Agenda Item D.1
Situation Summary
June 2012

NATIONAL MARINE FISHERIES SERVICE REPORT

National Marine Fisheries Service (NMFS) Northwest Region (NWR) 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 D.1.b, Attachment 1: *Federal Register* Notices Published Since the Last Council Meeting.

Agenda Order:

a. Agenda Item Overview — Kelly Ames
b. Regulatory Activities — Frank Lockhart
c. Fisheries Science Center Activities — John Stein and Michelle McClure
d. Reports and Comments of Advisory Bodies and Management Entities
e. Public Comment
f. Council Discussion

PFMC
05/21/12

Agenda Item D.1.b
Attachment 1
June 2012

Groundfish and Halibut Notices
3/16/12 through 6/1/12

Documents available at NMFS Sustainable Fisheries Groundfish Web Site
http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/index.cfm

77 FR 16740. Pacific Halibut Fisheries; Catch Sharing Plan. Action: Final Rule - 3/22/12

77 FR 20337. Pacific Coast Groundfish Fishery; Advance Notice of Proposed Rulemaking Regarding the Reconsideration of the Allocation of Whiting. Action: request for comments - 4/4/12

77 FR 22679. Fisheries off West Coast States; Biennial Specifications and Management Measures; Inseason Adjustments - 4/17/12

77 FR 24634. Fisheries off West Coast States; Biennial Specifications and Management Measures; Inseason Adjustments. Action: Final rule; Inseason adjustments to biennial groundfish management measures; request for comments - 4/25/12

77 FR 28497. Pacific Coast Groundfish Fishery; Biennial Specifications and Management Measures. Action: Final Rule. NMFS issues this final rule for the 2012 Pacific whiting fishery under authority of the Pacific Whiting Act of 2006 - 5/15/12

77 FR 29955. Pacific Coast Groundfish Fishery Management Plan; Trawl Rationalization Program. Action: Proposed Rule; request for comments - 5/21/12

Agenda Item D.1C
Supplemental Attachment 1
June 2012

Mr. Dan Wolford, Chair
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1386

Re: 2011 Catch Share Fishery Preliminary Landings and Retention Rates

Dear Chairman Wolford:

The NWFSC Observer Program is providing preliminary data from the 2011 Catch Share fishery including landings for IFQ species/groupings and other FMP species and the associated retention rates. We are providing preliminary data to allow state agency, council staff, and others an opportunity to compare landing values generated by the Observer program and validate them against their landings data.

This data should be considered preliminary until the NWFSC Observer Program releases the 2011 Catch Shares report in November 2012. The Catch Shares report will be a comprehensive look at the data and data systems used to manage the Catch Share fishery. In addition to reporting total catch, the report will describe the Catch Shares data systems to increase transparency. While the final outline of the report is not yet determined, the following topics will be covered:

1. In-season reporting to Vessel Account system including how observer data are aggregated and expanded.
2. Data sources used in analysis including Vessel Account system, e-tickets, PacFIN, observer, and VMS declarations.
3. Differentiation between landings with and without species composition samples applied. This data could be used to see the influence of port sampling on IFQ species groupings.
4. Sector definitions and how fish tickets were parsed into the correct sector.
5. Quality control and assessment that occurs prior to analysis.
6. Expansions of unsampled discard.

Suggestions, questions, or concerns on the preliminary landing and/or retention rates or on the final format of the Catch Shares report can be directed to Janell Majewski at Janell.Majewski@noaa.gov or (206) 860-3293.

Sincerely,

Dr. Michelle McClure
Division Director
Fishery Resource Analysis and Monitoring
Northwest Fishery Science Center

Table 1: Preliminary 2011 landing weight (mt) and retention rate for IFQ species, IFQ groupings, and other FMP species for the **non-hake groundfish trawl sector** of the Catch Share fishery.

IFQ Species/Grouping	Retained (mt)	Retention rate
Arrowtooth Flounder	2135.998	91%
Bocaccio Rockfish (South of 40°10' N. lat.)	5.305	100%
Canary Rockfish	2.641	95%
Chilipepper Rockfish (South of 40°10' N. lat.)	291.301	93%
Cowcod Rockfish (South of 40°10' N. lat.)	0.015	83%
Darkblotched Rockfish	82.613	98%
Dover Sole	7340.969	98%
English Sole	102.565	79%
Lingcod	189.882	83%
Longspine Thornyhead (North of 34°27' N. lat.)	857.562	95%
Minor Rockfish (South of 40°10' N. lat.)	0.001	100%
Minor Shelf Rockfish (North of 40°10' N. lat.)	17.050	88%
Minor Shelf Rockfish (South of 40°10' N. lat.)	0.125	4%
Minor Slope Rockfish (North of 40°10' N. lat.)	187.560	97%
Minor Slope Rockfish (South of 40°10' N. lat.)	71.905	99%
Mixed Thornyhead (North of 34°27' N. lat.)	2.896	52%
Other Flatfish	552.577	83%
Pacific Cod	236.032	100%
Pacific Hake	26.032	12%
Pacific Halibut (North of 40°10' N. lat.)	0.018	0%
Pacific Ocean Perch Rockfish (North of 40°10' N. lat.)	40.180	99%
Petrale Sole	711.156	98%
Sablefish (North of 36° N. lat.)	1576.199	99%
Sablefish (South of 36° N. lat.)	17.026	100%
Shortspine Thornyhead (North of 34°27' N. lat.)	668.699	99%
Splitnose Rockfish (South of 40°10' N. lat.)	8.655	22%
Starry Flounder	8.013	93%
Widow Rockfish	14.017	100%
Yelloweye Rockfish	0.041	89%
Yellowtail Rockfish (North of 40°10' N. lat.)	309.940	100%
Longnose skate	730.636	90%
Non-FMP flatfish	2.175	6%
Non-FMP skate	0.440	1%
Shortbelly rockfish	0.433	4%
Spiny dogfish	61.900	19%
Unspecified skate	329.727	98%

Table 2: Preliminary 2011 landing weight (mt) and retention rate for IFQ species, IFQ groupings, and other FMP species for the **hook-and-line sector** of the Catch Share fishery.

IFQ Species/Grouping	Retained (mt)	Retention rate
Arrowtooth Flounder	0.088	8%
Canary Rockfish	0.004	100%
Darkblotched Rockfish	0.246	67%
Dover Sole	0.070	21%
English Sole	0.001	100%
Lingcod	0.313	86%
Longspine Thornyhead (North of 34°27' N. lat.)	0.307	37%
Minor Shelf Rockfish (North of 40°10' N. lat.)	0.038	65%
Minor Slope Rockfish (North of 40°10' N. lat.)	10.988	56%
Minor Slope Rockfish (South of 40°10' N. lat.)	0.950	99%
Mixed Thornyhead (North of 34°27' N. lat.)	0.050	75%
Other Flatfish	0.000	6%
Pacific Cod	0.004	100%
Pacific Hake	0.535	83%
Pacific Halibut (North of 40°10' N. lat.)	0.000	0%
Pacific Ocean Perch Rockfish (North of 40°10' N. lat.)	0.020	44%
Petrale Sole	0.001	3%
Sablefish (North of 36° N. lat.)	157.709	97%
Sablefish (South of 36° N. lat.)	144.161	98%
Shortspine Thornyhead (North of 34°27' N. lat.)	12.144	95%
Shortspine Thornyhead (South of 34°27' N. lat.)	7.112	97%
Splitnose Rockfish (South of 40°10' N. lat.)	0.000	100%
Widow Rockfish	0.000	0%
Yelloweye Rockfish	0.013	100%
Longnose skate	0.519	3%
Non-FMP flatfish	0.000	0%
Non-FMP skate	0.000	0%
Spiny dogfish	0.036	0%
Unspecified skate	0.092	7%

Table 3: Preliminary 2011 landing weight (mt) and retention rate for IFQ species, IFQ groupings, and other FMP species for the **pot sector** of the Catch Share fishery.

IFQ Species/Grouping	Retained (mt)	Retention rate
Arrowtooth Flounder	0.224	60%
Canary Rockfish	0.001	100%
Darkblotched Rockfish	0.050	98%
Dover Sole	0.745	70%
Lingcod	2.907	97%
Longspine Thornyhead (North of 34°27' N. lat.)	0.036	66%
Minor Shelf Rockfish (North of 40°10' N. lat.)	0.047	96%
Minor Slope Rockfish (North of 40°10' N. lat.)	1.702	96%
Minor Slope Rockfish (South of 40°10' N. lat.)	1.315	97%
Mixed Thornyhead (North of 34°27' N. lat.)	0.001	17%
Other Flatfish	0.002	51%
Pacific Hake	0.000	0%
Pacific Halibut (North of 40°10' N. lat.)	0.000	0%
Pacific Ocean Perch Rockfish (North of 40°10' N. lat.)	0.011	89%
Petrale Sole	0.088	98%
Sablefish (North of 36° N. lat.)	524.318	99%
Sablefish (South of 36° N. lat.)	282.905	99%
Shortspine Thornyhead (North of 34°27' N. lat.)	0.645	77%
Splitnose Rockfish (South of 40°10' N. lat.)	0.006	100%
Non-FMP flatfish	0.003	24%
Non-FMP skate	0.000	0%
Spiny dogfish	0.019	11%

Science, Service, Stewardship

Agenda Item D.1.c
Supplemental NWFSC PowerPoint
June 2012

Groundfish Science Report

John Stein and Michelle McClure
Northwest Fisheries Science Center

June 21, 2012

NOAA FISHERIES SERVICE

NMFS Strategic Research Plans

- All Science Centers creating strategic research plans
- First drafts completed
- SWFSC and NWFSC coordinated in development
- Drafts currently undergoing internal review
- We will request Council to review in the Fall

FY12 Budget Update

- Multi-million dollar decrease in FY12 funding
- Took preemptive steps to reduce impact:
  - Did not backfill >10 positions FY10-11
  - Merged two divisions for administrative savings
  - Received support from HQ for surveys in FY12
- Priority to maintain surveys (incl. Joint Hake/Sardine), RecFIN, support for Catch Share program
- Non-Catch Share observer coverage to be reduced by 60% (i.e. ~60% of coverage cut in each sector)
- Will take additional actions in future to reduce costs
- Budget uncertainty for future years still a reality

Addressing Rumors

Overview

- Data-moderate methods workshop
- Stock complexes
- Joint hake-sardine survey
- Review of Hook and Line Survey
- Socio-economic work
- Cooperative Research Program
- Updates – other survey

Review of Assessment Methods for Data-Limited Stocks

June 26-29, 2012

Alaska Fisheries Science Center

Building 4, Traynor Seminar Room

7600 Sand Point Way NE

Seattle, Washington

Species Complexes – History

- 2000 -- Unspecified Sebates Complex is divided into 6 Minor Rockfish assemblages
  - Geographic/depth differences
- 2010 -- data-poor assessment methods for OFLs
  - Catch-only methods

Issues

- Current complexes tend to be heterogeneous
  - Productivity
  - OFL
  - Fishery interest
  - Catch-all (Other Groundfish)
- Sampling of landed fish
  - New complex/category= new sampling challenges

Developing Alternative Categorization

- Identify species at risk of being over-harvested
  - Small relative OFL contribution
  - High relative economic value
  - Imbalance in OFLs: catch of complex species
- Develop alternatives
  - Ecology, biology, fishery patterns, vulnerability
- Assess :
  - likely removal rate
  - harvest rate on more-abundant species
  - novel sorting and sampling requirements

Joint Hake-Sardine (SaKe) Survey

Northwest Fisheries Science Center

Southwest Fisheries Science Center

Fisheries and Oceans Canada

Fisheries and Oceans Canada Pêches et Océans Canada

NOAA Fisheries

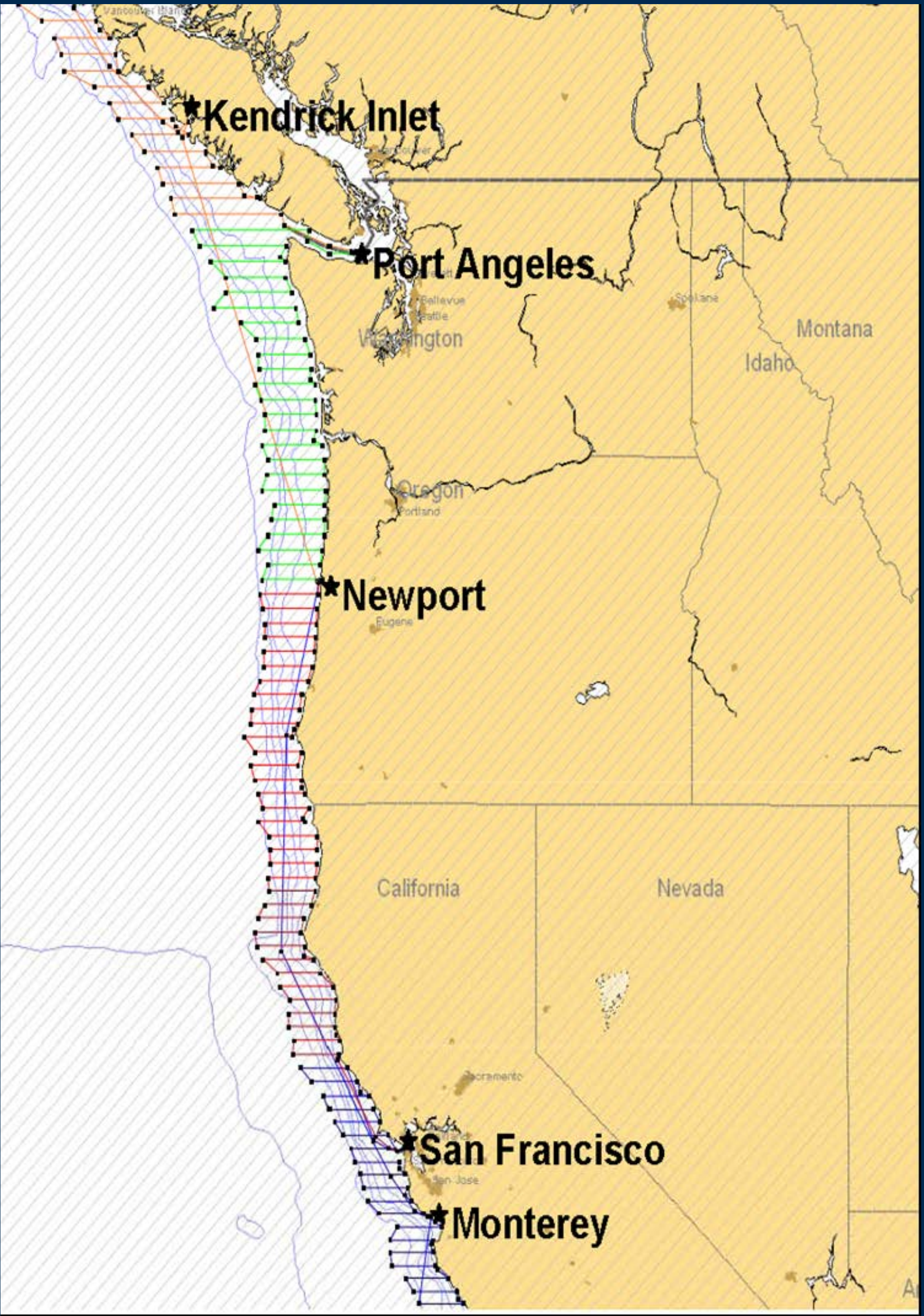
Summary of Objectives (1/2)

- Integrated acoustic-trawl survey of both Pacific Hake and Pacific sardine
- Distributions and abundances of Pacific hake and Pacific sardine.
- Oceanographic and environmental variables

Summary of Objectives (2/2)

Oceanographic/environmental variables:

- Continuously sample sea-surface temperature, salinity, and chlorophyll-*a*. Data will be used to estimate the physical oceanographic habitats for each target species.
- Continuously sample “weather”: air temperature, barometric pressure, and wind speed and direction.
- Sample plankton at nighttime stations, as time allows. Data will be used to estimate distributions and abundances of ichthyoplankton and zooplankton.
- Continuously sample profiles of currents using the RDI/ADCP, if it does not add noise to the EK60 data.



2012 *Bell M. Shimada* and F/V *Forum Star* Transects

Color Key

Leg 1: Newport to San Francisco June 24-July 6

Leg 2: San Francisco to Newport July 9 – July 25

Leg 3: Newport to Pt. Angeles July 30 to August 12

Leg 4: Pt. Angeles to Newport August 15 – 30th

2012 DFO/CCGS *W.E. Ricker* Transects

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Historical Integrated Acoustic-Trawl Survey vs. 2012 Integrated Acoustic-Trawl Survey

Historical Survey

- Spacing
  - 10 nmi spacing coastwide
  - 50 to 1500 m depths
- Variable Ping Rate: ~1ping/s and survey speed of 10 knots and centerboard fully deployed

2012 Survey

- Spacing
  - Monterey Bay to N. Vancouver Isl
    - 10 nmi
    - 30 m to 1500 m or 40nmi
  - N. Vancouver Isl. To Dixon Entrance
    - 20 nmi spacing
    - diagonal cross transects
    - 50 to 1500 m
- Nighttime trawling for sardine
- Increased total transect miles due to extension of transects for sardines and use of diagonal cross transects
- Fixed Ping Rate: 1.1 pings/s and survey speed of 8 knots and centerboard deployed only to mid position

Challenges

- First time operating a separate fishing boat with acoustics aboard the NOAA vessel
- Research agenda for off-year postponed; environmental data minimized
- Combining priorities and making compromises between two Science Center survey protocols with limited DAS.
- Tight schedule! (Marine Mammal protocols/ Murphy’s law events, Weather, etc.)

Thanks to DFO and the hake and sardine fishing industries for this important collaboration

Review of Hook and Line Survey

- 9th year of Southern California Bight Hook and Line Survey
  - Non-trawlable habitats and southern rockfish species

- Cooperative research funding support with cooperation from PSMFC and the Sportfishing Industry

- CIE review, April 2012

- Key reviewer concerns
  - Analytic approaches
  - Representativeness of sampling
  - Lack of sampling in CCA
  - Gear saturation

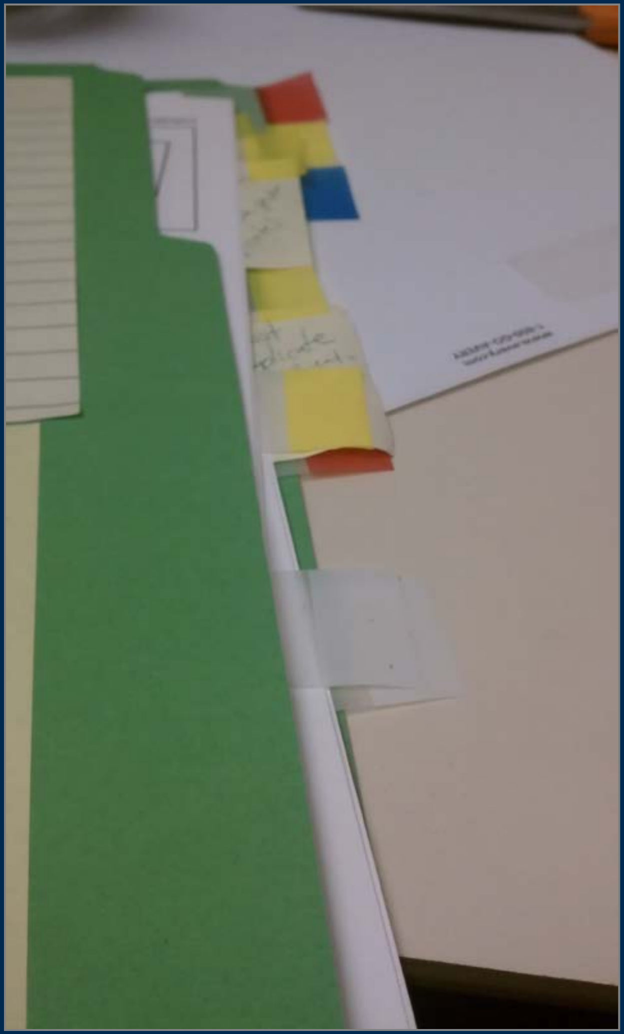
Economic Data Collection Program

2011 Data Collection

- Forms were mailed in the beginning of May
- We have received 21 surveys so far
- Forms must have an answer to every question to be considered complete
- Encourage anyone to contact us with questions
  - nwfsc.edc@noaa.gov, 866-791-3726

2009 and 2010 Data Collections

- Wrapping up QA/QC
- Have been contacting entities to clarify questions about data provided on forms



Pacific Coast Groundfish Fishery Social Study: Status Update

Collects non-economic social data to measure social changes in fishing communities

Baseline Data Collection Effort

- Conducted from Sept. 2010 – Jan. 2011
- Data currently under analysis

First Post-Catch Share Collection Effort

- Starting late July 2012 – Dec. 2012

For study information or questions contact:
Suzanne Russell, Social Scientist, NWFSC
206-860-3274, Suzanne.Russell@noaa.gov

Cooperative Research

- National Cooperative Research Committee will be meeting in Newport, Oregon August 26-29.
  - Presentation planned from the captains of our hook and line survey

•PFMC (Executive Directors nationally) will be receiving a notification of the 2013 National Cooperative Research competitive grant at the end of June.

  •National Grant: approximately $1.5 million

  •Requires NMFS to be co-PI

  •2 month solicitation, 3 proposals each from NW and SW

•Regional co-op solicitation will also involve review

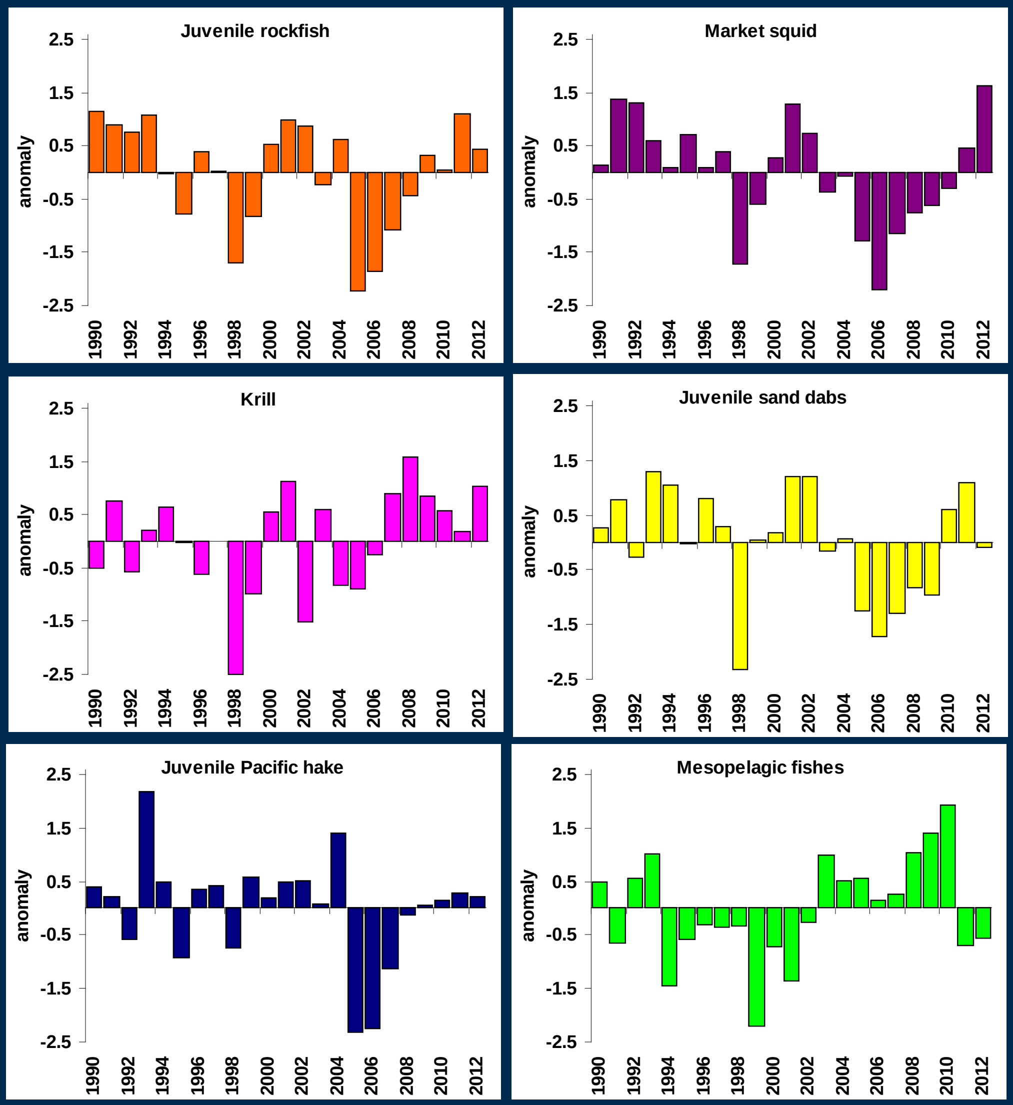
Update:
2012 West Coast Groundfish Bottom Trawl Survey

Pass 1: May 14-June 25 ongoing (2 weather days)
Vessels: F/V *Ms. Julie* and F/V *Noah's Ark*
Pass 2: August 13-October 22 upcoming
Vessels: F/V *Excalibur* and F/V ?

Status of Pass One:

- Increased number of Japanese floats sighted
- ~28% of stations complete
- Biological measurements
- Ecosystem data

SWFSC Juvenile Rockfish/Ecosystem Assessment Survey



- 30th annual survey
- Preliminary data on micronekton species assemblages
- Abundance of gelatinous zooplankton

Observer Program Update: June 2012

- 71 Catch Share & 39 Non-Catch Share observers
- 30 observers trained for at-sea hake in May
- Development of data system

Agenda Item D.2
Situation Summary
June 2012

BAROTRAUMA WORKSHOP REPORT AND POTENTIAL USE OF RECOMPRESSION CATCH-AND-RELEASE SURVIVAL ESTIMATES

A workshop to discuss how to improve survival of released fish that suffer barotrauma was convened in Portland, Oregon on May 8-9, 2012. There was a particular focus on how to improve survival of released rockfish caught using recreational hook-and-line gear using descending devices that enable fish to be released at depth. This allows recompression of expanded gasses that cause barotrauma in fish species that cannot quickly acclimate to the change in depth that occurs when fish are caught and quickly brought to the surface. Studies have shown there is both short and long-term survival of some of these fish when they are released at depth using descending devices.

Workshop participants recommended that the use of descending devices to mitigate the effects of barotrauma in released fish should be done routinely as a best practice. Specifically, fish that suffer barotrauma during capture should ideally be released at the depth of capture as quickly as possible with minimum handling. Studies have shown that water temperature, time on deck, and how released fish are handled influence survival rates. Participants also recommended that management systems give survival credit in fisheries where descending devices are used. The challenges will be how to educate anglers on how to use these devices properly, how to shape management systems to provide an appropriate survival credit when these devices are used, and how to determine appropriate survival rates for species that suffer barotrauma when these devices are used from the research conducted to date.

Attachment 1 provides the recommendations of participants in this year's Portland barotrauma workshop and those from the national barotrauma workshop convened last year in Atlanta, Georgia. Attachment 2 is an annotated bibliography of key research conducted on barotrauma and recompression effects on rockfish species. Attachment 3 provides slides of a PowerPoint presentation on venting and recompression of rockfish given by Dr. Alena Pribyl at the Portland barotrauma workshop (the original PowerPoint presentation available on the briefing book CD and online at pcouncil.org).

The Council task at this meeting is to provide guidance on how to best integrate the use of descending devices to recompress rockfish that suffer barotrauma in the west coast management system. The Council should consider the advice of the SSC on the science that informs this issue and GMT, GAP and public advice on how to shape the management system to reduce discard mortality of released rockfish.

Council Action:

Provide guidance on how to integrate the use of descending devices and recompression survival rates into the management of west coast rockfish.

Reference Materials:

1. Agenda Item D.2.a, Attachment 1: Summary recommendations of participants at the 2012 Portland, Oregon and 2011 Atlanta, Georgia barotrauma workshops.
2. Agenda Item D.2.a, Attachment 2: Annotated bibliography of research conducted on barotrauma and recompression of rockfish species caught and released using hook-and-line gears.
3. Agenda Item D.2.a, Attachment 3: Slides from a PowerPoint presentation given by Dr. Alena Pribyl at the Portland barotrauma workshop entitled, "Venting and Recompression: Techniques and Appropriate Uses."

Agenda Order:

a. Agenda Item Overview — John DeVore
b. Workshop Report — Dan Wolford
c. Reports and Comments of Advisory Bodies and Management Entities
d. Public Comment
e. **Council Action:** Review Recompression Methods and Survival Information and Provide Guidance on its Integration into Council Management

PFMC
05/31/12

FishSmart
www.FishSmart.org

FishSmart Pacific Workshop Makes Headway with Management and Research Recommendations

Fifty individuals representing researchers, fisheries managers, anglers, communication specialists, and the sport fishing industry gathered in Portland, Oregon for the "FishSmart Pacific Workshop on Improving the Survival of Released Fish Focusing on Barotrauma." Two days of intensive presentations and interactive discussion covered recreational fisheries from Alaska, Hawaii, and the length of the West coast to address ways of reducing mortality in fisheries that are constrained by high release mortality.

As in other FishSmart workshops, participants emphasized the need for anglers to avoid catching restricted species altogether, thereby averting the need to take special measures to help improve the fish's chances of survival. Avoidance techniques include knowing where restricted species are likely to be caught and avoiding them, use of gears that allow anglers to better judge depths and target species that they are seeking while avoiding those that would need to be returned to the water, and changing locations when too many restricted fish are being encountered.

If a fish caught in deeper water must be released, workshop participants supported using weighted grippers, "lip hangers," or baskets to return a fish to the depth where it was caught or as deep as possible wherever this is not possible (generally called "recompression") as the first choice to improve survival. Venting (releasing swim bladder gasses from the fish's body to enable it to return to deeper waters on its own) should generally be a last option. Some fish are caught at significant depths (up to 1,200 feet in Hawaii) or are too large to return using devices for recompression, necessitating venting as the only choice.

West coast rockfish (*Sebastes spp*.), a group of about 60 or more species, constituted a large part of the discussions due to the current situation where a few species with low abundance are constraining fishing for other species that are often caught in the same location and times. The high release mortality of these "choke species" prevents sustainable fishing activity for the other species. While some gaps in research remain, workshop participants coalesced around the concept that sufficient science already exists to allow managers to consider ways to incorporate "improved survival" scenarios into management and address mechanisms that would permit limited fishing in closed areas or otherwise increase fishing opportunities. Currently, the mortality rate used for management of most rockfish species caught at depths deeper than 30 fathoms (180 feet) is 100%, assuming that anglers take no special measures to improve their survival. However, numerous studies have shown that use of recompression devices when returning a fish to deeper waters significantly improves survival. Incorporating a lower

--more--

release mortality rate into management scenarios for these deeper caught rockfish would potentially allow expanded fishing opportunities in some fisheries. Workshop participants stressed that existing angler dockside surveys in Oregon, Washington, and California must incorporate questions to determine the extent of use of recompression techniques among anglers to better apply lower mortality rates into the modeling and management actions.

Management actions based on angler adoption of techniques to improve survival have already been approved in Alaska. Beginning in 2013, charter operators in southeast Alaska will be required to have a deep-water release mechanism onboard for use on rockfish that they release. Descending devices are anticipated to lower the mortality rates of released rockfish from as high as 90 percent to as low as 10 percent.

Best practices include a combination of avoidance, release techniques, and handling fish before release (see www.fishsmart.org). Workshop participants felt that voluntary adoption of these best practices and recompression techniques should be immediately implemented rather than waiting for mandated regulations. Voluntary adoption would allow greater flexibility to change as new information became available. Many anglers and Commercial Passenger Fishing Vessels (CPFV) already utilize, and aggressively promote, release techniques that improve survival but expanded communication efforts are needed to increase the number of anglers who use them in order to have a greater impact on the fish stocks. Several well established communication programs already exist and could become more effective with additional coordination. Expanded communication programs through organizations such as the Recreational Boating and Fishing Foundation could provide greater use of online and social media to reach additional audiences.

Finally, workshop participants discussed the current process of acquiring exempted fishing permits (EFP) to use in studies of gear and techniques that might increase the survival of released fish. In some cases, permit authorization can take more than two years, meaning that the time from permit application to final results and potential implementation by management entities could be 6 years or more. The process for applying for and obtaining such permits should be streamlined to allow quicker approval and initiation of studies.

The workshop was part of the larger FishSmart effort, a program lead by the sport fishing community to work with anglers and industry to improve the survival of caught and released fish. The initial phases of FishSmart are being funded by NOAA Fisheries Service through a grant to the Atlantic States Marine Fisheries Commission. Additional details of the program can be found at: (http://www.nmfs.noaa.gov/stories/2012/04/04_11_12fishsmart_workshops.html).

These workshop highlights will be part of a full that will be posted at www.fishsmart.org in the near future. For more information about FishSmart, visit www.fishsmart.org.

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FishSmart Workshop Likely to Change the Way to Manage Release of Saltwater Fish

Over a three day period in March, recreational anglers, charter operators, representatives of the sportfishing industry, management entities, and environmental groups met with leading scientific experts in the field of release mortality in marine recreational fisheries. The purpose of this FishSmart Barotrauma Workshop was to evaluate the current state of knowledge related to improving the survival of angler caught-and-released fish and explore ways that both release and fisheries management techniques could be improved.

A major conclusion of the workshop, based on evidence provided by Pacific coast rockfish scientists, was that recompression is more effective for many of these west coast species than traditional "venting" (releasing gases from a fish's body cavity by inserting a small hollow needle into the fish's body). Recompression has been shown to offer several benefits over venting for some Pacific rockfish. Additionally, some recompression gear (e.g., release baskets) provides protection from predators on the way back down and reduces the potential for additional physical injury to fish. However, recompression may not be possible in all cases, at which time venting would become the best alternative.

In the Gulf of Mexico and South Atlantic, additional research is needed to determine if rapid recompression may be a preferred alternative to venting. Currently, federal law requires venting bloated reef fishes before release in the Gulf of Mexico. Rapid recompression techniques may currently be used in conjunction with venting, but the use of recompression devices also requires research into whether their use promotes human/dolphin/marine mammal interactions that may conflict with provisions of the Marine Mammal Protection Act. Some rapid release devices such as release baskets may be effective for releasing fish and may not cause harm to dolphins and other marine mammal, whereas release devices with hooks and weights may not be appropriate in cases where marine mammals are prevalent.

During the workshop, participants discussed current research findings and developed guidelines for the release of saltwater fish (focusing on those caught at deep depths), recommendations for improving management of fisheries with high release mortality, and identified crucial gaps in research that are impeding managers' ability to make improvements in the way that these fisheries are managed.

These findings also could provide the basis for reforming the way that some areas closed to recreational fishing are managed. Data are needed from closed areas in order to adequately manage the fish stocks; anglers that are trained and certified in maximizing the survival of released fish using recompression could potentially provide these data by collecting it during specially permitted fishing trips while maximizing the survival of released fish.

Workshop results clearly indicated that development of species-specific advice on release techniques and management needs to be developed through regional workshops similar to the national workshop. General findings from the workshop are included below, but will be refined and included in messages to anglers.

The workshop was part of the larger FishSmart effort, a program lead by the sport fishing community to work with anglers and industry to improve the survival of caught and release fish. The initial phases of FishSmart are being funded by NOAA Fisheries through a grant to the Atlantic States Marine Fisheries Commission. Complete findings of the workshop are in the process of being prepared and will be available in April.

General Guidelines for Releasing Marine Recreational Fish

Note: These guidelines are generally acceptable practices available on state, federal, and nonprofit websites. They will be refined in the future and links provided to sources of additional information.

1. Plan Ahead – decide whether you might release fish on any given trip and prepare the equipment necessary to do so.
2. Avoid encountering fish that you are required to release. If catching fish that you cannot, or do not want to keep, changing the depth that you are fishing, moving to a different area, or using different bait are just a few techniques for avoiding unwanted catch.
3. Use gear suited to the size of fish that you are trying to catch. Consider using "weak hooks" that allow you to catch fish of the size that you want but break if you catch fish too big. Use circle hooks where recommended and be aware that circle hook fishing techniques are different from normal "J" style hook techniques.
4. When landing fish, don't play them to exhaustion; use line strength to minimize playing time.
5. Land the fish as quickly as possible. If possible, leave them in the water rather than bringing them on board. If you must handle them, use knotless rubberized landing nets, rubberized gloves, or wet towels to avoid removing the slime layer from their body. Support the body when lifting large fish.
6. When releasing fish, determine whether you need a release tool (dehookers, venting tools, recompression tools) to successfully release your catch.
7. Time is of the essence! – release fish as soon as practical and do not keep them out of the water longer than necessary.
8.

Guidelines Specific for Saltwater Fish Caught in Deep Water

Some saltwater fish that are caught in deep water may be suffering from "barotrauma," an expansion of swim bladder gases that makes it difficult or impossible for them to swim back down. Generally, fish caught deeper than 30 feet will suffer some effects. Starting in mid 2011, more specific guidance will be available at www.takemefishing.org and www.fishsmart.org. Until then, follow these tips:

IMPORTANT: The use of venting tools and dehooking devices is required when participating in the recreational reef fish fisheries in the Gulf of Mexico.

1. When anglers are not required by law to use venting tools, recompression is generally the first choice for returning fish to the depth from which they are caught. A variety of recompression tools are on the market, including descender devices, release weights, release baskets, and others. A complete inventory of such devices will be available at a later date from www.takemefishing.org and www.fishsmart.org.
2. Return fish to the depth of capture. If catching fish at very deep depths, returning them to at least 60 - 100 feet will dramatically improve survival.
3. If recompression is not possible, venting is a second option (use established guidelines for venting such as found at http://catchandrelease.org/). Note that the fish's stomach may protrude from its mouth. Do NOT puncture the stomach.

Guidance to Regulatory Bodies

The FishSmart Barotrauma Workshop developed recommendations for regulatory bodies (agencies and fisheries management councils/commissions) including:

1. Workshops should be held in each region similar to the national workshop to develop region specific guidance on species-specific handling and management techniques available in each region.
2. Incorporate metrics into the FishSmart efforts, including
   a. Measure the success of outreach efforts to the angler – who is being reached and how is it changing behavior.
   b. Measure impact of different release mortalities on stock assessments
   c. Measure impact of reduced release mortality on harvestable surplus
3. Exempted fishing permit studies –explore certifying anglers in release techniques for fishing in an MPA or other closed area for the purposes of collecting fisheries data in the closed area and enhancing angler involvement in the management of these areas.
4. Begin evaluating changes to the legal framework (particularly related to the Marine Mammal Protection Act and venting tool requirements) that *might* be needed if recompression tools are proven to be a preferred alternative in the Gulf of Mexico.

Additional management recommendations will be detailed in the full report of the workshop.

Gaps in the Current State of Knowledge

1. Research is needed on the effectiveness of recompression techniques for specific areas/fisheries where information is not currently available (e.g., red snapper in the Gulf of Mexico and South Atlantic)
2. Additional research is needed on how far down to release fish
3. Priority research is needed to quantify the impact of different release mortalities for fisheries assessments/catch estimation within season as a tool to use in management process.
4. Species specific effects of barotraumas, predation and hook mortality.

Additional research priorities will be detailed in the full report of the workshop.

Barotrauma effects in rockfish

(Brill et al. 2008; Hannah and Matteson 2007; Hannah et al. 2008a; Hannah et al. 2008b; Jarvis and Lowe 2008; Pribyl et al. 2011; Pribyl et al. 2009; Rogers et al. 2008)

Brill, R., C. Magel, M. Davis, R. Hannah, and P. Rankin. 2008. Effects of rapid decompression and exposure to bright light on visual function in black rockfish (Sebastes melanops) and Pacific halibut (Hippoglossus stenolepis). Fishery Bulletin 106(4):427-437.

Demersal Fishes hauled up from depth experience rapid decompression. In physoclists, this can cause overexpansion of the swim bladder and resultant injuries to multiple organs (barotrauma), including severe exophthalmia ("pop-eye"). Before release, fishes can also be subjected to asphyxia and exposure to direct sunlight. Little is known, however, about possible sensory deficits resulting from the events accompanying capture. To address this issue, electroretinography was used to measure the changes in retinal light sensitivity, flicker fusion frequency, and spectral sensitivity in black rockfish (Sebastes melanops) subjected to rapid decompression (from 4 atmospheres absolute [ATA] to 1 ATA) and Pacific halibut (Hippoglossus stenolepis) exposed to 15 minutes of simulated sunlight. Rapid decompression had no measurable influence on retinal function in black rockfish. In contrast, exposure to bright light significantly reduced retinal light sensitivity of Pacific halibut, predominately by affecting the photopigment which absorbs the green wavelengths of light (approximate to 520-580 nm) most strongly. This detriment is likely to have severe consequences for postrelease foraging success in green-wavelength-dominated coastal waters. The visual system of Pacific halibut has characteristics typical of species adapted to low light environments, and these characteristics may underlie their vulnerability to injury from exposure to bright light.

Hannah, R. W., and K. M. Matteson. 2007. Behavior of nine species of Pacific rockfish after hook-and-line capture, recompression, and release. Transactions of the American Fisheries Society 136(1):24-33.

We evaluated the effect of barotrauma on the behavior of nine species of Pacific rockfish Sebastes spp. after hook-and-line capture and release using a video-equipped underwater release cage. Sampling was conducted across a range of bottom depths (12-194 m), mostly where barotrauma resulting from an expanded swim bladder and gaseous release of dissolved blood gases would be expected. Behavioral impairment from barotrauma was depth related but highly species specific. Increased depth of capture was associated with lower behavioral scores for black rockfish S. melanops, blue rockfish S. mystinus, and yelloweye rockfish S. ruberrimus, but not for canary rockfish S. pinniger. Behaviorally impaired fish showed a decreased ability to maintain vertical orientation and were slower in exiting the release cage. Species differed in the degree of behavioral impairment resulting from barotrauma and in how rapidly behavioral impairment increased with depth of capture. When captured at depths between 40 and 99 m, blue rockfish showed the most serious behavioral impairment, 8 of 18 (44%) failing to swim away at the time of release and simply drifting off in a sideways or upside-down posture. In the same depth range all of the other species sampled showed only moderate behavioral impairment, which is indicative of some potential for survival after discard by the fishery. Surface observations of the external signs of barotrauma were variable among species and were poor indicators of which species would show behavioral impairment upon release at depth. Within individual species, however, the external signs of barotrauma were associated with an increased probability of behavioral impairment at time of release.

Hannah, R. W., S. J. Parker, and K. M. Matteson. 2008a. Escaping the surface: The effect of capture depth on submergence success of surface-released Pacific rockfish. North American Journal of Fisheries Management 28(3):694-700.

We evaluated the effect of capture depth and fish size on the ability of several Pacific rockfishes Sebastes spp. to resubmerge after hook-and-line capture and surface release. We observed fish as they were released into a bottomless floating enclosure, and we recorded submergence success within a 5-min time limit. Submergence success was greater than 80% for all rockfish captured in depths less than 30 in. Yellowtail rockfish S. flavidus (N = 51) were 100% successful at submerging in less than 49 s at all depths sampled (10-51 m). At capture depths of 40-51 m, submergence success was 89% for quillback rockfish S. maliger (N = 9), 65% for black rockfish S. melanops (N = 46), and 30% for canary rockfish S. pinniger (N = 40). At depths of 30-51 m, submergence success was 32% for blue rockfish S. mystinus (N = 31). The external signs of barotrauma (e.g., exopthalmia, eversion of the esophagus) increased with depth of capture and were least prevalent in yellowtail rockfish and quillback rockfish. The presence of severe esophageal eversion (beyond the buccal cavity) was strongly negatively associated with submergence success for several species ($P < 0.01$). At 40-51-m capture depths, the frequency of severe esophageal eversion by species was correlated with the frequency of submergence failure ($P < 0.05$). Logistic regression showed a negative relationship between depth of capture and submergence success for black rockfish ($P < 0.001$), blue rockfish ($P < 0.001$), and canary rockfish ($P < 0.05$). Larger body length negatively influenced submergence success only in blue rockfish ($P < 0.05$).

Hannah, R. W., P. S. Rankin, A. N. Penny, and S. J. Parker. 2008b. Physical model of the development of external signs of barotrauma in Pacific rockfish. Aquatic Biology 3(3):291-296.

Four species of Sebastes (Pacific rockfish) showed evidence of a wide array of internal injuries from capture-induced barotrauma, including liver and swimbladder damage, organ displacement related to esophageal eversion, and hemorrhage in the pericardium and abdominal cavity. However, clear evidence of swimbladder rupture was not observed in all fish with external signs of barotrauma. Injection of air through the body wall into the swimbladders of rockfish carcasses generated all of the common external signs of barotrauma documented in wild-captured fish, suggesting that the physical effects of swimbladder gas expansion can create these gross external signs without embolism from dissolved blood gases. Dissections of injected black rockfish S. melanops carcasses showed that, typically, injected air escaped the swimbladder without obvious rupture, moving in an anterio-dorsal direction, generating bulges and air bubbles that were externally visible through the branchiostegal membrane. Injected air also collected dorsally to the esophagus, posterior to the pharyngeal teeth, causing the esophagus to roll outwards into the buccal cavity (esophageal eversion). Injected air also frequently traveled further forward, collecting medially to the eyeball, leading to exophthalmia, and then moved distally along the fascia, invading the corneal stroma from the edges, resulting in corneal emphysemas. Air injected into the swimbladders of quillback rockfish S. maliger carcasses generated similar eye effects, but also escaped through ruptures in the branchiostegal membrane and did not generate esophageal eversion, which is also infrequent in wild-caught specimens. These results demonstrate that the major external signs of barotrauma in Pacific rockfish can develop as result of escaping swimbladder gases following an internal 'path of least resistance'.

Jarvis, E. T., and C. G. Lowe. 2008. The effects of barotrauma on the catch-and-release survival of southern California nearshore and shelf rockfish (Scorpaenidae, Sebastes spp.). Canadian Journal of Fisheries and Aquatic Sciences 65(07):1286-1296.

Two experiments were used to assess the effects of barotrauma on initial capture survival and short-term postrecompression survival of line-caught (range 18-225 m) southern California rockfish (Sebastes spp.). Occurrence of external and internal signs of barotrauma was characterized across all species. Despite species-specific differences in the extent of barotrauma observed, initial capture survival of rockfish held in a live well for a 10-min period following capture was 68% overall (19 species, n = 168). Overall 2-day survival of rockfish following recompression in cages was also 68% (17 species, n = 257). Short-term survival varied across species (range 36% to 82%), as did the occurrence of external signs of barotrauma. The degree of external signs of barotrauma was not a significant predictor of initial capture survival or short-term survival. The most significant predictor of short-term survival was surface holding time, with short-term survival increasing with decreasing surface holding time. These results suggest that rapid recompression of rockfish can significantly decrease discard mortality and could potentially enhance rockfish conservation.Original Abstract: Deux experiences nous ont servi evaluer les effets du barotraumatisme sur la survie initiale a la capture et la survie a court terme apres la recompression de sebastes (Sebastes spp.) du sud de la Californie captures a la ligne (etendue des profondeurs de 18-225 m). Nous avons observe des signes externes et internes de barotraumatisme chez toutes les especes. Malgre des differences specifiques de l'importance du barotraumatisme, la survie initiale a la capture des sebastes gardes dans un vivier pendant 10 min suivant la capture est globalement de 68 % (19 especes, n = 168). La survie globale des sebastes gardes dans des cages pendant 2 jours apres la recompression est aussi de 68 % (17 especes, n = 257). La survie a court terme varie d'une espece a l'autre (etendue de 36 a 82 %), de meme que la presence de signes externes de barotraumatisme. L'importance des signes externes de barotraumatisme ne permet pas de predire avec assurance la survie initiale a la capture, ni la survie a court terme. La variable la plus significative pour predire la survie a court terme est la duree de la retenue du poisson en surface, la survie augmentant en fonction inverse de la duree de la retenue en surface. Ces resultats indiquent qu'une recompression rapide des sebastes peut reduire de facon significative la mortalite lors de leur rejet a la mer et pourrait potentiellement favoriser la conservation des sebastes.

Pribyl, A. L., M. L. Kent, S. J. Parker, and C. B. Schreck. 2011. The response to forced decompression in six species of Pacific rockfish. Transactions of the American Fisheries Society 140(2):374-383.

Abstract Pacific rockfish experience high discard mortality when captured owing to a condition called barotrauma, which is caused by the change in pressure during capture. This condition appears to be species specific at the macroscopic level; however, little is known about the microscopic tissue-level effects of barotrauma. Determining whether tissue-level injuries are also species specific or influenced by factors such as life history and phylogenetic relatedness can improve our management of discard mortality. We evaluated the responses of six species of Pacific rockfish (black rockfish Sebastes melanops, blue rockfish S. mystinus, yellowtail rockfish S. flavidus, quillback rockfish S. maliger, canary rockfish S. pinniger, and yelloweye rockfish S. ruberrimus) captured from varying depths to forced decompression at the histological level (heart ventricle, rete mirabile, head kidney, liver, gill, and eye) as well as the macroscopic level. At the macroscopic level we focused on injuries caused by barotrauma, namely, everted esophaguses, exophthalmia, ocular emphysema, and ruptured swim bladders. Yellowtail and quillback rockfish experienced the fewest macroscopic injuries. Depth of capture influenced the presence of exophthalmia in quillback rockfish and ocular emphysema in quillback and yelloweye rockfish. Tissue injuries as a result of forced decompression included emphysema in the heart ventricle, emboli in the vessels of the rete mirabile, and emboli in the vessels of the head kidney. No injuries were observed at the histological level in the liver, gill, or eye owing to barotrauma. We could not detect a difference in the tissue-level response to barotrauma among the six species, suggesting that all species are susceptible to high internal gas pressure during forced decompression. Received June 9, 2010; accepted December 18, 2010

Pribyl, A. L., C. B. Schreck, M. L. Kent, and S. J. Parker. 2009. The differential response to decompression in three species of nearshore Pacific rockfish. North American Journal of Fisheries Management 29(5):1479-1486.

In this study, the macroscopic, morphological, and physiological responses to decompression of black rockfish S. melanops, blue rockfish S. mystinus, and yellowtail rockfish S. flavidus, all nearshore species, were investigated. The rockfish were adjusted to 4.5 atmospheres absolute (ATA; 35 m) over a period of 7-10 d in hyperbaric pressure chambers and when neutrally buoyant were rapidly brought to surface pressure in a simulated ascent. They were then examined for barotrauma injury, and the heart ventricle, head kidney, liver, gill, and pseudobranch were collected for histological analysis. We observed more macroscopic barotrauma indicators in black rockfish and blue rockfish than in yellowtail rockfish. Yellowtail rockfish had a low percentage of ruptured swimbladders (25%) compared to black rockfish (80%) and blue rockfish (100%). Histological analysis showed emphysema was present in the heart ventricle of more than one-half of the black rockfish, 11% of the blue rockfish, and none of the yellowtail rockfish. No other tissue had observable injury at the histological level that was attributable to barotrauma. The lack of injury at the tissue level for black, blue, and yellowtail rockfishes decompressed from 4.5 ATA is remarkable.

Rogers, B. L., C. G. Lowe, E. Fernandez-Juricic, and L. R. Frank. 2008. Utilizing magnetic resonance imaging (MRI) to assess the effects of angling-induced barotrauma on rockfish (Sebastes). Canadian Journal of Fisheries and Aquatic Sciences 65(7):1245-1249.

The physical consequences of barotrauma on the economically important rockfish (Sebastes) were evaluated with a novel method using T-2-weighted magnetic resonance imaging (MRI) in combination with image segmentation and analysis. For this pilot study, two fishes were captured on hook-and-line from 100 m, euthanized, and scanned in a 3 Tesla human MRI scanner. Analyses were made on each fish, one exhibiting swim bladder overinflation and exophthalmia and the other showing low to moderate swim bladder overinflation. Air space volumes in the body were quantified using image segmentation techniques that allow definition of individual anatomical regions in the three-dimensional MRIs. The individual exhibiting the most severe signs of barotrauma revealed the first observation of a gas-filled orbital space behind the eyes, which was not observable by gross dissection. Severe exophthalmia resulted in extreme stretching of the optic nerves, which was clearly validated with dissections and not seen in the other individual. Expanding gas from swim bladder overinflation must leak from the swim bladder, rupture the peritoneum, and enter the cranium. This MRI method of evaluating rockfish following rapid decompression is useful for quantifying the magnitude of internal barotrauma associated with decompression and complementing studies on the effects of capture and discard mortality of rockfishes.

Recompression in rockfish

(Hannah and Matteson 2007; Hannah et al. 2008; Hannah et al. 2012; Hochhalter and Reed 2011; Jarvis and Lowe 2008; Parker et al. 2006; Pribyl et al. 2012a; Pribyl et al. 2012b; Rogers et al. 2011)

Blain, Brittany, personal communication. Master's student, University of Alaska-Fairbanks. E-mail: brittanyblain@gmail.com

This work was conducted at the same reef that was used in Hochhalter's yelloweye survival study (also used the same yelloweye tagged in his study). In 2008, 45 yelloweye were tagged in a pilot study, and in 2009, 182 yelloweye were tagged during the mark-recapture study (Hochhalter and Reed 2011). This resulted in a grand total of 227 individual yelloweye tagged on the reef at the end of 2009. Natural mortality, mortality associated with the catch-and-release process, and emigration all likely influenced the number of tagged individuals available in 2010 by some unknown amount. The sex ratio of the tagged individuals was unknown so they were not sure of the exact number of tagged females. Sampling efforts during the egg/lavae carrying season (May 1st - July 15th) in 2010 captured a total of 108 yelloweye, 55 of which were recaptures. Sixteen of the recaptured individuals were sexually mature (>40 cm TL) females; 8 were spent and 8 were gravid. These fish had been at liberty for 330 - 729 days from the time of initial capture and exposure to barotrauma. Larvae from the eight gravid females were analyzed for oil globule volume, lipid content, and protein content. These values were compared to those from 14 newly captured females (no know previous exposure to barotrauma). Brittany found no evidence that barotrauma impacts the reproductive viability of female yelloweye in subsequent years: all 16 recaptured females had successfully gone through gonad development, mating, larval gestation, and, for 8 of them, parturition. She also found no evidence that maternal contribution to larval energetics was compromised by previous exposure to barotrauma; larvae oil globule volumes were similar between those from newly captured females and those from recaptured females.

Hannah, R. W., and K. M. Matteson. 2007. Behavior of nine species of Pacific rockfish after hook-and-line capture, recompression, and release. Transactions of the American Fisheries Society 136(1):24-33.

