4%	153	$235,449	$31,257,934	99.3%
	600	372	$6,894,221	$63,708,633	90.2%	75	$45,768	$14,081,160	99.7%
	800	415	$6,932,356	$72,249,014	91.2%	32	$7,632	$5,540,779	99.9%
	1000	444	$6,939,912	$77,412,210	91.8%	3	$77	$377,583	100.0%
Slope rf	200	9	$182,824	$1,231,814	87.1%	20	$48,999	$648,735	93.0%
	400	15	$217,943	$1,584,943	87.9%	14	$13,880	$295,606	95.5%
	600	19	$227,547	$1,669,046	88.0%	10	$4,276	$211,503	98.0%
	800	24	$231,133	$1,876,969	89.0%	5	$690	$3,580	83.8%
	1000	27	$231,705	$1,876,969	89.0%	2	$118	$3,580	96.8%
Lingcod	200	0	$0	$0		386	$715,418	$20,572,213	96.6%
	400	62	$396,788	$3,910,197	90.8%	324	$318,630	$16,662,016	98.1%
	600	136	$588,059	$7,406,058	92.6%	250	$127,360	$13,166,155	99.0%
	800	234	$683,268	$13,359,323	95.1%	152	$32,150	$7,212,890	99.6%
	1000	338	$713,067	$18,625,175	96.3%	48	$2,351	$1,947,038	99.9%
Shelf rf	200	1	$25,104	$106,276	80.9%	122	$145,602	$5,918,430	97.6%
	400	7	$76,459	$776,663	91.0%	116	$94,247	$5,248,043	98.2%
	600	26	$125,439	$2,046,715	94.2%	97	$45,267	$3,977,991	98.9%
	800	54	$153,155	$3,469,948	95.8%	69	$17,551	$2,554,758	99.3%
	1000	93	$169,373	$4,983,480	96.7%	30	$1,333	$1,041,226	99.9%
Shark	200	7	$171,487	$769,137	81.8%	50	$29,766	$4,525,668	99.3%
	400	12	$179,443	$1,092,082	85.9%	45	$21,811	$4,202,723	99.5%
	600	24	$192,956	$2,396,309	92.5%	33	$8,297	$2,898,496	99.7%
	800	39	$199,788	$4,206,288	95.5%	18	$1,465	$1,088,517	99.9%
	1000	51	$201,115	$5,227,559	96.3%	6	$138	$67,246	99.8%
Non-targ	200	6	$184,704	$949,325	83.7%	19	$43,570	$1,508,745	97.2%
	400	9	$204,298	$1,307,739	86.5%	16	$23,976	$1,150,331	98.0%
	600	16	$223,367	$1,718,706	88.5%	9	$4,906	$739,364	99.3%
	800	19	$226,890	$1,838,917	89.0%	6	$1,383	$619,153	99.8%
	1000	23	$228,106	$2,259,423	90.8%	2	$168	$198,647	99.9%
Misc	200	0	$0	$0		36	$43,977	$2,140,269	98.0%
	400	1	$9,225	$213,767	95.9%	35	$34,752	$1,926,502	98.2%
	600	7	$29,853	$238,522	88.9%	29	$14,124	$1,901,747	99.3%
	800	15	$41,378	$779,128	95.0%	21	$2,599	$1,361,141	99.8%
	1000	24	$43,625	$1,820,080	97.7%	12	$353	$320,189	99.9%

1/ 200=7,600 lbs; 400=2,221 lbs; 600=904 lbs; 800=300 lbs; 1000=50 lbs

Summary of Potential Impacts of Qualification Criteria to Target-Species Vessel Groups

Catch history differences between target-species vessel groups explains why some groups are more susceptible to permit non-qualification than others based on pounds landed frameworks (all except QF-4).

It also explains why some port groups (hence states) are more susceptible to permit non-qualification than others. Port groups that support large sablefish fleets are more likely to receive permits under any of the qualification criteria that are based on pounds landed (which does not include the 2 in 3 yrs-4 criterion) than those that have a large presence of target lingcod and shelf rockfish vessels.

State and target-species vessel group statistical data show that sablefish vessels in all three states, California slope rockfish vessels, and Washington shark vessels had median B species catch histories during 2004-2006 in the range of 3,140 lbs to 32,595 lbs (**Table E-15; Figure E-17).** For comparison, lingcod vessel median catch histories of B species groundfish during 2004-2006 were 430 lbs in California and 571 lbs in Oregon (Washington had a unique situation in which their lingcod vessels had a median B species catch history of 2,074 lbs, but this was only four vessels). Shelf rockfish vessels in Oregon and California had median catch histories of only 37 and 277 lbs, respectively, while California shark, California other species, and California non-target vessels had median B species histories of 488 lbs, 131 lbs, and 1,421 lbs, respectively.

Table E-15. Target and B species vessel catch history statistics for 2004-2006 by target-species vessel group and state

	Sablefish fleet			Shelf RF fleet			Slope RF fleet			Lingcod fleet		
	vsls	**target lbs**	**B lbs**	**vsls**	**target lbs**	**B lbs**	**vsls**	**target lbs**	**B lbs**	**vsls**	**target lbs**	**B lbs**
WA	114			0			2			4		
lbs/vsl		8,413	8,771		0	0		78	104		2,007	2,117
median		4,079	4,438		0	0		78	104		1,971	2,074
high		43,202	43,912		0	0		89	134		4,056	4,152
low		26	26		0	0		67	73		31	167
OR	178			9			0			158		
lbs/vsl		7,020	7,533		419	646		0	0		961	1,063
median		3,083	3,140		37	37		0	0		556	571
high		56,684	63,208		1,501	2,217		0	0		4,319	5,538
low		41	41		4	4		0	0		12	14
CA	155			114			27			224		
lbs/vsl		14,229	18,005		566	738		5,751	7,051		761	1,002
median		7,026	9,380		213	277		3,192	3,780		385	430
high		69,416	127,668		9,038	12,967		38,300	40,880		4,975	6,908
low		16	1,594		3	3		42	42		5	5

	Shark fleet			Other species fleet			Non-target fleet 2/			Totals for all fleets		
	vsls	**target lbs**	**B lbs**	**vsls**	**target lbs**	**B lbs**	**vsls**	**target lbs**	**B lbs**	**vsls**	**target lbs**	**B lbs**
WA	5			0			1			126		
lbs/vsl		57,634	59,762		0	0		0	34,379		10,043	10,649
median	10,000	32,063	32,595		0	0		0	34,379		3,750	4,214
high		175,190	183,801		0	0		0	34,379		175,190	183,801
low		3,347	3,347		0	0		0	34,379		26	26
OR	0			0			0			345		
lbs/vsl		0	0		0	0		0	0		4,073	4,390
median		0	0		0	0		0	0		1,235	1,302
high		0	0		0	0		0	0		56,684	63,208
low		0	0		0	0		0	0		4	4
CA	52			36			24			632		
lbs/vsl		2,793	2,889	36	454	523		0	7,676		4,535	5,233
median		427	488		131	131		0	1,421		579	702
high		64,070	64,088		5,337	5,337		0	127,668		69,416	127,668
low		9	14		1	1		0	15		1	1

1/ each vessel was assigned to a species group based on a >50% revenue criterion

2/ vessels that landed did not land >50% of revenues on a single species group were placed in this category

3/ number of vessels and lbs landed in B species directed trips are shown in this row including the proportion of the total landed of each species that were made by each tar

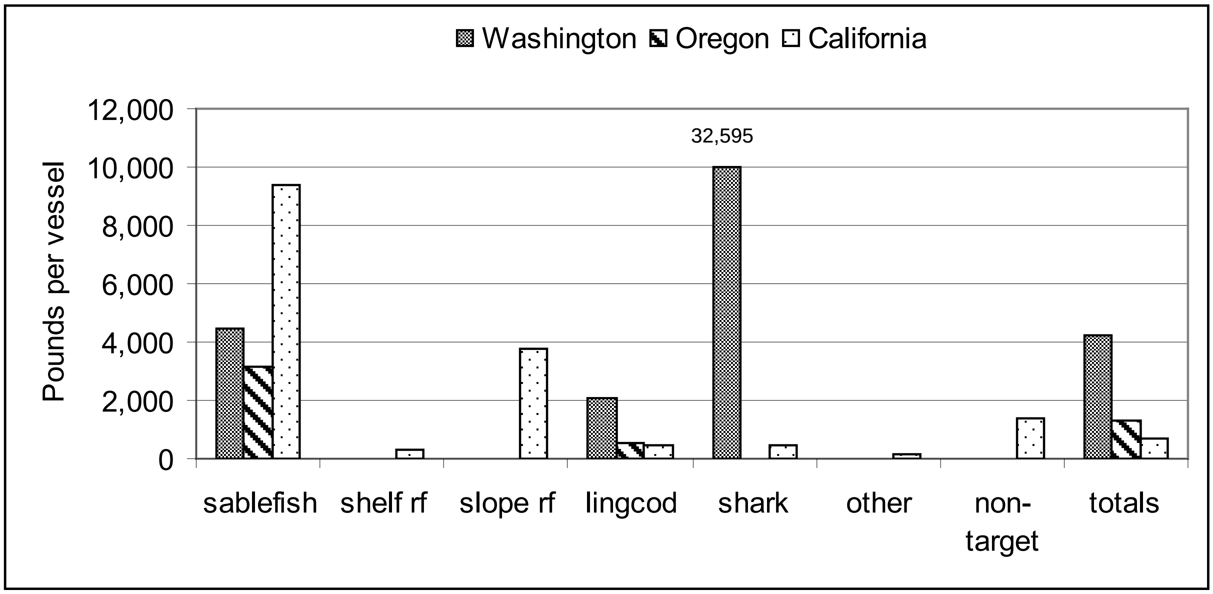

Figure E-17. Median pounds per vessel during 2004-2006 by target-species vessel group and state

Regulation differences for the different species were the likely causes of the small catch histories of the lingcod and shelf rockfish vessels (which historically were much larger than they have been in recent years). During 2004-2006, lingcod and shelf rockfish vessels could land no more than 300 lbs and 425 lbs, respectively, in any month, while sablefish vessels could land a monthly equivalent of 2,500 lbs north of the Conception Management Area and 4,200 lbs in the Conception area. Shark vessels were virtually unrestricted during 2004-2006 (**Table 1-2)**.

Qualification framework also affects permit issuance to target-species vessel groups. QF-3 which uses catch history data back to 1998 in combination with a 2004-2006 landing requirement will qualify slightly more shelf rockfish and lingcod vessels (3-7 percent depending on criterion) than frameworks that restrict qualification to landings during 2004-2006. This is because some target shelf rockfish and lingcod vessels have more robust B species catch histories when data back to 1998 are included for permit qualification. Conversely, sablefish and slope rockfish vessels receive slightly more permits when qualification criteria only include landings data for 2004-2006.

The analysis of target species vessel landings data under a wide range of hypothetical fleet size goals (with corresponding minimum landing requirements) showed a very low dependence of vessels overall on B species groundfish revenues during 2004-2006 window period years (**Table E-4c**). Thus vessels not meeting B permit qualification standards generally have a small revenue loss to make up for lost B species harvest opportunity stemming from B permit issuance.

Potential Economic Impacts of Qualification Criteria
Total revenues received by WOC directed B species fishing vessels in 2004-2006 totaled about $8.5 million, about half of which (51 percent) was received by California-based vessels and the remainder by Oregon- (29 percent) and Washington-based (20 percent) vessels. Sablefish was by far the most valuable species to the fishermen overall, accounting for 81 percent of total revenues. Lingcod was the second highest in terms of total ex-vessel revenues at 8 percent (**Table E-16).** The estimated total impact[15] of the fishery to the West Coast economy was estimated to be about $15.5 million, with about 51 percent

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[15] The word "impact" is used in terms of personal income impact on the economy, which goes beyond fishermen's income.

attributable to California-based vessels, 27 percent to Oregon-based vessels, and 22 percent to Washington-based vessels. Sablefish had the greatest impact, representing about 81 percent of the total. Lingcod had the second highest impact at about 8 percent of the total (**Table E-16).**

Table E-16. Ex-vessel revenues and estimated West Coast economic impact of directed B species groundfish fishery in 2004-2006 by target-species vessel group and state (000s)

	WA		OR		CA		Totals	
	Rev	Impacts	Rev	Impacts	Rev	Impacts	Rev	Impacts
Lingcod	$6.19	$12.44	$263.84	$445.89	$445.39	$734.89	$715.42	$1,193.22
Shelf RF	$0.00	$0.00	$7.89	$13.88	$162.82	$263.76	$170.71	$277.65
Sablefish	$1,623.22	$2,954.25	$2,161.44	$3,739.30	$3,155.33	$5,837.36	$6,939.99	$12,530.91
Slope RF	$0.09	$0.21	$0.00	$0.00	$231.73	$375.40	$231.82	$375.61
Sharks	$78.47	$328.81	$0.00	$0.00	$122.78	$298.35	$201.25	$627.16
Other	$0.00	$0.00	$0.00	$0.00	$43.98	$71.24	$43.98	$71.24
Non-target	$15.17	$33.38	$0.00	$0.00	$213.10	$345.22	$228.27	$378.60
Total	$1,723.14	$3,329.08	$2,433.17	$4,199.07	$4,375.12	$7,926.24	$8,531.44	$15,454.39

The potential economic impacts of the qualification criteria contained in A-3, A-4 and A-5 were analyzed based on estimated economic impacts of vessels that would have qualified for B permits during 2004-2006 compared to total estimated impacts (**Table E-16)**. The A-4 criteria were restricted to those that would qualify between 390 and 713 vessels. The analysis was done by state and target-species vessel group. Landing revenue data used in the analysis appear in **Tables E-17 and E-18.** These data were expanded to produce personal income impact estimates based on the expansion factors listed in the **Methods** section.

No attempt was made in the analysis to redistribute fish from non-qualifying vessels to qualifying vessels, which would have been possible through inseason regulation adjustments, or to estimate incidental catch allowances by non-qualifying vessels that take B species groundfish incidental to fishing for nearshore species or non-groundfish species. The Council and NMFS may allow for incidental landings by non-B permit vessels under the authority of a C permit or a nearshore permit off Oregon and California. Thus, the estimates produced here represent worse-case scenarios.

Table E-17. Estimated revenues received during 2004-2006 by target species group and state under A-3 and A-5 qualification criteria (000s)

QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total
	Lingcod	$5.8	$141.0	$233.6	$380.4		Lingcod	$5.8	$240.1	$391.5	$637.4		Lingcod	$5.8	$245.0	$406.5	$657.3
	Shelf RF	$0.0	$0.0	$76.5	$76.5		Shelf RF	$0.0	$7.2	$132.2	$139.4		Shelf RF	$0.0	$7.2	$135.8	$143.1
	Sablefish	$1,557.4	$2,034.7	$3,091.6	$6,683.7		Sablefish	$1,620.3	$2,148.2	$3,146.7	$6,915.3		Sablefish	$1,620.3	$2,152.4	$3,148.9	$6,921.7
390v-1	Slope RF	$0.0	$0.0	$217.9	$217.9	680v-1	Slope RF	$0.0	$0.0	$230.3	$230.3	713v-1	Slope RF	$0.0	$0.0	$230.3	$230.3
	Sharks	$78.5	$0.0	$101.0	$179.4		Sharks	$78.5	$0.0	$118.2	$196.7		Sharks	$78.5	$0.0	$119.0	$197.5
	Other	$0.0	$0.0	$9.2	$9.2		Other	$0.0	$0.0	$35.5	$35.5		Other	$0.0	$0.0	$38.0	$38.0
	Non-target	$15.2	$0.0	$189.1	$204.3		Non-target	$15.2	$0.0	$209.3	$224.5		Non-target	$15.2	$0.0	$210.7	$225.9
	Total	$1,656.9	$2,175.7	$3,918.9	$7,751.5		Total	$1,719.8	$2,395.5	$4,263.8	$8,379.1		Total	$1,719.8	$2,404.7	$4,289.4	$8,413.9
	Lingcod	$5.8	$29.8	$106.7	$142.3		Lingcod	$5.8	$160.5	$262.7	$429.0		Lingcod	$5.8	$173.2	$268.1	$447.2
	Shelf RF	$0.0	$0.5	$54.7	$55.2		Shelf RF	$0.0	$0.6	$85.2	$85.8		Shelf RF	$0.0	$0.6	$85.2	$85.8
	Sablefish	$1,337.1	$1,761.3	$2,957.4	$6,055.8		Sablefish	$1,529.3	$2,025.1	$3,096.0	$6,650.3		Sablefish	$1,536.9	$2,039.9	$3,100.9	$6,677.8
390v-2	Slope RF	$0.0	$0.0	$176.5	$176.5	680v-2	Slope RF	$0.0	$0.0	$219.8	$219.8	713v-2	Slope RF	$0.0	$0.0	$220.8	$220.8
	Sharks	$76.9	$0.0	$96.0	$172.8		Sharks	$77.7	$0.0	$108.2	$185.9		Sharks	$78.5	$0.0	$108.2	$186.7
	Other	$0.0	$0.0	$22.6	$22.6		Other	$0.0	$0.0	$25.1	$25.1		Other	$0.0	$0.0	$25.1	$25.1
	Non-target	$15.2	$0.0	$161.4	$176.5		Non-target	$15.2	$0.0	$186.2	$201.3		Non-target	$15.2	$0.0	$196.8	$211.9
	Total	$1,434.9	$1,791.6	$3,575.3	$6,801.8		Total	$1,627.9	$2,186.1	$3,983.3	$7,797.3		Total	$1,636.4	$2,213.7	$4,005.2	$7,855.3
	Lingcod	$5.8	$113.5	$230.9	$350.2		Lingcod	$5.8	$219.2	$377.5	$602.5		Lingcod	$5.8	$225.8	$390.9	$622.4
	Shelf RF	$0.0	$0.6	$60.6	$61.2		Shelf RF	$0.0	$7.8	$129.1	$136.9		Shelf RF	$0.0	$7.8	$132.4	$140.2
	Sablefish	$1,448.2	$1,944.9	$3,050.1	$6,443.3		Sablefish	$1,613.5	$2,128.7	$3,141.3	$6,883.5		Sablefish	$1,617.1	$2,131.0	$3,148.2	$6,896.3
390v-3	Slope RF	$0.0	$0.0	$209.5	$209.5	680v-3	Slope RF	$0.0	$0.0	$227.1	$227.1	713v-3	Slope RF	$0.0	$0.0	$228.9	$228.9
	Sharks	$76.9	$0.0	$102.9	$179.8		Sharks	$78.5	$0.0	$116.2	$194.7		Sharks	$78.5	$0.0	$116.5	$195.0
	Other	$0.0	$0.0	$22.6	$22.6		Other	$0.0	$0.0	$28.1	$28.1		Other	$0.0	$0.0	$32.4	$32.4
	Non-target	$15.2	$0.0	$181.4	$196.5		Non-target	$15.2	$0.0	$209.2	$224.4		Non-target	$15.2	$0.0	$209.2	$224.4
	Total	$1,546.0	$2,059.0	$3,858.0	$7,463.0		Total	$1,712.9	$2,355.8	$4,228.4	$8,297.1		Total	$1,716.6	$2,364.5	$4,258.5	$8,339.7

Table E-18. Estimated revenues received during 2004-2006 by target species group and state under A-4 qualification criteria that limit the fleet size to between 390 and 713 vessels (000s)

QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total
	Lingcod	$5.8	$242.1	$396.5	$644.4		Lingcod	$6.1	$240.0	$397.4	$643.5		Lingcod	$5.8	$209.9	$357.2	$572.9
	Shelf RF	$0.0	$7.2	$135.3	$142.5		Shelf RF	$0.0	$5.7	$128.2	$133.9		Shelf RF	$0.0	$5.7	$118.8	$124.5
	Sablefish	$1,620.3	$2,151.5	$3,148.9	$6,920.8		Sablefish	$1,404.3	$1,817.5	$2,941.4	$6,163.1		Sablefish	$1,597.0	$2,107.0	$3,136.8	$6,840.8
500 lbs-1	Slope RF	$0.0	$0.0	$230.3	$230.3	2 in 3 yrs-4	Slope RF	$0.0	$0.0	$193.9	$193.9	1.6K-3	Slope RF	$0.0	$0.0	$225.4	$225.4
(701 vsls)	Sharks	$78.5	$0.0	$118.2	$196.7	(595 vsls)	Sharks	$50.8	$0.0	$113.4	$164.2	(629 vsls)	Sharks	$78.5	$0.0	$114.7	$193.2
	Other	$0.0	$0.0	$38.0	$38.0		Other	$0.0	$0.0	$14.8	$14.8		Other	$0.0	$0.0	$25.2	$25.2
	Non-target	$15.2	$0.0	$210.7	$225.9		Non-target	$15.2	$0.0	$190.6	$205.7		Non-target	$15.2	$0.0	$209.2	$224.4
	Total	$1,719.8	$2,400.9	$4,278.0	$8,398.6		Total	$1,476.4	$2,063.2	$3,979.7	$7,519.3		Total	$1,696.4	$2,322.6	$4,187.3	$8,206.3
	Lingcod	$5.8	$211.8	$355.8	$573.4		Lingcod	$5.8	$226.3	$374.0	$606.0		Lingcod	$5.8	$186.9	$339.9	$532.6
	Shelf RF	$0.0	$7.2	$114.5	$121.8		Shelf RF	$0.0	$7.2	$126.6	$133.8		Shelf RF	$0.0	$2.8	$101.9	$104.7
	Sablefish	$1,614.4	$2,124.7	$3,137.2	$6,876.4		Sablefish	$1,620.3	$2,148.5	$3,147.7	$6,916.6		Sablefish	$1,583.5	$2,089.8	$3,132.9	$6,806.2
1000 lbs-1	Slope RF	$0.0	$0.0	$227.5	$227.5	500 max-5	Slope RF	$0.0	$0.0	$230.3	$230.3	2000 lbs-3	Slope RF	$0.0	$0.0	$225.1	$225.1
(577 vsls)	Sharks	$78.5	$0.0	$113.4	$191.9	(655 vsls)	Sharks	$78.5	$0.0	$115.8	$194.3	(581 vsls)	Sharks	$78.5	$0.0	$113.5	$192.0
	Other	$0.0	$0.0	$26.6	$26.6		Other	$0.0	$0.0	$38.0	$38.0		Other	$0.0	$0.0	$25.1	$25.1
	Non-target	$15.2	$0.0	$208.2	$223.4		Non-target	$15.2	$0.0	$209.3	$224.5		Non-target	$15.2	$0.0	$206.7	$221.8
	Total	$1,713.9	$2,343.7	$4,183.4	$8,241.0		Total	$1,719.8	$2,382.0	$4,241.7	$8,343.5		Total	$1,683.0	$2,279.4	$4,145.1	$8,107.5
	Lingcod	$5.8	$153.9	$260.3	$420.0		Lingcod	$5.8	$234.2	$396.4	$636.3		Lingcod	$5.8	$168.0	$262.7	$436.5
	Shelf RF	$0.0	$2.2	$79.7	$82.0		Shelf RF	$0.0	$7.8	$134.0	$141.8		Shelf RF	$0.0	$0.6	$85.2	$85.8
	Sablefish	$1,571.8	$2,052.0	$3,100.1	$6,724.0		Sablefish	$1,617.1	$2,133.5	$3,148.2	$6,898.8		Sablefish	$1,535.1	$2,031.0	$3,096.0	$6,662.1
2000 lbs-1	Slope RF	$0.0	$0.0	$224.1	$224.1	1000 lbs-3	Slope RF	$0.0	$0.0	$228.9	$228.9	3.5K-3	Slope RF	$0.0	$0.0	$220.8	$220.8
(420 vsls)	Sharks	$78.5	$0.0	$61.2	$139.6	(727 vsls)	Sharks	$78.5	$0.0	$117.6	$196.1	(474 vsls)	Sharks	$77.7	$0.0	$108.2	$185.9
	Other	$0.0	$0.0	$9.2	$9.2		Other	$0.0	$0.0	$32.8	$32.8		Other	$0.0	$0.0	$25.1	$25.1
	Non-target	$15.2	$0.0	$196.6	$211.8		Non-target	$15.2	$0.0	$209.2	$224.4		Non-target	$15.2	$0.0	$186.2	$201.3
	Total	$1,671.2	$2,208.2	$3,931.3	$7,810.7		Total	$1,716.6	$2,375.5	$4,267.1	$8,359.2		Total	$1,633.8	$2,199.6	$3,984.3	$7,817.6

Potential A-3 and A-5 Criteria Impacts

A-3 and A-5 criteria that were based on QF-1 had the lowest personal income impacts, followed by QF-3 (**Tables E-19 and E-20**). QF-2 was lower by 7-10 percentage points (7-10 pts) compared to QF-1 standards (**Tables E-19 and E-20).** This was because some vessels that qualified for permits under the QF-2 framework made no landings during 2004-2006, as discussed in previous sections (see **Table E-3b** for actual numbers**).** QF-3 reductions were less than QF-1 reductions for the same standards by 1-3 pts because some vessels that would have qualified had lower catch histories during 2004-2006 than some vessels that would not qualify under the QF-3 framework. There were very small differences overall (1 pt) between the 680 and 713 vessel goal alternatives (**Tables E-19 and E-20)**.

The sablefish reduction under the 390 vessels goal was 4-9 pts below the 713 vessel goal, but the reductions were much greater for lingcod (38-43 pts), shelf rockfish (18-46 pts) and other species (6-66 pts) vessels in these same comparisons. Shark and non-target species vessel reductions were only slightly greater (6-15 pts) than the sablefish reductions in these comparisons (**Tables E-19 and E-20)**.

Potential A-4 Criteria Impacts

2 in 3 yrs-4 Criterion

This criterion qualified 585 vessels but had greater negative economic impact than any of the other criteria except for 390v-3, which qualified fewer (33 percent) vessels overall and included vessels that did not participate in the fishery during 2004-2006. The sablefish impact was higher under this criterion by 8 pts compared to criteria that would qualify as few as 420 vessels (**Tables E-19, E-20, E-21 and E-22).**

500 lbs-1, 1000 lbs-1 and 2000 lbs-1 Criteria

These criteria used the same qualification framework (QF-1) but had different qualification standards. These criteria would have qualified 701, 577 and 420 vessels during 2004-2006, respectively. The decrease in overall economic impact ranged from 2 pts (500 lbs-1) to 8 pts (2000 lbs-1), while the comparative sablefish impact range was from 1 pt (500lbs-1) to 3 pts (2000 lbs-1). The impacts to lingcod, shelf rockfish and other species vessels were much greater under these criteria (and to all others) than it was to sablefish vessels (**Tables E-21 and E-22)**.

500 max-5

The overall impact of this criterion were close (≤1 pt) to those of the 500 lbs-1 criterion. For target-species vessel groups, the impacts were very similar (≤ 1 pt) to the 500 lbs -1 criterion for sablefish, slope rockfish, sharks, other species and non-target vessels, but were slightly higher (5-6 pts) for lingcod and California shelf rockfish vessels (**Tables E-21 and E-22)**.

1000 lbs-3, 1.6K-3, 2000 lbs-3 and 3.5K-3

These four criteria used the same qualification framework, QF-3, but had different qualification standards. The number of vessels that would have qualified for permit issuance in 2004-2006 under these criteria were: 727, 629, 581 and 474, respectively. The overall economic impact reductions ranged from 2 pts (1000 lbs-3) to 8 pts (3.5K-3). The impacts to target-species vessel groups were consistent with the other analyses presented in this section: sablefish, slope rockfish, sharks, and non-target vessels would have been the least affected under these criteria while lingcod, shelf rockfish and other species vessels would have been most affected (**Tables E-21 and E-22)**.

Summary of Economic Impact Analyses and Discussion

The economic analysis used vessel-specific 2004-2006 landings data and species- and state-specific economic impact expansion factors to estimate potential economic impacts of all or some of the qualification criteria contained in A-3, A-4, and A-5. The criteria that used the QF-2 framework (1998-2006 lbs landed) had the highest potential for negative impact of any of the criteria analyzed because those criteria would qualify vessels that did not participate in the fishery during 2004-2006. The 2 in 3 yrs-4 criterion would have qualified a mid-range number of vessels (595) but the potential negative economic impact was high (12 pts) compared to all other criteria--even those that would have qualified fewer vessels. The range in potential negative economic impacts among the remaining criteria was from 12 pts (390v-3) to 1 pt (713v-1; 500 max-5) with a median value of 3 pts.

The analysis did not attempt to (1) redistribute fish from non-qualifying vessels to qualifying vessels, which would have been possible through inseason regulatory adjustment, or (2) to estimate the amount and value of fish that non-qualifying vessels would have been allowed to harvest incidental to fishing for nearshore groundfish or non-groundfish species. Incidental fishing for B species groundfish under the authority of a C permit or an Oregon or California nearshore permit is a provision under A-3, A-4 and A-5. It would allow nearshore fishermen of Oregon and California to continue to land lingcod and shelf rockfish (species that co-occur with nearshore species) in small quantities, which is already the case for these species due to overfished groundfish concerns.

Table E-19. Estimated West Coast economic impacts based on B species revenues received during 2004-2006 by target species group and state under A-3 and A-5 qualification criteria (000s)

QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total
	Lingcod	$12	$238	$385	$635		Lingcod	$12	$406	$646	$1,063		Lingcod	$12	$414	$671	$1,097
	Shelf RF	$0	$0	$124	$124		Shelf RF	$0	$13	$214	$227		Shelf RF	$0	$13	$220	$233
	Sablefish	$2,835	$3,520	$5,719	$12,074		Sablefish	$2,949	$3,716	$5,821	$12,487		Sablefish	$2,949	$3,724	$5,826	$12,498
390v-1	Slope RF	$0	$0	$353	$353	680v-1	Slope RF	$0	$0	$373	$373	713v-1	Slope RF	$0	$0	$373	$373
	Sharks	$329	$0	$245	$574		Sharks	$329	$0	$287	$616		Sharks	$329	$0	$289	$618
	Other	$0	$0	$15	$15		Other	$0	$0	$58	$58		Other	$0	$0	$62	$62
	Non-target	$33	$0	$306	$340		Non-target	$33	$0	$339	$372		Non-target	$33	$0	$341	$375
	Total	$3,208	$3,758	$7,148	$14,115		Total	$3,323	$4,135	$7,739	$15,196		Total	$3,323	$4,151	$7,782	$15,255
	Lingcod	$12	$50	$176	$238		Lingcod	$12	$271	$433	$716		Lingcod	$12	$293	$442	$747
	Shelf RF	$0	$1	$89	$90		Shelf RF	$0	$1	$138	$139		Shelf RF	$0	$1	$138	$139
	Sablefish	$2,433	$3,047	$5,471	$10,952		Sablefish	$2,783	$3,503	$5,728	$12,014		Sablefish	$2,797	$3,529	$5,737	$12,063
390v-2	Slope RF	$0	$0	$286	$286	680v-2	Slope RF	$0	$0	$356	$356	713v-2	Slope RF	$0	$0	$358	$358
	Sharks	$322	$0	$233	$555		Sharks	$326	$0	$263	$588		Sharks	$329	$0	$263	$592
	Other	$0	$0	$37	$37		Other	$0	$0	$41	$41		Other	$0	$0	$41	$41
	Non-target	$33	$0	$261	$295		Non-target	$33	$0	$302	$335		Non-target	$33	$0	$319	$352
	Total	$2,801	$3,098	$6,553	$12,452		Total	$3,154	$3,776	$7,260	$14,190		Total	$3,171	$3,823	$7,297	$14,291
	Lingcod	$12	$192	$381	$584		Lingcod	$12	$370	$623	$1,005		Lingcod	$12	$382	$645	$1,038
	Shelf RF	$0	$1	$98	$99		Shelf RF	$0	$14	$209	$223		Shelf RF	$0	$14	$215	$228
	Sablefish	$2,636	$3,365	$5,643	$11,643		Sablefish	$2,937	$3,683	$5,811	$12,431		Sablefish	$2,943	$3,687	$5,824	$12,454
390v-3	Slope RF	$0	$0	$339	$339	680v-3	Slope RF	$0	$0	$368	$368	713v-3	Slope RF	$0	$0	$371	$371
	Sharks	$322	$0	$250	$572		Sharks	$329	$0	$282	$611		Sharks	$329	$0	$283	$612
	Other	$0	$0	$37	$37		Other	$0	$0	$46	$46		Other	$0	$0	$52	$52
	Non-target	$33	$0	$294	$327		Non-target	$33	$0	$339	$372		Non-target	$33	$0	$339	$372
	Total	$3,003	$3,557	$7,042	$13,602		Total	$3,310	$4,067	$7,678	$15,055		Total	$3,317	$4,082	$7,729	$15,128

Table E-20. Proportions of estimated directed B species fishery economic impacts during 2004-2006 contributed by vessels that would qualify for B permits under A-3 and A-5 qualification criteria (000s) by target species group and state

QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total
	Lingcod	94%	53%	52%	53%		Lingcod	94%	91%	88%	89%		Lingcod	94%	93%	91%	92%
	Shelf RF		0%	47%	45%		Shelf RF		92%	81%	82%		Shelf RF		92%	83%	84%
	Sablefish	96%	94%	98%	96%		Sablefish	100%	99%	100%	100%		Sablefish	100%	100%	100%	100%
390v-1	Slope RF	0%		94%	94%	680v-1	Slope RF	0%		99%	99%	713v-1	Slope RF	0%		99%	99%
	Sharks	100%		82%	92%		Sharks	100%		96%	98%		Sharks	100%		97%	99%
	Other			21%	21%		Other			81%	81%		Other			87%	87%
	Non-target	100%		89%	90%		Non-target	100%		98%	98%		Non-target	100%		99%	99%
	Total	96%	90%	90%	91%		Total	100%	98%	98%	98%		Total	100%	99%	98%	99%
	Lingcod	94%	11%	24%	20%		Lingcod	94%	61%	59%	60%		Lingcod	94%	66%	60%	63%
	Shelf RF		7%	34%	32%		Shelf RF		7%	52%	50%		Shelf RF		7%	52%	50%
	Sablefish	82%	81%	94%	87%		Sablefish	94%	94%	98%	96%		Sablefish	95%	94%	98%	96%
390v-2	Slope RF	0%		76%	76%	680v-2	Slope RF	0%		95%	95%	713v-2	Slope RF	0%		95%	95%
	Sharks	98%		78%	89%		Sharks	99%		88%	94%		Sharks	100%		88%	94%
	Other			51%	51%		Other			57%	57%		Other			57%	57%
	Non-target	100%		76%	78%		Non-target	100%		87%	88%		Non-target	100%		92%	93%
	Total	84%	74%	83%	81%		Total	95%	90%	92%	92%		Total	95%	91%	92%	92%
	Lingcod	94%	43%	52%	49%		Lingcod	94%	83%	85%	84%		Lingcod	94%	86%	88%	87%
	Shelf RF		7%	37%	36%		Shelf RF		99%	79%	80%		Shelf RF		99%	81%	82%
	Sablefish	89%	90%	97%	93%		Sablefish	99%	98%	100%	99%		Sablefish	100%	99%	100%	99%
390v-3	Slope RF	0%		90%	90%	680v-3	Slope RF	0%		98%	98%	713v-3	Slope RF	0%		99%	99%
	Sharks	98%		84%	91%		Sharks	100%		95%	97%		Sharks	100%		95%	98%
	Other			51%	51%		Other			64%	64%		Other			74%	74%
	Non-target	100%		85%	86%		Non-target	100%		98%	98%		Non-target	100%		98%	98%
	Total	90%	85%	89%	88%		Total	99%	97%	97%	97%		Total	100%	97%	98%	98%

Table E-21. West Coast economic impacts based on revenues received during 2004-2006 by target species group and state under A-4 qualification criteria that limit the fleet size to between 390 and 713 vessels (000s)

QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total
	Lingcod	$12	$409	$654	$1,075		Lingcod	$12	$406	$656	$1,074		Lingcod	$12	$355	$589	$956
	Shelf RF	$0	$13	$219	$232		Shelf RF	$0	$10	$208	$218		Shelf RF	$0	$10	$193	$203
	Sablefish	$2,949	$3,722	$5,826	$12,497		Sablefish	$2,556	$3,144	$5,442	$11,142		Sablefish	$2,906	$3,645	$5,803	$12,355
500 lbs-1	Slope RF	$0	$0	$373	$373	2 in 3 yrs-4	Slope RF	$0	$0	$314	$314	1.6K-3	Slope RF	$0	$0	$365	$365
(701 vsls)	Sharks	$329	$0	$287	$616	(595 vsls)	Sharks	$213	$0	$276	$488	(629 vsls)	Sharks	$329	$0	$279	$608
	Other	$0	$0	$62	$62		Other	$0	$0	$24	$24		Other	$0	$0	$41	$41
	Non-target	$33	$0	$341	$375		Non-target	$33	$0	$309	$342		Non-target	$33	$0	$339	$372
	Total	$3,323	$4,144	$7,762	$15,229		Total	$2,814	$3,560	$7,227	$13,602		Total	$3,280	$4,010	$7,609	$14,899
	Lingcod	$12	$358	$587	$957		Lingcod	$12	$382	$617	$1,011		Lingcod	$12	$316	$561	$888
	Shelf RF	$0	$13	$186	$198		Shelf RF	$0	$13	$205	$218		Shelf RF	$0	$5	$165	$170
	Sablefish	$2,938	$3,676	$5,804	$12,418		Sablefish	$2,949	$3,717	$5,823	$12,489		Sablefish	$2,882	$3,615	$5,796	$12,293
1000 lbs-1	Slope RF	$0	$0	$369	$369	500 max-5	Slope RF	$0	$0	$373	$373	2000 lbs-3	Slope RF	$0	$0	$365	$365
(577 vsls)	Sharks	$329	$0	$276	$604	(655 vsls)	Sharks	$329	$0	$281	$610	(581 vsls)	Sharks	$329	$0	$276	$605
	Other	$0	$0	$43	$43		Other	$0	$0	$62	$62		Other	$0	$0	$41	$41
	Non-target	$33	$0	$337	$371		Non-target	$33	$0	$339	$372		Non-target	$33	$0	$335	$368
	Total	$3,312	$4,046	$7,601	$14,960		Total	$3,323	$4,112	$7,700	$15,135		Total	$3,256	$3,936	$7,538	$14,730
	Lingcod	$12	$260	$430	$701		Lingcod	$12	$396	$654	$1,061		Lingcod	$12	$284	$433	$729
	Shelf RF	$0	$4	$129	$133		Shelf RF	$0	$14	$217	$231		Shelf RF	$0	$1	$138	$139
	Sablefish	$2,861	$3,550	$5,735	$12,146		Sablefish	$2,943	$3,691	$5,824	$12,458		Sablefish	$2,794	$3,514	$5,728	$12,035
2000 lbs-1	Slope RF	$0	$0	$363	$363	1000 lbs-3	Slope RF	$0	$0	$371	$371	3.5K-3	Slope RF	$0	$0	$358	$358
(420 vsls)	Sharks	$329	$0	$149	$477	(727 vsls)	Sharks	$329	$0	$286	$615	(474 vsls)	Sharks	$326	$0	$263	$588
	Other	$0	$0	$15	$15		Other	$0	$0	$53	$53		Other	$0	$0	$41	$41
	Non-target	$33	$0	$319	$352		Non-target	$33	$0	$339	$372		Non-target	$33	$0	$302	$335
	Total	$3,234	$3,814	$7,139	$14,188		Total	$3,317	$4,100	$7,744	$15,161		Total	$3,165	$3,799	$7,262	$14,225

Table E-22. Proportions of estimated directed B species fishery economic impacts during 2004-2006 contributed by vessels that would qualify for B permits under A-4 criteria that would qualify between 390 and 713 vessels by target species group and state

QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total	QC	Species	WA	OR	CA	Total
	Lingcod	94%	92%	89%	90%		Lingcod	99%	91%	89%	90%		Lingcod	94%	80%	80%	80%
	Shelf RF		92%	83%	84%		Shelf RF		72%	79%	78%		Shelf RF		72%	73%	73%
	Sablefish	100%	100%	100%	100%		Sablefish	87%	84%	93%	89%		Sablefish	98%	97%	99%	99%
500 lbs-1	Slope RF	0%		99%	99%	2 in 3 yrs-4	Slope RF	0%		84%	84%	1.6K-3	Slope RF	0%		97%	97%
(701 vsls)	Sharks	100%		96%	98%	(595 vsls)	Sharks	65%		92%	78%	(629 vsls)	Sharks	100%		93%	97%
	Other			87%	87%		Other			34%	34%		Other			57%	57%
	Non-target	100%		99%	99%		Non-target	100%		89%	90%		Non-target	100%		98%	98%
	Total	100%	99%	98%	99%		Total	85%	85%	91%	88%		Total	99%	95%	96%	96%
	Lingcod	94%	80%	80%	80%		Lingcod	94%	86%	84%	85%		Lingcod	94%	71%	76%	74%
	Shelf RF		92%	70%	71%		Shelf RF		92%	78%	78%		Shelf RF		35%	63%	61%
	Sablefish	99%	98%	99%	99%		Sablefish	100%	99%	100%	100%		Sablefish	98%	97%	99%	98%
1000 lbs-1	Slope RF	0%		98%	98%	500 max-5	Slope RF	0%		99%	99%	2000 lbs-3	Slope RF	0%		97%	97%
(577 vsls)	Sharks	100%		92%	96%	(655 vsls)	Sharks	100%		94%	97%	(581 vsls)	Sharks	100%		92%	96%
	Other			61%	61%		Other			87%	87%		Other			57%	57%
	Non-target	100%		98%	98%		Non-target	100%		98%	98%		Non-target	100%		97%	97%
	Total	99%	96%	96%	97%		Total	100%	98%	97%	98%		Total	98%	94%	95%	95%
	Lingcod	94%	58%	58%	59%		Lingcod	94%	89%	89%	89%		Lingcod	94%	64%	59%	61%
	Shelf RF		28%	49%	48%		Shelf RF		99%	82%	83%		Shelf RF		7%	52%	50%
	Sablefish	97%	95%	98%	97%		Sablefish	100%	99%	100%	99%		Sablefish	95%	94%	98%	96%
2000 lbs-1	Slope RF	0%		97%	97%	1000 lbs-3	Slope RF	0%		99%	99%	3.5K-3	Slope RF	0%		95%	95%
(420 vsls)	Sharks	100%		50%	76%	(727 vsls)	Sharks	100%		96%	98%	(474 vsls)	Sharks	99%		88%	94%
	Other			21%	21%		Other			75%	75%		Other			57%	57%
	Non-target	100%		92%	93%		Non-target	100%		98%	98%		Non-target	100%		87%	88%
	Total	97%	91%	90%	92%		Total	100%	98%	98%	98%		Total	95%	90%	92%	92%

Discussion
The one framework element that is critical to continued participation by some recent fishery participants is a recent year landing requirement. Many vessels have high cumulative landings during the window period, but have dropped out of the fishery in recent years. These vessels represent potentially latent fishing effort, the permitting of which could result in non-active permits becoming active or transfered, depending on adopted transfer conditions, to other vessels whose owners would likely be interested in using their new permits. QF-2 permitting of non-active vessels is shown to exclude vessels that have been active in the fishery in recent years, but that have small catch histories by comparison to vessels that have long catch histories.

Some of the qualification criteria under A-4 have the potential to substantially reduce the directed fishery fleet size, while others would permit more vessels than participated in any one year during 2004-2006. Thus the analysis of several issues was confined to those criteria that permitted between 390 and 713 vessels. The 390 fleet size goal under QF-2 could substantially reduce landings at some Oregon and California port groups based on 2004-2006 landings data. The degree to which regulation adjustments can be used to make up for landings by non-qualifying vessels is difficult to project. The geographic distribution of the non-qualifying vessels would be important because some port groups may be affected more than others. Regulation adjustment to allow permitted vessels to take fish formerly landed by non-permitted vessels could result in some ports receiving windfall landing increases. Species formerly landed by non-permitted vessels is another important consideration. Vessels that targeted lingcod, shelf rockfish and species in the "other" category are less likely as a group to receive B permits because of their much lower catch histories compared to vessels that targeted sablefish, slope rockfish and sharks. However, vessels and ports that continue to target the former groups and receive permits may not benefit from increased landing limits for those species because of concerns for overfished groundfish species.

A change in harvest opportunity for B species groundfish would, for some species, likely be met with increased trip or cumulative landing limits for the permitted vessels. The loss of B permit groundfish opportunity by non-qualified vessels was determined to be very small in comparison with the harvest by these same vessels of non-B species (associated species) groundfish. The amount of effort increase in other fisheries to cover this loss would be from <1 percent to 5 percent depending on qualification criteria.

The decision of which criterion to use for permit issuance should take into consideration the allocative as well as biological and economic impacts. The criteria used in this analysis were shown to affect the distribution of permits between states and ports to varying degrees based on qualification standard and base years used for qualification. The Groundfish Strategic Plan (2000) provides the following guidance with regard to the selection of a qualification criterion (paraphrased):

> The Plan calls for reduction in the number of open access fishery participants by requiring a limited entry permit for the directed take and commercial landing of groundfish. Permit eligibility would depend upon meeting minimum landing requirements based on historical catches and recent directed groundfish harvest. The objective in selecting a particular quantity or frequency of landings from a minimum landing requirement should be to identify those fishery participants who are economically most dependent on and committed to a particular fishery. Theoretically those who are less dependent and committed should fall below the minimum landing requirement. The Council may consider a number of different options for a minimum landing requirement. For example, one option for consideration could be a landing of 1,000 lbs or more of groundfish in a directed fishery in any qualifying year.

The data show that any qualification criterion that uses B species landing history during 2004-2006 to qualify vessels for B permits will have differential impacts on vessels depending on the vessel's target species strategy. Regulations during 2004-2006 had a major influence on the ability of vessels to land B species groundfish, lingcod and rockfish in particular. Demand for particular species of fish also influenced vessel targeting. Regulations only allowed for the maximum landing per vessel of 300 lbs of lingcod and 425 lbs of shelf rockfish per month during 2004-2006. Sharks and rays could be taken in larger quantities but demand and markets for those fish were probably much lower or more limited than they were for other B species groundfish. However, vessels that do not qualify for B permits will likely still be able to land B species groundfish when taken incidental to fishing for non-groundfish species and/or nearshore groundfish. The allowance for species such as lingcod and shelf rockfish may be no different for C permit vessels than may be for B permit vessels because of concerns for co-mingled overfished groundfish species.

Focus group meetings in California supported the use of a “nominal” set of qualification criteria for B permit issuance, the definition of which appeared to be related to the catch history of the individual fisherman: those with large catch histories tended to be more supportive of higher catch history credentials. A wide range of qualification criteria are included in the alternatives.

The fishermen have a stake in the outcome of this decision process. The optimal fleet size is one that accrues benefits to the fishery participants in the form of potential increased landing limits and fishing opportunity, which may be possible for such species as sablefish and in some areas slope rockfish. Management should also benefit from the decision in the form of increased cooperation with regulation enforcement and fishery sampling and reduced fishery discards stemming from trip limit overages and high grading.

Literature Cited

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Fisheries Economic Assessment Model. Vancouver, WA: William Jensen Consulting.

PFMC Groundfish EIS 2005-2006

PFMC Groundfish Strategic Plan

APPENDIX F: Groundfish and Non-groundfish Species Biological Characteristics, Life History Traits, and Stock Status Information

(Available on line via Council web site: www.pcouncil.org)

APPENDIX G: Groundfish Closed Areas

Introduction

Pacific Coast groundfish fisheries and fisheries that may take groundfish incidentally, are managed with a variety of closed areas intended to either minimize the bycatch of overfished groundfish species, or to protect groundfish habitat. Many of the closed areas are gear-specific, meaning that they are closed to some particular gear types, but not others. Detailed regulations for the closed area restrictions by fishery are specified at: §660.381 for limited entry trawl gear fisheries; §660.382 for limited entry fixed gear fisheries; §660.383 for open access fisheries; and §660.384 for recreational fisheries. The following report provides information only on marine areas closed to fishing by federal regulation. The states of Washington, Oregon and California may also have marine areas closed to fishing that fishing vessel operators need to know about.

Fishing Sector Closed Areas

Commercial Trawl Closed Areas

Commercial vessels fishing with trawl gear are prohibited from fishing in any of these areas:
Trawl (Groundfish and Non-Groundfish) Rockfish Conservation Areas
Cowcod Conservation Areas
Cordell Banks Closed Area
Farallon Islands Closed Areas
Essential Fish Habitat Conservation Areas

Commercial Non-Trawl Closed Areas

Commercial vessels fishing with gear other than trawl gear are prohibited from fishing in any of these areas:
Non-trawl Rockfish Conservation Areas
Cowcod Conservation Areas
Cordell Banks Closed Area
Farallon Islands Closed Areas
Essential Fish Habitat Conservation Areas
Yelloweye Rockfish Conservation Areas
- North Coast Commercial Yelloweye Rockfish Conservation Area
- Salmon Troll Yelloweye Rockfish Conservation Area
- North Coast Recreational Yelloweye Rockfish Conservation Area (voluntary closure)
- South Coast Recreational Yelloweye Rockfish Conservation Area (voluntary closure)

Recreational Closed Areas:

Recreational fishing vessels are prohibited from fishing in any of these areas:
Recreational Rockfish Conservation Areas
Yelloweye Rockfish Conservation Areas
- North Coast Recreational Yelloweye Rockfish Conservation Area
- South Coast Recreational Yelloweye Rockfish Conservation Area
- Stonewall Bank Yelloweye Rockfish Conservation Area

Cowcod Conservation Areas
Cordell Banks Closed Area
Farallon Islands Closed Areas

Essential Fish Habitat Conservation Areas

Closed Areas Described

The schedule and coordinates for all boundary lines referred to in the following sections are available at: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish-Closed-Areas/Index.cfm#CP_JUMP_30284

Rockfish Conservation Areas

RCAs are large-scale closed areas that extend along the entire length of the United States Pacific Coast. The RCA boundaries are lines that connect a series of latitude/longitude coordinates intended to approximate particular depth contours. RCA boundaries for particular gear types are likely to differ between the northern and southern areas of the coast. RCA boundaries are also likely to change at different times of the year. The locations of the RCA boundaries are set in order to minimize opportunities for vessels to incidentally take overfished rockfish by eliminating fishing in areas where and times when those overfished species are likely to co-occur with mores healthy stocks of groundfish. RCAs may change during the year. RCAs extending along all or part of the Pacific Coast have been in place since September 2002.