We evaluated the effect of barotrauma on the behavior of nine species of Pacific rockfish Sebastes spp. after hook-and-line capture and release using a video-equipped underwater release cage. Sampling was conducted across a range of bottom depths (12-194 m), mostly where barotrauma resulting from an expanded swim bladder and gaseous release of dissolved blood gases would be expected. Behavioral impairment from barotrauma was depth related but highly species specific. Increased depth of capture was associated with lower behavioral scores for black rockfish S. melanops, blue rockfish S. mystinus, and yelloweye rockfish S. ruberrimus, but not for canary rockfish S. pinniger. Behaviorally impaired fish showed a decreased ability to maintain vertical orientation and were slower in exiting the release cage. Species differed in the degree of behavioral impairment resulting from barotrauma and in how rapidly behavioral impairment increased with depth of capture. When captured at depths between 40 and 99 m, blue rockfish showed the most serious behavioral impairment, 8 of 18 (44%) failing to swim away at the time of release and simply drifting off in a sideways or upside-down posture. In the same depth range all of the other species sampled showed only moderate behavioral impairment, which is indicative of some potential for survival after discard by the fishery. Surface observations of the external signs of barotrauma were variable among species and were poor indicators of which species would show behavioral impairment upon release at depth. Within individual species, however, the external signs of barotrauma were associated with an increased probability of behavioral impairment at time of release.

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We evaluated the effect of capture depth and fish size on the ability of several Pacific rockfishes Sebastes spp. to resubmerge after hook-and-line capture and surface release. We observed fish as they were released into a bottomless floating enclosure, and we recorded submergence success within a 5-min time limit. Submergence success was greater than 80% for all rockfish captured in depths less than 30 in. Yellowtail rockfish S. flavidus (N = 51) were 100% successful at submerging in less than 49 s at all depths sampled (10-51 m). At capture depths of 40-51 m, submergence success was 89% for quillback rockfish S. maliger (N = 9), 65% for black rockfish S. melanops (N = 46), and 30% for canary rockfish S. pinniger (N = 40). At depths of 30-51 m, submergence success was 32% for blue rockfish S. mystinus (N = 31). The external signs of barotrauma (e.g., exopthalmia, eversion of the esophagus) increased with depth of capture and were least prevalent in yellowtail rockfish and quillback rockfish. The presence of severe esophageal eversion (beyond the buccal cavity) was strongly negatively associated with submergence success for several species ($P < 0.01$). At 40-51-m capture depths, the frequency of severe esophageal eversion by species was correlated with the frequency of submergence failure ($P < 0.05$). Logistic regression showed a negative relationship between depth of capture and submergence success for black rockfish ($P < 0.001$), blue rockfish ($P < 0.001$), and canary rockfish ($P < 0.05$). Larger body length negatively influenced submergence success only in blue rockfish ($P < 0.05$).

Hannah, R. W., P. S. Rankin, and M. T. O. Blume. 2012. Use of a Novel Cage System to Measure Postrecompression Survival of Northeast Pacific Rockfish. Marine and Coastal Fisheries 4(1):46-56.
We used a caging system designed to minimize the adverse effects of caging fish in marine waters to evaluate the discard mortality of seven species of rockfish Sebastes with barotrauma. Altogether, 288 rockfish were captured, scored for barotrauma, evaluated behaviorally at the surface, and caged individually on the seafloor for 48 h to determine survival. With the exception of three blue rockfish S. mystinus, the condition of surviving fish after cage confinement from 41 to 71 h was excellent. At capture depths up to 54 m, survival was 100% for yelloweye rockfish S. ruberrimus (n = 25) and copper rockfish S. caurinus (n = 10) and 78% for blue rockfish (n = 36). At capture depths up to 64 m, survival was 100% for canary rockfish S. pinniger (n = 41) and quillback rockfish S. maliger (n = 28) and 90% for black rockfish S. melanops (n = 144). Black rockfish survival was negatively associated with capture depth (m) and the surface?bottom temperature differential (°C). Blue rockfish survival was negatively associated with capture depth. Barotrauma signs and surface behavior scores were not good indicators of survival potential across species but were useful within species. In black and blue rockfish, severe barotrauma was negatively associated with survival, while higher scores on reflex behaviors at the surface were positively associated with survival. The high survival rates and excellent condition of some species in this study suggest that requiring hook-and-line fishers to use recompression devices to help discarded rockfish return to depth may increase survival for some species. Received April 14, 2011; accepted July 30, 2011

Hochhalter, S. J., and D. J. Reed. 2011. The effectiveness of deepwater release at improving the survival of discarded yelloweye rockfish. North American Journal of Fisheries Management 31(5):852-860.
The effectiveness of deepwater release at improving the 17-d survival of discarded yelloweye rockfish Sebastes ruberrimus was determined by comparing an estimate of survival for individuals released at depth with an estimate of submergence probability for individuals released at the water's surface. A mark-recapture study was used to generate a maximum likelihood estimate of the 17-d survival

probability of yelloweye rockfish (n = 182) caught by hook and line (depth = 18-72 m) and subsequently released at depth. The average Cormack-Jolly-Seber survival probability for yelloweye rockfish released at depth was remarkably high (0.988; 95% confidence interval = 0.478-0.999) and positively correlated with individual total length. Survival probability was not significantly influenced by the range of capture depths explored in this study or by exposure to barotrauma and other capture stressors. The submergence success of yelloweye rockfish released at the water's surface was 0.221 (95% confidence interval = 0.149-0.315), suggesting that the maximum survival potential of individuals released at the surface is low. The results of this study indicate that the average survival of discarded yelloweye rockfish can be substantially improved by deepwater release. Received March 25, 2011; accepted June 22, 2011

Jarvis, E. T., and C. G. Lowe. 2008. The effects of barotrauma on the catch-and-release survival of southern California nearshore and shelf rockfish (Scorpaenidae, Sebastes spp.). Canadian Journal of Fisheries and Aquatic Sciences 65(07):1286-1296.

Two experiments were used to assess the effects of barotrauma on initial capture survival and short-term postrecompression survival of line-caught (range 18-225 m) southern California rockfish (Sebastes spp.). Occurrence of external and internal signs of barotrauma was characterized across all species. Despite species-specific differences in the extent of barotrauma observed, initial capture survival of rockfish held in a live well for a 10-min period following capture was 68% overall (19 species, n = 168). Overall 2-day survival of rockfish following recompression in cages was also 68% (17 species, n = 257). Short-term survival varied across species (range 36% to 82%), as did the occurrence of external signs of barotrauma. The degree of external signs of barotrauma was not a significant predictor of initial capture survival or short-term survival. The most significant predictor of short-term survival was surface holding time, with short-term survival increasing with decreasing surface holding time. These results suggest that rapid recompression of rockfish can significantly decrease discard mortality and could potentially enhance rockfish conservation.Original Abstract: Deux experiences nous ont servi evaluer les effets du barotraumatisme sur la survie initiale a la capture et la survie a court terme apres la recompression de sebastes (Sebastes spp.) du sud de la Californie captures a la ligne (etendue des profondeurs de 18-225 m). Nous avons observe des signes externes et internes de barotraumatisme chez toutes les especes. Malgre des differences specifiques de l'importance du barotraumatisme, la survie initiale a la capture des sebastes gardes dans un vivier pendant 10 min suivant la capture est globalement de 68 % (19 especes, n = 168). La survie globale des sebastes gardes dans des cages pendant 2 jours apres la recompression est aussi de 68 % (17 especes, n = 257). La survie a court terme varie d'une espece a l'autre (etendue de 36 a 82 %), de meme que la presence de signes externes de barotraumatisme. L'importance des signes externes de barotraumatisme ne permet pas de predire avec assurance la survie initiale a la capture, ni la survie a court terme. La variable la plus significative pour predire la survie a court terme est la duree de la retenue du poisson en surface, la survie augmentant en fonction inverse de la duree de la retenue en surface. Ces resultats indiquent qu'une recompression rapide des sebastes peut reduire de facon significative la mortalite lors de leur rejet a la mer et pourrait potentiellement favoriser la conservation des sebastes.

Parker, S. J., H. I. McElderry, P. S. Rankin, and R. W. Hannah. 2006. Buoyancy regulation and barotrauma in two species of nearshore rockfish. Transactions of the American Fisheries Society 135(5):1213-1223.

Fishes with closed swim bladders regulate buoyancy during depth changes by secreting and resorbing swim bladder gases. Forced ascent during fishery capture results in barotrauma caused by rapid expansion and exsolution of gases from body fluids. Pressure changes in hyperbaric chambers were used to examine changes in swim bladder integrity and acclimation rates in two ecologically different, yet congeneric, species: black rockfish Sebastes melanops and China rockfish S. nebulosus. We also conducted simulated-capture experiments to investigate the relationship between capture in a fishery, barotrauma from pressure change, and survival after release. Black rockfish acclimated faster than China rockfish to both increases and decreases in pressure, but both species were much slower to acclimate than other physoclists, such as Atlantic cod Gadus morhua. Black rockfish required up to 48 h to acclimate from 4 atmospheres absolute (ATA; depth equivalent of 30 in) to surface pressure and required up to 168 h to become neutrally buoyant at 4 ATA after starting from surface pressure. In contrast, China rockfish required over 250 h to become neutrally buoyant at 4 ATA after starting from surface pressure. All black rockfish exposed to a 3-ATA decrease in pressure during simulated capture had ruptured swim bladders. However, mortality from simulated capture and subsequent recompression was low; only 3.3 +/- 1.7% (mean +/- SE) mortality was observed after 21 d. In experiments with black rockfish, rapid recompression reversed visible barotrauma, suggesting that a quick return to depth could be used to minimize mortality of discarded black rockfish in nearshore fisheries.

Pribyl, A. L., C. B. Schreck, M. L. Kent, K. M. Kelley, and S. J. Parker. 2012a. Recovery potential of black rockfish, Sebastes melanops Girard, recompressed following barotrauma. Journal of Fish Diseases 35(4):275-286.

Overfished species of rockfish, Sebastes spp., from the Northeast Pacific experience high bycatch mortality because of ‘barotrauma’, a condition induced from the rapid change in pressure during capture. Field experiments show that it may be possible for rockfish to recover from barotrauma if quickly recompressed; however, no work has followed the physiological recovery of rockfish after recompression or determined whether it is possible for rockfish to survive barotrauma in the long term. Barotrauma was induced in adult black rockfish, Sebastes melanops Girard, from a simulated depth of 35 m, followed by recompression. Blood and selected tissues (eye, heart ventricle, head kidney, liver, rete mirabile and gonad) were sampled at days 3, 15 and 31 post-recompression to evaluate the tissue- and physiologic-level response during recovery. No mortality from barotrauma occurred during the experiments, and feeding resumed in 80% of both treatment and control fish. The primary injury in treatment fish was the presence of a ruptured swimbladder and/or a ruptured tunica externa (outer layer of swimbladder), which was slow to heal. Blood plasma was analysed for glucose, sodium, chloride, potassium, calcium, phosphorus, insulin-like growth factor-1 and cortisol. Plasma analyses indicated no strong effects because of barotrauma, suggesting overall handling stress outweighed any effect from barotrauma. Rockfish with ruptured swimbladders may face compromised competency in the wild; however, it appears the majority of black rockfish decompressed from 35 m have a high potential for recovery if recompressed immediately after capture. This research suggests recompression could be a valuable bycatch mortality reduction tool for rockfish in recreational fisheries.

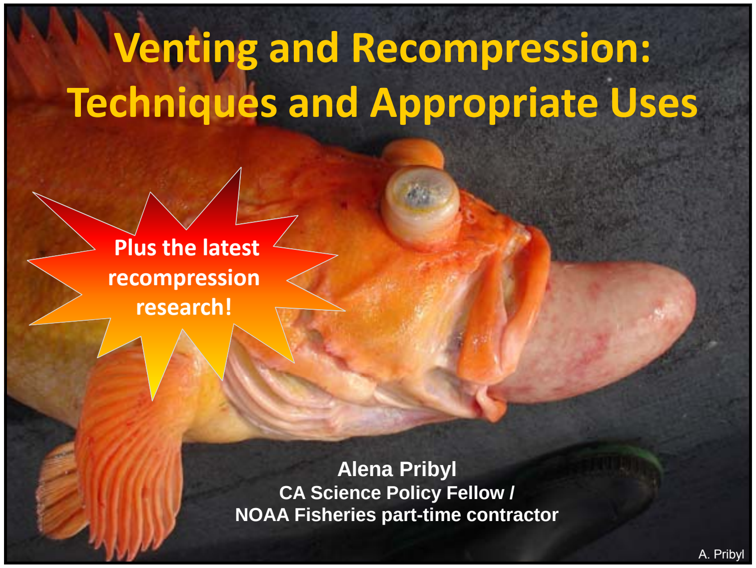
Pribyl, A. L., C. B. Schreck, S. J. Parker, and V. M. Weis. 2012b. Identification of biomarkers indicative of barotrauma and recovery in black rockfish Sebastes melanops. Journal of Fish Biology doi:10.1111/j.1095-8649.2012.03322.x.

A Sebastes-specific complementary DNA (cDNA) microarray was developed to identify potential biomarkers involved in the capture stress and recovery of Sebastes species if they are assisted in returning to their original depth of capture following barotrauma. Black rockfish Sebastes melanops were exposed to simulated decompression from 4·5 atmospheres (ATA) (which resulted in barotrauma) and subsequent recompression. Sebastes melanops were sampled for liver tissue at days 3, 15 and 31 post-barotrauma. Potential candidate genes were identified from the microarray and then quantitative real-time polymerase chain reaction (QRT-PCR) was used to validate expression levels in biological replicates. Six potential biomarkers associated with the innate immune system were identified that were up-regulated in liver tissue at 3 days post-barotrauma: complement

C1q-like protein 2, complement component C3, complement regulatory plasma protein, serum amyloid A-5, c-type lysozyme and hepcidin precursor type I. In addition, complement C1q was correlated to the presence of a ruptured swimbladder, providing further support that this gene may be a good biomarker of injury and recovery. Immune genes were no longer up-regulated at day 31 post-barotrauma, a good indication of recovery in S. melanops.

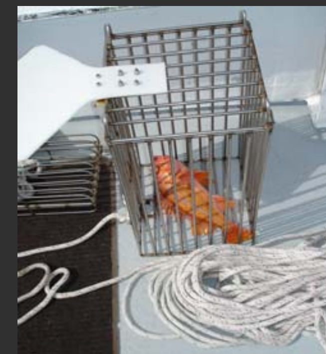
Rogers, B. L., C. G. Lowe, and E. Fernández-Juricic. 2011. Recovery of visual performance in rosy rockfish (Sebastes rosaceus) following exophthalmia resulting from barotrauma. Fisheries Research 112(1–2):1-7.

Rapid ascent during fishing capture can cause exophthalmia ('pop eye') in physoclistic fishes, resulting in stretching of the optic nerves and extraocular muscles, but it is not known whether exophthalmia affects vision temporarily or permanently. We used the optokinetic reflex test to assess changes in visual performance of rosy rockfish (Sebastes rosaceus) that had experienced exophthalmia. Vision was functional 4 days after recompression and was improved after 1 month of recovery evidenced by individuals being able to track both smaller and faster-moving gratings. Our results suggest that, after recompression, rosy rockfish recover from exophthalmia fairly rapidly and perhaps fast enough to minimize significant adverse impacts on survival. This measured recovery from exophthalmia, in addition to evidence of high short-term, post-release survivorship, shows that recompression of unwanted rosy rockfish may be a viable management technique, and may be appropriate for other rockfish species, some of which are at low population densities due to high fishing pressure.



Two Primary Release Techniques

Venting



Recompression with weights/cages

Venting Techniques

- Hold fish gently, but firmly on side
- Insert venting tool at 45° angle, 1”-2” behind base of pectoral fin
- Only insert tool deep enough to release gases

Marine species where venting appears to work

- Black sea bass, *Centropristis striata* (Collins et al. 1999)
- Gag, *Mycteroperca microlepis* (< 40 ft) (Burns et al. 2002)
- Mangrove snapper, *Lutjanus griseus* (< 100 ft) (Burns et al. 2002)
- Saddletail snapper, *Lutjanus malabaricus* (Sumpton et al. 2010, Brown et al. 2008)

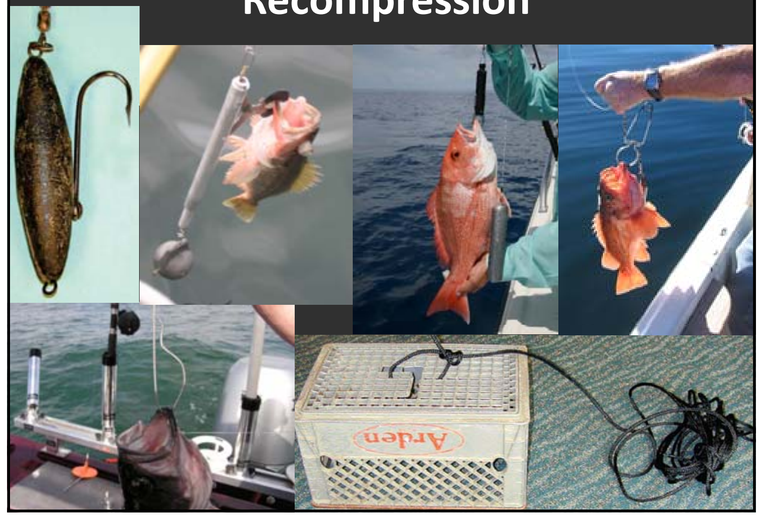
*Out of 18 marine species

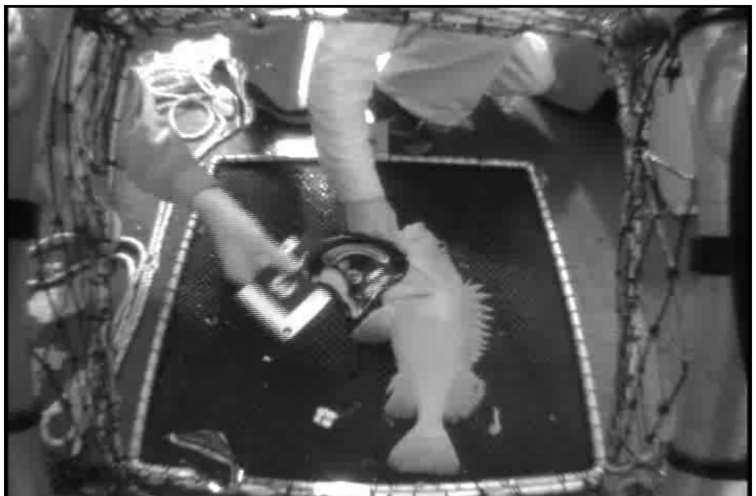
Agenda Item D.2.a
Attachment 3
June 2012

Where Venting could be Beneficial

- Limited species where it is shown to work
- When a fish is unable to submerge and no other option is available to overcome buoyancy
- Non-catch and release purposes
  - aquariums, laboratory use, aquaculture, live fish markets, etc.

Recompression





Video courtesy of the Oregon Dept. of Fish and Wildlife, Newport

Marine species where recompression appears to work

- Many from *Sebastes spp*: canary*, yelloweye*, quillback, copper, black, cowcod*, bocaccio*, flag, vermilion, rosy, rougheye (Hannah et al. 2012, Pribyl et al. 2012, Hochhalter et al. 2011, Rogers et al. 2011, Jarvis et al. 2008, Hannah and Matteson 2007, Smiley and Drawbridge 2007, Parker et al. 2006, P. Rankin pers. comm.)
- Red grouper, *Epinephelus morio* (<44 m) (Wilson and Burns 1996)
- Saddletail snapper, *Lutjanus malabaricus* (Sumpton et al. 2010)
- Australasian snapper, *Pagrus auratus* (<30 m) (Stewart 2008)

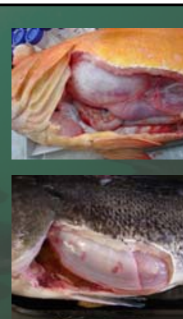
Benefits of Recompression Devices

1) Simple and easy to use
2) Devices can be made cheaply, or purchased
3) Fish can be released quickly
4) No risk of infection from unsterile needles
5) No risk of puncturing internal organs
6) Release cages can protect fish from predation

Factors Affecting Recompression Survival

- Fish species (Hannah et al. 2012, Sumpton et al. 2010, Jarvis et al. 2008, Hannah and Matteson 2007)
- Time on deck (Jarvis et al. 2008, Burns et al. 2002)
- Temperature difference (Hannah et al. 2012, Diamond and Campbell 2009, Jarvis et al. 2008, Feathers and Knable 1983)
- Depth of capture (Hannah et al. 2012, Campbell et al. 2009, Stewart 2008, Hannah and Matteson 2007, St.John and Syers 2005, Wilson and Burns 1996)
- Wounding (Davis and Ottmar 2006)

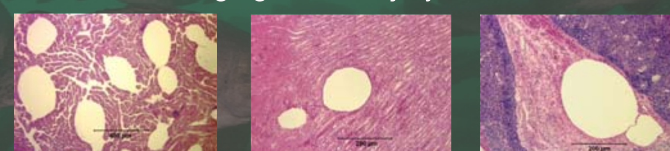
Fish Species



- Swimbladder morphology
  - Swimbladder thickness, elasticity
  - Size – volume of gas
  - Healing rate of swimbladder
- Life history: Pelagic or Benthic
  - Ruptured SwB will likely affect pelagic fish more than benthic fish
- Behavioral impairment
  - Fish species that recover quickly less likely to be subject to predation

Time on Deck

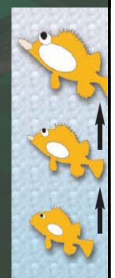
- Deck time >10 min results in high mortality (Jarvis et al. 2008)
  - Emboli can block blood flow, cause hemorrhaging, tissue injury



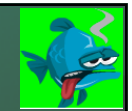
- Optimal deck time should be <5 min
  - The less time internal cavities are exposed to high gas pressure, the more likely internal injuries will not be permanent

Depth of Capture

- Decreased recompression survival when captured from greater depths
  - Black rockfish, blue rockfish, red snapper, red grouper, dhufish, Australasian snapper
- High recompression survival when captured deep
  - Canary, yelloweye , rougheye , bocaccio, sunset, vermilion rockfish



Temperature Differential



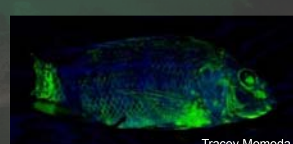
- Surface water temps may be outside of a fish's ability to acclimate , or thermal range
- Large thermal differentials can cause increased gas expansion, exacerbating barotrauma
- If large T diff, placing fish in cool water or in ice water during hook removal may help (P. Rankin, pers. comm.)

Wounding

Burns 2009

- Can be caused by net abrasion, rubbing against other fish, rough handling, hook removal, dropping on deck, etc.
- Can disrupt slime coat, leaving fish susceptible to infection

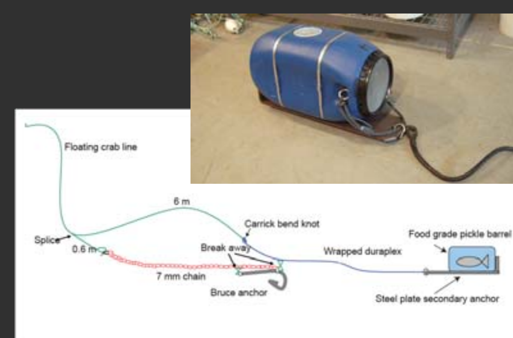
Tracey Momoda



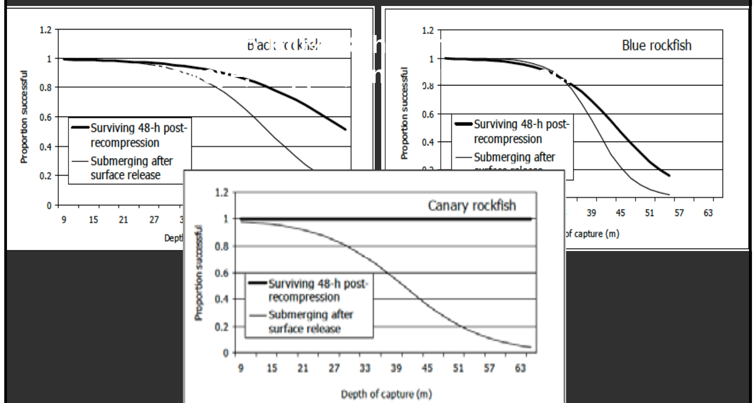
Tracey Momoda

Use of a novel cage system to measure postrecompression survival of NE Pacific rockfish

R.W. Hannah, P.S. Rankin, and M.T. Blume. 2012. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 4: 46-56



Submergence Data combined with 48-hr Survival Data



Graphs from Hannah et al. 2012

The effectiveness of deepwater release at improving the survival of discarded yelloweye rockfish

S.J. Hochhalter and D.J. Reed. 2011. *North American Journal of Fisheries Management* 31:852-860.

No recompression: 22% survival
Recompression: 98% survival

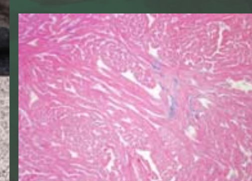
Recovery of visual performance in rosy rockfish following exopthalmia resulting from barotrauma

B.L. Rogers, C.G. Lowe, E. Fernandez-Juricic. 2011. *Fisheries Research 112: 1-7*

No vision impairment 4 days after recompression

Recovery potential of black rockfish following recompression

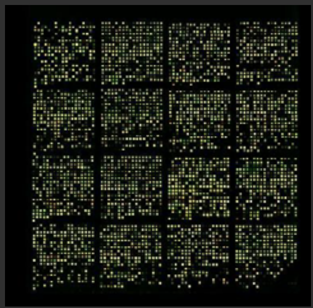
Pribyl, A. L., C. B. Schreck, M. L. Kent, K. Kelley and S. J. Parker. 2012 . *Journal of Fish Diseases* 35 (4): 275-286.



© Daniel J Wright

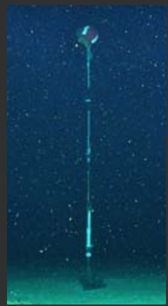
Identification of biomarkers indicative of barotrauma and recovery in Pacific rockfish.

Pribyl, A. L., C. B. Schreck, M. L., S. J. Parker and V. Weis. 2012. *Journal of Fish Biology* DOI: 10.1111/j.1095-8649.2012.03322.x.



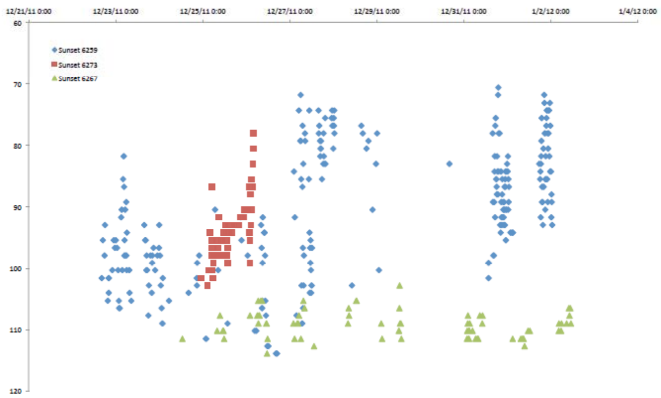
Ability of southern California shelf rockfish to survive barotrauma following in-situ recompression

In-progress study at NOAA's SWFSC, La Jolla
John Hyde, Nick Wegner, Alena Pribyl



Preliminary Results from Bocaccio

Preliminary Results from Sunset Rockfish

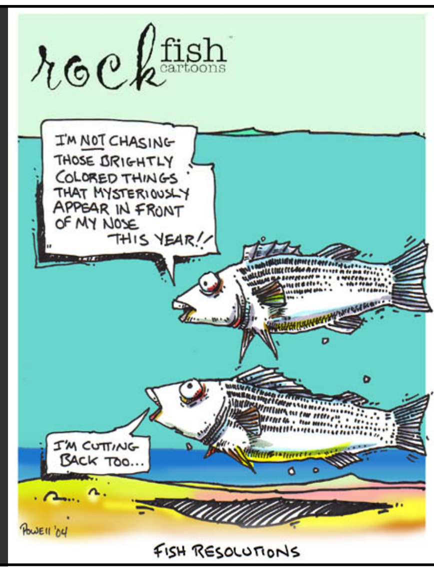


Summary of recompression studies in *Sebastes spp.*

- High survival rates, esp. for species that cannot submerge on their own (Hannah et al. 2012, Hochhalter and Reed 2011, Jarvis et al. 2008)
- Physiological recovery possible (Pribyl et al. 2012, Rogers et al. 2011)
  - Primary concern: SwB healing rates, vision immediately after recompression
- Prelim data looks good for shelf species (> 140 m)

Conclusions

- One size does not fit all
- Consider species-specific recommendations
- Be cognizant how factors such as time on deck, DOC, and temp differential may affect survival
- Even if fish do not recover 100%, recompression offers chance at survival



Agenda Item I.7.b
Supplemental CDFG Report
April 2012

CALIFORNIA DEPARTMENT OF FISH AND GAME INFORMATIONAL REPORT ON CALCULATING COWCOD MORTALITY IN THE CALIFORNIA RECREATIONAL FISHERY

California Department of Fish and Game (CDFG) will be using a modified method to calculate discard mortality for cowcod released on Commercial Passenger Fishing Vessels (CPFV) beginning in 2012. CDFG sent a letter to the RecFIN Technical Committee on April 3, 2012 (attached) outlining the method, which gives credit for use of descending devices for cowcod only. CDFG will apply reduced mortality rates for cowcod that observers record as being released using these devices.

CDFG finds the application of this method uniquely suitable to the situation with cowcod. Approximately 80 percent of the estimated recreational cowcod bycatch occurs in the CPFV mode. As part of CDFG's California Recreational Fisheries Survey (CRFS) program, sampling activities occur aboard CPFVs, rather than dockside. Because cowcod interactions are rare events, when they do occur samplers can easily observe and denote whether or not a descending device was used to release the fish. Additionally, as cowcod interactions are primarily limited to Southern California, there is no need to consider geographic differences that might exist in sampling procedures or other concerns that might be raised for stocks that are managed across several management areas or jurisdictions. Although at this time CDFG will limit the application of the method to cowcod released from CPFVs, there is potential for examining possible use of this approach with other species and fishing modes in the future.

CDFG believes that direct observations by our onboard employees regarding the disposition of released cowcod are best available data and superior to using a generic proxy. Descending devices have proven to reduce mortality of rockfish discards. Because CDFG can effectively observe their use in this situation and the reduction in mortality can be quantified, application of this method will result in more accurate cowcod mortality estimates.

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND GAME
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109
www.dfg.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

April 3, 2012

RecFIN Technical Committee
Pacific States Marine Fisheries Commission
205 SE Spokane Street, Suite 100
Portland, OR 97202

Dear Committee Members:

The purpose of this letter is to inform the committee of the Department of Fish and Game's (Department) intent to use a modified method to calculate cowcod mortality on released fish from the Party Charter (PC) mode. The Department's method will utilize empirical data instead of the Groundfish Management Team's (GMT) recommended proxy for these discards.

In January 2012, the GMT sent a letter recommending that proxy mortality rates be applied to species lacking species-specific depth dependent mortality rates, including cowcod. For cowcod, the GMT recommended that the deep-demersal guild proxy be applied to all released cowcod, whether fish were discarded alive or dead. Previously, in the absence of a species-specific discard mortality rate, RecFIN estimates had assumed 100 percent mortality of fish reported as released dead, and zero mortality of fish reported as released alive. Although there is data supporting higher survivorship rates for fish released using a descending device, to date it has not been used in the production of estimates.

Since 2007, the Department has conducted an extensive outreach campaign to educate the public on the use of descending devices to minimize mortality of discarded rockfish. Although the use of descending devices is not mandatory, many anglers are using them. The California Recreational Fisheries Survey (CRFS) observers document the use of these devices onboard Commercial Passenger Fishing Vessels (CPFV) during the course of fishing activity. Beginning in 2012, the Department will apply reduced mortality rates to the proportion of cowcod discarded alive from CPFVs that are released using these devices. Because the CPFV fleet accounts for more than 80 percent of cowcod bycatch, giving credit for use of descending devices is expected to significantly reduce overall mortality estimates for cowcod in the recreational fishery.

Methods
The GMT evaluated three specific mortality variables to develop the mortality proxy: a) surface mortality, b) short-term bottom mortality, and c) long-term delayed mortality. For cowcod released with descending devices on CPFVs, the Department will use a surface mortality rate of 22 percent, based on a study by Jarvis and Lowe (2008). In the study, 306 shelf rockfish were taken with recreational rod and reel gear, and after being

returned to depth in cages for two days, mortality was estimated at 22 percent. The Department will continue to use the GMT estimates for short term bottom mortality and long-term delayed mortality, which increases with depth. The Department will also continue to apply the GMT mortality proxy to fish released without a descending device on CPFVs, and for cowcod taken in the private/rental boat (PR) mode.

Table 1 shows the differences in depth dependent mortality rates with and without descending devices. Since no data are available from the study to inform savings from the use of a descending device in 20 fm or less, mortality estimates are based on the GMT proxy.

Table 1. Comparison of depth dependent mortality rates used by the GMT for the deep-demersal guild and estimates produced by the Department for cowcod released with a descending device on CPFVs.

	Depth Bin					
Mortality Estimate	0-10	11-20	21-30	31-40	41-50	51-60
GMT Method - Deep-Demersal Guild Mortality	21.0%	35.0%	52.0%	100.0%	100.0%	100.0%
CDFG Method - Cowcod Mortality Using Descending Device	21.0%	35.0%	39.2%	42.8%	46.4%	49.9%

Future Applications
Although the Department is using a modified mortality rate only for cowcod released with descending devices aboard CPFVs, there is the ability to examine additional applications of this approach to other species the future. Additionally, CRFS samplers are now gathering data on the use of descending devices on each trip for the PR mode. In the future, this information may allow for application of reduced mortality rates for fish released with descending devices in this mode as well.

If you have questions or need additional information, please contact me or John Budrick of my staff, at mvojkovich@dfg.ca.gov or jbudrick@dfg.ca.gov.

Sincerely,

Marija Vojkovich
Regional Manager
Marine Region

ec: John Budrick, Department of Fish and Game, Belmont, CA

GROUNDFISH ADVISORY SUBPANEL REPORT ON BAROTRAUMA WORKSHOP REPORT AND POTENTIAL USE OF RECOMPRESSION CATCH-AND-RELEASE SURVIVAL ESTIMATES

The Groundfish Advisory Subpanel (GAP) reviewed the documents involved with this agenda item. The GAP believes that discard survivability determinations should be a regular part of fishery management. The time has come to pursue existing and additional information and apply it to mortality estimates with regard to descending device use. Survivability credits could be applied for the use of descending devices to mitigate effects of barotrauma on released fish.

Virtually every fishing sector could benefit from using at-depth release and avoidance strategies. Recreational, commercial fixed gear and trawl could use these release methods successfully. It is apparent that some level of survivability is realized for most barotraumas-prone species that are released at depth. This result would benefit both the fishery and the rebuilding fish stocks.

The GAP does not propose that any mandate to use descending devices be implemented in the near term. However the GAP encourages widespread use of these devices across all fishery sectors.

If lower mortality rates can be realized through the use of these devices, it could potentially benefit all fishing sectors. If impacts are determined to be less in the future, it could potentially allow for additional allocations to be given to research and exempted fishing permit processes. The greatest benefit could be with yelloweye and cowcod.

PFMC
06/21/12

Agenda Item D.2.c
Supplemental GMT Report
June 2012

GROUNDFISH MANAGEMENT TEAM REPORT ON THE BAROTRAUMA WORKSHOP AND POTENTIAL USE OF RECOMPRESSION CATCH-AND-RELEASE SURVIVAL ESTIMATES

Recommendation: **The Groundfish Management Team (GMT) recommends analyzing and developing mortality rates associated with the use of descending devices for incorporation into management,** and provides the following thoughts for consideration.

Overview

Given the anticipated Council action, this report outlines the GMT's perspective on what is needed and considerations for the timeline in which it could be implemented. The Pacific Fish Smart Barotrauma Workshop provided a successful forum for discussing: consistent messaging for outreach to anglers, scientific studies on the mortality rates for fish released with descending devices, and integration of mortality rates into estimates of impacts in west coast recreational fisheries. While this GMT report focuses on the recreational fisheries, similar consideration could be given to nearshore fishery (e.g., rod and reel fishermen using descending devices). The Council should consider whether to expand the scope to include the commercial nearshore fisheries and under what timeframe.

First of all, the GMT supports the use of descending devices and believes that they should be promoted to recreational anglers, and fishermen in the rod and real nearshore commercial fisheries. It is almost certain that such descending devices increase the chance of survival compared to fish released at the surface. At the same time, depth and species-specific survival rates are uncertain, as are our basic estimates of catch and release by depth, and therefore subject to issues of statistical accuracy and precision. If the Council wishes to incorporate studies on the use of descending devices, the GMT recommends a thorough review in the context of recreational survey and catch estimation methods to ensure they meet the standards of the best available science. Even absent the interest in descending devices, the GMT has identified an update of the current discard mortality rates as a need. Addressing that need is also a question of workload priority for the Council and its partners.

Many of the most restrictive regulations (e.g., depth restrictions and area or season closures) in hook-and-line fisheries (i.e., recreational and commercial nearshore) are designed to ensure that mortalities of overfished rockfish species (i.e., yelloweye rockfish, canary rockfish, and cowcod rockfish) stay within relatively small harvest guidelines and annual catch limits. Since regulations used to reduce discard mortalities of these fish are most restrictive to hook-and-line fisheries, discard mortality estimates should be as accurate as possible, by integrating the best available science. Discard morality rates currently applied to released fish may be greater than what is actually occurring, due to evidence of use of descending devices by hook-and-line fishery participants, because the rates we use now assume that all fish are released at the surface. Releasing rockfish with descending devices results in lower discard mortality rates than releasing rockfish at the surface without the aid of descending devices (see Agenda Item D.2.a, Attachment 2). Current catch accounting methodologies, however, assume that all rockfish are released at surface without descending devices. Therefore, it is possible that discard mortality is overestimated in these fisheries. To improve discard mortality estimates, development of mortality rates for rockfish released with descending devices has been proposed. These mortality rates may then be applied to the proportion of fish released using descending devices to improve the accuracy of discard mortality estimates in these fisheries.

West Coast state recreational management programs have promoted avoidance as a first step to minimize mortality on discarded species and have provided basic information on the use of descending devices for many years. In recent years, this outreach effort has significantly expanded with the development of a variety of new descending tools and more scientific information supporting the benefits of using a descending device to release fish. West Coast efforts have included outreach to party (charter) boat operators, license vendors, recreational fishing clubs, and some commercial fishing groups (Port Orford Ocean Resources Team POORT) as well as distribution of brochures to private anglers. In addition, state recreational sampling programs are beginning to include questions to anglers on the use of descending devices, although this varies by state.

Many anglers are already using descending devices to release rockfish. California Department of Fish and Game (CDFG) has been collecting information on the use of descending devices in the commercial passenger fishing vessel (CPFV) fleet since 2010. Beginning in May 2012, Oregon Department of Fish and Wildlife (ODFW) began acquiring data on the percent of yelloweye and canary rockfish released with descending devices in Oregon. Preliminary information from ODFW shows that through the end of May, 42.5 percent of yelloweye rockfish and 45.6 percent of canary rockfish were reported by anglers to have been released using descending devices.

The GMT supports the development of new mortality rates that incorporates the scientific merits of differential survival rates for released fish when descending devices are used. The Council considered an update of surface release mortality rates, developed by the GMT in 2008, as part of the 2013-2014 harvest specifications and management measures cycle and elected to postpone this update due to other competing priorities and the limited scope of analysis adopted for that management cycle. Given the Council's direction for 2013-2014, many on the team have not had occasion to review the available scientific studies. The process should include appropriate time for review by the Scientific and Statistical Committee (SSC) and the Pacific States Marine Fisheries Commission RecFIN scientific and technical review bodies. The GMT understands that the Council will have to consider this effort against current workload and other competing tasks already underway by the various management and advisory bodies and hope that our summary below of what would need to be done will help in that evaluation.

Determination of Mortality Rates for Release with Descending Devices

Accounting for the use of descending devices in discard mortality estimates will require development of mortality rates to be applied to the proportion of fish released using a descending device. There is a substantial amount of research and data that could be used to develop those rates (Agenda Item D.2.a, Attachment 2). For example, studies in which fish were returned to the bottom in cages and re-examined after two days could be used to develop direct estimates of mortality rates. Such estimates of mortality are available for 19 species captured in 30-60 fm south of Point Conception including bocaccio (Jarvis and Lowe, 2008) as well as canary, yelloweye, blue and black rockfish captured from 10-30 fm in Oregon (Hannah, Rankin and Blume, 2012). Limited data from an acoustic tagging study provide a direct estimate of discard mortality for cowcod (Hyde and Pribyl, unpublished data). The original raw data from cage and acoustic tagging studies can be requested from the authors, who can also be consulted on its use. Recompression studies have only occurred within limited depth ranges, discard mortality rates for rockfish released in depths greater than have been studied can be developed when this information becomes available.

A GMT sub-group can review and analyze the appropriate existing data to develop mortality rates similar to the current depth based mortality matrix for species where there is a lot of data. Proxy estimates of mortality rates for other species in the same guild (shallow vs. deep, pelagic vs. demersal) using data from studies noted above, could be developed as was done in determining surface release mortality rate estimates currently applied in management; however, some members of the GMT are opposed to applying rates to unstudied or understudied species since survival rates in barotrauma studies have been shown to be species specific. The GMT would recommend mortality estimates that are conservative to address data gaps, as was done during the development of the current depth dependent mortality rates currently applied to fish released at the surface.

Application of Mortality Rates

In addition to needing estimated mortality rates for fish released using a descending device, an estimate of the proportion of fish released using a descending device will be needed before discard mortality calculations can be made. This will require changes (likely minor) to sampling methodologies in each state to obtain the necessary data and as mentioned above some data is already being collected, although there are differences in the data collected by state. Incorporating changes into state sampling programs that are consistent coast wide may occur on a different timeline for each state. The resulting proportions of fish released using a descending device will be applied to the estimate of discarded fish of each species. The estimates will be apportioned by depth in each stratum, then the depth dependent mortality rate reflecting the use of descending devices at each respective depth will be applied. The depth dependent mortality rates for surface release previously developed by the GMT will continue to be applied to the proportion of discarded fish released at the surface.

Consideration of Potential Timelines for Implementation

It is the GMT's understanding that incorporation of mortality rates can be achieved outside of the biennial harvest specifications and management measures process. The review sketched out above should be sufficient to ensure that the estimates and methods adopted are reliable enough to use in management and qualified as best available science. Given this, if the Council chooses to task the GMT with developing new discard mortality rates for fish released with descending devices the Council could consider a timeline that would range from as soon as possible in 2013-2014 or for the next management cycle (2015-2016).

To provide some perspective, the GMT offers the following specific tasks that would need to be accomplished within a chosen timeline. The Council could consider these tasks within a timeline that is very aggressive and allows for implementation in 2013-2014 or over a longer time period that might implement updated discard rates for the 2015-2016 management period.

- Task the GMT to begin data review and analysis to prepare a draft report to be included in a future briefing book and schedule SSC review.
- Recommend that the states develop and submit proposed methods for applying the new discard mortality rates to produce recreational catch estimates for review by the RecFIN technical committee.
- Request that the RecFIN technical committee provide comments to the states proposed methodologies.
- The GMT and states would need to address issues identified in the SSC/RecFIN review and provide solutions.
- Schedule Council discussion and consideration at an upcoming meeting.
- Task the GMT and SSC to provide a review of future research needed to fill data gaps and provide a statement of need for funding. For example, further research to determine mortality rates for a broader suite of species and depths north and south of Point Conception would be beneficial. Continued research will ensure that as mortality declines from the use of the devices and stocks continue to rebuild making access to deeper depths a possibility, data is available to inform the mortality rates in these depths.

There are tradeoffs between a timeline that implements changes as soon as possible compared to implementation at a later date. Though accounting for reduced mortality is not expected to immediately allow additional fishing opportunity, the resulting reduction in total mortality estimates could reduce the chance that inseason action would be needed if harvest rates were higher than projected. In addition, any estimates that account for reduced discard mortality through the use of discard devices would provide data for use in modeling seasons and depth restrictions for upcoming management cycles. Data collected in 2013 or 2014 would be available for analysis for the 2015-2016 cycle, which begins in the fall of 2013.

On the other hand, the GMT recommends that no new methods be applied until the Council is assured of their legitimacy. There are some on the GMT that are concerned that an aggressive timeline does not sufficiently consider the workload involved not just by those on the GMT but others that are needed for analysis and review. Consideration and implementation over a longer time period acknowledges the time commitments required by the various advisory bodies and management agencies. Of note, given current schedules and other workload items, the earliest the GMT could provide information for review would be November 2012. Additionally, from June through November of 2013, the SSC will be conducting stock assessments and reviewing them at Council meetings and will have limited time for review.

Recommendation

The GMT recommends analyzing and developing mortality rates associated with the use of descending devices for incorporation into management.

PFMC
06/20/12

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON BAROTRAUMA WORKSHOP REPORT AND POETENTIAL USE OF RECOMPRESSION CATCH-AND-RELEASE SURVIVAL ESTIMATES

The Scientific and Statistical Committee (SSC) discussed the potential for survival rate credits from the use of recompression methods for reducing the catch-and-release mortality of recreationally caught rockfish, in the context of the recent workshop on barotrauma held in Portland (Agenda Item D.2.a, Attachment 1). The discussion also included the letter to the RecFIN Technical Committee by the California Department of Fish and Game (CDFG) regarding CDFG's intention to use a modified method for calculating release mortality of cowcod caught by anglers on Commercial Passenger Fishing Vessels (CPFV) and released using devices that rapidly descend fish to depth to aid their recompression and survival (Agenda Item D.2.a, Supplemental Attachment 4). Dr. Chris Lowe (California State University, Long Beach) presented information on barotrauma and recompression and Mr John Budrick (Groundfish Management Team [GMT]) answered questions regarding CDFG plans to apply survival credits for the release of cowcod caught in the CPFV fishery.

There is compelling evidence that rockfish released at depth for recompression have increased survival relative to those released at the surface. Encouraging anglers to use recompression methods could increase the survival of released rockfish. However, available studies indicate that a wide variety of factors influence rockfish catch-and-release survival rates, including the species, the depth of capture, the differential in temperature between the bottom and the surface, the time on deck, and the degree of rough handling. Further, most studies only measured short-term survival (days rather than weeks or months) and the fish were released using very controlled methods. Measuring the effects of barotrauma for fish released under controlled methods is challenging, but relatively straightforward to accomplish. How to apply survival rates to fish released by anglers, given the diversity of recompression methods they may use, presents an additional challenge for which there is little current information.

Based on data for fish released at the surface, the GMT currently uses depth-dependent mortality rates to estimate the overall catch-and-release mortality of rockfish by species or guild. The available studies on the mortality of rockfish released at depth using recompression devices may contain sufficient information to provide a basis for constructing an additional table of survival estimates that the GMT could apply to rockfish released and returned to depth using recompression devices. However, it is clear that the information available at present is inadequate for some species.

The SSC notes that the Jarvis and Lowe (2008) study, cited by the CDFG letter as providing the basis for the 22 percent surface mortality rate (78 percent survival rate), did not include any observations of cowcod. Nor did the CDFG letter provide justification for using information from other species. Consequently, it is premature at this time to assume that there is an adequate scientific basis to support the depth-dependent mortality rates for cowcod presented in the CDFG letter.

The SSC emphasizes that proposals to the Council for survival credits include a clear and detailed description of the scientific basis supporting all aspects of the survival credit calculations. The SSC could review and recommend a proposal for one or two particular species as early as the September Council meeting provided that it included adequate documentation of the scientific basis and justification for the data and assumptions underlying the survival credit calculations.

In the long-term, the SSC recommends that the Council sponsor a methodology review that would consider the available information on rockfish catch-and-release survival, identify gaps in the information with regard to species effects and other important factors that may not have been adequately covered, determine how available information could be applied to specific fisheries, and develop recommendations for the construction of estimates of rockfish release-survival that could be used in the Council management process. This workshop could occur during the next biennial management cycle.

PFMC
06/21/12

Agenda Item D.2.c
Supplemental SWFSC PowerPoint (Vetter)
June 2012

Post-release survival and behavior of deep-dwelling rockfishes (genus *Sebastes*) suffering from barotrauma: Using recompression devices to reduce bycatch mortality

Nicholas C. Wegner
Alena L. Pribyl
John R. Hyde

National Marine Fisheries Service, Southwest Fisheries Science Center, La Jolla, CA

Rockfishes have a physoclistous (closed) gas bladder that expands with a change in ambient pressure during capture

This results in barotrauma

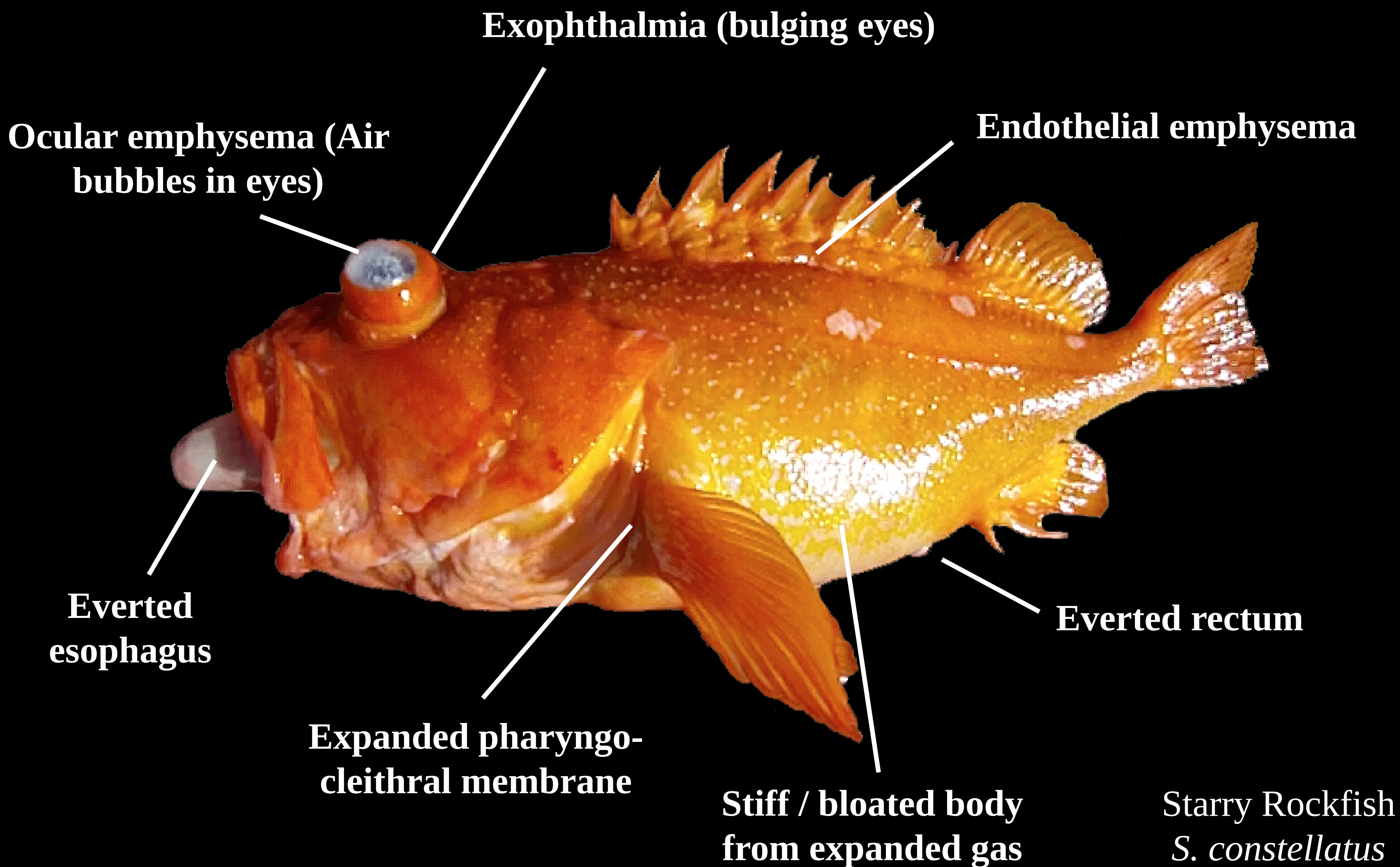
100 m below surface

At surface following capture

Starry Rockfish
S. constellatus

Starry Rockfish
S. constellatus

External Indicators of Barotrauma



Can rockfish recover from barotrauma?

100 m below surface

At surface following capture

If rockfishes experiencing barotrauma can be successfully released

- Bycatch mortality is reduced
- Creates additional management options to protect depleted species

Preliminary studies of rockfish recovery from barotrauma

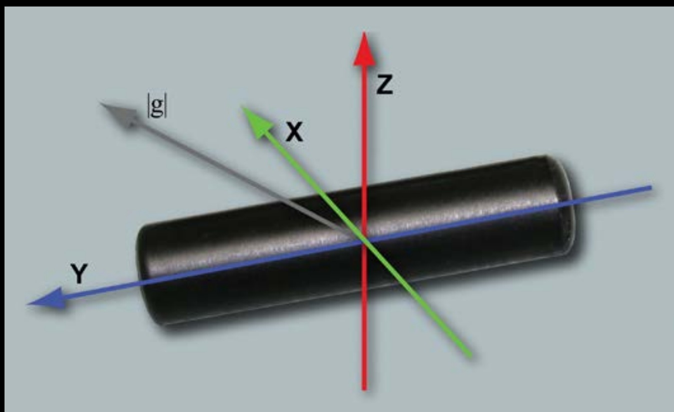
- Near 100% survival of rockfish during simulated capture and release using hyperbaric chambers (Parker et al., 2006; Pribyl *et al*., 2012).

- 68 - 92% survival of rockfishes recompressed and held in cages for two days following capture (Jarvis and Lowe, 2008; Hannah et al., 2012).

How well do rockfish recover from barotrauma under natural conditions (i.e., in the wild, long-term, and without the protection of cages)?

How do deep-dwelling rockfishes (e.g., bocaccio, cowcod) compare to shallow species previously studied?

Assessing deep-dwelling rockfish survival in the wild using acoustic telemetry



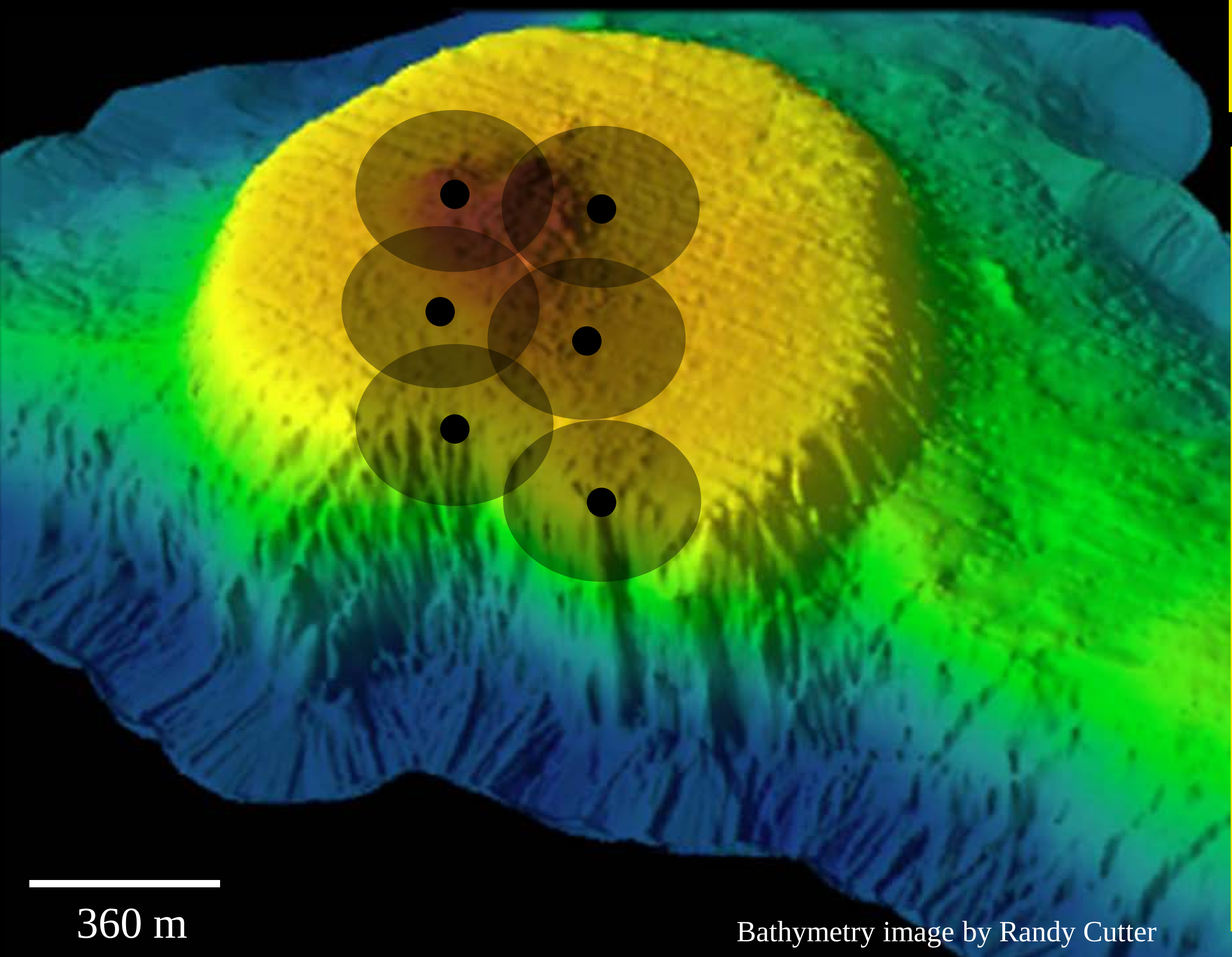
VEMCO V9AP acoustic transmitters report

1. Fish Acceleration

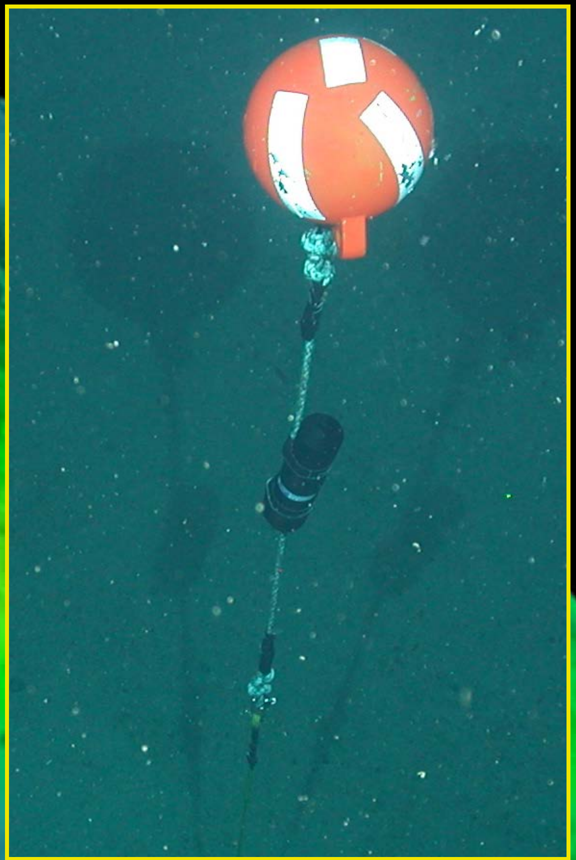
2. Fish Depth

Rockfish were tagged and released on the 43 Fathom Bank

An isolated seamount, limiting rockfish emigration



Bathymetry image by Randy Cutter



Tagged fish


Bocaccio (n=13)


Sunset rockfish (n=13)


Bank rockfish (n=12)


Cowcod (n=9)


Starry rockfish (n=3)

Capture Depth: 80 - 180 m

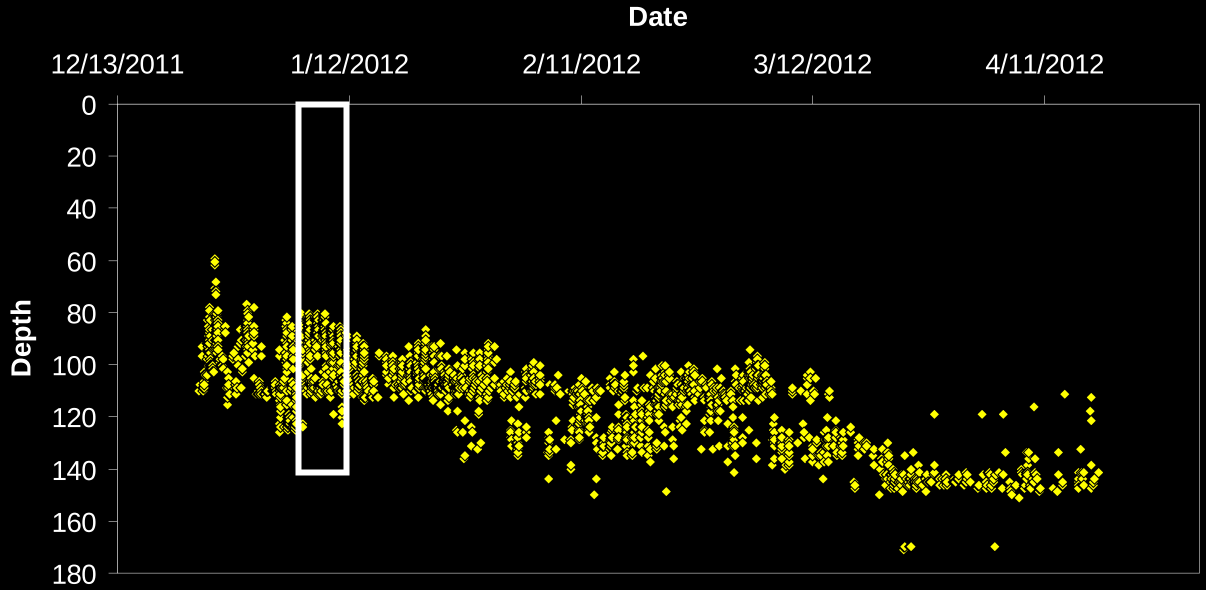
Release Depth: 32 - 72 m

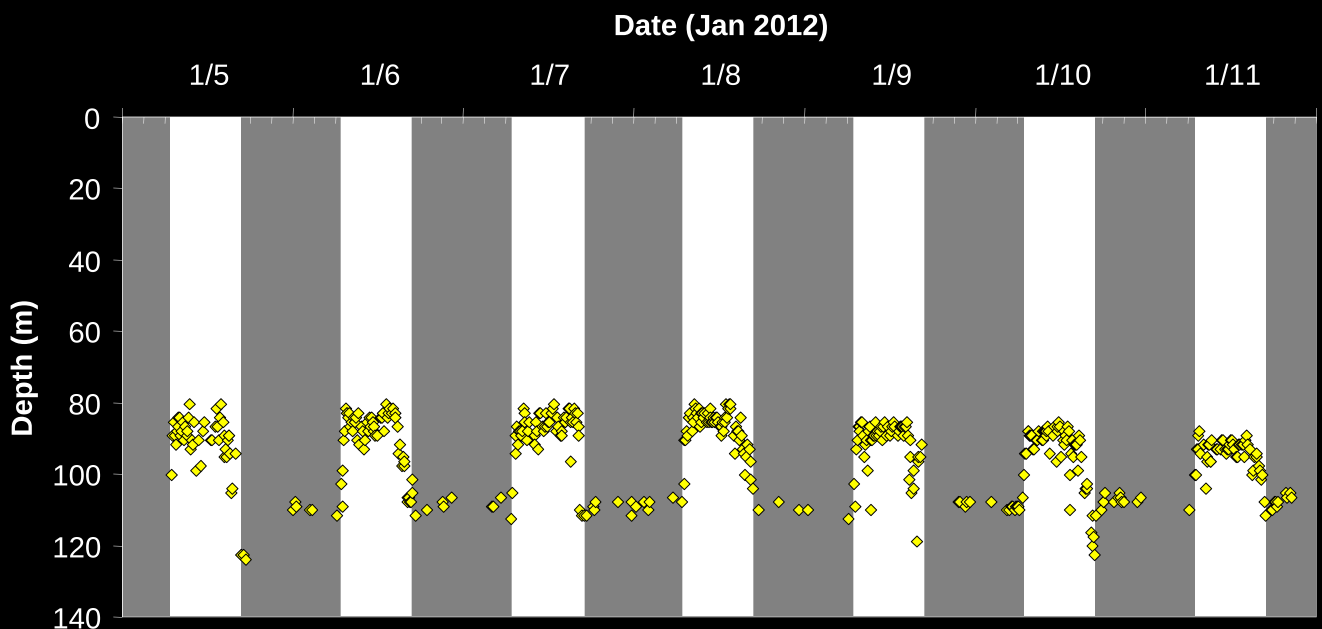

Receivers (n=6)

Bocaccio Capture, Tagging, and Recompression Using a Weighted Cage

Cowcod Capture, Tagging, and Recompression Using the SeaQualizer

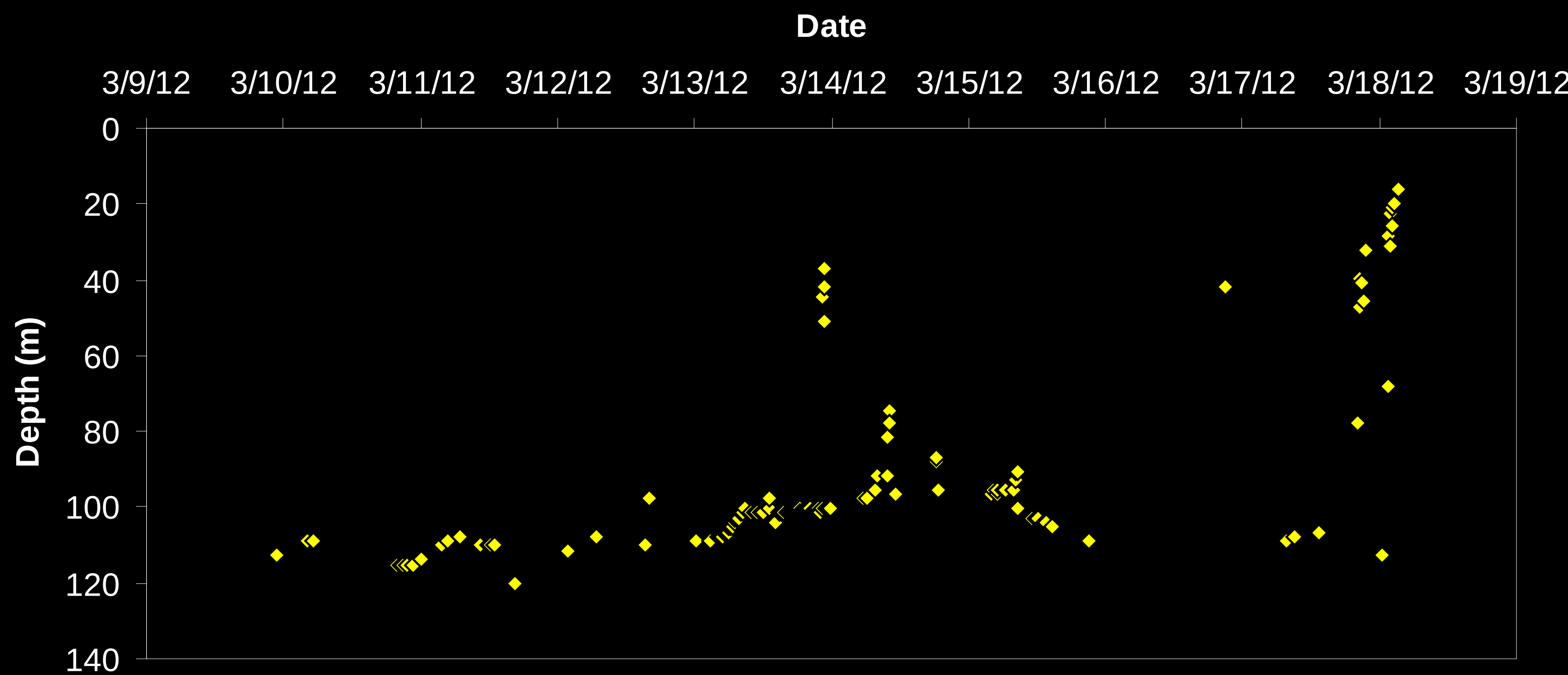
Movements of a 47.5 cm bocaccio (survived)





Movements of a 41.5 cm bank rockfish (died)

Movements of a 60.5 cm cowcod (no data after nine days)



Rockfish Survival by Species

2 day survival
10 day survival

	Species	Tagged	Survived	Died	Unknown	Percent Survival
	Bank	12	8	1	3	**88.9** (66.7-91.7)
			2	4	6	**33.3** (16.7-66.7)
	Bocaccio	13	11	1	1	**91.7** (84.6-92.3)
			9	1	3	**90.0** (69.2-92.3)
	Cowcod	9	9	0	0	**100**
			4	0	5	**100** (44.4-100)
	Starry	3	3	0	0	**100**
			3	0	0	**100**
	Sunset	13	8	1	4	**88.9** (61.5-92.3)
			5	2	6	**71.4** (38.5-84.6)
	Total	**50**	**39**	**3**	**8**	**92.9** (78.0-94.0)
			23	**7**	**20**	**76.7** (46.0-86.0)

Summary

93% two-day survival (all species)

- Species-specific differences in survival
- 92% two-day survival of shallow-dwelling rockfishes observed in cages by Hannah et al. (2012)
- 68% two-day survival of shallow-dwelling rockfishes observed in cages by Jarvis and Lowe (2008)

77% 10-day survival (all species)

- Preliminary assessment indicates little death after 10 days
- However, fish continue to emigrate from the system
- Cannot determine fate of fish following emigration

100% 2-day survival for cowcod, 100% (44-100%) 10-day survival

- 5 of 9 cowcod left the detection range of the array in first 10 days
- 69% survival for cowcod using recompression chambers (Smiley and Drawbridge, 2007)

Acknowledgements

Personnel:

Noah Ben-Aderet
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Matt Craig
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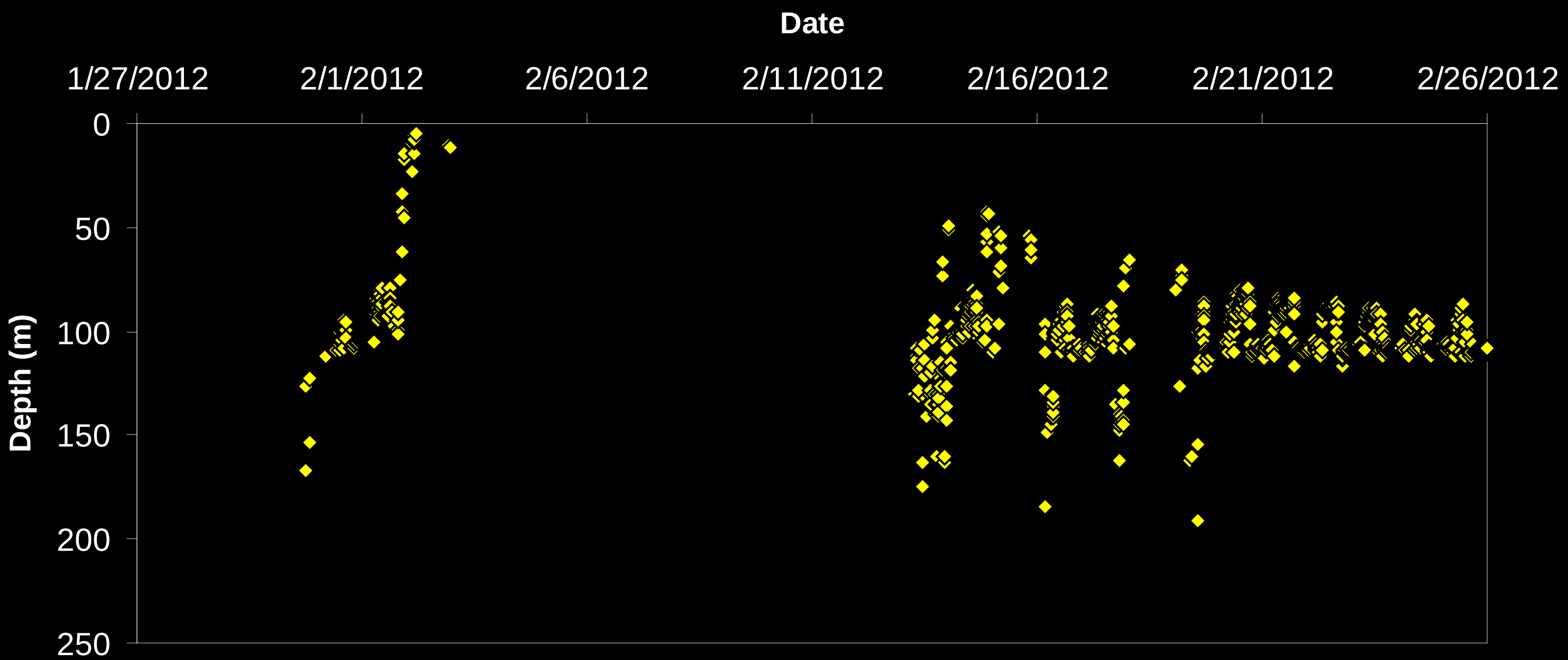
Randy Hupp
Jake Minich
Helena Aryafar
Erin Reed
Joel Schumacher
Owyn Snodgrass
Russ Vetter

Captain and crew of the M/V Outer Limits

Stay tuned to updates on this work:

http://swfsc.noaa.gov/barotrauma/

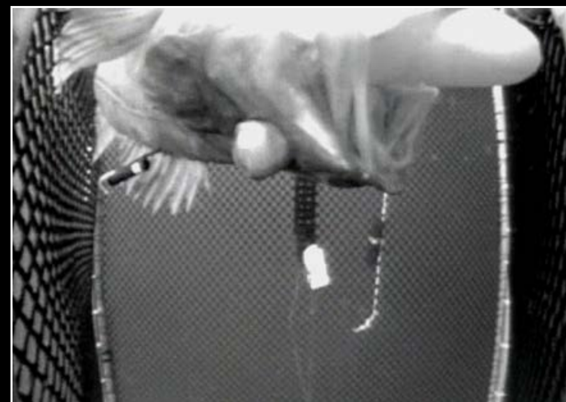
Shallow excursions of a 55.0 cm bocaccio



Rockfish Recompression

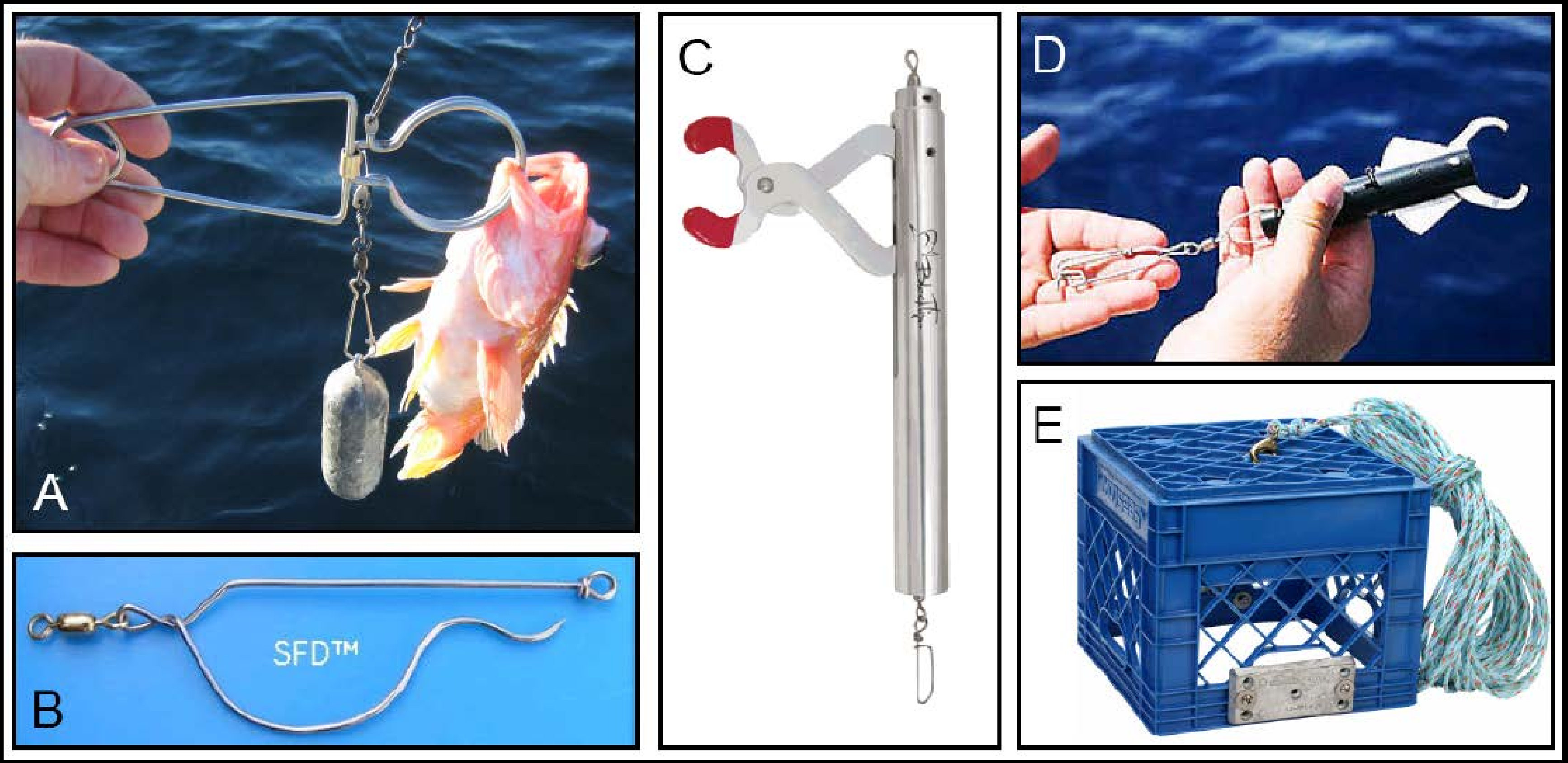
Following capture

0 meters



40 - 45 meters

Commercially Available Recompression Devices



A: Rokless (www.ecoleeser.com).
B: Shelton descending device (www.sheltonproducts.com)
C: Blacktip Catch and Release Recompression Tool (www.git-r-down.com).
D: SeaQualizer (www.theseaqualizer.com).
E. Fish Recompression Basket (www.westmarine.com).

This motion may have been modified by amendments. The FINAL adopted motion will be available in the Final June 2012 Council Meeting Minutes and Voting Log.

Motion (Wolford/Brizendine)

Amendment (Vokovich/Brizendine)

I move

(1) that the Council declare that barotrauma associated with our hook and line catch and release recreational groundfish fishery is a priority consideration that needs to be accounted for in our catch forecasting and catch accounting models, and that such accounting should include the differential release mortality associated with depth of catch and depth of release.
   a. That 2 or 3 of our most constraining species be addressed with the highest priority
   b. That additional species be addressed as data, and Council and State workloads permit

(2) in recognition that several viable recompression devices are effective in releasing fish back at depth with low mortality, and that devices are currently in use in West Coast recreational fisheries to conserve various groundfish stocks, that the Council
   a. assign the GMT to develop draft proposed estimates, or methodologies, for decompression release survival rates for appropriate groundfish species in West Coast recreational fisheries – specifically depth based mortality tables, by the deadline of the ~~September~~ November 2012 Council meeting advance Briefing Book;
   b. assign the SSC to review the GMT depth based mortality tables with regard to best available science and suitability for use in active fishery management decision making, and produce a statement for consideration at the ~~September~~ November 2012 Council meeting; and to identify additional research and data needs; and
   c. that the Council consider the GMT proposal, the SSC review, and a GMT response to the SSC review at the ~~September~~ March 2013 Council meeting, towards consideration for use as soon as practical.
      i. With an objective for 2013 on the 2 or 3 most constraining species
      ii. With a broader range of species in the 2015-16 SPEX cycle, as additional data becomes available.

Agenda Item D.3
Situation Summary
June 2012

STOCK ASSESSMENT PLANNING

In the Council stock assessment process, there is a year in which assessments are done to inform decisions for the following biennial management cycle, followed by a year for deciding the new groundfish harvest specifications and management measures. This agenda item concerns planning for new groundfish stock assessments that are anticipated to be done in 2013, which will be used during 2014 to decide the harvest specifications and management measures for 2015 and 2016 groundfish fisheries.

In March, the Council selected a preliminary list of groundfish stocks for full (also known as benchmark) assessment, update assessment, and those where a data report would be developed. Full assessments, where Stock Assessment Review (STAR) Panels are convened to comprehensively review assessments, are proposed for darkblotched rockfish, bocaccio rockfish, petrale sole, shortspine thornyhead, longspine thornyhead, cowcod, aurora rockfish, and Pacific sanddabs. Update assessments, where the input data for past full assessments are updated, are proposed for Pacific ocean perch and sablefish. Data reports are not assessments, but an evaluation of recent catches to ensure that management is effectively maintaining harvest at or below the limits prescribed in rebuilding plans. Data reports are proposed for canary and yelloweye rockfish. In the case of bocaccio, the Council consideration was to conduct either a full or update assessment depending on analysis this spring of the strength of the 2010 year class, which was estimated to be a large recruitment but estimated with high uncertainty in the 2011 assessment. Attachment 1 provides the updated analysis of bocaccio recruitment.

There are three Terms of Reference that guide the stock assessment process: one which specifies how the next assessment process should occur and defines the roles and responsibilities of various entities contributing to this process, one which guides the development of rebuilding analyses that are used to develop harvest specifications and rebuilding plans for overfished species, and one that guides how new methods are reviewed and recommended for scientific activities that inform analyses used in management decision-making. These Terms of Reference have been reviewed by some members of the Scientific and Statistical Committee (SSC) and others and are included as Agenda Item D.3.a, Attachments 2, 3, and 4, respectively. The Council may want to modify these Terms of Reference for the next assessment cycle. Refinement of these Terms of Reference for public review is scheduled for this meeting with final adoption scheduled for the September meeting.

The Council is to consider the input from National Marine Fisheries Service (NMFS) Science Centers, the advisory bodies, and the public before providing a preliminary decision on 2013-2014 stock assessment priorities by species, type of assessment (full or update), the language for the three draft Terms of Reference, and a proposed schedule for 2013 STAR Panel meetings. The Council is scheduled to make final decisions on stock assessment planning at their September meeting.

<u>Council Action:</u>

1. **Adopt for Public Review the List of Stocks To Be Assessed in 2013.**
2. **Adopt for Public Review the Preliminary Terms of Reference for the Groundfish and Coastal Pelagic Species Stock Assessment and Review Process for 2013-2014.**
3. **Adopt for Public Review the Preliminary SSC Terms of Reference for Groundfish Rebuilding Analysis.**
4. **Adopt for Public Review the Preliminary Terms of Reference for the Methodology Review Process for Groundfish and Coastal Pelagic Species.**
5. **Adopt for Public Review the 2013 Groundfish Stock Assessment Review Panel Meeting Schedule.**

<u>Reference Materials</u>:

1. Agenda Item D.3.a, Attachment 1: A "refreshed" estimation of the relative strength of the 2010 year class for bocaccio, *Sebastes paucispinis*.
2. Agenda Item D.3.a, Attachment 2: Draft Terms of Reference for the Groundfish and Coastal Pelagic Species Stock Assessment and Review Process for 2013-2014.
3. Agenda Item D.3.a, Attachment 3: Draft Terms of Reference for the Groundfish Rebuilding Analysis for 2013-2014.
4. Agenda Item D.3.a, Attachment 4: Draft Terms of Reference for the Methodology Review Process for Groundfish and Coastal Pelagic Species.
5. Agenda Item D.3.b, NMFS Report: Considerations for Selecting Species for Assessment in 2013.

<u>Agenda Order</u>:

a. Agenda Item Overview — John DeVore
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Refine the List and Schedule of Stocks for Assessment in 2013 and the Terms of Reference.

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PFMC
06/04/12

A “refreshed” estimation of the relative strength of the 2010 year class for bocaccio, *Sebastes paucispinis*

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Introduction

This short analysis informs the PFMC and advisory bodies regarding the best estimation of the relative strength of the 2010 year class for bocaccio rockfish (*Sebastes paucispinis*), based on data collected in 2011. The purpose of this short document is to provide some improved information that might be useful in considering ACL values for 2013-2014 management measures, and in considering the desirability for a full assessment of bocaccio in the next (2013) assessment cycle.

In the previous update, conducted in 2011 (Field 2011, PFMC 2011), the STAT reported that one particular source of information, the length frequency data for the NWFSC trawl survey, indicated an "unrealistically optimistic" level of recruitment for the 2010 year class. Although virtually all sources of data indicated a strong to very strong recruitment for both 2009 and 2010, the trawl survey data suggested a 2010 recruitment event unprecedented historically (~66 million recruits), based on length composition data from a small number of positive hauls, and associated with a very high level of uncertainty. As a result, a traditional "update" in which data series were not altered was infeasible, and a "revised update" was developed that excluded age 0 fish from the trawl survey length composition data, but included a data series that had been unavailable for the 2009 full assessment but had since been demonstrated to be informative with respect to year class strength (the power plant impingement time series). The final 2011 update suggested a total of 3.8 and 3.4 million recruits for 2009 and 2010, respectively (together 7.2 million fish, comparable to the 7.2 million recruits estimated for the1999 year class).

The resulting uncertainty regarding the potential magnitude of those two year classes was very high in the 2011 update, which was a concern both with respect to the appropriate numbers to use for catch limits (as strong year classes of bocaccio are often encountered by recreational fisheries at higher than usual rates) and with respect to the potential urgency of conducting a full assessment in the next assessment cycle in order to fully evaluate the relative strength of those year classes. As a result of this uncertainty, the STAT offered to "refresh" the 2011 update with new data (data from 2011 fisheries and surveys) in early 2012 to better evaluate and refine estimates of the magnitude of the 2010 year class. This short document, which is neither a formal update nor an assessment, presents the results of the "refreshed" 2011 update in order to provide improved and timely information to the Council community. The "refreshed" results are based on running the model forward through 2011 with the addition of (preliminary) length frequency information from recreational fisheries, the NWFSC bottom trawl survey and the NWFSC hook and line survey. Note that the associated CPUE data for 2011 are not available for any of these surveys as data have not been fully vetted for use in assessments. These points will have an additional influence on the model result at a later date.

Results

The previous model was extended to include 2011, with each of the new sources of length frequency information added independently, and a final run in which all data were included (which would represent a base model in a formal update or assessment). Table 1 provides the estimated recruitment deviation values for 2009 and 2010 (with CVs), the estimated recruitments (with standard deviations), the 2011 estimate of depletion (with standard deviation) and the associated 2013 and 2014 ACLs when the model is projected forward under the assumption of the adopted 2011-2012 ACLs being realized and an SPR of 0.777 for the 2013-

2014 management period. As changes in values for other model results and parameters were negligible, and the focus of this document is only on the relative magnitude of the 2009 and 2010 year classes, other results are not included.

Table 1 shows that with the exception of the 2011 central CA recreational length composition data, all of the new data sources increased significantly the estimated size of both the 2009 and 2010 year classes (the central CA data increased the estimated size of the 2009 but not 2010 year class, historically there has been a lag in strong year classes showing up in central CA fisheries data relative to the south, as selectivity peaks at a later age in the north). When considered individually, the NWFSC hook and line survey and trawl survey data estimated the greatest 2010 recruitment; the southern recreational fishery also estimated a large year class. All of the data sets substantially improved the precision (decreased the CV) of the 2010 recruitment deviation parameter, with the southern California recreational data associated with the greatest decrease in the CV. With all data, the CV for the 2010 recruitment deviation dropped to 0.16 from 0.44, meaning that although there is still uncertainty associated with the relative strength of this year class, the relative bounds of the year class are much better defined, with a point estimate of 8.8 million fish and approximate 95% confidence limits ranging from 5.3 to 12.3 million fish. The 2009 recruitment is only modestly changed from the 2011 estimate, suggesting that this year class was adequately resolved by the length compositional data available to the 2011 update. Note too that the fit to the impingement index with the 2011 length data is also considerably improved (Figure 9). The index actually forecast very close to (but slightly higher than) the current model result, but the combination of model tuning and recruitment penalties kept the model from fully fitting the high recruitment forecast from the index in the 2011 update.

The forecast ACLs with SPR of 0.777 for 2013 and 2014 are higher with the increased 2010 recruitment estimate; 451 and 475 tons respectively, whereas the 2011 update reported 303 and 340 mt for those years, respectively. As bocaccio can be difficult to avoid during periods of strong recruitment, it is possible that a reconsideration of the adopted ACLs is worthwhile; the SSC noted that new information could be useful in updating annual catch limits (ACLs) or annual catch targets (ACTs) for 2013 and 2014, but also noted that such an analysis should not be used for setting the overfishing limits (OFLs) (PFMC 2011). However, the fishery has been realizing catches considerably lower than the adopted ACL values in recent years, and there is little reason to expect a crisis in the fishery comparable to that in the early 2000s, when the abundance of 1999 recruits during a period in which allowable catches were at record low levels created severe constraints on commercial and recreational fisheries.

Discussion

As stated previously, the changes to other associated parameters with this small update are generally small, but the relative depletion estimated for 2011 changed from 0.26 to 0.25 with the addition of all new data. This is due to the fact that recruitment deviation values ultimately must sum to 0, and having high values in the very recent period results in a modest scaling downward of the spawning output trajectory. However, the result of these strong year classes is expected to be an accelerated rebuilding schedule; with a ten year forecast based on an SPR of 0.777 (the rebuilding SPR) the deterministic stock projections from this base run result in the stock rebuilding in 2017, as opposed to 2020 in the previous model. Clearly, this should be considered a tentative result until a proper update or full assessment is performed.

With respect to the need for a full assessment, the STAT considers that these results essentially negate a need for a full assessment in the next assessment cycle. The uncertainty regarding the magnitude of the 2010 year class was the primary source of the perceived need for a full assessment in 2013. However, the strength of the 2010 year class is better resolved from this short analysis, and consequently is expected to be very well resolved with the addition of complete 2011 and 2012 data that can be incorporated into a 2013 update. The other, more challenging issues associated with the bocaccio assessment at this time, such as the limitations related to applying data collected exclusive of the cowcod conservation area (and other closed areas), and the ability to develop and apply reliable aging criteria for this stock, are not likely to be tractable by the 2013 assessment cycle, and thus there are not likely to be substantive new contributions or results that would merit a full assessment at that time for this stock.

Sources

Field, J.C. 2011. Status of bocaccio, Sebastes paucispinis, in the Conception, Monterey and Eureka INPFC areas as evaluated for 2011. Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 200, Portland, Ore. http://www.pcouncil.org/wp-content/uploads/E1a_ATT1_STATUS_BOCACCIO_NOV2011BB.pdf

Pacific Fishery Management Council (PFMC). 2011. Scientific and Statistical Committee report on stock assessments for 2013-2014 groundfish fisheries. http://www.pcouncil.org/wp-content/uploads/E1b_SUP_SSC_NOV2011BB.pdf.

Table 1: Summary of refreshed 2011 model output with addition of preliminary length composition data from various sources.

	2011 base model projected to 2012	2011 southern rec LF data	2011 cen CA rec LF data	2011 NWFSC H&L survey LF data	2011 NWFSC trawl survey LF data	All new 2011 LF data
2009 RecDev	0.63	0.77	0.72	0.59	0.55	0.80
2010 Rec Dev	0.52	1.03	0.37	1.51	1.70	1.43
CV 2009 Rec Dev	0.18	0.15	0.17	0.17	0.17	0.14
CV 2010 Rec Dev	0.44	0.21	0.37	0.30	0.27	0.16
Recruitment (1000s) 2009	3824	4385	4192	3716	3554	4602
Recruitment (1000s) 2010	3489	5810	3004	9438	11419	8792
Recruitment (1000s)St Dev 2009	794	812	825	754	722	819
Recruitment (1000s) St Dev 2010	1589	1380	1174	3073	3302	1763
Depletion 2010	0.259	0.250	0.255	0.248	0.248	0.248
Depletion StDev 2010	0.039	0.037	0.038	0.037	0.037	0.037
Catch forecast 2013 (SPR=0.777)	352	387	352	445	482	451
Catch forecast 2014 (SPR=0.777)	380	409	372	481	523	475

Agenda Item D.3.a
Attachment 2
June 2012

TERMS OF REFERENCE

FOR THE

GROUNDFISH AND COASTAL PELAGIC SPECIES STOCK ASSESSMENT AND REVIEW PROCESS FOR 2013-2014

DRAFT

MAY, 2012

Published by the Pacific Fishery Management Council

TABLE OF CONTENTS

1. INTRODUCTION

The purpose of this document is to outline the guidelines and procedures for the Pacific Fishery Management Council's (Council) groundfish and coastal pelagic species (CPS) stock assessment review (STAR) process and to clarify expectations and responsibilities of the various participants. This document applies to assessments of species managed under the Pacific Coast Groundfish Fishery Management Plan and Management Plan for the CPS. The STAR process has been designed to provide for peer review as referenced in the 2006 Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (RMSA), which states that "the Secretary and each Regional Fishery Management Council may establish a peer review process for that Regional Fishery Management Council for scientific information used to advise the Regional Fishery Management Council about the conservation and management of the fishery (see Magnuson-Stevens Act section 302(g)(1)(E))." This peer review process is designed to investigate the technical merits of stock assessments and other scientific information used by the Council's Scientific and Statistical Committee (SSC). The process outlined here is not a substitute for the SSC, but should work in conjunction with the SSC. This document is included in the Council's Statement of Organization, Practices and Procedures as documentation of the review process that underpins scientific advice from the SSC.

The review of stock assessments requires a routine, dedicated effort that simultaneously meets the needs of NMFS, the Council, and others. Program reviews, in-depth external reviews, and peer-reviewed scientific publications are used by federal and state agencies to provide quality assurance for the basic scientific methods employed to produce stock assessments. The extended time frame required for such reviews is not suited to the routine examination of assessments that are, generally, the primary basis for harvest recommendations. The SSC has developed a separate terms of reference for reviewing new methods that might be used in stock assessments, including methods and tools to incorporate ecosystem processes.

The STAR process is a key element in an overall procedure designed to review the technical merits of stock assessments and other relevant scientific information. This process allows the Council to make timely use of new fishery and survey data, analyze and understand these data as thoroughly as possible, provide opportunity for public comment, assure that the results are as accurate and error-free as possible, and identify the best available science for management decisions. Parties involved in implementing the STAR process are Council members, Council staff, members of Council Advisory Bodies, including the SSC, the Groundfish and CPS Management Teams (GMT and CPSMT), the Groundfish Advisory Panel (GAP) and CPS Advisory Subpanel (CPSAS), the National Marine Fisheries Service (NMFS), state agencies, and interested persons.

This current version of the STAR terms of reference (TOR) reflects recommendations from previous participants in the STAR process, including STAR panel members, SSC members, stock assessment teams (STATs), Council staff, and Council advisory groups. Nevertheless, no set of guidelines can be expected to deal with every contingency, and all participants should anticipate the need to be flexible and address new issues as they arise.

Stock assessments are conducted to assess the abundance and trends of fish stocks, and provide the fundamental basis for management decisions regarding appropriate harvest levels. Assessments use statistical population models to integrate and simultaneously analyze survey, fishery, and biological data. Environmental and ecosystem data may also be integrated in stock assessments. Hilborn and Walters (1992)[1] define stock assessments as "the use of various statistical and mathematical calculations to make quantitative predictions about the reactions of fish populations to alternative management choices." In this document, the term "stock assessment" includes activities, analyses and reports, beginning with data collection and continuing through to scientific recommendations presented to the Council and its advisors. To best serve their purpose, stock assessments should attempt to identify and quantify major uncertainties, balance realism and parsimony and make best use of the available data.

There are three distinct types of assessments, which are subject to different review procedures. A "full assessment" is a new assessment or an assessment that may be substantially different from the previously conducted assessment. A full assessment involves a re-examination of the underlying assumptions, data, and model parameters previously used to assess the stock. Full assessments are reviewed via the full STAR process. There is a limit on the number of full assessments that can be conducted and reviewed during an assessment cycle. Some assessment models have relatively few modeling or data issues and provide relatively stable results as new data are added, such that it is not necessary to develop a completely new assessment every time the species is assessed. In these cases, an "update assessment" may be preferable. An "update assessment" is defined as an assessment that maintains the model structure of the previous full assessment and is generally restricted to the addition of new data to previously evaluated time series that have become available since the last assessment. Update assessments are reviewed by the relevant subcommittee of the SSC (Groundfish or CPS) rather than by a STAR panel. A "data report" is a third type of assessment product that applies when only limited new information is available to inform the assessment. Data reports are reviewed by the relevant subcommittee of the SSC (Groundfish or CPS).

The RMSA recently changed the terminology and process for determining harvest levels. The previous Allowable/Acceptable Biological Catch (ABC) has been replaced by the Overfishing Limit (OFL). However, the largest allowable harvest level is still the ABC (now "Acceptable Biological Catch"), which is buffered from the OFL based on the risk of overfishing adopted by the Council (which must be less than 50%). The P* approach uses a probability of overfishing (which the Council has set to be less than or equal to 45% or 0.45) and a measure of uncertainty in the assessment of current stock status (σ, the standard error of the biomass estimate in log space) to determine the appropriate buffer with which to reduce the harvest level from the OFL to the ABC (Ralston et al. 2011[2]). The Annual Catch Limit (ACL) is equivalent to what the Council previously called the Optimum Yield (OY). For groundfish species, the upper limit for the ACL is calculated using the 40:10 harvest control rule (and 25:5 rule for flatfish species) while for CPS, each species has a specific control rule to calculate the Harvest Guideline (HG), which is the upper limit for the ACL for CPS. The Annual Catch Target (ACT) is the targeted catch level, representing a further reduction from the ACL to account for management/implementation uncertainty. The OFL must be given in the stock assessment (along with, in some cases, σ). The ABC is determined from the OFL given σ and P*. For CPS, the assessment reports the application of the HG control rule. The OFL, ABC, ACL, any ACTs, and (for CPS) the HGs are reported in the Council's Stock Assessment and Fishery Evaluation (SAFE) report.

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[1] Hilborn, R., and C. J. Walters. 1992. Quantitative fisheries stock assessment: Choice, dynamics and uncertainty. Chapman and Hall.

[2] Ralston, S., Punt, A.E., Hamel, O.S., DeVore, J. and R.J. Conser. 2011. An approach to quantifying scientific uncertainty in stock assessment. *Fishery Bulletin* 109: 217-231.

2. STOCK ASSESSMENT PRIORITIZATION

Stock assessments for Pacific sardine and Pacific mackerel are conducted annually, with full assessments occurring every third year, and update assessments during interim years. Assessments for groundfish species are conducted every other year as part of the biennial harvest specification cycle. A relatively small number of the more than 90 species in Council's Groundfish Fishery Management Plan are selected each cycle for full or update assessments. To implement the RMSA requirements to establish ABCs and OFLs for all species in fishery management plans, simple assessment methods such as Depletion-Corrected Average Catch (DCAC)[3] and Depletion-Based Stock Reduction Analysis (DB-SRA)[4] have now been applied to the majority of groundfish species. It is the goal of the Council to substantially increase the number of groundfish stocks with full assessments.

In April 2006, the SSC recommended, and the Council adopted, a new approach to prioritize groundfish species for full and update stock assessments based on: 1) economic or social importance of the species, 2) vulnerability and resilience of the species, 3) time elapsed since the last assessment (NMFS advises assessments to be updated at least every five years), 4) amount of data available for the assessment, 5) potential risk to the stock from the current or foreseeable management regime, and 6) qualitative trends from surveys (when available). It was also recommended that overfished groundfish stocks that are under rebuilding plans be evaluated each assessment cycle to ensure adequate progress towards achieving stock recovery.

The proposed stocks for full and update assessments should be discussed and finalized by the Council at least a year in advance of a new assessment cycle to allow sufficient time to assemble relevant data and arrange STAR panels.

3. STAR GOALS AND OBJECTIVES

The goals and objectives of the groundfish and CPS STAR process are to:

1) ensure that stock assessments represent the best available scientific information and facilitate the use of this information by the Council to adopt OFLs, ABCs, ACLs, (HGs), and ACTs;
2) meet the mandates of the Magnuson-Stevens Fisheries Conservation and Management Act (MSA) and other legal requirements;
3) follow a detailed calendar and fulfill explicit responsibilities for all participants to produce required reports and outcomes;
4) provide an independent external review of stock assessments;
5) increase understanding and acceptance of stock assessments and peer reviews by all members of the Council family;
6) identify research needed to improve assessments, reviews, and fishery management in the future; and
7) use assessment and review resources effectively and efficiently.

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[3] MacCall, A. D. 2009. Depletion-corrected average catch: a simple formula for estimating sustainable yields in data-poor situations. *ICES Journal of Marine Science* 66: 2267-2271.
[4] Dick, E. J. and A. D. MacCall. 2011. Depletion-Based Stock Reduction Analysis: A catch-based method for determining sustainable yields for data-poor stocks. *Fisheries Research* 110: 331-341.

4. ROLES AND RESPONSIBILITIES OF STAR PARTICIPANTS

4.1. Shared Responsibilities

All parties have a stake in assuring adequate technical review of stock assessments. NMFS, as the designee of the Secretary of Commerce, must determine that the best scientific advice has been used when it approves fishery management recommendations made by the Council. The Council uses advice from the SSC to determine that the information on which it bases its recommendations represents the best available science. Scientists and fishery managers providing technical documents to the Council for use in management need to assure that their work is technically correct.

The Council, NMFS and the Secretary of Commerce share primary responsibility to create and foster a successful STAR process. The Council oversees the process and involves its standing advisory bodies, especially the SSC. For groundfish, NMFS provides a stock assessment coordinator (SAC) to facilitate and assist in overseeing the process, while for CPS a designated SWFSC staff member performs this role. Together NMFS and the Council consult with all interested parties to plan and prepare TOR, and develop a calendar of events with a list of deliverables for final approval by the Council. NMFS and the Council share fiscal and logistical responsibilities and both should ensure that there are no conflicts of interest in the process[5].

The STAR process is sponsored by the Council, because the Federal Advisory Committee Act (FACA) limits the ability of NMFS to establish advisory committees. FACA specifies a procedure for convening advisory committees that provide consensus recommendations to the federal government. The intent of FACA was three-fold: to limit the number of advisory committees; to ensure that advisory committees fairly represent affected parties; and to ensure that advisory committee meetings, discussions, and reports are carried out and prepared in full public view. Under FACA, advisory committees must be chartered by the Department of Commerce through a rather cumbersome process. However, the Sustainable Fisheries Act exempts the Council from FACA per se, but requires public notice and open meetings similar to those under FACA.

4.2. STAR Panel Responsibilities

The role of the STAR panel is to conduct a detailed technical evaluation of a full stock assessment to advance the best available scientific information to the Council. The specific responsibilities of the STAR panel are to:

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[5] The proposed NS2 guidelines state: “Peer reviewers who are federal employees must comply with all applicable federal ethics requirements. Peer reviewers who are not federal employees must comply with the following provisions. Peer reviewers must not have any real or perceived conflicts of interest with the scientific information, subject matter, or work product under review, or any aspect of the statement of work for the peer review. For purposes of this section, a conflict of interest is any financial or other interest which conflicts with the service of the individual on a review panel because it: (A) Could significantly impair the reviewer’s objectivity; or (B) Could create an unfair competitive advantage for a person or organization; (C) Except for those situations in which a conflict of interest is unavoidable, and the conflict is promptly and publicly disclosed, no individual can be appointed to a review panel if that individual has a conflict of interest that is relevant to the functions to be performed. Conflicts of interest include, but are not limited to, the personal financial interests and investments, employer affiliations, and consulting arrangements, grants, or contracts of the individual and of others with whom the individual has substantial common financial interests, if these interests are relevant to the functions to be performed. Potential reviewers must be screened for conflicts of interest in accordance with the procedures set forth in the NOAA Policy on Conflicts of Interest for Peer Review subject to OMB’s Peer Review Bulletin.”

1) review draft stock assessment documents, data inputs, and analytical models along with other pertinent information (e.g., previous assessments and STAR panel reports, when available);
2) discuss the technical merits and deficiencies of the input data and analytical methods during the open review panel meeting, work with the STATs to correct deficiencies, and when possible suggest new tools or analyses to improve future assessments; and
3) develop STAR panel reports for all reviewed species to document meeting discussion and recommendations.

The STAR panel chair has, in addition, the responsibility to: 1) develop a STAR panel meeting agenda; 2) ensure that STAR panel participants follow the TOR; 3) guide the STAR panel and the STAT to mutually agreeable solutions; and 4) coordinate review of revised stock assessment documents before they are forwarded to the SSC.

Groundfish and CPS STAR panels include a chair appointed from the relevant SSC subcommittee (Groundfish or CPS), and three other experienced stock assessment analysts knowledgeable of the specific modeling approaches being reviewed. Of these three other members, at least one should be appointed from the Center for Independent Experts (CIE) and at least one should be familiar with west coast stock assessment practices. Selection of STAR panelists should aim for balance between outside expertise and in-depth knowledge of west coast fisheries, data sets available for those fisheries, and modeling approaches applied to west coast groundfish and CPS. Expertise in ecosystem models or processes, and knowledge of the role of groundfish and CPS in the ecosystem is also desirable, particularly if the assessment includes ecosystem models or environmental processes. Reviewers should not have financial or personal conflicts of interest, either current to the meeting, within the previous year (at minimum), or anticipated. For groundfish, an attempt should be made to identify one reviewer who can consistently attend all STAR panel meetings in an assessment cycle. The pool of qualified technical reviewers is limited, therefore staffing of STAR panels is a subject to constraints that can make it difficult to meet the conditions above.

STAR panel meetings also should also include representatives of the relevant management team (MT) and advisory panel (AP), with responsibilities as laid out in these TOR, and a Council staff member to help advise the STAR panel and assist in recording meeting discussions and results. The STAR panel, STATs, the MT and AP representatives, and the public are all legitimate meeting participants who should be accommodated in discussions. It is the STAR panel chair's responsibility to coordinate discussion and public comment so that the assessment review is completed on time.

A STAR panel normally meets for one week. The number of assessments reviewed per panel should not exceed two, except in extraordinary circumstances if the SSC and NMFS agree that it is advisable, feasible, and/or necessary. When separate assessments are conducted at the sub-stock level (i.e., black rockfish), each assessment is considered an independent full assessment for review purposes. Contested assessments, in which alternative assessments are brought forward by competing STATs using different modeling approaches, would typically require additional time (and/or panel members) to review adequately, and should be scheduled accordingly. While contested assessments are likely to be rare, they can be accommodated within the STAR process. The STAR panel should thoroughly evaluate each analytical approach, comment on the relative merits of each, and, when conflicting results are obtained, identify the reasons for the differences. The STAR panel is also charged with selecting a preferred base model.

STAR Panel Requests for Additional Analyses

STAR panel meetings are not workshops. In the course of a meeting, the panel may ask the STAT for a reasonable number of sensitivity runs, request additional details on the proposed base model presented, or ask for further analyses of alternative runs. It is not unusual for the review to result in a change to the initial base model (given that both the STAR panel and the STAT agree). However, the STAR panel is not authorized to conduct an alternative assessment representing its own views that are distinct from those of the STAT, nor can it impose an alternative assessment on the STAT. Similarly, the panel should not impose their preferred methodologies when this is a matter of professional opinion. Rather, if the panel finds an assessment to be inadequate, it should document its opinion and suggest potential remedial measures for the STAT to take to rectify perceived shortcomings of the assessment. For groundfish species, the SSC reviews the STAR panel report and recommends whether an assessment should be further reviewed at the so-called "mop-up" panel meeting, a meeting of the SSC's Groundfish subcommittee that occurs after all of the STAR panels, primarily to review rebuilding analyses for overfished stocks. If a recommendation on whether to send the assessment to the mop-up panel meeting is needed before the full SSC is able to review the STAR panel report, the SSC Chair, Vice Chair, and Groundfish subcommittee Chair will make preliminary decision. This recommendation is subject to confirmation by the full SSC at its next scheduled meeting. For CPS, if an assessment is found not to be acceptable for use in management, a full assessment would be conducted the following year.

The STAR panels are expected to be judicious in their requests of the STATs. Large changes in data (such as wholesale removal of large data sets) or in analytical methods often result in such great changes to the assessment that they cannot be adequately reviewed during the course of the STAR panel meeting. Therefore caution should be exercised in making such changes, and in many cases such changes should be relegated to future research recommendations and/or methodology review. If a groundfish STAR panel agrees that significant changes are necessary, and the assessment is not otherwise acceptable, a recommendation for further review at the mop-up panel is warranted. Similarly, if the STAR panel agrees that the assessment results strongly indicate that current F_{MSY} value or management target and threshold are inappropriate, it should identify this in its report and recommend further analysis to support a change to more appropriate values.

STAR panel requests to the STAT for additional model runs or data analyses must be clear, explicit, and in writing. They should reflect the consensus opinion of the entire panel and not the minority view of a single individual or individuals. The STAR panel requests and recommendations should be listed within the STAR panel's report along with rationale and STAT response to each request.