The Yelloweye Rockfish Conservation Areas

YRCAs, are various closed areas intended to protect yelloweye rockfish off the Pacific Coast.

The North Coast Recreational YRCA is a C-shaped area off the northern Washington coast intended to protect yelloweye rockfish. The North Coast Recreational YRCA is closed to recreational fishing for groundfish and halibut and is designated as an area to be avoided (a voluntary closure) by commercial fixed gear fishers. This closed area was implemented in 1998 for the halibut sport fishery and was adopted for the groundfish fishery in January 2003. The name of this closed area changed from the YRCA to the North Coast Recreational YRCA in 2007.

The North Coast Commercial YRCA is an area off the northern Washington coast, overlapping the northern part of North Coast Recreational YRCA, intended to protect yelloweye rockfish. The North Coast Commercial YRCA is closed to commercial fixed gear fishing (limited entry and open access fixed gear). This closed area was implemented in 2007.

The Salmon Troll YRCA is an area off the northern Washington coast, overlapping the southern part of North Coast Recreational YRCA, intended to protect yelloweye rockfish. The Salmon Troll YRCA is closed to fishing with salmon troll gear. This closed area was implemented in 2007.

The South Coast Recreational YRCA is an area off the southern Washington coast intended to protect yelloweye rockfish. The South Coast Recreational YRCA is closed to recreational fishing for groundfish and halibut and is designated as an area to be avoided (a voluntary closure) by commercial fixed gear fishers. This closed area was implemented in 2007.

The Stonewall Bank YRCA is an area off central Oregon, near Stonewall Bank, intended to protect yelloweye rockfish. The Stonewall Bank YRCA is closed to recreational fishing for groundfish and halibut. This closed area was implemented in 2005 for the halibut sport fishery and was adopted for the groundfish fishery in 2007.

Cowcod Conservation Areas

There are two Cowcod Conservation Areas, or CCAs, off southern California, a Western and an Eastern CCA. The CCAs are closed to all commercial and recreational fishing for groundfish except: 1) "other flatfish" is permitted as specified at §§ 660.382 to 660.384; 2) recreational fishing is permitted shoreward of the 20 fm depth contour for minor nearshore rockfish, cabezon, all greenlings of the genus Hexagrammos, lingcod, and California scorpionfish; and 3) commercial fishing for rockfish and lingcod with limited entry fixed gear and open access non-trawl gear is permitted shoreward of the 20 fm depth contour. Commercial fishing vessels may transit through the Western CCA with their gear stowed and groundfish on board only in a corridor through the Western CCA bounded on the north by the latitude line at 33°00.50' N. lat., and bounded on the south by the latitude line at 32°59.50' N. lat. The CCAs have been in place since January 2001.

Cordell Banks Closed Area

The Cordell Banks are located offshore of California's Marin County. Commercial and recreational fishing for groundfish, except "other flatfish" as specified at §§ 660.382 to 660.384, is prohibited inside the area around Cordell Banks. The Cordell Banks Closed Area has been in place since 2005. Coordinates designating its boundary were revised in 2007.

Farallon Islands Closed Areas

The Farallon Islands, off San Francisco and San Mateo Counties, include: Southeast Farallon Island, Middle Farallon Island, North Farallon Island and Noon Day Rock. The State of California prohibits commercial and recreational fishing for groundfish, except "other flatfish" as specified at §§ 660.382 to 660.384, between the shoreline and the 10 fm (18 m) depth contour around the Farallon Islands. The Farallon Islands Closed Areas have been in place since 2004. The boundaries of these closed areas have not changed over time.

Essential Fish Habitat Conservation Areas

EFH protection measures will implement discrete area closures for specific gear types, effective June 12, 2006. These closed areas were identified by the Pacific Fishery Management Council and are intended to minimize to the extent practicable the adverse effects of fishing on groundfish EFH. Three types of areas are described in this section: EFH, HAPC, and EFH Conservation Areas. Only EFH Conservation Areas are closed to specific types of fishing.

EFH Conservation Area Maps: Coast wide map and detailed maps for areas off the coast of Washington, Oregon, North California, Central California, and Southern California

Habitat Areas of Particular Concern: Current coordinates for all of the EFH boundary lines are listed in Federal Regulation at 50 CFR 660.395 through 660.399.

APPENDIX H: SEC. 312 TRANSITION TO SUSTAINABLE FISHERIES (Not applicable to Initiative; Removed from Report)

APPENDIX I: Analysis of Preliminary Preferred Alternative (Alternative 6) [16]

Introduction

The Council adopted a preliminary preferred alternative (Alternative 6, A-6), for limiting participation in the directed open access fishery at its September 2008 meeting. It says that owners of vessels that meet the following criteria would be eligible for B permits: Their vessel(s) was (were) used to make one or more directed B species open access fishery landings totaling ≥100 lbs from federal and/or state waters off the Washington, Oregon or California coasts during the period April 9, 1998-September 13, 2006 (window period) and that at least one directed fishery landing was made during January 1, 2004-September 13, 2006. A-6 was contained in Alternative 4 of the Preliminary Draft Environmental Assessment (abbreviation 100 lbs-3) dated September 2008. The Council also proposed to consider take and landing endorsements for B permit vessels for sablefish and lingcod from within the following qualifying criteria for each species separately: ≥1 lb, ≥100 lbs, and ≥500 lbs maximum landing in any calendar year during the window period. Final adoption was tentatively scheduled for its March 2009 meeting, which would likely allow for license limitation implementation effective January 1, 2011. Other provisions of A-6 were: (1) permits and associated species endorsements would be transferable between vessels after the first program year[17]; and (2) A and B permits could be used alternately on the same vessel in the same year, but not in the same landing period. A declaration process would be required as part of the last provision.

Vessels that apply for and receive B permits, including any associated species endorsements, would be allowed to take and land B species groundfish using open access gear in amounts specified in federal groundfish regulations. Vessels that would not qualify for B permits and that do not possess a Limited Entry (A permit) may be allowed to take and land B species groundfish incidental to fishing for non-groundfish species under the authority of a C permit issued by the NMFS or a state-issued nearshore permit in amounts specified in federal groundfish regulations.

Methods

Vessel landings data from the window period in combination with hindcast analysis of 2004-2006 window period landings were used to assess the impact of the Council's license limitation alternatives. Data were produced for use in comparing the endorsement alternatives consistent with the approach used in Appendix E. Species endorsement hindcast calculations were made separate for each species endorsement alternative and were not produced for all of the possible combinations of endorsement alternatives (but can be calculated from the available outputs).

The analysis of A-6 qualification criteria impacts to directed fishery landings and communities during 2004-2006 window period years did not attempt to redistribute fish from non-qualifying vessels to qualifying vessels or to estimate the amount of fish that would have been landed by non-qualifying vessels under incidental fishery regulations. Thus the fishery and community impact estimates for the alternatives represent worst-case scenarios; i.e., all B species groundfish formerly impacted by non-qualifying vessels are assumed lost to the fishery and associated communities. The economic analysis

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[16] Prepared by LB Boydstun, CDFG retired, and Gerry Kobylinski, PSMFC, updated February 5, 2009 following January 29, 2009 Groundfish Allocation Committee meeting.

[17] Species endorsements would be permanently affixed to and for sole use with the original B permit and would allow directed fishing for the endorsed species in addition to other B species groundfish. The endorsement provision is intended to preclude non-endorsed vessels from directly fishing for (targeting) endorsed species. Species endorsements would only be transferable with the attached B permit. Thus, a species endorsement may not be separated from its permit. Also, B permit species endorsements may not be used for landing fish under the authority of an A or C permit. These conditions are consistent with the endorsement provisions of the groundfish limited entry A permit program.

used ex-vessel revenue data for qualifying and non-qualifying vessels during 2004-2006 window period years and the species specific economic impact multipliers presented in Appendix E. These data were used to produce estimates of West Coast community impacts stemming from the alternatives.

State-based registration data uploaded by the state agencies to the PacFIN data base were used to determine the number and proportion of vessels by state and in total that were projected to meet B permit issuance criteria under A-6 and that were registered as commercial fishing vessels in 2007 and 2008. The data base was inclusive of all Oregon and California registered vessels, but only included Washington vessels that actually made commercial fishery deliveries in those years. The available vessel registration data were used to project numbers of vessels that would be likely to be eligible for B permit issuance under A-6.

Landings data for vessels that made incidental fishery landings during 2004-2006 window period years and that would not qualify for a B permit under A-6 were used to estimate the number of C permits that might be needed to be issued under A-6. The data base was inclusive of landings by vessels that used incidental fishery gear[18]and by vessels that used directed fishery gear[19], but did not meet the >50 percent B species revenue criterion used to define a directed open access fishery landing. This same data base was used to compare fishery-specific impacts of individual fisheries and overall impacts of the incidental fisheries to open access fishery B species, sablefish and lingcod allocations.

Results

Pounds and Revenues

A total of 1,003 vessels would qualify for B species permits under A-6. This would leave 100 vessels (9 percent) that made at least one B species directed fishery landing during 2004-2006 window period years without B permits (**Tables I-1a and I-1b; Figure I-1**). The qualifying vessels landed 99.9 percent by weight or ex-vessel value of total B species groundfish landings in the directed fishery during 2004-2006 **(Table I-1a)**. Conversely, the non-qualifying vessels landed 0.1 percent by weight or value of total B species groundfish directed fishery landings during the same period (**Table I-1b)**. Commercial fish species other than B species groundfish (Non-B species groundfish or Associated Species) accounted for 99.9 percent of the commercial fishery landings by non-qualifying vessels during 2004-2006 window period years (**Table I-1b)**. Non-B species groundfish included such species as salmon, Dungeness crab, and Highly Migratory Species (albacore in particular).

The number of vessels that would qualify for a species endorsement under the qualification criteria contained in A-6 (≥1 lb, ≥100 lbs and ≥500 lbs for each species in any year during 1998-2006) would be 541, 513 and 464, respectively, for sablefish and 674, 549 and 337, respectively, for lingcod (**Table I-1a; Figure I-1)**. The total landing of B species groundfish in the directed fishery during the 2004-2006 widow period by vessels that would qualify for a species endorsement under A-6 ranged from 99.9 percent for sablefish or lingcod in terms of weight or ex-vessel value of fish under the ≥1 lb criterion for both species to 99.2 percent for lingcod in terms of ex-vessel value of fish landed under the ≥500 lb lingcod criterion (**Table I-1a)**. B species landings by vessels that would not qualify for a B permit during 2004-2006 represented from 0.1 percent to 0.8 percent (ex-vessel value of fish under the ≥500 lb lingcod criterion) of total commercial fishery landings by those vessels in those years (**Table I-1b)**. The vast majority of landings by non-

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[18] For this report, incidental fishery gear includes non-groundfish trawl, crabpot, salmon troll, sea urchin dive, spear, and gear types used to take and possess Coastal Pelagic Species and Highly Migratory Species (see Operational Terms, EA Section 11.0).

[19] For this report, directed fishery gear includes non-salmon hook and line, fishpot and setnet (see Operational Terms, EA Section 11.0).

Table I-1a. Landings data from 2004-2006 for vessels that WOULD qualify for a B permit and for a sablefish and lingcod species endorsement under A-6 with comparative data for A-1 (no action) and A-6 with no species endorsement 1/

					Directed fishery metrics				Associated fishery metrics				Total fishery metrics			
					BGF				Total				Total		Total	
Option	B criterion	Endorse?	Criterion	# vsls	lbs	P 2/	Rev	P 2/	lbs	P 3/	Rev	P 3/	lbs	P	Rev	P
A-1	N/A	N/A	N/A	1,103	6,163,951	1.000	$8,531,439	1.000	94,180,993	0.939	$116,160,405	0.932	100,344,944	1.00	124,691,844	1.00
A-6	≥100 lbs	B permit	None	1,003	6,160,158	0.999	$8,525,140	0.999	90,546,021	0.936	$111,827,961	0.929	96,706,179	1.00	120,353,101	1.00
A-6	≥100 lbs	Sablefish	≥1 lb	541	6,160,158	0.999	$8,525,140	0.999	90,546,021	0.936	$111,827,961	0.929	96,706,179	1.00	120,353,101	1.00
	≥100 lbs		≥100 lbs	513	6,159,799	0.999	$8,524,587	0.999	90,546,021	0.936	$111,827,961	0.929	96,705,820	1.00	120,352,548	1.00
	≥100 lbs		≥500 lbs	464	6,152,636	0.998	$8,514,386	0.998	90,546,021	0.936	$111,827,961	0.929	96,698,657	1.00	120,342,347	1.00
	≥100 lbs	Lingcod	≥1 lb	674	6,160,158	0.999	$8,525,140	0.999	90,546,021	0.936	$111,827,961	0.929	96,706,179	1.00	120,353,101	1.00
	≥100 lbs		≥100 lbs	549	6,156,716	0.999	$8,521,222	0.999	90,546,021	0.936	$111,827,961	0.929	96,702,737	1.00	120,349,183	1.00
	≥100 lbs		≥500 lbs	337	6,118,536	0.993	$8,467,381	0.992	90,546,021	0.937	$111,827,961	0.930	96,664,557	1.00	120,295,342	1.00

Table I-1b. Landings data from 2004-2006 for vessels that WOULD NOT QUALIFY for a B permit and for a sablefish and lingcod species endorsement under criteria contained in A-6 with comparative data for A-1 (no action) and A-6 with no species endorsement 1/

					Directed fishery metrics				Associated fishery metrics				Total fishery metrics			
					BGF				Total				Total		Total	
Option	B criterion	Endorse?	Criterion	# vsls	lbs	P 2/	Rev	P 2/	lbs	P 3/	Rev	P 3/	lbs	P	Rev	P
A-1	N/A	N/A	N/A	0	0	NA	$0	NA	0	NA	$0	NA	0	NA	0	NA
A-6	≥100 lbs	B permit	None	100	3,794	0.001	$6,300	0.001	3,634,972	0.999	$4,332,444	0.999	3,638,766	1.00	4,338,744	1.00
A-6	≥100 lbs	Sablefish	≥1 lb	562	3,794	0.001	$6,300	0.001	3,634,972	0.999	$4,332,444	0.999	3,638,766	1.00	4,338,744	1.00
	≥100 lbs		≥100 lbs	590	4,153	0.001	$6,853	0.001	3,634,972	0.999	$4,332,444	0.998	3,639,125	1.00	4,339,297	1.00
	≥100 lbs		≥500 lbs	639	11,316	0.002	$17,054	0.002	3,634,972	0.997	$4,332,444	0.996	3,646,288	1.00	4,349,498	1.00
	≥100 lbs	Lingcod	≥1 lb	429	3,794	0.001	$6,300	0.001	3,634,972	0.999	$4,332,444	0.999	3,638,766	1.00	4,338,744	1.00
	≥100 lbs		≥100 lbs	554	7,236	0.001	$10,218	0.001	3,634,972	0.998	$4,332,444	0.998	3,642,208	1.00	4,342,662	1.00
	≥100 lbs		≥500 lbs	766	45,416	0.007	$64,059	0.008	3,634,972	0.988	$4,332,444	0.985	3,680,388	1.00	4,396,503	1.00

1/ Abbreviations: BGF=B species groundfish; P=proportion; lbs=pounds; Rev=revenues

2/ Proportion of 2004-2006 B species groundfish landings (BGF)

3/ Proportion of total commercial fishery landings (Total fishery metrics)

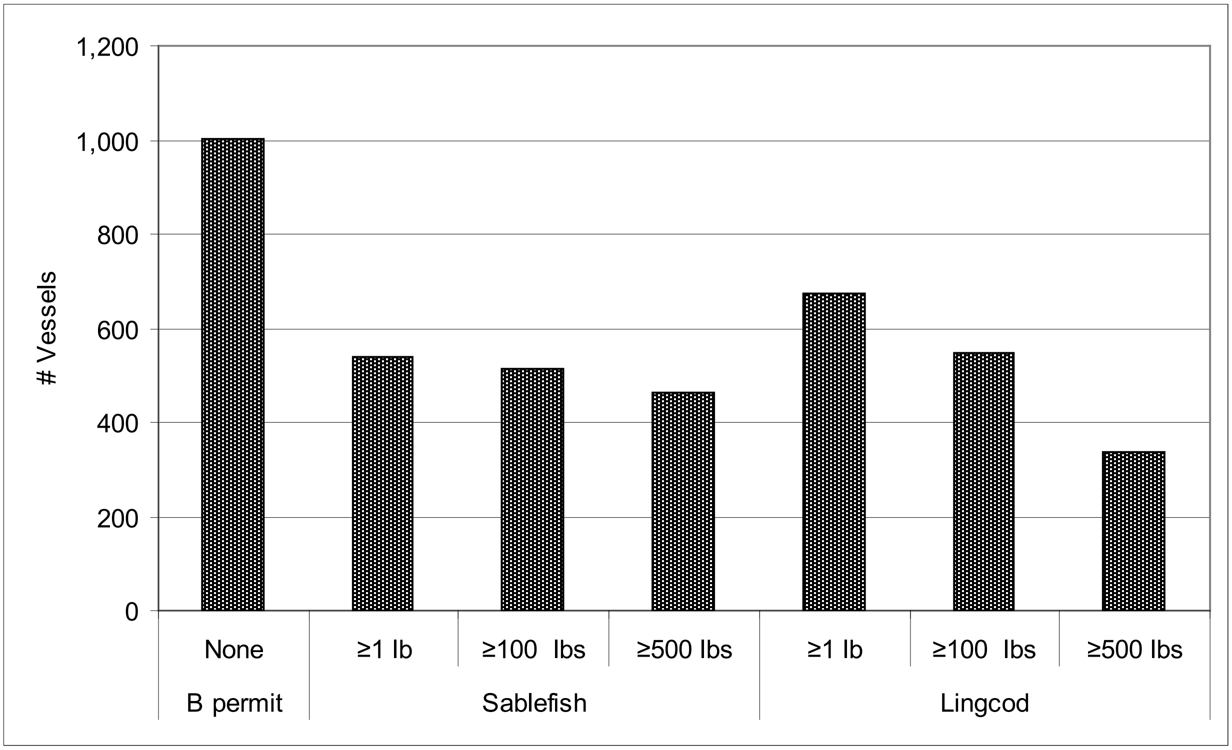

Figure I-1: Number of vessels that would qualify for a sablefish or lingcod endorsement including number of B permit qualifying vessels under A-6

qualifying vessels were made in non-B species groundfish fisheries such as salmon, Dungeness crab and Highly Migratory Species (albacore in particular).

Species Endorsement Frequencies

Vessel qualification data for the two species endorsement types showed that 80 vessels (8.0 percent) that would qualify for a B permit had no landings history during the window period for either species, thus would not be eligible to receive either species endorsement with their B permits. The data also showed that 382 to 152 (38 percent to 15 percent) vessels would be eligible for a lingcod endorsement only; 249 to 215 (2 to 21 percent) vessels would qualify for a sablefish endorsement only; and from 292 to 73 (29 percent to 7.3 percent) vessels would qualify for both endorsement types, depending on standard used for qualification.

Table I-2. Number of vessels that would qualify for sablefish and lingcod endorsements by preliminary preferred qualification standard (minimum lbs) 1/

Sablefish	Lingcod standard			
standard	=0	≥1	≥100	≥500
=0	80	382	321	152
≥1	249	292	197	101
≥100	245	262	171	83
≥500	215	230	149	73

There are 1,003 individual vessels in this table. For example, the highlighted entries total 1,003 vessels

Distribution of Permits and Endorsements

The sablefish endorsement would primarily impact Oregon and California B permit eligible vessels because relatively few vessels from these states had any sablefish catch history ($\geq$1 lb): 60 percent in Oregon (194 of 324) and 41 percent in California (231 of 558) (**Table I-3a**).

Table I-3a. Number of vessels that would qualify for a SABLEFISH endorsement under A-6 including A-6 with no endorsement standard (None)

	None		1-lb		100 lbs		500 lbs	
State/Port	#	P	#	P	#	P	#	P
SPS	2	0.2%	2	0.4%	2	0.4%	2	0.4%
NPS	18	1.8%	13	2.4%	12	2.3%	11	2.4%
CWA	51	5.1%	51	9.4%	51	9.9%	49	10.6%
CLW	50	5.0%	50	9.2%	50	9.7%	49	10.6%
WA	121	12.1%	116	21.4%	115	22.4%	111	23.9%
CLO	45	4.5%	45	8.3%	45	8.8%	41	8.8%
TLA	47	4.7%	13	2.4%	13	2.5%	9	1.9%
NPA	48	4.8%	38	7.0%	37	7.2%	32	6.9%
CBA	83	8.3%	58	10.7%	58	11.3%	56	12.1%
BRA	101	10.1%	40	7.4%	39	7.6%	38	8.2%
OR	324	32.3%	194	35.9%	192	37.4%	176	37.9%
CCA	37	3.7%	10	1.8%	10	1.9%	9	1.9%
ERA	43	4.3%	34	6.3%	34	6.6%	33	7.1%
BGA	79	7.9%	55	10.2%	49	9.6%	47	10.1%
BDA	21	2.1%	3	0.6%	1	0.2%	1	0.2%
SFA	62	6.2%	27	5.0%	22	4.3%	17	3.7%
MNA	87	8.7%	45	8.3%	42	8.2%	38	8.2%
MRA	98	9.8%	24	4.4%	22	4.3%	12	2.6%
SBA	51	5.1%	8	1.5%	5	1.0%	4	0.9%
LAA	49	4.9%	8	1.5%	7	1.4%	7	1.5%
SDA	31	3.1%	17	3.1%	14	2.7%	9	1.9%
CA	558	55.6%	231	42.7%	206	40.2%	177	38.1%
Total	1,003	100.0%	541	100.0%	513	100.0%	464	100.0%

Table I-3b. Number of vessels that would qualify for a LINGCOD endorsement under A-6 including A-6 with no endorsement standard (None)

	None		1-lb		100 lbs		500 lbs	
State/Port	#	P	#	P	#	P	#	P
SPS	2	0.2%	1	0.1%	1	0.2%	0	0.0%
NPS	18	1.8%	8	1.2%	5	0.9%	4	1.2%
CWA	51	5.1%	15	2.2%	9	1.6%	5	1.5%
CLW	50	5.0%	19	2.8%	6	1.1%	1	0.3%
WA	121	12.1%	43	6.4%	21	3.8%	10	3.0%
CLO	45	4.5%	19	2.8%	9	1.6%	1	0.3%
TLA	47	4.7%	41	6.1%	35	6.4%	19	5.6%
NPA	48	4.8%	24	3.6%	14	2.6%	10	3.0%
CBA	83	8.3%	56	8.3%	50	9.1%	32	9.5%
BRA	101	10.1%	96	14.2%	92	16.8%	72	21.4%
OR	324	32.3%	236	35.0%	200	36.4%	134	39.8%
CCA	37	3.7%	35	5.2%	33	6.0%	26	7.7%
ERA	43	4.3%	27	4.0%	24	4.4%	14	4.2%
BGA	79	7.9%	55	8.2%	39	7.1%	26	7.7%
BDA	21	2.1%	18	2.7%	14	2.6%	8	2.4%
SFA	62	6.2%	42	6.2%	37	6.7%	23	6.8%
MNA	87	8.7%	73	10.8%	65	11.8%	37	11.0%
MRA	98	9.8%	95	14.1%	90	16.4%	47	13.9%
SBA	51	5.1%	26	3.9%	16	2.9%	8	2.4%
LAA	49	4.9%	12	1.8%	4	0.7%	1	0.3%
SDA	31	3.1%	12	1.8%	6	1.1%	3	0.9%
CA	558	55.6%	395	58.6%	328	59.7%	193	57.3%
Total	1,003	100.0%	674	100.0%	549	100.0%	337	100.0%

By comparison, 96 percent of Washington vessels (116 of 121) would qualify for a sablefish endorsement under the ≥1 lb standard (**Table I-3a).** There was a slightly higher negative impact of the ≥500 lb qualification standard, compared to the ≥1 lb qualification standard, on California vessels (177 of 231,77 percent would qualify) compared to Washington and Oregon vessels (111 of 116, 96 percent and 176 of 194, 91 percent, respectively, would qualify) (**Table I-3a).** The port groups primarily impacted in terms of vessels qualifying for a sablefish endorsement between the ≥1lb and ≥500 lb standards would be Bodega Bay (1 of 3, 33 percent), Morro Bay (12 of 24, 50 percent) and Santa Barbara (4 of 8, 50 percent). The ≥100 lb standard would have much smaller impact (>80 percent qualification rate) compared to the ≥1 lb standard on all of these port groups except for Bodega Bay (1 of 3, 33 percent) and Santa Barbara (5 of 8, 63 percent) (**Table I-3a).**

A large majority of Oregon and California vessels (236 of 324,73 percent and 395 of 558, 71 percent, respectively) that would qualify for a B permit under A-6 would also qualify for a lingcod endorsement at the ≥1 lb qualification level (**Table I-3b).** Relatively few (43 of 121, 36 percent) Washington vessels that would qualify for a B permit would qualify for a lingcod endorsement under the ≥1 lb qualification standard (**Table I-3b).** The proportion of vessels that would qualify for a lingcod endorsement falls off sharply for vessels in all three states at the ≥500 lb level compared to the ≥l lb level, as follows: Washington, 23 percent (10 of 43); Oregon, 57 percent (134 of 236); and California 49 percent (193 of 395) (**Table I-3b).**.

Vessels at only two port groups (discounting South Puget Sound, which had only one lingcod vessel) would retain ≥60 percent lingcod endorsement status under the ≥500 lb standard compared to the ≥1 lb standard: Brookings, 75 percent (72 of 96) and Crescent City, 74 percent (26 of 32) (**Table I-3b)**. Less than 60 percent of the vessels at all other port groups that would qualify for a lingcod endorsement at the ≥1 lb level would qualify at the ≥500 lb level (**Table I-3b)**. The ≥100 lb lingcod standard would retain ≥60 percent lingcod endorsement status among vessels at all port groups compared to the ≥1 lb standard except as follows: Washington, Columbia River, 32 percent (6 of 19); Oregon, Columbia River, 47 percent (9 of 19); Los Angeles, 33 percent (4 of 12), and San Diego, 50 percent (6 of 12) (**Table I-3b)**.

Port Group Impacts
The pounds landed of B species groundfish in the directed fishery during 2004-2006 window period years was >91 percent of actual landings by vessels that would have qualified in those years for a species endorsement at all port groups except under the ≥500 lb lingcod alternative. Under that alternative the pounds landed at Tillamook by qualifying vessels were 91 percent of 2004-2006 window period landings (**Tables I-4a and I-4b).**

Community Economic Impacts
The estimated community economic impacts of the endorsement alternatives during 2004-2006 window period years ranged from negligible (<0.1 percent) impact under the two ≥1 lb species alternatives ($15.444 million compared to $15.454) to -$14 thousand (-0.1 percent) under the ≥500 lb lingcod alternative **(Tables I-5a and I-5b).** The ≥500 lb lingcod alternative would have potentially reduced the economic impact of the coastwide lingcod fishery from $1.2 million to $1.1 million (-8.6 percent) during the 2004-2006 window period, assuming no shift of fish from non-qualifying vessels to qualifying vessels. The largest potential reduction would have been in the Washington fishery at -36 percent ($12,438 to $7,913) followed by the Oregon and California fisheries at -8.8 percent ($445,912 to $406,644) and -8.0 percent ($734,918 to $676,074), respectively **(Tables I-5a and I-5b).**

Table I-4a. Pounds of B species groundfish landed in the directed fishery during 2004-2006 by state and port group under A-6 species endorsement criteria including comparative data for A-1 (no action) and A-6 without a species endorsement alternative 1/

State/Port	Total lbs (A-1)	Total lbs (A-6 no endorse)	Sablefish ≥1 lb	Sablefish ≥100 lbs	Sablefish ≥500 lbs	Lingcod ≥1 lb	Lingcod ≥100 lbs	Lingcod ≥500 lbs
SPS	41,626	41,626	41,626	41,626	41,626	41,626	41,626	41,614
NPS	404,733	404,660	404,660	404,660	404,562	404,660	404,629	404,375
CWA	337,657	337,583	337,583	337,583	337,199	337,583	337,435	337,096
CLW	557,771	557,614	557,614	557,614	557,396	557,614	556,835	555,037
WA	1,341,786	1,341,483	1,341,483	1,341,483	1,340,783	1,341,483	1,340,525	1,338,122
CLO	191,728	191,728	191,728	191,728	190,953	191,728	191,498	188,584
TLA	68,508	68,338	68,338	68,338	67,739	68,338	68,079	62,231
NPA	100,279	100,195	100,195	100,141	99,568	100,195	100,133	99,520
CBA	415,212	414,948	414,948	414,948	414,722	414,948	414,719	411,553
BRA	738,986	738,775	738,775	738,775	738,643	738,775	738,566	734,515
OR	1,514,713	1,513,984	1,513,984	1,513,930	1,511,625	1,513,984	1,512,995	1,496,403
CCA	77,213	77,213	77,213	77,213	76,883	77,213	77,045	75,674
ERA	294,304	294,251	294,251	294,251	294,251	294,251	294,164	293,441
BGA	1,333,164	1,332,743	1,332,743	1,332,720	1,332,512	1,332,743	1,332,576	1,330,431
BDA	20,773	20,592	20,592	20,569	20,569	20,592	20,440	19,891
SFA	173,006	172,518	172,518	172,509	171,962	172,518	172,375	171,009
MNA	823,762	823,267	823,267	823,209	822,749	823,267	823,051	818,244
MRA	218,029	217,805	217,805	217,805	216,093	217,805	217,629	210,211
SBA	71,812	71,386	71,386	71,364	71,364	71,386	71,230	70,602
LAA	80,487	80,144	80,144	80,094	80,094	80,144	79,958	79,849
SDA	214,903	214,773	214,773	214,653	213,752	214,773	214,729	214,660
CA	3,307,452	3,304,691	3,304,691	3,304,386	3,300,228	3,304,691	3,303,196	3,284,011
Total	6,163,951	6,160,158	6,160,158	6,159,799	6,152,636	6,160,158	6,156,716	6,118,536

Table I-4b. Proportion of B species groundfish pounds landed in the B species directed fishery during 2004-2006 by state and port group for vessels that would have qualified for A-6 species endorsement alternatives 1/

State/Port	Total lbs (A-1)	No endorse (A-6)	Sablefish ≥1 lb	Sablefish ≥100 lbs	Sablefish ≥500 lbs	Lingcod ≥1 lb	Lingcod ≥100 lbs	Lingcod ≥500 lbs
SPS	100%	100%	100%	100%	100%	100%	100%	100%
NPS	100%	100%	100%	100%	100%	100%	100%	100%
CWA	100%	100%	100%	100%	100%	100%	100%	100%
CLW	100%	100%	100%	100%	100%	100%	100%	100%
WA	100%	100%	100%	100%	100%	100%	100%	100%
CLO	100%	100%	100%	100%	100%	100%	100%	98%
TLA	100%	100%	100%	100%	99%	100%	99%	91%
NPA	100%	100%	100%	100%	99%	100%	100%	99%
CBA	100%	100%	100%	100%	100%	100%	100%	99%
BRA	100%	100%	100%	100%	100%	100%	100%	99%
OR	100%	100%	100%	100%	100%	100%	100%	99%
CCA	100%	100%	100%	100%	100%	100%	100%	98%
ERA	100%	100%	100%	100%	100%	100%	100%	100%
BGA	100%	100%	100%	100%	100%	100%	100%	100%
BDA	100%	99%	99%	99%	99%	99%	98%	96%
SFA	100%	100%	100%	100%	99%	100%	100%	99%
MNA	100%	100%	100%	100%	100%	100%	100%	99%
MRA	100%	100%	100%	100%	99%	100%	100%	96%
SBA	100%	99%	99%	99%	99%	99%	99%	98%
LAA	100%	100%	100%	100%	100%	100%	99%	99%
SDA	100%	100%	100%	100%	99%	100%	100%	100%
CA	100%	100%	100%	100%	100%	100%	100%	99%
Total	100%	100%	100%	100%	100%	100%	100%	99%

1/ No attempt was made in this analysis to shift fish from non-qualifying vessels to qualifying vessels or to estimate the amount fish that would have been landed by non-qualifying vessels under incidental fishery regulations

Table I-5a. Estimated West Coast economic impacts based on B species revenues received during 2004-2006 by target species group and state under A-6 species endorsement alternatives and including A-1 (no action) and A-6 with no endorsement alternative data for comparison 1/

Alternative	Species	WA	OR	CA	Total	Alternative	Species	WA	OR	CA	Total
	Lingcod	$12,438	$445,912	$734,918	$1,193,268		Lingcod	$12,438	$444,407	$730,793	$1,187,639
	Shelf RF	$0	$13,885	$263,789	$277,674		Shelf RF	$0	$13,805	$262,487	$276,292
	Sablefish	$2,954,253	$3,739,317	$5,837,187	$12,530,757	A-6	Sablefish	$2,951,121	$3,733,004	$5,826,064	$12,510,190
A-1	Slope RF	$207	$0	$375,454	$375,661	≥500 lbs sable	Slope RF	$139	$0	$375,399	$375,538
	Sharks	$328,810	$0	$298,387	$627,197		Sharks	$328,810	$0	$297,692	$626,502
	Other	$0	$0	$71,254	$71,254		Other	$0	$0	$69,978	$69,978
	Non-target	$33,376	$0	$345,232	$378,608		Non-target	$33,376	$0	$344,744	$378,120
	Total	$3,329,084	$4,199,113	$7,926,222	$15,454,419		Total	$3,325,884	$4,191,217	$7,907,158	$15,424,259
	Lingcod	$12,438	$444,407	$730,793	$1,187,639		Lingcod	$12,438	$444,407	$730,793	$1,187,639
	Shelf RF	$0	$13,805	$262,487	$276,292		Shelf RF	$0	$13,805	$262,487	$276,292
A-6	Sablefish	$2,953,540	$3,739,232	$5,836,841	$12,529,613	A-6	Sablefish	$2,953,540	$3,739,232	$5,836,841	$12,529,613
no endorse	Slope RF	$139	$0	$375,399	$375,538	≥1 lb ling	Slope RF	$139	$0	$375,399	$375,538
	Sharks	$328,810	$0	$297,692	$626,502		Sharks	$328,810	$0	$297,692	$626,502
	Other	$0	$0	$69,978	$69,978		Other	$0	$0	$69,978	$69,978
	Non-target	$33,376	$0	$344,744	$378,120		Non-target	$33,376	$0	$344,744	$378,120
	Total	$3,328,303	$4,197,445	$7,917,934	$15,443,682		Total	$3,328,303	$4,197,445	$7,917,934	$15,443,682
	Lingcod	$12,438	$444,407	$730,793	$1,187,639		Lingcod	$11,149	$442,611	$727,140	$1,180,901
	Shelf RF	$0	$13,805	$262,487	$276,292		Shelf RF	$0	$13,805	$262,487	$276,292
A-6	Sablefish	$2,953,540	$3,739,232	$5,836,841	$12,529,613	A-6	Sablefish	$2,953,540	$3,739,232	$5,836,841	$12,529,613
≥1 lb sable	Slope RF	$139	$0	$375,399	$375,538	≥100 lbs ling	Slope RF	$139	$0	$375,399	$375,538
	Sharks	$328,810	$0	$297,692	$626,502		Sharks	$328,810	$0	$297,692	$626,502
	Other	$0	$0	$69,978	$69,978		Other	$0	$0	$69,978	$69,978
	Non-target	$33,376	$0	$344,744	$378,120		Non-target	$33,376	$0	$344,744	$378,120
	Total	$3,328,303	$4,197,445	$7,917,934	$15,443,682		Total	$3,327,014	$4,195,649	$7,914,281	$15,436,944
	Lingcod	$12,438	$444,407	$730,793	$1,187,639		Lingcod	$7,913	$406,644	$676,074	$1,090,632
	Shelf RF	$0	$13,805	$262,487	$276,292		Shelf RF	$0	$13,805	$262,487	$276,292
A-6	Sablefish	$2,953,540	$3,739,087	$5,835,973	$12,528,600	A-6	Sablefish	$2,953,540	$3,739,232	$5,836,841	$12,529,613
≥100 lbs sable	Slope RF	$139	$0	$375,399	$375,538	≥500 lbs ling	Slope RF	$139	$0	$375,399	$375,538
	Sharks	$328,810	$0	$297,692	$626,502		Sharks	$328,810	$0	$297,692	$626,502
	Other	$0	$0	$69,978	$69,978		Other	$0	$0	$69,978	$69,978
	Non-target	$33,376	$0	$344,744	$378,120		Non-target	$33,376	$0	$344,744	$378,120
	Total	$3,328,303	$4,197,300	$7,917,066	$15,442,669		Total	$3,323,778	$4,159,682	$7,863,215	$15,346,675

1/ No attempt was made in this analysis to shift fish from non-qualifying vessels to qualifying vessels or to estimate the amount fish that would have been landed by non-qualifying vessels under incidental fishery regulations

Table I-5b. Estimated West Coast economic impacts based on B species revenues received during 2004-2006 by target species group and state expressed as a proportion of actual 2004-2006 landings under A-6 species endorsement alternatives and including A-1 (status quo) and A-6 with no endorsement alternative impact data for comparison 1/ 2/

Alternative	Species	WA	OR	CA	Total	Alternative	Species	WA	OR	CA	Total
	Lingcod	100%	100%	100%	100%		Lingcod	100%	100%	99%	100%
	Shelf RF		100%	100%	100%		Shelf RF		99%	100%	100%
	Sablefish	100%	100%	100%	100%	A-6	Sablefish	100%	100%	100%	100%
A-1	Slope RF	100%		100%	100%	≥500 lbs sable	Slope RF	67%		100%	100%
	Sharks	100%		100%	100%		Sharks	100%		100%	100%
	Other			100%	100%		Other			98%	98%
	Non-target	100%		100%	100%		Non-target	100%		100%	100%
	Total	100%	100%	100%	100%		Total	100%	100%	100%	100%
	Lingcod	100%	100%	99%	100%		Lingcod	100%	100%	99%	100%
	Shelf RF		99%	100%	100%		Shelf RF		99%	100%	100%
A-6	Sablefish	100%	100%	100%	100%	A-6	Sablefish	100%	100%	100%	100%
no endorse	Slope RF	67%		100%	100%	≥1 lb ling	Slope RF	67%		100%	100%
	Sharks	100%		100%	100%		Sharks	100%		100%	100%
	Other			98%	98%		Other			98%	98%
	Non-target	100%		100%	100%		Non-target	100%		100%	100%
	Total	100%	100%	100%	100%		Total	100%	100%	100%	100%
	Lingcod	100%	100%	99%	100%		Lingcod	90%	99%	99%	99%
	Shelf RF		99%	100%	100%		Shelf RF		99%	100%	100%
A-6	Sablefish	100%	100%	100%	100%	A-6	Sablefish	100%	100%	100%	100%
≥1 lb sable	Slope RF	67%		100%	100%	≥100 lbs ling	Slope RF	67%		100%	100%
	Sharks	100%		100%	100%		Sharks	100%		100%	100%
	Other			98%	98%		Other			98%	98%
	Non-target	100%		100%	100%		Non-target	100%		100%	100%
	Total	100%	100%	100%	100%		Total	100%	100%	100%	100%
	Lingcod	100%	100%	99%	100%		Lingcod	64%	91%	92%	91%
	Shelf RF		99%	100%	100%		Shelf RF		99%	100%	100%
A-6	Sablefish	100%	100%	100%	100%	A-6	Sablefish	100%	100%	100%	100%
≥100 lbs sable	Slope RF	67%		100%	100%	≥500 lbs ling	Slope RF	67%		100%	100%
	Sharks	100%		100%	100%		Sharks	100%		100%	100%
	Other			98%	98%		Other			98%	98%
	Non-target	100%		100%	100%		Non-target	100%		100%	100%
	Total	100%	100%	100%	100%		Total	100%	99%	99%	99%

1/ No attempt was made in this analysis to shift fish from non-qualifying vessels to qualifying vessels or to estimate the amount fish that would have been landed by non-qualifying vessels under incidental fishery regulations

2/ Proportions are based on A-1 impact estimates.

Potential C Permit Vessels

Incidental Fishery Vessels

An average of 190 vessels (range 127-246) made incidental B species groundfish landings in the three West Coast states during 2004-2006 window period years. An equal proportion of these vessels made their landings, on average, in Oregon and California (85, 45 percent, each), followed by Washington (20, 10 percent) (**Tables I-6b, I-6c and I-6d)**. Salmon vessels made up most (112, 59 percent) of the incidental fleet, on average, followed by non-groundfish trawl vessels (26, 14 percent) (**Table I-6a**). Most (72, 64 percent) of the salmon vessels, on average, delivered to Oregon ports, followed by California (23, 21 percent) and Washington (17, 15 percent) ports (**Tables I-6b, I-6c and I-6d**).

Table I-6a Landings data for vessels making incidental B species groundfish landings during 2004-2006 window period. Vessel counts EXCLUDE any vessels that would qualify for a B permit under A-6. WOC vessels

	# VESSELS 3/				B SPECIES POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	25	17	13	18	57,040	63,294	47,902	56,079
Pink shrimp	5	6	1	4	3,874	237	11	1,374
Ridgeback prawn	4	4	3	4	1,763	2,182	7,117	3,687
Sea cucumber	3	2	1	2	544	219	16	260
Spot prawn 1/	2	1	0	1	89	11	0	33
subtotal	31	29	18	26	63,310	65,943	55,046	61,433
California halibut HL 2/	15	14	10	13	4,389	1,825	1,843	2,686
CPS	12	3	7	7	5,974	1,619	4,163	3,919
Crabpot	0	1	0	0	1,580	1,124	1,025	1,243
Fish pot 2/	11	8	6	8	2,016	1,682	307	1,335
HMS	9	5	7	7	4,529	3,712	3,834	4,025
Pacific halibut LL 2/	13	7	7	9	35,045	44,747	43,821	41,204
Salmon	147	123	66	112	26,877	21,435	8,852	19,055
Sea urchin	1	0	1	1	1	0	22	8
Set net 2/	9	5	7	7	35,655	47,375	30,651	37,894
subtotal	217	166	111	165	116,066	123,519	94,518	111,368
fishery unknown	0	0	0	0	7,719	12,032	7,013	8,867
non-trawl TOTAL	215	169	109	164	123,785	135,551	101,531	120,289
TOTAL	246	198	127	190	187,095	201,494	156,577	181,722
	SABLEFISH POUNDS				LINGCOD POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	0	0	0	0	162	114	162	146
Pink shrimp	18	0	0	6	19	7	7	11
Ridgeback prawn	0	0	0	0	0	0	0	0
Sea cucumber	0	0	0	0	0	0	0	0
Spot prawn 1/	0	0	0	0	0	0	0	0
subtotal	18	0	0	6	181	121	169	157
California halibut HL 2/	33	15	0	16	2,508	1,067	707	1,427
CPS	0	0	55	18	47	0	70	39
Crabpot	602	262	232	365	238	60	38	112
Fish pot 2/	125	556	40	240	1,580	617	138	778
HMS	513	110	27	217	49	463	712	408
Pacific halibut LL 2/	30,922	37,671	37,227	35,273	3,562	3,781	3,676	3,673
Salmon	308	54	0	121	7,434	5,098	1,698	4,743
Sea urchin	0	0	0	0	0	0	22	7
Set net 2/	0	5	0	2	221	251	62	178
subtotal	32,503	38,673	37,581	36,252	15,639	11,337	7,123	11,366
fishery unknown	6,200	6,018	2,183	4,800	2,277	2,483	3,512	2,757
non-trawl TOTAL	38,683	44,691	39,764	41,046	17,916	13,820	10,635	14,124
TOTAL	38,701	44,691	39,764	41,052	18,097	13,941	10,804	14,281

1/ Prohibited in California starting April 2003. Incidental landings are allowed with ridgeback prawn landings

2/ Excludes directed fishery landings by vessels in this category

3/ Vessel counts are sums across states. Some vessels may be counted more than once if they landed in more than one state.

Table I-6b Landings data for vessels making incidental B species groundfish landings during 2004-2006 window period. Vessel counts EXCLUDE any vessels that would qualify for a B permit under A-6. CALIFORNIA vessels

	# VESSELS				B SPECIES POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	25	17	13	18	57,040	63,294	47,902	56,079
Pink shrimp	0	0	0	0	0	0	0	0
Ridgeback prawn	4	4	3	4	1,763	2,182	7,117	3,687
Sea cucumber	3	2	1	2	544	219	16	260
Spot prawn 1/	2	1	0	1	89	11	0	33
subtotal	26	23	17	22	59,436	65,706	55,035	60,059
California halibut HL 2/	15	14	10	13	4,389	1,825	1,843	2,686
CPS	10	3	4	6	5,889	1,619	4,122	3,877
Crabpot	0	1	0	0	1,580	1,124	1,025	1,243
Fish pot 2/	11	8	6	8	2,016	1,682	307	1,335
HMS	6	5	6	6	4,324	3,191	3,156	3,557
Pacific halibut LL 2/	0	0	0	0	0	0	0	0
Salmon	33	23	12	23	2,659	2,165	536	1,787
Sea urchin	1	0	1	1	1	0	22	8
Set net 2/	9	5	7	7	35,655	47,375	30,651	37,894
subtotal	85	59	46	63	56,513	58,981	41,662	52,385
fishery unknown	0	0	0	0	6,327	10,495	3,939	6,920
non-trawl TOTAL	83	62	44	63	62,840	69,476	45,601	59,306
TOTAL (unique vessels)	109	85	61	85	122,276	135,182	100,636	119,365

	SABLEFISH POUNDS				LINGCOD POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	0	0	0	0	162	114	162	146
Pink shrimp	0	0	0	0	0	0	0	0
Ridgeback prawn	0	0	0	0	0	0	0	0
Sea cucumber	0	0	0	0	0	0	0	0
Spot prawn 1/	0	0	0	0	0	0	0	0
subtotal	0	0	0	0	162	114	162	146
California halibut HL 2/	33	15	0	16	2,508	1,067	707	1,427
CPS	0	0	27	9	0	0	70	23
Crabpot	602	262	232	365	238	60	38	112
Fish pot 2/	125	556	40	240	1,580	617	138	778
HMS	465	0	27	164	9	87	34	43
Pacific halibut LL 2/	0	0	0	0	0	0	0	0
Salmon	129	20	0	50	823	674	318	605
Sea urchin	0	0	0	0	0	0	22	7
Set net 2/	0	5	0	2	221	251	62	178
subtotal	1,354	858	326	846	5,379	2,756	1,389	3,175
fishery unknown	6,200	6,018	2,183	4,800	1,281	953	694	976
non-trawl TOTAL	7,534	6,876	2,509	5,640	6,660	3,709	2,083	4,151
TOTAL	7,534	6,876	2,509	5,640	6,822	3,823	2,245	4,297

1/ Prohibited in California starting April 2003. Incidental landings are allowed with ridgeback prawn landings

2/ Excludes directed fishery landings by vessels in this category

Table I-6c Landings data for vessels making incidental B species groundfish landings during 2004-2006 window period. Vessel counts EXCLUDE any vessels that would qualify for a B permit under A-6. OREGON vessels

	# VESSELS				B SPECIES POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	0	0	0	0	0	0	0	0
Pink shrimp	3	2	0	2	3,749	140	0	1,296
Ridgeback prawn	0	0	0	0	0	0	0	0
Sea cucumber	0	0	0	0	0	0	0	0
Spot prawn 1/	0	0	0	0	0	0	0	0
subtotal	3	2	0	2	3,749	140	0	1,296
California halibut HL 2/	0	0	0	0	0	0	0	0
CPS	2	0	3	2	85	0	41	42
Crabpot	0	0	0	0	0	0	0	0
Fish pot 2/	0	0	0	0	0	0	0	0
HMS	3	0	1	1	205	521	678	468
Pacific halibut LL 2/	12	6	6	8	31,968	33,640	35,956	33,855
Salmon	93	85	39	72	18,523	15,306	5,541	13,123
Sea urchin	0	0	0	0	0	0	0	0
Set net 2/	0	0	0	0	0	0	0	0
subtotal	110	91	49	83	50,781	49,467	42,216	47,488
fishery unknown	0	0	0	0	1,230	1,537	3,074	1,947
non-trawl TOTAL	110	91	49	83	52,011	51,004	45,290	49,435
TOTAL (unique vessels)	113	93	49	85	55,760	51,144	45,290	50,731

	SABLEFISH POUNDS				LINGCOD POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	0	0	0	0	0	0	0	0
Pink shrimp	16	0	0	5	14	7	0	7
Ridgeback prawn	0	0	0	0	0	0	0	0
Sea cucumber	0	0	0	0	0	0	0	0
Spot prawn 1/	0	0	0	0	0	0	0	0
subtotal	16	0	0	5	14	7	0	7
California halibut HL 2/	0	0	0	0	0	0	0	0
CPS	0	0	28	9	47	0	0	16
Crabpot	0	0	0	0	0	0	0	0
Fish pot 2/	0	0	0	0	0	0	0	0
HMS	48	110	0	53	40	376	678	365
Pacific halibut LL 2/	28,639	28,207	30,152	28,999	2,767	2,309	2,886	2,654
Salmon	129	20	0	50	6,306	4,349	1,380	4,012
Sea urchin	0	0	0	0	0	0	0	0
Set net 2/	0	0	0	0	0	0	0	0
subtotal	28,816	28,337	30,180	29,111	9,160	7,034	4,944	7,046
fishery unknown	0	0	0		834	1,530	2,818	1,727
non-trawl TOTAL	28,816	28,337	30,180	29,111	9,994	8,564	7,762	8,773
TOTAL	28,832	28,337	30,180	29,116	10,008	8,571	7,762	8,780

1/ Prohibited in California starting April 2003. Incidental landings are allowed with ridgeback prawn landings

2/ Excludes directed fishery landings by vessels in this category

Table I-6d. Landings data for vessels making incidental B species groundfish landings during 2004-2006 window period. Vessel counts EXCLUDE any vessels that would qualify for a B permit under A-6. WASHINGTON vessels

	# VESSELS 3/				B SPECIES POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	0	0	0	0	0	0	0	0
Pink shrimp	2	4	1	2	125	97	11	78
Ridgeback prawn	0	0	0	0	0	0	0	0
Sea cucumber	0	0	0	0	0	0	0	0
Spot prawn 1/	0	0	0	0	0	0	0	0
subtotal	2	4	1	2	125	97	11	78
California halibut HL 2/	0	0	0	0	0	0	0	0
CPS	0	0	0	0	0	0	0	0
Crabpot	0	0	0	0	0	0	0	0
Fish pot 2/	0	0	0	0	0	0	0	0
HMS	0	0	0	0	0	0	0	0
Pacific halibut LL 2/	1	1	1	1	3,077	11,107	7,865	7,350
Salmon	21	15	15	17	5,695	3,964	2,775	4,145
Sea urchin	0	0	0	0	0	0	0	0
Set net 2/	0	0	0	0	0	0	0	0
subtotal	22	16	16	18	8,772	15,071	10,640	11,494
fishery unknown	0	0	0	0	162	0	0	0
non-trawl TOTAL	22	16	16	18	8,934	15,071	10,640	11,548
TOTAL (unique vessels)	24	20	17	20	9,059	15,168	10,651	11,626

	SABLEFISH POUNDS				LINGCOD POUNDS			
	2004	2005	2006	AVG	2004	2005	2006	AVG
Non-groundfish trawl								
California halibut	0	0	0	0	0	0	0	0
Pink shrimp	2	0	0	1	5	0	7	4
Ridgeback prawn	0	0	0	0	0	0	0	0
Sea cucumber	0	0	0	0	0	0	0	0
Spot prawn 1/	0	0	0	0	0	0	0	0
subtotal	2	0	0	1	5	0	7	4
California halibut HL 2/	0	0	0	0	0	0	0	0
CPS	0	0	0	0	0	0	0	0
Crabpot	0	0	0	0	0	0	0	0
Fish pot 2/	0	0	0	0	0	0	0	0
HMS	0	0	0	0	0	0	0	0
Pacific halibut LL 2/	2,283	9,464	7,075	6,274	795	1,472	790	1,019
Salmon	50	14	0	21	305	75	0	127
Sea urchin	0	0	0	0	0	0	0	0
Set net 2/	0	0	0	0	0	0	0	0
subtotal	2,333	9,478	7,075	6,295	1,100	1,547	790	1,146
fishery unknown	0	0	0	0	162	0	0	54
non-trawl TOTAL	2,333	9,478	7,075	6,295	1,262	1,547	790	1,200
TOTAL	2,335	9,478	7,075	6,296	1,267	1,547	797	1,204

1/ Prohibited in California starting April 2003. Incidental landings are allowed with ridgeback prawn landings

2/ Excludes directed fishery landings by vessels in this category

Nearshore Groundfish Vessels

A total of 100 vessels that made directed fishery landings during 2004-2006 would not qualify for a B permit under A-6 (**Tables I-1b and I-7**). A total of 46 Oregon and California vessels had nearshore groundfish landings during 2004-2006 and, presumably, had state nearshore groundfish permits (**Table I-**

7). This means that these vessels would not need C permits in order to land incidental amounts of B species groundfish when fishing for nearshore groundfish under the proposed permit program **(EA Table 2-1a).** The 54 vessels that had no nearshore landings (Oregon, 14; California 35) or nearshore permit requirement (Washington, 5) would need to obtain C permits in the future in order to land incidental amounts of B species groundfish under the proposed permit program **(EA Table 2-1a).**

Table I-7: Number of vessels that would not qualify under the preliminary preferred alternative by nearshore groundfish landing category during 2004-2006 window period years

Nearshore pounds	State			
	WA	OR	CA	Total
0	1	14	35	50
>0	4	7	39	50
Total	5	21	74	100
>100	2	3	21	26
>500	1	1	8	10
>1000	1	1	1	3

Incidental Fishery Landings of B Species Groundfish

The average annual landing of B species groundfish by total vessels that made incidental fishery landings during 2004-2006 window period years was 181,722 pounds (82.4 mt) (**Table I-6a)**, which was 3 percent of the open access fishery allocation for all species combined or 8 percent for all species excluding *Sebastes* (**Table 1-1)**[20]. Most (119,365 pounds, 66 percent) were landed, on average, in California, followed by Oregon (50,731 lbs, 28 percent) and Washington (11,626 lbs, 6 percent) (**Tables I-6b, I-6c and I-6d)**. Sablefish and lingcod comprised 22 percent (41,052 lbs) and 8 percent (14,281 lbs), respectively, of the total WOC incidental fishery poundage (**Table I-6a).** Sablefish were primarily landed in the combined Oregon and Washington Pacific halibut longline fisheries (86 percent, 35,273 lbs, **Tables I-6a, I-6b, I-6c and I-6d).** The total average annual sablefish incidental fishery harvest of 41,052 pounds (18.6 mt) represented about 3 percent of the sablefish-northern area open access fishery allocation (where the incidental fishery harvest took place) of 628 mt (**Table 1-1).** The lingcod incidental fishery harvest of 14,281 lbs (6.5 mt) was 14 percent of the average open access fishery average allocation of 45.7 mt during 2004-2006 (**Table 1-1)**. The salmon troll and Pacific halibut longline fisheries took most (8,416 lbs combined, 59 percent) of the lingcod followed by the California halibut hook and line fishery (1,427 lbs, 10 percent) (**Table I-6a**).

2007/2008 Vessel Registration Data

Respective total of 881 (88 percent) and 810 (81 percent) of the 1,003 vessels that met A-6 qualifying criteria were registered with WOC state agencies in 2007 and 2008 **(Table I-8)**. The highest registration proportions were California vessels (90 percent in 2007; 83 percent in 2008) followed by Oregon vessels (87 percent in 2007; 81 percent in 2008). Washington had relatively few registered vessels by comparison (79 percent in 2007; 67 percent in 2008), but the lower numbers may be because vessels that were registered in Washington did not make a commercial fishery landing and are not in the PacFIN data base (**Table I-8).**

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[20] *Sebastes* is excluded for this analysis because regulations to protect overfished rockfish stocks have impeded access to shelf rockfish species, which historically was a very important to the directed open access fishery (**EA Table 1-1).** Thus allocations of this species have not been ully available to the fishery in recent years.

Table I-8. Commercial fishing vessel registration status in 2007 and 2008 for WOC vessels that would qualify for B permits under the preliminary preferred alternative (A-6) 1/

State	# Qualify	2007	P	2008	P
WA	121	96	79%	81	67%
OR	324	283	87%	264	81%
CA	558	502	90%	465	83%
WOC	1003	881	88%	810	81%

1/ This table shows all qualifying vessels that were registered with the state agencies in 2007 and 2008, except for WA where only qualifying vessels that made a landing are shown.

Discussion

The number of vessels that would qualify for a B permit under the preliminary preferred alternative (Alternative 6, A-6), 1,003, would be more vessels than participated in the directed fishery in any year since 1998 and would be 132 percent to 158 percent (636 to 760) of the number of vessels that participated in the fishery in any year during 2004-2006 window period years (**Table I-1a; Table 2-5).** Thus A-6 would have had little or no impact to the level of vessel participation in the directed open access fishery for B species groundfish during 2004-2006 window period years, except as impacted by the species endorsement alternatives. The few vessels that made a directed fishery landing during 2004-2006 and that would not qualify for B permits, 100 in total, contributed very few fish to the landings (0.1 percent, **Table I-1a)** and had very low dependence, on average, on B species groundfish during 2004-2006, representing 0.1 percent, on average, of their total commercial fishery incomes (**Table I-1b**).

The species endorsement alternatives have the potential to provide an extra measure of protection to the target species fisheries while allowing all vessels to participate in fisheries for other stocks. Some of these other stocks are depressed (e.g., overfished shelf rockfish), but have the potential for recovery in the future. However, the degree of protection afforded to sablefish and lingcod stocks stemming from the species endorsements would depend on the amount of fishing power retained in the permitted vessels.

Sablefish and to a much lesser degree lingcod have been the most economically important species to the B species directed groundfish fishery during recent window period years. During 2004-2006, sablefish accounted for 81 percent ($12.5 million) of total fishery impact ($15.5 million) of the B species directed fishery followed by lingcod at 7.7 percent ($1.2 million) (**Table I-5a).** It is difficult to project the potential effectiveness of the species endorsement alternatives long term without knowing what the permit holders will do with their permits. However, it seems likely that the permit holders with low catch histories of the respective species will more apt to sell their permits and associated endorsements than those permit holders with relatively rich catch histories and that continue to rely on B species groundfish for income.

The sablefish alternatives (≥1 lb, ≥100 lbs, ≥500 lbs maximum landing in any year during 1998 -2006) would qualify between 168 percent and 196 percent (464 to 541) of the number of vessels that participated, on average, in the sablefish fishery (276, range 212-340) during 2004-2006 window period years (**Table I-1a;** EA **Table 2-5).** Thus little or no impact could be expected to the sablefish fishery stemming from the sablefish endorsement alternatives, except if low production sablefish endorsement owners decide to transfer their permits to owners that seek to actively participate in the sablefish fishery, in which case further restriction in sablefish landing limits might be necessary. The lingcod alternatives would qualify between 99 percent and 199 percent (337 to 674 vessels) as many vessels as participated in the lingcod fishery on average (339 range 331-347) during 2004-2006 window period years (**Table I-1a; EA Table 2-5).** The lingcod alternatives would have little or no impact to the lingcod fleet size during 2004-2006 except under the≥500 lb alternative, which would create a fleet size that would be very close to the average lingcod fleet size that existed during 2004-2006 window period years. None of the species

endorsement alternatives would have substantially impacted the commercial fishery incomes of non-qualifying vessels (0.1 percent to 0.8 percent revenue impact) during 2004-2006 (**Table E-1b).**
Only 80 vessels (8 percent) would not receive a sablefish or lingcod endorsement under A-6, while 92 percent of vessels (923) would qualify for at least one permit type under A-6 species endorsement alternatives at the ≥1 lb level. Between 73 (7.2 percent) and 292 (29 percent) vessels would qualify for both permit types, depending on standard used for qualification (**Table 1-2).** The higher lingcod standards (≥100 lbs and ≥500 lbs) would have had a greater impact on the proportion of qualifying vessels than the comparable sablefish standards. This was because of the much larger catch histories of sablefish vessels compared to lingcod vessels as discussed in Appendix E and indicated in **Figure I-1**.

None of the sablefish standards would have a substantial impact on Washington vessels with only 5 vessels (4 percent) not receiving a permit between the ≥1 lb and ≥500 lb standards The comparative statistics for Oregon and California vessels were 9 percent (18 of 194) and 23 percent (54 of 231), respectively (**Table I-3a).** A few port groups were more sensitive to sablefish non-qualification (i.e., Bodega Bay, Morro Bay and Santa Barbara) compared to the other 15 port groups, as described in the Results section.

The community impact of the species endorsement alternatives based on 2004-2006 data showed negligible impact (<1 percent) (**Tables I-5a and I-5b)**. The impact to the lingcod fishery under the ≥500 lb alternative was -9 percent, the overall fishery impact was very small at -0.7 percent because of the much smaller contribution of lingcod compared to other species, sablefish in particular, to the coastwide community **(Tables I-5a and I-5b).**

Incidental fishery landings data showed that an average of 190 vessels (range 127-246) made incidental B species groundfish landings and would not have met A-6 criteria for B permit issuance during 2004-2006 window period years. The number of directed fishery vessels during 2004-2006 window period years that would not have qualified for a B permit under A-6 and that did not appear to have an Oregon or California nearshore permit (no nearshore landings) totaled 54. However, some of the latter vessels may have made incidental fishery landings during 2004-2006 and are included in the aforementioned incidental fishery fleet. Thus an approximation of the *maximum* number of C permits that would have been required under A-6 during 2004-2006 window period years is 244 (190 incidental +54 non-nearshore) with a range of 181-300. Most of the permits would have been needed, on average, by California and Oregon vessels (120 and 99, respectively) and very few (25) by Washington vessels (**Tables I-6a, I-6b, I-6c, I-6d, I-7).**

The average incidental fishery B species poundage landed during 2004-2006 was very small compared to the total amount of fish set aside for the open access fishery (3 percent or 8 percent with and without *Sebastes*, respectively). The same was true for sablefish at 3 percent of the northern sablefish allocation but was 14 percent of the lingcod allocation. A large proportion of the sablefish harvest (86 percent) was taken in the Pacific halibut longline fishery while the lingcod incidental harvest was primarily distributed among three fisheries: salmon troll (33 percent), Pacific halibut longline (26 percent) and California halibut hook and line (10 percent). The amount of fish to set aside for incidental fisheries under the proposed permit program does not appear to be a major concern under recent years' incidental fishery regulations with regard to their impact on the directed fishery for all species except lingcod, which is an important B species directed fishery species.

A large proportion (≥81 percent) of the vessels that met A-6 criteria was registered as commercial fishing vessels with WOC agencies in 2007 and 2008 (**Table I-8)**. This indicates a high proportion of the vessels that meet B permit qualification criteria under A-6 would be eligible for B permit registration. However, the qualified but unregistered vessels in 2007 and 2008 would still be eligible for B permit registration if their current owners take the initiative and are able to re-register their vessels with the state agencies at the time of B permit application. It is difficult to project how many unregistered but qualified vessels will be re-registered by their vessel owners in order to apply for B permits. Also, some qualifying Washington vessels that did not make a commercial fishery landing in 2007 or 2008 may be eligible for B permit registration, but are not shown in the PacFIN vessel registration data base. It seems likely from the available information that the proportion of vessels that meet A-6 eligibility criteria (1,003 vessels) and that will be eligible for B permit registration will be >80 percent. The registration of >800 vessels under A-6 would make the B permit program the third largest limited entry program on the West Coast including those managed by the states (behind salmon troll, ~2700 vessels, and Dungeness crab, ~1300 vessels; **Appendix C**) and NMFS [Groundfish A permits, 404 vessels (PFMC web page); Coastal Pelagic Species permits, 65vessels (Joshua Lindsay, NMFS)].

References

Lindsay, Joshua. 2009. Personal communication, NMFS-SWR, January 2009

Agenda Item G.5.a
Attachment 4
March 2009

POSSIBLE OPEN ACCESS GROUNDFISH FISHERY CONVERSION TO LIMITED ENTRY AND PERMIT IMPLEMENTATION SCHEDULE

STEP	DATES
Council adopts final action	March 2009
NMFS develops permit issuance requirements	April – May 31, 2009
NMFS drafts proposed regulations and prepares proposed rule package	April – July 31, 2009
NMFS publishes proposed rule	September 1, 2009
30-Day comment period on proposed rule ends	September 30, 2009
Final rule/compliance guide published	November 30, 2009
Application period/public outreach	January - June 30, 2010
Deadline for B permit application	June 30, 2010
NMFS issues C permits	Continuous starting in late 2010
B and C permits required	January 1, 2011

Note: The current plan is that NMFS would provide applicants 45 days to make an appeal after a NMFS decision to disapprove a B permit application. NMFS would have 90 days to review an appeal and issue the final agency decision. NMFS anticipates that initial decisions on B permit applications will be issued both during the application period and after the application period (if applications are received near or on the application deadline date).

FINAL GROUNDFISH ALLOCATION COMMITTEE REPORT FROM JANUARY 2009 REGARDING OPEN ACCESS: AMENDMENT 22.

The Groundfish Allocation Committee (GAC) met in Portland, Oregon on January 29, 2009 to discuss Amendment 22 - Open Access Limitation. The following written GAC recommendations to the Council were vetted by the committee members at the GAC meeting and via email. The rationale was compiled from staff notes.

- The GAC recommends the following be added to the Amendment 22 purpose and need statement: Allowing unlimited open access to continue creates problems for tracking and monitoring the fishery and creates the potential for expansion of additional target fisheries. Closing the open access nature of the groundfish fishery and preventing additional entrants is an important step in managing fishery capacity.
- The GAC recommends a refinement of Option A-6, which is the preliminary preferred alternative. Refinement includes using >500 lb for sablefish and >100 lb for lingcod to qualify for the species endorsements; A and B permits can be used with single vessels in the same year; B permits are transferrable after the first year, and no C permit requirement.
- The GAC recommends a new alternative be analyzed that would set a fleet size of 713 vessels and maintain the current proportions of vessels by target species (sablefish, lingcod, slope rockfish, shelf rockfish, sharks, other species and non-target fleets). For the purposes of this analysis, "current" was defined as 2004-2006.
- The GAC recommends the Groundfish Management Team provide the trip limit differences for sablefish resulting from a fleet size of 445, as compared to status quo and the new alternative.

Rationale

Public comment at the GAC meeting included several statements asking for "meaningful action" to limit the open access fishery. The majority of the GAC responded by going forward with refinement of the purpose and need statement and the preliminary preferred alternative and asking for additional analysis. One of the objectives of limiting the open access fishery is to contain any impact on other sectors.

The assumption that fewer permits would lead to higher trip limits was examined by the group. Furthermore, the GAC discussed how limited the number of permits would have to be before there would be a meaningful amount of fish for redistribution among the remaining harvesters. Staff replied that the number of permits would need to be less than the number of currently active participants. The Federal GAC representative indicated that allowing endorsements to be severed from permits was not desirable, because more tracking and accounting of transfers would be required of National Marine Fisheries Service (NMFS). A statement addressing that point will be provided by NMFS for the open access document.

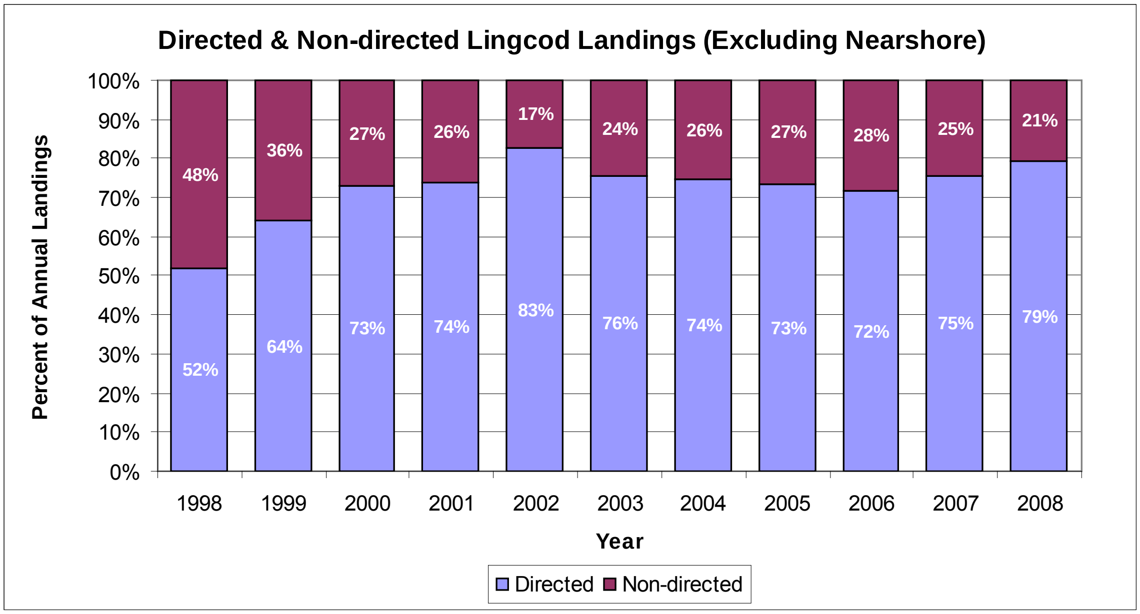
PFMC
2/23/09

CALIFORNIA DEPARTMENT OF FISH AND GAME REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 22 – OPEN ACCESS LICENSE LIMITATION

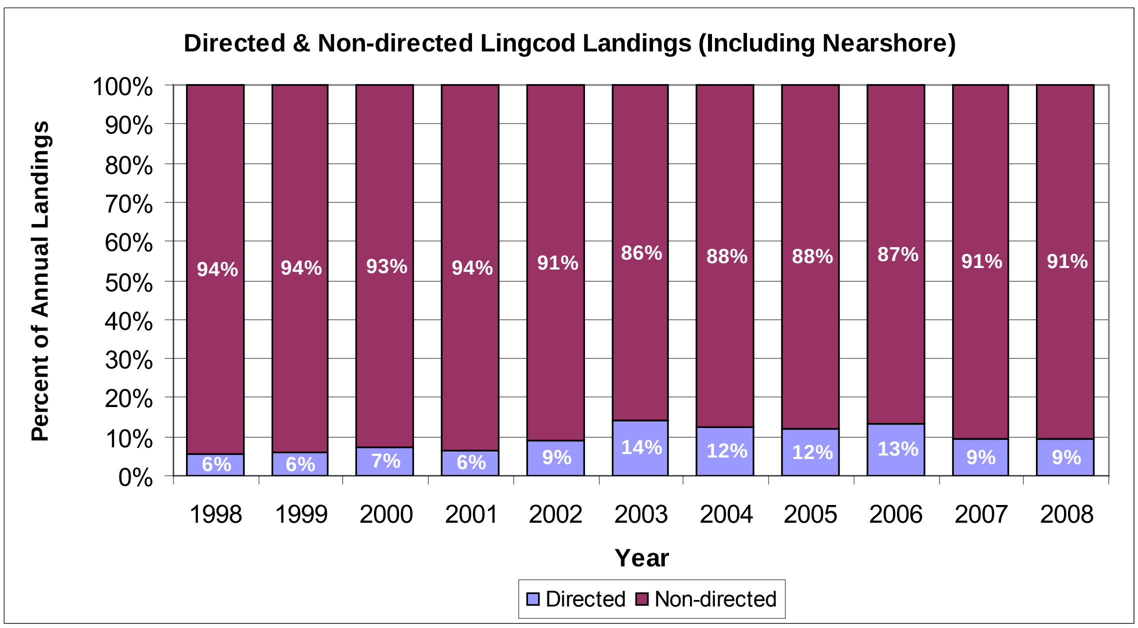
California's open access "fishery" is most accurately described as comprised of fisheries for: shallow nearshore (mostly groundfish) species, deeper nearshore (groundfish) species, sablefish, combinations of nearshore and shelf, shelf and slope, very minor directed fisheries for shelf groundfish, very minor directed fisheries for slope groundfish, and several fisheries that take groundfish by targeting state managed non-groundfish species. It is challenging to really call it a "fishery", however, if we were to identify a single significant directed open access "fishery" then it would be sablefish (and of course the nearshore fishery). Our open access "fishery" overall has been declining - not increasing. In California, the open access fishery (minus the nearshore fishery) is worth about $1.5 million and about $1 million of that is sablefish.

We believe the analysis for the EA paints a picture of the California open access fishery that is somewhat misleading relative to identifying "directed" fisheries. While the initial decision to remove the nearshore species from the analysis was intended to prevent vessels from qualifying based on their nearshore landings, we believe the unintended outcome has been to mis-portray some of our fisheries as "directed". Please see the graphics below concerning the EA depiction of California lingcod and shelf rockfish fisheries and our picture of those two "fisheries" when all groundfish species are used. Clearly the lingcod and shelf "fisheries are NOT "directed" fisheries. Therefore any proposal to permit or maintain fleet characteristics for these directed fisheries seems unnecessary. We also believe that the sablefish fishery may be the only open access fishery that warrants a separate "endorsed" permit.

California Lingcod Characterization

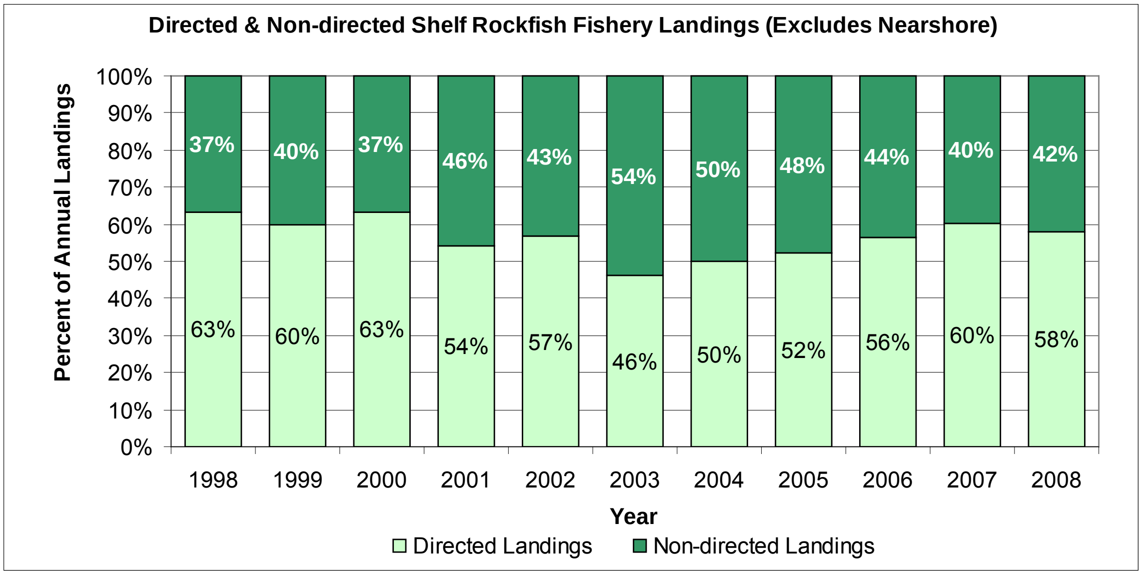


California statewide directed and non-directed lingcod landings where the nearshore species are excluded (as per the EA method).

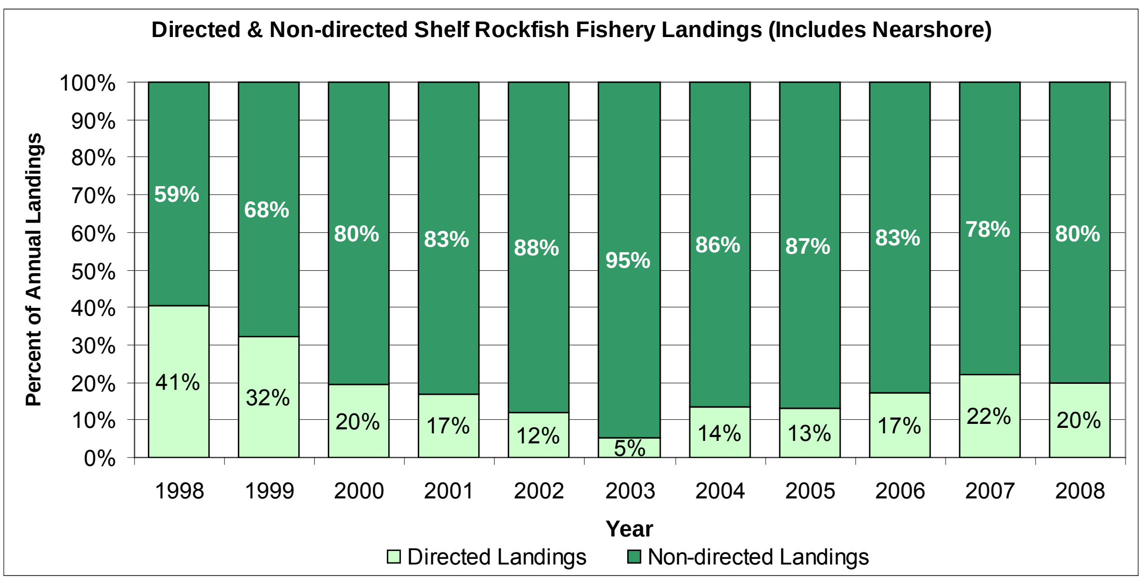


California statewide directed and non-directed lingcod landings where the nearshore species are included.

California Shelf Rockfish Characterization



California statewide directed and non-directed shelf rockfish landings where nearshore species are excluded (as per the EA method).



California statewide directed and non-directed shelf rockfish landings where nearshore species are included.

Supplemental Open Access Fishery Report: *Preliminary Analysis of 2006-2008 Post-Window Period Directed Fishery Landings* [1]

Introduction

The Council is slated to make a final decision on a final preferred open access fishery license limitation alternative at its March 2009 meeting. The analyses of alternatives contained in the Preliminary Draft Environmental Assessment have been limited to landings data for the period April 1998-September 2006, the window period used for permit qualification. These dates encompass the two control dates previously published in the *Federal Register* notifying the public that previous and future landings may not count toward a vessel's catch history for the purpose of limited entry permit qualification.

The vetting process for limited entry permit qualification through the Council meeting process has spanned approximately 20 months, having begun in June 2007 and extended through early March 2009. Considerable open access fishery landings have taken place since September 2006, and it may be important for the Council to consider recent fishery data before taking final action on the proposed license limitation program.

A preliminary analysis of open access fishery landings data for the period October 2006 through December 2008 is presented in the following. The data show that directed fishery landings and participation levels have declined, the sablefish target species vessel group continued to take a large majority of fish, while many "new" vessels made a directed fishery landing. Inclusion of these new vessels under the Council's preliminary preferred alternative (A-6) would substantially increase the number of vessels eligible for B permits and associated species endorsements.

Methods

A data file was created for each vessel that made a directed fishery landing during the post window period years of October 2006-December 2008. The data compiled for each directed fishing trip included pounds landed and revenues received for each of the following species groups: lingcod, sablefish, federal sharks, shelf rockfish, slope rockfish, and other species. Data were included for salmon and nearshore landings during 2007-2008. Each vessel was assigned to a port group, based on where the most landings were made for the entire data analysis period. Vessels were assigned to target species vessel groups (TSVGs) for each year based on the species or species group (named above) from which the majority of revenues were received. If a vessel could not be assigned to a TSVG it was assigned to a non-target species group. Excel software was used to sort and organize the data and to produce output tables and graphs.

Results

The data show that the number of vessels participating in the directed fishery generally declined from 1998-2004, increased slightly during 2005 and 2006 then declined during 2007 and 2008, the two most recent post-window period years [**Table 2-5 (updated); Figure S-1].** The overall WOC trend closely followed that of the California fishery because of the relatively large number of California fishery participants. The Oregon and Washington fisheries generally increased through the 2006 season then declined during 2007 and 2008, particularly in the Washington fishery [**Table 2-5 (updated); Figure S-1**]. Sablefish have dominated the directed fishery since 2000. Sablefish directed fishery landings generally increased during 1998-2005, peaked in 2005, declined considerably in 2007 then increased in 2008, to about 2003 landing level [**Table 2-5 (updated); Figure S-2**].

[1] Prepared by LB Boydstun, CDFG Retired, and Gerry Kobylinski, PSMFC, March 9, 2009. This document has not been reviewed by the full open access report writing review team.

Table 2-5 (updated). Directed B species open access fishery participation and landing statistics by species group, year, state and total, April 1998-2008 including data for 1998-2006 window period.

		Sablefish			Shelf RF			Slope RF			Lingcod			Sharks			Others 1/			Total Directed		
Yr		vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s
1998	CA	92	94.6	$219.0	433	797.3	$1,161.0	171	192.3	$220.0	257	46.2	$105.0	54	25.2	$34.0	71	29.0	$43.0	654	1,185.1	$1,782.0
	OR	30	16.3	$45.0	135	178.5	$272.0	3	4.4	$6.0	103	20.7	$47.0	0	0.0	$0.0	44	21.0	$38.0	200	240.8	$409.0
	WA	29	25.6	$79.0	10	12.4	$9.0	0	0.0	$0.0	17	5.6	$7.0	0	0.0	$0.0	20	57.0	$65.0	46	100.7	$160.0
	sum	151	136.5	$343.0	578	988.2	$1,442.0	174	196.7	$226.0	377	72.5	$159.0	54	25.2	$34.0	135	107.0	$146.0	900	1,526.6	$2,351.0
1999	CA	102	176.9	$454.0	479	264.1	$538.0	72	16.9	$29.0	293	39.9	$119.0	52	25.2	$37.0	105	49.0	$86.0	677	571.9	$1,263.0
	OR	15	20.6	$65.0	132	93.3	$194.0	8	1.2	$2.0	125	27.1	$74.0	0	0.0	$0.0	58	13.0	$43.0	180	155.4	$377.0
	WA	28	36.0	$115.0	7	9.1	$7.0	0	0.0	$0.0	14	4.8	$6.0	2	4.8	$2.0	15	9.0	$11.0	44	63.2	$141.0
	sum	145	233.5	$634.0	618	366.5	$739.0	80	18.1	$31.0	432	71.8	$199.0	54	30.0	$39.0	178	71.0	$140.0	901	790.5	$1,781.0
2000	CA	115	299.0	$944.0	403	96.3	$282.0	65	8.5	$22.0	221	19.8	$64.0	55	22.3	$31.0	127	81.0	$118.0	642	526.7	$1,460.0
	OR	34	43.6	$159.0	103	7.3	$19.0	1	0.5	$1.0	89	12.3	$45.0	2	0.1	$0.0	0	0.0	$0.0	154	63.9	$224.0
	WA	32	51.9	$202.0	9	1.7	$3.0	2	1.5	$2.0	12	4.8	$6.0	1	1.5	$1.0	2	1.0	$2.0	49	62.8	$215.0
	sum	181	394.5	$1,305.0	515	105.3	$304.0	68	10.5	$25.0	322	36.9	$115.0	58	23.9	$32.0	129	82.0	$120.0	845	653.4	$1,899.0
2001	CA	112	273.7	$820.0	301	66.7	$177.0	41	25.9	$52.0	244	29.0	$97.0	49	24.4	$34.0	96	48.0	$106.0	518	467.5	$1,286.0
	OR	64	58.9	$199.0	89	5.5	$15.0	1	0.6	$1.0	119	24.1	$82.0	0	0.0	$0.0	2	0.0	$0.0	180	89.3	$296.0
	WA	44	60.3	$218.0	8	0.8	$1.0	2	1.4	$1.0	12	3.6	$5.0	0	0.0	$0.0	0	1.0	$1.0	54	66.8	$225.0
	sum	220	392.9	$1,237.0	398	73.0	$193.0	44	27.9	$54.0	375	56.7	$184.0	49	24.4	$34.0	98	49.0	$107.0	752	623.6	$1,807.0
2002	CA	119	268.3	$798.0	222	19.7	$72.0	45	60.7	$133.0	244	37.2	$132.0	40	16.0	$24.0	68	49.0	$80.0	480	451.4	$1,238.0
	OR	53	49.7	$180.0	61	3.6	$9.0	1	0.1	$0.0	126	27.4	$94.0	0	0.0	$0.0	8	0.0	$0.0	176	81.2	$283.0
	WA	44	65.2	$237.0	0	0.6	$0.0	0	0.9	$1.0	9	2.9	$4.0	1	4.2	$1.0	0	1.0	$0.0	47	74.4	$244.0
	sum	216	383.2	$1,215.0	283	23.9	$81.0	46	61.7	$134.0	379	67.5	$230.0	41	20.2	$25.0	76	50.0	$80.0	703	607.0	$1,765.0
2003	CA	118	312.6	$946.0	169	8.7	$39.0	46	82.4	$194.0	240	32.5	$131.0	47	28.1	$37.0	50	55.0	$50.0	445	519.6	$1,398.0
	OR	96	134.3	$492.0	52	3.3	$8.0	13	0.8	$1.0	123	28.9	$91.0	0	0.0	$0.0	0	1.0	$0.0	202	168.1	$593.0
	WA	64	118.2	$450.0	0	0.2	$0.0	0	1.5	$2.0	4	2.1	$3.0	1	43.9	$18.0	0	2.0	$1.0	68	167.7	$473.0
	sum	278	565.1	$1,888.0	221	12.2	$47.0	59	84.7	$197.0	367	63.5	$225.0	48	72.0	$55.0	50	58.0	$51.0	715	855.4	$2,464.0
2004	CA	92	288.3	$831.0	189	23.9	$104.0	48	52.2	$130.0	215	39.9	$158.0	43	23.6	$48.0	60	57.0	$52.0	402	484.9	$1,323.0
	OR	67	73.6	$225.0	66	2.9	$7.0	3	1.0	$1.0	120	31.1	$97.0	0	0.2	$0.0	3	0.0	$0.0	177	109.1	$330.0
	WA	53	96.4	$326.0	1	0.5	$1.0	2	1.4	$1.0	4	1.7	$3.0	4	86.1	$38.0	0	1.0	$1.0	57	187.3	$369.0
	sum	212	458.3	$1,382.0	256	27.3	$112.0	53	54.6	$132.0	339	72.7	$258.0	47	109.9	$86.0	63	58.0	$53.0	636	781.3	$2,022.0
2005	CA	101	458.3	$1,312.0	170	21.2	$99.0	46	30.8	$84.0	192	35.8	$145.0	44	21.9	$31.0	49	39.0	$34.0	367	607.5	$1,704.0
	OR	107	257.6	$916.0	54	3.4	$9.0	4	5.1	$7.0	150	29.4	$101.0	2	0.2	$0.0	2	5.0	$2.0	232	300.5	$1,035.0
	WA	68	182.2	$678.0	2	0.4	$1.0	2	6.5	$8.0	5	2.4	$4.0	2	3.2	$2.0	0	1.0	$1.0	78	195.5	$693.0
	sum	276	898.1	$2,906.0	226	25.0	$109.0	52	42.4	$99.0	347	67.6	$250.0	48	25.3	$33.0	51	45.0	$37.0	677	1,103.5	$3,432.0
2006 2/	CA	126	379.2	$1,069.5	174	29.9	$139.8	36	38.0	$97.5	198	30.9	$131.4	42	25.4	$46.9	32	16.9	$41.7	396	520.8	$1,526.8
	OR	132	251.7	$985.6	42	3.8	$11.1	3	5.4	$7.3	136	32.8	$129.3	0	0.0	$0.0	2	4.3	$2.1	242	297.5	$1,135.5
	WA	86	157.5	$612.0	0	0.2	$0.0	1	0.8	$1.0	4	2.7	$5.0	2	59.8	$31.0	0	1.0	$0.0	90	221.6	$649.0
	sum	344	788.4	$2,667.1	216	33.8	$150.9	40	44.2	$105.8	338	66.3	$265.7	44	85.2	$77.9	34	22.2	$43.9	728	1,039.9	$3,311.3
2007	CA	149	289.8	$993.2	217	36.4	$174.4	83	13.9	$50.8	240	30.6	$140.8	40	9.3	$17.7	91	16.1	$39.6	416	396.2	$1,416.6
	OR	93	110.1	$468.8	83	3.2	$10.5	36	3.8	$5.3	155	36.4	$148.1	2	0.3	$0.0	38	2.3	$1.2	215	156.2	$634.0
	WA	53	53.6	$246.2	13	0.4	$0.4	20	1.0	$1.1	16	3.1	$5.7	2	0.2	$0.1	8	0.4	$0.2	55	58.7	$253.7
	sum	295	453.6	$1,708.2	313	40.0	$185.4	139	18.7	$57.2	411	70.1	$294.5	44	9.8	$17.9	137	18.8	$41.0	686	611.1	$2,304.3
2008	CA	144	341.4	$1,426.8	178	22.1	$121.1	71	18.1	$61.5	199	28.8	$140.1	26	5.5	$7.1	89	27.7	$37.5	357	443.8	$1,794.0
	OR	89	181.2	$948.5	87	3.6	$12.4	46	3.7	$5.1	177	43.7	$207.2	2	0.2	$0.0	59	7.3	$3.9	209	239.8	$1,177.1
	WA	39	44.3	$228.9	10	0.3	$0.2	17	1.0	$1.2	18	2.3	$4.2	9	10.9	$4.7	8	2.3	$1.2	39	61.1	$240.4
	sum	272	567.0	$2,604.2	275	26.0	$133.6	134	22.8	$67.8	394	74.8	$351.4	37	16.6	$11.9	156	37.3	$42.6	605	744.6	$3,211.5

1/ others species includes unspecified rockfish, flatfishes, rays and chimeras
2/ 2006 data have been updated with post window period data (Oct-Dec).

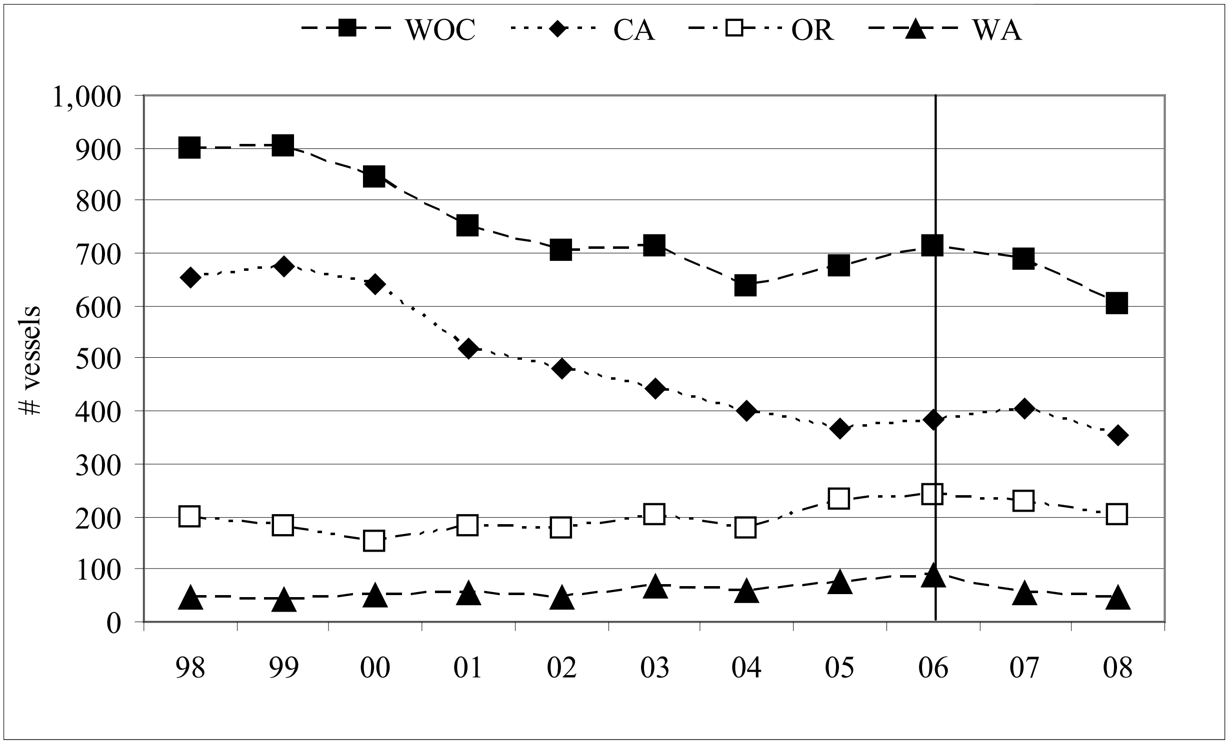


Figure S-1. Number of open access fishery directed fishery vessels by state, in total and year, April 1998-2008. The 2006 count is higher by 15 vessels than previously reported because of new post window period (Oct-Dec) fishery entrants.

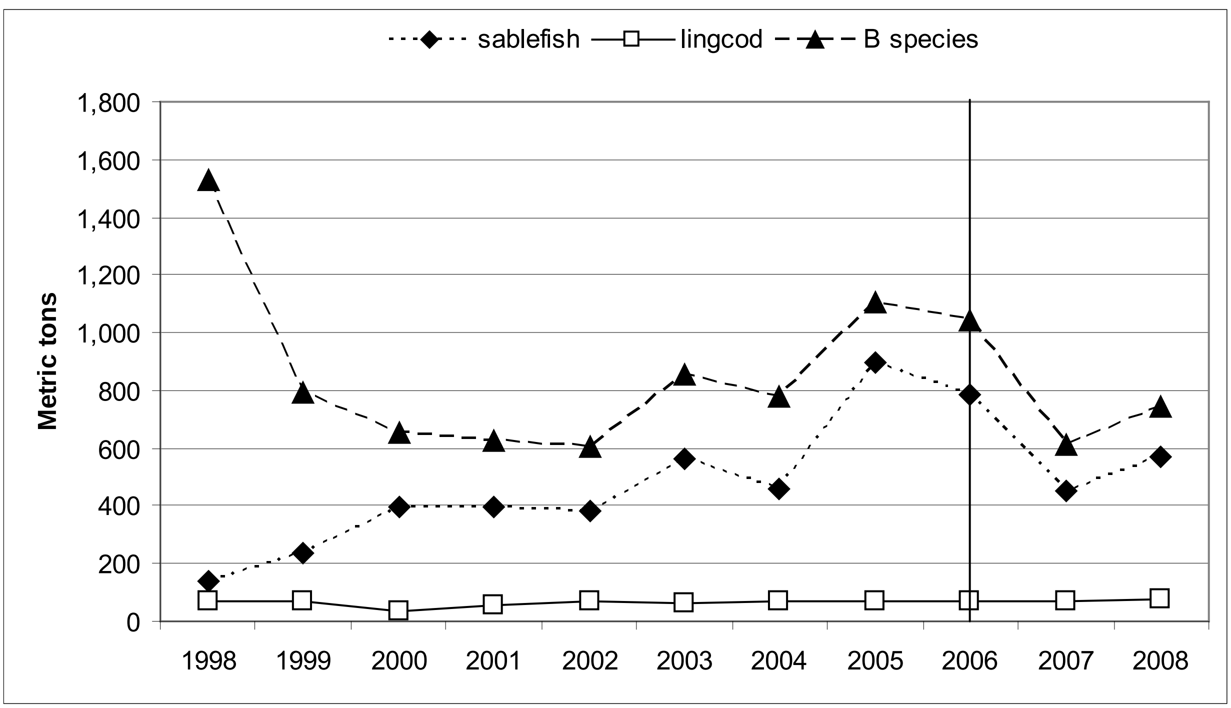


Figure S-2. Annual WOC directed open access directed fishery tonnage landed of B species groundfish, sablefish and lingcod.

A total of 850 vessels made directed fishery landings during the post window period years of 2006-2008. Of these, 281 (33%) were new fishery participants; i.e., did not make a landing during 2004-2006 window period years **(Table S-1).** The new vessels landed 25% of the B species landing including 25% and 19% of the sablefish and lingcod landings, respectively **(Table S-1).**

Table S-1 Selected landings statistics for directed open access fishery vessels during post window period years of 2006-2008. Landings are in mts.

Table S-1 S	Category	Number	P	B species	P	Sablefish	P	Lingcod	P
WA	Total	66	8%	119.8	8%	97.9	9%	5.5	4%
	New 1/	18	2%	34.7	2%	26.8	2%	0.3	0%
OR	Total	270	32%	403.4	27%	292.3	26%	85.3	55%
	New	76	9%	80.9	5%	61.4	5%	15.9	10%
CA	Total	514	60%	961.4	65%	730.6	65%	63.5	41%
	New	187	22%	251.7	17%	187.9	17%	13.6	9%
WOC	Total	850	100%	1,484.6	100%	1,120.8	100%	154.2	100%
	New	281	33%	367.4	25%	276.1	25%	29.8	19%

1/ Did not make a directed fishery landing during 2004-2006 window period years (New)

A total of 82 (29%) of the new fishery participants were salmon fishery vessels (**Table S-2**). About 79% (223 vessels) of the 281 new fishery participants and 69% (18 vessels) of the previous fishery participants that would not have qualified for B permits under A-6 landed ≥100 lbs of B species groundfish during 2006-2008 post window period years, the minimum landing standard for B permit issuance under A-6 **(Table S-2; Figure S-3).** From 16% (lingcod, ≥500 lbs) to 70% (lingcod, ≥1lb) of the new fishery participants that landed ≥100 lbs of B species groundfish would qualify for a species endorsement under the range of species endorsement alternatives contained in A-**6 (Table S-2; Figure S-3).** The comparative data for previous fishery participants, ones that would not qualify under A-6, is from 11% (lingcod, ≥500 lbs) to 55% (lingcod, ≥1lb) **(Table S-2; Figure S-3).**

Table S-2. Potential impact of including recent and previous non-qualifying directed fishery vessels to B permit program under A-6.