To the extent possible, analyses requested by the STAR panel should be completed by the STAT during the STAR panel meeting. It is the obligation of the STAR panel chair, in consultation with other panel members, to prioritize requests for additional analyses. In situations where a STAT arrives with a well-constructed, thoroughly investigated assessment, it may be that the panel finishes its review earlier than scheduled (i.e., early dismissal of a STAT). If follow-up work by the STAT is required after the review meeting (such as MCMC integration of an alternative model created during the STAR panel meeting), this should be completed before the briefing book deadline for the Council meeting at which the assessment is scheduled for review. It is the STAR panel responsibility to track STAT progress. In particular, the chair is responsible for communicating with the STAT to determine if the revised stock assessment document is complete. Any post-STAR drafts of the stock assessment must be reviewed by the STAR panel chair. The assessment document can only be given to Council staff for distribution after it has been endorsed by the STAR panel chair, and when it is accompanied by a complete and approved STAR panel report. Likewise, the final draft that is published in the Council's SAFE document must also be approved by the STAR panel chair prior to being accepted by Council staff.

For some stocks selected for full assessments, the available data may prove to be insufficient to support a category 1 assessment. In such cases, the STAT should consider whether simpler approaches appropriate for a category 2 assessment can be applied. Simpler approaches usually make stronger assumptions and estimate fewer parameters, but are less demanding of data. It is the responsibility of the STAR panel, in consultation with the STAT, to consider the strength of inferences that can be drawn from analyses presented, and identify major uncertainties. If useful results have been produced, the STAR panel should review the appropriateness and reliability of the methods used to draw conclusions about stock status and/or exploitation rates, and either recommend or reject the analysis on the basis of its ability to provide useful information into the management process. If the STAR panel agrees that important results have been generated, it should forward its findings and conclusions to the SSC and the Council for consideration in setting of OFLs, ABCs, and ACLs (for groundfish) and HGs (for CPS). A key section of the assessment is that on research needed to improve the assessment. Highlighting research priorities should increase the likelihood that future stocks assessments can be raised to category 1.

Uncertainty and Decision Tables in Groundfish Stock Assessments

The STAR panel review focuses on technical aspects of the stock assessment. It is recognized that no model or data set is perfect or issue free. Therefore, outputs of a broad range of model runs should be evaluated to better define the scope of the accepted model results. The panel should strive for a risk-neutral perspective in its deliberations, and discuss the degree to which the accepted base model describes and quantifies the major sources of uncertainty in the assessment. Confidence intervals for model outputs, as well as other measures of uncertainty that could affect management decisions, should be provided in completed stock assessments and the reports prepared by STAR panels. The STAR panel may also provide qualitative comments on the probability of results from various model runs, especially if the panel does not consider the probability distributions calculated by the STAT capture all major sources of uncertainty. However, as a scientific peer review body, the STAR panel should avoid matters of policy. Assessment results from model runs that are technically flawed or questionable on other grounds, should be identified by the panel and excluded from the alternatives upon which management advice is to be developed.

During the review meeting, the STAR panel and the STAT should strive to reach a consensus on a single base model. Once a base model is agreed upon, it is essential that uncertainty around the base model be captured and communicated to managers. One way to accomplish this objective is to bracket the base model with what is agreed to be the major axis of uncertainty (e.g., spawner-recruit steepness, the virgin level of recruitment, the natural mortality rate, survey catchability, etc.; and, less often, recent year-class strength, weights on conflicting CPUE series, etc.). Alternative models should show contrast in their management implications, which, in practical terms, means that that they should result in different estimates of current stock size and status, and the OFL. Markov chain Monte Carlo (MCMC) integration, where possible, is an acceptable method for reporting uncertainty about the base model. However, point estimates from the Maximum Likelihood Estimation (MLE) method should be used for status determinations even when MCMC outputs are available.

Once alternative models, which capture the overall degree of uncertainty in the assessment, are formulated, a 2-way decision table (alternative models versus management actions) should be developed to illustrate the repercussions of uncertainty to managers. The ratio of probabilities of alternative models should be 25:50:25, with the base model being twice as likely as the low and high stock size alternatives. Potential methods for assigning probabilities to alternative models include using the statistical variance of the model estimates of stock size, posterior Monte Carlo simulation, or expert judgment, but other approaches are acceptable as long as they are fully documented. An ideal bracketing of the base model is one for which the geometric mean of the high and low stock size alternative model final biomass levels approximates the base model biomass level. This is because the distribution of possible stock sizes is necessarily bounded at the low end, while the right tail can extend much further from the point estimate, and thus the probability density should look more log-normal than normal. If the bracketing models are far from this ideal (e.g. if the base model is closer to the upper bracketing model in absolute terms than to the lower bracketing model), the three levels should be reconsidered and either one or more of them adjusted (such that in certain cases, if there is a great deal of confidence in the bracketing models, the base model could be reconsidered), or a justification for the severely non-lognormal structure of alternatives be given. Similarly, if more than one dimension is used to characterize uncertainty, resulting in, for example, a 3-by-3 decision table, careful consideration of how the complete table brackets the uncertainty should be undertaken.

Areas of Disagreement

STATs and STAR panels are required to make an honest attempt to resolve any areas of disagreement during the meeting. Occasionally, fundamental differences of opinions may remain between the STAR panel and STAT that cannot be resolved during the STAR panel meeting. In such cases, the STAR panel must document the areas of disagreement in its report. While identifying areas of disagreement the following questions should be discussed at the meeting:

1) Are there any differences in opinion about the use or exclusion of data?
2) Are there any differences in opinion about the choice of the base model?
3) Are there any differences in opinion about the characterization of uncertainty?

The STAT may choose to submit a supplemental report supporting its view, but in that case, an opportunity must be given to the STAR panel to prepare a rebuttal. These documents would then be appended to the STAR panel report as part of the record of the review meeting. In some cases STAR panel members may have fundamental disagreements among themselves that cannot be resolved during the review meeting. In such cases, STAR panel members may prepare a minority report that would also become part of the record of the review meeting. The SSC would then review all information pertaining to STAR panel and STAR panel/STAT disputes, and issue its recommendation.

STAR Panel Report

The STAR panel report should be developed and approved by the full panel shortly after the STAR panel meeting. The STAR panel chair appoints members of the panel to act as rapporteurs and draft the report (or specific sections thereof) according to the STAR panel chair guidance on format and level of detail. The STAR panel chair is responsible for preparing the final draft of the panel report, obtaining panel approval, providing a copy for STAT review and comment, and submitting it to the Council in a timely fashion (i.e., by briefing book deadline).

The STAR panel report should include:

- Summary of the STAR Panel meeting:
    - Names and affiliations of STAR panel members, STAT and STAR panel advisors;
    - Brief overview of the meeting (where the meeting took place, what species was assessed, what was the STAR panel recommendation, etc.);
    - Brief summary of assessment model and the data used;
    - List of analyses requested by the STAR panel, the rationale for each request, and a brief summary of the STAT response to the request;
- Description of the base model and, for groundfish species, the alternative models used to bracket uncertainty;
- Comments on the technical merits and/or deficiencies in the assessment and recommendations for remedies;
- Areas of disagreement regarding STAR panel recommendations:
    - Between the STAR panel and STAT(s).
    - Among STAR panel members (including concerns raised by MT and AP representatives);
- Unresolved problems and major uncertainties, e.g., any special issues that complicate assessment and/or interpretation of results.
- Management, data, or fishery issues raised by the MT or AP representatives during the STAR panel.
- Prioritized recommendations for future research and data collection, including methodology and ecosystem considerations for the subsequent assessment.

For groundfish species, the STAR panel also makes a recommendation on whether the next assessment of the same species should be full or update, and explain reasons for its recommendation.

The STAR panel report should be made available for review by the STAT with adequate time prior to the briefing book deadline (i.e., a week in most circumstances, but at minimum a full 24 hours, in cases when the time between the STAR panel and the deadline is particularly compressed) so that the STAT can comment on issues of fact or differences in interpretation. If differences of opinion come up during review of the STAR panel report, the STAR panel and STAT should attempt to resolve them. Otherwise, the areas of disagreement must be documented in the STAR panel report.

The chair will also solicit comment on the draft report from the MT and AP representatives. The purpose of this is limited to ensuring that the report is technically accurate, and reflects the discussion that occurred at meeting, and should not be viewed as an opportunity to reopen debate on issues. The STAR panel chair is the final arbiter on wording changes suggested by STAT and the MT and AP representatives as the report is the panel's report of the meeting. Any detailed commentary by MT and AP representatives should be drafted separately, reviewed by full advisory body, and included in the briefing book.

The STAR panel chair is responsible for providing the Council staff with the final version of the STAR panel report. The STAR panel chair is also expected to attend the SSC meeting and, if requested, MT meetings and the relevant portions of the Council meetings, where stock assessments and harvest projections are discussed, explain the reviews and provide technical information and advice.

4.3. Stock Assessment Team Responsibilities

The stock assessment team (STAT) is responsible for conducting a complete and technically sound stock assessment that conforms to accepted standards of quality, and in accordance with these TOR. The STAT is responsible for preparing three versions of the stock assessment document:

1) a "draft" for discussion during STAR panel meeting;
2) a "revised draft" for presentation to the SSC, the Council, and relevant MT and AP; and
3) a "final version" to be published in the Council's SAFE document.

The draft assessment document should follow the outline in Appendix A with an executive summary as in the template in Appendix B. In the draft document, the STAT should identify a candidate base model, fully-developed and well-documented, for STAR panel to review. For CPS, the STAT should submit a draft assessment document to the STAR panel chair and Council staff two weeks prior to the STAR panel meeting. For groundfish, a draft assessment document should be submitted by the STAT to the STAR panel chair, Council staff, and the NMFS Stock Assessment Coordinator (SAC) three full weeks prior to the STAR panel meeting, to determine whether the document is sufficiently complete to undergo review. If the draft assessment is judged complete, the draft assessment and supporting materials would be distributed to the STAR panel and relevant MT and AP representatives two weeks prior to the STAR panel meeting. If the assessment document does not meet minimum criteria of the TOR, the review would be postponed to a subsequent assessment cycle or to the mop-up panel. The mop-up panel generally is not able to review more than two assessments. Therefore, the review options are limited for assessments not completed on time. The STAT is also responsible for bringing model files and data (in digital format) to the STAR panel meeting so that they can be analyzed on site.

In most cases, the STAT should produce a revised draft of the assessment document within three weeks of the end of the STAR panel meeting. The revised draft must include a point-by-point response of the STAT to each of the STAR panel's recommendations. The revised draft must be finalized before the briefing book deadline for the Council meeting at which the assessment is scheduled for review. Post-STAR drafts must be reviewed and approved by the STAR panel chair prior to being submitted to Council staff. This review is limited to editorial issues, verifying that all required elements are included, and confirming that the document reflects the discussion and decisions made during the STAR panel.

The final version of the assessment document is produced after the assessment has been reviewed by the SSC. Other than changes recommended by the SSC, only editorial and other minor alterations should be made to the revised draft for the final version. Electronic versions of the final assessment document, model files, and key output files should be submitted by the STATs to Council staff (for CPS) and to Council staff and the SAC (for groundfish) for inclusion in a stock assessment archive. Any tabular data that are inserted into the final documents in an object format should also be submitted in alternative forms (e.g., spreadsheets), which allow selection of individual data elements.

A STAT for which no base model was endorsed by a STAR panel should, in most cases, provide the pre-STAR draft assessment (or corrected/ updated version thereof, as agreed upon with the STAR panel) to the Council by the briefing book deadline. If the STAR panel, nonetheless, recommends using outputs of certain sensitivity runs to bracket uncertainty in the assessment, the results of those runs should be appended to the draft assessment and provided to the Council and its advisory bodies.

STATs are strongly encouraged to develop assessments in a collaborative environment by forming working groups, holding pre-assessment workshops, and consulting with other stock assessment and ecosystem assessment scientists. STAT meetings with Integrated Ecosystem Assessment (IEA) teams are strongly encouraged to evaluate alternative models and analyses that incorporate ecosystem considerations and cross-FMP interactions that may affect stock dynamics. When new data sources or methods, which could be used in many assessments or are likely contentious, are planned for inclusion in the assessment they should ideally be reviewed by a methodology panel. STATs should identify whether such new data sources or methods will be proposed for inclusion in assessments as early as feasible so that it is possible to hold a methodology review panel if one is needed. Irrespective of whether a methodology review panel takes place, the STAR panel should be provided with model runs with and without the new data sources so that it can evaluate the sensitivity of model outputs to these data sources.

STATs should coordinate early in the process with state representatives and other data stewards to ensure timely availability of data. STATs are also encouraged to organize independent meetings with industry and interested parties to discuss data and issues. The STAT should initiate contact with the AP representative early in the assessment process, keep the AP informed of the data being used and respond to any concerns that are raised. The STAT should also contact the MT representative for information about changes in fishing regulations that may influence model structure and the way data are used in the assessment. The STAT should be well represented at the STAR panel meeting to ensure timely completion of the STAR panel requests. Barring exceptional circumstances, STAT members, who are not attending the STAR panel meeting, should be available remotely to assist with responses when needed. Each STAT conducting a full assessment should appoint a representative to attend the Council meeting where the assessment is scheduled to be reviewed and give presentations of the assessment to the SSC and other Council advisory bodies. In addition, the STAT should be prepared to respond to MT requests for model projections for the MT's to develop ACL alternatives.

For stocks that are estimated to be below overfished thresholds (or those previously declared overfished and not yet rebuilt), the STAT must complete a rebuilding analysis according to the SSC's TOR for Rebuilding Analyses and prepare a document that summarizes the analysis results. For groundfish, it is recommended that this rebuilding analysis be conducted using the software developed by Dr. André Punt (University of Washington). Groundfish rebuilding analyses are reviewed at the mop-up panel.

4.4. National Marine Fisheries Service Responsibilities

The NMFS Northwest Fisheries Science Center (NWFSC) and the Southwest Fisheries Science Center (SWFSC) assist in organizing stock assessment reviews of groundfish and CPS, respectively. For groundfish, the NMFS provides a stock assessment coordinator (SAC) to facilitate and assist in overseeing the STAR process.

The NMFS (through the SAC for groundfish and a designated SWFSC staff member for CPS) works with the STATs and other STAR process participants to develop a proposed list of stocks to be assessed for the consideration by the Council. NMFS also develops a draft STAR panel schedule for the Council review. NMFS identifies STAR panel members based on criteria for reviewer qualifications, and, for groundfish, makes every effort to designate one independent reviewer who can attend all STAR panel meetings to provide consistency among reviews. The costs associated with these reviewers are borne by the NMFS. The NMFS also helps organize STAR panel meetings and develops meetings' schedules.

The NMFS (along with the Council staff and the STAR panel chair) coordinates with the STATs to facilitate delivery of required materials by scheduled deadlines and in compliance with the TOR. The NMFS also assists Council staff and the STAR panel chair in a pre-review of assessment documents, to assure they are received on time and complete, and in a post-STAR review of the revised assessment document for consistency with the TOR.

4.5. Council Staff Responsibilities

The role of Council staff is to coordinate, monitor and document the STAR process to ensure compliance with these TOR.

Council staff coordinates with the STAR panel chair and the NMFS (the SAC in the case of groundfish; a designated SWFSC staff member for CPS) in a pre-review of assessment documents, to assure they are complete and received on time. If an assessment document is not in compliance with the TOR, Council staff returns the assessment document to the STAT with a list of deficiencies, a notice that the deadline has expired, or both. Council staff also coordinates with the STAR panel chair, STAT and the NMFS in a post-STAR review of the revised assessment document for consistency with the TOR. When inconsistencies are identified, the STAT is requested to make appropriate revisions in time for briefing book deadlines.

Council staff attends and monitors all STAR panel meetings to ensure continuity and adherence to the TOR and the independent review requirements of Council Operating Procedure 4. If inconsistencies with the TOR occur during STAR panel meetings, Council staff coordinates with the STAR panel chair to develop solutions to correct the inconsistencies. Council staff also attends and monitors the SSC review of stock assessments to ensure compliance with the TOR.

Council staff is responsible for timely issuance of meeting notices and distribution of stock assessments and other appropriate documents to relevant groups. Council staff also collects and maintains electronic copies of assessment documents, STAR panel, SSC, MT and AP reports as well as letters from the public and any other relevant documents. These documents are typically published in the Council's SAFE document.

4.6. Management Team Responsibilities

The management team (MT) is responsible for identifying and evaluating potential management actions based on the best available scientific information. Particularly, the MT uses stock assessment results and other information to make ACL and ACT recommendations to the Council.

A MT representative, usually appointed by the MT chair, is responsible to attend the STAR panel meeting and serve as advisor to the STAT and STAR panel on changes in fishing regulations that may influence data used in the assessment and the nature of the fishery in the future. The MT representative does not serve as a member of the STAR panel.

Successful separation of science (e.g., STAT and STAR panels) from management (e.g., MT) depends on assessment reviews being completed by the time the MT meets to discuss preliminary ACL and ACT recommendations. The MT should not seek revision or additional review of the stock assessments, after they have been endorsed by the STAR panel. The MT chair should communicate any unresolved issues to the SSC for consideration. The MT, however, can request additional model projections from the STAT, to fully evaluate potential management actions.

4.7. Advisory Panel Responsibilities

An Advisory Panel (AP) representative, usually appointed by the AP chair, is responsible to attend the STAR panel meeting and serve as advisor to the STAT and STAR panel. The AP representative should review the data sources being used in the assessment prior to development of the stock assessment model and insure that industry concerns regarding the adequacy of data used by the STAT are communicated and addressed early in the assessment process. The AP representative does not serve as a member of the STAR panel, but, as a legitimate meeting participant, may provide appropriate information and advice to the STAT and STAR panel during the meeting.

The AP representative (along with STAT and STAR panel chair, if requested) is expected to attend the MT meeting at which preliminary ACL and ACT recommendations are developed. The AP representative is also expected to attend subsequent MT and Council meetings where the relevant harvest recommendations are discussed.

4.8. Scientific and Statistical Committee Responsibilities

The Council's Scientific and Statistical Committee (SSC) plays multiple roles within the STAR process and provides the Council and its advisory bodies with technical advice related to the stock assessments and the STAR process. The SSC assigns a member of its relevant subcommittee (Groundfish or CPS) to act as the STAR panel chair. The STAR panel chair attends the assigned STAR panel meeting and fulfills responsibilities described in the section "STAR Panel Responsibilities".

The STAR panel chair presents the STAR panel report at the SSC and Council meetings at which stock assessments are reviewed. If requested, the STAR panel chair also attends the MT meeting, at which preliminary ACL and ACT recommendations are developed, to discuss the STAR panel report and assist with interpreting the assessment results.

The full SSC conducts a final review of the stock assessment. This review should not repeat the detailed technical review conducted by the STAR panel. The SSC also reviews the STAR panel recommendations and serves as arbitrator to resolve disagreements between the STAT and the STAR panel if such disagreements occurred during the review meeting. The SSC is responsible to review and endorse any additional analytical work requested from the STAT by the MT after the stock assessment has been reviewed by the STAR panel. To insure independence in the SSC review, the SSC members who served on the STAT or STAR panel for the stock assessment being reviewed are required to recuse themselves; their involvement in the review being limited to providing factual information and answering questions.

The SSC is responsible for making OFL recommendations to the Council. The SSC is also responsible for assigning groundfish species managed by the Council to a specific category (or tier) based on definitions of species categories in Appendix C. It is also the SSC's responsibility to determine when it is appropriate to make changes to proxies or the use of estimated values of F_{MSY} and B_{MSY}.

5. UPDATE ASSESSMENTS AND DATA REPORTS

For CPS, update assessments typically occur during two years out of every three. For groundfish, the initial recommendation whether the next assessment should be full or update is made by the STAR panel during the STAR panel meeting. The final recommendation is made by the SSC.

An update assessment is generally restricted to the addition of new data that have become available since the last full assessment. It must carry forward the fundamental structure of the last full assessment reviewed and endorsed by a STAR panel, the SSC and the Council. Assessment structure here refers to the population dynamics model, data sources used as inputs to the model, the statistical platform used to fit model to the data, and how the management quantities used to set harvest specifications are generated. Particularly, when an update assessment is developed, no substantial changes should be made to:

1) the particular sources of data used;
2) the software used in programming the assessment;
3) the assumptions and structure of the population dynamics model underlying the stock assessment;
4) the statistical framework for fitting the model to the data and determining goodness of fit; and
5) the analytical treatment of model outputs in determining management reference points.

Significant changes to the assessment should be postponed until the next full assessment. Minor alternations to the input data and the assessment can be considered as long the update assessment clearly documents and justifies the need for such changes. A step-by-step transition (via sensitivity analysis) from the last full assessment to an update assessment under review should be provided. Minor alternations can be considered under only two circumstances: first, when the addition of new data reveals an unanticipated sensitivity of model, and second, when there are clear and straightforward improvements in the input data and how it is processed and analyzed for use in the model. Examples of minor alterations include a) changes in how compositional data are pooled across sampling strata, (b) the weighting of the various data components (including the use of methods for tuning the variances of the data components), and (c) changes the time periods for the selectivity blocks, d) correcting data entry errors, e) bug fixes in software programming. This list is not meant to be exhaustive, and other alternations can be considered if warranted. Ideally, improved data or methods used to process and analyze data would be reviewed by the SSC prior to being used in assessments.

In certain cases limited new information is available to inform the assessment (e.g., cowcod). If the estimated catch of a species is near the value projected by the previous assessment/rebuilding analysis, no new insight would be obtained by rerunning the assessment model. In such cases, it is appropriate for the STAT to simply provide a data report comparing recent catches to ACLs.

Review of Update Assessments and Data Reports

Update assessments and data reports are reviewed by the relevant SSC subcommittee (Groundfish or CPS), during a single meeting. Review typically requires one or two days with an option of early dismissal of a STAT. The STAT is responsible for producing the update assessment document or data report and submitting it to Council staff in a timely manner, before the relevant SSC subcommittee reviews the assessment. The document should follow the outline in Appendix A. The STAT, however, can reference the last full assessment (or other relevant documentation) for description of methods, data sources, stock structure, etc., given that they have not been changed. Any new information to the assessment must be presented in sufficient detail for the subcommittee to determine whether the update meets the Council's requirement to use the best available scientific information.

The document must include a retrospective analysis illustrating the model performance with and without the most recent data (new to the update assessment) and discuss whether the new data and update assessment results are sufficiently consistent with those from the last full assessment. The assessment document should include a detailed step-by-step transition from the last full assessment to the update under review. The updated decision table, if there is one, should be of the same format as in the last full assessment; it should highlight differences among alternative models defined using the same axes of uncertainty as those of the last full assessment.

In additional to the update assessment document (or data report), Council staff also provides the subcommittee with a copy of the last full stock assessment reviewed via STAR process and the STAR panel report. The chair of the subcommittee designates a lead reviewer from the subcommittee members for each update assessment and data report to document the meeting discussion, produce a review report, and ensure that each review is conducted according to the TOR. MT and the AP representatives also participate in the review.

The review of update assessments is not expected to require additional model runs or extensive analytical requests during the meeting, although changes in assessment outputs may necessitate some model exploration. The review focuses on two main questions:

1) Does the assessment meet the criteria of a stock assessment update?
2) Can the results of the update assessment form the basis of Council decision making?

If the answer to either of these questions is negative, a full stock assessment for the species would typically be recommended for the next assessment cycle (for groundfish) or the next year (for CPS). For groundfish, if the subcommittee agrees that the update assessment results require additional, but limited exploration before being endorsed for management use, further review at the mop-up meeting, in the end of the assessment cycle, could be recommended. In cases like this, the subcommittee needs to develop a list of requests for the STAT to address before the mop-up meeting.

Shortly after the meeting, the subcommittee issues a review report that includes: 1) comments on the technical merits and/or deficiencies of the update assessment; 2) explanation of areas of disagreement between the subcommittee and STAT (if any); and 3) recommendations on the adequacy of the update assessment for use in management. The report may also include subcommittee recommendations for modifications that should be made when the next full assessment is conducted.

The report is reviewed by the full SSC at the next Council meeting. If the subcommittee review concludes that it is not possible to use the update assessment, the SSC is responsible for evaluating all model runs examined during the review meeting and providing recommendations on appropriate fishing level to the Council.

APPENDIX A: OUTLINE FOR STOCK ASSESSMENT DOCUMENTS

This is a general outline of elements that should be included in stock assessment reports for groundfish and CPS managed by the Pacific Fishery Management Council. Not every item listed in the outline is relevant (or available) for every assessment. Therefore, this outline should be considered a flexible guideline on how to organize and communicate stock assessment results. Items with asterisks (*****) are optional for draft assessment documents prepared for STAR panel meetings but should be included in the final document.

A. Title page and list of preparers – the names and affiliations of the stock assessment team (STAT) either alphabetically or as first and secondary authors.

B. Executive Summary (should follow the template in Appendix B).

C. Introduction
   1. Scientific name, distribution, the basis for the choice of stock structure, including regional differences in life history or other biological characteristics that should form the basis of management units.
   2. A map showing the scope of the assessment and depicting boundaries for fisheries or data collection strata.
   3. Important features of life history that affect management (e.g., migration, sexual dimorphism, bathymetric demography).
   4. Ecosystem considerations (e.g., ecosystem role and trophic relationships of the species, habitat requirements/preferences, relevant data on ecosystem processes that may affect stock or parameters used in the stock assessment, and/or cross-FMP interactions with other fisheries). This section should note if environmental correlations or food web interactions were incorporated into the assessment model. The length and depth of this section would depend on availability of data and reports from the IEA, expertise of the STAT, and whether ecosystem factors are informational to contribute quantitative information to the assessment.
   5. Important features of current fishery and relevant history of fishery.
   6. Summary of management history (e.g., changes in mesh sizes, trip limits, or other management actions that may have significantly altered selection, catch rates, or discards).
   7. Management performance, including a table or tables comparing Overfishing Limit (OFL), Annual Catch Limit (ACL), Harvest Guideline (HG) [CPS only], landings, and catch (i.e., landings plus discard) for each area and year
   8. Description of fisheries for this species off Canada, Alaska and/or Mexico, including references to any recent assessments of those stocks.

D. Assessment
   1. Data
      a. Landings by year and fishery, historical catch estimates, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, abundance indices (typically survey and CPUE data), data used to estimate biological parameters (e.g., growth rates, maturity schedules, and natural mortality) with coefficients of variation (CVs) or variances if available. Include complete tables and figures and date of extraction.
      b. Sample size information for length and age composition data by area, year, gear,

market category, etc., including both the number of trips and fish sampled.

c. All data sources that include the species being assessed, which are used in the assessment, and provide the rationale for data sources that are excluded.
d. Clear description of environmental or ecosystem data if included in the assessment.

2. History of modeling approaches used for this stock – changes between current and previous assessment models
   a. Response to STAR panel recommendations from the most recent previous assessment.
   b. Report of consultations with AP and MT representatives regarding the use of various data sources in the stock assessment.
   c. If environmental or ecosystem data are incorporated, report of consultations with technical teams that evaluated ecosystem data or methodologies used in the assessment.
3. Model description
   a. Complete description of any new modeling approaches.
   b. Definitions of fleets and areas.
   c. Assessment program with last revision date (i.e., date executable program file was compiled).
   d. List and description of all likelihood components in the model.
   e. Constraints on parameters, selectivity assumptions, natural mortality, treatment of age reading bias and/or imprecision, and other fixed parameters.
   f. Description of stock-recruitment constraints or components.
   g. Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B_0, stable age structure, etc.).
   h. Critical assumptions and consequences of assumption failures.
4. Model selection and evaluation
   a. Evidence of search for balance between model realism and parsimony.
   b. Comparison of key model assumptions, include comparisons based on nested models (e.g., asymptotic vs. domed selectivities, constant vs. time-varying selectivities).
   c. Summary of alternate model configurations that were tried but rejected.
   d. Likelihood profile for the base-run (or proposed base-run model for a draft assessment undergoing review) configuration over one or more key parameters (e.g., M, h, Q) to show consistency among input data sources.
   e. Residual analysis for the base-run configuration (or proposed base-run model in a draft assessment undergoing review) e.g., residual plots, time series plots of observed and predicted values, or other approaches. Note that model diagnostics *are* required in draft assessments undergoing review.
   f. Convergence status and convergence criteria for the base-run model (or proposed base-run).
   g. Randomization run results or other evidence of search for global best estimates.
   h. Evaluation of model parameters. Do they make sense? Are they credible?
   i. Are model results consistent with assessments of the same species in Canada and Alaska? Are parameter estimates (e.g., survey catchability) consistent with estimates for related stocks?
5. Point-by-point response to the STAR panel recommendations**.* Not required in draft assessment undergoing review**.
6. Base-model(s) results

a. Table listing all explicit parameters in the stock assessment model used for base model, their purpose (e.g., recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model.
b. Population numbers at age × year × sex (if sex-specific M, growth, or selectivity) (May be provided as a text or spreadsheet file).*** Not required in draft assessment undergoing review**.
c. Time-series of total, 1+ (if age 1s are in the model), summary, and spawning biomass (and/or spawning output), depletion relative to B_0, recruitment and fishing mortality or exploitation rate estimates (table and figures).
d. Selectivity estimates (if not included elsewhere).
e. Stock-recruitment relationship.
f. OFL, ABC and ACL (and/or ABC and OY or HG) for recent years.
g. Clear description of units for all outputs.
h. Clear description of how discard is included in yield estimates.
i. Clear description of environmental or ecosystem data if included in the assessment.

7. Uncertainty and sensitivity analyses. The best approach for describing uncertainty and the range of probable biomass estimates in groundfish assessments may depend on the situation. Important factors to consider include:
    a. Parameter uncertainty (variance estimation conditioned on a given model, estimation framework, data set choice, and weighting scheme), including likelihood profiles for important assessment parameters (e.g., natural mortality). This also includes expressing uncertainty in derived outputs of the model and estimating CVs using appropriate methods (e.g., bootstrap, asymptotic methods, Bayesian approaches, such as MCMC). Include the CV of spawning biomass in the first year for which an OFL has not been specified (typically end year +1 or +2).
    b. Sensitivity to data set choice and weighting schemes (e.g., emphasis factors), which may also include a consideration of recent patterns in recruitment.
    c. Sensitivity to assumptions about model structure, i.e., model specification uncertainty.
    d. Retrospective analysis, where the model is fitted to a series of shortened input data sets, with the most recent years of input data being dropped.
    e. Historical analysis (plot of actual estimates from current and previous assessments).
    f. Subjective appraisal of the magnitude and sources of uncertainty.
    g. If a range of model runs is used to characterize uncertainty it is important to provide some qualitative or quantitative information about relative probability of each. If no statements about relative probability can be made, then it is important to state that all scenarios (or all scenarios between the bounds depicted by the runs) are equally likely
    h. If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels; and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.

E. Harvest control rules (CPS only)

The OFL, ABC and HG harvest control rules for actively managed species apply to the U.S. (California, Oregon, and Washington) harvest recommended for the next fishing year and are defined as follows:

- OFL = BIOMASS * FMSY * U.S. DISTRIBUTION
- ABC = BIOMASS * BUFFER * FMSY * U.S. DISTRIBUTION
- ACL LESS THAN OR EQUAL TO ABC
- HG = (BIOMASS-CUTOFF)* FRACTION * U.S. DISTRIBUTION
- ACT EQUAL TO HG OR ACL, WHICHEVER VALUE IS LESS

where FMSY is the fishing mortality rate that maximizes catch biomass in the long-term.

Implementation for Pacific Sardine

1. BIOMASS is the estimated stock biomass (ages 1+) at the start of the next year from the current assessment,
2. CUTOFF (150,000 mt) is the lowest level of estimated biomass at which harvest is allowed,
3. FRACTION is an environment-based percentage of biomass above the CUTOFF that can be harvested by the fisheries. Given that the productivity of the sardine stock has been shown to increase during relatively warm-water ocean conditions, the following formula has been used to determine an appropriate (sustainable) FRACTION value:

   FRACTION = 0.248649805(T_2) - 8.190043975(T) + 67.4558326,

   where T is the running average sea-surface temperature at Scripps Pier, La Jolla, California during the three preceding years. Under the harvest control rule, FRACTION is constrained and ranges between 5% and 15% depending on the value of T.
4. U.S. DISTRIBUTION is the percentage of BIOMASS in U.S. waters (87%).

Implementation for Pacific Mackerel

1. BIOMASS is the estimated stock biomass (ages 1+) at the start of the next year from the current assessment,
2. CUTOFF (18,200 mt) is the lowest level of estimated biomass at which harvest is allowed,
3. FRACTION (30%) is the fraction of biomass above CUTOFF that can be taken by fisheries, and
4. U.S. DISTRIBUTION (70%) is the average fraction of total BIOMASS in U.S. waters.

The CUTOFF and FRACTION values applied in the Council's harvest policy for mackerel are based on simulations published by MacCall et al. in 1985.

F. Reference points (groundfish only)

1. Unfished spawning stock biomass, summary age biomass, and recruitment, along with unfished spawning stock output.
2. Reference points based on $B_{40\%}$ for rockfish and roundfish and on $B_{25\%}$ for flatfish (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
3. Reference points based on default SPR proxy (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
4. Reference points based on MSY (if estimated) (spawning biomass and/or output, SPR,

exploitation rate, equilibrium yield).

5. Equilibrium yield curve showing various B_{MSY} proxies.

G. Harvest projections and decision tables (groundfish only) *** Not required in draft assessment undergoing review**.

1. Harvest projections and decision tables (i.e., a matrix of alternative models (states of nature) versus management actions) should cover the plausible range of uncertainty about current stock biomass and a set of candidate fishing mortality targets used for the stock. See section "*Uncertainty and Decision Tables in Groundfish Stock Assessment"* (this document, pp.12-13) on how to define alternative states of nature. Management decisions in most cases represent the sequence of catches including estimate of OFL based on F_{MSY} (or its proxy) and those obtained by applying the Council 40-10 harvest policy to each state of nature; however other alternatives may be suggested by the GMT as being more relevant to Council decision making. OFL calculations should be based on the assumption that future catches equal ABCs and not OFLs.
2. Information presented should include biomass, stock depletion, and yield projections of OFL, ABC and ACL for ten years into the future, beginning with the first year for which management action could be based upon the assessment.

H. Regional management considerations.

1. For stocks where current practice is to allocate harvests by management area, a recommended method of allocating harvests based on the distribution of biomass should be provided. The MT advisor should be consulted on the appropriate management areas for each stock.
2. Discuss whether a regional management approach makes sense for the species from a biological perspective.
3. If there are insufficient data to analyze a regional management approach, what are the research and data needs to answer this question?

I. Research needs (prioritized).

J. Acknowledgments: include STAR panel members and affiliations as well as names and affiliations of persons who contributed data, advice or information but were not part of the assessment team. *** Not required in draft assessment undergoing review.**

K. Literature cited.

L. An appendix with the complete parameter and data in the native code of the stock assessment program. (For a draft assessment undergoing review, these listings can be provided as text files or in spreadsheet format.)

APPENDIX B: TEMPLATE FOR AN EXECUTIVE SUMMARY

Items with asterisks (*) are optional for draft assessment documents prepared for STAR panel meetings but should be included in the final document.

Stock	Species/area, including an evaluation of any potential biological basis for regional management.
Catches	Trends and current levels - include table for last ten years and graph with long term data.
Data and assessment	Date of last assessment, type of assessment model, data available, new information, and information lacking.
Stock biomass	Trends and current levels relative to virgin or historic levels, description of uncertainty-include table for last 10 years and graph with long term estimates.
Recruitment	Trends and current levels relative to virgin or historic levels-include table for last 10 years and graph with long term estimates
Exploitation status	Exploitation rates (i.e., total catch divided by exploitable biomass, or the annual SPR harvest rate) - include a table with the last 10 years of data and a graph showing the trend in fishing mortality relative to the target (y-axis) plotted against the trend in biomass relative to the target (x-axis).
Ecosystem considerations	A summary of reviewed environmental and ecosystem factors that appear to be correlated with stock dynamics, e.g., variability in the physical environment that directly or indirectly affects the vital rates (growth, survival, productivity/recruitment) of fish stocks, and/or trophic interactions that affect predators and prey. Note what, if any, ecosystem factors are used in the assessment and how.
Reference points (groundfish)/ Harvest control rules (CPS)	Groundfish: Management targets and definition of overfishing, including the harvest rate that brings the stock to equilibrium at $B_{40\%}$ (the B_{MSY} proxy) and the equilibrium stock size that results from fishing at the default harvest rate (the F_{MSY} proxy). Include a summary table that compares estimated reference points for SSB, SPR, Exploitation Rate and Yield based on SSB proxy for MSY, SPR proxy for MSY, and estimated MSY values. CPS: Results of applying the control rule to compute the harvest guideline, including specification of each of the quantities on which the harvest guideline is based (BIOMASS, CUTOFF, FRACTION, U.S. DISTRIBUTION)
Management performance	Catches in comparison to OFL, ABC, [HG], and OY/ACL values for the most recent 10 years (when available), overfishing levels, actual catch and discard. Include OFL (encountered), OFL (retained) and OFL (dead) if different due to discard and discard mortality.
Unresolved problems and major uncertainties	Any special issues that complicate scientific assessment, questions about the best model scenario, etc.
Decision table (groundfish only)*	Projected yields (OFL, ABC and ACL), spawning biomass, and stock depletion levels for each year. OFL calculations should be based on the assumption that future catches equal ABCs and not OFLs.
Research and data needs	Identify information gaps that seriously impede the stock assessment.
Rebuilding Projections*	Reference to the principal results from rebuilding analysis if the stock is overfished. For groundfish, see Rebuilding Analysis terms of reference for detailed information on rebuilding analysis requirements.

APPENDIX C: DEFINITIONS OF SPECIES CATEGORIES FOR GROUNDFISH ASSESSMENTS

Category 3: **Data poor**. OFL is derived from historical catch.	**a**	No reliable catch history. No basis for establishing OFL.
	b	Reliable catches estimates only for recent years. OFL is average catch during a period when stock is considered to be stable and close to BMSY equilibrium on the basis of expert judgment.
	c	Reliable aggregate catches during period of fishery development and approximate values for natural mortality. Default analytical approach DCAC.
	d	Reliable annual historical catches and approximate values for natural mortality and age at 50% maturity. Default analytical approach DB-SRA.
Category 2: **Data moderate**. OFL is derived from model output (or natural mortality).	**a**	M*survey biomass assessment (as in Rogers 1996).
	b	Historical catches, fishery-dependent trend information only. An aggregate population model is fit to the available information.
	c	Historical catches, survey trend information, or at least one absolute abundance estimate. An aggregate population model is fit to the available information.
	d	Full age-structured assessment, but results are substantially more uncertain than assessments used in the calculation of the P* buffer. The SSC will provide a rationale for each stock placed in this category. Reasons could include that assessment results are very sensitive to model and data assumptions, or that the assessment has not been updated for many years.
Category 1: **Data rich**. OFL is based on F_{MSY} or F_{MSY} proxy from model output. ABC based on P* buffer.	**a**	Reliable compositional (age and/or size) data sufficient to resolve year-class strength and growth characteristics. Only fishery-dependent trend information available. Age/size structured assessment model.
	b	As in 1a, but trend information also available from surveys. Age/size structured assessment model.
	c	Age/size structured assessment model with reliable estimation of the stock-recruit relationship.

Agenda Item D.3.a
Attachment 3
June 2012

TERMS OF REFERENCE

FOR THE

GROUNDFISH REBUILDING ANALYSIS FOR 2013-2014

DRAFT

MAY, 2012

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1. INTRODUCTION

Amendment 11 to the Groundfish Fishery Management Plan (FMP) established a default overfished threshold equal to 25% of the unexploited female spawning output[1] (B_0), or 50% of B_{MSY}, if known. By definition, groundfish stocks falling below that level were designated to be in an overfished state ($B_{25\%} = 0.25 \times B_0$[2]). To reduce the likelihood that stocks would decline to that point, the policy specified a precautionary threshold equivalent to 40% of B_0. The policy required that the ACL, when expressed as a fraction of the allowable biological catch, be progressively reduced at stock sizes less than $B_{40\%}$. Because of this linkage, $B_{40\%}$ has sometimes been interpreted to be a proxy measure of B_{MSY}, i.e., the female spawning output that results when a stock is fished at F_{MSY}. In fact, theoretical results support the view that a robust biomass-based harvesting strategy for most rockfish (*Sebastes* spp.) would be to maintain stock size at about 40% of the unfished level (Clark 1991, 2002). In the absence of a credible estimate of B_{MSY}, which can be very difficult to estimate (MacCall and Ralston 2002), $B_{40\%}$ is a suitable proxy to use as a rebuilding target for most groundfish.

The recently revised Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires that U.S. fishery management councils avoid overfishing by setting annual catch limits (ACLs). Stock assessments now will provide overfishing level (OFL) estimates, and an acceptable biological catch (ABC) will be derived from the OFL by reducing the OFL to account for scientific uncertainty. The ACL cannot exceed the ABC.
Following the 2008 assessment season, the Pacific Fishery Management Council ("Council") revised the reference points for flatfish, as separate from other groundfish species. The new reference points include an MSY proxy fishing rate of $F_{30\%}$, a target spawning output of $B_{25\%}$ and an overfished threshold of $B_{12.5\%}$. Similarly, the 40:10 policy has been replaced by a 25:5 policy for flatfish.

Under the MSA, rebuilding plans are required for stocks that have been designated to be in an overfished state. Amendment 12 of the Groundfish FMP provided a framework within which rebuilding plans for overfished groundfish resources could be established. Amendment 12 was challenged in Federal District Court and found not to comply with the requirements of the MSA

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[1] The absolute abundance of the mature portion of a stock is loosely referred to here in a variety of ways, including: population size, stock biomass, stock size, spawning stock size, spawning biomass, spawning output; i.e., the language used in this document is sometimes imprecise. However, the best fundamental measure of population abundance to use when establishing a relationship with recruitment is spawning output, defined as the total annual output of eggs (or larvae in the case of live-bearing species), accounting for maternal effects (if these are known). Although spawning biomass is often used as a surrogate measure of spawning output, for a variety of reasons a non-linear relationship often exists between these two quantities (Rothschild and Fogarty 1989; Marshall *et al.* 1998). Spawning output should, therefore, be used to measure the size of the mature stock when possible.

[2] Estimates of stock status are typically obtained by fitting statistical models of stock dynamics to survey and fishery data. In recent years, the bulk of stock status determinations have been based on Stock Synthesis 3, an age- and size-structured population dynamics model (Methot 2005, 2007). Stock assessment models can be fitted using Maximum Likelihood or Bayesian methods. For both types of estimation methods, a stock is considered to be in an overfished state if the best point estimate of stock size is less than 25% (rockfish and roundfish) and 12.5% (flatfish) of unfished stock size. This corresponds to the maximum likelihood estimate for estimation methods based on Maximum Likelihood methods, to the maximum of the posterior distribution (MPD) for estimation methods in which penalties are added to the likelihood function, and to the mode of the posterior distribution for Bayesian analyses. The median of the Bayesian posterior is not used for determination of overfished status.

because rebuilding plans did not take the form of an FMP, FMP amendment, or regulation. In response to this finding, the Council developed Amendment 16-1 to the Groundfish FMP which covered three issues, one of which was the form and content of rebuilding plans.

The Council approach to rebuilding depleted groundfish species, as described in rebuilding plans, was re-evaluated and adjusted under Amendment 16-4 in 2006 so they would be consistent with the opinion rendered by the Ninth Circuit Court of Appeals in *Natural Resources Defense Council, Inc. and Oceana, Inc.* v. *National Marine Fisheries Service, et al.,* 421 F.3d 872 (9th Cir. 2005), and with National Standard 1 of the MSA. The court affirmed the MSA mandate that rebuilding periods "be as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock of fish within the marine ecosystem" (Section 304(e)). The court opinion also recognized that some harvest of overfished species could be accommodated under rebuilding plans to avoid severe economic impacts to West Coast fishing communities dependent on groundfish fishing. Under Amendment 16-4 rebuilding plans, more emphasis was placed on shorter rebuilding times and the trade-off between rebuilding periods and associated socioeconomic effects.

Rebuilding Plans include several components, one of which is a rebuilding analysis. Simply put, a rebuilding analysis involves projecting the status of the overfished resource into the future under a variety of alternative harvest strategies to determine the probability of recovery to B_{MSY} (or its proxy) within a pre-specified time-frame.

2. OVERVIEW OF THE CALCULATIONS INVOLVED IN A REBUILDING ANALYSIS

This document presents guidelines for conducting a basic groundfish rebuilding analysis that meets the minimum requirements that have been established by the Council's Scientific and Statistical Committee (SSC), those of Amendment 16-1 of the Groundfish FMP, and those arising from the 9th Circuit Court decision. It also outlines the appropriate documentation that a rebuilding analysis needs to include. These basic calculations and reporting requirements are essential elements in all rebuilding analyses to provide a standard set of base-case computations, which can then be used to compare and standardize rebuilding analyses among stocks. The steps when conducting a rebuilding analysis are:

1. Estimation of B_0 (and hence B_{MSY} or its proxy).
2. Selection of a method to generate future recruitment.
3. Specification of the mean generation time.
4. Calculation of the minimum and maximum times to recovery.
5. Identification and analysis of alternative harvest strategies and rebuilding times.

The specifications in this document have been implemented in a computer package developed by Dr André Punt (University of Washington). This package can be used to perform rebuilding analyses for routine situations. However, the SSC encourages analysts to explore alternative assumptions, calculations and projections that may more accurately capture uncertainties in stock rebuilding than the default standards identified in this document, and which may better represent

stock-specific concerns. In the event of a discrepancy between the generic calculations presented here and a stock-specific result developed by an individual analyst, the SSC groundfish subcommittee will review the issue and recommend which results to use.
The SSC also encourages explicit consideration of uncertainty in projections of stock rebuilding (see Section 8 below).

2.1. Estimation of B_0

B_0 is defined as mean unexploited female spawning output. The default approach for estimating B_0 for rebuilding analyses is to base it on some form of spawner-recruit model because most of the recent assessments of west coast groundfish have been based on stock assessments that integrate the estimation of the spawner-recruit model with the estimation of other population dynamic parameters. These stock assessments therefore link the recruitments for the early years of the assessment period with the average recruitment corresponding to B_0.

Stock assessment models that integrate the estimation of the spawner-recruit model also provide estimates of B_{MSY}. However, at this time, the SSC recommends that these estimates not be used as the target for rebuilding because they may not be robust. Rather, the rebuilding target should be taken to be the agreed proxy for B_{MSY} (e.g. $0.4B_0$ for most groundfish stocks) in all cases.

The recruitment process depends on the environment in addition to female spawning output. For example, the decadal-scale regime shift that occurred in 1977 (Trenberth and Hurrell 1994) is known to have strongly affected ecosystem productivity and function in both the California Current and the northeast Pacific Ocean (Roemmich and McGowan 1995; MacCall 1996; Francis *et al*. 1998; Hare *et al*. 1999). With the warming that ensued, West Coast rockfish recruitment appears to have been adversely affected (Ainley *et al*. 1993; Ralston and Howard 1995). In principle, B_0 and the approach used to generate future recruitment (see below) could take account of regime-shift effects on productivity. However, this would need to be justified (and the assumptions used for projection purposes would need to be consistent with those on which the assessment was based).

2.2. Selection of a Method to Generate Future Recruitment

One can project the population forward once the method for generating future recruitment has been specified, given the current state of the population from the most recent stock assessment (terminal year estimates of numbers at age and their variances) and the rebuilding target. The current default approach for generating future recruitment is to use the results of a fitted spawner-recruit model (e.g., the Beverton-Holt or Ricker curves), in particular because SS3-based assessments all assume a structural spawner-recruit model, either estimating or pre-specifying the steepness of the curve[3]. Moreover, this approach is consistent with that recommended above for setting B_0. This approach can, however, be criticized because stock productivity is constrained to behave in a pre-specified manner according to the particular spawner-recruit model chosen, and there are different models to choose from, including the

[3] The "steepness" of a spawner-recruit curve is related to the slope at the origin and is a measure of a stock's productive capacity. It is expressed as the proportion of virgin recruitment that is produced by the stock when reduced to $B_{20\%}$, and ranges between 0.2 and 1.0.

Beverton-Holt and Ricker formulations. These two models can produce very different reference points, but are seldom distinguishable statistically. Moreover, there are statistical issues when a spawner-recruit model is estimated after the assessment is conducted, including: (1) time-series bias (Walters 1985), (2) the "errors in variables problem" (Walters and Ludwig 1981), and (3) non-homogeneous variance and small sample bias (MacCall and Ralston 2002). Thus, analyses based on a spawner-recruit model should include a discussion of the rationale for the selection of the spawner-recruit model used, and refer to the estimation problems highlighted above and whether they are likely to be relevant and substantial for the case under consideration. A rationale for the choice of spawner-recruit model should also be provided. In situations where steepness is based on a spawner-recruit meta-analysis (e.g., Dorn 2002), the reliability of the resulting relationship should be discussed.

2.3. Specification of the Mean Generation Time

The mean generation time should be calculated as the mean age of the net maturity function. A complication that can occur in the calculation of mean generation time, as well as B_0 (see above), is when growth and/or reproduction have changed over time. In such instances, the parameters governing these biological processes should typically be fixed at their most recent, contemporary, values, as this best reflects the intent of "prevailing environmental conditions" as stated in the NMFS Guidelines for National Standard 1. Exceptions may occur if there are good reasons for an alternative specification (e.g., using growth and maturity schedules that are characteristic of a stock that is close to B_{MSY}).

2.4. Calculation of the Minimum and Maximum Times to Recovery

The minimum time to recovery (denoted T_{MIN}) is defined as the median time (i.e. 50% probability) for a stock to recover to the target stock size, starting from the time when a rebuilding plan was actually implemented (usually the year after the stock was declared overfished) to when the target level is first achieved, assuming no fishing occurs.

Although no longer used directly in Council decision-making for overfished stocks, rebuilding analyses should report the maximum time to recovery (denoted T_{MAX}). T_{MAX} is ten years if T_{MIN} is less than 10 years. If T_{MIN} is greater than or equal to 10 years, T_{MAX} is equal to T_{MIN} plus one mean generation. Likewise, rebuilding analyses should report an estimate of the median number of years needed to rebuild to the target stock size if all future fishing mortality is eliminated from the first year for which the Council is making a decision about[4] ($T_{\mathrm{F=0}}$). This will typically differ from T_{MIN}.

Finally, when a stock rebuilding plan has been implemented for some time and recruitments have been estimated from an assessment, it may be that explicit, year-specific estimates of recruitment are available for the earliest years of the rebuilding time period. In such instances, rebuilding forecasts should be conducted setting the recruitments from the start of the rebuilding plan to the current year based on the estimates from the most recent assessment, rather than through re-sampling methods (see above) because this reflects the best available information regarding the recruitment during the rebuilding period.

[4] This year will generally not be the current year, but rather the year following the current two-year cycle.

2.5. Alternative Harvest Strategies during Rebuilding

The Council is required to rebuild overfished stocks in a time period that is as short as possible, but can extend this period to take into account the needs of fishing communities. The simplest rebuilding harvest strategy to simulate and implement is a constant harvest rate or "fixed F" policy. Such strategies should also mean that encounter rates with overfished species remain relatively constant over time, which is unlikely to be the case for constant catch strategies. All rebuilding analyses should, therefore, minimally consider fixed F (or SPR) strategies. However, many other strategies are possible, including constant catch and phase-in strategies, in which catch reductions are phased-in. In these latter cases, analysts should always assess whether fishing mortality rates exceed F_{MSY} (or its proxy), as this would constitute overfishing.

Analysts should consider a broad range of policy alternatives to give the Council sufficient scope on which to base a decision. The following represent the set of harvest strategies which have been identified by the GMT – all rebuilding analyses should minimally include these strategies:

1) eliminate all harvest beginning in the next management cycle (i.e., estimate $T_{\mathrm{F=0}}$),
2) apply the harvest rate that would generate the ACL specified for the current year (i.e., the latest year specified in regulations),
3) apply the spawning potential ratio[5] or relevant harvest control rule in the current rebuilding plan,
4) apply the harvest rate that is estimated to lead to a 50% probability of recovery by the current T_{TARGET},
5) apply the harvest rate that is estimated to lead to a 50% probability of recovery by the T_{MAX} from the current cycle,
6) apply the harvest rate that is estimated to lead to a 50% probability of recovery by the T_{MAX} from the previous cycle,
7) apply the default (e.g. 40-10 or 25-5) harvest policy, and
8) apply the ABC harvest rate (i.e., F_{MSY} less the uncertainty buffer).

For all of these strategies, except for numbers 1 and 8, the median catch streams from each run should be used as the harvest strategy in a follow-up run to evaluate the result of following the actual catch advice from the harvest policies above. In other words each of strategies 2-7 should be run twice; once with a given sequence of harvest rates and then using the median catches obtained from the first run. If the catch for a given year under one of the harvest strategies exceeds the ABC for that year, the catch should be set to the ABC (this is done automatically in the rebuilding software).

These polices should be implemented within the projection calculations in the year for which the Council is making a decision. For example, for assessments conducted in 2013 (using data up to 2012), the harvest decisions pertain to OFLs, ABCs and ACLs for 2015 and 2016. In this case, the catches for 2013 and 2014 should be set to the ACLs established by the Council for those years.

[5] The Spawning Potential Ratio (SPR) is a measure of the expected spawning output-per-recruit, given a particular fishing mortality rate and the stock's biological characteristics, i.e., there is a direct mapping of SPR to *F* (and *vice versa*). SPR can therefore be converted into a specific fishing mortality rate in order to calculate ACLs.

Many other harvest policies could be implemented by the Council. Consequently, analysts should be prepared to respond to requests by the Council for stock-specific projections on an individual case-by-case basis.

3. EVALUATING PROGRESS TOWARDS REBUILDING

There are no agreed criteria for assessing the adequacy of the progress towards rebuilding for species that are designated to be in an overfished state and are under a Rebuilding Plan. The SSC currently reviews each stock on a case-by-case basis, considering the following two questions: (1) have cumulative catches during the period of rebuilding exceeded the cumulative ACL that was available, and (2) what is the difference between the year in which recovery is predicted to occur under the current SPR (T_{REBUILD}) and the currently-adopted T_{TARGET}? If the difference between T_{REBUILD} and T_{TARGEST} is minor, progress towards rebuilding is considered to be adequate. In contrast, if the difference between T_{REBUILD} and T_{TARGET} is major, it will be necessary to define a new T_{TARGET}. As an initial step in this direction, a new maximum time to rebuild T_{MAX}^{N} will be computed based on the specifications outlined in Section 5. Analysts will be asked to assess whether the currently-adopted SPR will readily rebuild the stock before T_{MAX}^{N}.