	New				Previous				Totals		Potential	
Category	WA	OR	CA	Sub-total	WA	OR	CA	Sub-total	N/P	A-6	Grand	Increase
New vessels or vessels that did not previously qualify 1/	18	76	187	281	3	9	14	26	281	1,103	1,384	25.5%
New vessels or previous vessels w/ salmon history 2/	2	40	40	82	0	3	6	9	82	406	488	20.2%
New & previous w/ >100 lbs, post window period	18	65	140	223	3	7	8	18	241	1,003	1,244	24.0%
Sablefish ≥1lb	18	31	67	116	3	0	4	7	123	541	664	22.7%
Sablefish ≥100lb	18	29	60	107	3	0	4	7	114	513	627	22.2%
Sablefish ≥500lb	16	27	50	93	3	0	4	7	100	464	564	21.6%
Lingcod ≥1 lb	4	62	91	157	0	7	3	10	167	674	841	24.8%
Lingcod ≥100 lb	1	44	39	84	0	6	2	8	92	549	641	16.8%
Lingcod ≥500 lb	0	22	13	35	0	2	0	2	37	337	374	11.0%

1/ Did not make a directed fishery landing during 2004-2006 window period years (New) or did not previously qualify under A-6 (Previous).

2/ New to fishery or previously did not qualify under A-6 (see 1/) and made a salmon landing during 2007-2008 or 2004-2006, respectively

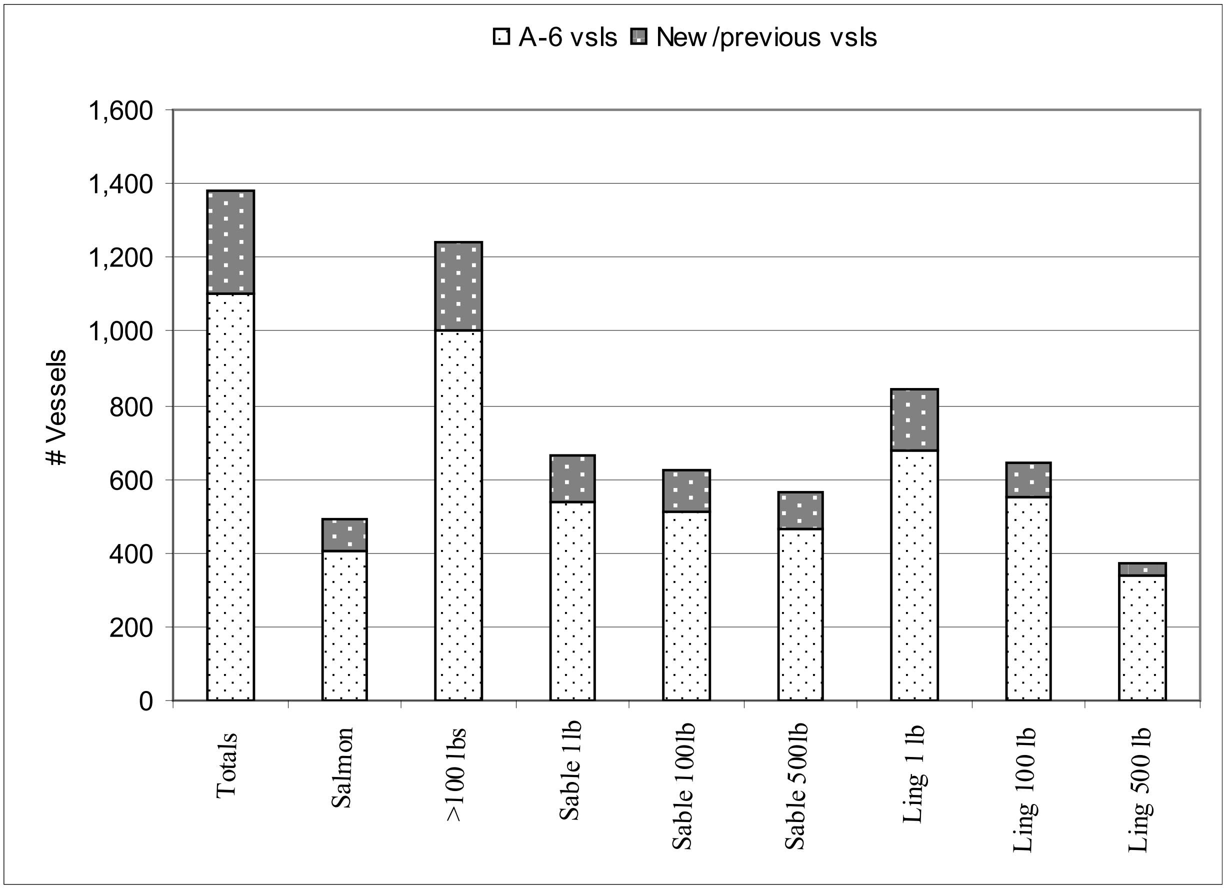


Figure S-3. Numbers of new and previous directed fishery vessels that would qualify for a B permit and species endorsement under A-6 qualification criteria

The majority of vessels (62%-83%) were assigned to the lingcod and sablefish TSVGs (**Table S-3; Figure S-4**). However, the proportion assigned to the sablefish TSVG was relatively low in 2006 (14% compared to 40%-42% in other years), which encompassed only the last three months of the year. This low number was likely due to late season sablefish closure (see **Table S-4**, below), which reduced overall sablefish fishing effort. In all years the sablefish TSVG landed the majority of B species groundfish (range 79%-85%) (**Table S-3; Figure S-5**) and sablefish (range 98%-99%). The Washington fishery did not make any directed fishery landings, based on the available data, in late 2006, but was heavily dependent on sablefish in 2007 (91%) and 2008 (73%) (**Table S-3**). The Oregon and California fisheries were also heavily dependent on sablefish in terms of pounds landed, particularly in 2007 (71% and 73%, respectively) and 2008 (89% and 77%, respectively) (**Table S-3**), but had substantial number of vessels that were assigned to the lingcod and shelf rockfish TSVGs in all three years **(Table S-3; Figure S-4).**

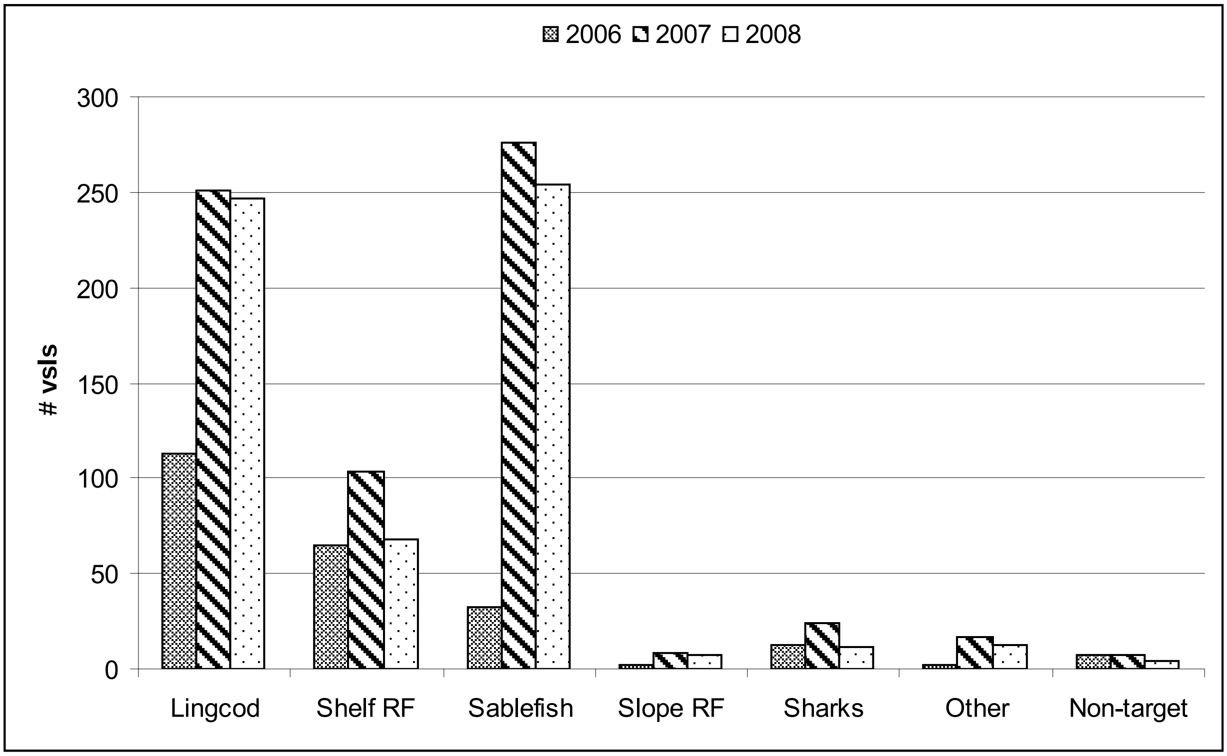


Figure S-4. Number of WOC vessels by target species vessel group during 2006-2008 post window period years

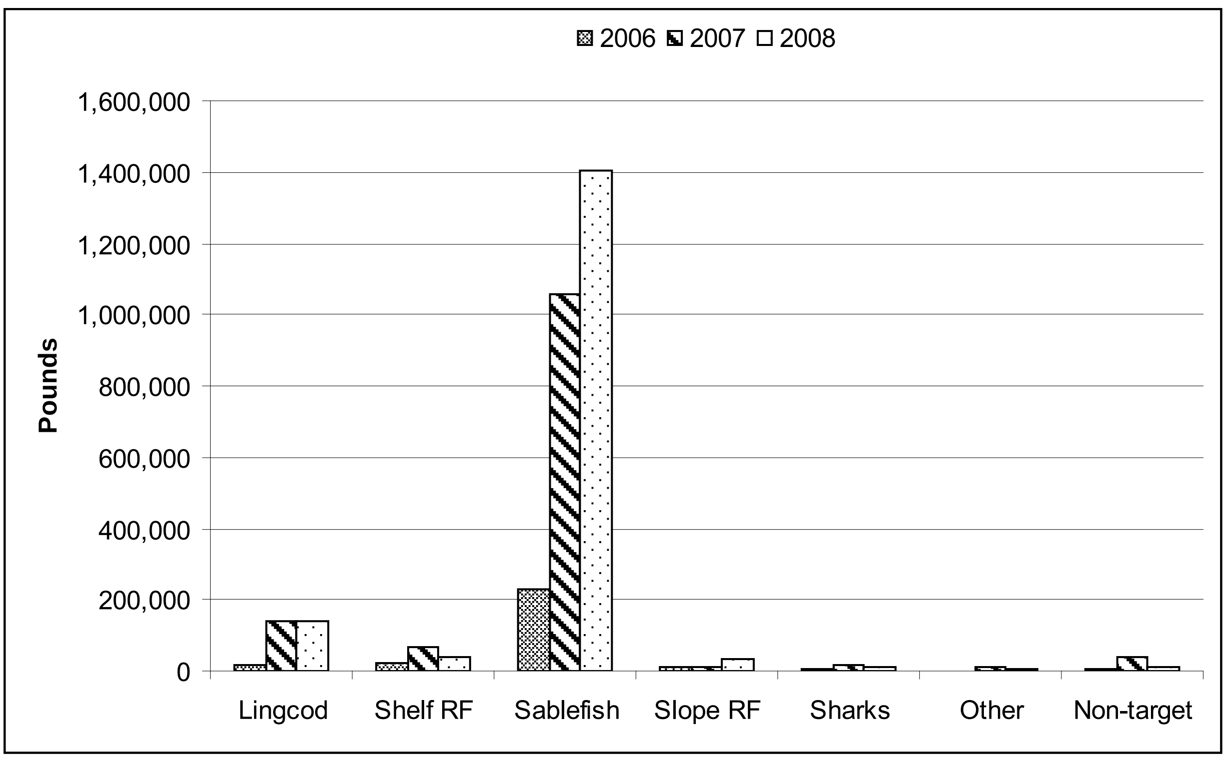


Figure S-5. WOC pounds landed of B species groundfish by target species vessel group during 2006-2008 post window period years

Discussion

Post window period data indicate that the directed fishery declined during 2007 and 2008 to about 2003-2004 levels of vessel participation and fishery landings **[Table 2-5 (updated); Figure S-2].** The new VMS requirement for vessels fishing in federal waters to take or transport federal groundfish likely contributed to the decline. Sablefish trip limit changes, since May 2006 north of the Conception area and since January 2007 in the Conception area, may have also contributed to the change (**Table S-4).**

Table S-4.Monthly equivalent open access fishery sablefish trip limits in pounds of fish by management area, cumulative landing period, and year, 2002-2008

Management Area	Year	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Northern 2/	2002	1200	1200	1200	1200	1200	1350 (Nov)
	2003	1600	1600	1600	1600	1600	1800
	2004	1800	1800	1800	1800	1800	1800
	2005	2500	1800	1800	1800	1800	4500 (Nov)
	2006	2500	2500	1500	1500	1500	closed (Nov)
	2007	1050	1050	1050	1050	1050	1050
	2008	1200	1200	1200	1200	1200	1200
Conception	2002	4200	4200	3600	3600	3600	3600
	2003	4200	4200	4200	4200	4200	4200
	2004	4200	4200	4200	4200	4200	4200
	2005	4200	4200	4200	4200	4200	4200
	2006	4200	4200	4200	4200	4200	4200/3000
	2007	2800	2800	2800	2800	4200	4200
	2008	2800	2800	2800	1000	1050	1050

1/ Daily and weekly trip limits were further used to constrain harvest; above values are generally based on weekly and bimonthly limits as published by the NMFS (http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/).

2/ Northern=WOC north of Conception area.

The sablefish TSVG continued to take the majority of B species landings during post window period years, but nearly as many vessels could be assigned to the lingcod TSVG during these same years. The average take of B species groundfish by the two groups were substantially different during post window period years: sablefish, 7,091 lbs; lingcod, 166 lbs **(WOC Totals, Table S-3).** This was undoubtedly due to the much higher trip limit allowances for sablefish (**Table S-4**) compared to lingcod (**Table S-5**).

Table S-5. Monthly equivalent open access fishery lingcod trip limits in pounds of fish by cumulative landing period and year, 2002-2008 1/

Year	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
2002	0	0	300	300	300	0
2003	0	0	300	300	300	0
2004	0	0	300	300	300	0
2005	0	0	300	300	300	0
2006	0	0	300	300	300	0
2007	0	0	400	400	400	400/0
2008	0	0	400	400	400	400/0

1/ lingcod regulations have been coordinated with nearshore regulations, which are not shown in this table

A total of 281 vessels that did not make a landing during 2004-2006 window period years made a directed fishery landing during 2006-2008 post window period years. Of these, 223 (79%) landed ≥100 lbs of B species groundfish, the minimum landing standard under A-6, the Council's preliminary preferred alternative (PPA). In addition, 18 vessels that previously did not qualify for permits under A-6 landed ≥100 lbs of B species groundfish during the post window period years. Inclusion of these two groups of vessels under PPA standards would increase the number of qualifying vessels from 1,003 to 1,244, a 24% increase. Such a fleet size would be larger than the actual fleet size in any window period year since 1998 and would be 74% higher than the 2006 window period fleet size of 713 vessels **[Table 2-5 (updated)); Figure S-1]** [2]**.** Variable numbers of the new and previous vessels would qualify for species endorsements under the alternatives contained in A-6 (see **Table S-2; Figure S-3**).

[2] Table 2-5 shows 728 vessels in 2006, but 15 made an initial landing during post window period months of October-December 2006.

Review and Update of Open Access Fishery Preliminary Draft Environmental Assessment, Proposed Amendment 22

LB Boydstun

March 10-12, 2009

Basics

Proposed action: (1) Convert directed open access fishery to limited entry management (B permit program) and (2) register all incidental fishery vessels (C permit program).

Why?: (1) To cap directed fishery (prevent expansion)
(2) Begin to reverse trend in reduced trip limits and improve fishery economic performance
(3) Improve accuracy of inseason catch projections, facilitate law enforcement, and improve information exchange

Species covered: All federal groundfish not including nearshore species (cabezon, kelp greenling, California scorpionfish, nearshore rockfish)

Which landings count toward B permit qualification?: Only those made during April 1998-September 2006 (window period) in which >50% of revenues were B species groundfish and open access gear was used (excludes A permit vessels).

Who gets the B permit?: Current owners of qualifying vessels; PacFIN database will be used to determine qualifying vessels.

When could program be implemented?: January 1, 2011, if Council takes final action at March 2009 meeting.

Who will administer program?: National Marine Fisheries Service, Northwest Region

B Permit Alternatives
(Elements can be mixed and matched)

	A-1 (no action)	A-2 (register)	A-3	A-4	A-5	A-6 (preferred)
Initial fleet size goal:	n/a	n/a	680 or 713 vsls	none	390 vsls	none
Fleet size goal:	n/a	n/a	none	none	170	none
Permit transferability:	n/a	n/a	yes	yes	no 1/	yes, after first year
Previous year landing:	n/a	n/a	no	no	yes	no
State landing endorsement:	n/a	n/a	yes	no	no	no
A & B permit use on same vessel:	n/a	n/a	yes 2/	yes 2/	no	yes 2/
B permit criterion:	n/a	n/a	3 picks	many	3 picks	≥100 lbs
Species endorsement:	n/a	n/a	no	no	no	yes 3/

1/ except for hardships

2/ pre-fishing declaration required

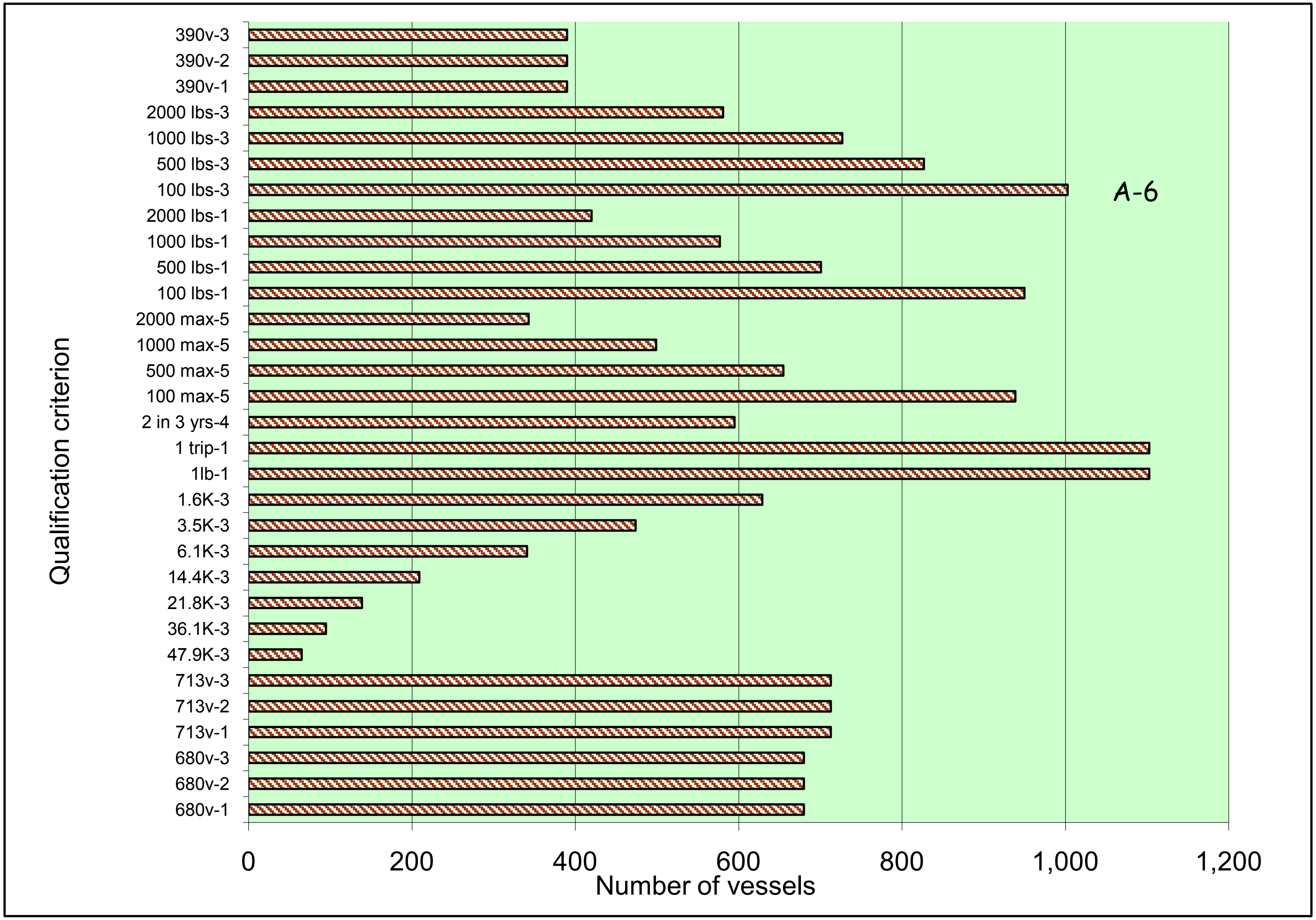
3/ sablefish and lingcod alternatives: (a) ≥1 lb, (b) ≥100 lbs and (c) ≥500 lbs in any year

Directed Fishery Characterization
(see Section 3)

- Fishery has taken 93% of OA lbs and $$ in recent years
- The fishery declined from 901-638 vsls during window yrs
- Species emphasis now is on sablefish (78% of $$)
- Many different vessels were in fishery during window yrs (2,587)
- Most vessels have <1200 lbs of B species catch history
- Most vessels are heavily dependent (>93% avg) on other fisheries for $$
- Fishery is very small (<9%) compared to other West Coast fisheries

Summary of Appendix I: "Analysis of Preliminary Preferred Alternative (Alternative 6)"

Context of A-6 B Permit Criterion



Species Endorsement Vessel Counts

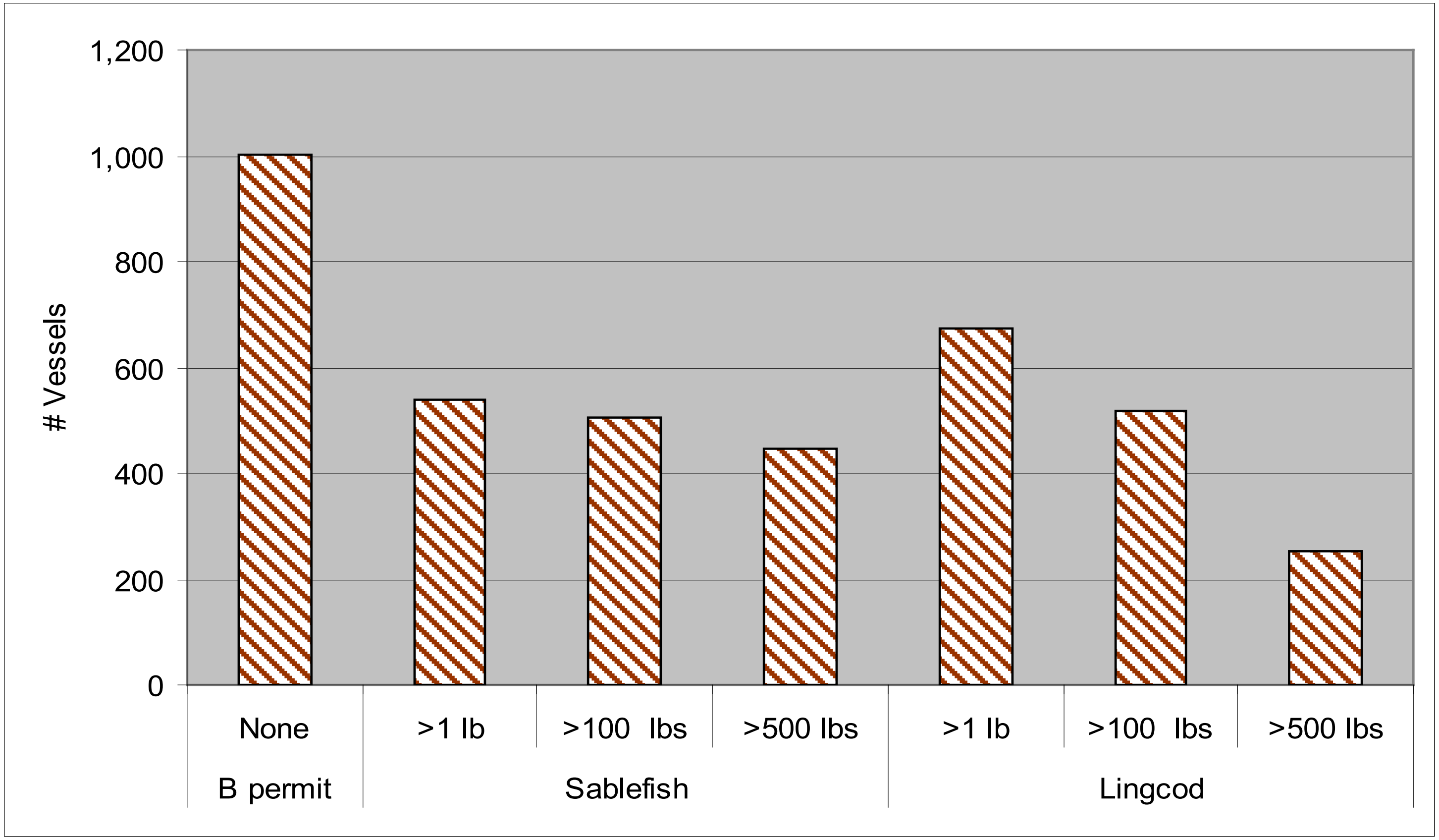


Figure 2. Number of vessels that would qualify for sablefish and lingcod endorsements including number of B permit qualifying vessels under A-6

Dual Endorsements

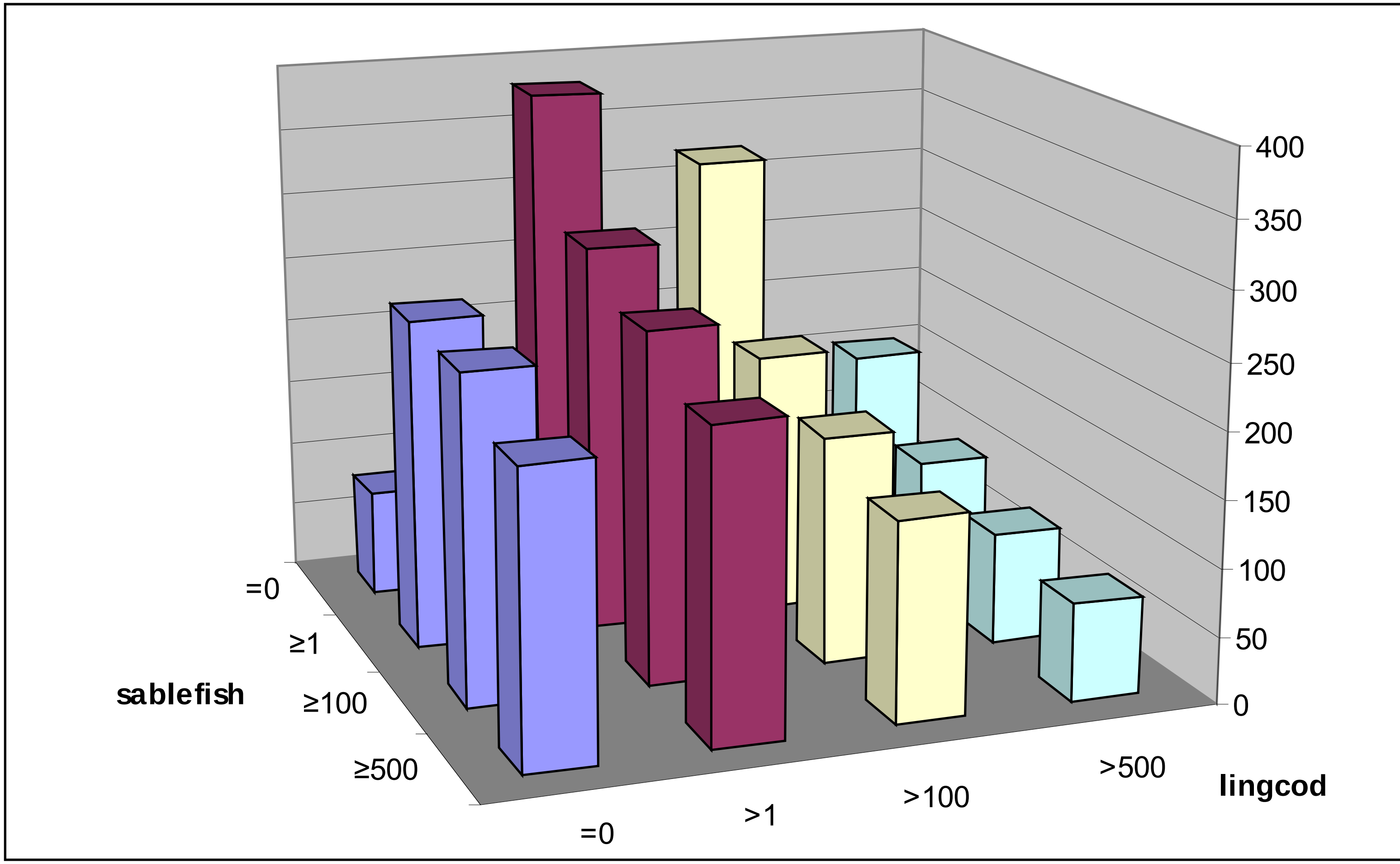


Figure 3. Number of vessels that would qualify for dual sablefish and lingcod endorsements by qualification standard (minimum lbs)

Impact of Lingcod Criteria on Community Economics
(Worst-case scenario)

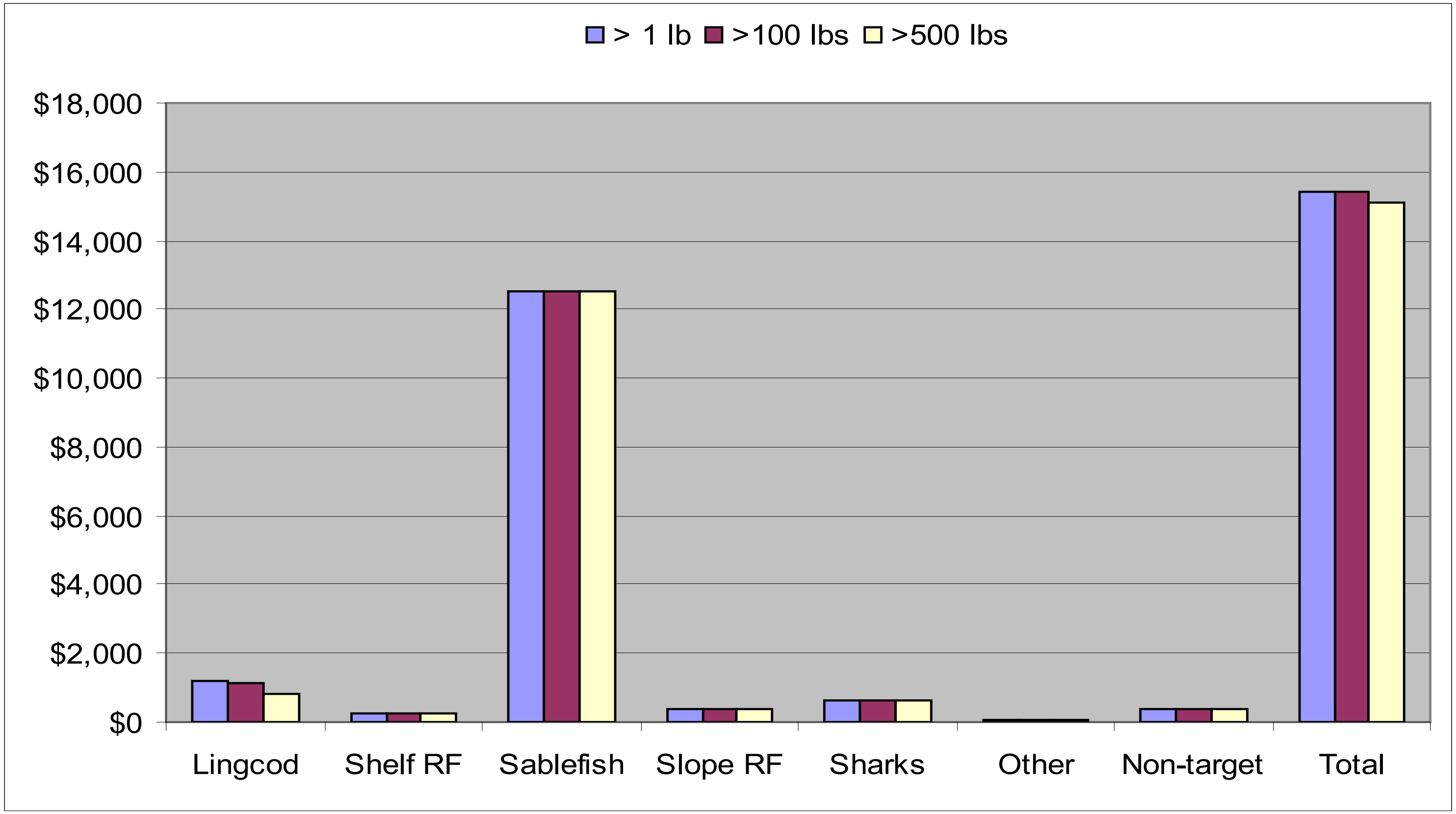


Figure 6. Community economic impact (000s) during 2004-2006 by vessels that would qualify for a lingcod endorsement under A-6 criteria

How Many C Permits?

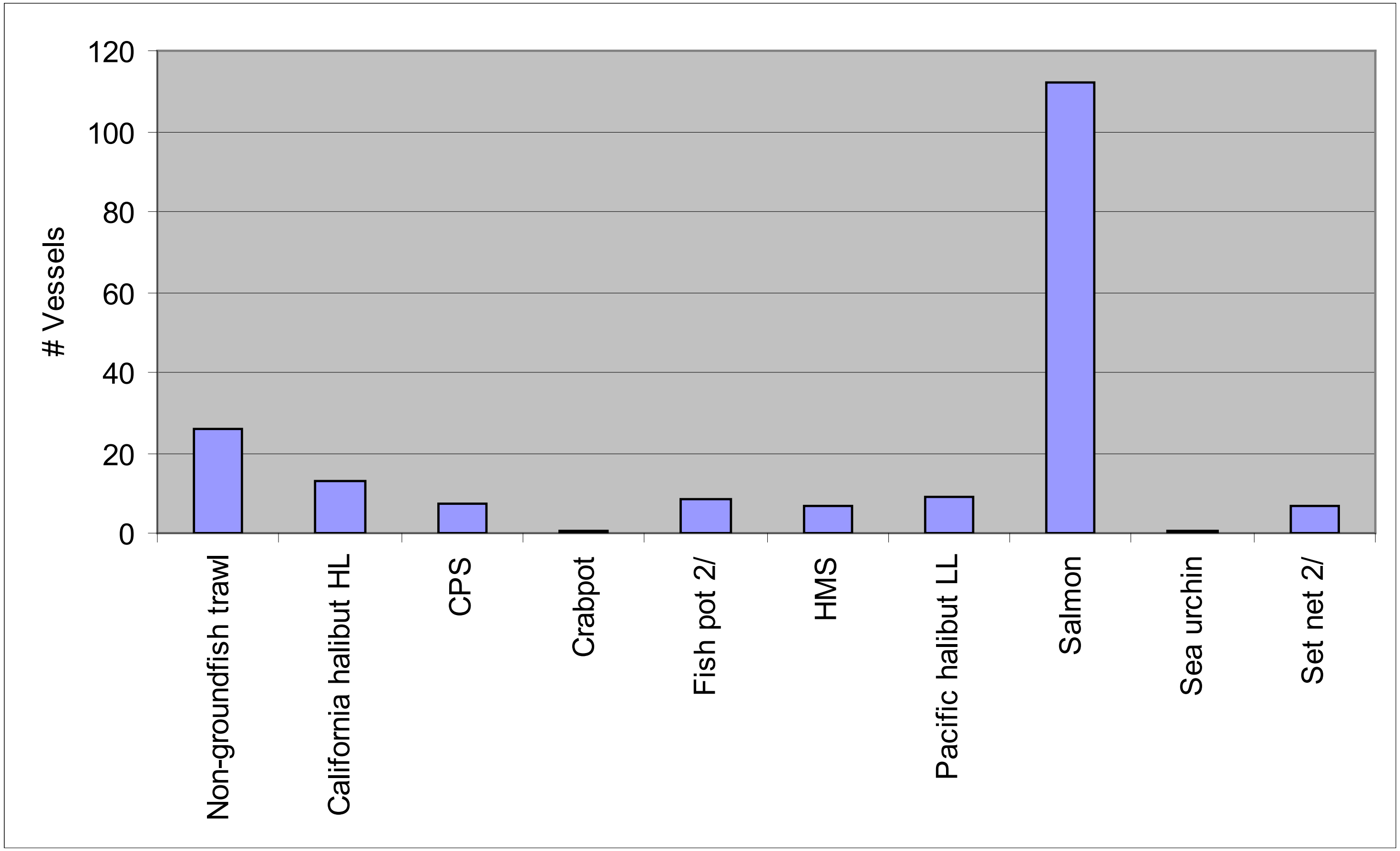


Figure 7. Average number of vessels that made B species incidental fishery landings during 2004-2006 by fishery type. Not included are vessels that qualified for B permits under A-6 or made nearshore landings (and may be able to use their state-issued nearshore permits in lieu of C permits).

How Many Pounds for C Permit Vessels?

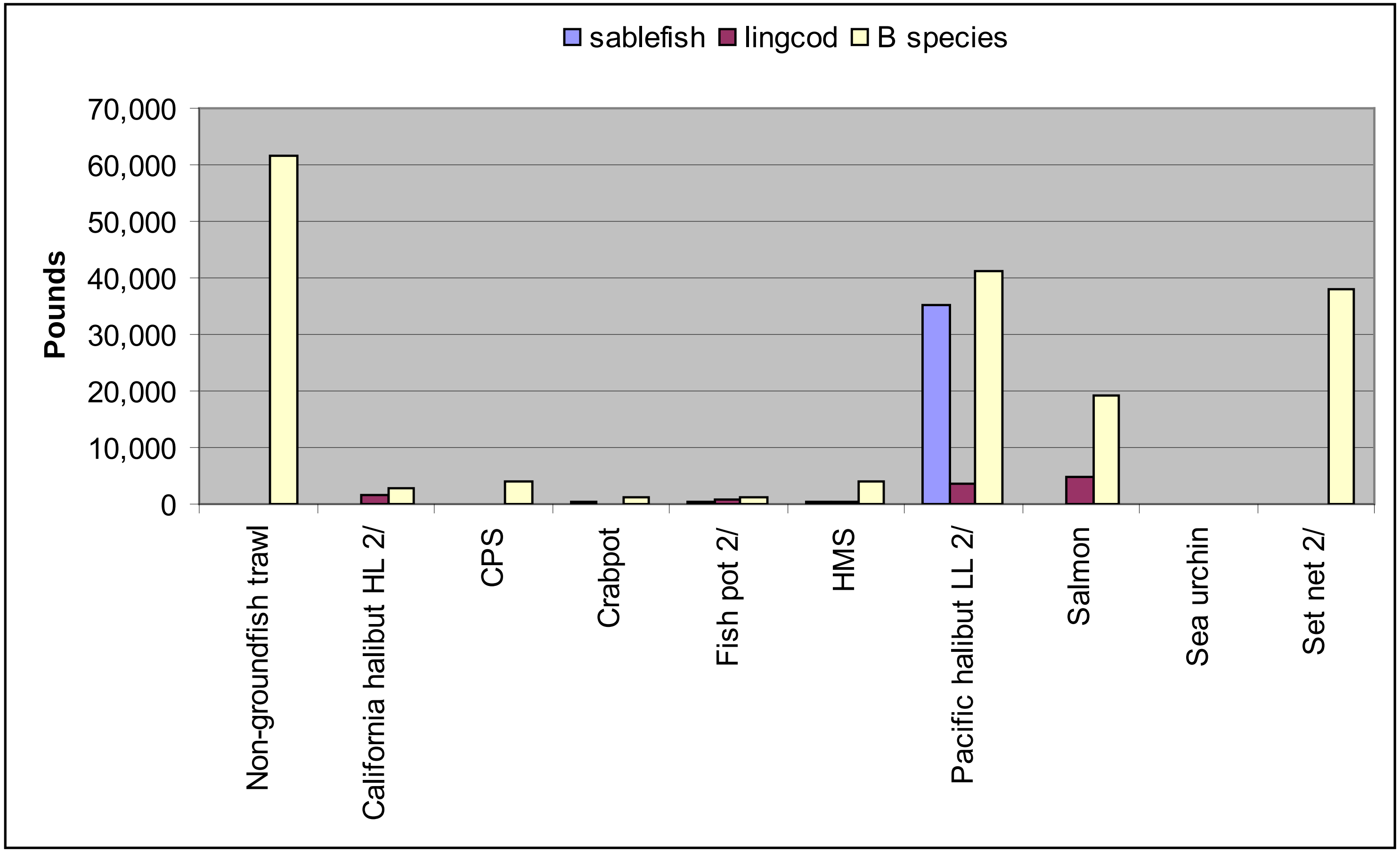


Figure 8. Sablefish, lingcod and B species average landings data for vessels making incidental B species groundfish landings during 2004-2006 window period years by fishery type. Data include landings by vessels that would qualify for a B permit but did not meet the 50% revenue criterion or landed fish using non-open access gear.

For Your Information

A-6 has the potential to create the third largest limited entry program on the West Coast (800 vessels) behind salmon (~2700) and Dungeness crab (~1300)

Questions about Appendix I?

Other Additions to EA

Cumulative Impacts
(Section 4.7)

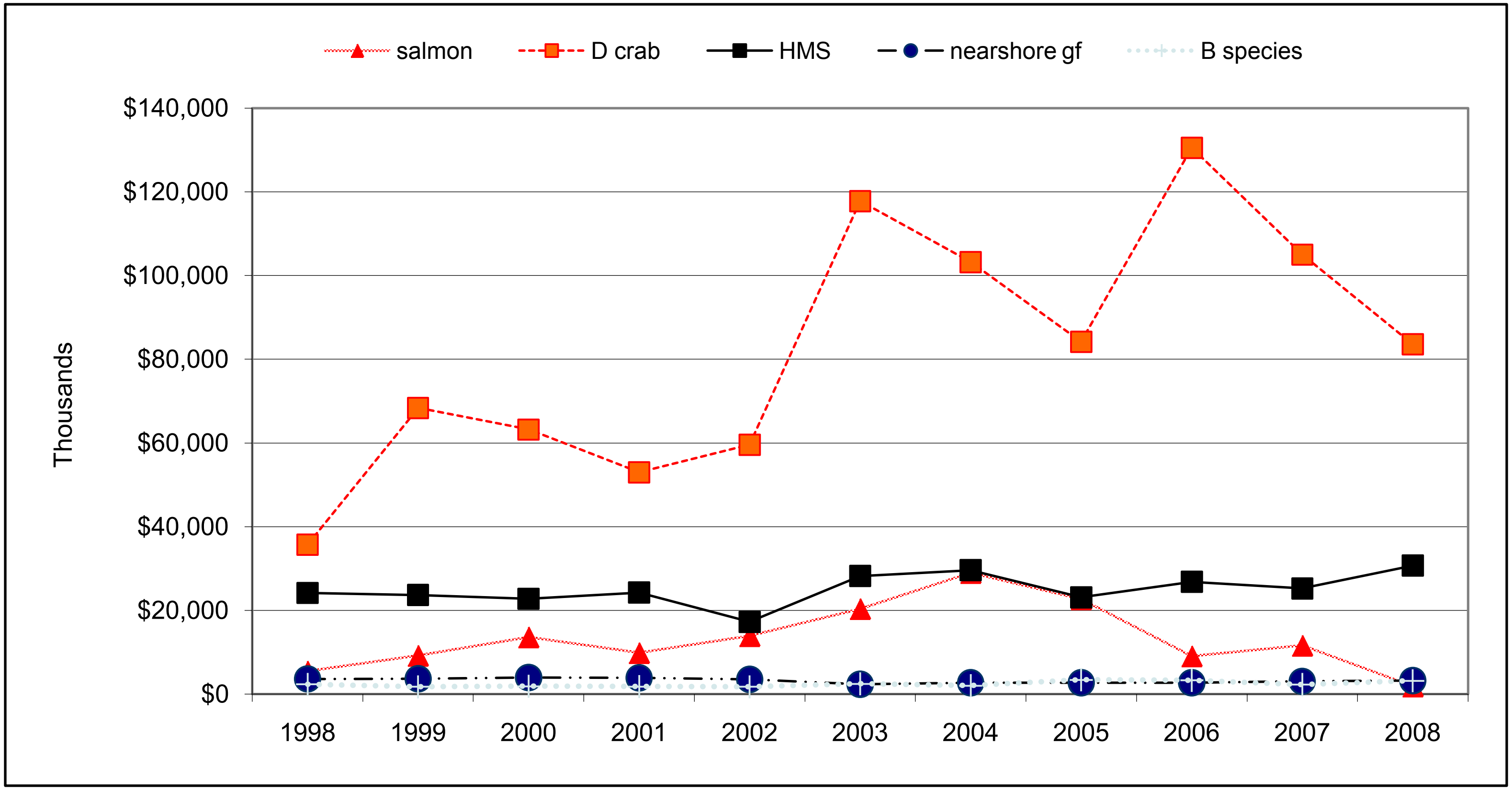


Figure 4-6 WOC fisherman revenues for species of major importance to B species directed fishery vessels, 1998-2008.

Post Window Period Data

(New data; see Supplemental Report)

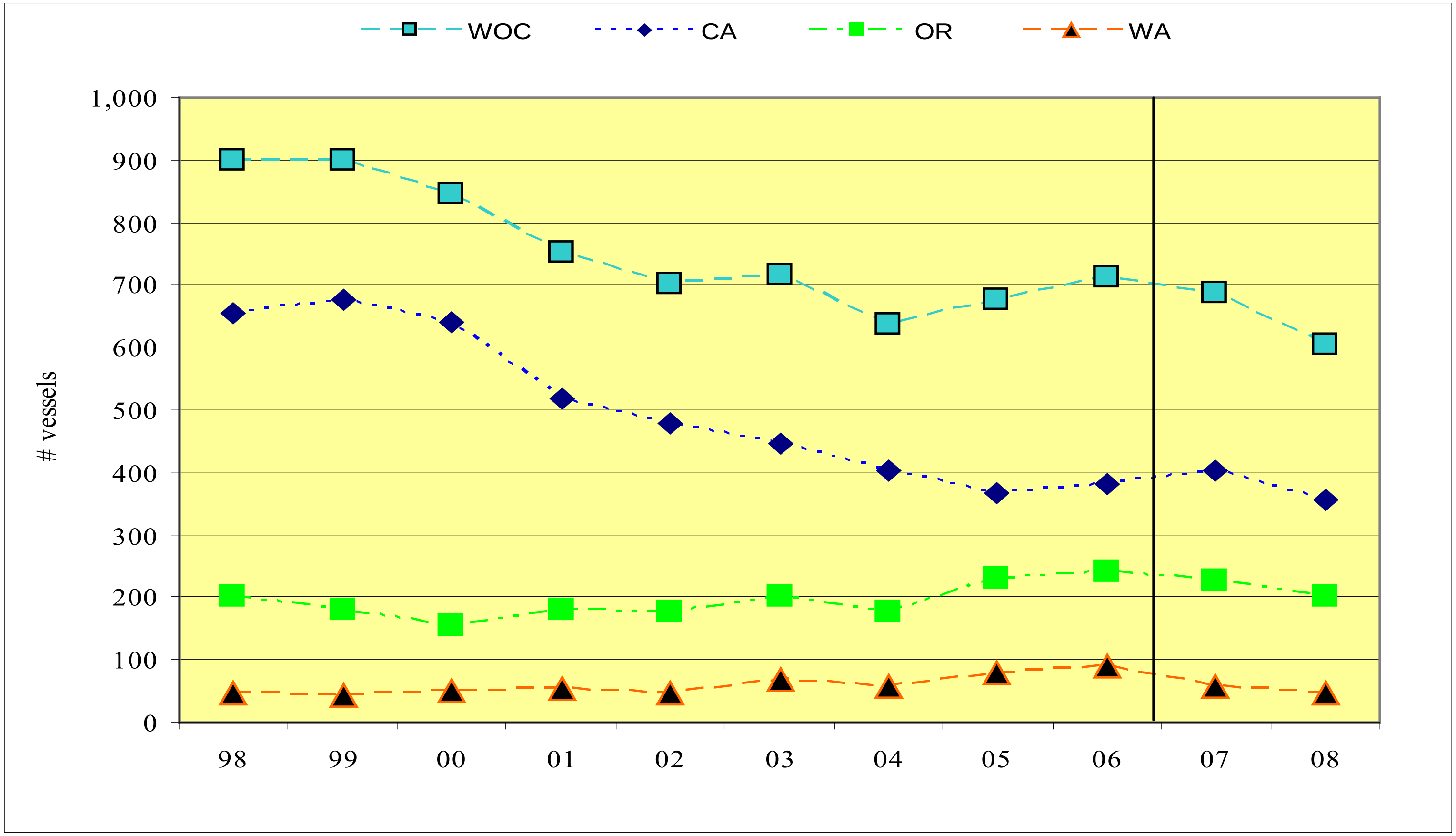


Figure S-1. Number of open access fishery directed fishery vessels by state, in total and year, April 1998-2008. The 2006 count is higher by 14 vessels than previously reported because of new post window period fishery entrants.

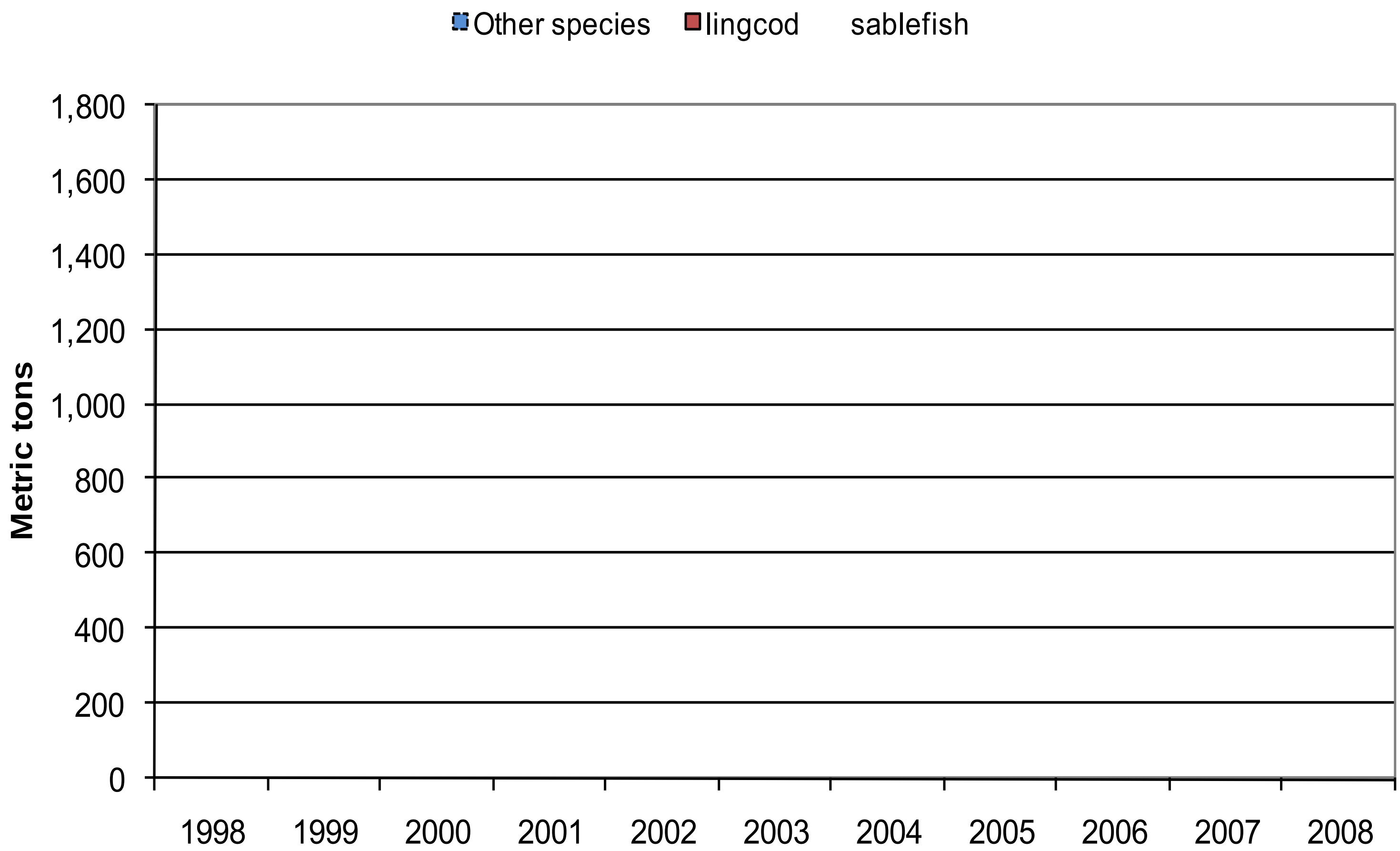


Figure S-2. Annual WOC directed open access directed fishery tonnage landed of sablefish, lingcod and other species.

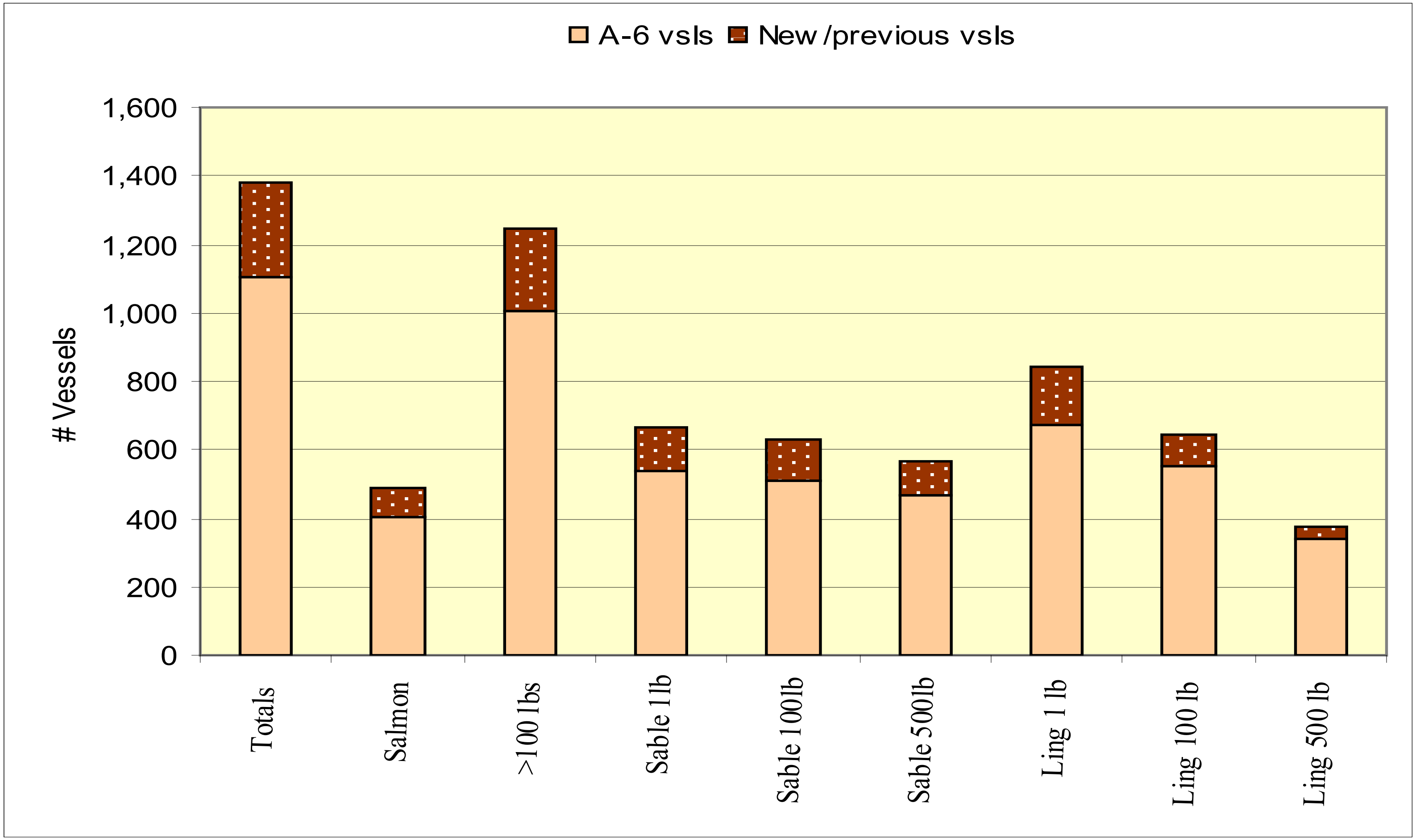
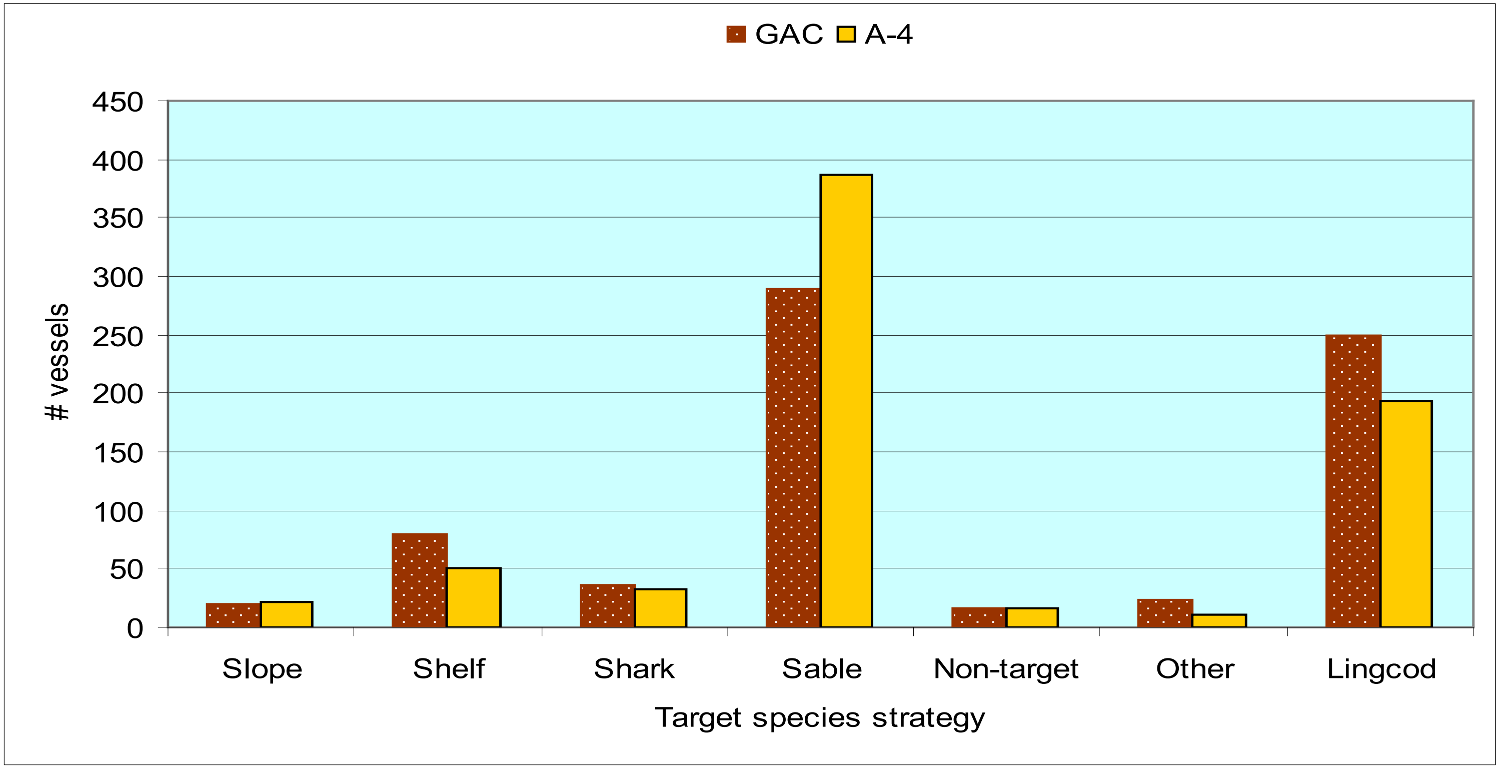


Figure S-3. Numbers of new and previous directed fishery vessels that would qualify for a B permit and species endorsement under A-6 qualification criteria

GAC Request Analysis
(Attachment 2)



GAC Figure 1: Number of vessels that would qualify for B permits under the GAC request (consider target species strategy) and A-4 (total lbs approach) by vessel target species strategy. Fleet size goal=713 vessels.

Notification Flyer
(Attachment 1)

- A notification flyer was completed in late-December 2008.
- The states provided mailing lists to Council staff.
- Over 6 thousand flyers were mailed out in early January 2009.
- About 70 phone calls were received through early March 2009; callers were urged to write the Council describing their situation.
- About half the calls were related to the license limitation issue, the remainder to other fishery issues (VMS in particular).

Possible Implementation Timeline
(Attachment 4)

Council adopts final action	**March 2009**
NMFS develops permit issuance requirements	**April-May 31, 2009**
NMFS drafts proposed regulations and prepares proposed rule package	**April-July 31, 2009**
NMFS publishes proposed rule	**September 1, 2009**
30-Day comment period on proposed rule ends	**September 30, 2009**
Final rule/compliance guide published	**November 30, 2009**
Application period/public outreach	**January - June 30, 2010**
Deadline for B permit application	**June 30, 2010**
NMFS issues C permits	**Continuous starting in late 2010**
B and C permits required	**January 1, 2011**

Note: The current plan is that NMFS would provide applicants 45 days to make an appeal after a NMFS decision to disapprove a B permit application. NMFS would have 90 days to review an appeal and issue the final agency decision. NMFS anticipates that initial decisions on B permit applications will be issued both during the application period and after the application period (if applications are received near or on the application deadline date).

Council Action
(after public comment)

1. Take final action.

- Consider cumulative impact, GAC Request, and post window period data. Then decide on the following.

- Confirm/modify B permit qualification criterion contained in A-6 (≥100 lbs-3).
- Confirm (1) alternate use of A and B permits, and (2) B permit transferability after first program year.
- Decide on species endorsement(s): sablefish- none, ≥1 lb, ≥100 lbs or ≥500 lbs; lingcod-none, ≥1 lb, ≥100 lbs or ≥500 lbs.

- Some B permit alternatives (suggestions):

  - Allow for species endorsement severability from B permit (see NMFS report).

  - Specify exceptions for permit issuance to replacement vessels (e.g., lost vessel) or delayed permit application for heirs of recently deceased vessel owners. Other exceptions? Request NMFS to develop these?

- Confirm need for C permit program.

2. Discuss Implementation Schedule

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Relative Dependence of Low and High Production Vessels on B Species Groundfish

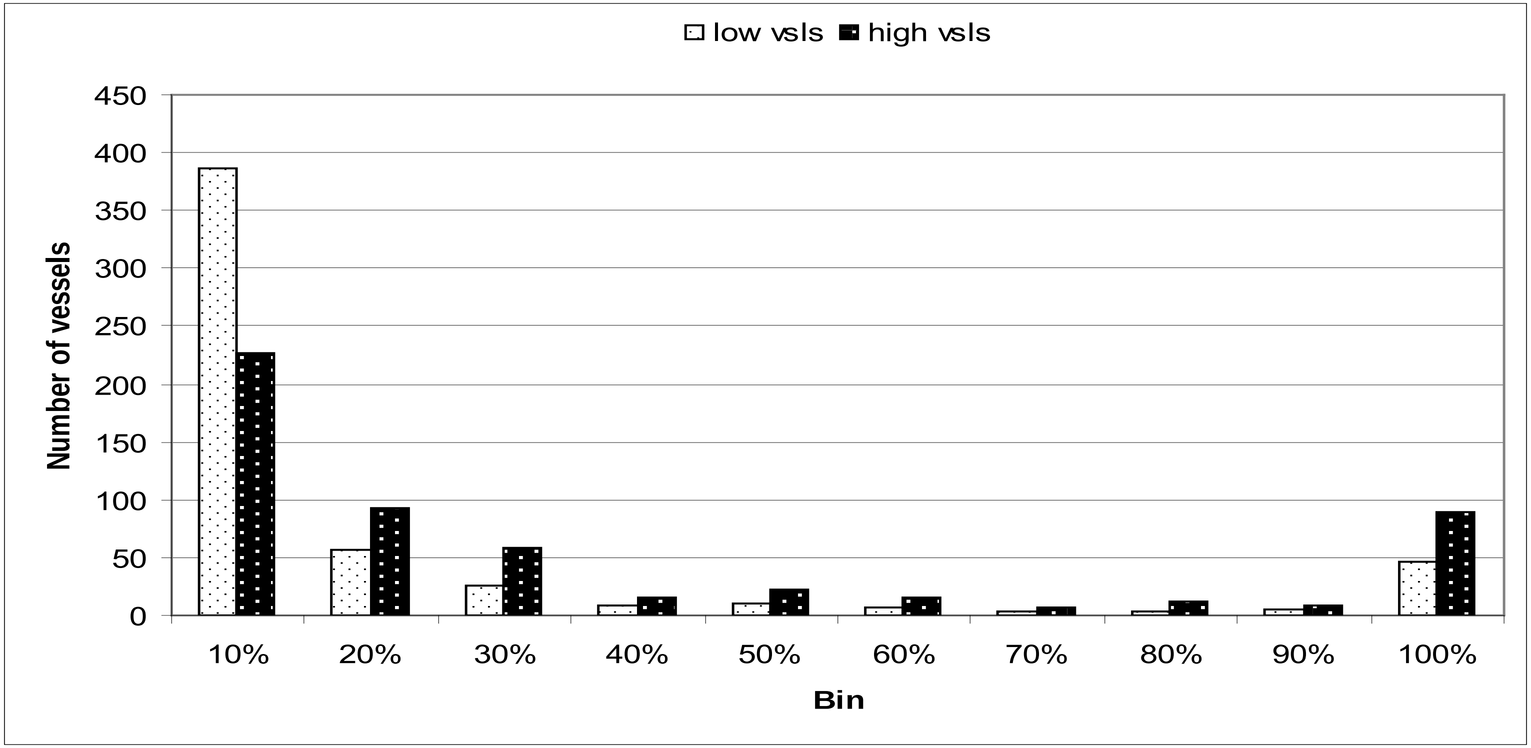

Figure 3-6b B species revenue frequencies expressed as a proportion of total commercial fishery revenues for B species directed fishery vessels during 2004-2006 window period years. Data are partitioned into "low" and "high" B species revenue groups. Revenue groups are separated at the median B species revenue value of $1,830; revenue frequencies are combined based on 10 percentage point bins.

Possible Regulatory Framework for B permit Vessels (i.e., status quo framework, information only)

Table 3-1a. Generalized description of Table 5 to Part 660, subpart G: Trip limits for open access gears dated January 1, 2009 (north and south of 40°10' N. Lat) 1/

Management issue	General regulations
Rockfish Conservation Areas (RCAs)	Boundaries vary by area, time of yr, depth, and gear type used
Minor slope rockfish & darkblotched rockfish	<25% of sablefish landed except for Conception area
Sablefish	Daily/weekly/ 2-mo landing limits apply
Thornyheads	Closed except for Conception area
Flatfishes	300 lb/ mo except for Pac sanddab
Whiting	300 lbs/ mo
Shelf rockfish (minor and specified exceptions)	≤1000 lbs/ mo depending on time and area
Canary and yelloweye rockfish, cowcod (south)	No retention
Bocaccio (south)	≤200 lbs/ 2-mo depending on area and time of year
Minor nearshore rockfish and Black rockfish	Variable between species and areas
Lingcod	400 lbs/ mo (May-Nov only)
Pacific cod	1000 lbs/ 2-mo
Spiny dogfish	100K-200K/ 2-mo
Other fish	Not limited
Non-groundfish trawl groundfish limits	
Pink shrimp	500-1500 lbs/ trip; lingcod, sablefish, and overfished species bans apply
CA halibut, prawn and cucumber	300 lbs/ trip; various other restrictions apply
Salmon troll-yellowtail rockfish (north, not subject RCAs)	1 lb/ 2 lbs salmon; 200 lbs/ mo

1/ Open access gear includes all gear types except (1) long-line or trap gear to which an A permit gear endorsement is attached and (2) groundfish trawl (72 FR 69162, December 7, 2007)

Possible Framework to Use in Developing C permit Regulations (no action needed at this time)

Table 4-4. Itemization of possible modifications needed to Table 5 to Part 660, subpart G-Trip limits for C permit vessels 1/

Rockfish Conservation Areas (RCAs)	Same as B permit vessels
Minor slope rockfish & darkblotched rockfish	NEED TO DETERMINE
Sablefish	NEED TO DETERMINE
Thornyheads	NEED TO DETERMINE
Flatfishes	NEED TO DETERMINE
Whiting	NEED TO DETERMINE
Shelf rockfish (minor and specified exceptions)	NEED TO DETERMINE
Canary and yelloweye rockfish, cowcod (south)	No retention
Bocaccio (south)	NEED TO DETERMINE
Minor nearshore rockfish and Black rockfish	NEED TO DETERMINE
Lingcod	NEED TO DETERMINE
Pacific cod	NEED TO DETERMINE
Spiny dogfish	NEED TO DETERMINE
Other fish	NEED TO DETERMINE
Non-groundfish trawl groundfish limits	
Pink shrimp	Same as B permit vessels
CA halibut, prawn and cucumber	Same as B permit vessels
Salmon troll-yellowtail rockfish (north, not subject RCAs)	Same as B permit vessels

1/ See table 3-1a for generalized description of current open access fishery regulatory tables.

Proposed Open Access Fishery Discussion Items (after public comment)

- Confirm B permit qualification criterion contained in A-6 (100 lbs-3) for March 2009 meeting.
- Confirm (1) alternate use of A and B permits, and (2) B permit transferability after first program year.
- Decide on species endorsement(s) as follow: sablefish- none, >1 lb, >100 lbs or >500 lbs; lingcod-none, >1lb, >100 lbs or >500 lbs
- Some B and C permit usage alternatives (suggestions):
  - Do NOT require B permit and/or nearshore vessels to obtain C permits when fishing for and possessing non-groundfish species (i.e., exempt B permit and nearshore vessels from C permit requirement).
  - Allow for species endorsement transfer to other B permit vessels separate from the original B permit.
  - Specify any exceptions for permit issuance to replacement vessels (e.g., lost vessels) or delayed permit application for heirs of recently deceased vessel owners. Other exceptions? Allow NMFS to develop these?
  - The GMT will likely have other issues for discussion.

September 2008 Council Action

- Mr. Steve Williams moved and Ms. Culver seconded a motion (Motion 18) to adopt the following as a preliminary preferred alternative for limiting the directed groundfish open access fishery:
- Alternative A-4, as specified in the Preliminary Draft Environmental Assessment for Amendment 22 (Agenda Item I.4.a, Attachment 1) with *a* ***minimum landing criteria of 100 pounds.***
- ***Qualifying Framework QF-3 (1998-2006, with one trip in 2004-2006).***
- No long-term fleet size goal.
- Allow for permit transferability after the first year of the program.
- Allow for use of A and B permits on the same vessel in the same year using a declaration process.
- No state landing (or vessel length) endorsement provision.
- No previous year B species landing requirement to renew or transfer permit.
- ***Separate species endorsements for sablefish and lingcod*** for vessels that qualify for a B permit; using the following qualifying criteria for analysis: ***one pound, 100 pounds, and 500 pounds in any one year used in the analysis from 1998-2006 (window period).*** All other B species will be managed under a general B permit.
- *Council Guidance*: ***Notify all commercial fishery permit/license holders who landed any groundfish since 2004 in Washington, Oregon, and California that the PFMC proposed action may limit their opportunities in groundfish open access*****.** This is to ensure notification of those affected by both the “B” and “C” permit alternatives. Include easily understood documents that clearly display the preliminary preferred alternative, that there are other alternatives for consideration, and where they can obtain more detailed information. Include a detailed description of what is allowed under the “C” permit (i.e., allow for B species incidental catch while participating in another directed fishery), and how one is obtained. Provide notice of public comment opportunities in early January.
- Mr. Lockhart said the motion slightly changes the direction of the EA, hence we may need to amend or ***revise the Purpose and Need statement***.

Sablefish Endorsements by Port Group and State

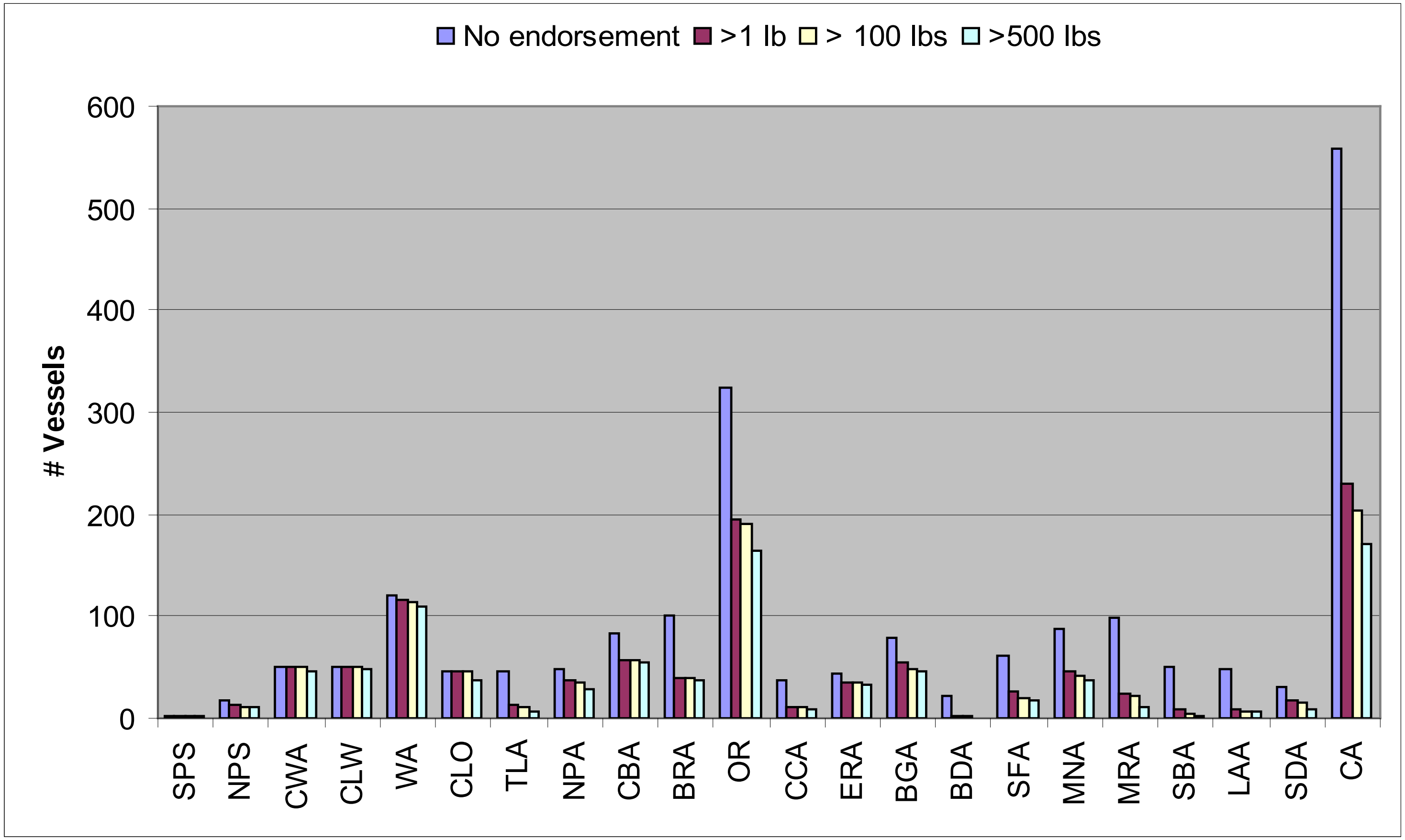

Figure 4. Number of sablefish endorsements by port group and state

Lingcod Endorsements by Port Group and State

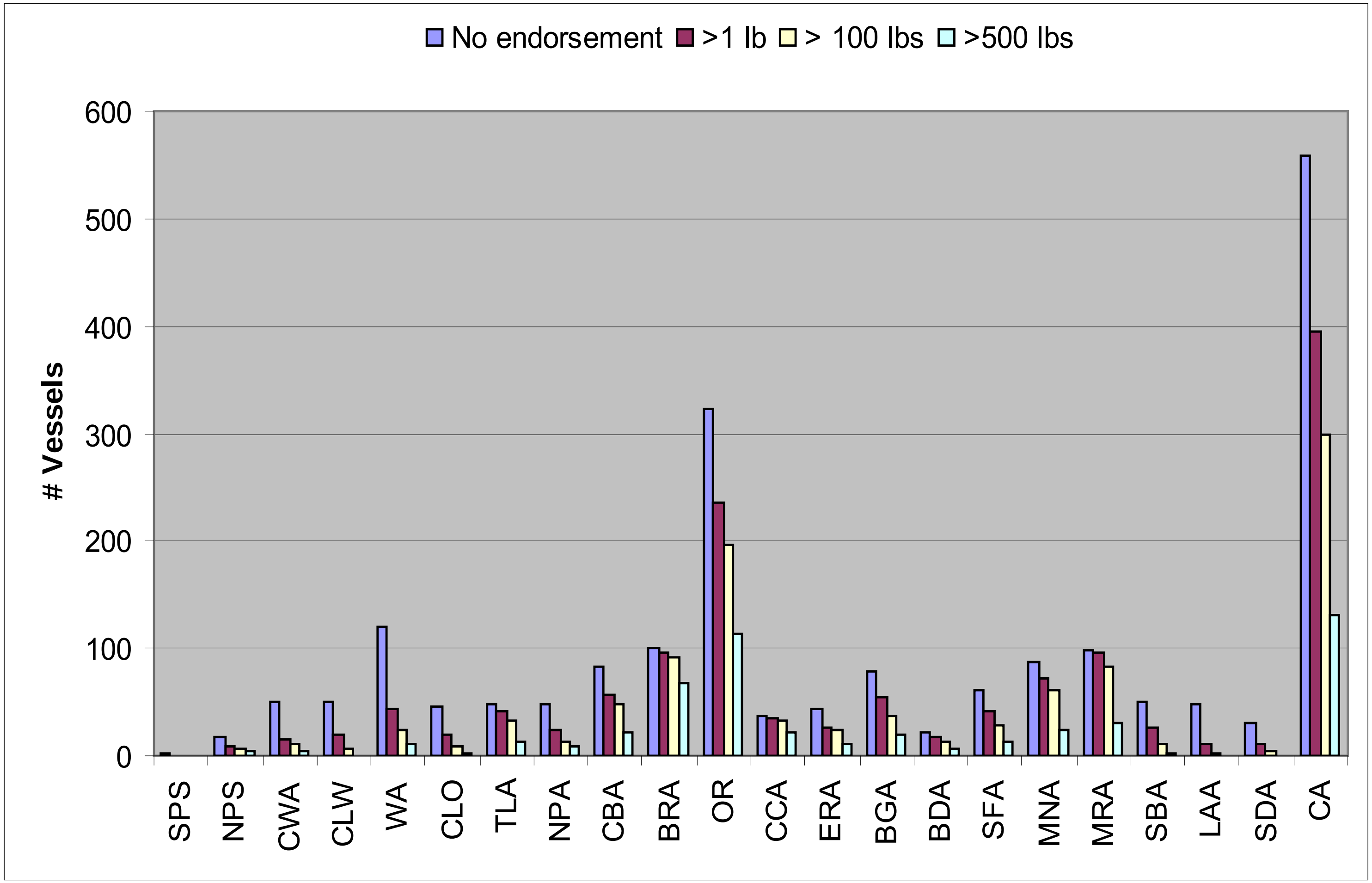

Figure 5. Number of lingcod endorsements by port group and state

Purpose and Need Statement
(as amended by staff and GAC)

The proposed action is needed because:

1. The number of vessels fishing for federal groundfish species needs to be limited to ensure that capacity and/or effort is maintained consistent with resource availability. **Allowing unlimited open access to continue creates problems for tracking and monitoring the fishery and creates the potential for expansion of additional target fisheries. Closing the open access nature of the groundfish fishery and preventing additional entrants is an important step in managing fishery capacity.**
2. The directed open access fishery has diverse community impacts, which may require additional protective measures for some species or fisheries in order to maintain future fishery viabilities (e.g., sablefish and lingcod) and to allow for possible fishery expansion or redirection of effort in the event of improved species abundance and/or protective status (e.g., some shelf rockfish species).
3. Restrictive landing limits have been necessary for some groundfish species because of high fishing capacity. Low landing limits reduce the economic potential of the fishery to local communities, and can exacerbate fishery discards due to trip limit overages and species high grading. Limiting capacity or capacity reduction has the potential to increase fishery profits.
4. Registration of all fishery vessels is important to meeting fishery management goals to facilitate projecting fishery catches and discards and efficiently allocating sampling resources to collect fishery biological and economic data among ports.
5. The Pacific Coast states have management programs for their nearshore groundfish fisheries, which has likely pushed unlicensed vessels into federal waters, increasing fishing pressure there.
6. Salmon fishing restrictions have likely resulted in effort shifts by salmon vessels to directed open access groundfish fisheries, which puts added pressure on overfished groundfish stocks and reduces economic viability of affected groundfish fisheries.
7. Management measures to protect overfished groundfish species have, in recent years, included large area closures and reduced harvest limits. Enforceability of these and other management measures would be improved by managers and enforcement officials being able to identify which vessels are permitted to participate in the groundfish fisheries. It would also facilitate dissemination of fishery information including fishery regulations

Other Additions to Preliminary Draft Environmental Assessment

(The points in the following slides are important for GAC discussion and concurrence)

- Table 2-1a (modified) major new points:
- B permits apply to the directed taking of federal groundfish allocated to the open access fishery not including nearshore species or endorsed species by non-endorsed vessels. However, a small amount of incidental catch of endorsed species may be allowed for B permit non-endorsed vessels.
- (1) C permits will be required of all vessels (including B permit and nearshore permitted vessels, but not A permit vessels) to take "small" amounts of B species groundfish, possibly including B species endorsed species when (1) fishing with non-open access gear (e.g. salmon troll, non-groundfish trawl) or (2) when participating in non-groundfish fisheries using open access gear (e.g., Pacific halibut longline, California halibut hook and line, setnet to take California-managed species). 1/ Or
- (2) C permits will be required of all vessels that are NOT registered to an A or B permit or a state-issued nearshore permit to take "small" amounts of B species groundfish when fishing for non-groundfish species. 1/
- Vessel trip limits will be used to <u>prevent</u> directed fishing by (1) C permit vessels for B species groundfish and (2) non-endorsed B permit vessels for endorsed species.

1/ It is expected that additional or modified regulatory tables will be required for each management area (north and south of Cape Mendocino) because of the need for separate regulations for (1) B and C permit (including nearshore) vessels, and (2) vessels with and without species endorsements.

•Table 2-1b (new) major points:

•Government documents must be provided to show proof of current ownership (and that the vessel still exists).

•Only current owners may apply for permits, and permits will be registered to qualifying vessels (not to replacement vessels).

•Permits must be renewed annually by November 30. Expired permits will not be renewed.

•Permits are only valid for vessels with current state-issued commercial fishing vessel registrations (permits will not be valid on vessels with an expired vessel registration).

•Permit transfer requests will be accepted during October-December of the first program year and each year thereafter (no permit transfers allowed in the first year). Species endorsements may not be separated from their original B permits (thus are transferred when the B permits are transferred).

•NMFS may adopt exceptions to these conditions (e.g., lost vessel replacement, death of vessel owner, sale of permitted vessels) FURTHER DISCUSSION MAY BE NEEDED ON EXCEPTIONS

Table 2-1c (new) major points:

- **The NMFS will make a reasonable effort to contact current owners of vessels that are expected to potentially need a C permit based on the PacFin data base.**

- **C permits will be issued year round to owners of state-registered commercial vessels either for the current year or the following year.**

- **C permits will NOT be transferable between vessels.**

GROUNDFISH ADVISORY SUBPANEL REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 22 – OPEN ACCESS LICENSE LIMITATION

The Groundfish Advisory Subpanel (GAP) received a presentation from Mr. LB Boydstun regarding open access license limitation. Deliberations then took place regarding the various issues using all of the available Council documentation.

The GAP chose the preferred alternative A-6 as its choice for the final preferred alternative with the following criteria:

1. Qualifying criteria for sablefish and lingcod endorsements to be set at ≥100 lbs each.

The 100 lb qualifier was selected due to the fact that it would include most of the vessels currently in the fishery. The 500 lb limit would offer very little reduction in vessel numbers beyond the 100 lb limit. After deliberating the control date, the GAP settled on the preferred option decided by the Council. Much discussion was centered on the pros and cons of linking the lingcod and sablefish endorsement to the "B" permit. The GAP recommends keeping the lingcod and sablefish endorsements linked to the "B" permit.

The GAP discussed other issues involving this agenda item and wishes to add the following comments:

C Permit
The GAP supports the GAC recommendation to eliminate the "C" permit. It is believed that the "C" permit will add unnecessary complexity resulting in little gain.

Vessel ownership exchange after the control date
The GAP discussed the problem of qualifying criteria for permits based on vessel catch history rather than the catch history of individual fishermen. Many vessels with catch history during the qualifying window were bought and sold after the control date. The catch history remaining with the vessel presents a problem for those fishermen who originally qualified for a permit with their catch history and then sold their vessel after the control date, thereby losing their catch history associated with that vessel. The GAP urges the Council to address this issue by allowing fishermen with personal catch history prior to the control date and who sold their vessels after the control date to have the opportunity to qualify for a limited entry "B" permit. Further, those fishermen who bought a vessel after the control date who had no personal catch history prior to the control date should not qualify for a permit based solely on vessel catch history. The GAP acknowledges that fleet size may increase if personal catch history and vessel catch history are used in qualifying for a permit and therefore requests further analysis of this issue before qualifying criteria are decided.

Appeals process for license holders

The GAP requests NMFS set up an appeals process for the benefit of license holders and potential applicants so that some of the above and other issues can be resolved. An example might be the use of an outside legal agreement to transfer catch history to another vessel.

The GAP urges the Council to move this item forward in a timely manner so that the fishery can achieve stability sooner by avoiding a lengthy process.

PFMC
03/11/09

GROUNDFISH MANAGEMENT TEAM REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 22 – OPEN ACCESS LICENSE LIMITATION

The Groundfish Management Team (GMT) discussed updates to the "Preliminary Draft Environmental Assessment (EA) for Pacific Coast Fishery Management Plan Amendment 22: Conversion of the Open Access Fishery to Federal Permit Management" and provides the following comments.

The GMT spent its time for discussion and report writing at this meeting discussing, generally, how the Groundfish Allocation Committee's (GAC) refinement of the Council's September 2008 preliminary preferred alternative (GAC refinement of the preliminary preferred alternative [PPA]) might impact inseason management of the fishery. We did not have time to explicitly address the other alternatives being considered by the Council.

As a reminder, the Groundfish Allocation Committee (GAC) refinement of the PPA would create four types of permits (Table 1).

Table 1. Numbers of vessels that would qualify for single, dual, or no species endorsements by state, and overall under A-6 with≥500 lb sablefish and ≥100 lb lingcod qualification criteria. Note: Counts in this table are off 9 vessels from those in Appendix I, Table 2 of the EA. This was a data sort issue that will be corrected in the final EA

State	Sable Only	Only Ling	Dual	None	Totals
WA	93	3	18	7	121
OR	107	131	69	17	324
CA	106	257	71	124	558
Total	***306***	***391***	***158***	***148***	***1003***

We approached this discussion by asking how we would respond if the Council requested that the GMT recommend trip limits for the four new permit types through inseason action at this meeting. From this frame of reference, we then discussed how management might change over the long-term.

Sablefish Endorsed B-Permits

For sablefish endorsed permits, we envisioned recommending to the Council that they begin with status quo trip limits. The program would create 464 sablefish endorsements, which is considerably more than the 212-345 vessels that landed open access sablefish between 2004-2008.[1] Although, there is some worry that all 464 permits would be fished this year; under status quo, there is no cap on vessel participation. The trip limits would be expected to provide the same economic incentive to fish as they do now. This led us to believe that effort patterns would

[1] *See* Table 2-5 of Agenda Item G.5.b, Supplemental EA Writing Team Report.

not deviate substantially from what we see now. At the same time, many on the GMT saw the potential for fleet behavior to change under a permit system, meaning that vessels might respond differently to trip limits. Per standard practice, we would closely monitor catches in the fishery and recommend adjustments to trip limits at the June or September meetings if necessary. In addition, having a Federal permit number associated with the landings would likely aid our ability to track open access landings. As seen in 2008, there have been some difficulties in the past identifying open access landings through the quota species management (QSM) system.

Over the long-run, with the number of permits capped, the GMT could potentially improve modeling of the fishery. We would need more data on catch and effort patterns and how they respond to adjustments in the trip limits in order to do so. However, initial look at the model suggests that the fleet size would need to be reduced below 225 before the concerns about effort surges disappear. At this fleet size, the GMT might be comfortable recommending removing the daily limit, and possibly even the weekly limit. Removing these limits would increase harvesting efficiencies.

Lingcod Endorsed B-Permits

The GMT also envisioned recommending status quo trip limits for lingcod. The GMT does not currently model lingcod trip limits, although lingcod catches are taken into account in our overfished species impact models (see below). We track catches each year through the Total Mortality Report. Lingcod trip limits have been stable in recent years and are largely constrained by overfished species management. Recent catches have remained under the optimum yield. Lingcod is an important stock in the Oregon and California nearshore fisheries.

Over the long run, if catches of lingcod increased above current levels, the GMT would need to build a trip limit model tied to the endorsed B-permits.

Dual Endorsed Permits

The GMT could not identify reasons why dual endorsed permits would need special trip limits.

Non-Endorsed B-Permits

As shown in Table 1, the GAC's refinement of the PPA would create 148 non-endorsed B-permits, with 124 of those being issued to vessels in California. For non-endorsed permits, the GMT would not recommend new trip limits at this time. The permits would fish under current trip limits for everything sablefish and lingcod. This potentially raises the need to create additional incidental allowances for lingcod and sablefish. For example, the non-endorsed B-permits might require an incidental allowance of lingcod to accommodate bycatch while fishing for shelf rockfish. It might be as simple as decreasing the current open access limits, or the GMT could look to available data sources such as landings composition from fish tickets, logbooks, and observer data.

Modeling of Overfished Species Impacts

All of our current open access overfished species impact models are catch-based models. In other words, even with a proposed B-permit program estimates of overfished species bycatch would remain unchanged unless the open access catch increased.

The C-permit

The GMT concurs with the GAC recommendation to not include C-permits in the program.

The Council may still need to consider incidental allowances for permit holders in other fisheries (e.g., state nearshore fisheries) that do not qualify for a B-permit.

Transferability

The GMT's discussion also focused on the transferability of the B-permits. In general, transferability raises the basic question of whether the buyer of a B-permit will fish the same target strategy, in the same intensity, and in the same location as the seller. If on the whole, buyers tend to differ from sellers, there will be shifts in patterns of fishing effort and catch. As previously noted in the GMT's March 2008 report there could be significant, unintended socioeconomic impacts consequences to the shift in permits (Agenda Item F.4.b, Supplemental GMT Report).[2]

These shifts could have socioeconomic impacts and could create some instability in the GMT's ability to model trip limits in the short-term. Over the long-term, as more information on catch and effort patterns becomes available, changes due to transferability would be incorporated into the GMT's trip limits model, just as with the limited entry A permits.

The GMT also discussed the general pros and cons of transferability of permit ownership (as distinguished from transfer of a permit to a different vessel without changing owners). The major benefits of transferability in this fishery would be to facilitate entry and exit into the fishery. Allowing transferability of permits will not facilitate fleet attrition. Once permits become tradable and have an associated value they will be traded or sold, resulting in extremely low rates of attrition. Many of the transferable permits could ultimately exist in perpetuity. With a non-transferable permit, there would be attrition as permit holders chose to not renew their permits. There was also some discussion that certain B-permits might take on a high value, which could make new entry difficult.

PFMC
03/12/09

[2] Agenda Item F.4.b, Supplemental GMT Report (March 2008).

February 23, 2009

TO: Frank Lockhart, Assistant Regional Administrator, NMFS, Sustainable Fisheries Division

FROM: Kevin Ford, Team Leader, Fisheries Permit Office

SUBJECT: Pros/Cons of Severable Species Endorsement from "B" Groundfish Permits

I understand that certain members of the GAC requested that NMFS provide pros and cons of implementing a program that allows for species endorsements (sablefish and lingcod) that are severable from a "B" Groundfish permit. Below are some of the pros and cons of severable species endorsements. Also, attached is a list of the many combinations of A and B permit ownership one person or entity might have. Generally, the tradeoff before us is between flexibility for B permit owners with endorsements and administrative burden and additional cost for NMFS.

PROS

1) Allows an endorsement owner to sell or temporarily convey the endorsement to another individual and retain his/her B permit.

2) Allows an individual who qualified for a B permit but did not qualify for a species endorsement to potentially obtain an endorsement on a permanent or temporary basis. In this situation, the B permit owner need only obtain the endorsement and does not have to obtain both a B permit (which is redundant) and the assigned endorsement.

3) Similarly, allows for a B permit owner who may have one species endorsement to obtain the other species endorsement (Mr. A qualifies for a B permit with a sablefish endorsement and he can obtain the lingcod endorsement later) without having to obtain another person's B permit with the desired endorsement.

CONS

1) **Increased Workload**: Preliminary Preferred Alternative (PPA) provides that up to 1000 B permits could be issued to vessel owners with approximately 400 B permits having a sablefish endorsement and about 200 permits having a lingcod endorsement. The number of B permits alone is more than twice the number of the existing A permits. The number of transfers of A permits is about 100-150 per year. Annual renewals and transfers of the B permits will add a significant workload for NMFS. In addition to the B permit actions, the potential number of transfers involving individual species endorsements could be significant as well. Even if a one transfer rule is applied to both the permit and endorsements, the potential transfer activity is great.

One concern is a number of the B permit owners have historically been marginal or occasional participants in the fishery. As such, these individuals would be more likely to lease the permit and/or endorsement out more frequently than those who participate in the fishery on a more consistent basis.

2) **Separate Transfer Rules for Endorsements**: If you allow for severability of the endorsement from the permit, NMFS will need to develop separate rules and processes to effectively assign, track and monitor the endorsements. Here is a list of some of the additional requirements NMFS will need to undertake if endorsements are severable from the permit:
    a. NMFS will need to assign a unique ID to the endorsement to allow the agency to track its current status.
    b. NMFS will need to assign a status code to the endorsement.
    c. NMFS will need to assign an effective dates to the endorsement
    d. NMFS will need to associate an "owner" with the endorsement for specific dates. NMFS may need to obtain address/contact information for an endorsement owner. NMFS will need to be able to produce an endorsement history
    e. NMFS will need to associate an endorsement to a permit which may change over time.
    f. NMFS will need to prepare either a B permit transfer form that includes a means to request an endorsement transfer or provide a separate endorsement transfer form.

    These additional rules will add complexity for NMFS staff and the public, and potentially add confusion for permit/endorsement owners. Our experience with the A Permit program is that individuals who are part time participants either do not read the rules and/or do not understand the rules. These individuals can consume a large amount of staff time when it comes to performing a transaction involving their permit. The potential for confusion and need to educate participants is large for the B permit program given that many have minimal landings in the fishery over the years.

    A couple of key questions in defining the rules are: Can an individual that does not own a B permit own a species endorsement? Does a species endorsement have to be assigned to a B permit at all times? What is the definition of a transfer of endorsement? Can a species endorsement be transferred multiple times? If a species endorsement is transferred, when is it effective? How can NMFS deal with an endorsement that a holder attempts to convey to someone who does not own a B permit [example: Mr. Jones owns a B permit and sablefish endorsement. Mr. Jones dies and in his will leaves the B permit to his son and leaves the endorsement to his daughter]. Barring direction otherwise, should NMFS renew a permit that has someone else's endorsement (presuming the lease arrangement is staying the same) or should NMFS automatically remove all endorsements that are not owned by the B permit for purposes of renewal?

3) **Permit and Endorsement Relationship**: My understanding is that in order to fish sablefish in a B groundfish fishery, a vessel must be registered to a valid B permit with an appropriate endorsement to fish for either sablefish or lingcod. The proposed severability of the endorsement from the B permit breaks apart a basic relationship between permit and endorsement, which are required to fish for either sablefish or lingcod. We anticipate that there may be possible confusion where some individuals may feel that the endorsement is a stand-alone fishing privilege. Also, because the endorsement conveys a trip limit, one may be able to fish B species during a cumulative limit period but the acquisition of an endorsement may not be effective until the next cumulative limit period. Another possible confusion is some may think that severability allows for "stacking" of endorsements. Of course, this will not be allowed. I note that we have had several individuals attempt to stack fixed gear, non sablefish permits in the A program to a single vessel.

4) **Cost:** The additional activities associated with transfers will increase costs to NMFS and potentially the endorsement owner. NOAA policy requires that the agency charge for administrative services associated with a product (i.e. map) or privilege (permit/endorsement). We anticipate charging an annual renewal fee (currently $125 for the A permit) for the B permit. NMFS must recalculate the costs on annual basis. NMFS does not charge for an A permit transfer currently, but the authority to do so exists in regulation. NMFS may consider charging a fee for all transfers in the future, which in itself generates additional work. A fee might serve as a mechanism to reduce the number of transfers. Any fee collected will be deposited to U.S. Treasury as the Magnuson-Stevens Act does not provide for such monies to be returned to NMFS to offset labor/mailing costs associated with renewal or transfer activities. So the additional workload and costs associated with the B permit and endorsements will be carried out with existing resources.