Adequacy of progress will be evaluated when the SSC groundfish subcommittee reviews the draft rebuilding plans. Analysts should provide the information needed to address the two questions listed above. If the SSC agrees that progress is not sufficient, the draft rebuilding analysis documents will need to be updated to include T_{MAX}^{N} and the probability that the currently adopted harvest rate (SPR) will rebuild the stock before T_{MAX}^{N}.

4. DECISION ANALYSES / CONSIDERING UNCERTAINTY

The calculation of T_{MIN} and the evaluation of alternative harvest strategies involve projecting the population ahead taking account of uncertainty about future recruitment. There are several reasons for considering model and parameter uncertainty when conducting a rebuilding analysis. For example, if several assessment model scenarios were considered equally plausible by the assessment authors or, alternatively, one model was preferred by the assessment authors and another was preferred by the STAR Panel. Accounting for implementation uncertainty (i.e. the realized catch differing from the set ACL) is needed for cases in which the catch of the overfished stock is likely to differ appreciably from the set ACLs.

The uncertainty associated with parameters, such as the rate of natural mortality and the current age-structure of the population, can also be taken into account. This can be achieved in a variety of ways. For example, if the uncertainty relates to the parameters within one structural model, this uncertainty can be reflected by basing projections on a number of samples from a distribution which reflects this uncertainty (such as a Bayesian posterior distribution or bootstrap samples). Alternatively, if there are multiple models (e.g. different structural assumptions regarding data weights, use of data sources, etc.) projections can be conducted for each model and the results appropriately weighted when producing the final combined results if the uncertainty pertains to alternative structural models. In the case of assessments for which a decision table has been produced, the weights assigned to each model on which the decision table is based would be those assigned by the STAR Panel (and endorsed/modified by the SSC). Implementation uncertainty can take many forms. Two common ways to model implementation uncertainty are (a) the realized catch is distributed about the ACL (i.e. the catch equals the ACL on average), and (b) the realized catch is distributed about the ACL, but the expected catch is less [or greater] than the ACL. The latter case is appropriate if past data suggest that ACLs will be undercaught given management arrangements.

5. DOCUMENTATION

The analysts are responsible for conducting a complete and technically sound rebuilding analysis that conforms to accepted standards of quality, and in accordance with these TOR. It is important for analysts to document their work so that any rebuilding analysis can be repeated by an independent investigator at some point in the future. Therefore, all stock assessments and rebuilding analyses should include tables containing the specific data elements that are needed to adequately document the analysis. Clear specification of the exact assessment scenario(s) used as the basis for the rebuilding analysis is essential. Linkages with the most recent stock assessment document should be clearly delineated (e.g., through references to tables or figures). This is important because assessments often include multiple scenarios that usually have important implications with respect to stock rebuilding. The rebuilding analysis document should follow the outline below.

1) Title page and list of preparers – the names and affiliations of the analysts either alphabetically or as first and secondary authors.
2) Summary – condensed overview and results of the rebuilding analyses.
3) Introduction – scientific name; years when species declared overfished; summary of assessment efforts (when first assessed, brief overview of subsequent assessments and rebuilding analyses).
4) Overview of the most recent stock assessment – main assumptions, estimated stock status, sources of uncertainty, alternative states of nature used in the decision table, median and 95% intervals for: (a) summary / exploitable biomass, (b) spawning output (in absolute terms and relative to the target level), (c) recruitment, (d) catch, (e) landings (if different from catch), (f) OFL, (g) ABC, and (h) SPR for the actual harvest strategy selected by the Council.
5) Management performance under rebuilding – brief overview and a table comparing Overfishing Limit (OFL), Annual Catch Limit (ACL), and catch (i.e., landings plus discard) for each year of the rebuilding period.
6) Rebuilding calculations
   - Specifications for the software used for the analysis (including the version number); date on which the analysis was conducted; the program's input files (should be included as an Appendix).
   - The rationale for the approach used to estimate B_0 and to generate future recruitment.
   - The biological information on which the projections are based (e.g. natural mortality rate by age and sex, individual weight by age and sex, maturity by age, fecundity by age, selectivity-at-age by sex (and fleet), population numbers (by age and sex) for the

year the rebuilding plan commenced, population numbers (by age and sex) for the present year).
  - Description of how fishing mortality is allocated (and selectivity applied) to each fleet for rebuilding analyses based on multiple fleets.
  - Description of how uncertainty in input parameters from the stock assessment in the rebuilding analysis is accounted for.
  - List and description of alternate rebuilding strategies analyzed.
7) Results
  - Summary of rebuilding reference points. For each alternative model, a table (see Table 1 for an example based on canary rockfish) should be produced which lists: (a) the year in which the rebuilding plan commenced, (b) the present year, (c) the first year that the evaluated harvest policy calculates the ACL, (d) T_{MIN}, (e) mean generation time, (f) T_{MAX}, (g) $T_{F=0,}$ (h) the estimate of B_0 and the target recovery level, (i) the current SPR, (j) the current T_{TARGET} and (k) the estimate of current stock size.
  - Results of harvest policy projections (see, for examples, Tables 2-5; Figures 1-3). The following information should be provided for each harvest policy evaluated: (a) the first year in which recovery to the target level occurs with at least 0.5 probability, (b) the SPR for the first year of the projection period, (c) the probability of recovery by the current T_{TARGET}, (d) the probability of recovery by the current T_{MAX}, (e) probability of the stock dropping below the female spawning biomass in the present year and the year the stock was declared overfished, (f) tables of median time-trajectories (from the present year to T_{MAX}) of: (i) spawning output relative to the target level, (ii) probability of being at or above the target level, (iii) OFL, and (iv) ABC. Median time-trajectories of SPR should be provided for the projection based on the 40:10 rule (as applied to the ABC) and any phase-in harvest policies that have been specified.
8) Acknowledgements
9) Literature cited

The software and data files on which the rebuilding analyses are based should be archived with the stock assessment coordinator. Much of the biological information will be stored in the input file for the projection software and does not need to be repeated unless there is good reason to do so. For cases in which the projections take account of uncertainty about the values for the biological parameters (e.g., using the results from bootstrapping or samples from a Bayesian posterior distribution), some measure of the central tendency of the values (e.g., the mode or median) should be provided and the individual parameter values should be archived with the stock assessment coordinator. Rebuilding analyses may be based on selectivity-at-age vectors constructed by combining estimates over fleets. If this is the case, the rebuilding analysis needs to document how the composite selectivity-at-age vector was constructed.

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Table 1. Summary of rebuilding reference points for canary rockfish (based on Stewart (2007)).

Parameter	Values
Year declared overfished	2000
Current year	2007
First ACL year	2009
T_{MIN}	2019
Mean generation time	22
T_{MAX}	2041
$T_{F=0}$ (beginning in 2009)	2019
B_0	32,561
Rebuilding target ($B_{40\%}$)	13,024
Current SPR	0.887
Current T_{TARGET}	2063
SB_{2007}	10,544

Table 2. Results of rebuilding alternatives for canary rockfish (based on Stewart (2007)). (This table should include the OFL, ABC and ACL).

	Run #			
	1	2	3	4
50% prob. recovery by:	2019	2021	2035	2041
SPR_{TARGET}	100%	88.7%	62.0%	59.2%
2009 ACL (mt)	0.0	155.2	636.9	700.0
2009 ABC (mt)	936.9	936.9	936.9	936.9
2010 ACL (mt)	0.0	155.0	623.1	683.1
2010 ABC (mt)	941.4	935.4	916.7	914.2
Probability of recovery				
2071 (T_{MAX})	97.1%	84.6%	73.5%	70.0%
2048 (T_{MIN})	76.4%	75.0%	64.8%	56.9%
2053 ($T_{F=0}$ from 2007)	79.4%	75.3%	67.9%	61.3%
2063 (T_{TARGET})	91.4%	78.8%	72.0%	66.8%

Table 3. Probability of recovery for four rebuilding alternatives for canary rockfish (based on Stewart (2007)). Note that after 25 years the table is compressed.

	Run #			
	1	2	3	4
2007	0.250	0.250	0.250	0.250
2008	0.250	0.250	0.250	0.250
2009	0.250	0.250	0.250	0.250
2010	0.250	0.250	0.250	0.250
2011	0.250	0.250	0.250	0.250
2012	0.250	0.250	0.250	0.250
2013	0.250	0.250	0.250	0.250
2014	0.250	0.250	0.250	0.250
2015	0.250	0.250	0.250	0.250
2016	0.251	0.250	0.250	0.250
2017	0.284	0.257	0.250	0.250
2018	0.407	0.288	0.250	0.250
2019	0.550	0.366	0.250	0.250
2020	0.660	0.473	0.256	0.251
2021	0.702	0.561	0.260	0.256
2022	0.732	0.633	0.267	0.261
2023	0.742	0.681	0.279	0.267
2024	0.746	0.707	0.290	0.275
2025	0.749	0.725	0.309	0.281
2026	0.749	0.735	0.321	0.293
2027	0.749	0.742	0.341	0.300
2028	0.750	0.746	0.358	0.313
2029	0.750	0.746	0.376	0.324
2030	0.750	0.747	0.402	0.336
2031	0.750	0.749	0.424	0.348
2041	0.750	0.750	0.586	0.500
2051	0.781	0.751	0.671	0.601
2061	0.895	0.776	0.714	0.660
2071	0.971	0.846	0.735	0.700

Table 4. Median spawning biomass (mt) for four rebuilding alternatives for canary rockfish (based on Stewart (2007)). Note that after 25 years the table is compressed.

	Run #			
	1	2	3	4
2007	10,544	10,544	10,544	10,544
2008	10,841	10,841	10,841	10,841
2009	11,073	11,073	11,073	11,073
2010	11,258	11,197	11,010	10,985
2011	11,383	11,260	10,880	10,831
2012	11,463	11,274	10,701	10,627
2013	11,524	11,268	10,501	10,403
2014	11,607	11,280	10,318	10,197
2015	11,751	11,351	10,186	10,041
2016	11,987	11,508	10,133	9,964
2017	12,328	11,765	10,163	9,969
2018	12,738	12,089	10,251	10,029
2019	13,181	12,432	10,357	10,113
2020	13,685	12,838	10,520	10,247
2021	14,236	13,293	10,721	10,419
2022	14,773	13,731	10,909	10,583
2023	15,350	14,210	11,130	10,775
2024	15,941	14,674	11,345	10,966
2025	16,500	15,133	11,515	11,105
2026	17,015	15,536	11,679	11,251
2027	17,517	15,959	11,852	11,391
2028	18,045	16,348	11,999	11,515
2029	18,600	16,811	12,211	11,699
2030	19,093	17,183	12,329	11,799
2031	19,528	17,519	12,432	11,877
2041	23,511	20,635	13,491	12,751
2051	26,282	22,743	14,238	13,357
2061	27,862	24,058	14,655	13,689
2071	28,903	24,832	15,097	14,073

Table 5. Median catches (mt) for four rebuilding alternatives for canary rockfish (based on Stewart (2007)). Note that after 25 years the table is compressed.

	Run #			
	1	2	3	4
2007	0.0	44.0	44.0	44.0
2008	0.0	44.0	44.0	44.0
2009	0.0	155.2	636.9	700.0
2010	0.0	155.0	623.1	683.1
2011	0.0	157.5	621.9	680.2
2012	0.0	163.7	635.4	693.4
2013	0.0	171.5	654.9	713.1
2014	0.0	179.7	675.9	734.4
2015	0.0	186.9	691.6	750.1
2016	0.0	193.4	705.3	763.1
2017	0.0	198.7	713.8	770.8
2018	0.0	205.1	724.3	780.5
2019	0.0	210.6	733.9	789.5
2020	0.0	216.8	744.3	798.9
2021	0.0	222.0	753.8	807.8
2022	0.0	228.3	765.2	818.8
2023	0.0	234.0	769.3	821.3
2024	0.0	239.0	778.8	830.7
2025	0.0	245.3	786.9	837.4
2026	0.0	250.0	795.2	845.3
2027	0.0	257.0	807.6	856.9
2028	0.0	261.7	814.0	862.9
2029	0.0	267.3	821.5	868.6
2030	0.0	272.3	830.5	877.2
2031	0.0	276.5	836.3	882.5
2041	0.0	318.0	897.1	938.2
2051	0.0	346.9	937.3	972.9
2061	0.0	365.2	967.1	1,002.9
2071	0.0	377.7	985.9	1,019.3

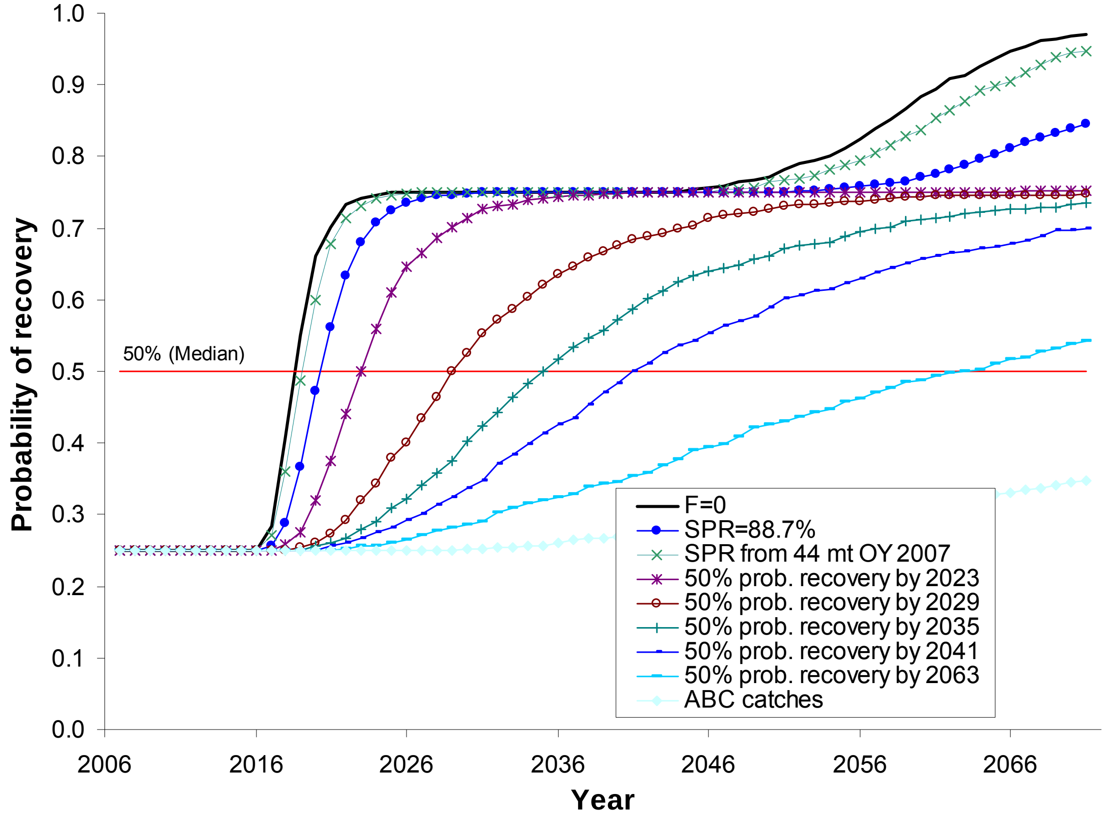

Figure 1. Probability of recovery for nine rebuilding alternatives for canary rockfish.

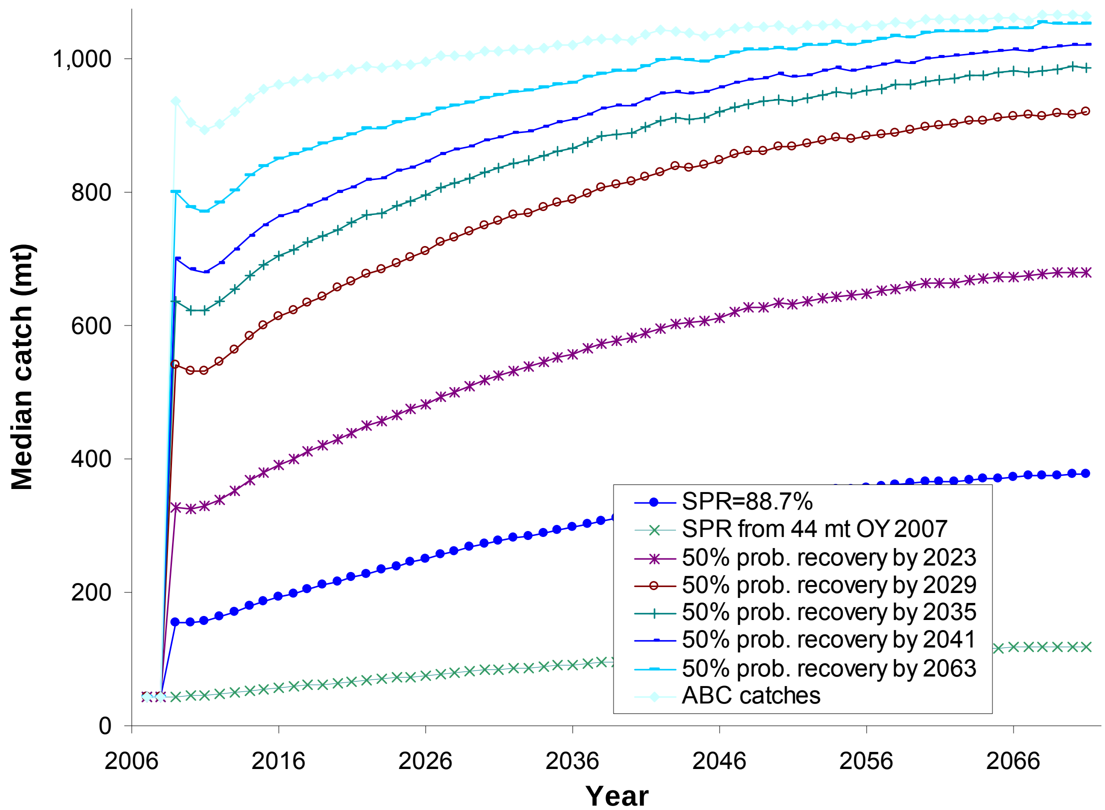

Figure 2. Projected median catch (mt) for nine rebuilding alternatives for canary rockfish.

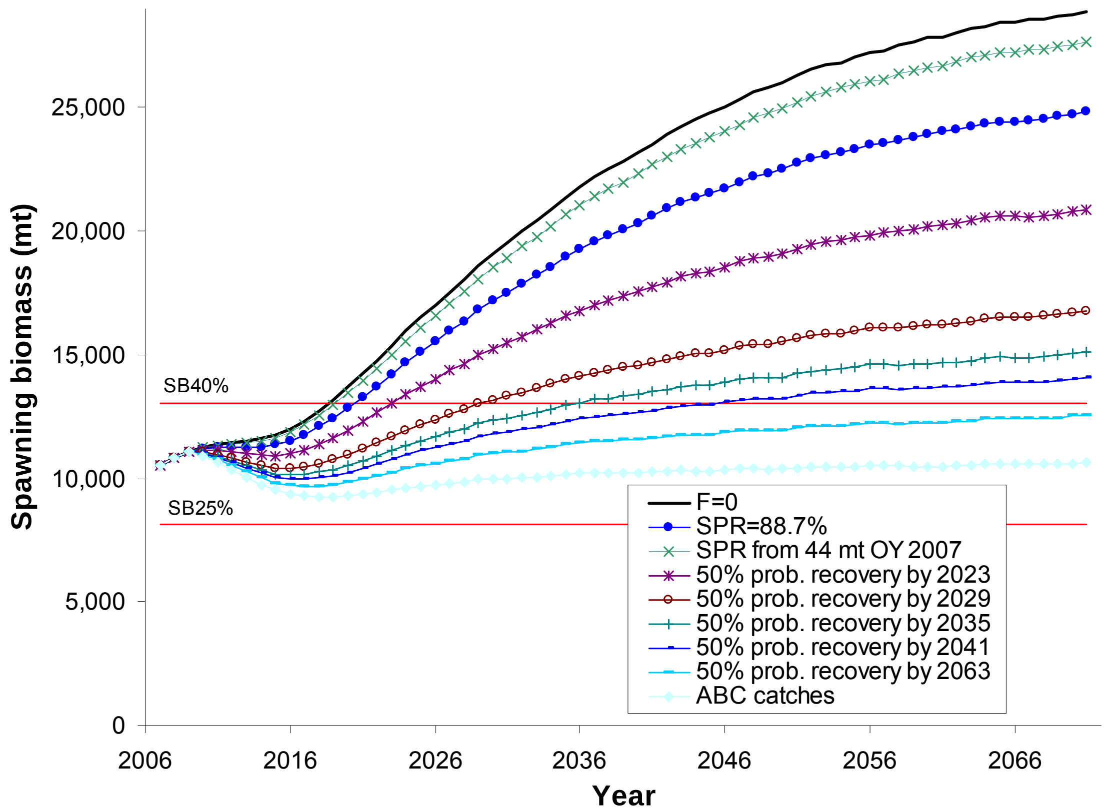

Figure 3. Projected median spawning biomass (mt) for nine rebuilding alternatives for canary rockfish.

Agenda Item D.3.a
Attachment 4
June 2012

TERMS OF REFERENCE

FOR THE

METHODOLOGY REVIEW PROCESS FOR GROUNDFISH AND COASTAL PELAGIC SPECIES

DRAFT

MARCH 13, 2012

Published by the Pacific Fishery Management Council

Introduction

This document lays out general procedures for methodology and data reviews related to the assessment and management of coastal pelagic species (CPS) and groundfish by the Pacific Fishery Management Council (Council). It clarifies the responsibilities of the proponents of new methods or data sets proposed for use in CPS or groundfish stock assessment and the responsibilities of participants in the review process. Each review is likely to have additional requirements that will be defined in a set of Specific Terms of Reference (TOR), which should conform to the general terms defined in this document. Although these General Terms of Reference focus on methodology and data reviews for CPS and groundfish stock assessments, they may be applied to methods in other areas, including economic analyses and ecosystem-based fishery management. In the text below the term "methodology review" should be understood to mean "methodology and data review".

The methodology review process provides for peer review as referenced in the 2006 Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA), which states that "the Secretary and each Regional Fishery Management Council may establish a peer review process for that Regional Fishery Management Council for scientific information used to advise the Regional Fishery Management Council about the conservation and management of the fishery" (MSRA section 302(g)(1)(E)). The peer review process is not a substitute for the Council's Scientific and Statistical Committee (SSC), and should work in conjunction with the SSC. This document will be included in the Council's Statement of Organization, Practices and Procedures as documentation of part of the review process that underpins the SSC's scientific advice.

Parties involved in implementing the peer review process described here are the Council; Council staff; members of Council Advisory Bodies, including the SSC; the relevant Management Team and Advisory Panel (CPSMT and CPSAS for CPS, and GMT and GAP for groundfish); the National Marine Fisheries Service (NMFS); state agencies; and interested persons (including external reviewers).

Unlike Stock Assessment Review (STAR) Panels, methodology review panels do not occur on a regular timetable but are instead established by the Council to provide peer and in-depth review of major changes to the methodology on which stock assessments are based. Consequently, the outcomes from a methodology review are recommendations regarding whether a particular methodology should be applied in future stock assessments, and on recommended (or required) improvements and modifications. Existing methodologies could be reviewed, particularly if they are key to stock assessments and have not been reviewed for many years or if incremental changes in how the methodology is applied have occurred.

Methodology reviews may be appropriate when a major new data source is introduced or when a major change in the stock assessment modeling is contemplated. In both cases, a methodology review is needed when the change(s) from how assessments have been conducted in the past are deemed to be more than what a STAR Panel can reasonably be expected to handle. The introduction of a new survey will generally require a methodology review, as will a change to a new stock assessment modeling platform. However, changes to the structure of a previously reviewed assessment model (e.g., changes in selectivity year-blocking) fall within the scope of a standard STAR Panel review.

No explicit guidelines for what topics can be covered in a methodology review are provided here, but typical examples would be evaluation of: (a) proposed major new data types which if included in an assessment could change its outcomes markedly (e.g., the aerial survey for Pacific sardine), (b) proposed changes to the design of existing surveys, (c) existing data inputs to assessments which have not been reviewed in depth by a Council-sponsored peer-review panel for many years (e.g., the egg production method for Pacific sardine), (d) data or model results that contribute to ecosystem-based management of CPS and groundfish stocks, and (e) proposed major changes to stock assessment methods that fall outside the scope of a normal STAR Panel review (for example, a change to the stock assessment modelling platform).

Changes to harvest control rules could also be considered by a methodological review. Care must be taken to separate the scientific analysis supporting the change (e.g. the structure and technical aspects of simulation studies used to compare a revised control rule against the *status quo*) and the management objectives used to measure performance (e.g. minimize year-to-year catch variance, maximize long-term average catch, etc.). The former are amenable to methodological review (provided adequate background analyses have been completed), but the latter are management decisions – not well suited to a methodological review.

These TOR reflect how previous methodology reviews have been undertaken. Nevertheless, no set of guidelines can be expected to deal with every contingency, and all participants should anticipate the need to be flexible and address new issues as they arise.

Methodology Review Goals and Objectives

The general goals and objectives for the methodology review process are to:

1. Ensure that research surveys, data collection, data analyses and other scientific techniques in support of CPS and groundfish stock assessments are the best available scientific information and facilitate the use of information by the Council.
2. Provide recommendations regarding whether, and if so, how a particular methodology can be applied in future stock assessments.
3. Meet the MSRA and other legal requirements.
4. Follow a detailed calendar and fulfil explicit responsibilities for all participants to produce required outcomes and reports.
5. Provide an independent external review of survey and analytical methods used to develop data to inform CPS and groundfish stock assessments.
6. Increase understanding and acceptance of CPS and groundfish research methodologies and review by all members of the Council family.
7. Identify research needed to improve assessments, reviews, surveys, analyses, and fishery management in the future.

Responsibilities of Methodology Review Participants

Shared Responsibilities

All parties have a stake in ensuring adequate technical review of stock assessments and the information on which they are based. The National Marine Fisheries Service (NMFS), as the designee of the Secretary of Commerce, must determine that the best scientific advice has been used when it approves fishery management recommendations made by the Council. The Council uses statements from the SSC to determine whether the information on which it will base its recommendation represents the "best available" science. Fishery managers and scientists providing technical documents to the Council for use in management need to ensure their work is technically correct.

The Council, NMFS, and the Secretary of Commerce share primary responsibility to create and foster a successful peer review process. The Council will oversee the process and involve its standing advisory committees, especially the SSC. The SSC will designate a member to coordinate, oversee, and facilitate each methodology review. Together, NMFS and the Council will consult with all interested parties to plan, prepare terms of reference, and develop a calendar of events for each methodology review and a list of deliverables for final approval by the Council. NMFS and the Council will share fiscal and logistical responsibilities and both should ensure that there are no conflicts of interest in the process[1].

The peer-review process is sponsored by the Council, because the Federal Advisory Committee Act (FACA) limits the ability of NMFS to establish advisory committees. FACA specifies a procedure for convening advisory committees that provide consensus recommendations to the federal government. The intent of FACA was to limit the number of advisory committees; ensure that advisory committees fairly represent affected parties; and ensure that advisory committee meetings, discussions, and reports are carried out and prepared in full public view. Under FACA, advisory committees must be chartered by the Department of Commerce through a rather cumbersome process. However, the Sustainable Fisheries Act exempts the Council from FACA per se, but requires public notice and open meetings similar to those under FACA.

Management Team Responsibilities

The Management Team (MT) is responsible for identifying and evaluating potential management actions based on the best available scientific information. In particular, the MT makes Annual Catch Limit (ACL) and Annual Catch Target (ACT) recommendations to the Council.

A representative of the relevant MT may be appointed by the MT chair and, if appointed, will serve as a liaison to the methodology review panel meeting and will participate in discussions. The MT representative will not serve as a member of the panel. The MT representative should be prepared to advise the panel on fishing regulations or practices that may influence data used in assessments and the nature of the fishery in the future (this will be more relevant for some of the topics which are considered by methodology reviews than others).

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[1]The proposed NS2 guidelines state: “Peer reviewers who are federal employees must comply with all applicable federal ethics requirements. Peer reviewers who are not federal employees must comply with the following provisions. Peer reviewers must not have any real or perceived conflicts of interest with the scientific information, subject matter, or work product under review, or any aspect of the statement of work for the peer review. For purposes of this section, a conflict of interest is any financial or other interest which conflicts with the service of the individual on a review Panel because it: (A) Could significantly impair the reviewer’s objectivity; or (B) Could create an unfair competitive advantage for a person or organization. (C) Except for those situations in which a conflict of interest is unavoidable, and the conflict is promptly and publicly disclosed, no individual can be appointed to a review Panel if that individual has a conflict of interest that is relevant to the functions to be performed. Conflicts of interest include, but are not limited to, the personal financial interests and investments, employer affiliations, and consulting arrangements, grants, or contracts of the individual and of others with whom the individual has substantial common financial interests, if these interests are relevant to the functions to be performed. Potential reviewers must be screened for conflicts of interest in accordance with the procedures set forth in the NOAA Policy on Conflicts of Interest for Peer Review subject to OMB’s Peer Review Bulletin.”

Advisory Panel Responsibilities

It is the responsibility of the AP representative to ensure that AP concerns regarding the issue being reviewed are conveyed to the panel. The chair of the AP may appoint a representative to participate in a methodology review. If appointed, the AP representative will serve as an advisor to the review meeting. The AP representative will participate in review discussions as an advisor to the panel, in the same capacity as the MT advisor. The AP representative may provide appropriate data and advice to the review meeting and will report to the AP on the meeting.

Scientific and Statistical Committee Responsibilities

The SSC will assign at least one member to each methodology review. This member will chair the review meeting, and present the report of the meeting to the SSC and the Council. The SSC will review any additional analytical work arising from the review meeting, will serve as arbitrator to resolve disagreements that arose during the review meeting, and will make recommendations to the Council (e.g. whether the reviewed methodology provides the "best available science", and hence could be used for stock assessment and developing conservation and management measures).

Council Staff Responsibilities

Council staff will be assigned to coordinate, monitor and document the review process. Council staff will be responsible for timely issuance of meeting notices and distribution of appropriate documents. Council staff will coordinate with the panel chair and NMFS to assure that all documents are received on time, and are complete. Council staff will coordinate materials and presentations for Council meetings relevant to Council decision making. Council staff will also collect and maintain file copies of reports from each methodology review, the documents considered during the review, SSC, Management Team, and Advisory Panel comments and reports, letters from the public, and any other relevant information.

A primary role for Council staff assigned to each methodology review will be to monitor review meetings and SSC activities to ensure compliance with these TOR. Council staff will identify inconsistencies with the TOR that occur during review meetings and work with the panel chair to develop solutions and to correct them. Council staff will work with the panel chair to finalize the panel report and provide it to the Council.

National Marine Fisheries Service Responsibilities

NMFS will assign a coordinator to work with the Council, other agencies, groups, or interested persons that carry out assessment work to assist in organizing methodology reviews. The NMFS coordinator will identify independent panellists following criteria for reviewer qualifications. The costs associated with these reviewers will be borne by NMFS. The NMFS coordinator will work with methodology proponents to facilitate delivery of materials by scheduled deadlines and in compliance with other requirements of these terms of reference, to the extent possible and with the assistance of the assigned Council staff officer and the panel chair.

General Review Panel Responsibilities

The objective of a methodology review panel is to complete a detailed evaluation of a topic selected by the Council which could have a major impact on stock assessments or the provision of scientific advice and to make a recommendation regarding whether the methodology represents the best available scientific information for the Council. The general responsibilities of the panel are to:

1. review documents pertinent to the topic under consideration;
2. evaluate the technical merits and deficiencies of the proposed method(s) during the panel meeting and work with the proponents to correct deficiencies;
3. provide recommendations for alternative methods or modifications to proposed methods, or both, as appropriate during the panel meeting;
4. provide recommendations on application of the methods to the stock assessment and/or management process;
5. document meeting discussions;
6. provide complete panel reports.

The panel chair has, in addition, the responsibility to:

7. review revised documents and panel reports before they are forwarded to the SSC.

Review panels may have additional responsibilities that are defined in the Specific Terms of Reference for the review.

Panel Composition

Methodology review panels normally include a chair, at least one "external" member (i.e., who is outside the Council family and not involved in management or assessment of West Coast fisheries, often designated by the Center for Independent Experts [CIE]), and at least two additional members. Selection of the external and independent panellists should aim for balance between outside expertise of the topic being reviewed and in-depth knowledge of West Coast fisheries, data sets available for those fisheries, and relevant modelling approaches. Reviewers should not have financial or personal conflicts of interest, either current to the meeting, within the previous year (at minimum), or anticipated. Panellists should be knowledgeable about the specific approaches being reviewed. In addition to panel members, methodology review meetings will include Council staff to help advise the panel and assist in recording meeting discussions and results, and may include MT and AP representatives with responsibilities as laid out above. The length of a methodology review meeting will be selected by the SSC and could range one to five days.

The panel chair is responsible for: 1) developing an agenda and a list of the major issues to be addressed by the review panel, 2) ensuring that the panel follows the TOR, 3) guiding the participants in the review (proponents and panel) to mutually agreeable solutions, 4) coordinating review of documents, and 5) providing Council staff with a camera ready and suitable electronic version of the panel report. The panel, those proposing the methodology, the MT and AP representatives, and the public are legitimate meeting participants that should be accommodated during discussions. It is the panel chair's responsibility to manage discussions and public comment so that work can be completed.

Conduct of a Review

The panel's review solely concern technical aspects of the method. It is therefore important that the panel strive for a risk neutral perspective in its reports and deliberations. Methods or results that have a flawed technical basis, or are questionable on other grounds, should be identified by the panel and a recommendation made that they should excluded from consideration in developing management advice. The panel should comment on the degree to which the uncertainty associated with the method being reviewed is quantified (e.g. through confidence or prediction intervals) because uncertainty is taken into account during the management process.

Recommendations and requests to the proponents for additional or revised analyses must be clear, explicit, and in writing. Panel recommendations and requests to the proponents should reflect the consensus opinion of the entire panel and not the minority view of a single individual or individuals on the panel. A written summary of discussion on significant technical points and lists of all panel requests and recommendations and requests to the proponents are required in the panel report, which should be completed (at least in draft form) prior to the end of the review meeting. It is the chair and panel's responsibility to carry out any follow-up review of work that is required.

The panel's primary duty is to conduct a peer review of the proposed methodology. Methodology review panel meetings are not workshops, although the involvement of the panel in shaping the methodology is greater during methodology reviews than during STAR Panels. This is particularly the case when the outside reviewers have considerably more experience with a given methodology than the proponents and the reviewers from within the Council family. In the course of this review, the panel may ask for a reasonable number of additional analyses, as well as for additional details of the proposed methodology. It would not be unusual for this evaluation to result in a change to the initial methodology, provided both the panel and the proponents agree. Panels are expected to be judicious in their requests of the proponents, recognizing that some issues uncovered during a review are best flagged as research priorities (and use of the methodology possibly deferred until those issues are resolved). The panel should not impose as a requirement their preferred methodologies when such is a matter of professional opinion. Rather, if the panel finds that a method is inadequate, it should document and report that opinion.

Panels and proponents are required to make an honest attempt to resolve any areas of disagreement during the review meeting. Occasionally, fundamental differences of opinion remain between the panel and the proponents that cannot be resolved by discussion. In such cases, the panel must document the areas of disagreement in its report. In exceptional circumstances, the proponents may choose to submit a supplemental report supporting its view, but in the event that such a step is taken, an opportunity must be given to the panel to prepare a rebuttal. These documents will then be appended to panel report as part of the record of the review meeting. Panel members may have fundamental disagreements that cannot be resolved during the meeting. In such cases, panel members may prepare a minority report that will become part of the record of the review meeting. The SSC will then review all information pertaining to panel or panel/proponent disputes, and issue a recommendation.

Additional analyses required by the panel should be completed by the proponents during the review meeting. It is the obligation of the panel chair, in consultation with other panel members, to prioritize requests for additional analyses. If follow-up work by the proponents is required after the review meeting, then it is the panel's responsibility to track progress. In particular, the chair is responsible for communicating with proponents (by phone, e-mail, or any other convenient means) to determine if the revised analyses and documents are complete and ready to be presented to the SSC.

Review Panel Report

The panel chair is responsible for preparing the final draft of the panel report, obtaining the panel's approval, and providing the report to the Council for inclusion in the Briefing Book. The chair will appoint members of the panel (the "external" members and other members) to act as rapporteurs who will draft the report according to guidance by the panel chair on format and level of detail. The aim of the report is to provide information to the SSC on whether it should recommend the methodology for use in Council assessments and, if necessary, what additional work must be completed before the methodology can be used. The report is not meant as a detailed summary of the methodology, nor is it meant to be the minutes of the meeting. The report may include Appendices which summarize work presented to the panel in response to requests. The chair will solicit comment on the draft report from the proponents and the MT and AP advisors. The purpose of this review is limited to ensuring that the report is technically accurate, and reflects the discussion that occurred at the meeting, and should not be viewed as an opportunity to reopen debate on issues. The chair will be the final arbiter on wording changes suggested by proponents and the MT and AP advisors—i.e., the report is the panel's report of the meeting. Any detailed commentary by MT and AP advisors should be drafted separately, reviewed by full advisory body, and included in the Briefing Book.

Suggested Template for Methodology Review Panel Report

- Summary of the Methodology Review Panel meeting, containing:
  - names and affiliations of panel members;
  - topic(s) being reviewed; and
  - list of analyses requested by the panel, the rationale for each request, and a brief summary the responses to each request.
- Comments on the technical merits and/or deficiencies of the methodology and recommendations for remedies. Depending on the methodology being reviewed comments may address the following issues:
  - What are the data requirements of the methodology?
  - What are the situations/stocks for which the methodology is applicable?
  - What are the assumptions of the methodology?
  - Is the methodology correct from a technical perspective?
  - How robust are results to departures from the assumptions of the methodology?
  - Does the methodology provide estimates of uncertainty? How comprehensive are those estimates?
  - Will the new methodology or data set result in improved stock assessments or management advice?
- Areas of disagreement regarding panel recommendations:
  - among panel members (including concerns raised by the MT and AP representatives); and
  - between the panel and proponents.
- Unresolved problems and major uncertainties, e.g., any issues that could preclude use of the methodology.
- Management, data or fishery issues raised by the public and MT and AP representatives during the panel review.
- Prioritized recommendations for future research and data collection.

General Responsibilities Proponents of New Methodology or Data Sets

New methods or data sets will be used in producing CPS or groundfish stock assessments (or in providing management advice) if there is a reasonable expectation that doing so will result in an improved assessment relative to a status quo assessment that did not use the new method or data set.

Proposing a New Methodology for Review

The proponents of new methods or data sets for use in CPS or groundfish stock assessments will submit a 1-2 page proposal for consideration by the SSC and the Council. The proposal should be submitted by the briefing book deadline of the appropriate Council meeting, and should address the following:

- Title
- Name of proposers (including the researchers who will participate at the methodology review and will be expected to conduct analyses during that review).
- How the proposed methodology will improve assessment and management for the stock(s) in question.
- Outline of methods (field and analytical).

Proponents of methods to be reviewed should be prepared to present their proposal to the SSC, the relevant MT, and the full Council. Proponents should also include a description of the funding, logistics, or other factors that would indicate the likelihood of success of the proposed methodology

The proposed methodology should be field tested, and preferably there will be available data for one or more years. Untested or experimental methods are typically not appropriate for this type of review.

Methodology reviews are intended for methods or data sets that apply to a range of stocks. A STAR Panel would be more appropriate for reviewing methods or data sets that apply to only one or to a small number of related stocks.

Responsibilities of Methodology Proponents

If the Council recommends review of the methodology, the proponents will appoint a representative to coordinate work with the panel and attend the panel meeting. A representative of the proponents should attend the SSC meeting at which the outcomes from the panel review are discussed.

The proponents are responsible for preparing two versions of the methodology review document:

1) a "draft", including an executive summary, for discussion during the review meeting; and
2) a "final" version for presentation to the SSC, the Council, and the relevant Management Team and Advisory Panel.

The proponents will distribute "draft" documents fully describing the methodology to the panel, Council staff, and the MT and AP representatives at least two weeks prior to the review meeting. The proponents are responsible for bringing analysis methods and relevant data (in digital format) to the review meeting so that data can be analyzed on site and sensitivity analyses conducted. In most cases, the proponents should produce a revised document outlining the methodology (and preliminary results / responses to the panel recommendations) three weeks after the end of the panel meeting (including any internal agency review).

The proponents and the panel may disagree on technical issues, but “final” documents must include a point-by-point response by the proponents to each of the panel recommendations.

The draft and final reports on the methodology should include information that addresses the following:

- Data requirements of a new methodology or documentation of how information in a new data set was collected.
- The situations/stocks for which the methodology or data are applicable.
- The assumptions of the methodology and whether those assumptions are likely to be satisfied by data sets to which the method would be applied.
- An evaluation of robustness of the methodology to departures from the underlying assumptions.
- An application of a new methodology to real or simulated data, including an evaluation of the bias and accuracy of the results.
- An evaluation of how the new method(s) or data set(s) would improve stock assessments or the provision of management advice.

Agenda Item D.3.b
NMFS Report
June 2012

NMFS REPORT ON STOCK ASSESSMENT PLANNING FOR 2013

At its March meeting, the Council adopted a preliminary set of species for full assessments in 2012: aurora rockfish, bocaccio, cowcod, darkblotched rockfish, longspine thornyhead, Pacific sanddabs, petrale sole, and shortspine thornyhead. Additional analysis has been conducted for bocaccio rockfish since March to help inform current management discussions and consideration of whether it should have a full or updated assessment in 2013. We understand that the SSC will be providing the Council with guidance on this latter question, as part of this agenda item.

The main body of Table 1 includes bocaccio as a full assessment, as tentatively adopted by the Council in March. Assuming the process of developing data-moderate methods and assessments continues to move forward, review of several such assessments would be conducted in late April. Updated assessments for POP and sablefish, and data reports for canary and yelloweye rockfishes would be presented to the SSC in June, along with the findings of the May STAR panel (which tentatively includes petrale and sanddab). The remaining six full assessments would be reviewed in 3 panels in July and August, with those results presented to the SSC in September. A review of rebuilding analyses and any mop-up issues would follow the week after the September Council meeting. The schedule shown in Table 1 is based on the Southwest Fisheries Science Center (SWFSC) leading full assessments for Pacific sanddab, cowcod, and bocaccio, and contributing to the data-moderate review, as appropriate. All other assessments would be led by the Northwest Fisheries Science Center (NWFSC). In order to reduce travel costs for NMFS, all STAR meetings are planned for Seattle or Santa Cruz.

If the assessment for bocaccio is changed to an update, the SWFSC has indicated that it would not be able to accommodate a replacement full assessment. In that event, the NWFSC could conduct a 6th full assessment, but would be unable to update the sablefish assessment in 2013. Two candidate species to replace bocaccio in the full assessment list would be rex sole and rougheye rockfish . Rougheye rockfish has a much higher vulnerability score and has been experiencing high catch, relative to its OFL contribution (calculated using DB-SRA) in recent years, but has very little fishery independent data (only 31 positive hauls per year, for 2007-2011). Rex sole has a low vulnerabilty score, but has a considerable amount of data from west coast bottom-trawl surveys (over 400 positive hauls per year, for 2007-2011). Both of the species are included in NMFS's Fishery Stock Sustainability Index. In order to minimize travel costs for the stock assessment teams, there would also be some reshuffling of STAR Panel pairings, as well, as indicated in Table 1b.

Table 1.—Tentative groundfish stock assessment schedule for 2013.

Review Meeting	Document Deadline	Timing	Tentative Location	Species	
Hake Treaty	Early Feb.	Late Feb.	Canada	Pacific Hake	
Data-Moderate Panel	4/15	4/29-5-3	Santa Cruz or Seattle	Number and Names To Be Determined	
Full Panel 1	4/29	5/13-5/17	Seattle or Santa Cruz	Petrale sole	Pacific sanddabs
June Council Meeting	~5/29	6/18-6/25	Orange County	Petrale sole & Pacific sanddab STAR reports POP & sablefish updates Canary & yelloweye data reports.	
Full Panel 2	6/24	7/8-7/12	Seattle	Darkblotched	Aurora rockfish
Full Panel 3	7/8	7/22-7/26	Seattle	Shortspine thornyhead	Longspine thornyhead
Full Panel 4	7/22	8/5-8/9	Santa Cruz	Cowcod	Bocaccio
Sept. Council Meeting	~8/21	9/10-9/17	Boise	STAR reports for: shortspine and longspine thornyheads, darkblotched and aurora rockfishes, cowcod, and bocaccio	
Mop-up / Rebuilding	7/8	9/23-9/27	Seattle	Rebuilding analyses and continuing issues, as determined to be necessary	

Table 1b.--Alternative schedule elements, <u>if</u> bocaccio is changed to an update:

Full Panel 1	4/29	5/13-5/17	Seattle	Petrale sole	Rex sole [1] Rougheye rockfish [1]
June Council Meeting	~5/29	6/18-6/25	Orange County	Petrale sole & TBD STAR reports POP & bocaccio updates Canary & yelloweye data reports.	
Full Panel 4	7/22	8/5-8/9	Santa Cruz	Cowcod	Pacific sanddabs
Sept. Council Meeting	~8/21	9/10-9/17	Boise	STAR reports for: shortspine and longspine thornyheads, darkblotched and aurora rockfishes, cowcod, and Pacific sanddab	

[1] Rougheye rockfish has a much higher vulnerability score and has been experiencing high catch, relative to its OFL contribution (calculated using DB-SRA) in recent years, but has very little fishery independent data. Rex sole has a low vulnerabilty score, but has a considerable amount of data from west coast bottom trawl surveys.

GROUNDFISH ADVISORY SUBPANEL REPORT ON STOCK ASSESSMENT PLANNING FOR 2013

The Groundfish Advisory Subpanel (GAP) engaged in a joint discussion with Dr. Jim Hastie regarding stock assessment planning for 2012. Having completed this discussion with Dr. Hastie the GAP wishes to recommend the following for Council consideration.

The GAP continues to support doing full assessments for the following stocks in 2013:

Aurora Rockfish
Cowcod
Darkblotched Rockfish
Longspine Thornyhead
Shortspine Thornyhead
Pacific Sanddabs
Petrale Sole

The GAP had further discussions on bocaccio rockfish and whether to include that species as a full or updated assessment for the next management cycle. We evaluated Dr. John Field's "refreshed" estimation of the relative strength of the 2010 year class (Agenda Item D.3.a, Attachment 1). Dr. Field suggested that the results of this refreshed update negate the need for a full assessment in 2013. The GAP agrees as the stock appears to rebuilding much faster than originally presumed and may in fact be rebuilt by 2017. The GAP concluded an updated assessment would be satisfactory to inform future management considerations for the 2013-2014 fishing seasons.

If bocaccio is removed from the full assessment list, the GAP requests the Council consider doing a full yellowtail rockfish assessment in its place. Yellowtail rockfish are a species of growing importance economically to both the recreational and commercial sectors. Validating that importance, we suggest looking to the Supplemental ODFW Report under Agenda Item D.8.b. Under Table 3 in that report is a ranking of the top ten species with the greatest percent increase in the 2011 Oregon non-whiting individual fishing quota (IFQ) fishery relative to the 2006 to 2010 historical average in the Oregon non-whiting trawl fishery. You should note that number one on that list is yellowtail rockfish showing a 2,391.6 percent increase in 2011 IFQ landings with the average poundage landings of 25,484 lbs. in 2006-2010 increasing to 634,965 lbs. in 2011! The GAP suggests it would be wise to do a full assessment of this stock since the last full assessment was done over 10 years ago.

The GAP then discussed how best to handle the next sablefish assessment. Industry continues to report seeing large numbers of the 2008 and 2010 year classes in its catches which the recent 2011 assessment suggested may be quite substantial. The GAP believes that waiting one more cycle will better enable these fish to be captured in the future surveys and that data would be more beneficial to inform the next assessment. After careful consideration we believe it would be best to hold off on any kind of assessment of sablefish until the 2015-2016 management cycle and probably doing a full assessment at that time.

Lastly, the GAP is comfortable with POP remaining an updated assessment along with canary and yelloweye as simple data reports.

Summary of GAP recommendations

2013 Full assessments

1) **Aurora Rockfish**
2) **Cowcod**
3) **Darkblotched Rockfish**
4) **Longspine Thornyhead**
5) **Shortspine Thornyhead**
6) **Pacific Sanddabs**
7) **Petrale Sole**
8) **Yellowtail Rockfish**

2013 Update Assessments

1) **POP**
2) **Bocaccio**

2013 Data Reports

1) **Canary Rockfish**
2) **Yelloweye Rockfish**

PFMC
06/22/12

GROUNDFISH MANAGEMENT TEAM REPORT ON STOCK ASSESSMENT PLANNING FOR 2013

The Groundfish Management Team (GMT) considered issues pertaining to the planning of 2013 stock assessments to inform the 2015-2016 management cycle. The GMT thanks Dr. Jim Hastie of the Northwest Fisheries Science Center (NWFSC) for his helpful and informative overview of this topic.

The NWFSC provided a tentative list of species and two schedules in Agenda Item D.3.b. This list includes a mix of rebuilding species, species in need of updated assessments, and species never assessed. The species list acknowledges resource limitations at both Science Centers, and the schedule attempts to balance the resource-intensive review panels with data availability and Council needs.

Commercial catches used in assessments

There are instances where data-limited methods or stock assessments use the California Commercial (CALCOM) database to source California commercial landings instead of Pacific Fisheries Information Network (PacFIN). The GMT recommends that PacFIN rather than CALCOM be the consistent and standard source of commercial catches in California.

Data-limited methods

The GMT is encouraged by the potential of the "data-moderate" panel to identify and approve methods for category 2 stocks. These methods should provide better informed catch limits with lower discounted allowable biological catch (ABCs) relative to overfishing level (OFLs), determined using catch-only methods.

Assuming category 2 methods are approved, the number of species to be considered in next year's data-moderate Stock Assessment Review Panel is still to be determined, but will rely heavily on identifying appropriate indices of abundance. In the event that the number of species for which index of abundance data is available exceeds the 6 to 12 slots available for data moderate stock assessments, the productivity susceptibility analysis (PSA) score, total mortality over the last three years, and the annual catch limit (ACLs) from previously applied data-poor methods, would be useful in prioritizing species. The Science Centers could provide this information as well as the quality and availability of fishery independent indices of abundance for Council consideration in the September briefing book.

The GMT encourages this workshop, and the Scientific and Statistical Committee (SSC) in its review of the workshop's findings, to consider the question of imprecision in catch estimates. Catch history is uncertain for several species, including those managed as part of complexes because the estimates are based on statistical sampling. Many if not all of the methods we use now calculate the OFL as if catch history is known with certainty. The GMT also sees need to pay attention to methods that do not rely on catch history (e.g., swept area biomass, length-based methods). There will be more and more species for which our information about catch is highly uncertain.

Stock assessments

The remaining species proposed for stock assessments would benefit from Council attention before a list of species is finalized. The GMT offers the following comments regarding those species:

1) Bocaccio: Full or updated assessment?

Dr. John Field (SWFSC) provided new information (the "refreshed" analysis) that the bocaccio assessment has stabilized. The large recruitment demonstrated in the last assessment was supported by new length data, but the variance around that estimate decreased substantially. Given no new data or expectation of altering of model structure, **the GMT concurs with the bocaccio STAT that an update is sufficient for bocaccio in 2013**.

2) Sablefish: Update or no new assessment?

Significant uncertainty was captured in the most recent sablefish assessment. The magnitude of uncertainty makes it difficult to gauge how an updated assessment may respond to new data. Dr. Hastie presented 2011 survey data indicating a steady trend of selected biomass, noting that spawning biomass is likely still decreasing given relatively recent poor recruitment, so any increase in the population is unlikely. A large recruitment in 2008, 2010 and possibly 2011 gives hope for future increases in the population, but these year classes are unlikely to be reflected in the survey data available for the 2013 stock assessment cycle. More information from the NWFSC may be forthcoming and ready for the September Council meeting to provide greater insight into these recruitments and the need of a sablefish update. **The GMT recommends waiting for additional information before determining whether a sablefish update is warranted.**

3) Pacific Ocean Perch (POP): Update or data report?

The 2011 POP STAT does not expect any significantly new data for a proposed POP update. **Given science center resource constraints, the Council may consider a data report instead of an update.**

4) Rougheye rockfish or rex sole full assessment?

If bocaccio goes forward as an update an open spot for a full assessment will be created. This spot is suggested to be filled by either rougheye rockfish or rex sole. A rougheye rockfish assessment is desirable because the high vulnerability score of rougheye makes its status relative to overfishing and/or being overfished a concern. Rougheye rockfish data is very limited though, leaving the possibility of a viable assessment questionable. Further, it is the GMT's understanding that the lack of catch data makes data-poor methodologies less informative for this species. Management based on such a data-poor assessment is likely to be misspecified and new data to better inform any future assessments unless a concerted effort were made to collect data on this species, thus a full assessment may offer the best chance of mitigating poor catch histories. Rex sole, on the other hand, has low vulnerability to overfishing or being overfished, but has substantial data for a stock assessment. While the results of an assessment may not require major management considerations, the assessment would increase the number of category 1 stocks informing Council management. **The GMT does not offer a recommendation on one species over the other.**

Stock assessment planning scenarios:

Scenario A) IF bocaccio is a full assessment, rougheye rockfish, rex sole, or another assessments will not be considered. No additional full assessment is added to the NWFSC workload, thus sablefish and POP updates could reasonably be done.

Scenario B) IF bocaccio is an update, rougheye rockfish, rex sole or another species can be assessed. This adds another full assessment to the NWFSC workload, constraining the ability to do both a sablefish and POP update. It is not clear whether making POP a data report would provide the resources for a sablefish update.

The GMT recommends scenario B.

Rebuilding Terms of Reference

We are expecting the SSC to update the Draft Terms of Reference (TOR) for the Groundfish Rebuilding Analysis for 2013-2014 (Agenda Item D.3.a, Attachment 3) based on the questions we have raised on rebuilding analyses and related analysis of rebuilding and the discussion we had with the SSC economics and groundfish subcommittees in April. We hope to have a joint session with the SSC to discuss the proposed changes to the TOR and related issues at the September meeting.