5) **Consistency with A permits**: In the current A permit system, the existing endorsements are not severable. The size endorsements, gear endorsements, and sablefish endorsements are not severable from the permits. Structuring the B permit system in a fundamentally different way could add more confusion for the public and more work and cost for NMFS. In the A system, one reason for non-transferability was the attempt to prevent expansion of the fishery. If the B permit system is managed so differently from the A system the record would need to explain why this difference makes sense.

6) **Latent Effort**: The PPA would result in a fishery with significant permitted latent effort, because many permits would be issued to vessels with minor or sporadic participation. Allowing severability of the endorsement would make it easier for the latent effort to be deployed.

7) **Example of Other Potential Complexities of a Severable Endorsement:** As of January 1, Mr. Smith owns a B permit and in May he leases a sablefish endorsement from Mr. Jones which is assigned to his B permit. In July, Mr. Smith decides to sell his B Permit to Mr. Bishop. If NMFS assumes that endorsement is not part of the transfer and returns it to Mr. Jones, where is the endorsement reassigned to? If Mr. Jones has multiple B permits, he may want to redirect to one specific permit. If there is a one transfer limitation, Mr. Jones may not be able to reassign it to an existing permit that has a vessel registered to it.

Conclusion: The severability of endorsements may provide flexibility to permit/endorsement owners but it comes at a cost and adds significant complexity. Like the states, NMFS has a finite set of resources to give to permit activities. Given that the open access fishery has a value that is considerably less than the A limited entry fishery, it is hard to justify the use of a disproportionate amount of NMFS resources to manage the B permit program. Efforts to make the rules governing A and B fisheries more consistent will reduce the administrative burden and costs to NMFS, reduce costs to the permit/endorsement owners, and reduce possible confusion about the rules.

Open Access Permit Options

A permits	
1a	A permit trawl
2a	A permit fixed gear non sablefish
3a	A permit fixed gear with sablefish (can stack up to 3 tiers)

B Permits	
1b	B permit no endorsement
2b	B permit with sablefish only
3b	B permit with lingcod only
4b	B permit with lingcod and sablefish

A + B Options	
1a 1b	A permit trawl + B permit no endorsement
1a 2b	A permit trawl + B permit with sablefish only
1a 3b	A permit trawl + B permit with lingcod only
1a 4b	A permit trawl + B permit with lingcod and sablefish
2a 1b	A permit fixed gear non sablefish + B permit no endorsement
2a 2b	A permit fixed gear non sablefish +B permit with sablefish only
2a 3b	A permit fixed gear non sablefish + B permit with lingcod only
2a 4b	A permit fixed gear non sablefish + B permit with lingcod and sablefish
3a 1b	A permit fixed gear with sablefish (can stack up to 3 tiers) + B permit no endorsement
3a 2b	A permit fixed gear with sablefish (can stack up to 3 tiers) + B permit with sablefish only
3a 3b	A permit fixed gear with sablefish (can stack up to 3 tiers) + B permit with lingcod only
3a 4b	A permit fixed gear with sablefish (can stack up to 3 tiers) + B permit with lingcod and sablefish

*Did not break out each tier as a separate option but that is a possibility

OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 22 – OPEN ACESS LICENSE LIMITATION

The Oregon Department of Fish and Wildlife (ODFW) reviewed the Preliminary Draft Environmental Assessment (EA) for Pacific Coast Groundfish Fishery Management Plan Amendment 22: Conversion of the Open Access Fishery to Federal Permit Management and offers the following considerations. Additionally, public comment received regarding initial qualification criteria is summarized.

Appendix I of the EA analyzes the effect of implementing sablefish and/or lingcod endorsements on the proposed B permit for the open access fisheries. As shown in Tables I-3a and I-3b (page 240), under the qualification requirements contained in the preliminary preferred alternative (PPA), 1,003 vessels would qualify for the B permit; 324 of those vessels currently reside in Oregon. At its September 2008 meeting, the Council requested analysis to show the impacts of 1, 100, and 500 pound landings of lingcod and/or sablefish in any one year during the window period to qualify for those species endorsements. At the January 2009 Groundfish Allocation Committee (GAC) meeting, the Committee refined the Council's preliminary preferred option to include a 100-pound criteria to qualify for a lingcod endorsement and a 500 pound criteria to qualify for a sablefish endorsement. Under the various lingcod endorsement criteria, 134 to 236 Oregon vessels would be eligible for a lingcod endorsement. The absence of a lingcod endorsement could result in an additional 88 to 190 Oregon vessels targeting lingcod in the waters off Oregon. Since the permits and associated endorsements are coastwide, the potential increase of effort on lingcod is even greater when looking at the entire fleet.

Increased effort on lingcod relative to status quo will likely increase interaction and associated impacts on overfished species such as yelloweye rockfish as well as minor nearshore rockfish, stocks that are not currently assessed. Further, this increased effort on lingcod in nearshore waters would result in negative impacts to the Oregon state permitted fishery. The state nearshore fishery permits 126 vessels to target and land black and blue rockfish. Of those 126 vessels, 70 are further endorsed to land target amounts of 21 nearshore species (e.g., other nearshore rockfish, cabezon, and greenling); the remaining vessels may land incidental amounts (15 pounds per day) of nearshore species. Vessels without state black/blue permits are allowed to land up to 15 pounds per day of nearshore species and black rockfish and blue rockfish combined; fish in excess of this incidental limit have to be discarded. This fishery is subject to precautionary state landing limits (i.e., more restrictive than those adopted federally) since the stock status of many of the nearshore species is unknown. Increased targeting of lingcod at the levels detailed above, with increased associated bycatch of nearshore species, even at very low allowances could result in disastrous consequences to the state nearshore fishery such as greatly reduced trip limits for the directed fishery and premature fishery closure. Additionally, increases in impacts to overfished species, such as yelloweye rockfish, would likely result in severe curtailment of not only the nearshore fisheries, but nearly all groundfish fisheries.

Public Comment

ODFW held public meetings in August, 2008 to gather input on the alternatives for limiting the open access fishery. As expected, input varied widely and was dependent upon which open access fisheries, both directed and incidental, that individuals participated in. This resulted in a lack of consensus on most issues and alternatives discussed, with the exception of two: required separation of sablefish and lingcod fisheries when considering a B permit qualification and transferability of permits. Overall, most meeting participants were not comfortable making a specific recommendation, as they lacked information on what doing so means to them and where they "fell out" of the alternatives.

After the September Council meeting, ODFW presented the PPA to members of the Oregon commercial nearshore fishery at additional public meetings. During these meetings many fishers voiced a preference of status quo (i.e., no B permit). When asked what criteria they prefer if the Council was to implement a B permit, industry confirmed that they still preferred sablefish and lingcod endorsements attached to a B permit, but were unsure about qualifying criteria for initial B permit issuance, as well as poundage criteria for endorsements.

Since these public meetings, additional analysis has become available and ODFW contacted members of industry again with questions of qualification criteria preference. Of the 26 fishers contacted some still prefer status quo (no permit). However, when asked which landing requirement they prefer if the Council decision is to implement a B permit, 17 (a mix of sablefish and nearshore fishers) prefer modifying the PPA (as defined on page 129 of the EA) by increasing the cumulative landing criteria from 100 pounds to 1,000 pounds of B species during the window period. They stated that this amount shows a meaningful amount of catch, showing that the person was "serious" about fishing for these species. They also said that 1,000 pounds is not so high that "serious" fishermen would be eliminated from the fishery. The remaining nine nearshore fishers contacted preferred the PPA with the 100 pound cumulative landing criteria, stating either that they do not want to eliminate lingcod vessels at a higher rate than sablefish vessels or that they started fishing late in 2006 and believe that they did not land 1,000 pounds before the end of the window period, but would qualify with the 100 pound criteria. All fishers contacted were in support of retaining the lingcod and sablefish endorsement.

PFMC
03/12/09

Dear John, Merrick, and Heather:

I write regarding the implementation of the limited entry system for the open access groundfish fishery and the final decision that will reportedly be made in March of 2009.

I began fishing groundfish (shelf rockfish) in June of 2008 with hook and line gear out of my 14 foot aluminum skiff powered by a 8 hp motor. Not exactly a large scale operation, but I have landed approximately 2,000 lbs of groundfish so far with very little bycatch. Currently 100% of my fishing income is derived from groundfish. It has come to my attention that a limited entry permit system is scheduled to go into place on January 1, 2011 and that the permits will be issued based upon groundfish landings from the period of 1996 to 2006. Under such a scenario I would not qualify for any permit and would potentially be precluded forever from participating in the fishery.

I fully support the implementation of regulations that will allow for a more sustainable groundfish fishery, including the limited entry program. However, I feel that those who depend most upon the groundfish fishery as well as those who would currently like to participate in the groundfish fishery should be given an opportunity to do so. I do not want to be forever preceded from participating in this fishery merely because I was not old enough, was going to school and/or lacked sufficient money to purchase a boat before 2006. By implementing a control date of 2006 the current proposal would potentially preclude myself, as well as other similarly situated new entrants from participating in this fishery.

As stated above I support further regulation in the groundfish fishery. Although, I was only a child when the groundfish fishery was collapsing in the 80s and 90s I certainly do not want to see that happen again. Ample regulation needs to be in place to ensure the groundfish fishery becomes, and then remains sustainable so my children and myself can have the opportunity to participate in it as well. Thus, in considering a final regulatory alternative for the open access fishery I plead that provision be made for new groundfish participants such as myself - that measures be taken to give those who could not participate in the fishery from 1996 to 2006 an opportunity to participate in the future.

I propose that non-transferable permits be issued to any fisherman, such as myself, who did not participate in the directed groundfish fishery before 2006, but who currently rely upon groundfish for a large portion of their fishing income. A similar non-transferable permitting process was implemented in the California spot prawn trap fishery by way of a tier 3 permit granting certain qualifying fisherman the ability to participate in the fishery on a limited scale. A similar permit program should be set up for the groundfish fishery for those who qualify. Also, much like there were very few individuals who qualified for tier 3 permits in the California spot prawn trap fishery, I anticipate there would be very few individuals out there like me who failed to qualify for a regular permit, but who would qualify for a non-transferable groundfish permit.

Also, I would request that all other open access groundfish permits issued to those who qualified based upon the control period of 1996 to 2006 be made transferable immediately upon implementation. This would allow new participants and those eager to participate in the groundfish fishery to buy their way into the fishery, rather than being forever preceded from participating.

A non-transferable permit process for fisherman similarly situated to myself as well as transferability of the regular groundfish permits will allow those who depend upon and are most interested in participating in a sustainable groundfish fishery, to do so. Otherwise, people such as myself who in no way contributed, or participated in the fishery during the time of its implosion will not be unfairly penalized for it.

Thank you

Jason Roberson

Hi, my name is Nick Bordelon. I am a twenty-five year old fisherman and own the F/V Keta. It is a 30 foot wood boat that I fish out of Port Orford, Oregon.

I am very concerned about what is going to happen with open access fishing. I am paying my bills with open access black cod. Its still good money, about $6000.00 every two months. That pays for a lot of my family's expenses. I am a new owner of the boat, I bought it in 2007. The boat has black cod history, but I think I missed the qualifying years. I have landings in 2003 and 2008.

Please consider people like me that might be on the fine line of qualifying for a permit. Maybe there is a way that you could write something in to the qualification criteria. With the cut off date of 2006 you are excluding the people that have been making their living off of open access black cod for the last two years.

If I do not qualify for a permit I will need to buy one immediately to keep my boat fishing. There are people that qualified for these permits and are not fishing their boats anymore. Please make these permits transferable, but not stackable. Open access fishing has been good to me and a lot of other small-boat owners. Please do not give all of our fish to big-company boats and the trawl fleet. Thank you for your time and I hope you come to the right decision.

Nick Bordelon

January 08, 2009

Dear: PFMC + Jim Seger, John DeVore, Merrick Burden & Heather Brandon

At: Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

I am writing you about:
Groundfish Fishery Management Plan: Amendment 22.

I have been an open access commercial fisherman for many years. My original target species was deep and shallow groundfish. I have not only held a commercial license for many years, I have also held a near shore permit. Unfortunately due to divorce & financial hardship I failed to meet landing requirements and lost my near shore permit.

Now we have a new law/regulation in the works. I am not against the limit of no new participants. In fact I am for it. During the control years of 2004~2006, I have enough landings of shelf and slope species including lingcod >100 pounds in any one year that is proposed in the preferred plan option #6.

I should get the permit for B species and lingcod. However due to equipment issues my catch of Sable fish is only about 25 pounds per year during this time period.

In 2007~2008 my sable fish count has improved and I have eliminated all unwanted by catch. This is because I have already spent $80,000 to build the needed equipment to fish the depths required to get away from the unwanted species + comply with the new federal ground fish laws effective as of the implementation of the R.C.A.'s. I have also spent money to install a required V.M.S., which included drilling many holes in my boat.

The considerations below are why I am proposing a change or recommendation in landing requirements for the preferred plan # 6 as listed below:

- Now that I finally got my boat equipped to comply with the new regulations, either the state or the feds change the laws.
  This has forced me to refit the whole boat several times at a huge and honestly unbearable expense to comply with the constantly changing new laws.
- Another consideration is wasted discarded species. In other words if I have a permit for B species groundfish and I do not have a ling cod or sablefish endorsement, I will be forced discard dead sablefish that will be caught with the slope & shelf species.

Therefore I am asking the PFMC to consider the landing control requirements as follows:

Vessels that made cumulative landings during the 1998-2006 window period of ≥100 lbs of B species groundfish and that made at least one B species directed fishery landing during 2004-2006 would qualify for a B species permit under this alternative (A-6). The permit would allow directed fishing for and landing of all B species groundfish not including sablefish and lingcod, for which species-specific landing endorsements would be required.

For sable and Ling cod endorsements: The Council would choose: landing thresholds in any one year during the 1998-2006 window period for issuance of sablefish and lingcod landing endorsements: a) ≥1 lb.

VMS requirements & pirate fishing.

VMS problems: In February 2008 all who fished groundfish in federal waters were required to install and use a VMS tracking system. Most of us who followed the new regulations have experienced huge problems with the existing VMS systems killing our batteries. In my trailer boat that is stored in the redwoods, the VMS goes crazy because it cannot find signal. This causes it to transmit every 10 seconds and it kills the battery within 12 hours. I am forced to file a haul out and disconnect the unit during the time the boat is stored here. Since landings are so restricted I usually have the boat on haul out for 45 of the 60 days in the two-month weight limit cycle. 12+ hours before each time I used the boat I have filed the report of intent to splash the boat and re-energized the VMS. Comparing the boat tracking history to the landings it made can prove this.

Pirate fishing: There are very few spots in California state waters that are outside the RCA and not in a California MLPA. There are many boats fishing without a VMS and they are claiming to only fish in state waters. Many of these boats are actually sliding over the line into federal waters. We call this pirate fishing.

Honestly it really pisses me off: I have to travel 20+ miles to find a legal spot + I have to use very expensive gear + I have to fish real deep to stay legal. Than when I get to port I find that some in-state boat that stopped short inside the line has plugged the buyers.

In California waters this will be easily remedied. That is because the California Dept of Fish and Game plans to follow suit with the feds and only let those with a federal permit participate in this fishery.

So let me suggest that you put an additional control on who gets the permits. This control should read: Only those open access boats that have registered a VMS before April 01. 2009 and that have at least one VMS recorded groundfish trip with landings of >1 pound by this date shall receive the permit.

Closed areas: Somewhere I read mention that we need more huge closed areas. What? For open access in California everything is already closed from

30 ~ 150 fathoms. This means that 90% of all fishable water is already closed. Not only that the RCA line jaunts strait across the Monterey canyon and the Carmel canyon as well. The California MLPA’s closes the only two sections of water outside the RCA in this area. That and all the best locations inside the 30-fathom line have or are being closed by the California MLPA’s as well. I am sorry but closing one more inch is just plain wrong.

Changing of boats during the control years:

I am getting old and having back problems as well as a bad hip. In 2007 This forced me to change from a 21’ center council boat to a 23’ deep v cabin boat with a comfortable seat. I need my permit to apply to the new boat, not the 21’ boat I had in the past

I would appreciate it if my concerns are voiced at your meetings about this measure.

Thank you

Daniel Martin CEO www.tunabite.com (800+ members)
5250 Hwy. 9 Commercial License # L58195
Felton, Ca. 95018 Current vessel ID # 06765
831 421 2669. Previous vessel ID #05322

From: "Harold" <brejoh@peak.org>
To: <lbboydstun@comcast.net>
Subject: oa groundfish
Date: Thu, 8 Jan 2009 04:54:55 +0000

hi Mr.Boydstun I feel 100 lbs. a little low as a base to qualify for a B permit.2000lbs seems alittle bit more realistic if your trying to get the fleetsize to a reasonable number producing,a decent trip quota for the boats that qualify, please keep me informed thanks .Harold

From: "Josh Churchman" <josh.churchman@gmail.com>

Hi LB

How many of the small “ports” or coastal communities will end up with no B permits? I fear some large geographic areas will be forever eliminated. The same way the A permit situation has unfolded.

What happens with these non transferable deeper near shore permits? Do our lingcod count?

My port has not landed a fish on any of three permits since the VMS rule started in February.

We are leaving the future generations a network of MPAs, it would be s shame to leave them coastal communities without access to the ocean they live by.

Josh

Re: Change in Open Access

I would like to emphasize that the open access system, in addition to providing additional income to fishermen, has been reduces the waste of dead rockfish bycatch by salmon trollers. It just makes sense to allow trollers to bring in rockfish caught while salmon trolling. Whether they have enough to be worth while selling at the dock, or have just a couple to take home to their family, it is better conservation to use the bycatch rather than waste it. Especially true when fishing in the RCZ, where the depth at which the rockfish are caught results in a bloated air bladder and a trail of dying wasted rockfish behind the boat.

The above mentioned waste is even more idiotic if the prohibition against retaining troll caught rockfish is based on the convenience of regulators and statisticians.

Mat Keller
F/V Candice, Bodega Bay

Dear Council Members,

Well, it's been almost ten years now and I am beginning to feel like I'm writing to and old friend. My boat is held together with bubble gum and bailing wire, but I don't dare upgrade out of the fear that if I buy a new boat I'll lose my future in the groundfish fishery. So I put this question to you: When you head to the next council meeting would you like to ride in a 1980 Taxi-cab? Would a nearly thirty year old rental car be OK? How about flying on an airline that was not allowed to upgrade its' fleet? No other government agency but yours allows anything but the safest, most modern vehicles to be used, in the interest of public safety. I would love to buy a new boat, however I am at a standstill until a decision is made by your council. I cannot sell my boat out of fear that a future decision will exclude me from the groundfish fishery. With this said, I am asking you to make a decision on who is in and who is out, so that those of us who would like to feel safer on the water can do so.

The most recent proposal that I have heard is one landing of 100 lbs from 2004-2006. If this is actually going to be the criteria, why not just say any directed landing, even if it is one pound? What is the difference? A landing of one hundred lbs. during this time frame does nothing to meet the strategic plans objective of long term participation and dependence on the fishery. Boats that jumped in after the initial control date had no long term participation, and landings of 100 lbs. show no dependence on the fishery.

I still think that the criteria for an open access groundfish permit should be much higher landings over a longer period of time including participation before 2004.

With all this having been said I will offer the following ideas to be considered:

Regardless of what criteria is used to qualify a vessel, notify the owner of his ability to continue to fish for groundfish. In addition, notify all other open access vessel owners that they may not fish for groundfish.

Do not issue any transferable permits. Require all OAGF vessels to display the vessel number in 10 inch letters followed by the letter B on the side of the vessel. (Example - my boat - 36207B) Vessels with a limited entry groundfish permit and an OA permit would be 36207AB. Vessels with a state permit would have a "C". These markings have many purposes in addition to helping enforcement. In southern California we have many sportfishermen who become commercial fishermen once the sport catch is safely ashore. In other words, they use their ultra-clean sportfisher to catch a sport limit for themselves and several friends and then market the catch once ashore.

Insisting on big ugly numbers on the side of these boats would quickly eliminate many entrants and stop poaching. Also I would like to see the California DFG require that a copy of the vessel registration be required to be submitted when renewing a vessel license. Many southern CA. vessels have a pleasure registration and use this to purchase a license to sportfish in Mexican waters. A true commercial registration and vessel markings will be a great enforcement tool.

Once the fleet is established the process of determining transferability can begin. I see the current fleet split into four groups: 1) Vessels that are on the water daily and catch legitimate, marketable amounts of fish, 2) Older individuals who still enjoy the ocean and their occupation but do not catch large quantities.(Example: we have a 75 year old man that catches a few Leopard sharks and sells them to a fish and chips market), 3) Vessels that may have tried the fishery and have departed or come and go at a low level of participation, 4) Vessels that use a commercial license to market sport-caught fish. Transferability of a permit can be determined by the catch levels of vessels after they qualify for a B permit. I would like to see a level of strong participation before a permit could be transferred. Let's say 10,000 lbs. A vessel fishing Blackgill and slope rockfish may qualify in one month. Shelf rockfish - less than three years or much less if Ling cod are caught. This process would really determine what vessels are contributing to the good of the communities and transferring these permits would most likely keep the supply of fish coming in. Lesser used permits would not be discontinued and a stipulation that a permit could be transferred to a child or grandchild could be added. Once the vessel is sold or not registered it would lose its' groundfish permit.

A quick look at the other California fisheries that have converted to a limited entry format will show why the groundfish fishery will benefit. An example is the nearshore fishery. Initially with more than 1000 permits issued it was a free for all with scattered demand and low prices. Now it is a solid fishery with strong prices and demand. The participants in this fishery make a good living, as do the buyers. Participants are few and enforcement is easy and rarely necessary. Permits are hard to come by and value is high. On the other side is the spiny lobster fishery which allowed too many transferable permits and is now seeing enforcement problems.

OK , thanks for reading all of this and once again I hope that the right decision will be made. For now I'll just hope that "chitty-chitty bang bang" gets me through another day. JL

John Law
2795 Massachusetts Ave.
Lemon Grove, CA. 91945
WILDWESTJL@YAHOO.COM
858-414-9731

Open Access Groundfish
To whom this concerns
PCMC members:

My name is Ron Blodgett and I have been a Commercial fisherman for 35+ years. I have fished out of Bodega Bay with my 30' boat (Happy Jack) for most of my fishing life and will probably continue doing so. I fish all the time and have supplemented my income in tough times with various land jobs. My time has been spent fishing mostly Crab, Salmon, Rock Cod. The way I fish rock cod is by hook and line only!

During this time I have fished for Rock Cod mainly at Cordell Banks, and other palaces north up to Pt. Arena for approx, 15-18 yrs. On one of these occasions I thought about not even salmon fishing for a season as I did well at it. But as I could not do two fisheries at once, I decided to just do Rock cod for the winter months.

When I was asked some years ago if I wanted a, A permit, I had to refuse as I could at that time not even afford the price of $270! (There were other considerations also) And I did Qualify! But times were tough.

Now with the restrictions on the Salmon fishing last year and this year, I have no means of fishing unless I continue crabbing. And with the season the way it is here I am not doing well again. My hope was always of doing another fishery during tough times. Due to the restrictions now I may not even qualify!

I do not support limited entry, as the only ones that can fish are the people with money that can afford to buy a permit, and then hire someone to run it! I believe fisherman should run there own boat! But if we are going to have it I hope this will help in any little way toward any decision that you make.

Thank You!

Ron Blodgett
FV Happy Jack
Bodega Bay Calif.

fvhappyjack2@earthlink.net

To:
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

From:
Ted Torgersen
Box 531
Point Arena CA 95468
707-882-2531

cc:
John McCammon, Director
CA Dept. of Fish and Game

To Those Concerned:

As a lifelong commercial fisherman, I am deeply disturbed by the continuing trend of consolidation as management policy for fisheries. It is as if you are saying that reducing the number of fisherman is the goal, rather than preserving or rebuilding fish populations. In addition, no attention is payed to the disastrous cultural side effects of removing working fishing boats from local communities. In addition to lost employment, small ports lose revenue generated by shoreside operations. Many times even tourism is affected when fresh local fish is not available, and local residents likewise suffer from the inability to purchase seafood “off the boat”, long a benefit of rural coastal life. Commercial fishermen cannot even look for work under these oppressive policies, we must purchase jobs in the form of permits, sometimes at a cost greater than the value of the yearly quota for the fishery. I am sure there is some unfashionable anti-trust legislation still on the books of which this is a violation, but I am not rich enough to pursue that avenue of redress. If this trend is allowed to continue, the occupation of fisherman will have been systematically removed from America, replaced by a very small, corporate owned industrial fishing fleet. In an age where more attention is being paid to renewable energy sources, sustainable farming and forestry practices, it seems that more small boats delivering fresh fish to the local population makes more sense than clinging to a wasteful industrial approach to fishing which was originally designed to feed the world, something we are no longer in a position to do, anyway.

The cultural implications of this so called management policy of a permit for every type of fish, are enough to condemn it. Generations of traditional livelihood and community are systematically removed from the American landscape, leading to rootlessness, which is the cause of so many social ills. It is the responsibility of government, both elected and appointed to serve the country, not just a special interest that will eventually remove fresh seafood from our diets. I commercial fished for salmon in California for fifteen years, and am not optimistic about seeing another season in my lifetime. I will turn sixty this year. I also did not get a lucrative settlement, like many did, nor do I want one. If I cannot earn my living from fishing, I must at least be allowed to feed myself and pay my expenses. Any less is a policy of cultural genocide. My ancestors are Norwegian and we have lived off the sea for a hundred generations. I hope I am not alone in feeling betrayed by these callous policies.

The practical side of the policy of issuing separate permits for groundfish that are caught using the same gear, and on the same grounds also must be questioned. I attempted to fish for open access species (vermillion and lingcod), and stopped after one day because of a discard rate of sixty percent. Even with a partner and a deeper nearshore permit, the discard rate is above twenty five percent, exclusive of protected species (ie. canary and goldeneye). There is a high mortality among discards of fish with swim bladders. A more sensible approach would be one permit for all species with an overall quota, which would minimize waste, and cause fishing to stop in a timely fashion, rather than the so called grocery list approach which encourages discards and prevents the grounds from recovering.

Since we now have a new president, perhaps now is the time to re-evaluate acceptable methods of fisheries management in the light of sustainability rather than consolidation. Not only is it better for the recovery of fish stocks, as smaller boats fish fewer days due to weather, but it is better for America, because it preserves tradition and a sense of community in coastal areas. Either that, or we can all learn to eat soybeans and work in the tourist industry. For me this is not an option.

Sincerely,
Ted Torgersen
Corvo, F &G # 06915
L21235
CA Drivers Lic. #V9128311

It is imperative that I continue to have open access to sablefish with groundlines. I am barely paying my bills in the salmon troll fishery, but if I can continue to make sablefish landings and supplement that with albacore landings, I may be able to survive. I have spent $8000 gearing up for the open access fishery in the form of a drum, hauler, chute, line, blocks, hooks, and VMS installation. Being told that I could not fish for black cod would impact me greatly. Now more than ever, we need to have access to these other fisheries in order to survive. Sincerely.......Mike Watson F/V Sleipner dear pfmc I am deeply troubled by your proposal to take away my fishing rights. After all the reductions in salmon seasons so we can feed the predator's i am left with nothing, how can you do this to us at a time of economic collapse due to federal miss-management. I am a third gen com-fisher and have seen some gross mistakes in the management of ground fish Beginning with the first allocations of the blackcod tierd permit boondoggle, take from the small and make a very few really Rich. Then to not give any recognition of old fishing methods like Portuguese or dinglebar back when it was still legal any history making it like it never existed and all are efforts to rehabilitate the redfish stock has been a sham, we will never have access to another fishery ,this open access is for small boats to have chance to survive in times of trouble, now its about making a few drag boats and some California boats with history happy,well there are some people in newport that have invested in this with boats, gear, vms's and we will be out of a job soon , please reconsider your position either extend the access date to 08 or the shut down out a couple more years till the salmon come back so we can save our livelihoods,this open access elimination was not an open door till the doors were closed, we did not read the fine print and now will be out of luck. With our economy in the tank this is not a good time to put us out of work, you have turned the ocean that feed us into a private reserve with overregulation so the only ones with a job are the ones that make the rules.

henry deRonden-pos
f\v newdawn newport ore pobox 1424 97365

Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

February 16, 2009

Salmon Trollers Marketing Association
PO Box 137
Fort Bragg, CA 95437

Agenda item G.5.

Dear Sir(s),

We recently circulated a survey generated by PCFFA which aimed to find out how many fishermen in each port would qualify for the proposed "B" groundfish permits under the criteria for the "preferred alternative" currently being considered by the Council.

Following is a breakdown of the results of the open access survey in Ft. Bragg:

Originally, we identified at least 32 active commercial fishermen in our port who have participated in open access groundfishing. Of that group, we were able to contact 25 fishermen and received detailed responses from 20 fishermen.

*Of the group of 12 fishermen that we were unable to contact or did not return surveys, we believe from our own knowledge of their fishing history that at least 8 would qualify for a "B" permit and probably half of that group, or 4, would qualify for at least one endorsed species. <u>This is notable because it is in contrast to those who **did** respond to the survey, of which almost all believe that they will qualify under the criteria in the preferred alternative, and the majority believe they will qualify for both endorsements.</u>

Of the group of 20 who completed surveys, 18 reported that they landed 100 pounds or more of "B" species groundfish in a directed landing between 1998 and 2006.

16 of the 20 respondents made one landing or more of "B" species between 2004 and 2006.

When asked if they had landed black cod in a directed fishery landing between 1998 and 2006, 17 said "yes". When asked if they had landed more than 100 pounds in one calendar year, 17 said "yes". When asked if they had landed more than 500 pounds in one calendar year, 17 said "yes". 3 replied "no" to all three questions. One respondent said he did not fish for black cod during those years because he was concentrating on salmon and crab fishing. 15 of the 20 reported that they had landed ling cod in a directed fishery landing between 1998 and 2006. 15 reported landing more than 100 pounds in one calendar year. 11 said they had landed more than 500 pounds in one calendar year. 10 of the 20 did not land more than 500 pounds in a calendar year. It is notable that at least three of the positive responses were based on directed trawl landings during this period, and these fishermen no longer own boats in the trawl fishery.

Of those who did not make ling cod landings between 1998 and 2006, reasons given were as follows:
"Mostly fishing for black cod after open access began", "Monthly quotas and time open too limited to make any profit", "restricted monthly limits too small to cover expenses", "concentrated on fishing black cod and salmon", "never had to fish for lingcod before salmon

fishery was shut down", "buyer not able to handle small quantities and price offered was too low."

The average number of years commercial fishing was 33.2. The range was 7 years to 60 years. The average years of participation in federal species groundfishing was 22. The average number of years fishing groundfish before 1998 was 14. The average number of years fishing groundfish between 1998 and 2006 was 6 out of 9 years. After 2006, 1.5 years (out of two possible) was the average fished between 2007 and the present.

When asked what species of federal groundfish they had landed, 1 listed black cod only, 4 listed at least black cod and lingcod, and 14 reported landings of many different species, including black cod, lingcod, slope rockfish, shelf rockfish, halibut, petrale, dover sole, etc. Only one reported no landings in a directed fishery. All 20 respondents said they were interested in fishing for groundfish in the future. When asked what species they were interested in being able to fish, all 20 were interested in at least black cod and lingcod; 17 said "all species" or at least some other species in addition to black cod and lingcod, most notably in the slope rockfish species. All 20 reported making the majority of their landings in the port of Noyo, Ft. Bragg, CA. Only one fisherman of those who no longer fish for groundfish said they made at least half of their historical landings in a port other than Noyo.

Please note that, although many of the fishermen in Ft. Bragg may qualify for a "B" permit under the preferred alternative, only half may qualify for a lingcod endorsement and at least 4 of the 20 respondents will not qualify for either black cod or lingcod. Of the 12 who did not respond, at least 5 will not qualify for either endorsement and most likely will not qualify at all.

<u>It is notable that of those that do not meet the criteria to qualify for the "B" permit under the preferred alternative, most had significant groundfish landings before 1998</u>. Two of those who will not qualify both have fished commercially for at least 50 years.

We sincerely hope that this portrait of open access participation in our port will help the Council make the decision most beneficial to the future of the resource and the future of our independent commercial fishermen. We need to keep as many boats in active participation in groundfishing as possible because our strength is in fleet diversity and the inclusion of newcomers insures the perpetuation of our commercial fleet. One of our association members wanted to know why it was necessary to exclude any fishermen when "there are so few of us left and there are already so many restrictions in place that we couldn't negatively impact the resource if we were all fishing all the time".

Sincerely,
Ben Platt
Boardmember
Salmon Trollers Marketing Association
F/V "Kay Bee"
Ft. Bragg, California

Dear Council Members, February 14, 2009

In the face of the countries dire economic situation and skyrocketing unemployment it seems illogical for the council to make regulatory changes that would create more financial hardship and unemployment.

Commercial fishermen depend on the open access fishery to make ends meet when other fisheries such as salmon are closed. A limited entry program for open access is unnecessary. Since it appears the council is going to make a decision to limit entry into the open access fishery the preferred alternative would be acceptable with one change. Please drop the Sablefish / Lingcod endorsement portion and allow open access fishermen that have participated during the 1998-2006 time slot as much latitude as possible to participate in the open access fishery. The creation of MPA's (Marine Protected Areas) in California, the federal change in the RCA boundary of 30 fathoms to 20 fathoms and the cancelled salmon seasons has recently forced long term open access fishermen to fish outside (west) of the RCA for sablefish. These fishermen should be allowed to continue in this fishery.

The change of the 40'10'North RCA boundary from 30 fathoms to 20 fathoms will also result in increased financial hardship to open access fishermen. In my home port of Trinidad all of the Lingcod grounds and the most productive Nearshore fishing grounds are in waters deeper than 20 fathoms in the Redding Rock area. This change will eliminate some of the most productive fishing grounds. Were closed areas such as MPAs and the RCA taken into account in rebuilding plans for Yelloweye Rockfish further depth restrictions and the financial hardships that result wouldn't be necessary. Please consider closed areas in rebuilding plans before changing the RCA. My business as well as the local markets that depend on my fish will appreciate it. If you conclude you must change the boundary to 20 fathoms then leave a block open on the east side of Redding Rock and on the Point Saint George Reef.

The VMS requirement for open access is also putting an unnecessary burden on the smallest operators. Boats without charging systems and shore power are those most impacted. The VMS requirement should be dropped for vessels less than 30 feet. If the requirement is not dropped then it should only be mandatory during the quota period that the vessel is participating in a federal ground fish fishery and the providers such as Faria should be mandated to only be able to charge during the months of operation.

Please drop the Sable fish /Lingcod endorsement portion of the preferred alternative for open access and reconsider the 20 fathom RCA boundary and VMS requirement.

Sincerely,
Mike Zamboni
F/V Lucky 50
F/V skiff II

John Gillespie
P.O. Box 830
Santa Margarita, CA
93453

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

pfmc.comments@noaa.gov
FAX: (503)820-2299

RE: In response to open access limited entry proposals by Council in the upcoming period 2009:

I am the owner/operator of the Windwalker, a nineteen meter sail assisted, diversified-fishing-dependent vessel, manned by myself and either one or two others. The Windwalker fishes with hook and line or potentially traps out of Morro Bay, but over the last twenty five years, changes in the fishing regulations have closed me and the other fishers of the Morro Bay and other Pacific Coast fishing communities out of one fishery after another. As a result Morro Bay has lost both its processing plant and much of its traditional fleet which continues to shrink at an alarming rate.

The NMFS management approach for the last twenty five years or more has resulted in the destabilization of the fishing community, particularly those dislocated and methodically preempted from their fishing heritage by various whimsical and capriciously promulgated policies. The council has published documents in which they state that various regulations they have promulgated (formally proclaimed or declared as new statutory or administrative law), which are causing boat abandonments as well as forcing us out of our businesses and out of our professions, are intended to reduce capitalization. They even discuss the potential effect of these actions in reducing the number of boats. This verifies that the Council's actions are not merely adjustments of catch in targeted fisheries, but that they constitute intentional takings without compensation. These arbitrary and capricious actions also constitute a lack of equity and a lack of consideration of environmental sociology (ie, respect for humanity affected, including impact on fishing for a living) and a flouting of our US Constitutional right to equitable compensation. Also detrimental reliance of the fishers on management rationalization proceeding equably and in regards to environmental and sociological effects.

There has seemingly been a disregard for humanity affected (i.e. the nature of fishing for a living) as well as the above disregard for basic law and due process. Fishers are not well versed in administrative procedure nor are they well represented, particularly in light of the necessity of being at sea while meetings are held.

I see the current proposal as being in disregard of commercial fishing and those well versed in its complexity through generations of acquired knowledge and functional experience. Proposals disregarding the cyclical nature of fisheries and the fisherman's need for varied access to different stocks for efficient productive harvest show a large gap between theory and function. One could rationalize a specialty approach and fleet pigeonholing or compartmentalization. However, in actual practice this does not account for veteran fishers varied specialties covering many different fisheries with a current capacity developed from years of experience. In fact, being too specialized leaves one vulnerable to irrelevance if a down cycle ensues which inevitably happens. The specialty approach encourages overfishing when stocks needs less pressure. Many examples of NMFS results are available.

Practiced fishermen and women need a portfolio of fishing access and abilities acquired from experience; this is now seriously threatened. Open access has served as a useful lateral move for seasonal and cyclical opportunity.

Further dislocation and fleet capability manipulation is likely to undermine efficiency too extremely and cause more harm to the fishing community and the market it serves. Examples can be seen with albacore, a long standing and sustainable fishery largely of combination vessels which have moved to the albacore fishery from their primary fishery after being displaced from other fisheries and options. This is raising mortality and affecting the albacore stock which is now showing signs of pressure by a high mortality of small fish.

I would propose to the Pacific Council to use such examples to suggest that NMFS protect both fish and fishing community by reinstating fishers to fisheries available to them when substantial investment was made in their history.

Improved stock assessments can lead to the development of managed quotas, fishery periods and gear control to alleviate all of the problems fisheries have experienced, maintaining equable, autonomous fleet management and the fishing community. It would alleviate detrimental commoditization and undue enrichment of small groups of quota holders at the expense of the whole of current displaced experienced fishers and their community.

Refutable aspects of the present management approach include IFQs which have not proven necessary and have caused severe sociological harm (ie. whole stocks of commons in private hands, dislocation, fishers resorting to drastic measures due to dislocation and displacement). Management goals could be reached without detriment to many to enrich a few. Conservation ethic standards can be implemented and educated.

Buyout has proven marginally useful, but caused further disenfranchisement due to inadequate compensation. Permits are unavailable and unreasonably costly thus unavailable to experienced fishers, causing inefficient displacement and inequable results. For example, dispirited fishers, abandoned boats, etc. to sociological detriment of community.

These are examples of sociological irresponsibility. The untenable bureaucracy and disruption to my own operation is so distressing, that I seek relief, if not from this council, then by legal and political means. As anyone subject to wrongful acts such as detrimental reliance, taking without compensation, bearing cost of undue enrichment, victim of capricious, arbitrary, preemptive bureaucracy, pain and suffering, would and should pursue to secure the right and dignity to protect themselves and others from unconscionable reckless authority.

Sincerely,
John Gillespie

02/16/09

RE: Groundfish Limited Entry Open Access

I recommend both of the following permits be available. Groundfish landings would be permitted as long as one of the following permits is possessed.

A “personal” permit:

A fisherman who has a history of groundfish landings (any and all species) should be entitled to continue landing groundfish (any and all species) indefinitely.

A “vessel” permit:

A vessel that has a history of groundfish landings (any and all species) should be entitled to continue landing groundfish (any and all species) indefinitely.

At all times and particularly during an economic crisis we must find simple and fair solutions to keep the industry viable. Fishermen need to have a job they can count on without fear of needless "job killing" regulations.

Anthony Cannia
19070 Noyo Acres Drive
Fort Bragg, CA 95437

Dear PFMC,

Concerning your new open access groundfish regulations. It is time to remember that you have a responsibility to all the fishermen under your management-- not just the well placed and well heeled who can show up at all the meetings and spend money for access, and design windows of opportunity that place themselves in the way of that limited opportunity. It doesn't make sense to deny fishermen who have been in the business all their lives opportunities to fish when your own published data states the stocks needed to support fishermen and ports and coastal communities are dramatically rebuilding(PFMC Groundfish Assessment Results for 2007-2008).

Now is the time to recognize the fisheries under your management are meant to benefit all the fishermen, all the ports and all the coast as they have until very recently. To restrict fishing on overfished stocks is one thing. To deny access by most fishermen to these stocks forever is to create a fishing aristocracy that is neither deserving nor serves the best interest of your job description. This is particularly not the time to listen to NGO's who have drawn paternalistic conclusions about what needs to be done for fishermen and the ocean and then have gone looking for evidence to support their conclusions. They have the money to pay for this work, but it is not science. It is the antithesis of science and should be condemned as such. Evidence is the basis of conclusions not the other way around. The NGO's want IFQ's to divide the resource up between a few selected individuals whether it is needed or not. They have not done their homework. They look at the bright results from resource division in Alaska that support their preordained conclusions. They don't look at look at the fishermen who were thrown on the beach or forced to crowd into other fisheries or the economic loss to fishing communities and infrastructure. Their solutions condemn the many to internecine warfare for what's left of the resource in favor of the selected few who will then make their solutions look successful. The drag fleet has been dramatically reduced and at the expense of many small boats who are now paying the bill for that buyout and having to compete with the fishermen they bought out as they reenter the remaining fisheries.

Small boats do not have significant bycatch issues. Small boats deliver a quality product to more buyers and more ports than a few big boats. This is not the time to erase the many in favor of the few. Instead, design a program that feeds the boats back into the recovering fisheries. Design a program that spreads the resource over the entire coast to which it belongs.

David Helliwell
FV Corregidor
850 Greenwood Hts. Dr.
Kneeland, Ca. 95549

Mark Hamerdinger
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Black_Mariah@hotmail.com

Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220
pfmc.comments@noaa.gov
Fax(503)820-2299 2-16-09 Public Comment

Dear council.

Please deal with the below mentioned serious problems before any new threats are imposed upon the fishing fleets and their communities.

1. Allow open access for ground fish to continue (lateral moves in fishing are necessary).
2. Outdated science and inaccurate science (fishing effort vs. fish landings and size of fish should be used to evaluate fish stocks and not scientist going out and trying to find and to count fish. Eliminate false science. Demand that it is up to date, accurate and understandable to the lay person).
3. VMS (unreasonably makes violators out of honest law abiding fishermen).
4. Over population of sea lions (Remove sea lions from the marine mammal protection act. Bring back the sea lion Fish & Game thinner program).
5. By catch laws (which promote the throwing back of dead or injured fish needs to be outlawed).
6. Sea Otters (Devastation to marine species must not be allowed).
7. Sewage treatment (insure a minimum of secondary treatment to sewage and preferably full tertiary treatment to sewage. Insure EPA fully regulates the industry).
8. Power plants (Eliminate once through cooling (OTC). Insure EPA fully regulates the industry).

Although I made the cut-off window for open access ground fish, I am in favor of leaving ground fish an open access fishery. I am an avid supporter of sustainable fisheries but I don't believe that the science that shows that this fishery is in danger of being over fished is reliable or provable at this time.

Also I don't understand why all of these fish on the outer shelf need to be classified as ground fish. Sablefish for example, is a species that has a huge range and is only being fished near to the harbors but in actuality the sablefish habitat is not hardly being fished.

Most of those that now qualify for the Open Access ground fishery do not fish it because of the small quotas that even a small boat such as my 30' fishing boat can't survive on. I believe limited entry fisheries and IFQ's should be re-examined so as corporations don't end up with owning every fish in the sea. As it stands at this time marine management is well on its way to allowing corporations to take from the small fishing communities without compensation. This is in violation of constitutional law.

The current VMS laws as is written in the federal marine register need to be changed or the program discontinued if honest law abiding fishermen aren't going to find themselves in court proving themselves innocent. I always thought that the law had to prove that a person was guilty, not innocent.

I respectfully ask the council to address the issues mentioned above before further destroying the fishing fleet.

Note: Commercial fishing is one of the foundation blocks of which California is based on.

From: "Alan Alward" <netflea@charter.net>
To: lbboydstun@comcast.net
Sent: Sunday, February 15, 2009 11:42:46 PM GMT -08:00 US/Canada Pacific
Subject: Open Access comment

My name is Alan Alward and I own and operate the F/V Longfin which I have use to fish black cod with traps since November of 2007. I have been a commercial fisherman for over 30 years, most of that time spent diving for sea urchins. I am getting too old to dive now so I bought a boat and started fishing albacore during the summer off of Oregon. During the winter I take small amounts of black cod to keep my finances afloat. I really need to be able to access this fishery. I feel the council's proposed target fleet size for the B permit will shut too many present day users out of the fishery. Many of the boats that will qualify are not actively fishing black cod at this time while I hope to seasonally fish every year until I retire.

I fish out of Morro Bay, CA and very few fishermen from this port qualify for the B permit, although Morro Bay has a long and productive groundfish history. I spoke before the council at a meeting it held in Sacramento and was asked by the council what I would do if the quota had to be lowered because they let additional boats, like my own in. Yet now its seems the council recognizes that there are more fish in our area than they thought at that time because they are substantially increasing the quota for our area. It seems to me that the fleet target number should be relaxed to allow fishermen who have shown and interest in the fishery and installed the VMS in. If the council cannot bring itself around to expanding the number of B permits then I urge it to either grandfather in late entering boats with non-transferable permits or leaving some segment of the quota as open access available to fishermen who need to supplement their incomes. I have a very small impact on the fishery and I really need the opportunity to fish.

Hello My Name Is Mike Hague I fish out of charleston And meet the over 500 lbs for both lingcod and sable fish . I think in these hard economic times and little to no salmon fishing that you use the lowest lb recirements possible to keep from cutting out fisherman that has went through the expence of gear purpose also if there is a salmon season you will have the boats particapating in that fishery insead so not all the boats are going to fish cod all the time and the 100 % observer rule that the observer program is pushing for is rediculis for small mom and pop bisseness you can tell the by catch for everyone from a smple ing of the Boats save us taxpayers some money and redce employees not add more Mike Hague

Agenda Item G.5
March 2009

Mr. Don Hansen, Chairman of the PFMC, and Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Amendment 22

Dear Mr. Hansen and members of the Pacific Fishery Management Council,

Dear Council Members please note, according to the way the preferred alternative is written, the owner of the vessel during the qualifying years is not necessarily eligible for the "B" permit. The owner of the vessel at some undetermined, future arbitrary date is, even if that owner never made a qualifying landing or owned that vessel during the qualifying period. How fair is that?

The new "B" permit should be given to the owner of a qualifying vessel that had control of that vessel at the end of the qualifying window period.

The difference of who owned the vessel and when has very significant consequences for fisherman like me who bought and sold boats after the control date.

Imagine the expense, time and labor, if you will, involved in establishing fishing history bases on a future expectation of limited entry without any definite guidelines as far as eligibility. Imagine the risk taken just to land enough fish necessary to qualify for a "B" permit. Imagine learning years later you got it right (years fished, pounds landed, etc.), only to find out because you couldn't afford to maintain two vessels at the same time while trying to improve your fishing business situation you lost your eligibility for a fishery that you had established a catch history in. It would've cost me at least $10,000 to maintain the first boat, including licenses, if I hadn't sold it on 1/15/2007 and up until the year 2011. I hope the Council didn't expect guys like me to incurre that kind of expense to protect our right to fish. And what if the Council pushed the 2011 date further back? Obviously the cost would've been greater.

The way the preferred alternative to limiting the open access fleet is written, I'd receive nothing and suffer a financial negative while the new owner of my old boat would benefit by receiving an undeserved windfall eventhough he's never even recorded a rockcod or blackcod landing since he's owned the boat. That's why I recommend the new "B" permits be given to the owner of the vessel at the end of the qualifying window period.

If the council moves ahead with this ominous alternative, the least it should do is create a review board with a sympathetic ear for situations like mine that aren't as black and white as some would hope. It is my hope that the Council will help maintain healthy and sustainable fisheries in a fair and equitable manner.

Sincerely,

Jason Salvato
419 E D St.
Petaluma, CA 94952

DATE 2-5-09

To Pacific Fishery Management Council

I am Kenneth Bravo owner of the Lucky Lady F&G #32138 - L18021 I started fishing Black Cod in 2006 making deliveries in 9/17 & 9/24 totaling 1159 pounds. We were then cut off the season was closed.

In the paper work I have received it says you have to have at least one landing from 2004 to 2006 in order to qualify for a B permit. I was told I may have misted the cut off date by 3 or 4 days. If this is so I sure hope you would consider my landings in september to qualify for the B permit.

I am now 62 yrs old fishing for salmon out of town and living on the boat is just to hard on me. Having a B permit would allow me to have income all summer and would be a lots easier on my health. I have been a commercial fisherman since 1977.

Thank You

Kenneth Bravo

PREPARED BY

PAGE

February 9, 2009

Augustino Tarantino
212 S. Main Street
Fort Bragg CA 95437
707-961-1177 Ext O

Pacific Fishery Management Council
Attn: Don Hanson
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

RECEIVED
FEB 0 9 2009
PFMC

RE: Groundfish Limited Entry Open Access

My name is Augustino Tarantino. I have been in the commercial fishing business for the past fifty-eight years. Throughout my career I have caught several million pounds of ground fish black cod. In addition, between 1995 and 2002 I delivered thousands of pounds of open access black cod, yearly. However, under the current proposal set forth in the open access groundfish directive, I will not qualify for the "B" permit.

It is our understanding that the preferred plan "B", Amendment 22, now under consideration for "Open Access" would restrict the program, allowing only a select few to participate and benefit from this fishery. This is an outrage! Why should only a few be allowed to participate in "Open Access" when the current system of monitoring through trap permits, pot limits, and quotas has historically regulated and sustained this product successfully.

Your pamphlet states "the main reason for this change is too many participants pursuing to few fish, leading to smaller landing limits for each participant". Are you saying that the select few want a bigger piece of the pie, therefore, the rest of us are not entitled to this national resource? This is unacceptable!

All fishermen who have fished "Open Access" with the proper license and trap permits in the past should NOT be excluded from this fishery.

This fishery should be left as is – giving everyone a chance at their fair share.

Sincerely,

Augustino Tarantino

February 15, 2009

Dear Council Members and Open Access Advisors,

I have been involved in the commercial fishing industry for over 40 years. I have fished from Oregon to Alaska and have a son who has followed in my footsteps. I am one of the owners of Bell Buoy Crab Co, Inc. at the mouth of the Columbia River.

In January I attended the open access portion of the PFMC meeting in Portland.

My son, as well as several of the fishermen at our cannery, has worked into the sablefish open access program. Over the past few years this has become a part of their program to earn a living. Everyone I have spoken to around the mouth of the Columbia River hopes you will accomplish two things – make this a meaningful and manageable fishery.

Everyone has certainly had plenty of opportunity to participate in this fishery over the past decade. Your direction of using three qualifying years is great. It also makes good sense to show current participation by landing in the last two years.

I attended on this subject last winter in Astoria. There was a lot of feeling to move in the direction requiring 10,000 to 14,000 pounds of sablefish to qualify for a B license endorsement on sablefish.

When attending the January meeting in Portland I was very surprised to see the meaningless 1 – 100 – 500 pound concept.

At the end of the meeting I asked John DeVore if there was any info showing how many fishers had fished for sablefish each year. John quickly had one of the gentlemen pull this up. It appears the current year's show ranges from 270 to 320 people have made at least one landing of sablefish per year. That's where we should have started!!

Fishers in our area can't understand what our goal should be. If we use the 1 – 100 – 500 pound concept we will create twice as many participants as are currently active in this fishery!

The A license fishery has approximately 170 tier licenses yet it harvested the huge majority of sablefish in the hook and line fishery. Why would we create 1003 B licenses to harvest almost no fish?

One of the California fishermen spoke at the Portland meeting. He explained he had just started in the fishery and wouldn't get a license. At the end of the meeting he told me he completely agreed with what I had said; make it a meaningful fishery. He would be very willing to buy someone's license and continue as long as there was a fishery that was meaningful.

There is no doubt that the B licenses should have different endorsement. For example, you would either qualify for a sablefish, or lingcod, or maybe a rockfish endorsement.

It definitely wouldn't make sense to create more endorsements than we have current vessels fishing. If the bio mass were to increase we couldn't increase the two month limits due to the fact that there would be too many latent unmanageable licenses.

Currently you could catch 600 pounds once and 800 pounds of sablefish twice in a two month period. With the rockfish conservation zone out to 100 fathoms you have to travel approximately 30 miles off the Washington coast. With fuel prices so high, the cost of bait, crew, and boat maintenance, most of us just tread water. Frankly, most of us have been participating in this fishery hoping to qualify when you make this a meaningful program. Even the yellow flyer you sent out states, "the current open access fishery has too many participants pursuing to few fish".

As was stated earlier – we should have looked at the current number of vessels that actually catch a meaningful amount of either sablefish or lingcod and create an endorsement for either one. To create a system that establishes licenses almost double the actual participating group won't work.

Let me give you an example of meaningful and manageable. We run the 30 miles – set our skates of gear – you set enough gear so that you can get your weekly limit, either the 600 or 800 pounds. You stand a good chance of catching more fish than your limit. You sort out the largest ones and the smaller ones go over, probably dead. Everyone is hoping that management can evolve into a plan that would allow you to keep your two month quota in one trip. This would make a lot more economic sense, as well as conservation sense. We have just been through this mess in the trawl fishing. No doubt it makes a much more prudent program to keep them than to throw them over each time. So, you have evolved into the IFQ program – good planning! It will definitely cut back on a lot of wasted fish. So would a program of catching your limit for a two month period in one shot. If you follow a plan that creates way more permits than are actually fishing, then move to a conservative program enabling a fisher to catch the limit in one trip you would see the extra latent licenses come into play. This would obviously diminish the trip limit poundage, thus non-meaningful.

At Portland, Michelle Culver recommended a 10% reduction after separate endorsements, and that's certainly a step in the right direction. We need to do this after we identify what is the current number of actual fishermen, and I don't mean one landing in three years!

As we look back to the qualifying years of 2004 – 2006 it seems like the two month quota was about 1000 pounds – 4 times in the two months. If this fishery meant anything to a participant he definitely would have caught 1 two month quota of 4,000 pounds at least once in three years. Please, don't penalize those who have worked to make this a part of their livelihood.

Sincerely,

Steve Gray

Steve Gray
Bell Buoy Crab Co.

Feb. 16, 2009

Dear Commission and Advisory members,

I support my wife and two children entirely from commercial fishing. As we all know it seems to get tougher to make a living every year. I have tried to follow the open access reorganization process.

I have done open access sablefish fishing for several years. I have invested in a longline hauler, side rollers, VMS, Deep water fathometer, and good gear. I have stayed involved hoping you would restructure this fishery so that it would become meaningful. It is very hard to make much profit when you can only catch 600 - 700 - 800 pounds three times in two months. Obviously it would be a big step backwards for you to create more B licenses than are currently fishing, which is about 300.

I have watched several people rush out in the last year trying to get some pounds at the last minute hoping to get a license. I hope you will stay with the qualifing years 2004 — 2006.

It appears on these B licenses you should do an endorsment for different species. It certainly looks like sablefish should be its own endorsement, as lingcod should also be on its own endorsement. It wouldn't make sense to give out licenses to fishers who have never harvested a decent level of one type of fish. The required poundage should show that there has been meaningful involvement. It doesn't seem fair to those of us who have worked hard to make this a necessary part of our living for you to issue so many permits that the future harvest numbers go down. I urge you to <u>not</u> use this 1-100-500 pound requirement to qualify for sablefish.

We have about 174 A Type licenses to catch the huge percentage of hook and line Sablefish. Why would you create a larger than current number of endorsements to catch a small percentage of fish?

I have waited and hoped for years that you would do something significant — Please don't drop the ball now. Require adequate poundage to create less numbers of endorsements than are currently fishing. The thought that 500 lbs. over three years would be good doesn't make sense —

Sincerely — Lance Gray

fishing Vessel — Lady Mary

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FEB 1 8 2009

PFMC

February 17, 2009

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220
(866) 806-7204

RE: An open letter to the Pacific Fishery Management Council.

I. "Moratorium", rethink qualification criteria.

A. Landing any or all of open access species, with no pound requirement.
B. Keep September 13, 2006 control date.

II. "Conservation"

A. "Trawl discards", North of 40.10 as opposed to open access catch. Ling Cod 2007-17.38 metered ton, 2008 2.73 metered ton, Sablefish 2007-59.90 metered ton, 2008 10.08 metered ton, Pacific Halibut 2007- 43.43 metered ton, 2008 22.92 metered ton, what a waste!
B. Other discards include, Salmon, Dungeness Crab, Canary R.F., Yellow Eye R.F., Rough eye R.F., and many more, see data report dated October 2008 N.M.F.S.
C. The Pacific Coast is open to open access from 0-30 fathoms, closed 30 to 100, and open 100-200 with vessel monitoring system only.

III. "Personal information"

A. This is my 30th year in commercial fishing. I am 70 years old, and fishing is all I have.
B. "Grandfather amendment" I believe all fishermen and women over age 65 and with 25 years or more commercial fishing should be grandfathered in all fisheries.
C. Government employees can retire after 25 years, and enjoy a pension and medical benefits.

D. I have a small fish dealer business which can't survive without my open access catch. I sell quality fresh same day fish, and live fish, to restaurants, and private consumers.
E. "Salmon closure", 2006 was according to the Salmon tactical team supposed to be a banner year, it turned out to be one of the poorest, 2007 except for a small Coho season was just as bad.
F. 2008 Salmon closure really hurt, and I don't have a clue what 2009 will bring. If it is a good year that will bring relief to the open access.
G. Finally, I am heavily in debt, about $32,000.00, my boat is in need of repair, my social security benefits last year were $8,518.00, which is well below the poverty level.

IV. This is an open letter! My intent is to send a letter to our newly elected President who is trying to save and create jobs, to our Senators and Representatives, State Governors, Fish and Wildlife, and of course the news media.

Respectfully,

A.J. Mattila
F/V Moonlighter

P.O. Box 1225
Depoe Bay, OR 97341
(541) 765-3343

Mary Fleming
Citizen of a fishing community

Pacific Fisheries Management Council
7700 Ambassador Place, suite 101
Portland, Oregon 97220
Pfmc.comments@noaa.gov
9-16-09

Public comment

Dear Council,

I am a concerned citizen of a fishing community. Due to growing corporate interest and greed the small fisheries and fisherman are being gradually put out of business. How is this going to help out falling economy? Every individual from the wealthy class down to those living on minimum income levels have an innate right to make an honest living. This includes the citizens in the fishing industry, i.e., the small fisherman. In order for the human race to function as a whole there needs to be a balance on all levels. Corporate overtake will certainly cause a serious imbalance and eventually lead to the destruction of the economy of the corporations in the end.

The decrease in the fisherman has affected the community on many levels of business. This ranges from the marine supplies business to the stores, restaurants, coffee houses and many others. The corporations are being irresponsible for trying to put the small fisherman out of business.

The counting of the fish in the ocean should be left to the experts who are fisherman rather than scientists who often have little or no hands on experience like the fisherman do. How do you count the fish? Certainly the fresh scientist right out of a university has no experience and yet often times they are delegated to the task of counting fish. It is understood that the big draggers who are corporate owned contract with the scientist to take samples of the fish caught.. They go to areas where it is known to have little or no fish with the sole purpose of making it seem that there is a lack of fish. The purpose of their actions is to make it law that inhibits small fisherman from being able to fish in the ocean, thus making viable for only the large corporate owned draggers to fish the oceans. President Barrack Obama is focused on strengthening the middle class and the small fisherman certainly fits into is category.

On the central coast of California there are no sea urchins. It is understood by the Marine Life Protection Agency that this is due to the overpopulation of sea otters. It is therefore an impetus of the various Marine Agencies to find a way to decrease the population of sea otters so that the population of sea urchins can flourish again. Sea Urchins play an important role in eating vile matters from the ocean floors.

There is also an overpopulation of sea lions perhaps up to sixteen times the normal size. They consume tons of fish per day and this has contributed to the so called lack of fish in the oceans. Although it is considered politically incorrect to kill sea lions, the Marine agencies need to find a way to create a balance of sea life populations. The small fisherman plays an integral role keeping the balance of sea life population. The small fisherman in no way causes an imbalance such as the big draggers, trawlers, and sea lions do.

The by catch laws make it possible or mandatory to pollute our oceans with millions of dead fish. This is a dreadful waste and ethically abhorring.
Another issue that I would like to bring up is the lobbyists who are paid millions of dollars by the corporations which make it possible to pass laws that will eventually put all fishermen out of business. Perhaps a grand jury investigation should be started to look into who is the recipient of corporate cash and how it is being used to put fisherman out of business.

The VMS device poses a great inconvenience to the small fisherman. It seems unfair to impose the same rules to the small fisherman as the trawlers and draggers who run on a much larger quota than the small fisherman are allowed. The VMS device is supposed to be on 24/7. This runs the batteries down and if the boats can't run due to the batteries being run down the fisherman is penalized by heavy fines and or cannot fish without the VMS being on regardless of what fisheries they are fishing for.
It is understood that 40% or more satellites are owned by the Bin Laden family. They are foreign citizens and own fishing fleets out of Tunisia. It is possible that foreign vessels can take the fishing spots of the small fisherman and thus the VMS device was used to find out the various fishing spots. Why support such a program which displaces the economy of the middle class citizens of the United States for the big corporations or foreign countries?

Once again I hope the council will agree to open access fishing. And the quota is increased so that the small fisherman can also enjoy the quality of life that they are deserving of. Fisherman are honest, hard working, taxpaying citizens, please see that they are viewed in this manner and not some insignificant matter for the corporations to sweep under the rug for their own monumental greed.
I would appreciate your consideration.

Sincerely,

Mary Fleming

Steve Pschaida
4544 Contour blvd.
San Diego, Ca. 92115
F\V Irene M
fvirenem@gmail.com

Pacific Fisheries Management Council
7700 NE Ambassador Place suite 101
Portland, Oregon 97220
pfmc.comment@noaa.gov
Fax (503)820-2299 Public Comment

Public Comment by Steve

Dear Council,

I am the owner/operator of the Irene M a 45' Salmon Troller. I have made my living commercial fishing since 1974. I also fished Albacore when it was necessary. I no longer have the option to fish salmon. This is the reason for fishing open access ground fish.

I spoke at the 2008 meeting in Sacramento. I spoke in favor of moving the qualifying date so as to include myself and others who have also been displaced but still need to make a living. What about the grandfather clause? I also question the science which says sablefish is in any way being overfished by the few boats participating. How in a time of depression, financial global collapse, and Calif. totally bankrupt, can anything but a rollback of these draconian regulations be justified?

One would assume that production would be welcomed. Fishermen are prime producers as are farmers. We bring the new dollar. Instead of appreciation or any kind of recognition we are made to feel like criminals and have been forced by the federal government to install and carry VMS devices so we can be monitored 24/7. The logic is missing. Your science is a fantasy. Your practices are cruel.

The NMFS seems more concerned with promoting aquaculture industry than commercial fishing. Aquaculture is injurious to and goes ay against nature itself. Consider the many serious and ongoing problems associated with Salmon aquaculture. I am tired of being deprived of my right to make a living in a so called democracy. Please deal with these issues in a compassionate and realistic approach, being ever mind full of the the times in which we live. Remember fisheries enhancement does not mean fisheries elimination! This constitutes taking without compensation. This means theft. The precautionary approach - practice belongs on the back burner, at least in relation to this fishery and these issues. At the same time I would like to thank those responsible for the daily and weekly quota increase beginning this march. This speaks to the science which says sablefish is in any way endangered or overfished.

Thank you. Sincerely,

Steven R. Pschaida F\V Irene M

February 17, 2009

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

Dear Chairman;

I am writing on behalf of the Shelter Cove fishermen (Mosquito Fleet) who wish to express their concerns over the potential adoption of Amendment 22 in the Groundfish Management Plan. Our traditional hook and line/trap fishery has historically been discriminated against because of limited entry groundfish qualifying criteria being linked to black cod landings which only the large bottom trawlers can easily catch. We were grouped into the open access fishery under protest. We had many years of landing large mixed quantities of other species of groundfish such as ling cod, yellow eye, yellow tail, vermillion and many others that were ignored and now we find we have been phased out of fishing some of these species altogether or given microscopic quotas, the smallest of all California open access fishermen, that mean we have to fish mixed species to survive at all. This eliminates us from again qualifying our ling cod landings as directed landings to obtain limited entry status.

I have fished groundfish for over 40 years and our fishery is environmentally friendly, helps our struggling local economy as our fish are landed in Humboldt County, bycatch and discard are kept to a minimum as we use gear that allows for catch and release, nets don't and our product are superior to fish caught by other methods as we land our fish daily.

Small fishing communities are having their resources stolen by not only by fishermen who land out of our area but newcomers to the industry who have recently entered the open access fishery and their only requirement to obtain a limited entry B permit is to have targeted and landed black cod or ling cod in large quantities without taking into account their destructive practices of discard or bycatch. What a travesty. What are we trying to achieve with this regulation? We eco-minded fishermen are being replaced by these boats. We need CHANGE to save our fishery not more of the same. Jobs will also be lost as the large boat employs less people per pound of landed fish.

We plea for a hardship consideration for our unique fishery and request a non-black cod endorsement fixed gear limited entry permit to fix this injustice.

Thank you in advance for your consideration,

Don Sack
Commercial Fisherman
On behalf of the Fishermen of Shelter Cove, Humboldt County.

HUMBOLDT FISHERMEN'S MARKETING ASSOCIATION, INC.
3 Commercial Street
Eureka, California 95501-0241
(707) 443-0537 FAX (707) 443-1724

Dr. Donald McIsaac
Executive Director, PFMC
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

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FEB 1 7 2009
PFMC

Dear Dr. McIsaac:

HFMA has just participated in the PCFFA survey of open access groundfishermen to see how many will qualify for the proposed B permit, and how many won't. Two-thirds of those who responded will be excluded under any of the proposed alternatives. These are smaller boats, with a history of groundfish landings by hook and line or pot fishing. Most have no directed landings since 1998 because of a) the restrictions on these types of groundfishing which began appearing about that time, and b) the availability of salmon and crab fishing opportunity during this period. Some began fishing since the window closed in 2006; we submit that these people represent the future of the fishery and should not be excluded due to recent entry.

We believe it's wrong to exclude people from the fishery as the Council proposes for three reasons:

1) The Council is essentially saying, "we have done whatever we could to discourage participation in this fishery; now we're going to exclude those whom we discouraged;"
2) The boats so excluded tend to be smaller producers, who in the famous words of one big-producer advocate "don't catch enough to eat." What that advocate, and this Council, don't seem to get is that these guys can make a living not catching enough to eat, but it takes the combined catch of any ten of them to make a living for one big dog.
3) Almost all groundfish stocks, including those of concern such as canaries, are currently rebuilding faster than was thought possible a few years ago. In this situation, excluding boats from the fishery is purely an allocation and socioeconomic issue. In spite of all the valuable work this Council has done towards achieving sustainability in groundfisheries, we believe it is on the wrong side of this issue. Once issues of sustainable catch levels, bycatch, and habitat protection have been successfully addressed, and we're getting close to that, we believe the only path to a socioeconomically sustainable future for fisheries lies in having as many boats of all gear types working as can reasonably make a living, rather than in concentrating production in ever fewer hands.

Sincerely,

Aaron Newman

Aaron Newman
President, HFMA

Dr. Lewis E MacCarter
761 Butte Ave., Apt. 6
Morro Bay, CA 93442

mac@terranrobotics.com

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

pfmc.comments@noaa.gov
FAX: (503)820-2299

RECEIVED
FEB 17 2009
PFMC

COMMENT RE: For March 2009 upcoming proposal limiting open access,

I am a US citizen, ecologist, and statistician who lives in Morro Bay, who enjoys the fishing fleet and who sometimes advises fishermen on a voluntary basis. In addition to research in various fields, I have many years of both secondary and tertiary teaching of biology and statistics, have worked as a co-project leader of marine pollution monitoring in New Zealand, and I was the first Vice President of Research and Extension at the College of Micronesia-FSM (initiated and took part in the negotiations to merge the regional US funded Land Grant program with the three national colleges of greater Micronesia).

Open access is essential because we need to move boats from one fishery to another depending on seasons, or on cycles during which a fishery may be open some years and closed in others. This is essential for the small traditionally family owned boats of the fishing community which depend on access to a diversity of available fisheries.

Under the MSA the Council has the responsibility to preserve that community as a part of the environment. The council has only assessed the economics of geographic regions associated with ports having fishing vessels as though this data, which includes a majority of people who are not in the fishing community, but they are represented as a large part of the fishing community. In light of the fact that the non-fishing population in these geographical areas far exceeds the fishing population, there is reason to be skeptical as to whether the Pacific Council is aware of who is impacted let alone how they are impacted. To meet the mandate that it consider the fishing community, the Pacific Council needs to consider such matters as the family structure, the age structure, the ethnic (including racial) composition and the family incomes of the actual fishers and packers constituting the human fishing communities which are impacted. The councils are under the Secretary of Commerce which includes the Census Department, therefore they have no grounds for asserting that they are using "the best available" social science data.

Many promulgated regulations have, by the Pacific Council's own documented admission, been directed at forcing fleet reduction without due compensation. These include, but are not restricted to, what are from the fisher's view, arbitrary, windows. These actions constitute takings and I am certain that you may look forward to civil action in that matter. The Pacific Council could have avoided this if they had only considered that the average age of the fishers is older than the general population. Between this and the fact that boats wear out and, at present, many are being abandoned, capital reduction is taking place anyway. In order to avoid further social disruption and additional civil action the Council and associated regulatory agencies must seriously consider protecting both fish and the fishing community by reinstating fishers to the fisheries that were available to their boats when substantial investment was made in the past (often with government encouragement and sometimes assistance).

Because landing limits (both regarding quantity and size [the latter desperately needed for albacore]) along with gear restrictions may be adequately effective in managing fisheries, additional controversial and harmful strategies are inappropriate at this time. Gear restrictions may be taken broadly to include buyouts of, or adequate and equitable incentives to convert, all (including roller equipped) draggers except pink shrimp and possibly some flat fishes. (As a side issue, relevant to bottom disturbance, flat fish fisheries need research including new approaches to electric fishing.)

The NMFS and the council claim to be using "the best available scientific data" in the management of the actual fisheries themselves. However, the results over the last 25 years suggest the "best available" has proven to be insufficient. The council needs to better use landing data in fisheries management, hopefully devising a strategy for linking it with fishing effort. Unlike trying to sample all the fish in the sea, the observation of a declining return to effort suggests a need for reduction in landing limits and an increasing return to effort, may suggest a need to relax limits in some instances. This would be a scientifically valid approach to attainment of sustainable fisheries without invoking measures which have potential for manipulation and undue enrichment (for instance, IFQs and resalable licenses whether based on seemingly arbitrary windows or not).

I note that your own Pacific Council News, Fall 2008, quotes then President Elect Obama regarding the Councils, "...they serve a critical role in designing fishery-management plans that are regionally and fishery appropriate, as well as fair to the various industry participants. However, many stakeholders have stated they have lost confidence in the council appointments and decision-making process, and that is not good for the future of fishery management.".

Sincerely,

L E Mac Carter

02/14/09

L.E.(Mac) MacCarter, MAg, MPH, PhD

RECEIVED
FEB 1 8 2009
PFMC

I'm writing concerning the open access groundfish fishery.

I think its something that needs to be done but it needs to be something thats feasable and you can make some money doing

I live in Astoria and we have 30 to 35 miles to run just to get where you can legally fish. With you're current system with 600 pounds per week it certainly isn't anything that you can afford to do.

In order to make this work get the number of boats down to a level that makes this profitable. By using you're cutoff date will help and a poundage limit that will limit the no. of boats in the fishery makes it viable.

I built a boat when you could make a few dollars because the limits were higher but at 600 pounds its a go backwards situation.

I would appreciate this getting to the other council members.

Tom Svensen
P.O. Box 274
Astoria, Or. 97103

CRAB BOAT OWNERS ASSOCIATION, Inc.
2907 Jones Street
San Francisco, California 94133-1115
415-885-1180

January 29, 2009
Don Hanson, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Agenda Item G.5

RECEIVED
FEB 1 8 2009
PFMC

Re: Amendment 22

Chairman Hanson and Council Members:

The Crab Boat Owners Association of San Francisco represents the working fishing men and women of the San Francisco Bay Area. Our members fish for crab, salmon, herring, rockfish, black cod, California halibut and albacore. We are a 50 foot and under fleet.

After reviewing the landing requirements for the Council's preferred alternative for Amendment 22 we thought it would be a good idea to poll our members (and other fishermen in our harbor who may not be members) as to the effect on us, should the council approve this amendment.

We came up with 35 fishermen to interview. There are probably 5 others where language issues prevent us from including them in the survey. Out of the 35 we identified, we were able to reach 30. We've attached a copy of the survey we used.

Here are the results:

Out of the 30 responses, 5 were "new guys" with three to five years commercial fishing. They either got their first groundfish landing after the window period, or purchased their boat after the window.

Of the 25 others, the average number of years in the industry was 30.2.

Of the 30 responses, 9 will qualify for a B permit, but 4 of those will not have either the black cod or the lingcod landings for an endorsement.

The fishermen with long participation in the industry all have groundfish landings before 1998. One made his last landing in 1998. He says that's when it stopped making economic sense.

Most of our members preferred “Portagee” style fishing (vertical gear drifting over a spot) and fished the Cordell Banks and the Farallon Islands. Their harvest was primarily shelf rockfish. They say they stopped landing groundfish because the Rockfish Conservation Area took away their traditional grounds; the regulations were confusing, they didn't know what could be landed from where or when and the quotas were too small to travel so far.

All of the fishermen said they would like to fish for rockfish again.

Our members' strategy for economic survival has always been to work a “portfolio” of fisheries, moving from one to the other as cycles dictate. Fisheries management has removed groundfish from the portfolio, but we always thought that was temporary, that when the fish populations improved we'd be able to return to our traditional fishing. Amendment 22, in its present form, will take this option away permanently.

We ask you to consider the consequences of this action on professional fishermen with years of experience and on the newcomers who will have to invest even more to get into a tough business.

None of the alternatives look very good.

Sincerely,

Larry Collins,
President

Subject:
Open Access Fishery Limited (B Permit Program)
From:
joe and jackie nungaray <fishpeople@charter.net>
Date:
Mon, 13 Oct 2008 21:26:56 -0700
To:
pfmc.comments@noaa.gov

Council Members:

As a fisherman who has invested considerable monies, time and effort to participate in the Open Access Fishery for Sablefish since September 2006 I ask that you not limit myself or other fishermen from the "B" Permit Program. The cut of date of September did not allow most of the salmon fishermen, myself included, to qualify since we were just ending a salmon season in Northern California. Since then I have spent money on the installation and continued monthly service charges for the Vessel Monitoring System (VMS), traps and miscellaneous gear that is required for Open Access Sablefish Fishery. At no time, when this VMS was force upon fishermen, was there any notice that if we would be excluded from this fishery. The Sablefish fishery is controlled by the Federal Government authorities therefore I respectfully ask that this council consider allowing those fishermen who have done as I have, that is complied with limit restriction and VMS be considered for a "B" Permit, especially in light on No Salmon Season this year and mostly likely next.

Respectfully Submitted,
Joe Nungaray
F/V Michael Too
426 Shasta Ave.,
Morro Bay, California 93442

December 17, 2008
LB Boydstun
Pacific Fishery Management Council

Subject: Open Access Permitting

Council Members:

I have been fishing in the open access ground fishery in Bodega Bay CA since 1995. I am a California North-Central Nearshore fishery permitee. I am writing in opposition to the preliminary preferred alternative A-6 chosen at the last council meeting. I believe the 2004-06 single landing requirement is unfair to those who have had the longest participation in the fishery or in my case most recent and past participation. I have several thousand pounds of direct B species landings 1995-02 and more than six thousand pounds of cumulative direct B species and nearshore species landings in 2007-08. I was unable to fish for groundfish in permit years 2004-06 due to a serious injury I had in late 2003 when I was forced to sell my vessel. I employ two other local fisherman on the F/V Hai Son. This is a small 22' vessel. I have worked closely with DFG port sampler Aarn Aresberg and always have notified him when landing fish. I have also complied with NOAA observers. If I'm not eligible for a B permit this will severely impact my business.

The open access ground fishery has always been more of an alternative fishery for most. If a fisherman has had a good Salmon season like some had in 2004-06 they may not have participated in the groundfish fishery. Also, if a fisherman didn't qualify for a Nearshore permit in 2003 then they most likely wouldn't have fished for open access groundfish in 2004-06. I believe this single landing requirement in 2004-06 was crafted by a handful of folks who may have qualified for Nearshore and Deeper nearshore permits and now want to lock out those who were already excluded in 2003 when the nearshore permits were implemented.

In all fairness to those with the longest vested time and most recent need for the B permit please exclude this 2004-06 single landing requirement.

Sincerely,
Dan Helminiak
F/V Hai Son
Bodega Bay

David Bitts
President
Larry Collins
Vice-President
Marlyse Battistella
Treasurer
In Memoriam:
Nathaniel S. Bingham
Harold C. Christensen

PACIFIC COAST FEDERATION

of FISHERMEN'S ASSOCIATIONS

W.F. "Zeke"
Grader, Jr.
Executive Director
Glen H. Spain
Northwest Regional Director
Mitch Farro
Fishery Enhancement Director
Vivian Helliwell
Watershed Conservation Director

http://www.pcffa.org

Please Respond to:

☐ **California Office**
P.O. Box 29370
San Francisco, CA 4129-0370
Tel: (415) 561-5080
Fax: (415) 561-5464

☐ **Northwest Office**
P.O. Box 11170
Eugene, OR 97440-3370
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Fax: (541) 689-2500

Agenda Item G.5
March 2009

18 February 2009

Dr. Don McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Briefing Book Agenda Item G.5 Fishery Management Plan Amendment 22: Open Access License Limitation

Dear Dr. McIsaac and members of the Pacific Fishery Management Council,

The Pacific Coast Federation of Fishermen's Associations (PCFFA) represents working men and women in the West Coast commercial fishing fleet. The fishermen in PCFFA member organizations are engaged in a number of different fisheries including the open access groundfish fishery.

The Council's proposal (Amendment 22) to convert the open access fishery to a limited entry fishery will affect many of our members who have historically relied on this fishery or who had anticipated participating in the fishery again after stocks had rebuilt. While PCFFA is not opposed to a limited entry permit system for the open access groundfish fishery, we want to ensure that any permit system accurately captures both historic and current participants and provides opportunities for newcomers. For this reason, PCFFA is opposed to the Council's preferred alternative (A-6).

Over the past few months many of our member fishermen reported to us that they do not qualify for a "B" permit despite past participation in the fishery. In order to get a better idea of how many of our members would be excluded from receiving a "B" permit PCFFA conducted a survey of open access fishermen in coordination with our member associations. The survey (a sample survey is attached) was distributed to eleven port and marketing associations. PCFFA and the member associations were not able to reach all of our members but were able to get good representation of fishermen in our ports.

A few patterns from the surveys became immediately apparent. First, the preferred alternative window period that begins in 1998 excludes more than half of the fishermen who historically participated in this fishery. Many fishermen reported that they stopped fishing open access groundfish before 1998 following management changes that reduced access (e.g. the implementation of the RCA, confusing regulations, and smaller allocations to the open access sector). For instance, in San Francisco only 5 out of 26 open access fishermen surveyed are eligible for a "B" permit. Most of these fishermen had historically fished the Cordell Banks and Farallon Islands until the Rockfish Conservation Area closed most of their grounds. In Eureka two-thirds of the open access fishermen surveyed do not qualify. Even though many fishermen had stopped fishing open access groundfish, they planned to participate in the fishery again once stocks rebuilt. The business model of a small boat fisherman in California has always depended on access to multiple fisheries. The decent salmon and crab seasons from 1998 to 2006 compensated for the loss of the groundfish fishery and masked its importance to the small boat fleet.

The surveys also revealed that eligibility for "B" permits vary substantially by region. For instance, in Fort Bragg 16 out of 20 fishermen who completed the survey will be eligible for a "B" permit primarily because fishermen in Fort Bragg could still profitably fish open access groundfish by targeting black cod in nearby grounds. In other ports where access to black cod and other profitable groundfish had been restricted the number is much lower.

According to the results of our survey many of the youngest fishermen in our fleet do not qualify for a permit and not because they began fishing after the control date of September 13, 2006. Most of these fishermen have between three and five years experience and never had an opportunity to build fishing history in a fishery with such limited access. However, these small boat fishermen are no different than small boat fishermen from previous generations in that they will need to rely on a "portfolio" of fisheries.

Based on the results of our survey PCFFA does not believe that the Council's preferred alternative of Amendment 22 accurately reflects historic participation or adequately allows access to newer fishermen. We urge the Council to consider an expanded qualifying window in order to capture historic participation and consider other management approaches such as community fishing associations to provide access to fishermen. Additionally, we ask that if the Council goes forward with the preferred alternative that it create a review and appeals process for fishermen who fall between the cracks or who feel that they have been unfairly excluded from receiving a "B" permit. The Council's current preferred alternative will exclude fishermen with decades of fishing history in the open access groundfish fishery. There needs to be a process that can deal fairly with these fishermen.

Sincerely,

W.F. "Zeke" Grader
Executive Director

Councilmembers,

I support preferred alternate #6. I feel however, that the VMS requirement may have drastically reduced the fleet size already, making this whole process unnecessary.

Thank you,   John Grocott Ilwaco, Wa.

I received information from you about further restrictions on open access black cod and ling cod fisheries. I don't see any reason why the ling cod fishery should be linked to black cod. With the 400 pound per month quota (when the season is open) and a $.60 price from Pacific Choice Sea Foods,I can't possibly understand the rationale behind linking the two fisheries together. I currently hold a "CA Deeper Near Shore Rockfish Permit." If you want to restrict access to valid long-time commercial fishers, than I suppose the criteria used to obtain such a permit would suffice. But to link the sable fish fishery, a fishery that really doesn't target ling cod seems wrong. The fact is that the depth that most long liners fish for black cod is usually much deeper than ling cod even range. With todays uncertain economy in the US, I would think that noaa, the pmcc, and the Department of Commerce would think twice before allocating more fish to just a handful of people and try to use data and skills to proliferate more jobs for the fishing community.

Sincerely,
Andrew Novak
(BS fisheries Humboldt State University and 33 year California commercial fishing veteran)

Comment on PFMC Proposal to Eliminate Open Access

I'm at a loss to understand why the PFMC would even consider taking away open access black cod. We're witnessing one of the worst economic meltdowns since the Great Depression. The taxpayers in this country are about to unload 900 billion on an economic stimulus package in the hope that they can create 3 million jobs. Meanwhile PFMC is about to cut jobs by excluding anyone who didn't fish for black cod prior to November 2006. When this is implemented in 2011 it is unlikely that the economy will have recovered, not to mention the Sacramento River.

Why the cut-off date of November 2006? Why exclude people who are currently taking part in this fishery? Anyone who has entered this fishery recently has done so because of real need. PFMC cites lack of profitability if they had to cut quotas to preserve stocks. Open access is currently at 2,400 pounds every 2 months. At current market value that averages $5000. This isn't a huge amount, but it still something. Even at 60 or 70 percent of the current quota, this would still be profitable to me. Boats currently with a "B" permit receive twice the open access quota every two months (4,800 pounds) plus the block quota on their permits (some 12,000 pounds which varies year to year). This permits them to make in the region of $100,000 per year. If stocks are such an issue, why give them so much? Since when was a $100,000 not profitable? Even $50,000 or $75,000 is profitable.

We all know more people are black cod fishing because the Sacramento River has failed, but the answer isn't to put people like myself and others out of business by taking away open access. You could rearrange or reduce the quotas. People will still go fishing. You'd just be, as we've heard so often recently, "spreading the wealth". What you are proposing is privatization of a public resource. By reducing the number of boats and giving "B" permits to those who have "B" permits you are stacking permits creating yet another "elite" fishery! Furthermore 100 or 500 pounds caught before November 2006 gives permits to people who are not even currently participating in the fishery. If you make these transferable in 2012 where do you think they are going to end up?

On a personal level, I've been a fisherman for 23 years. I finally bought a boat 4 years ago. Of the 5 possible salmon seasons, including 2009, 3 of them will have been declared a disaster. Last year I invested in black cod gear and a VMS in an effort to survive financially. If you take this away from me there is no doubt in my mind that I am going to lose my boat. Last year at various times I employed 4 people. I respectfully request that PFMC do not do this to me. I urge them to consider reducing or rearranging quota as a first step. If PFMC absolutely has to eliminate open access black cod at least allow those of us who are currently fishing to continue to do so.

Respectfully,

Alan Baird
F/V Lora Lee
Eureka California

From: Jason J. Roberson

To: lbboydstun@comcast.net
Sent: Tuesday, November 25, 2008 2:30 PM
Subject: Open Access Permitting Process Request

Dear Mr. Boydstun:

I write regarding the implementation of the limited entry system for the open access groundfish fishery and the final decision that will reportedly be made in March of 2009.

I began fishing groundfish (shelf rockfish) in June of 2008 with hook and line gear out of my 14 foot aluminum skiff powered by a 8 hp motor. Not exactly a large scale operation, but I have landed approximately 2,000 lbs of groundfish so far with very little bycatch. Currently 100% of my fishing income is derived from groundfish. It has come to my attention that a limited entry permit system is scheduled to go into place on January 1, 2011 and that the permits will be issued based upon groundfish landings from the period of 1996 to 2006. Under such a scenario I would not qualify for any permit and would potentially be precluded forever from participating in the fishery.

I fully support the implementation of regulations that will allow for a more sustainable groundfish fishery, including the limited entry program. However, I feel that those who depend most upon the groundfish fishery as well as those who would currently like to participate in the groundfish fishery should be given an opportunity to do so. I do not want to be forever preceded from participating in this fishery merely because I was not old enough, was going to school and/or lacked sufficient money to purchase a boat before 2006. By implementing a control date of 2006 the current proposal would potentially preclude myself, as well as other similarly situated new entrants from participating in this fishery.

As stated above I support further regulation in the groundfish fishery. Although, I was only a child when the groundfish fishery was collapsing in the 80s and 90s I certainly do not want to see that happen again. Ample regulation needs to be in place to ensure the groundfish fishery becomes, and then remains sustainable so my children and myself can have the opportunity to participate in it as well. Thus, in considering a final regulatory alternative for the open access fishery I plead that provision be made for new groundfish participants such as myself - that measures be taken to give those who could not participate in the fishery from 1996 to 2006 an opportunity to participate in the future.

I propose that non-transferable permits be issued to any fisherman, such as myself, who did not participate in the directed groundfish fishery before 2006, but who currently rely upon groundfish for a large portion of their fishing income. A similar non-transferable permitting process was implemented in the California spot prawn trap fishery by way of a tier 3 permit granting certain qualifying fisherman the ability to participate in the fishery on a limited scale. A similar permit program should be set up for the groundfish fishery for those who qualify. Also, much like there were very few individuals who qualified for tier 3 permits in the California spot prawn trap fishery, I anticipate there would be very few individuals out there like me who failed to qualify for a regular permit, but who would qualify for a non-transferable groundfish permit.

Also, I would request that all other open access groundfish permits issued to those who qualified based upon the control period of 1996 to 2006 be made transferable immediately upon implementation. This would allow new participants and those eager to participate in the groundfish fishery to buy their way into the fishery, rather than being forever preceded from participating.

A non-transferable permit process for fisherman similarly situated to myself as well as transferability of the regular groundfish permits will allow those who depend upon and are most interested in participating in a sustainable groundfish fishery, to do so. Otherwise, people such as myself who in no way contributed, or participated in the fishery during the time of its implosion will not be unfairly penalized for it.

Thank you.

Jason Roberson

Kenyon Hensel
871 Elk valley rd
Crescent City Ca.
95531

Permitting open access,

I continue to support permitting open access, but it is important to follow a procedure that allows every one to understand the available alternatives. Too many fishermen (myself included) who will be affected by this process are confused. Mass mailings aside, there have been too many changes and last minute upgrades for the public to make sound comment. Please make the final decision at a Sacramento meeting to give small boat fishermen a central location to make comment.

Black cod fishing in our port of Crescent city has waned over the years, yet there are healthy stocks available in our adjacent waters. While I do not have problems with black cod endorsements for current fishermen, please set up a pool of extra permits for release later. These extra black cod endorsements could be controlled by committee and be awarded to existing fishermen. Allowing some movement by those who may need to supplement lost income in the future, and cover the possibility that some ports may not have qualifying boats currently fishing black cod.

Most fishermen want the shelf permit to be attached to the person, not the boat, making transferability easier. This has worked will for our state permits. It would be nice to have the federal permits follow this president.

Having qualification requirements attached to shelf dominate landings will benefit the people who have fished recently for ling cod without near shore landings. These are the fishermen who have started fishing after the rock cod disaster, not long-term fishermen who have vested interest in our fisheries. It is the exact opposite of long standing council goals.

John Gillespie
P.O. Box 830
Santa Margarita, CA 93453

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

pfmc.comments@noaa.gov
FAX: (503)820-2299

RE: In response to open access limited entry proposals by Council in the upcoming period 2009:

I am the owner/operator of the Windwalker, a nineteen meter sail assisted, diversified-fishing-dependent vessel, manned by myself and either one or two others. The Windwalker fishes with hook and line or potentially traps out of Morro Bay, but over the last twenty five years, changes in the fishing regulations have closed me and the other fishers of the Morro Bay and other Pacific Coast fishing communities out of one fishery after another. As a result Morro Bay has lost both its processing plant and much of its traditional fleet which continues to shrink at an alarming rate.

The NMFS management approach for the last twenty five years or more has resulted in the destabilization of the fishing community, particularly those dislocated and methodically preempted from their fishing heritage by various whimsical and capriciously promulgated policies. The council has published documents in which they state that various regulations they have promulgated (formally proclaimed or declared as new statutory or administrative law), which are causing boat abandonments as well as forcing us out of our businesses and out of our professions, are intended to reduce capitalization. They even discuss the potential effect of these actions in reducing the number of boats. This verifies that the Council's actions are not merely adjustments of catch in targeted fisheries, but that they constitute intentional takings without compensation. These arbitrary and capricious actions also constitute a lack of equity and a lack of consideration of environmental sociology (ie, respect for humanity affected, including impact on fishing for a living) and a flouting of our US Constitutional right to equitable compensation. Also detrimental reliance of the fishers on management rationalization proceeding equably and in regards to environmental and sociological effects.

There has seemingly been a disregard for humanity affected (i.e. the nature of fishing for a living) as well as the above disregard for basic law and due process. Fishers are not well versed in administrative procedure nor are they well represented, particularly in light of the necessity of being at sea while meetings are held.

I see the current proposal as being in disregard of commercial fishing and those well versed in its complexity through generations of acquired knowledge and functional experience. Proposals disregarding the cyclical nature of fisheries and the fisherman's need for varied access to different stocks for efficient productive harvest show a large gap between theory and function. One could rationalize a specialty approach and fleet pigeonholing or compartmentalization. However, in actual practice this does not account for veteran fishers varied specialties covering many different fisheries with a current capacity developed from years of experience. In fact, being too specialized leaves one vulnerable to irrelevance if a down cycle ensues which inevitably happens. The specialty approach encourages overfishing when stocks needs less pressure. Many examples of NMFS results are available.

Practiced fishermen and women need a portfolio of fishing access and abilities acquired from experience; this is now seriously threatened. Open access has served as a useful lateral move for seasonal and cyclical opportunity.

Further dislocation and fleet capability manipulation is likely to undermine efficiency too extremely and cause more harm to the fishing community and the market it serves. Examples can be seen with albacore, a long standing and sustainable fishery largely of combination vessels which have moved to the albacore fishery from their primary fishery after being displaced from other fisheries and options. This is raising mortality and affecting the albacore stock which is now showing signs of pressure by a high mortality of small fish.

I would propose to the Pacific Council to use such examples to suggest that NMFS protect both fish and fishing community by reinstating fishers to fisheries available to them when substantial investment was made in their history.

Improved stock assessments can lead to the development of managed quotas, fishery periods and gear control to alleviate all of the problems fisheries have experienced, maintaining equable, autonomous fleet management and the fishing community. It would alleviate detrimental commoditization and undue enrichment of small groups of quota holders at the expense of the whole of current displaced experienced fishers and their community.

Refutable aspects of the present management approach include IFQs which have not proven necessary and have caused severe sociological harm (ie. whole stocks of commons in private hands, dislocation, fishers resorting to drastic measures due to dislocation and displacement). Management goals could be reached without detriment to many to enrich a few. Conservation ethic standards can be implemented and educated.

Buyout has proven marginally useful, but caused further disenfranchisement due to inadequate compensation. Permits are unavailable and unreasonably costly thus unavailable to experienced fishers, causing inefficient displacement and inequable results. For example, dispirited fishers, abandoned boats, etc. to sociological detriment of community.

These are examples of sociological irresponsibility. The untenable bureaucracy and disruption to my own operation is so distressing, that I seek relief, if not from this council, then by legal and political means. As anyone subject to wrongful acts such as detrimental reliance, taking without compensation, bearing cost of undue enrichment, victim of capricious, arbitrary, preemptive bureaucracy, pain and suffering, would and should pursue to secure the right and dignity to protect themselves and others from unconscionable reckless authority.

Sincerely,

John Gillespie

John Gillespie

02/16/09

Agenda Item G.5
March 2009

Mr. Don Hansen, Chairman of the PFMC, and Council Members
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RECEIVED
FEB 2 0 2009
PFMC

RE: Amendment 22

Dear Mr. Hansen and members of the Pacific Fishery Management Council,

Dear Council Members please note, according to the way the preferred alternative is written, the owner of the vessel during the qualifying years is not necessarily eligible for the "B" permit. The owner of the vessel at some undetermined, future arbitrary date is, even if that owner never made a qualifying landing or owned that vessel during the qualifying period. How fair is that?

The new "B" permit should be given to the owner of a qualifying vessel that had control of that vessel at the end of the qualifying window period.

The difference of who owned the vessel and when has very significant consequences for fisherman like me who bought and sold boats after the control date.

Imagine the expense, time and labor, if you will, involved in establishing fishing history bases on a future expectation of limited entry without any definite guidelines as far as eligibility. Imagine the risk taken just to land enough fish necessary to qualify for a "B" permit. Imagine learning years later you got it right (years fished, pounds landed, etc.), only to find out because you couldn't afford to maintain two vessels at the same time while trying to improve your fishing business situation you lost your eligibility for a fishery that you had established a catch history in. It would've cost me at least $10,000 to maintain the first boat, including licenses, if I hadn't sold it on 1/15/2007 and up until the year 2011. I hope the Council didn't expect guys like me to incurre that kind of expense to protect our right to fish. And what if the Council pushed the 2011 date further back? Obviously the cost would've been greater.

The way the preferred alternative to limiting the open access fleet is written, I'd receive nothing and suffer a financial negative while the new owner of my old boat would benefit by receiving an undeserved windfall eventhough he's never even recorded a rockcod or blackcod landing since he's owned the boat. That's why I recommend the new "B" permits be given to the owner of the vessel at the end of the qualifying window period.

If the council moves ahead with this ominous alternative, the least it should do is create a review board with a sympathetic ear for situations like mine that aren't as black and white as some would hope. It is my hope that the Council will help maintain healthy and sustainable fisheries in a fair and equitable manner.

Sincerely,

Jason Salvato
419 E D St.
Petaluma, CA 94952

February 17, 2009

RECEIVED
FEB 23 2009
PFMC

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

Dear Chairman;

I am writing on behalf of the Shelter Cove fishermen (Mosquito Fleet) who wish to express their concerns over the potential adoption of Amendment 22 in the Groundfish Management Plan. Our traditional hook and line/trap fishery has historically been discriminated against because of limited entry groundfish qualifying criteria being linked to black cod landings which only the large bottom trawlers can easily catch. We were grouped into the open access fishery under protest. We had many years of landing large mixed quantities of other species of groundfish such as ling cod, yellow eye, yellow tail, vermillion and many others that were ignored and now we find we have been phased out of fishing some of these species altogether or given microscopic quotas, the smallest of all California open access fishermen, that mean we have to fish mixed species to survive at all. This eliminates us from again qualifying our ling cod landings as directed landings to obtain limited entry status.

I have fished groundfish for over 40 years and our fishery is environmentally friendly, helps our struggling local economy as our fish are landed in Humboldt County, bycatch and discard are kept to a minimum as we use gear that allows for catch and release, nets don't and our product are superior to fish caught by other methods as we land our fish daily.

Small fishing communities are having their resources stolen by not only by fishermen who land out of our area but newcomers to the industry who have recently entered the open access fishery and their only requirement to obtain a limited entry B permit is to have targeted and landed black cod or ling cod in large quantities without taking into account their destructive practices of discard or bycatch. What a travesty. What are we trying to achieve with this regulation? We eco-minded fishermen are being replaced by these boats. We need CHANGE to save our fishery not more of the same. Jobs will also be lost as the large boat employs less people per pound of landed fish.

We plea for a hardship consideration for our unique fishery and request a non-black cod endorsement fixed gear limited entry permit to fix this injustice.

Thank you in advance for your consideration,

Don Sack
Commercial Fisherman
On behalf of the Fishermen of Shelter Cove, Humboldt County.