PFMC
06/21/12

Agenda Item D.3.b
Supplemental NMFS PowerPoint
June 2012

Science, Service, Stewardship

Considerations for Selecting Groundfish Species for Assessment in 2013

NOAA
FISHERIES
SERVICE

Overview

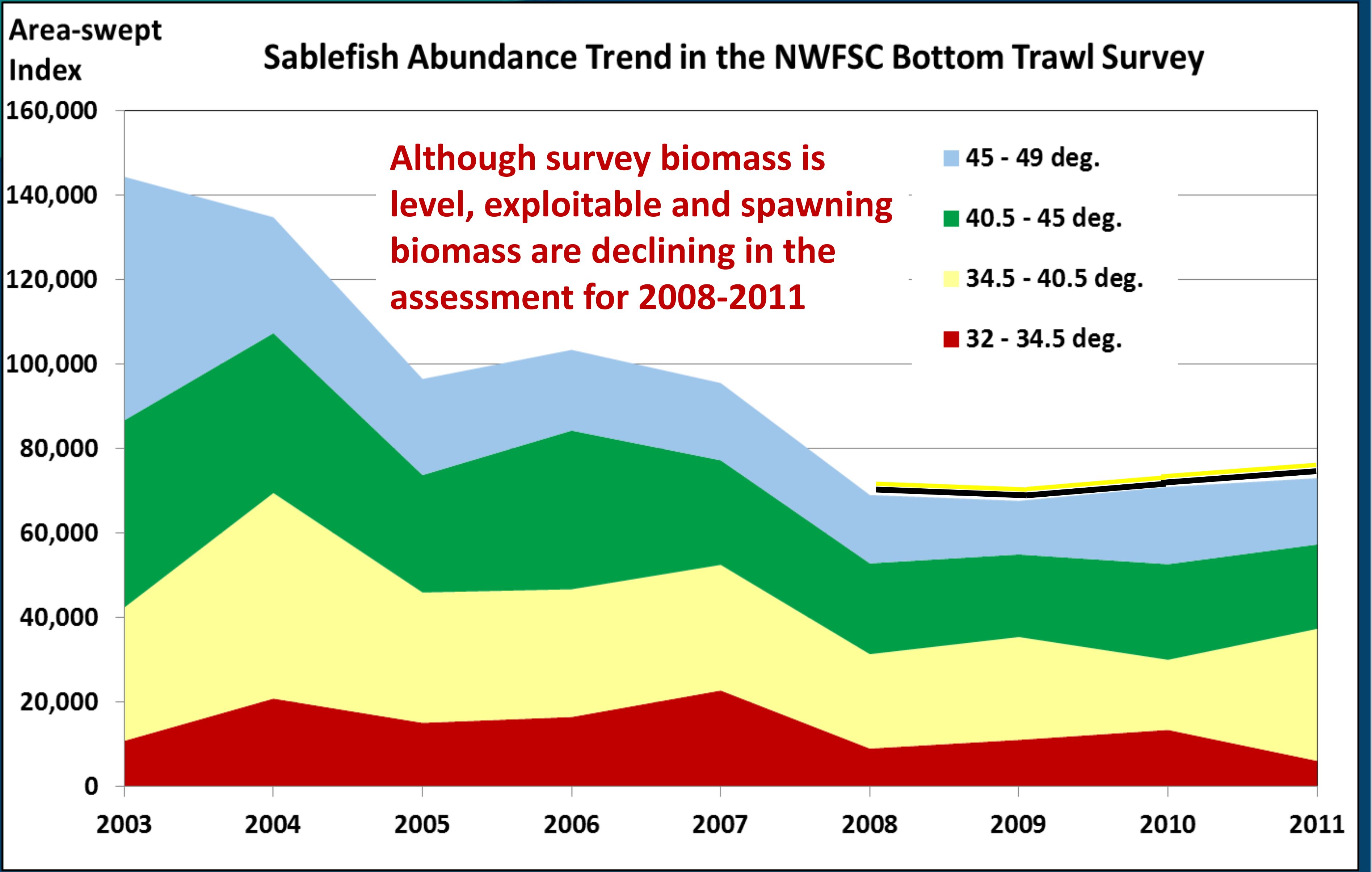
- Preferred alternative
- Options
    - Sablefish update needed?
    - Bocaccio assessment – full or update?

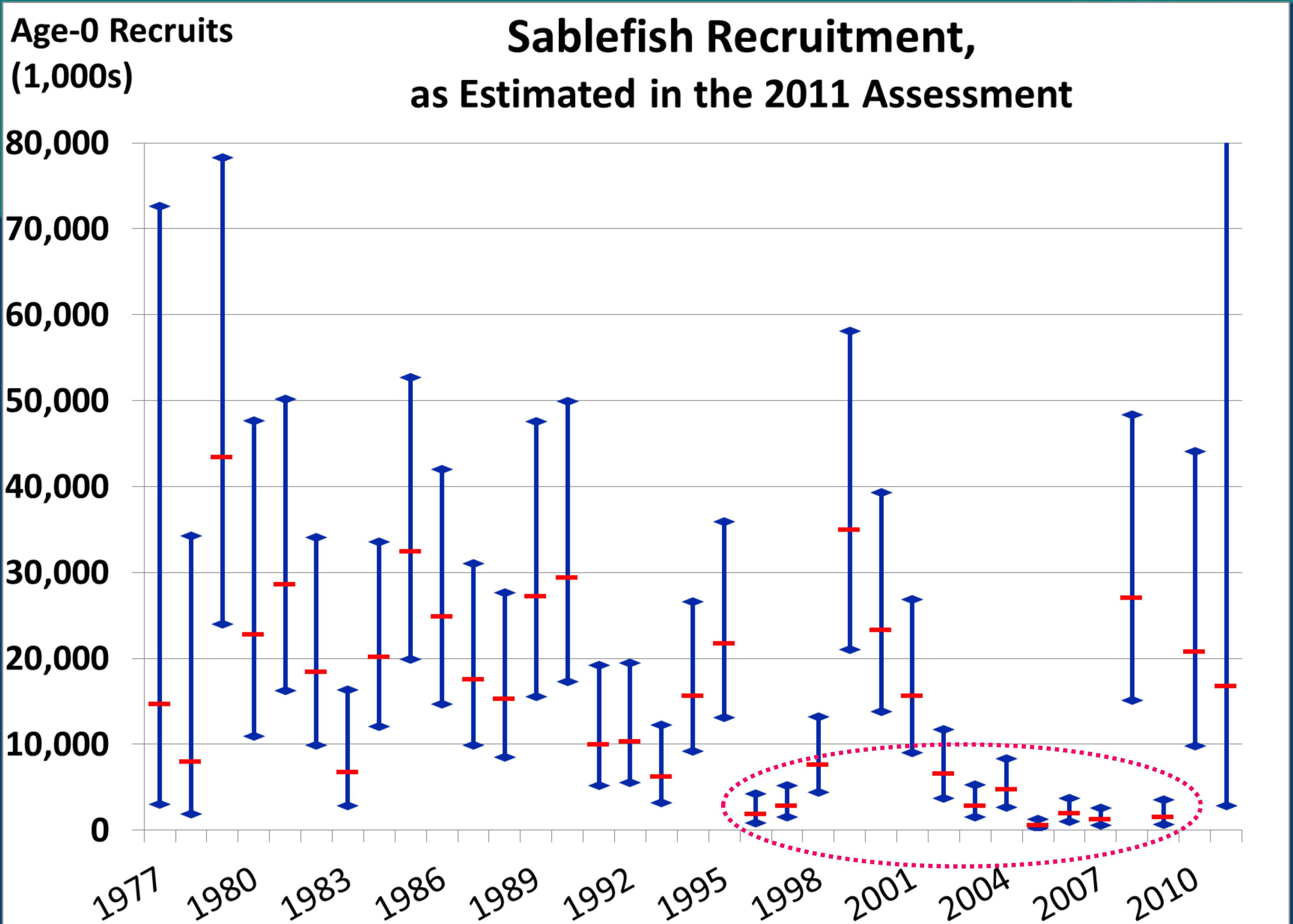
- Review proposed schedule

March’s Preferred Alternative

- Full Assessments
  - Petrale sole, sanddab, dark-blotched rockfish, aurora rockfish, short-spine thornyhead, long-spine thornyhead, cowcod, bocaccio
- Updates – POP, Sablefish
- Data reports – Canary and yelloweye rockfish
- Data limited – 6-12 species

2011 survey suggests stable sablefish biomass





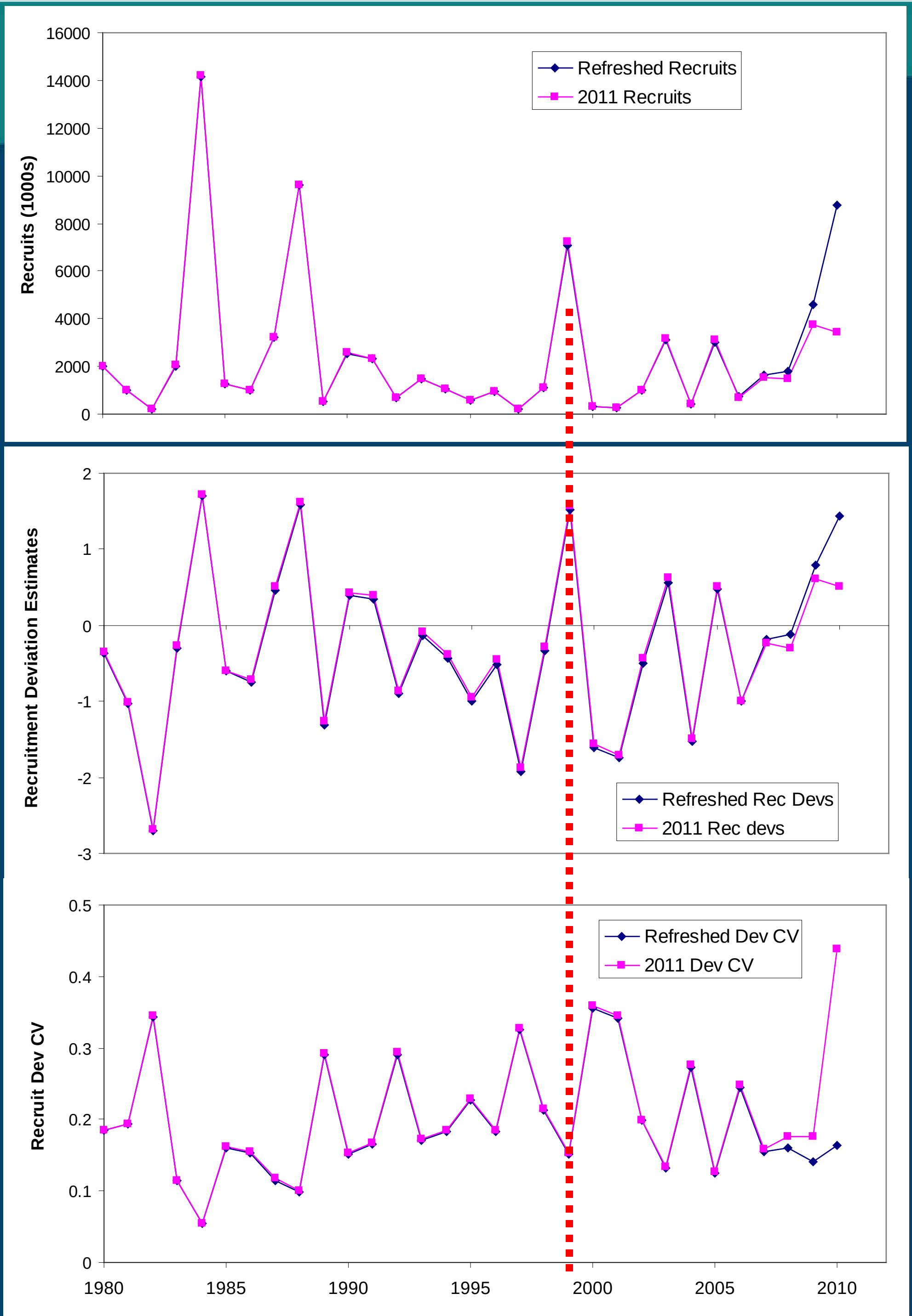
Age-0 Recruits
(1,000s)
Sablefish Recruitment,
as Estimated in the 2011 Assessment
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010

Bocaccio assessment planning

- A "refreshed" look at the 2011 bocaccio update (adding only length data) indicates that the **2010 year class is stronger** than estimated in 2011 (although **not** nearly as strong as the "unrealistic" estimate that caused the update to go to the mop-up).

- **The CV is much smaller** (a better estimate) and the estimate will improve further with 2012 data. It is always difficult to estimate very recent year class strength, but the estimate typically resolves fairly quickly for this species.

- STAT recommendation: There is no real need to do a full assessment in 2013. The 2010 YC will be even better resolved by then, and there is no new data, no anticipated changes to model structure, no major outstanding issues that can be dealt with between now and 2013.



Candidate Assessment Species

Species Identified as Preferred in March

		Vulner-ability Score	2007-2011 NWFSC Survey Average annual number of:		
			lengths	otoliths	hauls > 0
cowcod	F	2.13	31	31	16
aurora rockfish	F	2.10	1,692	694	96
petrale sole	F	1.94	4,444	1,170	289
bocaccio	F/U	1.93	148	115	28
darkblotched rf	F	1.92	2,020	924	119
Pacific ocean perch	U	1.69	693	471	48
sablefish	U	1.64	4,213	2,021	435
shortspine th'head	F	1.80	4,600	1,272	356
longspine th'head	F	1.54	4,250	992	255
Pacific sanddab	F	1.25	3,620	872	221

Other Possible Species

	Vulner-ability Score	2007-2011 NWFSC Survey Average annual number of:		
		lengths	otoliths	hauls > 0
rougheye rockfish	**2.27**	**110**	**104**	**31**
redstripe rockfish	2.16	351	173	12
rosethorn rockfish	2.09	1,159	478	54
sharpchin rockfish	2.05	943	465	38
bank rockfish	2.02	100	61	14
redbanded rockfish	2.02	169	167	49
California skate	2.12	370	0	70
big skate	1.99	303	113	89
yellowtail rockfish	**1.88**	**805**	**471**	**43**
Pacific grenadier	1.82	2,531	589	135
stripetail rockfish	1.80	2,183	691	147
spotted ratfish	1.72	2,642	0	337
Pacific cod	1.34	219	74	29
rex sole	**1.28**	**6,145**	**817**	**418**
flathead sole	1.26	289	41	39
halfbanded rockfish	1.26	1,070	227	56
curlfin sole	1.23	323	114	68

Proposed Schedule: Full Bocaccio Assess.

Review Meeting	Timing	Tentative Location	Species	
Hake Review (Treaty)	Late Feb.	Canada	Pacific Hake	
Data-Moderate Panel	4/29-5-3	Santa Cruz or Seattle	Number and Names To Be Determined	
Full Panel 1	5/13-5/17	Seattle or Santa Cruz	Petrale sole	Pacific sanddabs
June Council Meeting	6/18-6/25	Orange County	Petrale sole & Pac. sanddab STAR reports POP & sablefish updates Canary & yelloweye data reports.	
Full Panel 2	7/8-7/12	Seattle	Darkblotched	Aurora rockfish
Full Panel 3	7/22-7/26	Seattle	Shortspine thornyhead	Longspine thornyhead
Full Panel 4	8/5-8/9	Santa Cruz	Cowcod	Bocaccio
Sept. Council Meeting	9/10-9/17	Boise	STAR reports for: shortspine and longspine thornyheads, darkblotched and aurora rockfishes, cowcod, and bocaccio	
Mop-up / Rebuilding	9/23-9/27	Seattle	Rebuilding analyses and continuing issues, as determined to be necessary	

Proposed Schedule: Bocaccio is Update

Review Meeting	Timing	Tentative Location	Species	
Hake Review (Treaty)	Late Feb.	Canada	Pacific Hake	
Data-Moderate Panel	4/29-5-3	Santa Cruz or Seattle	Number and Names To Be Determined	
Full Panel 1	5/13-5/17	Seattle	Petrale sole	Rex sole/Yellowtail RF or Darkblotched
June Council Meeting	6/18-6/25	Orange County	Petrale sole & TBD STAR reports POP & bocaccio updates Canary & yelloweye data reports.	
Full Panel 2	7/8-7/12	Seattle	Darkblotched or Rougheye rockfish?	Aurora rockfish
Full Panel 3	7/22-7/26	Seattle	Shortspine thornyhead	Longspine thornyhead
Full Panel 4	8/5-8/9	Santa Cruz	Cowcod	Pacific sanddabs
Sept. Council Meeting	9/10-9/17	Boise	STAR reports for: shortspine and longspine thornyheads, darkblotched and aurora rockfishes, cowcod, and Pacific sanddab	
Mop-up / Rebuilding	9/23-9/27	Seattle	Rebuilding analyses and continuing issues, as determined to be necessary	

Workload considerations

- It is important to take full advantage of STAR Panel opportunities
- If bocaccio is an update, and a replacement species is added to the 'full' list, workload options:
    - Remove sablefish update?
    - POP as a data report?

Agenda Item D.3.b
Supplemental SSC Report
June 2012

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON STOCK ASSESSMENT PLANNING

The Scientific and Statistical Committee (SSC) discussed three topics related to stock assessment planning for 2013: the "refreshed" bocaccio analysis, the draft Terms of Reference (TOR) for stock assessment, rebuilding analysis, and methodology reviews, and the proposed list of stocks to be assessed in 2013.

The "refreshed" bocaccio analysis incorporated 2011 length composition data from surveys and recreational fisheries to evaluate the size of 2009 and 2010 year-classes, which were estimated to be relatively strong in the 2011 bocaccio update, but were highly uncertain. The refreshed analysis should not be considered a new update, and should not be the basis for setting the catch limits in 2013-14. The 2011 length information is generally consistent with the update assessment. The estimate of 2009 year class increased from 3.8 million to 4.6 million recruits, and the estimate of the 2010 year class increased from 3.4 million to 8.8 million recruits in the "refreshed" analysis. Strong recruitment will lead to faster rebuilding, but there is a potential for increased encounter rates in recreational fisheries that should be considered in developing inseason management measures.

The SSC groundfish subcommittee revised the TOR for stock assessment, rebuilding analysis and methodology reviews (Agenda Item D.3.a Attachments 2-4). The revisions reflect discussion during the meeting in December 2011 to review the stock assessment process, and the SSC's meeting with the Groundfish Management Team in April on rebuilding analysis. The TOR for stock assessment and methodology reviews were revised to be applicable to both groundfish and coastal pelagic species, thereby achieving some consolidation of TOR. The SSC plans to further revise the section on data reports before final adoption of the stock assessment TOR. The revisions will clarify that data reports should be used only when new information is unlikely to be informative about changes in stock status, and that only catch data need be included in the report. The SSC proposes changing the term "data report" to "catch report" to better reflect the nature of these reports.

With respect to the list of stocks to be assessed in 2013, the SSC discussed bocaccio, sablefish, and Pacific ocean perch. The SSC agrees it would be appropriate for bocaccio to be an update rather than a full assessment. The assessment model showed the expected response to the new information, and should be able to provide acceptable management advice without extensive modification and review. For sablefish, the SSC notes that there will be more information available in September to help inform the decision of whether a full or update sablefish assessment would be more appropriate. For Pacific ocean perch, the SSC suggests a data report be considered rather than an update, since little new information will be available since the last full assessment in 2011.

PFMC
6/22/12

EXEMPTED FISHING PERMITS FOR 2013-2014 FISHERIES

Exempted fishing permits (EFPs) provide a process for testing innovative fishing gears and strategies to substantiate methods for prosecuting sustainable and risk-averse fishing opportunities.

The Council adopted three EFP applications for public review at the November 2011 Council meeting. At this meeting, the Council will make its final recommendations to NMFS regarding the three EFPs.

The first EFP (Attachment 1), sponsored by Steve and Kathy Fosmark, seeks to test the effectiveness of trolled longline gear to selectively harvest chilipepper rockfish in waters off central California.

The second EFP (Attachment 2), sponsored by the San Francisco Fishermen's Cooperative and Mr. Dan Platt, seeks to test the effectiveness of vertical hook-and-line gear to selectively harvest midwater species such as yellowtail rockfish off of central California.

The third EFP, sponsored by the Central Coast Sustainable Groundfish Association, seeks to survey the distribution and size of overfished species in the Rockfish Conservation Area off the central coast of California using hook-and-line and trap gear.

In November, the Council recommended a range of EFP set-asides which would inform bycatch caps for the first two EFPs. The Council also recommended the SSC review the survey study design in the third EFP. The SSC review occurred at their March 2012 meeting and a second SSC review of the EFP study is scheduled for this meeting. All three EFP applications have been revised according to these recommendations.

The Council should review these EFP applications, consider public and advisory body comments, and consider recommending the 2013-2014 EFP applications to NMFS.

Council Action:

Consider EFP applications for 2013-2014 and provide final recommendations to NMFS.

Reference Materials:

1. Agenda Item D.4.a, Attachment 1: Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish (*Sebastes goodei*) off California.
2. Agenda Item D.4.a, Attachment 2: Groundfish EFP Proposal: Yellowtail Rockfish Jig Fishing off California.
3. Agenda Item D.4.a, Attachment 3: Supporting a spatial analysis of the distribution and size of rebuilding stocks in the Rockfish Conservation Area through directed fishing surveys.
4. Agenda Item D.4.c, Public Comments.

Agenda Order:

a. Agenda Item Overview John DeVore
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Adopt Final Recommendations

PFMC
05/31/12

Agenda Item D.4.a
Attachment 1
June 2012

Groundfish EFP Proposal: Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish (*Sebastes goodei*) off California

Date of Application: May 31, 2012

Changes to Application and Responses to comments.

1. Table of Requested set asides for 2013 (Same request for 2014)
The following table shows the requested set asides that would allow a sufficient harvest of incidental species to allow for the prosecution of the EFP.
Page: 7

Table 1. Overview of Target and Incidental Species Caught under the EFP

Species	Target or Incidental?	Overfished? Y/N	Depth Range	Requested Amount of EFP Harvest (mt)
Chilipepper *Sebastes goodei*	Target	No	0-1080 ft (0-180 fms)	200
Widow Rockfish *Sebastes entomales*	Incidental	No	0-1050 ft (0-175 fms)	9
Bocaccio *Sebastes paucispinis*	Incidental	Yes	0-1050 ft (0-175 fms)	3
Canary Rockfish *Sebastes pinniger*	Incidental	Yes	0-900 ft (0-150 fms)	3
Yelloweye Rockfish *Sebastes ruberrimus*	Incidental	Yes	150-1200 ft (25-200 fms)	0.023
Cowcod *Sebastes levis*	Incidental	Yes	132-1620ft (22-270fms)	0.015
Dorkblotched Rockfish *Sebastes crameri*	Incidental	Yes	240-1200ft (40-200fms)	0.1
Pacific Ocean Perch *Sebastes alutus*	Incidental	Yes	180-2100ft (30-350fms)	0
Petrale Sole	Incidental	Yes		0
Lingcod S of 42°	Incidental	No		0.5
Sablefish N of 36°	Incidental	No		3
Splitnose	Incidental	No		1.5
Minor Slope S of 40.10°	Incidental	No		1
Minor Shelf S of 40.10°	Incidental	No		1
Black Roskfish S of 46.16°	Incidental	No		1

Species	Target or Incidental?	Overfished? Y/N	Depth Range	Requested Amount of EFP Harvest (mt)
Pacific Whiting	Incidental	No		1
Other Fish	Incidental	No		1

For all other species cumulative limits will apply.

2. To address the need for a historical fish ticket summary of catch in the proposed area prior to 1998 when the RCA was first implemented, Appendix B has been added: See Receipt Numbers: CD45149 (2/15/96), CD45171(3/21/96), KI01905(3/27/96), KI01923(4/11/96). These landings are all from block 514 and are almost entirely Chilipepper.

Appendix B:

04/29/2012 14:13 8313730123 FOSMARK PAGE 01

RECEIVED TIME APR. 30. 10:03AM

California Department of Fish and Game - Confidential

1996 - 2003 All Landings for Commercial Fishing Vessel ID #18458

I hereby certify that the Document to which this Statement is affixed is a true and correct copy of the original document on file with the California Department of Fish and Game.

Signature: Joann S. Grea

Custodian of Records

Date: 9/3/2004

YEAR 1996

Receipt	Date	Species Code and Common Name		Pounds	Price	Value	Block	Port Code and Name		Vessel	License	Fish Bus.	Gear Code and Description	Condition and Description	
V168515	1/6/1996	004	Tuna - bluefin	31.00	$5.75	$178.25	0540	550	MONTEREY	18458	L18675	05207	07 TROLL (ALBACORE)	00	
I063907	1/15/1996	091	Swordfish	260.00	$5.00	$1,300.00	1037	592	MOSS LANDING	18458	L18675	04633	66 SET GILL NET	00	
I063907	1/15/1996	155	Shark - thresher	148.00	$1.25	$185.00	1037	592	MOSS LANDING	18458	L18675	04633	66 SET GILL NET	00	
V168516	1/15/1996	155	Shark - thresher	162.00	$2.00	$324.00	0551	550	MONTEREY	18458	L18675	05207	65 DRIFT GILL NET	00	
C045149	2/15/1996	195	Lingcod	50.00	$0.50	$25.00	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
C045149	2/15/1996	247	Rockfish - canary	10.00	$1.00	$10.00	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
C045149	2/15/1996	253	Rockfish - bocaccio	30.00	$0.50	$15.00	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
C045149	2/15/1996	254	Rockfish - chilipepper	2,817.00	$0.50	$1,408.50	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
C045149	2/15/1996	259	Rockfish - yellowtail	34.00	$0.50	$17.00	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
C045171	3/21/1996	254	Rockfish - chilipepper	2,784.00	$0.50	$1,392.00	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
K101905	3/27/1996	254	Rockfish - chilipepper	2,024.00	$0.50	$1,012.00	0514	592	MOSS LANDING	18458	L18675	60325	05 SET LONGLINE	00	
K101923	4/11/1996	254	Rockfish - chilipepper	791.00	$0.50	$395.50	0514	592	MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00	
D146433	5/11/1996	302	Salmon - chinook	2,027.00	$1.67	$3,385.09	0514	592	MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00	
N116947	5/15/1996	302	Salmon - chinook	875.00	$1.67	$1,461.25	0514	592	MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00	
D122626	6/1/1996	302	Salmon - chinook	120.80	$2.00	$241.60	0607	606	MORRO BAY	18458	L18675	06866	09 TROLL (SALMON)	05	Dressed head o
J087686	6/3/1996	302	Salmon - chinook	1,984.00	$1.82	$3,610.88	0514	592	MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00	
C043217	6/17/1996	302	Salmon - chinook	5,692.00	$0.00	$0.00	0514	592	MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00	
K102753	6/24/1996	302	Salmon - chinook	1,361.00	$1.25	$1,701.25	0514	592	MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00	
C053742	9/23/1996	005	Tuna - albacore	32,598.00	$0.82	$26,730.36	0514	592	MOSS LANDING	18458	L18675	60325	07 TROLL (ALBACORE)	00	
P153953	10/7/1996	004	Tuna - bluefin	307.00	$0.25	$76.75	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153953	10/7/1996	005	Tuna - albacore	490.00	$0.70	$343.00	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153953	10/7/1996	091	Swordfish	3,300.00	$3.00	$9,900.00	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02	Dressed head o
P153953	10/7/1996	151	Shark - shortfin mako	180.00	$1.25	$225.00	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02	Dressed head o
P153953	10/7/1996	155	Shark - thresher	94.00	$1.50	$141.00	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02	Dressed head o
P153953	10/7/1996	191	Louvar	78.00	$3.50	$273.00	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153953	10/7/1996	467	Opah	309.00	$0.35	$108.15	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
K104301	10/14/1996	005	Tuna - albacore	1,270.00	$0.70	$889.00	0514	592	MOSS LANDING	18458	L18675	60325	07 TROLL (ALBACORE)	00	
P153959	10/14/1996	004	Tuna - bluefin	246.00	$0.70	$172.20	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153959	10/14/1996	091	Swordfish	5,108.00	$3.00	$15,324.00	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02	Dressed head o
P153959	10/14/1996	151	Shark - shortfin mako	177.00	$1.25	$221.25	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02	Dressed head o
P153959	10/14/1996	191	Louvar	143.00	$3.50	$500.50	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153959	10/14/1996	467	Opah	493.00	$0.35	$172.55	1037	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153973	11/5/1996	004	Tuna - bluefin	41.00	$0.75	$30.75	0567	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05	Dressed head o
P153973	11/5/1996	091	Swordfish	48.00	$2.25	$108.00	0567	592	MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02	Dressed head o

Summary for 'YEAR' = 1996 (34 detail records)

	Pounds	Value
Sum	66,082.80	$71,877.83

YEAR 1997

Receipt	Date	Species Code and Common Name	Pounds	Price	Value	Block	Port Code and Name	Vessel	License	Fish Bus.	Gear Code and Description	Condition and Description

Friday, September 03, 2004

1996 - 2003 All Landings for Commercial Fishing Vessel ID #18458

Page 1 of 9

3. To address concerns regarding measurable components of gear configuration the following changes have been made:

Page 6:
Line 5:
Change: “No hooks closer than 3fm of the bottom” to “ No hooks closer than 3 fm from the weight”

Line 17:
Change: “mainline will connect at about 1 fathom above this weight” to “mainline will connect at least 3 fathoms above this weight”

Line 22:
Change: Approximately “1000-1,083 feet” to “500-1,083 feet”

Line 23:
Add: “(at least 500 hooks needed to fund 100 percent observer coverage)”

Line 31:
Add: “Mainline will connect at least 3 fathoms above weight”

4. To address the concern over the temporal component of the fishery as it relates to avoiding overfished species the following has been added:

Page 7:
Line 12:
Add: “This is not a precaution to avoid overfished species as much as a limitation for when chilipeppers are present in mid-water.”

5. To address concerns regarding Rockfish Conservation Area (RCA) incursion by a vessel that is actively fishing, the following has been added:

Page 9:
Line 20:
Add: “4. VMS and Vessel Marking – Before each trip a vessel will call the West Coast Groundfish Declaration Line to report the trip. (This procedure should work for both the EFP and for future use of this gear type). Vessels participating in this EFP will also display a banner with “EFP Fishing” written in 2 foot high letters.”

Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish (*Sebastes goodei*) off California

Date of Application: May 31, 2012

Applicants	Mailing address	Telephone #	Email
Steven and Kathy Fosmark F/V SeeAdler Moss Landing, CA	PO Box 1338 Pebble Beach, CA 93953	(831)-373-5238 (831)-601-4074	fvseeadler@aol.com kfosmark@aol.com
Scientific Advisors	**Mailing address**	**Telephone #**	**Email**
Dr. Steve Ralston Acting Director of the NMFS Santa Cruz Lab	NMFS-110 Schaffer Road Santa Cruz, CA 95060	(831)-420-3940	Steve.Ralston@noaa.gov
NMFS Contact	**Mailing address**	**Telephone #**	**Email**
Kevin Duffy Groundfish Branch Chief NMFS Northwest Regional Office	7600 Sand Point Way NE Seattle, WA 98115	(206)526-4743	Kevin.duffy@noaa.gov

Purpose and Goals

Chilipepper rockfish stocks on the west coast are considered healthy. However, because of weak stock management, harvest of these stocks is limited. In 2009, the total catch of chilipepper was estimated to be 311 mt of a 2,885 mt OY, or 11% of the total allowable catch. Area closures to protect overfished rockfish species have effectively closed access to this resource.

The goal of this project is to describe and evaluate the effectiveness of a species-selective longline technique, which if proven effective, will allow commercial fishermen access to chilipepper rockfish, a relatively abundant species of rockfish, while avoiding the weaker stocks. This fishery is constrained by the current rockfish area closures (Rockfish Conservation Areas, RCA), implemented to protect overfished rockfish species. Despite the depressed condition of some west coast groundfish stocks, there are other stocks that remain healthy. These healthier stocks could safely sustain increased harvest levels if they could be fished more cleanly and without bycatch of more depleted stocks. If stronger stocks could be targeted without increasing fishing mortality on depressed stocks, the California commercial fishing fleet would have additional fishing opportunities that would provide some economic relief to the industry while providing the public with a highly desirable product.

The research goal for the EFP is to establish the performance characteristics of the gear and to rigorously document the catch and bycatch when deployed in areas where chilipepper are abundant and bycatch species are not, under commercial fishing conditions. Specific objectives of the experiment are:

1) to test the trolled gear and fishing strategy with vertical lines and artificial flies, and
2) determine Groundfish Fishing Areas that are abundant with chilipepper rockfish, and that correspond to low densities of overfished species.

This latter objective may better help to answer the question of how EFP results can potentially be translated into future fleet-wide fishing opportunities.

Disposition of Catch

Target species (chilipepper) and legal incidental catch, such as widow rockfish, will be retained for sale. Fish not authorized for sale would be released alive if possible. If desired, incidental catch of certain species (e.g., canary and yelloweye) that cannot be released alive could be retained by the observer and provided to NMFS, CDFG, or other researchers.

Justification and Broader Significance

This EFP seeks to explore development of new, cleaner fishing opportunities in fulfillment of and compliance with the Magnuson-Stevens Act (MSA) mandates and goals (e.g., National Standards 1, 8, and 9). If more selective fishing methods can be developed, it is hoped that there will be additional opportunity in the groundfish fishery, which has been greatly constrained since rockfish conservation areas (RCAs) and lowered quotas were implemented to rebuild overfished species.

The long-term goal, if experiments prove successful, is to allow commercial fishing with this gear off the entire West Coast, including in the RCAs, by the Open Access and Limited Entry participants. This gear could also be used by fishermen to avoid species of concern and could create a fishery that would fill out the portfolios of those who make up the bulk of the fishermen in the West Coast's coastal communities. Thus, the benefits of this EFP would extend beyond the initial EFP participants.

Despite the generally depressed condition of many west coast groundfish stocks, there are some stocks that remain healthy. These healthier stocks could safely sustain increased harvest levels if they could be fished more cleanly and without bycatch of more depleted stocks. If stronger stocks could be targeted without increasing fishing mortality on depressed stocks, the West Coast commercial fishing fleet would have alternative fishing opportunities that would provide some economic relief to the industry while providing the public with highly desirable sustainably harvested local seafood.

Details

Total Duration of the EFP

This EFP proposal is for a total of 2 years (2013-2014).

Location of Fishing under the EFP

The EFP fishing would be conducted off **central California** between 38.0 degrees (Pt. Reyes) and 36.0 degrees (Point Lopez).

Within this area, fishing would occur at **depths of approximately 80-120 fm**. It is thought that there is a high-density of the target chilipepper rockfish in this range and that they tend to get smaller in size and schools are thinner in shallower depths. This range is currently within the non-trawl RCA established to protect overfished rockfish species. Vessels authorized under this EFP would be allowed to fish inside the current RCA using otherwise legal open access fixed gear.

Fishing effort will be concentrated in areas with canyon edges and walls, smooth hard bottom, with no rocks (example: canyon south of Año Nuevo). Areas to be selected for high-density target species will be between 38.0 degrees (Pt. Reyes) and 36 degrees (Point Lopez).

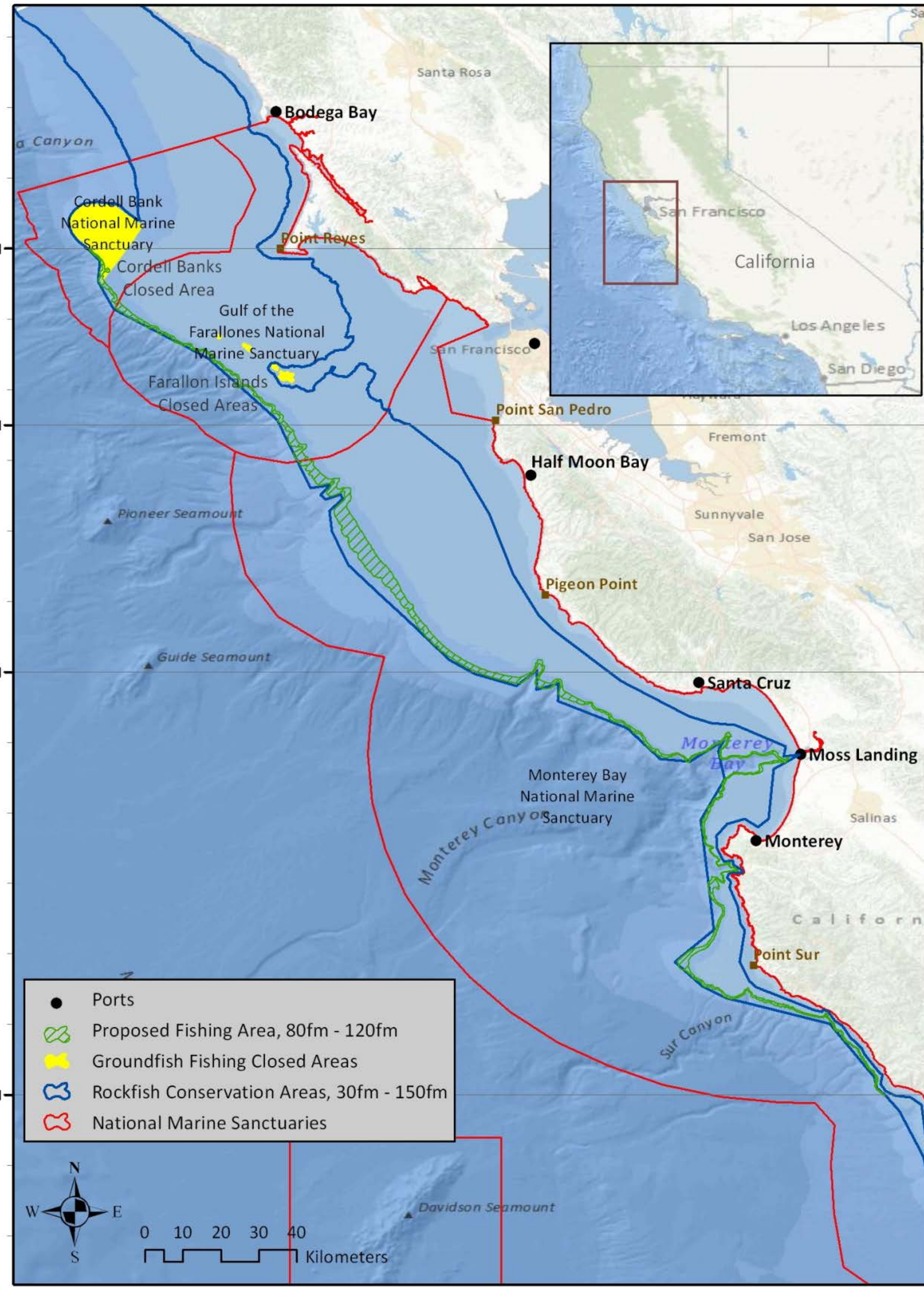


Figure 1: Map of the proposed EFP fishing area.

Description of the Gear to be Used

The gear is designed to selectively catch target chilipeppers in mid-water, when properly deployed, and will involve prospecting to avoid non-target species. A variety of gear is involved, including a hydraulic puller, conveyor belting or wide runner, fly-hooks, line, wire, snaps, small buoys (floats), one large buoy, and weights.

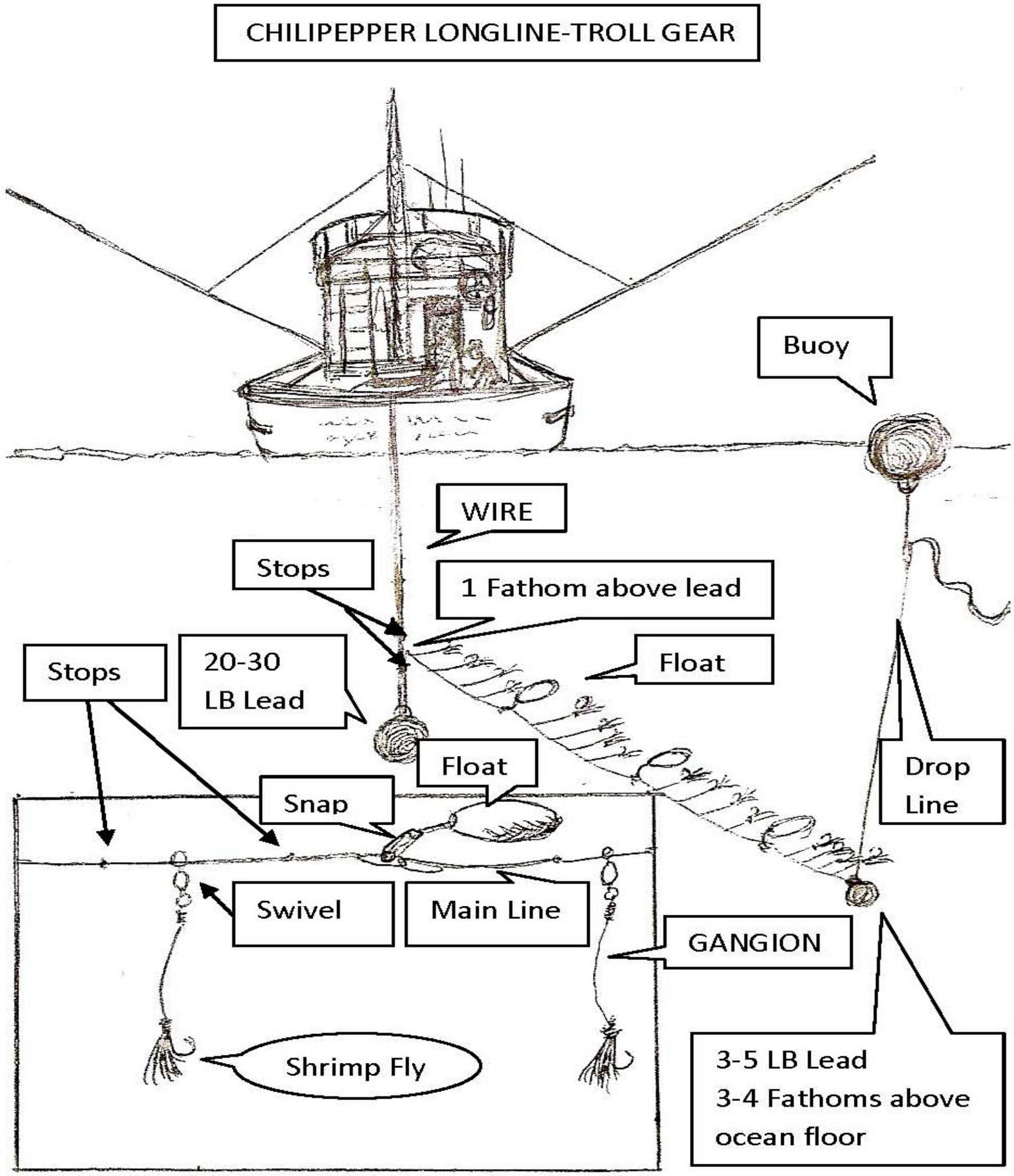


Figure 2. Gear description A

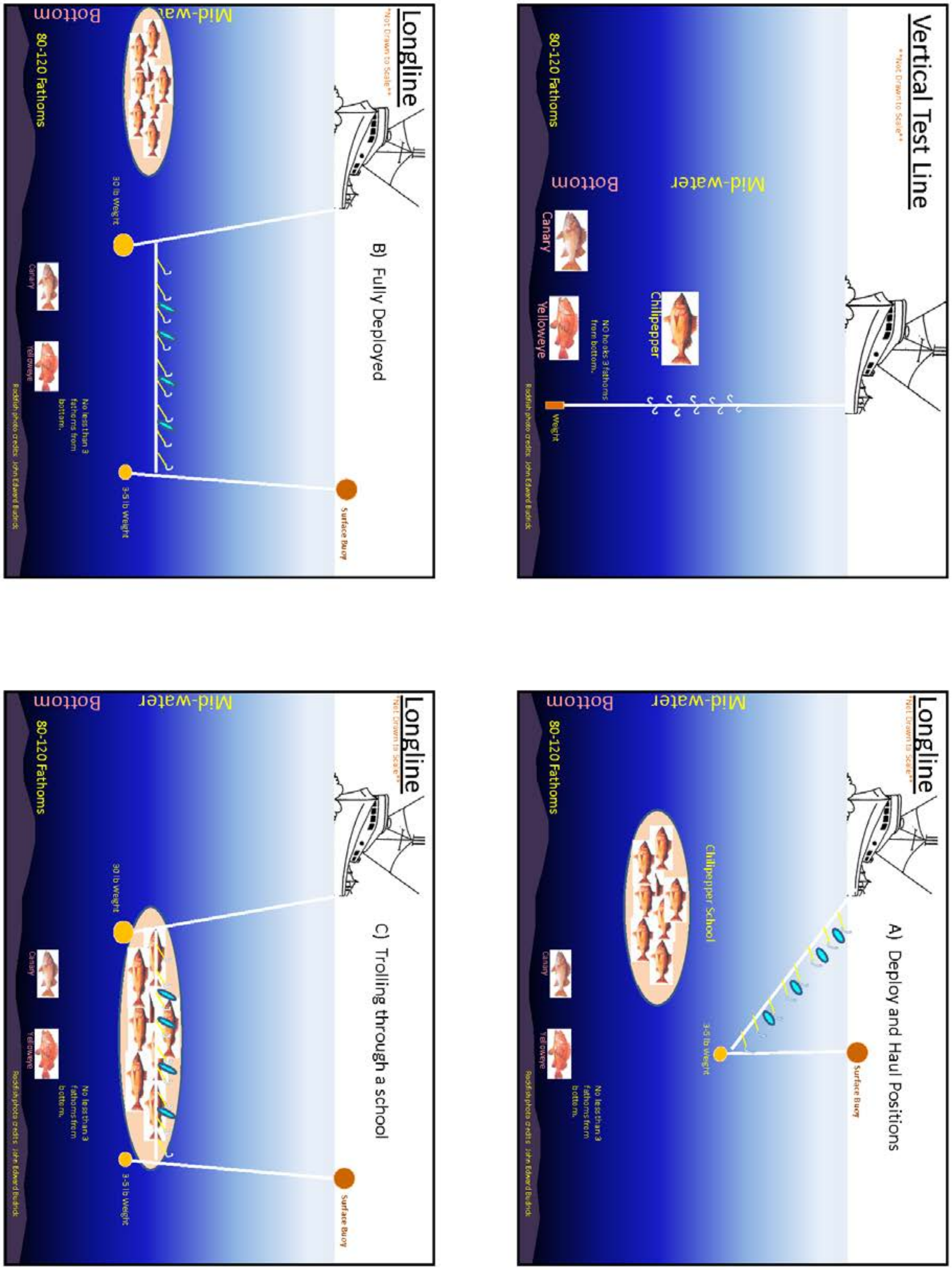


Figure 3. Gear description B

Specifications

<u>Vertical Test Line</u>

- No more than twenty (20) hooks (shrimp flies)
- No hooks closer than 3 fm from the weight
- Weight – 3-5 lbs

<u>Longline</u>

- 3 segments:
  - a drop line from a surface bouy
  - linked (skates) main line,
  - a drop line attached to a reel

- All lines maintained at least 3 fathoms from the bottom

- DROP LINE - FROM BOUY
  - Weight - 3 to 5 lb (mainline will connect at least 3 fathoms above this weight)
  - Surface bouy

- MAINLINE – Between two drop lines
  - 200-1000 lb. test monofilament (lower test for smaller vessels, stronger test for larger vessels)
  - approximately 500 - 1,083 feet
  - 1000 hooks per set maximum (at least 500 hooks needed to fund 100 percent observer coverage)
  - shrimp flies (hooks) (no bait)
  - 12" monofilament ganions/leaders with swivel (approximately 60 lb test)
  - leaders spaced approximately 13" apart
  - 20 small floats, every 50 hooks (floats have short tethers and attach to the mainline w/ snaps)

- DROP LINE – FROM VESSEL
  - Weight - 30 lb, Mainline will connect at least 3 fathoms above weight

Deployment

<u>Vertical Test Line</u>

- Prior to setting the longline gear, a test set will be made with vertical line to ensure that the target species is present and minimize the chance of encountering any overfished rockfish.
- Using acoustic soundings, no hooks will get within 3 fm of the bottom.
- The weight may hit the bottom initially, then immediately be pulled up a bit.

<u>Longline</u>

Once the test set establishes the presence of chilipepper rockfish, the longline will be deployed:

- The vessel moves slowly ahead as the longline is deployed (gear is attached to the vessel at all times).
- The mainline may be spooled to a drum. One end, with buoy and weight attached in such a way that the gear does not touch the bottom, is sent overboard as the boat moves slowly ahead, and the remaining gear is deployed.
- The weighted buoy line length is adjusted in such a way that does not have bottom contact to reduce the likelihood of bycatch and to prevent the hooks from hanging up on bottom.
- When the line reacts to bites, take the boat out of gear and fish will climb the line to the floats as they do with vertical gear on up and as line is pulled, line rises to the surface. Boat must be going ahead while pulling to keep the fish on. The terminal drop line remains at 85 fathoms.
- As the boat moves forward the drop line moves close to the end of the boat tight and fish continue to climb the line.

- As the line is towed in, fish stay in area of line where school is, (pull through spot of fish). As line is pulled on board it becomes vertical and can be alternatively stacked in basket gear.

Effort

Time to fish will be short each fishing day, taking place at daybreak and late evening. During the day chilipepper come off the bottom and once they are mid-water they are difficult to catch by this method. Therefore the morning and evening are the best times. This is not a precaution to avoid overfished species as much as a limitation for when chilipeppers are present in mid-water.

Number of vessels covered under the EFP

Three (3) vessels are proposed for participation.

Species to be Harvested (target and incidental)

Table 1 provides an overview of the species that may be caught under the EFP, their status, and estimated catch amounts.

Table 1. Overview of Target and Incidental Species Caught under the EFP

Species	Target or Incidental?	Overfished? Y/N	Depth Range	Requested Amount of EFP Harvest (mt)
Chilipepper *Sebastes goodei*	Target	No	0-1080 ft (0-180 fms)	200
Widow Rockfish *Sebastes entomales*	Incidental	No	0-1050 ft (0-175 fms)	9
Bocaccio *Sebastes paucispinis*	Incidental	Yes	0-1050 ft (0-175 fms)	3
Canary Rockfish *Sebastes pinniger*	Incidental	Yes	0-900 ft (0-150 fms)	3
Yelloweye Rockfish *Sebastes ruberrimus*	Incidental	Yes	150-1200 ft (25-200 fms)	0.023
Cowcod *Sebastes levis*	Incidental	Yes	132-1620ft (22-270fms)	0.015
Dorkblotched Rockfish *Sebastes crameri*	Incidental	Yes	240-1200ft (40-200fms)	0.1
Pacific Ocean Perch *Sebastes alutus*	Incidental	Yes	180-2100ft (30-350fms)	0
Petrale Sole	Incidental	Yes		0
Lingcod S of 42°	Incidental	No		0.5
Sablefish N of 36°	Incidental	No		3
Splitnose	Incidental	No		1.5
Minor Slope S of 40.10°	Incidental	No		1

Minor Shelf S of 40.10°	Incidental	No		1
Black Roskfish S of 46.16°	Incidental	No		1
Pacific Whiting	Incidental	No		1
Other Fish	Incidental	No		1

For all other species cumulative limits will apply.

Catch of species other than those listed in Table 1 are expected to be uncommon, although some yellowtail and perhaps other rockfish may be encountered in small numbers.

a. Species Descriptions

Descriptions of the **species life histories** can be found in Appendix B2 of the Pacific Coast Groundfish Fishery Management Plan.
http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/FMP-Appendix-B2.pdf

Updated information on **species abundance** can be found in Chapter 3 of the Proposed Harvest Specifications and Management Measures for the 2011-2012 Pacific Coast Groundfish Fishery and Amendment 16-5 to the Pacific Coast Groundfish Fishery Management Plan to Update Existing Rebuilding Plans and Adopt a Rebuilding Plan for Petrale Sole; Final Environmental Impact Statement.
http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/1112GF_SpexFEIS_100806-FINAL_feb21_.pdf

b. Estimated Harvest Amounts

Harvest amounts will be determined by the GMT.

Catch Accounting and Compliance

Attaining any of the above aggregate catch limits will terminate the EFP for all vessels. It is requested that there not be a trip limit for target species.

This EFP will incorporate a standardized data collection and reporting format as determined by NMFS Southwest Fisheries Science Center, Santa Cruz Lab, and Northwest Fisheries Science Center (Observer Program).

Observers: Under this EFP there will be 100% observer coverage with the cost of observer coverage borne by the EFP participants. Fisheries Observers will record all fish caught and ensure that aggregate bycatch limits are not exceeded, as well as collect data on fishing gear, location, catch, and disposition of catch.

Precautionary Measures

Given the potential to catch overfished species and by fishing in the RCA, the utmost caution will be taken with this experiment. The following measures are proposed and applicants are open to working with the PFMC, NMFS, and CDFG to implement others deemed necessary.

1. **Observers** – 100% observer coverage (a standard measure for EFPs, but worth noting here).

2. **Caps** – Based on input from the PFMC and NMFS, each boat will have either a ***daily*** or ***trip*** limit/cap of canary and yelloweye. If this cap is reached, based on catch accounting reports verified by the observer, fishing will cease for that day or trip.

3. **Trip reports and catch accounting** – On a timeline agreeable to NMFS and CDFG, trip and cumulative catch reports will be provided after each trip (e.g., within 48 hours).

4. **VMS and Vessel Marking** – Before each trip a vessel will call the West Coast Groundfish Declaration Line to report the trip. (This procedure should work for both the EFP and for future use of this gear type). Vessels participating in this EFP will also display a banner with "EFP Fishing" written in 2 foot high letters.

Data Collection and Analysis Methodology

Data Collection

The following data will be collected by observer for all fishing under this EFP:

Gear Configuration

- Number of hooks
- Number of floats
- Weight sizes
- spacing of hooks
- number of hooks between floats
- length of drop line

Set and Haul Data:

- Position (GPS coordinates)
- Depth
- Time

Catch of each set of gear

- Species
- Total weight
- Species distribution
- Disposition (landings and discards)

If desired, incidental catch of certain species (e.g., canary and yelloweye) that cannot be released alive could be retained by the observer and provided to NMFS, CDFG, or other researchers for biological sampling.

Data Analysis

The applicant and the scientist (NMFS Santa Cruz Lab) will be responsible for data analysis. Data analysis will consist of statistical analysis of catch and bycatch of all species by set, trip, and month. Catch rates will be expressed as catch per hook, per set, per day, and per trip. Value of the catch will be recorded following sale. The final report will provide an estimate of fishing effort and total catch; absolute and relative species composition summarized by set, trip, and month; size composition of catch and bycatch; and sex ratio (if possible) and stage of maturity for chilipepper.

Participation

Choosing Participants

Vessels to participate in this EFP fishery will be chosen based on their ability to accommodate and pay for an observer, their willingness to maintain detailed catch data, and their willingness to participate during months when fish are available to this fishery.