(707) 986-1639

Subject: March 3 Comments for March meeting
Date: Tue, 03 Mar 2009 22:23:40 -0800
From: Bill James <Halibutbill@msn.com>
To: pfmccomments@noaa.org
CC: Carolyn Porter <Carolyn.Porter@noaa.gov>

March 3, 2009
Mr. Donald K. Hansen
Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite101
Portland, Oregon 97220-1384

Dear Chairman Mr. Hansen,

I am writing on behalf of Port San Luis Commercial Fishermen's Association, a non profit organization of 40 commercial Fishermen and their families to offer a alternative to the preferred alternative of Amendment 22 "Open Access Limitation". Our request is as follows : 1). B permits to be issued to California Nearshore Species Fishery Permit holders with active participation in the 1998-2006 Qualifying years with at least one landing between the years of January 1, 2004 and September 13, 2006 or landing of 100 pounds of B species in the qualifying years of 1998-2006 and at least one landing in the period of January 1, 2004 – September 13, 2006. 2). A Sablefish endorsement would be required in addition to a B species permit to catch and retain Sablefish. Qualifying years would correspond to the above dates listed for B species permits. 3). Permits and endorsements issued for California should be put on the person NOT the vessel. This will help conform to other California state managed fisheries that the permit is issued to the person. The permit should be issued to the fishermen who originally caught the qualifying fish. Many of the smaller vessels have been already sold so the landings history needs to go with the commercial fisherman. Qualifying poundage requirement : Total cumulative landings of 500 pounds or greater of Sablefish in qualifying period to be eligible for a Sablefish endorsement. No lingcod endorsement, all B species permit holders to be eligible to land Lingcod. IN ADDITION CONCERNING SABLEFISH… For California in addition to the qualifying Sablefish endorsements (approximately 170 in California) an additional 75 endorsements be created for California Commercial Fishermen who have not qualified for a Sablefish endorsement. A "Regional Equity and Heritage Committee" be formed to evaluate (vote?) which of the Sablefish endorsement requests (Fisherman) be granted be one of the 75 additional created endorsements. Regions in California with "Regional Inequity" of qualifying Sablefish endorsement could (should) be given priority in granting process of additional endorsements. Possible membership makeup could be: one commercial fisherman from each major groundfish dependent port in California, one member California Fish and Game, one member NMFS, and one member PFMC staff. Each member is a voting member. Justification for the additional endorsements: 1). Over 60 percent of the qualifying Sablefish endorsements in California will be issued to only 3 ports in California. They are Fort Bragg, Eureka, and Moss Landing. This leaves large portions of the California coastline with very few open access small vessels to fish Sablefish. Sablefish are abundant throughout the offshore waters along the entire coast of California. 2). Local vessels fill local niche markets and lower our carbon footprint by fishing local waters. 3). Local Smaller vessels can receive higher value for their fish. Each Commercial fisherman that owns a vessel is another small business owner. California commercial fishermen need a portfolio of permits, endorsements, etc. in order to spread their effort into different fisheries in order to not overfish one species or guild of fish. New MPA's have made it necessary to diversify our portfolio of fisheries that we fish in order to meet overarching conservation goals. Even small vessels need additional fisheries in order to stay in business. Please consider and adopt the recommendations in this letter.

Sincerely, Bill James for PSLCFA

March 4,2009

Agenda Item G.5.c
Supplemental Public Comment 3
March 2009

Don Hanson, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Re: Amendment 22

Chairman Hanson and Council Members:

One day I went to work and saw a big ugly trawler. That no good bum was stealing my fish and my future as a small boat fisherman. The rest of the fleet were mad too! We decided to pick a fight with these trawlers and we won. We sent them back to Poland, Russia, Korea, Japan, wherever they came from. We won control of the waters 200 miles off shore.

Now, thirty years later, we have a fleet of US trawlers that think they own the fish that we trollers fought to save. Because of a few US trawlers catch history (and they caught all the fish), I feel like someone stole my piggy-bank!

We did not run the rest of the world's trawlers off our fishing grounds to give this resource to a few US Trawlers.

Please give the trollers of the West Coast at least 6,000 or more pounds open access of ground fish monthly landings. That will make it possible to go for fishing Rock cod and be profitable on a small scale. I think that our money goes further in the small west coast communities than the US trawlers can. I hate that we trollers are faced with having to beg for a slice of the ground fish pie that we fought so hard to save.

Thank you,

Christian Jon Iversen
FV Ace High
Fort Bragg, CA

2

vessels or to estimate the amount of fish that would be allowed for landing by non-qualifying vessels under incidental fishery regulations.

Results

It was determined that about 65 percent (713 of 1,103 vessels) of each TSVG would be needed to meet the GAC request for balanced TSVG representation based on 2004-2006 window period data **(GAC Table 1).** This resulted in as few as 16 vessels for the non-TSVG to 289 vessels for the sablefish TSVG. The B species qualifying poundage ranged from as few as 127 lbs for the Other species TSVG to 3,816 lbs for the sablefish TSVG **(GAC Table 1).** The comparative data for A-4 ranged from 10 vessels (27.8 percent of A-1) for the other species TSVG to 387 vessels (86.6 percent of A-1) for the sablefish TSVG. The A-4 data showed relatively high fleet proportions for the sablefish, slope rockfish and non-target TSVGs, which is consistent with the results produced in Appendix E showing relatively large catch histories for vessels in these TSVGs.

GAC Table 1. Number of vessels that made directed B species fishery landings during 2004-2006 window period by target species vessel group (TSVG) and comparative data for GAC request and A-4 B permit qualification criteria for 713v-3 (A-4) (see Appendix E)

	A-1		GAC Request			A-4 1/	
TSVG	# vsls	Prop 2/	# vsls	Prop 3/	Qualify lbs	# vsls	Prop 3/
Slope	29	2.6%	19	65.5%	1,972	21	72.4%
Shelf	123	11.2%	79	64.2%	283	51	41.5%
Shark	57	5.2%	37	64.9%	640	33	57.9%
Sable	447	40.5%	289	64.7%	3,816	387	86.6%
Non-target	25	2.3%	16	64.0%	2,154	17	68.0%
Other	36	3.3%	23	63.9%	127	10	27.8%
Lingcod	386	35.0%	250	64.8%	576	194	50.3%
Total	1,103	100.0%	713	64.6%	NA	713	64.6%

1/ Data from Appendix E Table E-14; 1,071 lbs to qualify

2/ Proportion of Total

3/ Proportion of TSVG under A-1

The GAC request resulted in proportionately more lingcod and shelf rockfish vessels (250, 35 percent and 79, 11 percent, respectively) than the A-4 approach (194, 27 percent and 51, 7 percent)**(GAC Table 1; GAC Figure 1).** The Other species TSVG also fared better under the GAC approach (23, 3.2 percent) than under A-4 (10, 1.4 percent)**(GAC Table a; GAC Figure 1)**. For sablefish the GAC request resulted in a fleet of 289 vessels (41 percent) compared to 387 vessels (54 percent) under A-4 **(GAC Table 1; GAC Figure 1)**. These results could be expected because of generally larger catch histories of sablefish vessels compared to lingcod, shelf rockfish and other species vessels, as reported in Appendix E. There were other relatively small differences in number of qualifying vessels among the other TSVGs between A-4 and the GAC request **(GAC Table 3; GAC Figure 1)**.

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Table 2-5 (updated). Directed B species open access fishery participation and landing statistics by species group, year, state and total, April 1998-2008 including data for 1998-2006 window period.

Yr		Sablefish			Shelf RF			Slope RF			Lingcod			Sharks			Others 1/			Total Directed		
		vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s	vsl	mts	000s
1998	CA	92	94.6	$219.0	433	797.3	$1,161.0	171	192.3	$220.0	257	46.2	$105.0	54	25.2	$34.0	71	29.0	$43.0	654	1,185.1	$1,782.0
	OR	30	16.3	$45.0	135	178.5	$272.0	3	4.4	$6.0	103	20.7	$47.0	0	0.0	$0.0	44	21.0	$38.0	200	240.8	$409.0
	WA	29	25.6	$79.0	10	12.4	$9.0	0	0.0	$0.0	17	5.6	$7.0	0	0.0	$0.0	20	57.0	$65.0	46	100.7	$160.0
	sum	151	136.5	$343.0	578	988.2	$1,442.0	174	196.7	$226.0	377	72.5	$159.0	54	25.2	$34.0	135	107.0	$146.0	900	1,526.6	$2,351.0
1999	CA	102	176.9	$454.0	479	264.1	$538.0	72	16.9	$29.0	293	39.9	$119.0	52	25.2	$37.0	105	49.0	$86.0	677	571.9	$1,263.0
	OR	15	20.6	$65.0	132	93.3	$194.0	8	1.2	$2.0	125	27.1	$74.0	0	0.0	$0.0	58	13.0	$43.0	180	155.4	$377.0
	WA	28	36.0	$115.0	7	9.1	$7.0	0	0.0	$0.0	14	4.8	$6.0	2	4.8	$2.0	15	9.0	$11.0	44	63.2	$141.0
	sum	145	233.5	$634.0	618	366.5	$739.0	80	18.1	$31.0	432	71.8	$199.0	54	30.0	$39.0	178	71.0	$140.0	901	790.5	$1,781.0
2000	CA	115	299.0	$944.0	403	96.3	$282.0	65	8.5	$22.0	221	19.8	$64.0	55	22.3	$31.0	127	81.0	$118.0	642	526.7	$1,460.0
	OR	34	43.6	$159.0	103	7.3	$19.0	1	0.5	$1.0	89	12.3	$45.0	2	0.1	$0.0	0	0.0	$0.0	154	63.9	$224.0
	WA	32	51.9	$202.0	9	1.7	$3.0	2	1.5	$2.0	12	4.8	$6.0	1	1.5	$1.0	2	1.0	$2.0	49	62.8	$215.0
	sum	181	394.5	$1,305.0	515	105.3	$304.0	68	10.5	$25.0	322	36.9	$115.0	58	23.9	$32.0	129	82.0	$120.0	845	653.4	$1,899.0
2001	CA	112	273.7	$820.0	301	66.7	$177.0	41	25.9	$52.0	244	29.0	$97.0	49	24.4	$34.0	96	48.0	$106.0	518	467.5	$1,286.0
	OR	64	58.9	$199.0	89	5.5	$15.0	1	0.6	$1.0	119	24.1	$82.0	0	0.0	$0.0	2	0.0	$0.0	180	89.3	$296.0
	WA	44	60.3	$218.0	8	0.8	$1.0	2	1.4	$1.0	12	3.6	$5.0	0	0.0	$0.0	0	1.0	$1.0	54	66.8	$225.0
	sum	220	392.9	$1,237.0	398	73.0	$193.0	44	27.9	$54.0	375	56.7	$184.0	49	24.4	$34.0	98	49.0	$107.0	752	623.6	$1,807.0
2002	CA	119	268.3	$798.0	222	19.7	$72.0	45	60.7	$133.0	244	37.2	$132.0	40	16.0	$24.0	68	49.0	$80.0	480	451.4	$1,238.0
	OR	53	49.7	$180.0	61	3.6	$9.0	1	0.1	$0.0	126	27.4	$94.0	0	0.0	$0.0	8	0.0	$0.0	176	81.2	$283.0
	WA	44	65.2	$237.0	0	0.6	$0.0	0	0.9	$1.0	9	2.9	$4.0	1	4.2	$1.0	0	1.0	$0.0	47	74.4	$244.0
	sum	216	383.2	$1,215.0	283	23.9	$81.0	46	61.7	$134.0	379	67.5	$230.0	41	20.2	$25.0	76	50.0	$80.0	703	607.0	$1,765.0
2003	CA	118	312.6	$946.0	169	8.7	$39.0	46	82.4	$194.0	240	32.5	$131.0	47	28.1	$37.0	50	55.0	$50.0	445	519.6	$1,398.0
	OR	96	134.3	$492.0	52	3.3	$8.0	13	0.8	$1.0	123	28.9	$91.0	0	0.0	$0.0	0	1.0	$0.0	202	168.1	$593.0
	WA	64	118.2	$450.0	0	0.2	$0.0	0	1.5	$2.0	4	2.1	$3.0	1	43.9	$18.0	0	2.0	$1.0	68	167.7	$473.0
	sum	278	565.1	$1,888.0	221	12.2	$47.0	59	84.7	$197.0	367	63.5	$225.0	48	72.0	$55.0	50	58.0	$51.0	715	855.4	$2,464.0
2004	CA	92	288.3	$831.0	189	23.9	$104.0	48	52.2	$130.0	215	39.9	$158.0	43	23.6	$48.0	60	57.0	$52.0	402	484.9	$1,323.0
	OR	67	73.6	$225.0	66	2.9	$7.0	3	1.0	$1.0	120	31.1	$97.0	0	0.2	$0.0	3	0.0	$0.0	177	109.1	$330.0
	WA	53	96.4	$326.0	1	0.5	$1.0	2	1.4	$1.0	4	1.7	$3.0	4	86.1	$38.0	0	1.0	$1.0	57	187.3	$369.0
	sum	212	458.3	$1,382.0	256	27.3	$112.0	53	54.6	$132.0	339	72.7	$258.0	47	109.9	$86.0	63	58.0	$53.0	636	781.3	$2,022.0
2005	CA	101	458.3	$1,312.0	170	21.2	$99.0	46	30.8	$84.0	192	35.8	$145.0	44	21.9	$31.0	49	39.0	$34.0	367	607.5	$1,704.0
	OR	107	257.6	$916.0	54	3.4	$9.0	4	5.1	$7.0	150	29.4	$101.0	2	0.2	$0.0	2	5.0	$2.0	232	300.5	$1,035.0
	WA	68	182.2	$678.0	2	0.4	$1.0	2	6.5	$8.0	5	2.4	$4.0	2	3.2	$2.0	0	1.0	$1.0	78	195.5	$693.0
	sum	276	898.1	$2,906.0	226	25.0	$109.0	52	42.4	$99.0	347	67.6	$250.0	48	25.3	$33.0	51	45.0	$37.0	677	1,103.5	$3,432.0
2006 2/	CA	126	379.2	$1,069.5	174	29.9	$139.8	36	38.0	$97.5	198	30.9	$131.4	42	25.4	$46.9	32	16.9	$41.7	396	520.8	$1,526.8
	OR	132	251.7	$985.6	42	3.8	$11.1	3	5.4	$7.3	136	32.8	$129.3	0	0.0	$0.0	2	4.3	$2.1	242	297.5	$1,135.5
	WA	86	157.5	$612.0	0	0.2	$0.0	1	0.8	$1.0	4	2.7	$5.0	2	59.8	$31.0	0	1.0	$0.0	90	221.6	$649.0
	sum	344	788.4	$2,667.1	216	33.8	$150.9	40	44.2	$105.8	338	66.3	$265.7	44	85.2	$77.9	34	22.2	$43.9	728	1,039.9	$3,311.3
2007	CA	149	289.8	$993.2	217	36.4	$174.4	83	13.9	$50.8	240	30.6	$140.8	40	9.3	$17.7	91	16.1	$39.6	416	396.2	$1,416.6
	OR	93	110.1	$468.8	83	3.2	$10.5	36	3.8	$5.3	155	36.4	$148.1	2	0.3	$0.0	38	2.3	$1.2	215	156.2	$634.0
	WA	53	53.6	$246.2	13	0.4	$0.4	20	1.0	$1.1	16	3.1	$5.7	2	0.2	$0.1	8	0.4	$0.2	55	58.7	$253.7
	sum	295	453.6	$1,708.2	313	40.0	$185.4	139	18.7	$57.2	411	70.1	$294.5	44	9.8	$17.9	137	18.8	$41.0	686	611.1	$2,304.3
2008	CA	144	341.4	$1,426.8	178	22.1	$121.1	71	18.1	$61.5	199	28.8	$140.1	26	5.5	$7.1	89	27.7	$37.5	357	443.8	$1,794.0
	OR	89	181.2	$948.5	87	3.6	$12.4	46	3.7	$5.1	177	43.7	$207.2	2	0.2	$0.0	59	7.3	$3.9	209	239.8	$1,177.1
	WA	39	44.3	$228.9	10	0.3	$0.2	17	1.0	$1.2	18	2.3	$4.2	9	10.9	$4.7	8	2.3	$1.2	39	61.1	$240.4
	sum	272	567.0	$2,604.2	275	26.0	$133.6	134	22.8	$67.8	394	74.8	$351.4	37	16.6	$11.9	156	37.3	$42.6	605	744.6	$3,211.5

1/ others species includes unspecified rockfish, flatfishes, rays and chimeras
2/ 2006 data have been updated with post window period data (Oct-Dec).

Please note: This motion was not voted on; a substitute motion was made to replace it which will be available in the Final March 2009 Council Meeting Minutes and Voting Log

MOTION: I move that the Council approve converting the Open Access Fishery to Federal Permit Management using the Council PPA with the addition of sablefish and lingcod endorsements using the following criteria:

- The current owner of a vessel is eligible for a B permit if that vessel(s) was (were) used to make one or more directed B species open access fishery landings totaling ≥ 100 pounds from federal and/or state waters off the Washington, Oregon or California coasts during the period April 9, 1998-September 13, 2006 (window period) and that at least one directed fishery landing was made during January 1 2004-September 13, 2006;
- A lingcod endorsement will be affixed to a B permit if a vessel qualifies for a B permit and landed ≥100 pounds of lingcod in any one year during the window period;
- A sablefish endorsement will be affixed to a B permit if a vessel qualifies for a B permit and landed ≥500 pounds of sablefish in any one year during the window period;
- Allow both a lingcod and a sablefish endorsement to be affixed to a B permit if the vessel qualifies for both endorsements;
- Affix species endorsements permanently to and for sole use with the original B permit and allow directed fishing for the endorsed species in addition to other B species groundfish;
- The endorsement provision is intended to preclude non-endorsed vessels from directly fishing for (targeting) endorsed species, but allow B permitted vessels without endorsements to land incidental amounts of the endorsed species under cumulative landing limits identified during the normal specifications process;
- Vessels that apply for and receive B permits, including any associated species endorsements, would be allowed to take and land B species groundfish using open access gear in amounts specified in Federal groundfish regulations;
- Vessels that do not receive a B permit and that do not possess a Limited Entry (A) permit will be allowed to take and land B species groundfish incidental to fishing for non-groundfish species in amounts specified in Federal groundfish regulations;
- Permits and associated species endorsements are transferable between vessels, including transfer during the first year;
- Allow A and B permits to be used alternately on the same vessel in the same year, but not in the same cumulative limit period. A declaration process is required as part of the A and B provision;
- Establish a process for initial issuance appeals;
- Remove C permit program provisions and provide a mechanism to account for and manage incidental catch of groundfish in these fisheries

NATIONAL MARINE FISHERIES SERVICE REPORT

National Marine Fisheries Service (NMFS) Northwest Region will briefly report on recent regulatory developments relevant to groundfish fisheries and issues of interest to the Pacific Fishery Management Council (Council).

NMFS Northwest Fisheries Science Center (NWFSC) will also briefly report on groundfish-related science and research activities.

Council Task:

Discussion.

Reference Materials:

1. Agenda Item G.6.a, Attachment 1: *Federal Register* Notices Published Since the Last Council Meeting.

Agenda Order:

a. Regulatory Activities — Frank Lockhart
b. Fisheries Science Center Activities — Elizabeth Clarke
c. Reports and Comments of Agencies and Advisory Bodies
d. Public Comment
e. Council Discussion

PFMC
02/19/09

Agenda Item G.6.a
Attachment 1
March 2009

FEDERAL REGISTER NOTICES

Groundfish and Halibut Notices
November 10, 2008 through March 1, 2009

Documents available at NMFS Sustainable Fisheries Groundfish Web Site
http://www.nwr.noaa.gov/1sustfsh/gdfsh01.htm

73 FR 72739. Pacific Coast Groundfish Fishery; Pacific Whiting Allocation. NMFS has reapportioned the surplus whiting to the other sectors in the fishery - 12/1/08

73 FR 72740. Pacific Coast Groundfish Fishery; Biennial Specifications and Management Measures; Inseason Adjustments. This final rule announces inseason changes to management measures in the commercial Pacific Coast Groundfish Fisheries - 12/1/08

73 FR 79008. Pacific Coast Groundfish Fishery; Biennial Specifications and Management Measures; Inseason Adjustment. This final rule announces inseason changes to management measures in the commercial Pacific Coast Groundfish Fisheries (effective 1/09) -12/24/08

73 FR 80516. Pacific Coast Groundfish Fishery; 2009-2010 Biennial Specifications and Management Measures. Action: Proposed Rule. NMFS proposes a rule to set the 2009-2010 harvest specifications and management measures for groundfish - 12/31/08

74 FR 2032. Pacific Halibut Fisheries; Catch Sharing Plan. Proposed rule. NMFS proposes to approve & implement changes to the Pacific Halibut Catch Sharing Plan for the International Pacific Halibut Commission's regulatory Area 2A off Washington - 1/14/09

74 FR 6997. Pacific Coast Groundfish Fishery; Pacific Whiting Allocation. NMFS has determined that 4,000 mt. of the shorebased sector and 6,000 mt. of the mothership sector allocation would not be used by December 31, 2008 - 2/12/09

Pacific Whiting Fishery Summary, All Sectors, 2008

	Tribal		Mothership	Catcher/ Processors	Shore-Based		TOTAL WOC
	Mothership	Shoreside			EFP[1]	Non-EFP	
Whiting allocation	*35,000*		*58,087 (original allocation 55,811)*	*115,789 (original allocation 79,065)*	*58,669 (original allocation 97,669)*		*267,545*
ROUNDFISH (mt)							
Pacific whiting	14,943	16,964	57,432	108,121	50,017	406	247,883
Pacific cod	0.01	0.0	0.06	0.00	0.19		0.26
Lingcod	2.02	3.95	2.95	0.59	3.41		12.92
Sablefish	0.76	0.28	0.34	1.29	0.27		2.94
FLATFISH (mt)							
Dover sole	0.00	0.00	0.04	0.73	0.02		0.79
English sole	0.00	0.00	0.00	0.01	0.00		0.01
Petrale sole	0.00	0.00	0.00	0.00	0.00		0.00
Arrowtooth	2.02	6.46	1.24	3.03	0.87		13.62
Starry flounder	0.00	0.00	0.00	0.00	0.00		0.00
Other flatfish	0.00	0.02	0.08	0.38	0.87		1.35
ROCKFISH (mt)							
POP	0.07	6.30	2.93	12.83	0.07		22.20
Shortbelly	0.00	0.00	0.00	0.00	0.00		0.00
Widow	1.66	1.67	60.75	52.37	99.09		215.54
Canary	0.62	0.51	0.74	2.43	1.66		5.96
Chilipepper	0.00	0.00	0.60	0.07	4.01		4.68
Splitnose	0.00	0.00	0.00	0.66	0.00		0.66
Yellowtail	36.35	38.77	61.04	76.60	43.07		255.83
Shortspine thornyhead	0.00	0.00	0.18	5.17	0.14		5.49
Longspine thornyhead	0.00	0.00	0.00	0.45	0.00		0.45
Thornyhead, unident.	--	--	--	1.43	--		1.43
Darkblotched	0.00	0.07	3.93	2.40	0.94		7.34
Yelloweye	0.00	0.00	0.00	0.01	0.00		0.01
Black	0.00	0.00	0.00	0.00	0.01		0.01
All other rockfish	2.79	3.95	3.37	70.07	0.69		80.87
REMAINING GROUNDFISH							
Spiny Dogfish	158.57	210.77	26.92	488.77	47.26		932.29
All other groundfish	0.11	0.05	3.12	17.09	0.32		20.69
PROHIBITED SPECIES (numbers)							
Chinook salmon	157	539	225	497	1,962		3,380
Coho salmon	0	21	18	3	10		52
Chum salmon	0	11	17	43	8		79
Pink salmon	0	9	0	0	7		16
Sockeye salmon	0	0	0	2	0		2
Salmon, unident.	0	0	0	18	13		31
Steelhead	0	0	0	0	0		0
Pacific Halibut	149	not available	91	255	46		541
Dungeness crab	0	0	12	0	72		84
NON-GROUNDFISH SPECIES (mt)							
American shad	0.32	1.04	0.16	0.42	3.31		5.25
Pacific herring	0.00	0.00	0.01	0.01	0.23		0.25
Squid (unidentified)	0.58	263.61	15.61	69.49	876.23		1,225.52
Jack Mackerel	0.01	0.00	1.86	2.08	46.95		50.90
Pacific Mackerel	0.00	0.00	0.00	0.00	0.85		0.85
Pacific Sardine	0.00	0.00	0.21	0.04	0.39		0.64
Mackerel (unidentified)	--	0.02	--	--	0.08		0.10
All other non-groundfish	0.05	0.01	4.02	80.20	16.25		100.53

[1] Weights include estimates of catch that was dumped at-sea

Agenda Item G.7
Situation Summary
March 2009

FINAL CONSIDERATION OF INSEASON ADJUSTMENTS – IF NEEDED

Consideration of inseason adjustments to 2009 groundfish fisheries may be a two-step process at this meeting. The Council will meet on Tuesday, March 10, 2009, and consider advisory body advice and public comment on inseason adjustments under Agenda Item G.2. If the Council elects to make final inseason adjustments under Agenda Item G.2, then this agenda item may be cancelled, or the Council may wish to clarify and/or confirm these decisions. If the Council tasks advisory bodies with further analysis under Agenda Item G.2, then the Council task under this agenda item is to consider advisory body advice and public comment on the status of 2009 groundfish fisheries and adopt final inseason adjustments as necessary.

Council Action:

Consider information on the status of ongoing 2009 fisheries and adopt inseason adjustments as necessary.

Reference Materials: None.

Agenda Order:

a. Agenda Item Overview — Merrick Burden
b. Reports and Comments of Agencies and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt or Confirm Final Adjustments to 2009 Groundfish Fisheries

PFMC
02/13/09

GROUNDFISH MANAGEMENT TEAM REPORT ON FINAL CONSIDERATION OF INSEASON ADJUSTMENTS

Commercial Fisheries

Limited Entry Whiting Trawl
The Groundfish Management Team (GMT) updated the scorecard estimates for both tribal and non-tribal whiting based on the Council's action under G.1. We examined the estimates of Pacific Ocean perch (POP) in the scorecard for the non-tribal whiting sectors and note that the updated numbers are based on years (2003-2006) and are reflected in Attachment 1.

Recreational Fisheries

Unidentified Rockfish
In October 2008, RecFIN staff brought to the GMT's attention the fact that angler reported unidentified rockfish catch from the recreational fishery has not been accounted for in historical annual estimates of recreational impacts. The angler reported unidentified rockfish catch from the recreational fishery has not been accounted for in historical annual estimates of recreational impacts. Unidentified rockfish catch is composed of rockfish that anglers have discarded during the course of their fishing trip or retained catch that is unavailable to the sampler (filleted, given away etc.). Prior to accounting for the unidentified rockfish, the catch must be apportioned to the species level using existing data on the proportion of discarded and retained catch. The GMT first discussed this issue in January 2009 and has identified several issues regarding the accounting of unidentified rockfish catch that the Council should be aware of. The GMT requests Council guidance on the appropriate timing for reconciling the accounting of unidentified rockfish catch in all aspects of the Council management process.

Five processes are typically undertaken in a management cycle, each of which will be affected by accounting for unidentified rockfish: 1) stock assessments, 2) allocation between sectors, 3) interstate catch sharing agreements, 4) regulatory development, and 5) inseason catch tracking relative to management targets (e.g. harvest guidelines). Historical catch data is used in all aspects of each next management cycle. For example, accounting for unidentified rockfish catch inseason in 2009 could result in increased catch accruing in the recreational fisheries without the mitigating effect of this catch having been accounted for in historical data used in the intersector allocation process that determined the 2009-2010 recreational harvest guidelines.

The GMT is asking the Council for guidance on whether or not to address this issue:

A. Immediately through inseason action in 2009-2010, or
B. Within the 2011-2012 management cycle, while additional actions are taken in the field sampling procedures to reduce the number of unidentified rockfish reported by anglers.

Implications for the Recreational Fishery

In order to understand the implications, the total number and metric tons of unidentified rockfish from 2005-2008 by state is shown in Table 1 below.

Table 1. Estimated Catch of Unidentified Rockfish from 2005-2008 by State (Data from RecFIN).

		2005	2006	2007	2008	Total
California	Number of Fish	465,395	521,871	245,605	165,943	1,398,814
	Weight (mt)	*140.8*	*183.2*	*82.8*	*50.3*	*457.10*
Oregon	Number of Fish	401	989	1,083	1,121	3,594
	Weight (mt)	*0.2*	*0.6*	*0.7*	*0.6*	*2.10*
Washington	Number of Fish	460	249	248	247	1,204
	Weight (mt)	*0.6*	*0.4*	*0.3*	*0.3*	*1.60*
Total	Number of Fish	466,256	523,109	246,936	167,311	1,403,612
	Weight (mt)	*141.6*	*184.2*	*83.8*	*51.2*	*460.8*

Washington, Oregon, and California staff have done some preliminary analysis to determine the quantity of unidentified rockfish by geographic area, sector, and whether or not the fish are reported as retained or discarded. This information provides an initial indication of the overall impacts of accounting for unidentified rockfish. The unidentified rockfish from Washington are approximately 50 percent angler-reported discarded fish. Oregon's unidentified rockfish are 99 percent angler-reported discards and 95 percent of those are from private vessels targeting halibut and bottomfish. Of the unidentified rockfish represented in Table 1, 99 percent originated from California, of which, 93 percent are from charter and private rental vessels and more than 50 percent are angler-reported discarded fish.

The much higher amount of unidentified rockfish in California is largely a result of the higher effort combined with greater species identification issues. California is the transition zone for the range of many rockfish species, so there are many more species for anglers to confuse with one another making identification of species and recollection of daily catch more difficult for anglers. California's recreational rockfish catch routinely includes 41 species while the Oregon catch is comprised of 25 species and Washington catch is comprised of 11 species. The number of unidentified rockfish in the California recreational fishery has decreased from 2006 to 2008 (see Table 2). In California, 75 percent of the 50.3 mt of unidentified rockfish in 2008 originated from south of Point Conception, which could ultimately increase the estimated impacts for cowcod, bocaccio, and Minor Nearshore Rockfish South. The unidentified rockfish catch north of Point Arena is relatively low and is not expected to significantly change yelloweye catch estimates.

Table 2. Estimated metric tons of unidentified rockfish catch in California by California Recreational Fisheries Survey (CRFS) district and year. Note that metric tonnages were calculated using an average weight for all species combined and the total estimate will differ once catch is apportioned and species specific average weights are applied. (Data from CRFS)

CRFS District	2005	2006	2007	2008	District Total
South	36.7	20.5	24.4	28.2	109.8
Channel	20.2	11.3	12.6	9.1	53.2
Central	46.1	60.3	15.9	4.2	126.5
Bay	23.0	83.2	22.3	7.4	135.9
Wine	5.8	5.3	6.1	0.8	18.0
Redwood	9.0	2.7	1.5	0.7	13.8
Annual Total	*140.8*	*183.2*	*82.8*	*50.3*	*457.1*

All three states could be in jeopardy of exceeding their harvest guidelines for overfished species as a result of applying additional impacts that were not included in modeling the estimated impacts for the 2009-2010 management cycle. If the Council chooses to implement inseason accounting for unidentified rockfish during the 2009-2010 management cycle, reductions in season length, reduced bag limits, or other management measures will likely be necessary to prevent harvest guidelines from being exceeded. Depending on the number of unidentified rockfish in 2009, these management measures may still not be enough to avoid affecting other fishery sectors as the GMT balances the scorecard.

Implications for Stock Assessments

Though some stock assessments may account for unidentified rockfish from the recreational fishery, many do not and the effects on the relative abundance of these species through time are unknown. The composition and amount of unidentified rockfish is likely to vary from year to year due to variation in recruitment, fishing regulations, behavior of anglers, changes to the sampling programs, and oceanographic conditions. This makes it difficult to anticipate the effects for any one species before the unidentified rockfish catch is apportioned to the species level. Stock assessment scientists working on historic catch reconstruction may need to consider accounting for unidentified rockfish if they are using data for the recreational fishery. The GMT notes that each state has personnel that are designated points of contact for providing available data sources as well as highlighting any vagaries for the various data sets; however, it would be beneficial to assessment teams if uniform catch reconstruction methodologies for unidentified rockfishes could be identified.

Implications for Biennial Between-sector Allocations

The GMT produced estimated impacts for optimum yield species in the 2009-2010 regulatory specifications process for each fishery sector based on the apportionment structure approved by the Council. The apportionment and subsequent recreational management measures for 2009-10 did not include impacts for unidentified rockfish. To have the recreational fishery account for the unidentified rockfish impacts inseason, without having the mitigating effect of an increased harvest guideline from allocation between sectors, could result in recreational catches that exceed the projected estimates.

Accounting for this catch in 2009-2010, without the catch having been considered when allocating between sectors, could necessitate management actions that would reduce fishing opportunity. Even though most unidentified fish are from the California recreational fishery, the affect of potential reallocation of available yields has an unknown potential for inseason management for all sectors in all three states. As historical catch of unidentified rockfish is accounted for in future biennial cycles when deciding intersector allocations, management measures can be built in ahead of time to accommodate the catch of unidentified rockfish.

Implications for Catch Projection Models

Unidentified rockfish were not considered in any of the recreational catch estimate models used to project 2009-2010 harvest estimates. Accounting for unidentified rockfish in the inseason catch during the 2009-2010 seasons would cause catch estimates to deviate from projected impacts produced by these models. The models would have to be re-parameterized to incorporate unidentified rockfish catch and would likely produce different catch estimates than those presented in the 2009-2010 Harvest Specifications and Management Measures Environmental Impact Statement (2009-2010 Specifications Environmental Impact Statement).

Data Quality and Methodological Issues

Each state is currently discussing the appropriate methodology for apportioning the catch of unidentified rockfish to the species level so that it can then be included in the recreational bottomfish mortality estimates in the future. The catch apportionment methodology would rely on the following catch composition data sources:

1) Data from onboard party/charter vessel sampling available coastwide except for North of Point Arena in California where onboard sampling of party/charter vessels began in 2008 and in Washington where no onboard sampling data is available. This data is representative of the party/charter vessel fishery, but may not be representative of the private/rental fishery due to potential differences in the depth distribution of effort between the two modes.
2) Reported catch data from anglers which are dependent on the angler's ability to identify and recall their catch, calling its reliability into question. Species that are easy to identify or that have species specific restrictions and prohibitions may be more prevalent in the reported identified catch and the resulting apportioned unidentified rockfish catch than in reality.
3) Data on the catch composition of retained fish which is appropriate for use in apportioning the catch of unavailable unidentified retained fish, which may not be representative of discarded catch.

It will be important to consider several issues in developing the methodology for accounting for these unidentified rockfish. These issues include: spatial (i.e. latitudinal and depth) differences in bycatch rates and effort shifts, stratifying catch data by trip type and boat type, the percentage of unidentified fish that are reported retained and discarded, when to apply the estimate (inseason vs. post season), the capability of current sampling programs and the timeline over which changes can be achieved. Each state will also be exploring ways to reduce the number of unidentified fish through sampling methods

Other Considerations for Review and Implementation

Given the implications of incorporating estimates of unidentified rockfish into the historical and inseason catch estimates, the GMT notes that the Council may wish to have any new methodology reviewed by the Scientific and Statistical Committee (SSC).

State agency staff have indicated that addition of an entire catch stream into existing catch estimation methodologies, allocation between sectors, and catch projection models is a time and labor intensive undertaking that would divert hundreds of hours of time from existing duties and assignments. With current furloughs and overtime restrictions on many state staff due to budget issues, the time devoted to this item will have to be taken from other priorities.

GMT Recommendations:

1. The GMT requests that the Council provide guidance on when to develop and implement methodologies to incorporate accounting for unidentified rockfishes into all Council processes that use historical and current recreational catch data.

Attachment 1. Updated Bycatch Scorecard

Projected mortality impacts (mt) of overfished groundfish species updated with most recent West Coast Groundfish Observer data for LE trawl, nearshore, OA DTL, LE FG.

Fishery	Bocaccio b/	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Limited Entry Trawl- Non-whiting	**15.1**	**16.2**	**1.3**	**214.4**	**82.1**	**18.1**	**0.3**
Limited Entry Trawl- Whiting							
At-sea whiting motherships a/		4.3		6.0	**0.5**	**60.0**	0.0
At-sea whiting cat-proc a/		6.1		8.5	**0.5**	**85.0**	0.0
Shoreside whiting a/		7.6		10.5	**0.1**	**105.0**	0.0
Tribal whiting		**1.4**		0.0	**0.7**	**3.7**	0.0
Tribal							
Midwater Trawl		3.6		0.0	0.0	40.0	0.0
Bottom Trawl		0.8		0.0	3.7	0.0	0.0
Troll		0.5		0.0	0.0		0.0
Fixed gear		0.3		0.0	0.0	0.0	2.3
Fixed Gear Sablefish	**0.0**	**0.3**	**0.0**	**1.0**	**0.2**	**0.3**	**1.1**
Fixed Gear Nearshore	**0.0**	**2.9**	**0.0**	**0.0**	**0.0**	**0.1**	**0.9**
Fixed Gear Other	**5.0**	**0.0**	**0.0**	**9.0**	**0.0**	**0.7**	**0.0**
Open Access: Incidental Groundfish	**2.0**	0.9	0.0	0.0	0.0	**4.0**	0.3
Recreational Groundfish c/							
WA		20.9					5.2
OR						1.0	
CA	67.3	22.9	0.1			6.2	2.8
EFPs	13.7	2.7	0.3	1.3	0.0	5.5	0.3
Research: Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.							
	2.0	8.0	0.2	2.0	2.0	1.1	**2.4**
TOTAL	105.1	99.4	1.9	252.7	89.8	330.7	15.6
2009 OY d/	288	105	4.0	285	189	522	17
Difference	182.9	5.6	2.1	32.3	99.2	191.4	1.4
Percent of OY	36.5%	94.6%	47.5%	88.7%	47.5%	63.3%	91.9%
Key		= either not applicable; trace amount (<0.01 mt); or not reported in available data					

a/ Non-tribal whiting values for canary, darkblotched, and widow reflect bycatch limits for the non-tribal whiting sectors. The widow bycatch limit is the difference between the OY and the projected impacts in all non-whiting fisheries. All other species' impacts are projected from the GMT's whiting impact projection model. The Council may elect to change these bycatch limits when setting final whiting management measures in March of 2009 or 2010 or under any inseason action at any of their future meetings.

b/ South of 40°10' N. lat.

c/ Values in scorecard represent projected impacts for all species except canary and yelloweye rockfish, which are the prescribed harvest guidelines.

d/ 2009 and 2010 OYs are the same except for darkblotched (291 mt in 2010), POP (200 mt in 2010), and widow (509 mt in 2010).

PFMC
03/13/09

ESSENTIAL FISH HABITAT REVIEW COMMITTEE TERMS OF REFERENCE

The Ad Hoc Groundfish Essential Fish Habitat Review Committee (EFHRC) met with Council Member Frank Warrens and Council Staff in December, 2008 to develop terms of reference for the proposals to modify groundfish Essential Fish Habitat (EFH). The terms of reference are intended to guide the process for submitting a complete proposal and the provide criteria for initial evaluation of proposals. Subsequent to a discussion of the groundfish EFH agenda item at the September Council meeting in Boise, Idaho, the EFHRC also developed a statement of intent to help clarify its role in the process.

Currently, the anticipated schedule includes solicitation for proposals after the March 2009 Council meeting, followed by a meeting of the EFHRC in May to evaluate proposals and develop initial recommendation for Council consideration at the June 2009 meeting. The Council would then take preliminary action in June to further consider proposals and request additional information as necessary. The Council would then take final action in November 2009 to approve proposals for subsequent analysis in the biennial management specifications process, or other process as appropriate.

Council Task:

1. **Discussion of EFHRC Statement of Intent**
2. **Approve Final Terms of Reference.**
3. **Provide direction on process for solicitation and evaluation of proposals.**

Reference Materials:

1. Agenda Item G.8.b, EFHRC Report: Statement of Intent and Terms of Reference

Agenda Order:

a. Agenda Item Overview — Chuck Tracy
b. Reports and Comments of Agencies and Advisory Bodies
c. Public Comment
d. **Council Action:** Adopt Final Terms of Reference

PFMC
02/13/09

AD HOC GROUNDFISH ESSENTIAL FISH HABITAT REVIEW COMMITTEE STATEMENT OF INTENT AND TERMS OF FERERNECE

STATEMENT OF INTENT

The ad hoc Essential Fish Habitat Review Committee (EFHRC, Committee) has developed this statement of intent in order to establish a clear understanding of Pacific Fishery Management Council (Council) expectations as to the charge, direction and flow of information between the Committee and the Council. The EFHRC cannot be effective as an advisory body without the confidence of the Council, and Committee members have strived to develop a transparent Essential Fish Habitat (EFH) review process. The original EFH Technical Review Committee, which included many of the same members as the current EFHRC, was very successful at advising the Council on scientific and technical matters related to the initial development of Groundfish Amendment 19. This Committee would like to ensure that it builds upon that success as it moves into the review phase, and as such would like to note the following:

1) The Committee understands that it serves at the pleasure of the Council and will provide advice based on Council direction. Since its creation, the EFHRC has given advice based on the agendas and guidance provided by Council staff. The Committee encourages the Council to give regular, constructive guidance in order for the Committee to be an effective ad hoc advisory body.
2) The credibility and effectiveness of the Committee are founded on the professional reputations of its members. The EFHRC is not, and will not be, an advocacy group and has not developed or edited any documents that reflect an advocacy position. The Committee has developed criteria in order to provide evaluations of all proposals submitted in accordance with the review process and timeline established by the Council.
3) The Committee has developed the Terms of Reference document and is proceeding under the assumption that the Council considers the EFHRC as the initial evaluators of proposals in the Council Groundfish EFH review process.
4) The Committee will continue to provide advice consistent with Council direction. The Committee has further clarified its neutral role in the Terms of Reference, specifically stating that the Committee will provide an initial evaluation of proposals with regard to the scientific and technical sufficiency as it relates to modifications of EFH designations, areas, and gear types.
5) Transparency of the review process and Committee activities will be maintained at all times. The Committee will work to recognize any potential conflicts of interest and will act on these accordingly.

TERMS OF REFERENCE:
PROTOCOL FOR CONSIDERATION OF
GROUNDFISH ESSENTIAL FISH HABITAT MODIFICATION PROPOSALS

BACKGROUND

The Pacific Fishery Management Council's (Council) groundfish fishery management plan (FMP) provides designations of Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), and Ecologically Important Habitat Closed Areas (HCAs) to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities. The FMP requires review and update of these designations during a periodic 5-year review process, and also allows for reviews as needed during interim periods.

Section 7.2 and Appendix B in the FMP describes groundfish EFH, which is generally between the shore line or limit of saltwater intrusion out to depths of 3,500 m as well as seamounts in depths greater than 3,500 m. HAPC have been identified for four habitat types (Estuaries, Canopy Kelp, Seagrass, and Rocky Reefs) and several Areas of Interest. Figure 7.2 in the FMP is a map of the approximate location of habitat types identified as HAPC. The coordinates defining Area of Interest HAPC are presented in FMP Appendix B. HCAs are currently categorized as either Bottom Trawl Closed Areas or Bottom Contact Closed Areas. There are currently 50 HCAs on the West Coast; maps showing their locations and coordinates defining their boundaries are presented in FMP Appendix C. The FMP is available on the Council website at: http://www.pcouncil.org/groundfish/gffmp/fmpthru19.html.

PURPOSE

The purpose of this document is to provide guidance on the content of proposals to change, add, or delete groundfish EFH, HAPC, HCA, and other areas as appropriate, to ensure proposals have the necessary biological, ecological, and socioeconomic information for the Council to decide if they should undergo additional consideration and analysis in either the periodic or interim review process. This document will also guide the process and criteria by which proposals are evaluated by the Council and its advisory bodies.

PROTOCOL

A. Submission

1. Following a request by the Council for proposals to modify, add, or delete protected groundfish habitat, the Council's ad hoc Groundfish Essential Fish Habitat Review Committee (EFHRC) will provide an initial evaluation of such proposals to the Council with regard to the technical sufficiency and potential biological, ecological, and socioeconomic significance of the proposal. The evaluation will include identifying any deficiencies that should be addressed if the Council desires a full assessment of the proposal for potential adoption. The Groundfish Management Team (GMT), Groundfish Advisory Subpanel (GAP), Habitat Committee (HC), Enforcement Consultants (EC), and Scientific and Statistical Committee (SSC) may also review initial proposals and provide

comments on methodology and relevance to management issues, and make recommendations to the Council accordingly. Public comment will also be accepted at Council meetings.

2. Initial proposals for Council review and consideration must be received at the Council office by May 1, 2009.

3. Proposals may originate from individuals, non-government organizations, federal, state, or tribal agencies.

B. Proposal Contents

It is recognized that some applicants may not have access to proprietary information or sufficient resources to address all of the information needs listed below, and that some needs will not be relevant to specific proposals, however, this should not preclude consideration of such proposals if the information necessary for analysis can be obtained from other sources later in the process. In as much as possible, applicants must submit a completed proposal in writing that includes, but is not limited to, the following information:

1. Date of application.

2. Applicant's name, mailing address, email address, and telephone number, including contacts for any cooperating agencies or entities.

3. A statement of the problem and the proposed action.

4. An explanation why the proposal is warranted, including:

   a. How it is consistent with the Council's requirement to identify and protect EFH and to mitigate for the adverse effects of groundfish fishing activities.

   b. Why an interim review is necessary prior to the periodic 5-year review.

5. A detailed description of the proposed action(s), including:

   a. Spatial changes to currently protected areas such as boundary modifications, elimination of current areas of EFH, HAPC, and HCA or addition of new areas of EFH, HAPC, or HCA. Latitude and longitude coordinates (DDD° mm.mmḿ) and maps, including before and after change, and digital files if available (e.g., GIS shape files, navigation plotter data).

   b. Gear regulation changes, (e.g., allowing or disallowing gear types, tow technique, mesh size, weight of gear, time of bottom contact, tow time, number of pots or hooks).

   c. Other changes.

6. All relevant and applicable information on the following characteristics, including the attendant impacts of the proposed action:

    a. Biological and ecological characteristics (e.g., habitat function, vulnerability, index of recovery, species associations, including reference to any ESA-listed species, and biogenic components).

    b. Geological characteristics (e.g., substrate type, grain size, relief, morphology, depth).

    c. Physical oceanographic characteristics (e.g., temperature, salinity, circulation, waves).

    d. Chemical characteristics (e.g., nutrients, dissolved oxygen).

    e. Socioeconomic characteristics (see 7.e below).

7. A discussion of the following topics as relevant to the proposed actions:

    a. The importance of habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity.

    b. The presence and location of important habitat (as defined in 7.a above).

    c. The presence and location of habitat that is vulnerable to the effects of fishing and other activities as relevant.

    d. The presence and location of unique, rare, or threatened habitat.

    e. The socioeconomic and management-related effects of proposed actions, including changes in the location and intensity of bottom contact fishing effort, the displacement or loss of revenue from fishing, and social and economic effects to fishing communities attributable to the location and extent of closed areas. Applicants are encouraged to collaborate with socioeconomic experts as well as affected fishermen and communities in order to identify socioeconomic costs and benefits.

C. Review and Approval

1. The EFHRC will review proposals prior to the June 2009 Council meeting and provide an evaluation for the briefing materials. The Council is scheduled to take preliminary action at the June 2009 meeting and may request additional information on proposals in time for evaluation prior to final action at the November 2009 Council meeting.

2. For the November 2009 meeting the EFHRC and other appropriate Council advisory bodies review the scientific and technical merits of proposals, including any new

information incorporated since the initial proposal was submitted the preceding June. Only those proposals that were considered in June may be considered in November.

3. The Council determines an appropriate process (e.g., biennial specifications, periodic EFH review, etc.) for further analysis and consideration of proposals adopted at the November 2009 meeting.

4. The EFHRC initial review will consider, at a minimum, the following questions:

    a. Is the application complete?

    b. Are the coordinates consistent with the proposed actions and do they map out correctly?

    c. What habitat types are affected by the proposal?

    d. Are the data sufficient to evaluate the proposal effects and objectives, and if not why?

    e. What are the biological, ecological, and socioeconomic effects (beneficial and detrimental) of the proposal? For example:

        i. What is the importance of affected habitat types to any groundfish FMP stocks for their spawning, breeding, feeding, or growth to maturity?

        ii. What is the distribution and abundance of important habitat?

        iii. Is that habitat vulnerable to the effects of fishing and other activities?

        iv. Is there unique, rare, or threatened habitat?

        v. What are the changes in location and intensity of bottom contact fishing effort?

        vi. What is the displacement or loss of revenue from fishing?

        vii. Has there been collaboration with affected fishermen and communities to identify socioeconomic costs and benefits?

    f. If models are used in the proposal are they consistent with the best available information?

    g. Is the proposal consistent with the goals and objectives of the FMP?

    h. How will fishing communities and other stakeholders be affected by the proposal?

    i. How are tribal Usual and Accustomed Areas affected by the proposal, and how was that determined?

j. How are overfished stocks affected by the proposal?

k. Is a monitoring plan part of the proposal?

l. Has there been coordination with appropriate state, tribal, and federal enforcement, management, and science staff?

m. Are there components of the proposal that require additional expertise beyond the EFHRC for a comprehensive evaluation?

PFMC
02/13/09

HABITAT COMMITTEE REPORT ON ESSENTIAL FISH HABITAT REVIEW COMMITTEE (EFHRC) TERMS OF REFERENCE

The Habitat Committee (HC) heard a report on the Ad Hoc Groundfish Essential Fish Habitat Review Committee (EFHRC) draft Terms of Reference that was prepared in December 2008 when the EFHRC met with Council Member Frank Warrens and Council staff. The HC also reviewed an EFHRC Statement of Intent that was developed at the same time to help clarify the HC's role in the process.

There was significant discussion about the schedule for the review process and the proposal process. HC members praised the level of detail in the Terms of Reference but felt that the required rigor was out of sync with the accelerated schedule. In addition, there was concern that the level of detail required could exclude some valid proposals from consideration. This might detract from a precautionary approach to habitat protection. There was also concern that the short time frame might not allow sufficient time for notification about the process and would not provide sufficient time for people to submit proposals.

PFMC
03/12/09

TRIBAL REPORT ON ESSENTIAL FISH HABITAT REVIEW COMMITTEE (EFHRC) TERMS OF REFERENCE

Mr. Chairman,
The tribes would like to have Mr. Joe Schumacker, Marine Resources Scientist, for the Quinault Indian Nation, appointed to the Essential Fish Habitat Review Committee (EFHRC) as a representative for the Pacific Northwest tribes. He will be participating on the EFHRC when issues arise that are of concern to the tribes.

PFMC
03/13/09