Planned EFP Fishing by Participants

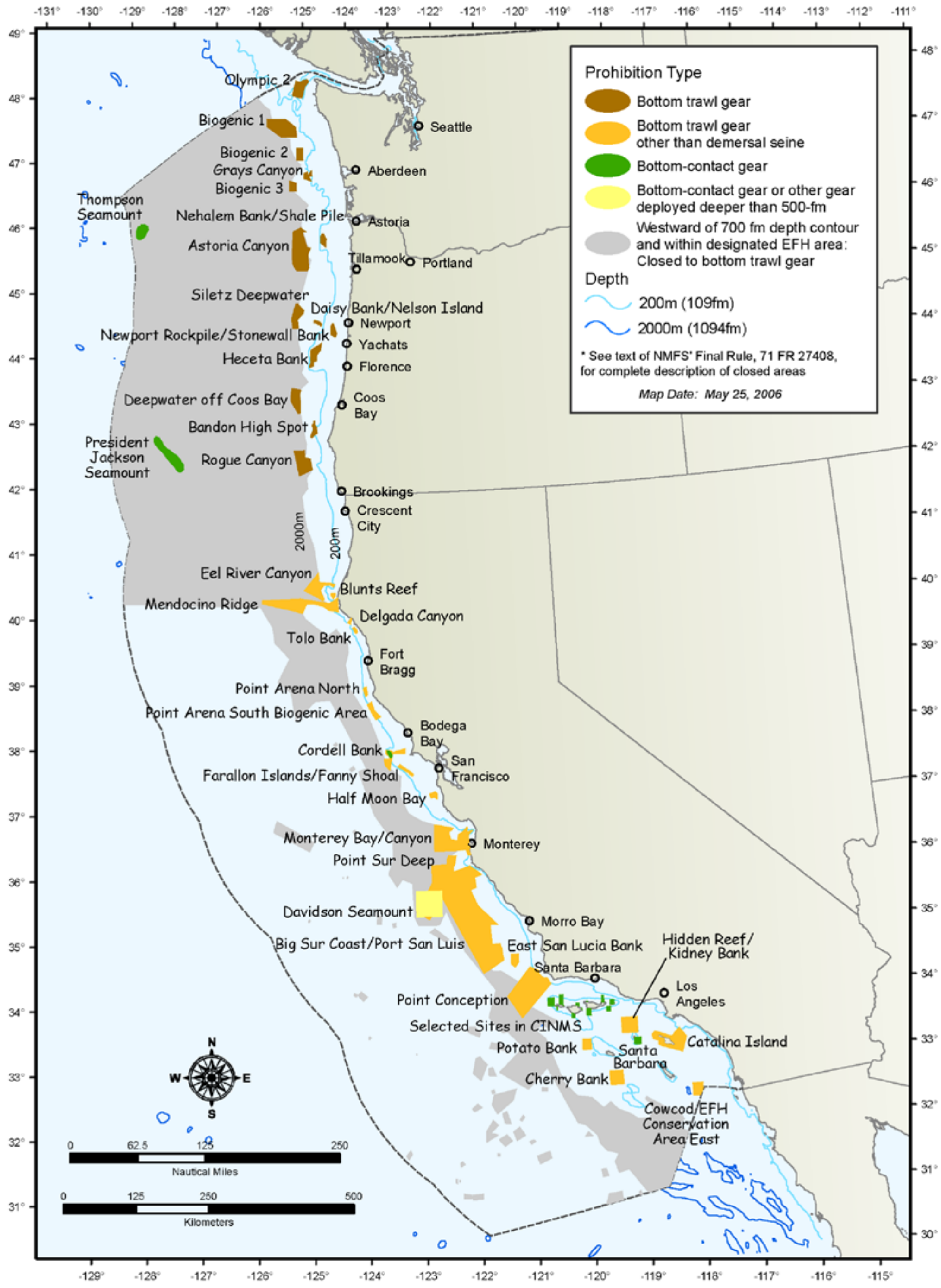
Timeframe / Months of fishing – Could be year round, but would be constrained by weather, marketing, and availability of observers.

Signatures

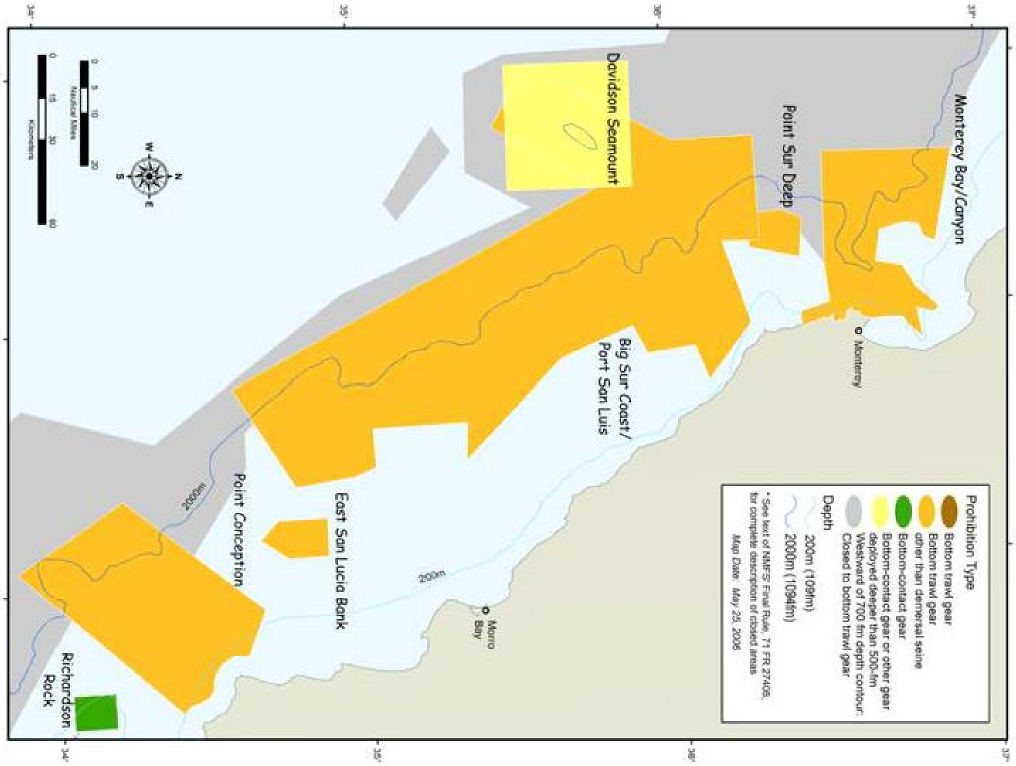
____________________________ ____________________________

Steve Fosmark Kathy Fosmark

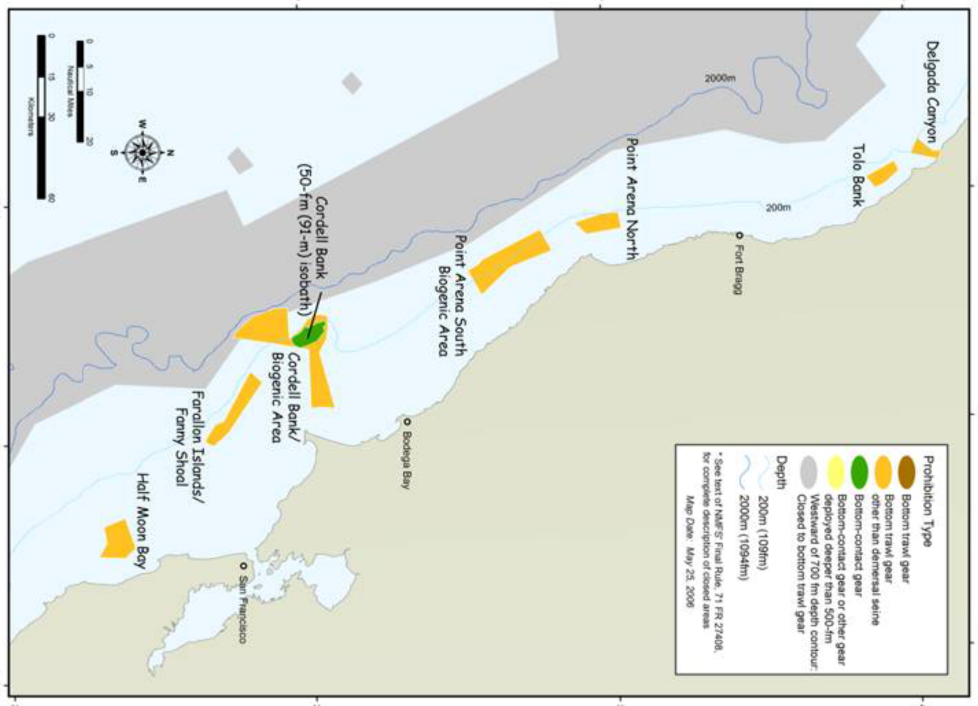
Appendix A- Maps



EFH area closures to protect Pacific Coast groundfish habitat - Coastwide.



EFH area closures to protect Pacific Coast groundfish habitat – Central California.



EFH area closures to protect Pacific Coast groundfish habitat – Northern California.

Appendix B- Landings

California Department of Fish and Game - Confidential

1996 - 2003 All Landings for Commercial Fishing Vessel ID #18458

I hereby certify that the Document to which this Statement is affixed is a true and correct copy of the original document on file with the California Department of Fish and Game.
Signature: [signature] Custodian of Records
Date: 9/3/2004

YEAR 1996

Receipt	Date	Species Code and Common Name	Pounds	Price	Value	Block	Port Code and Name	Vessel	License	Fish Bus.	GearCode and Description	Condition and Description
V168515	1/6/1996	004 Tuna - bluefin	31.00	$5.75	$178.25	0540	550 MONTEREY	18458	L18675	05207	07 TROLL (ALBACORE)	00
I063907	1/15/1996	091 Swordfish	260.00	$5.00	$1.300.00	1037	592 MOSS LANDING	18458	L18675	04638	66 SET GILL NET	00
I063907	1/15/1996	155 Shark - thresher	148.00	$1.25	$185.00	1037	592 MOSS LANDING	18458	L18675	04638	66 SET GILL NET	00
V168516	1/15/1996	155 Shark - thresher	162.00	$2.00	$324.00	0551	550 MONTEREY	18458	L18675	05207	65 DRIFT GILL NET	00
C045149	2/15/1996	195 Lingcod	50.00	$0.50	$25.00	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
C045149	2/15/1996	247 Rockfish - canary	10.00	$1.00	$10.00	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
C045149	2/15/1996	253 Rockfish - bocaccio	30.00	$0.50	$15.00	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
C045149	2/15/1996	254 Rockfish - chilipepper	2,817.00	$0.50	$1,408.50	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
C045149	2/15/1996	259 Rockfish - yellowtail	34.00	$0.50	$17.00	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
C045171	3/21/1996	254 Rockfish - chilipepper	2,784.00	$0.50	$1,392.00	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
K101905	3/27/1996	254 Rockfish - chilipepper	2,024.00	$0.50	$1,012.00	0514	592 MOSS LANDING	18458	L18675	60325	05 SET LONGLINE	00
K101923	4/11/1996	254 Rockfish - chilipepper	791.00	$0.50	$395.50	0514	592 MOSS LANDING	18458	L18675	60325	01 HOOK & LINE	00
D146433	5/11/1996	302 Salmon - chinook	2,027.00	$1.67	$3,385.09	0514	592 MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00
N116947	5/15/1996	302 Salmon - chinook	875.00	$1.67	$1,461.25	0514	592 MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00
D122626	6/1/1996	302 Salmon - chinook	120.80	$2.00	$241.60	0607	606 MORRO BAY	18458	L18675	06866	09 TROLL (SALMON)	05 Dressed head o
J087686	6/3/1996	302 Salmon - chinook	1,984.00	$1.82	$3,610.88	0514	592 MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00
C048217	6/17/1996	302 Salmon - chinook	5,692.00	$0.00	$0.00	0514	592 MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00
K102753	6/24/1996	302 Salmon - chinook	1,361.00	$1.25	$1,701.25	0514	592 MOSS LANDING	18458	L18675	60088	09 TROLL (SALMON)	00
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P153953	10/7/1996	091 Swordfish	3,300.00	$3.00	$9,900.00	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02 Dressed head o
P153953	10/7/1996	151 Shark - shortfin mako	180.00	$1.25	$225.00	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02 Dressed head o
P153953	10/7/1996	155 Shark - thresher	94.00	$1.50	$141.00	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02 Dressed head o
P153953	10/7/1996	191 Louvar	78.00	$3.50	$273.00	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05 Dressed head o
P153953	10/7/1996	467 Opah	309.00	$0.35	$108.15	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05 Dressed head o
K104301	10/14/1996	005 Tuna - albacore	1,270.00	$0.70	$889.00	0514	592 MOSS LANDING	18458	L18675	60325	07 TROLL (ALBACORE)	00
P153959	10/14/1996	004 Tuna - bluefin	246.00	$0.70	$172.20	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05 Dressed head o
P153959	10/14/1996	091 Swordfish	5,108.00	$3.00	$15,324.00	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02 Dressed head o
P153959	10/14/1996	151 Shark - shortfin mako	177.00	$1.25	$221.25	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02 Dressed head o
P153959	10/14/1996	191 Louvar	143.00	$3.50	$500.50	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05 Dressed head o
P153959	10/14/1996	467 Opah	493.00	$0.35	$172.55	1037	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05 Dressed head o
P153973	11/5/1996	004 Tuna - bluefin	41.00	$0.75	$30.75	0567	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	05 Dressed head o
P153973	11/5/1996	091 Swordfish	48.00	$2.25	$108.00	0567	592 MOSS LANDING	18458	L18675	07295	65 DRIFT GILL NET	02 Dressed head o

Summary for 'YEAR' = 1996 (34 detail records)

	Pounds	Value
Sum	66,082.80	$71,877.83

YEAR 1997

Receipt	Date	Species Code and Common Name	Pounds	Price	Value	Block	Port Code and Name	Vessel	License	Fish Bus.	GearCode and Description	Condition and Description

Friday, September 03, 2004 1996 - 2003 All Landings for Commercial Fishing Vessel ID #18458 Page 1 of 9

Groundfish EFP Proposal:
Yellowtail Rockfish Jig Fishing off California

Date of Application: May 31, 2012

Changes to Application and Responses to comments.

1. Table of Requested set asides for 2013 (Same request for 2014)
The following table shows the requested set asides that would allow a sufficient harvest of incidental species to allow for the prosecution of the EFP.

Table 1. Overview of Target and Incidental Species Caught under the EFP

Species	Target or Incidental?	Overfished? Y/N	Depth Range	Requested Amount of EFP Harvest (mt)
Yellowtail Rockfish N of 40.10° *Sebastes flavidus*	Target	No	0-900 ft (0-150 fms)	30
Widow Rockfish *Sebastes entomales*	Incidental	No	0-1050 ft (0-175 fms)	9
Bocaccio *Sebastes paucispinis*	Incidental	Yes	0-1050 ft (0-175 fms)	3
Chilipepper *Sebastes goodei*	Incidental	No	0-1080 ft (0-180 fms)	12
Canary Rockfish *Sebastes pinniger*	Incidental	Yes	0-900 ft (0-150 fms)	3
Yelloweye Rockfish *Sebastes ruberrimus*	Incidental	Yes	150-1200 ft (25-200 fms)	0.023
Darkblotched	Incidental	Yes		0.1
Cowcod	Incidental	Yes		0.015
Petrale	Incidental	Yes		0
POP	Incidental	Yes		0
Lingcod S of 42°	Incidental	No		1.5
Sablefish N of 36°	Incidental	No		1
Splitnose	Incidental	No		1.5
Minor Slope N of 40.10°	Incidental	No		1
Minor Slope S of 40.10°	Incidental	No		1
Minor Shelf N of 40.10°	Incidental	No		1
Minor Shelf S of 40.10°	Incidental	No		1
Black Rockfish S of 46.16°	Incidental	No		1
Pacific Whiting	Incidental	No		1
Other Fish	Incidental	No		1

For all other species cumulative limits will apply.
Page 12:
Line 5:
Change: “Harvest amounts will be determined by the GMT” to “Requested allocation is found in Table 1”

2. . To address concerns regarding Rockfish Conservation Area (RCA) incursion by a vessel that is actively fishing, the following has been added:
Page 13:
Line 1:
Add: “VMS and Vessel Marking – Before each trip a vessel will call the West Coast Groundfish Declaration Line to report the trip. (This procedure should work for both the EFP and for future use of this gear type). Vessels participating in this EFP will also display a banner with “EFP Fishing” written in 2 foot high letters.”

3. To address concerns over gear configuration the following changes have been made:
Page 9:
Lines 6-7
Change: “a float above the top hook to keep the gear from contacting the bottom, as suggested by the GMT in 2009; float size large enough to float the gear without the weight” to “a float, at least 3.5 inches in diameter, above the top hook to keep the gear from contacting the bottom, as suggested by the GMT in 2009.”

Line 12:
Add: “When two lines are used they may be deployed with different lengths of breakaway line.”

4. To address concerns from National Marine Sanctuaries regarding bottom contact in areas with hydrocorals the following changes have been made:

Page 4:
Line 16:
Change: “between 30-100 fathoms” to “between 35-100 fathoms”

Line 16:
Add: “Fishing will take place deeper than 35 fms to avoid hydrocorals (primarily *Stylaster spp*.) found mainly shallower than 30 fathoms.”

Line 23:
Change: “whereas the overfished rockfish species of greatest concern are bottom-dwelling. (i.e., canary and yelloweye).” To “whereas the overfished rockfish species of greatest concern tend to be more bottom associated. (i.e., canary and yelloweye).”

Lines 35:
Change: “while in a submersible and saw no yelloweye and very few canary rockfish in this same area.” To “while in a submersible and saw no adult yelloweye and very few canary rockfish in this same area.”

Page 12:
Line 46:
Add: "and National Marine Sanctuaries Service."

5. To document past yellowtail catch in the RCA the following changes have been made:

Page 12:
Line:20:
Add:. "Landing data from 1992-1998 for all California Ports North of 37° were summed by DFG Block. The data show that most blocks within the proposed area have some yellowtail catch during the years prior to the RCA.(See Appendix F)"

Add: Appendix F

Appendix F- Yellowtail Rockfish Landings by DFG block for 1992-1998 all California Ports North of 37°

Pounds of Yellowtail Rockfish Landed By DFG Block from 1992-1998 for Ports within the propsed fishing area and with more than 1000 lbs per block.				
Block Code	Total Pounds		Block Code	Total Pounds
102	3032		441	118333.6
108	3093.8		442	69438
109	2935		445	1066
114	2063		446	1008
205	1757		447	8990
208	2988		448	2522
211	5313.7		449	5467
213	1399		450	4141
217	1306		451	21376.8
218	131434.7		452	10018.4
222	11897		455	13947.9
223	12739		456	5615.7
224	2517		457	6927.55
228	84802		458	63786.23
229	14048		459	16027.3
233	5210		464	2347.4
234	3614		465	1477
243	7352		466	5025.7
249	2674.25		468	1180
253	2885		471	157773
257	13998		472	3184.9
262	1493.95		473	2350.74
263	2723		475	6618.6
268	1674.35		476	1251
274	11594		477	7118
402	1080		485	11097
403	2335		486	12307
415	1837.25		488	4564
422	8965.9		514	7705
425	5133		532	1247.35
431	6787.9		546	10037
432	2388.05		1035	1399
435	2396		1037	2253.75
436	1132		1038	845366.95
438	2211		1040	305230.45
439	2862		1041	435281.23
440	4017		1042	679553

5. Other Items to Change:

Page 1:

Line 5:

Change Barbara Emley's email to: barbaraemley@gmail.com

Page 9:
Line 3:
Strike: "If two are used, one will be on the bow and one on the stern."
Line 13:
Strike: "whether bait will be needed"
Page 13:
Line 16:
Strike: "Type of Bait"

Line 18:
Change: "Depth" to "Bottom Depth"

Line 23:
Add: "Length" and "Biological Sampling (if applicable)"

Date of Application: May 31, 2012

Applicants	Mailing address	Telephone #	Email
San Francisco Community Fishing Association Contact: Barbara Emley	535 Ramsell St. San Francisco, CA 94132	(415) 585-5711	barbaraemley@gmail.com
Dan Platt Open Access Representative Groundfish Advisory Panel **PFMC**	PO Box 1912 Ft. Bragg, CA 95437	(707) 813-7221	morefish@mcn.org
Scientific Advisors	Mailing address	Telephone #	Email
Yonat Swimmer Research Fisheries Biologist NMFS Pacific Islands Fisheries Science Center	501 W. Ocean Blvd Ste. 4200 Long Beach, CA 90802	(562) 980-4046	Yonat.Swimmer@noaa.gov
Dean Wendt Associate Dean, College of Science and Math California Polytechnic State University, San Luis Obispo	Cal Poly State University Biological Sciences Department San Luis Obispo, CA 93407	(805) 756-2988	Dwendt@calpoly.edu
NMFS Contact	Mailing address	Telephone #	Email
Kevin Duffy Groundfish Branch Chief NMFS Northwest Regional Office	7600 Sand Point Way NE Seattle, WA 98115	(206)526-4743	Kevin.duffy@noaa.gov
NMFS Technical Advisor	Mailing address	Telephone #	Email
Charles Villafana Fisheries Biologist NMFS Southwest Regional Office	501 W. Ocean Blvd Ste. 4200 Long Beach, CA 90802	(562)980-4033	Charles.villafana@noaa.gov

Purpose and Goals

Purpose

West Coast fisheries have been increasingly restricted in state and federal waters over the last decade to reduce impacts from fishing. Yet, demand remains for fresh, local seafood. To harvest healthy and abundant fish stocks with less impact, conservation engineering and gear experimentation is needed. The purpose of this EFP is to test the potential for a new commercial jig gear configuration to harvest currently underutilized rockfish species (yellowtail) while avoiding overfished stocks to enhance optimum yield in the mixed stock West Coast groundfish fishery.

Goals

This EFP seeks to fulfill and comply with national mandates and goals of the Magnuson-Stevens Act (MSA) for fisheries, fisheries resources, and fishing communities by addressing specific conservation and management issues in the mixed stock groundfish fishery off of California.

1. Consistent with MSA National Standard 1 (optimum yield) and National Standard 9 (minimize bycatch), harvest abundant stocks while minimizing bycatch and providing for rebuilding of overfished stocks.
2. Consistent with the purpose of MSA to conserve and manage U.S. fishery resources to realize their full potential (i.e., by providing employment, food, and revenue to the nation) and consistent with MSA National Standard 8 (fishing communities), seek to develop and utilize gear technology that contributes to sustained participation of fishing communities while also preventing overfishing and ensuring rebuilding of overfished stocks.
3. Provide additional opportunity in the groundfish fishery off California that has been greatly constrained since rockfish conservation areas (RCAs) and lowered quotas were implemented to rebuild overfished species.
4. Test the success of this experimental commercial jig gear configuration at: 1) avoiding deep dwelling overfished rockfish stocks (canary and yelloweye) while selectively harvesting an abundant mid-water rockfish stock (yellowtail), and 2) providing enough harvest of abundant rockfish species to support, or at least contribute to, a commercial fishery off the West Coast in the long-term.

Disposition of Catch

Target species (yellowtail rockfish) and legal incidental catch, such as chilipepper rockfish, will be retained for sale. Fish not authorized for sale would be released alive if possible. If desired, incidental catch of certain species (e.g., canary and yelloweye) that cannot be released alive could be retained by the observer and provided to NMFS, CDFG, or other researchers.

Justification

The fishing grounds which have been historically accessible to portfolio fishermen in California's coastal communities are geographically identified as "shelf", and because of this, the gear used by these fishermen isn't useful for catching fish on the "slope" (depths greater than 100 fathoms-see Figure 5). The creation of the non-trawl rockfish conservation area (RCA) over the shelf (between 30 and 150 fathoms) has pushed fishermen outside their historical fishing grounds into deeper waters where fishing is no longer feasible with their current gear (see Appendix E).

In order to protect and rebuild overfished yelloweye and canary rockfish off California, depth and area closures were implemented off of California. Unfortunately, these closures have also prevented harvest of more abundant yellowtail rockfish that live higher in the water column. Combined with lower quotas, these measures caused many fishermen in California's coastal communities to switch fisheries and/or supplement their incomes in non-fishery jobs because they could no longer harvest the abundant groundfish stocks. If a gear could be developed capable of harvesting the more abundant mid-water species while avoiding catch of the overfished bottom dwellers, then the optimum yield of the fishery could be enhanced. There are currently no conservation concerns with yellowtail rockfish which is an under-utilized species.

In 2009, the Oregon Recreational Yellowtail Rockfish EFP, approved by the Council, was permitted to the Southern Oregon Sport Fishermen and Recreational Fishing Alliance (Oregon Chapter) for fishing in 2010 and 2011. Although not identical, this OR EFP is based on the same concept (i.e., placing hooks near the target species in mid-water and away from non-targets on the bottom). Therefore, it offers interesting insights of some relevance to this EFP application, particularly its catch composition and success at avoiding the non-target species. Under this EFP, 29 trips were made with an average of 11 anglers and 33 hooks per vessel (3 per line) were deployed on average. Reported catch of 4.3 mt (as of Aug. 1, 2011) was composed of roughly 62% Yellowtail, 23% Widow, 12% Canary and 3% other rockfish and 4kg of Yelloweye (2 fish) (see Appendix B). This catch is well below the 1 mt of Canary and 100 kg Yelloweye authorized for year two alone.

A similar design will be tested under this EFP with some modifications for use in a commercial fishery (e.g., number of hooks, size of weight). An EFP is necessary to test this gear because it is not currently authorized under the Groundfish FMP regulations and because fishing conducted under this EFP is proposed for areas that are currently closed to fishing. If the proposed modified vertical hook and line fishing technique is successful, this exempted fishing permit (EFP) would allow commercial fishermen to access historical fishing grounds targeting healthy rockfish stocks and would promote ecologically and economically sustainable fisheries in Central and Northern California.

Broader Significance

The long-term goal, if experiments prove successful, is to allow commercial jig fishing with this gear off the entire West Coast, including in the RCAs, by the Open Access and Limited Entry participants. If successful, this gear could also be used by the Nearshore fleet to avoid species of concern and could create a fishery that would fill out the portfolios of those who make up the bulk of the fishermen in the West Coast's coastal communities. The recreational fleet might also benefit from using a similar gear with fewer hooks, similar to the Oregon Yellowtail EFP previously mentioned. Thus, the benefits of this EFP would extend beyond the initial EFP participants.

Despite the generally depressed condition of many west coast groundfish stocks, there are some stocks that remain healthy. These healthier stocks could safely sustain increased harvest levels if they could be fished more cleanly and without bycatch of more depleted stocks. If stronger stocks could be targeted without increasing fishing mortality on depressed stocks, the West Coast commercial fishing fleet would have alternative fishing opportunities that would provide some economic relief to the industry while providing the public with highly desirable sustainably harvested local seafood.

Details

In determining the proposed specifications for this experiment, several factors have been considered.

- **Creating a statistically valid sample size –** allowing for a sufficient number of hooks, lines, days, vessels, and locations that can provide valid conclusions as to the success of this gear at avoiding overfished non-target species and harvesting the target yellowtail in sufficient quantity to allow for potential expansion of this gear to support future commercial fishing.
- **Feasibility and efficiency –** whether participants can at least cover the costs involved to perform these experiments (including observer costs, fuel, gear, and bait), even if no profit is made under the EFP.
- **Safety-at-sea –** ensuring participants can fish on days with safe weather conditions.

- **Precaution and minimizing risk –** Knowing that overfished rockfish could be encountered and because at least some of the fishing would take place in the RCA, several precautionary measures are proposed.

With consideration of these factors, applicants are open to discussing modifications to this proposal with the GMT and GAP (e.g., # hooks, depth range, etc.).

Total Duration of the EFP

This EFP proposal is for a total of 2 years (2013-2014) with 30 fishing days for the first year, and possibly 45-60 days in the second year. In the second year, additional time and other modifications may be desired and/or necessary (e.g., number of participating vessels, hooks, area and days fished), but would be subject to review and approval through the PFMC process and NMFS.

Location of Fishing under the EFP

The fishing will occur between Point San Pedro and the Oregon/California border (37°35'N and 42°N), between 35 and 100 fathoms. Fishing will take place deeper than 35 fms to avoid hydrocorals (primarily *Stylaster spp.*) found mainly shallower than 30 fathoms. Locations for the EFP fishing have been chosen based on known yellowtail habitat, rather than lines of latitude or fathom lines and it is known that there is appropriate yellow-tail habitat in this area, i.e., high relief rocky reef deeper than 30 fathoms (see Appendix D).

Yellowtail rockfish is the target in this experiment because they are underutilized and because they are a mid-water species, whereas the overfished rockfish species of greatest concern tend to be more bottom associated. (i.e., canary and yelloweye). The hooks would be located only in the mid-water column based on the hypothesis that this will be in the range of yellowtail but out of range for canary and yelloweye rockfish, making it less likely that they would encounter the hooks.

Fishing under this EFP is proposed to occur within the RCAs making this a sensitive and delicate experiment that would be undertaken with precautionary steps, such as having 100% observer coverage and daily limits (see section on **Precautionary Measures**). Unfortunately, it is thought that yellowtail rock fish live primarily inside the RCAs and it would be useful to verify this assertion by reviewing fish ticket information from years prior to implementation of the RCAs. Recently, the Superintendent of the Cordell Bank National Marine Sanctuary reports seeing very large numbers ("clouds") of yellowtail rockfish on the "high spots" while in a submersible and saw no adult yelloweye and very few canary rockfish in this same area.

If the project proves successful in avoiding stocks of concern, then fishermen in other West Coast harbors may want to explore other appropriate habitat in their area. Much of the area proposed for this EFP is within the boundaries of the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries. These sanctuaries are in support of this experiment. It has been 10 years since any fishing has taken place in this area, and the Sanctuaries' superintendents are very interested in learning the results of this experiment.

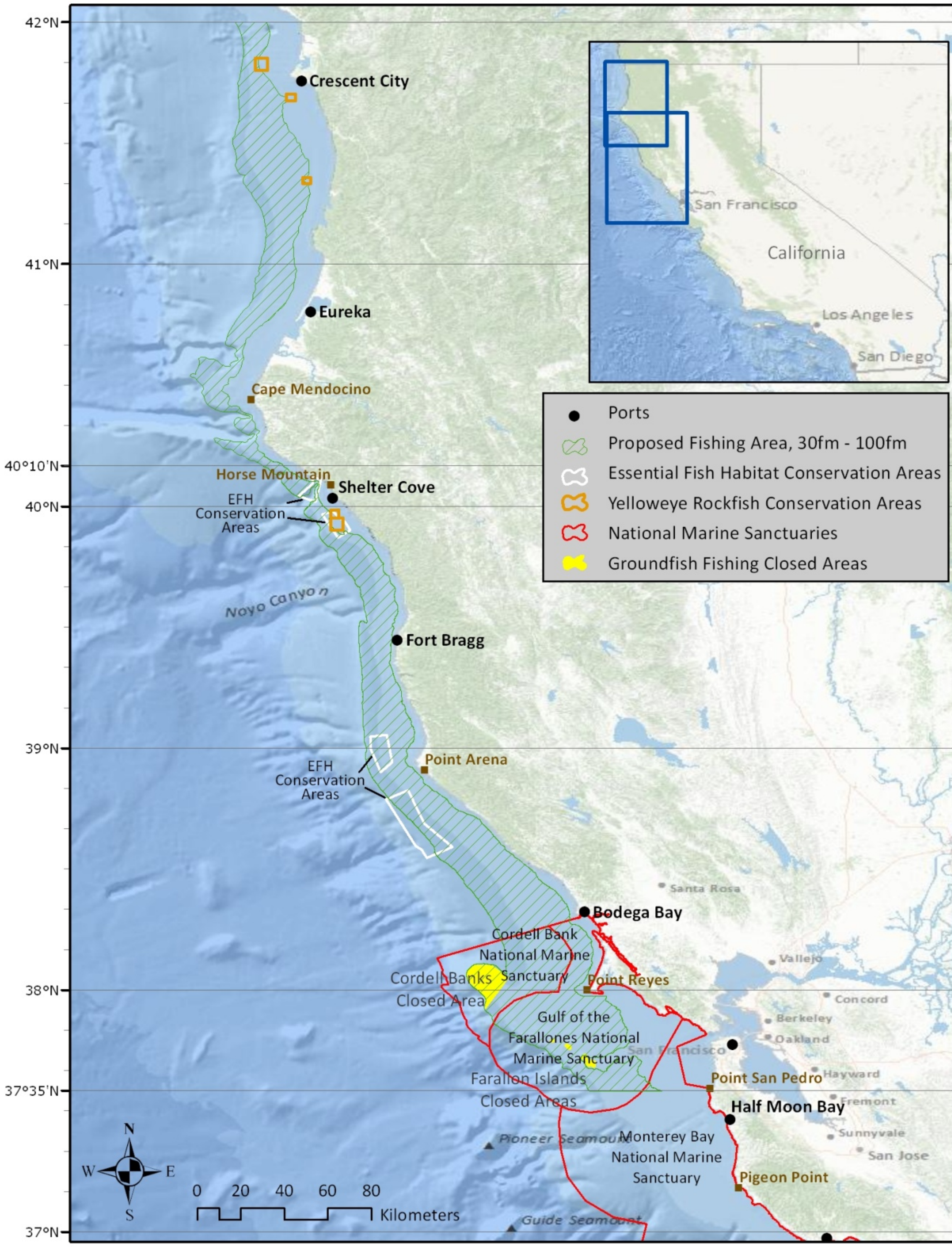


Figure 1. Chart of proposed EFP fishing area – Pigeon Point, CA, to CA/OR border.

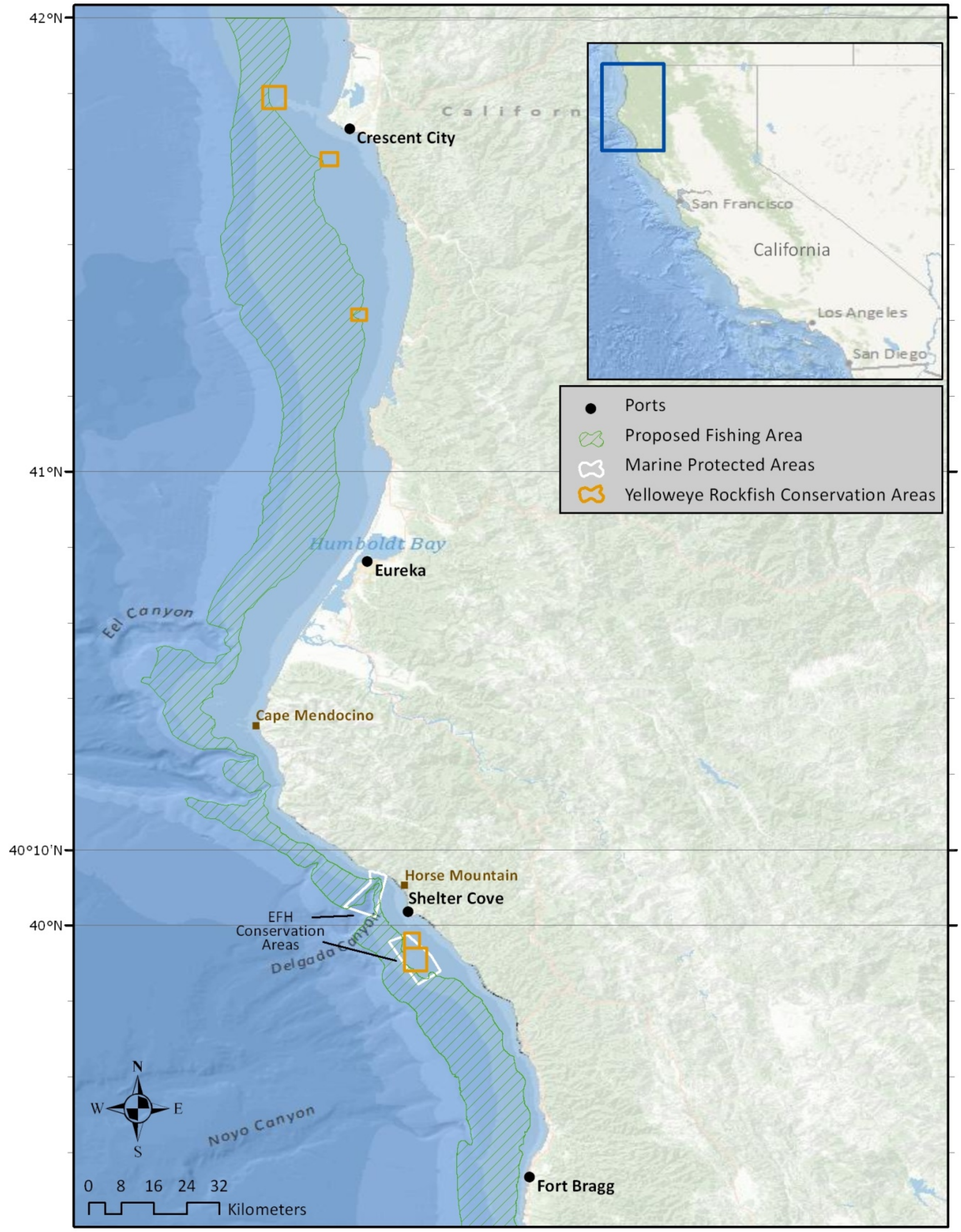


Figure 2. Chart of proposed EFP fishing area – Ft. Bragg, CA, to CA/OR border.

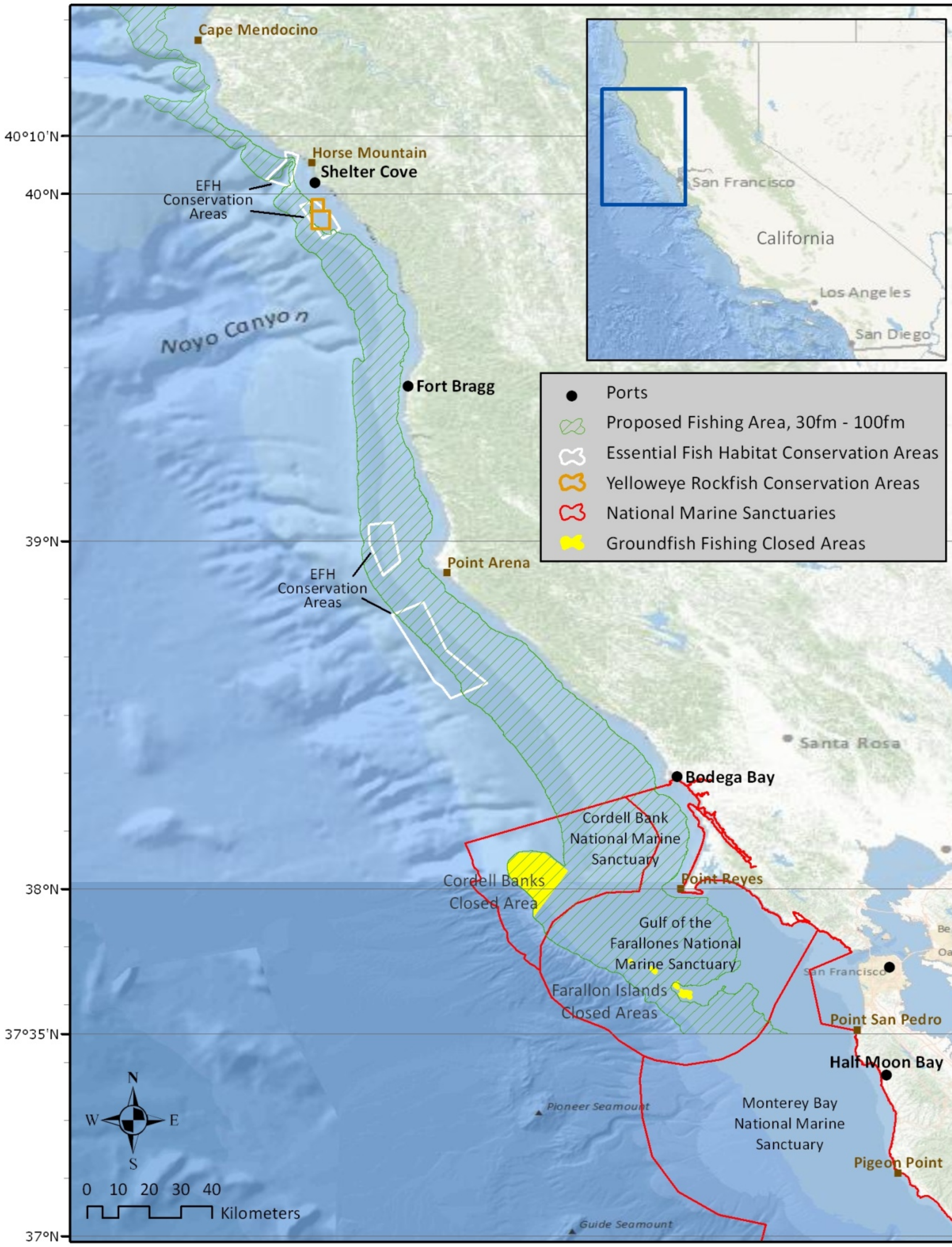


Figure 3: Chart of proposed EFP fishing area – Pigeon Point, CA, to Cape Mendocino, CA.

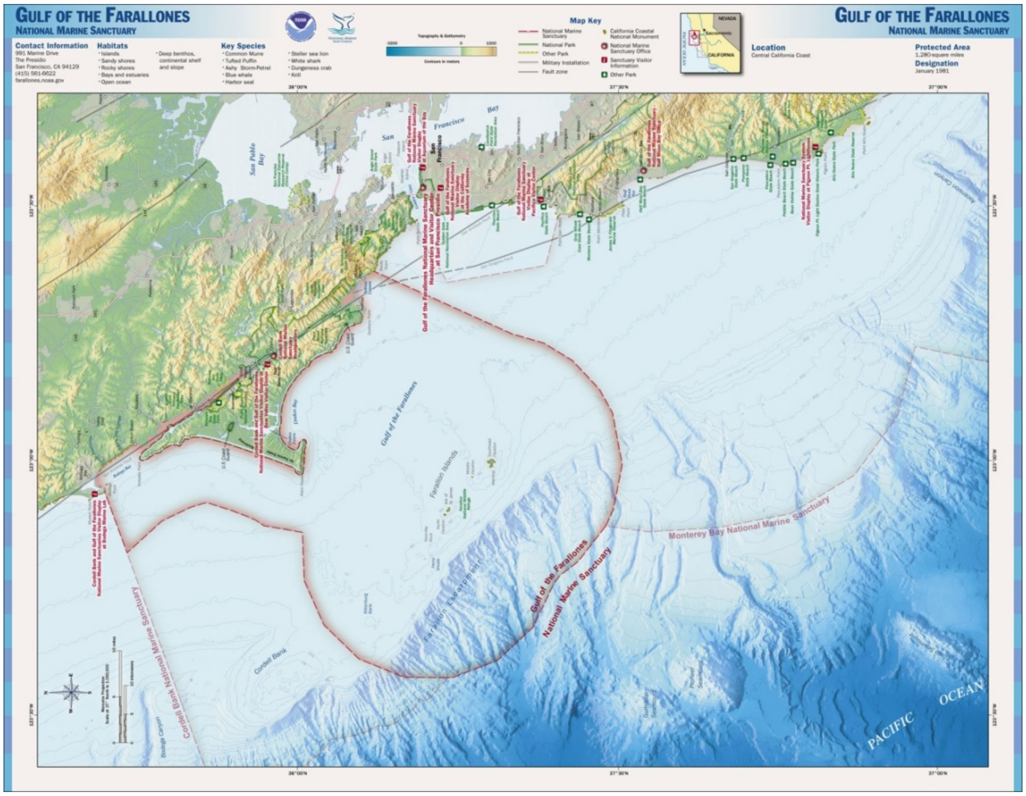


Figure 4: Detailed Chart of the Southern end of proposed fishing area

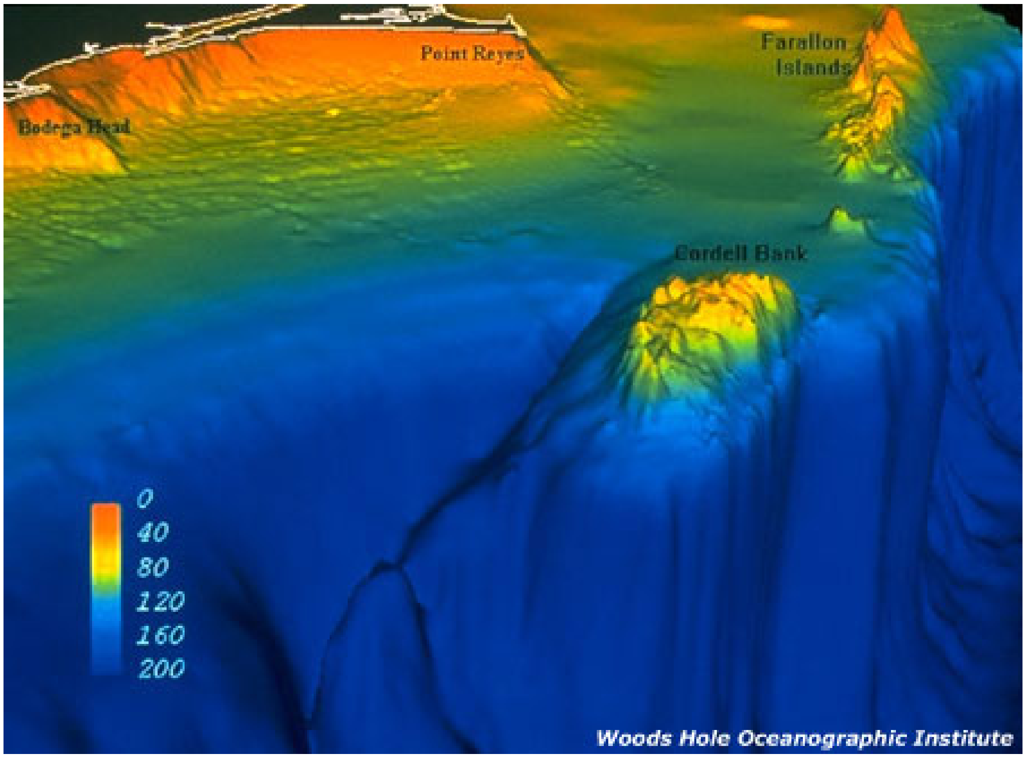


Figure 5: Depth of proposed fishing area

Description of the Gear to be Used

Specifications

- A vessel will fish up to two lines.
- Each line will consist of all of the following:
    1. a tuna cord mainline
    2. a float at least 3.5 inches in diameter, above the top hook to keep the gear from contacting the bottom, as suggested by the GMT in 2009; a monofilament ganion with 25 to 50 hooks (shrimp flies) each, spaced 1-3 feet apart
    3. a weight of no more than 15 lbs
    4. a breakaway (lower test line) that is a minimum of 30 feet (5 fathoms) located between the lowest hook and the weight
    5. When two lines are used they may be deployed with different lengths of breakaway line.
- Still to be determined: weight and strength of the breakaway line.

Storage and Deployment

- The mainline can be coiled in a basket, wound on the reel of a fishing pole, or spooled on the boat's gurdies.
- The hooks can be placed on a "pinning rail" (usually a long piece of rubber with slots for the hooks) followed by the breakaway and the weight.
- After the weight is thrown overboard followed by the breakaway, the hooks will peel off the pinning rail.
- The float will be attached above the hooks as the gear is deployed.
- Once the fisherman feels the weight hit bottom, he immediately pulls the line up so that it does not drag on the bottom and to avoid tangling in the rocks.

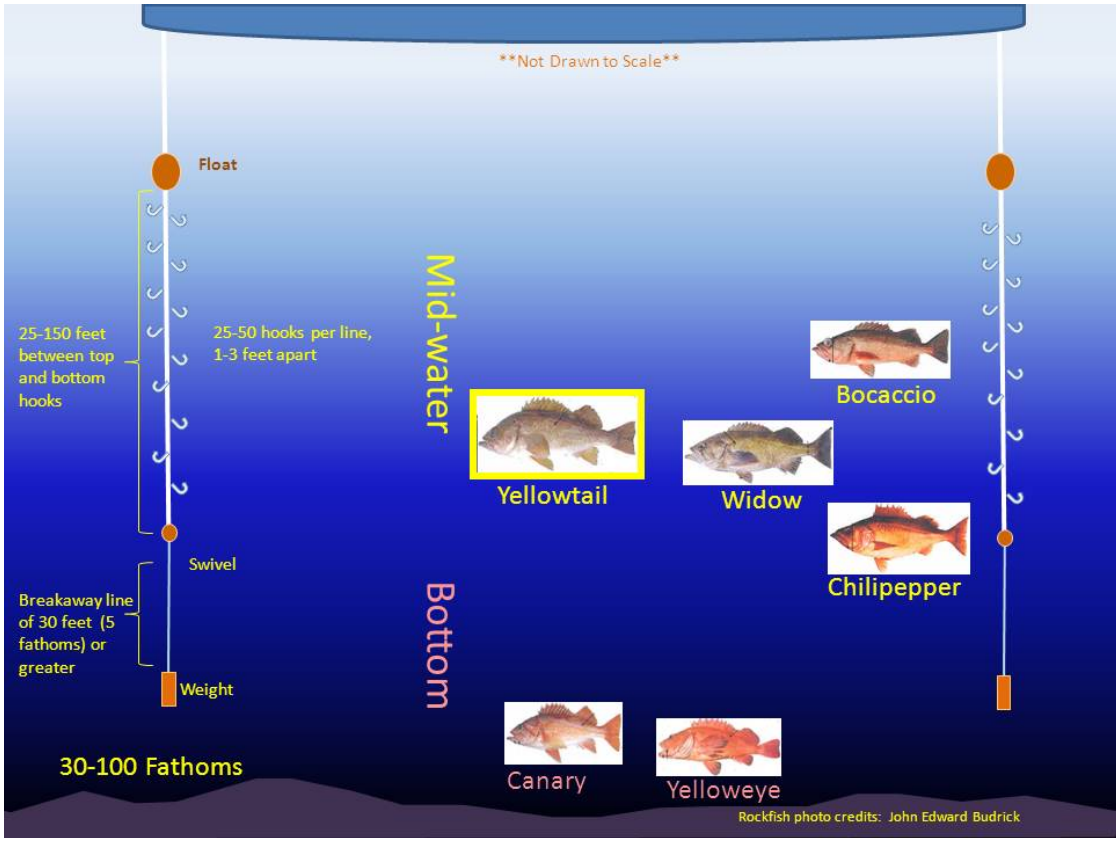


Figure 6. Conceptual drawing of the proposed gear

Effort

- *Trip length*:
  - Vessels out of Ft. Bragg and south – 4 to 5 days (2 day travel time, 2-3 fishing days);
  - Vessels out of Crescent City – 1 day
- *Drops per day*: TBD (depends on conditions), possibly 5 hours total drop time
- *Length of drop*: possibly 5 min to 30 minutes

Number of vessels covered under the EFP

A total of 4 vessels would participate in the study the first year (potential vessels: 2 out of San Francisco, 1 out of Ft. Bragg, 1 out of Crescent City). While the area is very large for 4 vessels to cover, we want the first year simply to explore whether the gear will be able to catch Yellowtail and successfully avoid overfished bottom-dwelling species. If successful and with PFMC approval, in the second year, the experiment could expand with more vessels to cover more area and locate additional suitable habitat (applicants are open to GMT/GAP feedback to determine an appropriate level of expansion if a specific proposal is necessary at this time or leaving it at 4 for both years). Applying for a second two-year EFP for the 2015-2016 cycle might be appropriate to discover more suitable habitat in a larger West Coast area and add more vessels.

Species to be Harvested (target and incidental)

Table 1 provides an overview of the species that will be caught under the EFP, their status, and estimated catch amounts.

Table 1. Overview of Target and Incidental Species Caught under the EFP

Species	Target or Incidental?	Overfished? Y/N	Depth Range	Requested Amount of EFP Harvest (mt)
Chilipepper *Sebastes goodei*	Target	No	0-1080 ft (0-180 fms)	200
Widow Rockfish *Sebastes entomales*	Incidental	No	0-1050 ft (0-175 fms)	9
Bocaccio *Sebastes paucispinis*	Incidental	Yes	0-1050 ft (0-175 fms)	3
Canary Rockfish *Sebastes pinniger*	Incidental	Yes	0-900 ft (0-150 fms)	3
Yelloweye Rockfish *Sebastes ruberrimus*	Incidental	Yes	150-1200 ft (25-200 fms)	0.023
Cowcod *Sebastes levis*	Incidental	Yes	132-1620ft (22-270fms)	0.015
Dorkblotched Rockfish *Sebastes crameri*	Incidental	Yes	240-1200ft (40-200fms)	0.1
Pacific Ocean Perch *Sebastes alutus*	Incidental	Yes	180-2100ft (30-350fms)	0
Petrale Sole	Incidental	Yes		0
Lingcod S of 42°	Incidental	No		0.5
Sablefish N of 36°	Incidental	No		3
Splitnose	Incidental	No		1.5
Minor Slope S of 40.10°	Incidental	No		1
Minor Shelf S of 40.10°	Incidental	No		1
Black Roskfish S of 46.16°	Incidental	No		1
Pacific Whiting	Incidental	No		1
Other Fish	Incidental	No		1

a. Species Descriptions

Descriptions of the **species life histories** can be found in Appendix B2 of the Pacific Coast Groundfish Fishery Management Plan. http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/FMP-Appendix-B2.pdf

Updated information on **species abundance** can be found in Chapter 3 of the Proposed Harvest Specifications and Management Measures for the 2011-2012 Pacific Coast Groundfish Fishery and Amendment 16-5 to the Pacific Coast Groundfish Fishery Management Plan to Update Existing Rebuilding Plans and Adopt a Rebuilding Plan for Petrale Sole; Final Environmental Impact

Statement. http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/1112GF_SpexFEIS_100806-FINAL_feb21_.pdf

b. Estimated Harvest Amounts

Requested allocation is found in Table 1. To assist in determining potential harvest amounts, provided for consideration is an estimated range of CPUE and potential catch composition. Appendix A includes CPUE estimates, which was derived in order to consider the landings likely needed to cover costs of fishing under this EFP.

No prior data exists from which to pull an exact catch composition estimate from this gear. However, some data may be informative and could possibly be considered as the best available proxies. A possible proxy may potentially be derived from the mix of species caught during the first two years of the Oregon Recreational Yellowtail Rockfish EFP. If considered appropriate and desirable to use, an attempt to analyze this data can be found in Appendix C. Under that EFP, the reported catch of 4.3 mt (as of Aug. 1, 2011) was composed of roughly 62% Yellowtail, 23% Widow, 12% Canary and 3% other rockfish and 4kg of Yelloweye (2 fish) (see Appendix B). Also, analysis of PacFIN data to look at block data from groundfish landings from relevant ports could be another potential source. However, limitations with this data include: the landings would encompass trawl and hook & line gear together, past landings data could reflect abundance issues (i.e., lower abundance because of overfished stocks), and concerns with the accuracy of block reporting. Landing data from 1992-1998 for all California Ports North of 37° were summed by DFG Block. The data show that most blocks within the proposed area have some yellowtail catch during the years prior to the RCA (See Appendix F).

Catch Accounting and Compliance

This EFP will incorporate a standardized data collection and reporting format. Under the terms of this EFP there will be 100% observer coverage. Fisheries Observers will collect data on fishing gear, location, catch, and disposition of catch.

Precautionary Measures

Given the potential to catch overfished species and by fishing in the RCA, the utmost caution will be taken with this experiment. The following measures are proposed and applicants are open to working with the PFMC, NMFS, and CDFG to implement others deemed necessary.

1. **Observers –** 100% observer coverage (a standard measure for EFPs, but worth noting here).
2. **Caps –** Based on input from the PFMC and NMFS, each boat will have either a ***daily*** or ***trip*** limit/cap of canary and yelloweye. If this cap is reached, based on catch accounting reports verified by the observer, fishing will cease for that day or trip.
3. **Trip reports and catch accounting –** On a timeline agreeable to NMFS and CDFG, trip and cumulative catch reports will be provided after each trip (e.g., within 48 hours).
4. **Status and evaluation call before each trip –** Before each vessel departs on a trip, a cumulative catch accounting report (i.e., running total for the season) and evaluation of the trips taken thus far will be reviewed to determine if another trip can be made and to discuss lessons learned (e.g., float sizes, bait, etc.). If it is likely that the allocated harvest cap would be exceeded in the upcoming trip, then all fishing under the EFP will cease for the season. Participants on each call would include the EFP participants and could include NMFS (SF & OLE), CDFG (Marine Region & Enforcement) and National Marine Sanctuaries Service.

5. **VMS and Vessel Marking –** Before each trip a vessel will call the West Coast Groundfish Declaration Line to report the trip. (This procedure should work for both the EFP and for future use of this gear type). Vessels participating in this EFP will also display a banner with "EFP Fishing" written in 2 foot high letters.

Data Collection and Analysis Methodology

Data Collection

The following data will be collected by observer for all fishing under this EFP:

Gear Configuration

- Number of hooks and type
- Weight size
- Float size
- Breakaway line length
- Distance between hooks

Set and Haul Data:

- Position (GPS coordinates)
- Time
- Bottom Depth

Catch

- Species
- Disposition (landings and discards)
- Total weight
- Count
- Length
- Biological Sampling (if applicable)
- Species
- position on line (e.g., hook #)

Attachment of depth recorders may be used, as available.

If desired, incidental catch of certain species (e.g., canary and yelloweye) that cannot be released alive could be retained by the observer and provided to NMFS, CDFG, or other researchers for biological sampling.

Data Analysis

Catch per unit effort will be calculated based on hooks per hour fished. This will allow comparison between short and long drops and different gear configurations. The data will be reported on a trip by trip level. The catch data will be analyzed for CPUE of all species and each species individually.

We have received a grant to engage an undergraduate student to provide data analysis and to ensure statistically valid data. We have begun to make arrangements with Cal Poly for that student and his/her supervisor,

Participation

Choosing Participants

Vessels participating in this EFP will be chosen on their ability to accommodate an observer, which means having bunk space for overnight trips; a life raft for enough people and a coast guard decal and their willingness to maintain detailed catch data. Vessels will also be required to have VMS as required by the open access and limited entry groundfish regulations.

Planned EFP Fishing by Participants

Fishing will take place in appropriate habitats within the latitudes and fathom curves mentioned earlier. Finding these habitats is important to the success of the EFP. Weather conditions are critical for this type of fishing, which involves drifting (not too much wind or current), so times will be left to the discretion of the captains. It is likely that October will be the best time of year, but fishing would not be limited to October. The gear is as described earlier except that a vessel may choose to use less gear than authorized to check species composition prior to setting all gear.

Signatures

Barbara Emley

Daniel Platt

Appendix A- CPUE Estimates

Catch per unit effort is calculated below using 1 hook per hour as a unit of effort. The assumed effort per day is 5 hours of actual fishing time (gear in the water). Therefore, total catch is calculated for various numbers of hooks and CPUE of either 1 fish (2kg) or 2 fish (4kg) per hook per hour five hours a day. These numbers are expanded for 30 and 45 fishing days (3 vessels) and 40 and 60 fishing days(4 vessels). The green highlighted fields represent the estimated catch required to meet expenses of $800/day.

Estimated effort for 3-6 vessels

One day of effort is approximately 5 hours of wet gear time

# of vessels	Days per vessel		Total Days	
	4 trips / vessel	6 trips / vessel	10 days/ vessel	15 days/ vessel
3	10	15	30	45
4	10	15	40	60
5	10	15	50	75
6	10	15	60	90

Assessment of estimated harvest for Year 1 of the EFP

Preferred Gear Configuration | $800 a day needed to cover expenses (Including Observer Coverage, Fuel, Bait, and Gear) | fish = all fish caught, not species specific | Amount that would cover expenses

Comparision of gear configuration by day and CPUE

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	spacing between top hook and bottom hook (1-3 ft btwn hooks)	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	9-27ft	100	200	100	200
20	40	19-57ft	200	400	200	400
25	50	24-72ft	250	500	250	500
30	60	29-87ft	300	600	300	600
40	80	39-117ft	400	800	400	800
45	90	44-132ft	450	900	450	900
50	100	49-147ft	500	1000	500	1000
100	200	99-297ft	1000	2000	1000	2000

Conclusion: At least 50 hooks would be needed to meet expenses if CPUE was between 1 and 2 fish per hook per hour with 5 hours of wet gear time.

Comparision of number of hooks for 30 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	30	3000	6000	3000	6000
20	40	30	6000	12000	6000	12000
25	50	30	7500	15000	7500	15000
30	60	30	9000	18000	9000	18000
40	80	30	12000	24000	12000	24000
45	90	30	13500	27000	13500	27000
50	100	30	15000	30000	15000	30000
100	200	30	30000	60000	30000	60000

Conclusion: With 30 days of fishing, between 12 and 24 MT of fish would be harvested

Comparision of number of hooks for 45 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	45	4500	9000	4500	9000
20	40	45	9000	18000	9000	18000
25	50	45	11250	22500	11250	22500
30	60	45	13500	27000	13500	27000
40	80	45	18000	36000	18000	36000
45	90	45	20250	40500	20250	40500
50	100	45	22500	45000	22500	45000
100	200	45	45000	90000	45000	90000

Conclusion: With 45 days of fishing, between 18 and 36 MT of fish would be harvested

Comparision of number of hooks for 40 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	40	4000	8000	4000	8000
20	40	40	8000	16000	8000	16000
25	50	40	10000	20000	10000	20000
30	60	40	12000	24000	12000	24000
40	80	40	16000	32000	16000	32000
45	90	40	18000	36000	18000	36000
50	100	40	20000	40000	20000	40000
100	200	40	40000	80000	40000	80000

Conclusion: With 40 days of fishing, between 16 and 32 MT of fish would be harvested

Comparision of number of hooks for 60 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	60	6000	12000	6000	12000
20	40	60	12000	24000	12000	24000
25	50	60	15000	30000	15000	30000
30	60	60	18000	36000	18000	36000
40	80	60	24000	48000	24000	48000
45	90	60	27000	54000	27000	54000
50	100	60	30000	60000	30000	60000
100	200	60	60000	120000	60000	120000

Conclusion: With 60 days of fishing, between 24 and 48 MT of fish would be harvested

Appendix B- Oregon EFP Catch

In 2009, the Oregon Recreational Yellowtail Rockfish EFP, approved by the Council, was permitted by NMFS to the Southern Oregon Sport Fishermen and Recreational Fishing Alliance (Oregon Chapter) for fishing in 2010 and 2011. Although not identical, this OR EFP is based on the same concept (i.e., placing hooks near the target species in mid-water and away from non-targets on the bottom), and, therefore, offers interesting insights of relevance to this EFP application, particularly the catch composition and success at avoiding non-target species. Under this EFP, 29 trips were made with an average of 11 anglers and 33 hooks per vessel (3 per line) were deployed on average.

Oregon Recreational Yellowtail Rockfish EFP Catch

Year 1	kg	% of total	anglers	catch per angler day
Total	**2083**	**100**	**137**	**15.20437956**
Yellowtail	1657	79.54873	137	12.09489051
Widow	266	12.77004	137	1.941605839
Canary	129	6.192991	137	0.941605839
Yelloweye	0	0	137	0
Other (approx kg)	31	1.488238	137	0.226277372
Year 2	**kg**	**% of total**	**anglers**	**catch per angler day**
Total	**2283**	**100**	**169**	**13.50887574**
Yellowtail	1062	46.51774	169	6.284023669
Widow	722	31.62505	169	4.272189349
Canary	380	16.64477	169	2.24852071
Yelloweye	4	0.175208	169	0.023668639
Other (approx kg)	115	5.037232	169	0.680473373
Both	**kg**	**% of total**	**anglers**	**catch per angler day**
Total	**4366**	**100**	**306**	**14.26797386**
Yellowtail	2719	62.27668	306	8.885620915
Widow	988	22.62941	306	3.22875817
Canary	509	11.65827	306	1.663398693
Yelloweye	4	0.091617	306	0.013071895
Other (approx kg)	146	3.344022	306	0.477124183

Appendix C- Potential Harvest Estimates

The estimates below are based on the catch composition from the Oregon Recreational Yellowtail Rockfish EFP (see Appendix B) and the estimated CPUE (see Appendix A).

Estimated Harvest		30 Days		45 Days		40 Days		60 Days	
Hooks	Species	CPUE = 1	CPUE = 2	CPUE = 1	CPUE = 2	CPUE = 1	CPUE = 2	CPUE = 1	CPUE = 2
50	Yellowtail	4670	9341	7006	14012	6227	12455	9340	18682
	Widow	1697	3394	2546	5092	2263	4525	3394	6788
	Canary	874	1748	1312	2623	1165	2331	1748	3496
	Yelloweye	7	13	10	21	9	17	14	26
	Other Rockfish	250	501	376	752	333	668	500	1002
80	Yellowtail	7473	14946	11209	22419	9964	19928	14946	29892
	Widow	2715	5431	4073	8146	3620	7241	5430	10862
	Canary	1398	2797	2098	4197	1864	3729	2796	5594
	Yelloweye	11	22	16	33	15	29	22	44
	Other Rockfish	401	802	601	1203	535	1069	802	1604
100	Yellowtail	9341	18683	14012	28024	12455	24911	18682	37366
	Widow	3394	6788	5092	10183	4525	9051	6788	13576
	Canary	1748	3497	2623	5246	2331	4663	3496	6994
	Yelloweye	13	27	21	41	17	36	26	54
	Other Rockfish	501	1003	752	1504	668	1337	1002	2006

One day of effort is approximately 5 hours of wet gear time

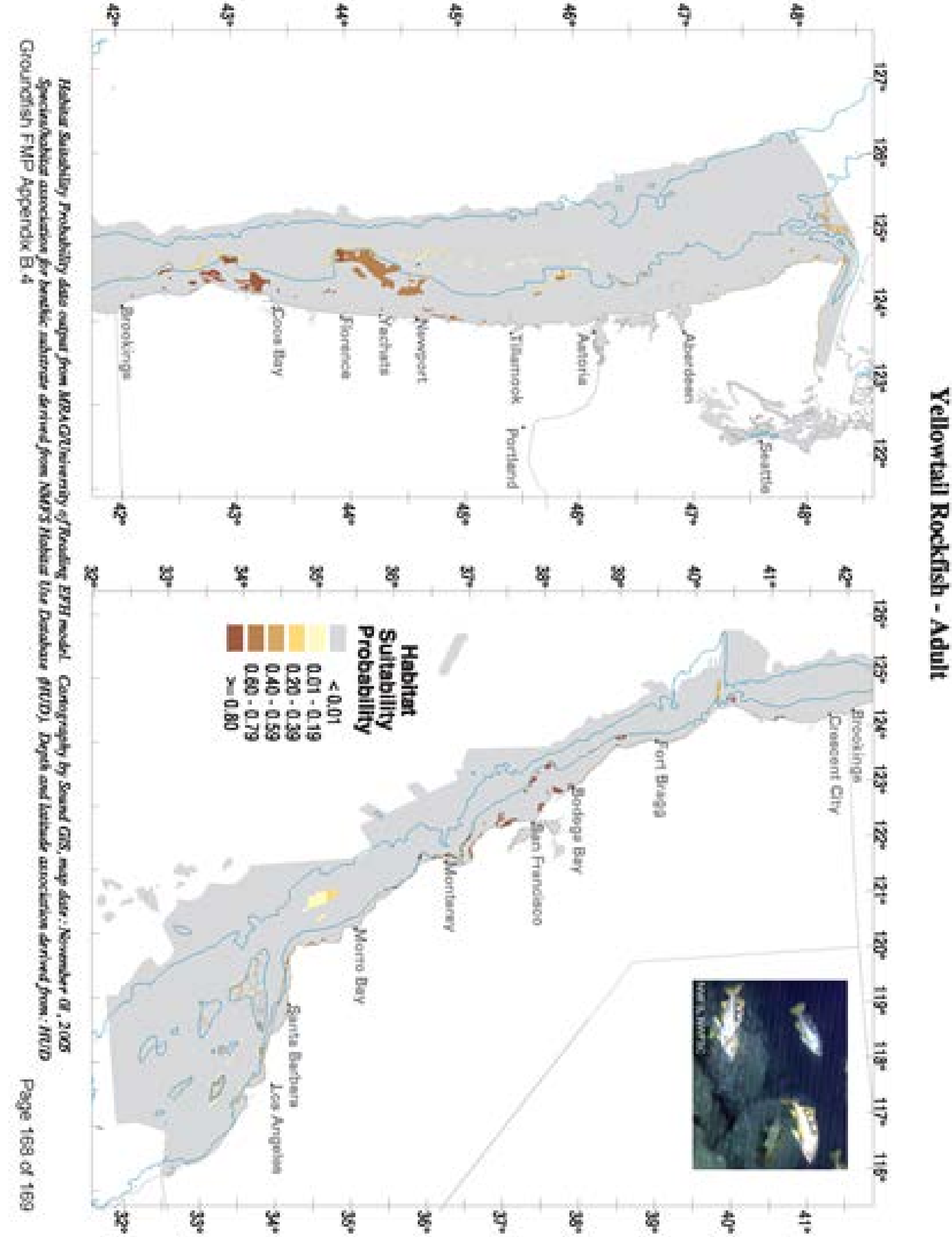
All weights are in kg

CPUE = 1 (1 fish (2kg) per hook per hour five hours a day)

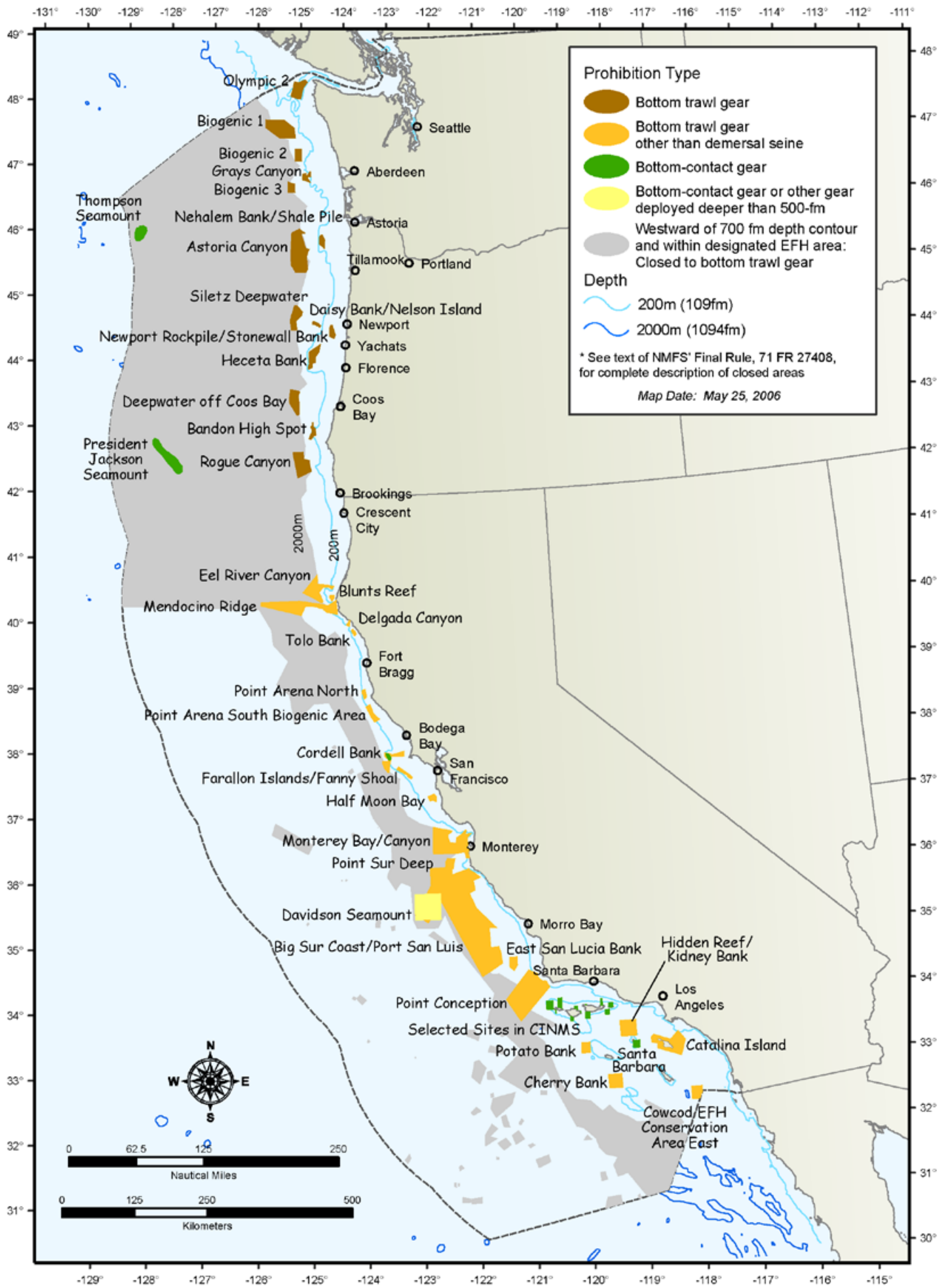
CPUE =2 (2 fish (4kg) per hook per hour five hours a day)

Appendix D- Adult Yellowtail Rockfish Habitat Suitability

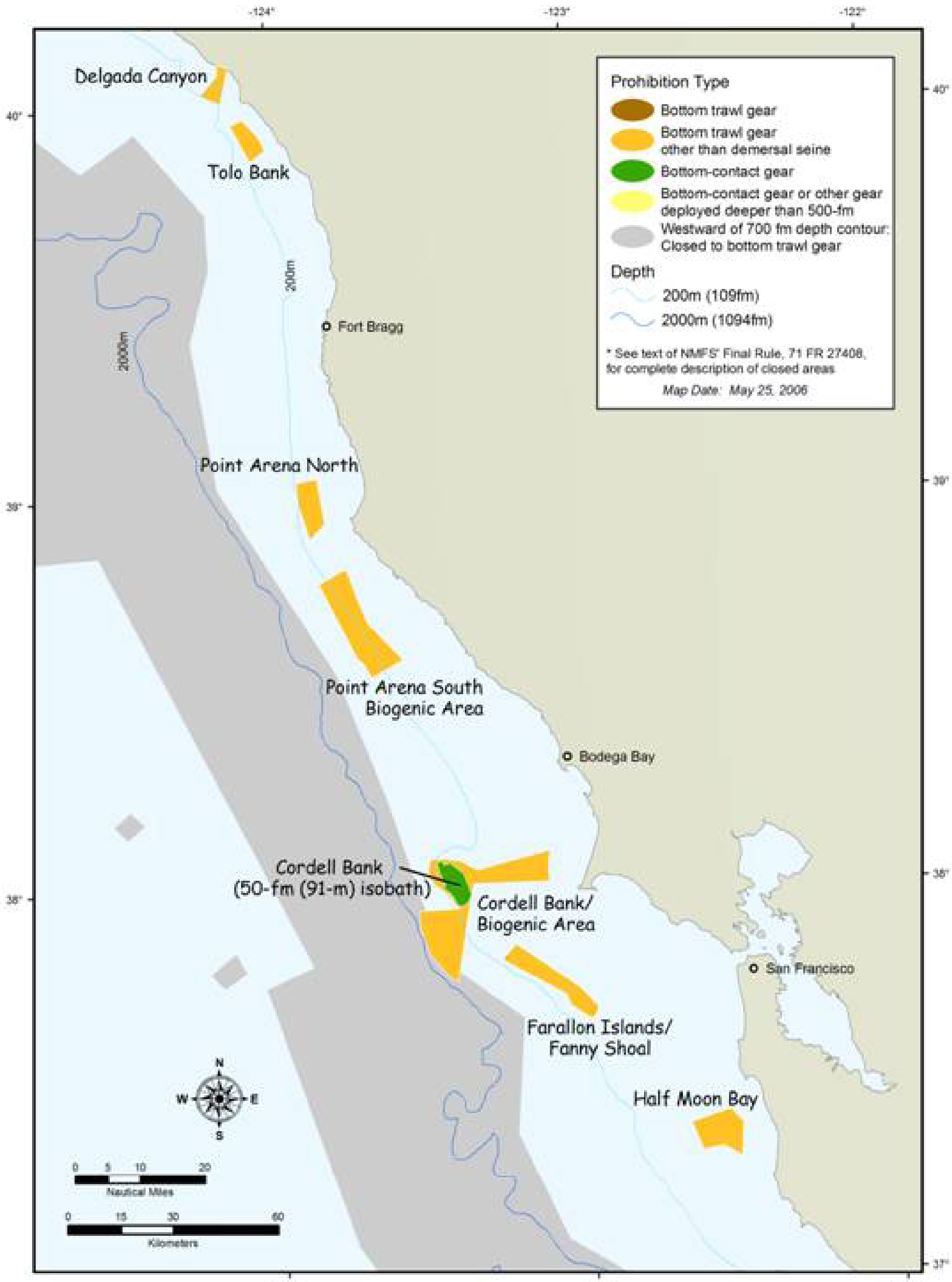
There is a high probability of suitable habitat for adult yellowtail rockfish within the proposed fishing area.



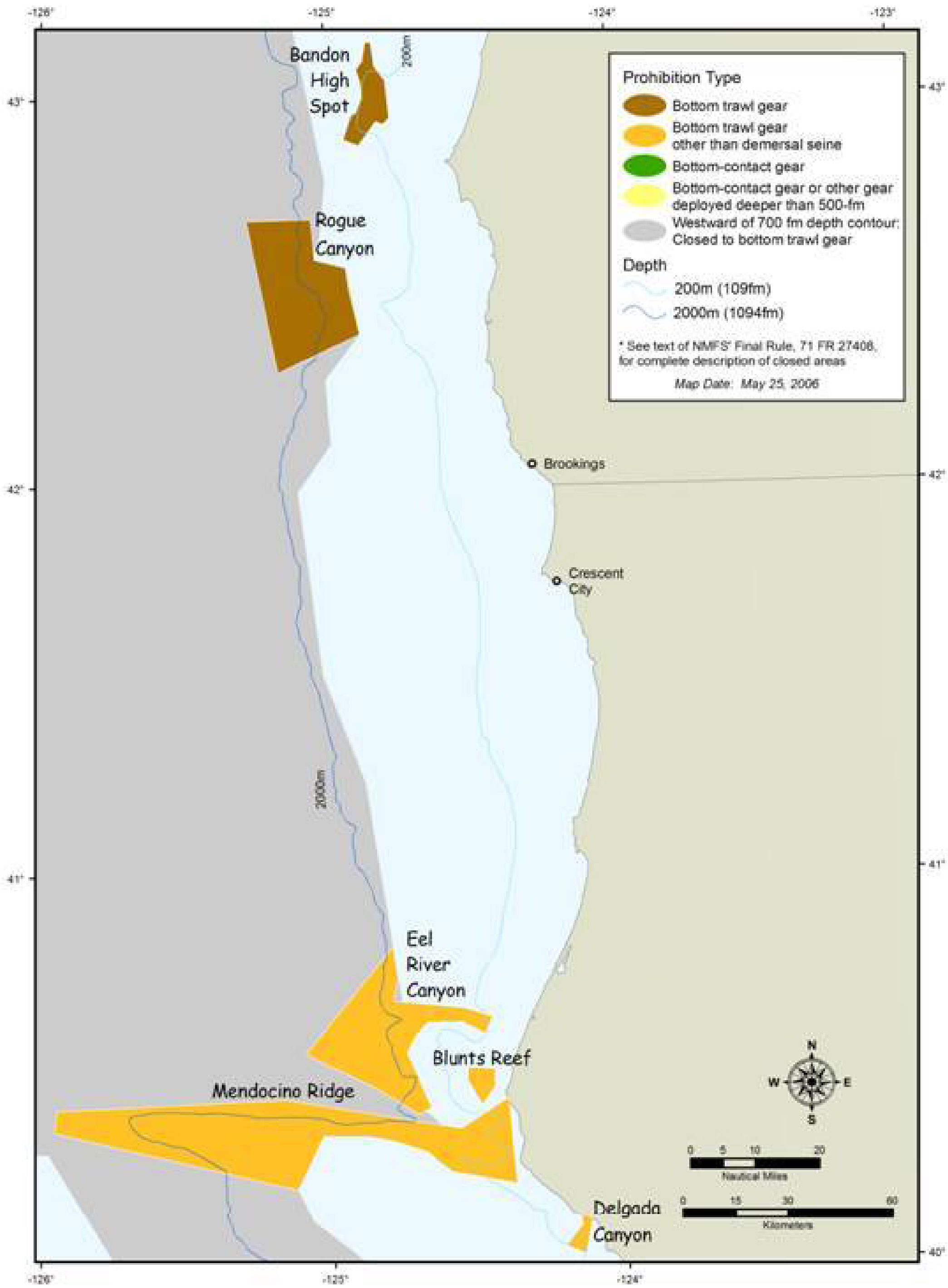
Appendix E- Essential Fish Habitat and Rockfish Conservation Areas



EFH area closures to protect Pacific Coast groundfish habitat - Coastwide.



EFH area closures to protect Pacific Coast groundfish habitat – Northern California.



EFH area closures to protect Pacific Coast groundfish habitat – Oregon and Northern California.

Appendix F- Yellowtail Rockfish Landings by DFG block for 1992-1998 all California Ports North of 37°

Pounds of Yellowtail Rockfish Landed By DFG Block from 1992-1998 for Ports within the propsed fishing area and with more than 1000 lbs per block.				
Block Code	Total Pounds		Block Code	Total Pounds
102	3032		441	118333.6
108	3093.8		442	69438
109	2935		445	1066
114	2063		446	1008
205	1757		447	8990
208	2988		448	2522
211	5313.7		449	5467
213	1399		450	4141
217	1306		451	21376.8
218	131434.7		452	10018.4
222	11897		455	13947.9
223	12739		456	5615.7
224	2517		457	6927.55
228	84802		458	63786.23
229	14048		459	16027.3
233	5210		464	2347.4
234	3614		465	1477
243	7352		466	5025.7
249	2674.25		468	1180
253	2885		471	157773
257	13998		472	3184.9
262	1493.95		473	2350.74
263	2723		475	6618.6
268	1674.35		476	1251
274	11594		477	7118
402	1080		485	11097
403	2335		486	12307
415	1837.25		488	4564
422	8965.9		514	7705
425	5133		532	1247.35
431	6787.9		546	10037
432	2388.05		1035	1399
435	2396		1037	2253.75
436	1132		1038	845366.95
438	2211		1040	305230.45
439	2862		1041	435281.23
440	4017		1042	679553

Submitted 10/11/11; Revised 5/30/2012

Dan Wolford, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Chair Wolford and Council Members,

We appreciate the opportunity to submit a revised version of the attached application for an Exempted Fishing Permit (EFP) for the 2013 and 2014 groundfish seasons. The revisions since our preliminary submittal in October 2011 reflect the input we received from the Science and Statistical Committee (SSC) in February, as well as refinement of the study objectives and design for this project. We changed the study design to focus our sampling effort only inside the Rockfish Conservation Area (RCA) to increase our sample sizes and statistical power and to avoid the confounding effect of depth in any comparisons among sites inside versus outside the RCA, thereby addressing some important concerns that the SSC expressed.

Over the last ten years the RCAs have been an important tool in minimizing the catch of depleted species. However the RCAs are coarse tools and may close some areas unnecessarily, especially given the emergence of several important factors aimed at protecting these species, including hard bycatch caps, observer coverage, and strong fishermen incentives to avoid depleted species. In addition, there has been little research on the finer scale demographic and distributional patterns of rebuilding species that could allow fishermen to better target healthy populations while avoiding depleted ones. For instance, there are populations of some species, such as chilipepper, yellowtail rockfish, and lingcod that are difficult to access due to their proximity to the RCA and the risk of encountering rebuilding species. Currently, we do not know enough about the distribution of overfished stocks to inform bycatch avoidance plans and promote fishing opportunities for underutilized stocks.

We are therefore working with the EFP partners and others on a collaborative research plan that includes three main elements:

- developing predictive maps of the distribution, abundance, and size of six overfished groundfish stocks (yelloweye rockfish, canary rockfish, darkblotched rockfish, cowcod, Pacific Ocean perch, and bocaccio) and nine targeted species along the entire West Coast using existing fisheries independent and dependent data;
- ground-truthing the predictive maps by performing scientific sampling of encounter rates with overfished species (OFS) using directed fishing methods in a subset of predicted "hotspot" (ie. higher predicted abundance), "warm spot" (ie. moderate predicted abundance) and "cold spot" (ie. lower predicted abundance) locations inside the trawl RCA on the Central Coast of California; and,
- characterizing the abundance, length, and habitat associations of OFS in those same locations using visual survey techniques (drop stereo video camera and remotely operated vehicle).

All quota needs, research, and observer costs will be covered by the EFP partners.

We are requesting permission to conduct hook and line and trap fishing within the RCA off the Central Coast of California. In conjunction with drop video camera and ROV surveys, we will use these directed fishing surveys to test the conclusions of the spatial analysis with respect to targeted and rebuilding species abundance, length, and habitat associations in hotspots, warm spots, and cold spots. We will also collect important biological information such as maturity, fecundity, and age on fish caught in the directed fishing surveys. As funding permits, we will also explore the use of descending devices to test survivorship from barotrauma at depths within the RCA.

After its initial review of the application in November, the Council requested that the Science and Statistical Committee (SSC) review the application and provide feedback on the study design. Our team greatly appreciated the time and input that the SSC subsequently provided at the March meeting. The SSC asked for clarification on several important issues. Below are the SSC comments which we have addressed in the revised application.

> 1. *Clarify the expected sample sizes and estimates of statistical power to differentiate between the spatial distribution model and sampling results to test the hypothesis that the spatial distribution model is consistent with the sampling results.*
>
> 2. *Provide estimates of the spatial distribution from currently available data, as far as possible.*
>
> 3. *Describe the methodology that will be used for comparing trawl catch data to expected catch with hook and line and trap gear.*
>
> 4. *Provide additional Information on the design of the proposed optical surveys.*
>
> 5. *Provide an analysis of the number of samples of various species that can be collected within the constraints of overfished species take.*
>
> 6. *Provide the number of overfished species observed during bottom trawl surveys in the area being mapped.*
>
> 7. *Identify the procedures for recording exact GPS coordinates of catch*

We believe that the information gained through this research will have coast-wide and fleet- wide value by improving our understanding of the distribution of these species, helping guide fishing plans and bycatch avoidance efforts, exploring changes in age structure and productivity inside the RCA, and informing any reconfiguration of the RCA that may occur in the future. Therefore, we believe this project meets the priority criteria for EFP proposals. This EFP is an opportunity to bring together a range of partners and data sources to develop information that fishermen and managers can use to better avoid depleted species and increase fishing opportunities on healthy stocks. We respectfully request the Council's consideration of this application.

Sincerely,

Roger Cullen

Roger Cullen, President
Central Coast Sustainable Groundfish Association

Application for an Exempted Fishing Permit (EFP)

Title: Supporting a spatial analysis of the distribution and size of rebuilding stocks in the Rockfish Conservation Area through directed fishing surveys

a) Date of Application: October 13, 2011; revised version May 30, 2012

b) Applicant: Central Coast Sustainable Groundfish Association (Roger Cullen [President], Chris Kubiak)

Project Partners:

The Nature Conservancy (Dr. Mary Gleason, Michael Bell, Steve Rienecke)

Environmental Defense Fund (Shems Jud, Dr. Rod Fujita, Huff McGonigal)

Local industry research partners (Tim Maricich, commercial fisherman)

Academic Science advisors and partners:

Dr. Rick Starr (Moss Landing Marine Laboratory / California Sea Grant)

Dr. Jono Wilson (University of California, Santa Barbara)

Dr. John Field (NMFS/SWFSC)

Deb Wilson-Vandenberg (California Dept. of Fish and Game)

Dr. James Lindholm (California State University Monterey Bay)

Dr. Dean Wendt (California Polytechnic University, San Luis Obispo)

SUMMARY

Fishing opportunities, and the economic and social benefits associated with them, may be unnecessarily constrained in the groundfish fishery due to a lack of understanding of the spatial distribution of overfished species (OFS) that are currently the focus of rebuilding plans. Landings of many targeted species (eg. lingcod, yellowtail rockfish, and chilipepper) are significantly lower than quota allocations due to efforts to avoid encountering rebuilding species during exploratory fishing or fishing near the Rockfish Conservation Areas (RCAs).

This EFP is a key part of a broader research project that will result in a synthesis of existing data (best available information regarding the spatial distribution of overfished stocks) that will help inform bycatch avoidance plans and maximize fishing opportunities of healthy stocks. Furthermore, this work will provide new data on abundance and productivity of stocks within the RCAs that may help support bycatch avoidance plans, stock assessments, and spatial management decisions. Using a combination of

spatial modeling, fishermen's knowledge, and scientific surveys, the opportunity exists to increase the potential for fishermen to meet target quotas, while reducing interactions with rebuilding species.

Specifically, we request permission to conduct collaborative directed fishing surveys of areas with predicted high, medium, and low fish density ("hotspots", "warm spots", and "cold spots") in the trawl RCA (100-150 fathoms) to develop the scientific support for important fishing and management decisions. The goals of the project are to:

1. **Compile existing data about the distribution of OFS collected from NMFS trawl surveys, underwater visual surveys, and historical catches;**
2. **Use the combination of existing fisheries independent and dependent data and local knowledge to develop predictive maps of the distribution, abundance, and size of overfished groundfish stocks along the entire West Coast;**
3. **Ground-truth the predictive maps by performing scientific sampling (visual surveys and directed fishing) to assess encounter rates with OFS in a subset of locations inside the trawl RCA in Central California with predicted high, medium, and low density ("hotspots", "warm spots", and "cold spots" respectively) of OFS; and**
4. **Characterize the abundance, length, and habitat associations of OFS in those same locations, as well as collect biological samples of OFS for growth and maturity studies.**

c) Statement of Purpose and Goals:

The RCAs were implemented in 2002 as depth-based closures aimed at minimizing the potential to catch overfished species (eg. yelloweye rockfish, canary rockfish, widow rockfish, dark-blotched rockfish, cowcod, bocaccio, and Pacific Ocean Perch) that constrain the groundfish fishery, and they have largely been effective at achieving that purpose. However, a larger goal of the RCAs was to help these depleted stocks rebuild so that the fishery can become less constrained.

The recent transition of the trawl sector of the groundfish fishery to an Individual Fishing Quota (IFQ) management system, and the associated hard caps for these rebuilding species, has created strong new incentives for fishermen to avoid these species on their own. Given these incentives and the fact that Annual Catch Limits (ACLs) for these rebuilding species are not to be exceeded, there has been a growing interest in developing better spatial maps of the distribution of these rebuilding species to inform fishing activities (ie. bycatch avoidance plans, risk pools, etc.) and management efforts (including potentially a reexamination of the role and configuration of the trawl RCA). In addition, there are other species, such as lingcod, yellowtail rockfish, and chilipepper rockfish that could be more fully utilized if fishermen could fish "cleaner" near the trawl RCA with reduced risk of bycatch of rebuilding species.

To better understand the distribution and abundance of overfished species and many of the underutilized targeted species, our team (which includes commercial fishermen, federal scientists, academic institutions, and NGOs) is conducting a coast-wide spatial analysis of existing data. This analysis incorporates fisheries-dependent and fisheries-independent data and environmental characteristics to generate coast-wide predictive maps of the distribution, size and abundance of overfished and targeted species. Initial maps based on trawl survey data were completed in April of 2012, subject to peer review by some groundfish experts, and currently under revision. From these predictive model outputs, we will identify "cold spots" (i.e. predicted low abundance of OFS stocks), "warm spots" (i.e. predicted moderate abundance of OFS stocks), and "hot spots" (i.e. predicted high abundance of OFS stocks) inside the trawl RCA. In its March review, the SSC requested that we include the sample size for project species in the FRAM data. Coastwide sample sizes in the FRAM data set are as follows:

Table 1. Coast-wide sample size of project species in the FRAM trawl survey dataset used to develop initial predictive maps of species distributions; these initial maps will be augmented by other fishery independent and dependent data and local knowledge.

Species	**Sample size**
Bocaccio	285
Canary rockfish	347
Cowcod	127
Darkblotched rockfish	921
Pacific ocean perch	346
Widow rockfish	186
Yelloweye rockfish	107
Petrale sole	2097
Sablefish	3359
Longspine thornyhead	1875
Shortspine thornyhead	2628
Blackgill rockfish	267
Chilipepper rockfish	679
Dover sole	4266
Lingcod	1587

The SSC cautioned on the limitations of the FRAM data set given its sampling bias and the limited sample size for rare species. We appreciate this concern and will be complementing the FRAM data with earlier trawl survey data, fisheries dependent information, observational data from visual surveys, and fishermen knowledge to complete the spatial analysis.

The objectives for generating these maps and conducting the proposed visual surveys and directed fishing effort for this study include: the development of spatial fishing plans to minimize bycatch and help fishermen match landings to quota, ground-truth the predictive maps to assess anticipated encounter rates with OFS from directed hook and line and trap fishing effort , examination of fine scale distribution and demographic rates of depleted species inside the RCA, and to develop a better understanding of species-habitat relationships.

To be effective at achieving the stated objectives, the coast-wide predictive maps must be validated through direct observation in the field using directed fishing surveys and visual surveys (using a drop camera with stereo video and a Remotely Operated Vehicle [ROV]). In this EFP application we request permission to conduct directed fishing surveys using vertical hook & line (targeting subadults and adults) and traps (targeting juveniles) inside the trawl RCA. For a variety of reasons related to existing data and collaborative partnerships, we have identified the Central Coast as the key geography to conduct this ground-truthing.

We will use a collaborative approach with fishermen, external scientists, and our study team to identify the specific study sites. In the first two months of the project, we will conduct meetings with fishery managers, fishermen, scientists, and other informed stakeholders to select study sites that will be based on the spatial analysis and predictive modeling by the NOAA Biogeographic team, existing submersible and ROV survey data, and information from historical catches by Central Coast fishermen. We will identify a total of 9 study sites - to include three coldspots, three warmspots, and three hotspots - located along the depth contour of the trawl RCA (100-150 fathoms) where predicted abundance from the spatial analysis and modeling correlates well with observational information and local knowledge (e.g. an OFS hotspot would be a location where the spatial analysis predicts high abundance and observational data or prior catch also would predict high abundance of OFS). The cold, warm, and hot spots will be relative to the predicted abundances of widow, bocaccio, and chilipepper, as well as yelloweye and cowcod.

We will aim to stratify the study sites geographically by identifying one predicted hotspot, warmspot, and cold spot in each of three main study regions - one region in the north, central, and southern parts of the project area, respectively. This approach will allow us to group sites by geographic region to account for regional variability, as well as improve study logistics by minimizing travel time from port. Some potential regions under consideration, based on preliminary predictive maps and local knowledge, include:

- Offshore of Half Moon Bay
- Near Ano Nuevo, Ascension, and Cabrillo canyons
- South side of Monterey canyon
- North side of Point Sur
- Near Cape San Martin and Cambria
- Offshore of Pt. Buchon
- Offshore of Point Sal and Purisima Point

- Near Arguello canyon

Final selection of the three geographic areas and 9 study sites will also consider other factors such as logistics, availability of existing multi-beam habitat mapping, and habitat type. Meetings (one in Monterey and one in Morro Bay) will be held with local fishermen and scientists in late July and early August to review predictive maps, existing data on OFS distribution, and habitat maps to identify the nine specific study sites.

Directed fishing surveys will be used to ground-truth the spatial analysis and predictive modeling of distribution of overfished and target species. The directed fishing will be done in conjunction with visual surveys using a drop stereo video camera in each of the study locations to collect observation data on abundance, size, and fish/habitat associations. More focused ROV surveys may be conducted in areas where OFS are observed in 2014, depending on available funding. All rebuilding species sampled from hook & line and trap surveys will be retained for length measurements, as well as biological analyses of growth, maturity, and fecundity.

The quota needed to prosecute the EFP will be provided by the applicants and partners, and is described below.

A key feature of this study is the integration of regional-scale scientific data and predictive mapping with more localized survey data to inform our understanding of spatial distribution patterns of rebuilding stocks. The study will be designed to address the following research questions:

1) Can predictive maps of the distribution and abundance of target and overfished species be used to describe the realized CPUE of these species during commercial fishing operations?
2) What is the relative abundance of target and OFS in predicted "cold spots", "warm spots", and "hotspots based on directed fishing effort methods and visual surveys?
3) How does the abundance and size distribution of OFS inside the RCA differ among nine different sites in Central California, based on directed fishing effort and visual survey methods?

Disposition of all species: Target species (listed below) not needed for biological analyses would be sold commercially. Biological samples from rebuilding species would be provided to NMFS/SWFSC for analysis of biological parameters. If funding allows, we may also explore the efficacy of descending devices for both rebuilding species and target species; however, all species caught would be counted against available quota.

d) Justification:

Fishing opportunities, and the economic and social benefits associated with them, may be unnecessarily constrained in the groundfish fishery due to a lack of information regarding the spatial distribution and demographic patterns of targeted and rebuilding species. This EFP will result in a synthesis of existing data (best available information regarding the spatial distribution of targeted and rebuilding stocks) and new data from the field that will help fishermen avoid hot spots of overfished species, target healthy populations, and inform analyses on local changes in demography resulting from protection inside RCAs. This information can be made available for science-based management, including adjustments to rebuilding schedules, precautionary buffers, and ACLs.

This EFP is necessary because, while we can and will synthesize existing fisheries independent data to try to identify hot, warm, and cold spots for rebuilding species, a paucity of fine scale data exists. The fishing surveys would provide valuable fine scale data on species abundance and distribution, along with information from the biological samples necessary to accurately estimate fish sizes and demographic patterns. The spatial analysis that this EFP will be ground-truthing will complement fishermen's knowledge about where they can fish "cleanly" in the RCA to avoid bycatch of rebuilding species, inform spatial fishing plans, and be useful for spatial fisheries management considerations (eg. any future reconfiguration of the RCA) coast-wide.

Gaining an improved understanding of the distribution of rebuilding species, and in particular their demographic patterns within the RCA is critical to informing management of these species. Reviews of recent stock assessments have identified research and data needs for several rebuilding and target species. Our work in this EFP will contribute much needed life history, demographic information, and habitat associations of rebuilding species, as well as quantify survey selectivity for hook & line and trap methods. These needs are universal across species, and in many cases are lacking for rebuilding stocks. Such data can be helpful for informing stock assessments and results will be communicated directly with stock assessment authors.

e) Broader significance:

An important reason why the effects of the RCAs have not been quantified is that the primary tool used to assess groundfish stocks is the West Coast Groundfish Bottom Trawl Survey (http://www.pcouncil.org/groundfish/stock-assessments/by-species). This survey (a combined Shelf/Slope survey time series) was designed specifically to provide fishery-independent data for statistical assessments required by the fisheries management process. The survey targets the commercial groundfish resources inhabiting depths of 55 to 1,280 meters depth and from Cape Flattery, Washington (lat. 48°10'N) to the U.S.-Mexican border (lat. 32°30'N). In each trawl tow, every attempt is made to identify and sort captured fishes to species and weigh the entire contents of successful trawl operations. Approximately 700 trawl tows are sampled annually, offering an extensive fishery-independent dataset. Unfortunately, the trawl tows are prosecuted only on low-relief habitats. Thus, although they are excellent for species such as flatfishes that inhabit soft sediments, they provide very little information about species that inhabit high-relief, untrawlable habitats. This survey strategy thus results in a situation in which we have little knowledge about the effects of the RCA on the rebuilding of OFS.

This project will promote understanding of the distribution, habitat associations and demographic variability of targeted and rebuilding species, as well as provide tangible evidence for areas that can be fished more cleanly to inform fishing opportunities. Efforts such as this may also inform stock assessments and uncertainty buffers. In addition, the results will help inform future spatial management decisions, including any reconfiguration of the RCA that is considered. This project is also part of a larger collaborative research effort among many partners and will aim to demonstrate the benefits of combining different types of data and survey techniques to build the most accurate picture of the distribution of depleted stocks needed to improve fishery performance. This project is also a great example of a collaborative effort among fishermen, academics, managers, and NGOs to work together to advance our collective understanding of the distribution of rebuilding stocks.

f) Duration of EFP: 2013 and 2014 fishing seasons. The directed fishing effort will be initiated late in the year (fall) of 2013 and will extend into the fall of 2014 as needed to complete the sampling, given the available quota.

g) Number of vessels covered: We anticipate engaging between 2 and 4 fixed gear fishing vessels from Central Coast ports.

h) Species to be harvested and harvest estimates:

We envision sequencing the research activities in a manner such that fishing activities with a low risk of encounter with rebuilding species are completed first, with riskier activities conducted subsequently. Specifically, we will do the directed fishing near and inside "cold spots", then the directed fishing near and inside "warm spots", and then finally to "hotspots" so that we can collect as much data as possible before any EFP hard caps or quota limits are reached.

The project partners will provide the quota needed for the research effort. The species we anticipate encountering and the estimated harvest amounts are as follows:

Table 2: Estimated harvest caps

	Species to be Harvested	**Harvest Estimates in quota pounds**
Rebuilding or recently rebuilt species	Cowcod	Up to 200 lbs
	Yelloweye rockfish	Up to 34 lbs
	Canary rockfish	Up to 500 lbs (est. 200 lbs)
	Widow rockfish	Up to 1,500 lbs (est. 300 lbs)
	Dark-blotched rockfish	Up to 500 lbs (est. 200 lbs)
	Bocaccio	Up to 1,000 lbs (est. 400 lbs)
Other Species	Chilipepper rockfish Lingcod Minor shelf rockfish Minor slope rockfish Splitnose rockfish Yellowtail rockfish Other flatfish Pacific whiting Dover sole	Harvest estimates difficult to make at this time; however, harvest amounts will be covered by quota from project partners.

	English sole Petrale sole	

i) Monitoring:

All vessels engaged in the EFP directed fishing will have 100% human observer coverage. Project partners will fund the observer costs during research fishing trips.

j) Data collection and analysis methodology - This EFP application is focused on gaining permission for the collaborative fishing surveys within the RCA that are part of the broader collaborative research effort described above. Under this proposed EFP, we will conduct directed fishing (hook & line and trap) to measure encounter rates and collect biological samples of rebuilding species inside the trawl RCA.

The total number of sites selected will depend on available resources; however a minimum of 9 study sites will be selected to include three cold spots, three warm spots, and three hotspots located along the depth contour of the trawl RCA (100-150 fathoms). The study will take place over the course of three years, with collaborative research cruises conducted in September of each year to coincide with NMFS annual groundfish trawl surveys. The first year (2012) will focus on compiling available bathymetry data and spatial data on OFS observations, and conducting visual surveys using the drop stereo camera system in each of the nine sites to identify areas of high relief structure and schools of fish. This information will be used to design the directed fishing surveys, to be conducted in the second and third years (2013 and 2014) at each site.

We will focus the drop camera surveys in the first year within the depth zone of the trawl RCA. We will use GIS to place a grid over the study sites; the grid will contain 500 m by 500 m cells that align with the predictive modeling grids. Based on the topography of the region, each study site will contain from 8-10 cells. We will randomly select 5 cells to survey at each study site (Figure 1). In 2012, we will survey each of the selected cells with a drop video camera, encased in a "video lander", to search for the two types of habitat we have chosen to survey: high relief rock and canyon walls. GPS coordinates will be recorded for each location containing the targeted habitat types. The video lander will contain a pair of color video cameras mounted on a rotating tray that will enable us to obtain stereo video of fishes and habitats in about a 330 degree arc around the video lander. The lander will contain a weak-link system to enable retrieval of the cameras if it hangs up. LED lights will provide illumination of fishes to enable us to identify and quantify all species within 2 m of the lander. The mounted cameras will transmit signals up an umbilical cord to a recording device (e.g., laptop and hard drive with DVD backup) for both real-time view of demersal habitats and recording of fishes observed. From the initial video drops survey locations, we will determine the appropriate "soak time" for the video camera system by leaving it on the bottom for 20 minutes and analyzing the species-time curves to determine the amount of time at which new species or abundances level off. Similar work in shallow reef environments in Oregon has indicated that a 5 minute soak period is adequate to sample reef fishes (Bob Hannah Oregon Department of Fish and Wildlife, pers. comm.).

In 2013 and 2014, after the canyon wall and high-relief rock habitat types have been identified in the selected cells, we will conduct standardized, timed fishing activities using vertical hook and line gear (hydraulic snapper reel with 15-20 hooks per line, stainless hooks baited with squid). We will randomly pick a sampling cell and we will direct the fishermen to fish within that cell to catch fish. Each deployment of the vertical hook and line gear will constitute a sample unit. The appropriate soak time for the gear will be determined experimentally in the first days of the study; we will aim for less than full saturation of hooks with fish and expect that to be less than 30 minutes. The vertical hook and line gear will be deployed five meters above the seafloor to target widow rockfish, bocaccio and chilipepper rockfish, and to minimize the risk of encountering yelloweye rockfish and cowcod (the most constraining species, for which we have limited quota).

At each site, we will survey predicted coldspots, then warmspots, then hotspots in order to reduce the possibility of quickly reaching the limit of our quota for yelloweye rockfish. If time and funding allow, traps may be utilized to assess abundance of juveniles that are not expected to take hooks. We will collect 10 samples (~ 30 min deployment of hook and line gear) per habitat type per study site. Based on past studies, we anticipate that these sample sizes will be sufficient to detect differences in CPUE between predicted hot, warm, and coldspot locations.

The estimated sample sizes and sampling days needed are provided in Table 2. It is difficult a priori to estimate statistical power as we do not have prior data to indicate sample variance. Previous studies in shallow habitats by Rick Starr and others indicate that a sample size of 10 per habitat will be sufficient; however, we plan to review our sample variance after the first few days of sampling and adjust our samples sizes accordingly. Upon collection of several days worth of data, we will perform power analyses to inform the optimal sample sizes needed to detect a statistically significant difference (alpha=0.05) between hot, medium and cold sites with 80% power. We will then adjust our sampling appropriately.

Table 3. Estimated sample sizes

	# sites	# habitats	#samples/ habitat	Total samples	Samples/day	Total days
"Coldspots"	3	2	10	60	5	12
"Warmspots"	3	2	10	60	5	12
"Hotspots"	3	2	10	60	5	12

If our available quota permits, at the conclusion of our sampling we also propose to test selective traps designed to catch lingcod but exclude overfished rockfish species. However, this testing will be opportunistic and any results will not be part of the core analysis outlined below.

Analytical approach: The scientific sampling (both directed fishing and visual) will aim to get robust estimates of the density of fishes in three predicted hot, warm, and coldspots, stratified by the two habitat types. We will compare data from the visual and fishing surveys among sites using a fixed factor ANOVA, binomial statistics, and regression analysis. The primary hypothesis to be tested using ANOVA is that we expect a significant difference among hot, warm, and coldspot locations and that the slope of the regression line from cold to hot would be positive (Figure 2).

Specifically, the ANOVA design will test the impact of site (hot, warm, cold) and habitat (high relief, canyon head) on CPUE using a two-way fixed factor ANOVA. Habitat and site location (hot, warm, cold) are fixed factors and replicates will be the grand means of 10 sets at each combination of site and habitat (N=3 hot, 3 warm, 3 cold x 2 habitats = 18). Results of these analyses will be used to determine whether predictive mapping model results (hot, warm, cold) can predict realized differences in CPUE at our study locations. To evaluate the relative change in CPUE that is attributable to habitat type and site, we will perform a multiple regression where the response is CPUE and the predictive variables include habitat and site. Coefficients of the regression analysis will determine the influence of each variable on CPUE that can be used to refine predictive models in future iterations. It is important to note that in this analysis, we are comparing CPUE of hook and line between sites, and using these results to detect whether similar trends are found in the predictive mapping which uses trawl survey data as inputs. We are not directly comparing hook and line to trawl survey CPUE.

We will further extend our model validation techniques to approaches in which we directly investigate the relationship between map outputs (predicted) and empirical CPUE estimates from our survey (observed). Statistical tools that we will use include calculating the mean absolute error (Mean(|observed-predicted|/observed), Spearman's rank correlation coefficient of observed vs. predicted, relative absolute bias expressed as the % of the 90^{th} and 10^{th} percentile range of the data, and the area under the receiver operating characteristic curve(AUC). AUC is the probability that a randomly chosen observation of presence would be assigned a higher ranked prediction than a randomly chosen observation of absence. AUC is useful as it allows the user to choose thresholds for determining tolerance for Type I and Type II errors. Using a combination of all methods we will attempt to validate the maps using simple presence/absence data as well as abundance data making our model validation robust to several forms of bias and error.

Biological Sample Analysis: Locations of all fish caught or observed will be geo-referenced and all fishes will be identified and measured; OFS specimens will be provided to NMFS for biological analysis of growth and maturity. After the vertical hook and line gear has been brought to the surface, all captured fish will be removed from the gear, identified to species, and measured to the nearest millimeter by MLML research staff. At that point, species suitable for sale or destined for further analyses in the NMFS laboratory will be euthanized by cranial concussion, bagged, labeled, and placed on ice in appropriate storage locations. Species unsuitable for sale or not needed for biological analyses will be returned to depth using a fish descending device, such as the Git-R-Down fish release tool or cage. Despite disposition, all species caught will be counted against available quotas. As per regulatory requirements, federal observers will be on board to verify catch of all species.

Immediately after a fishing sample has been collected, we will deploy the drop video camera to verify habitat type and record fish species observed at depth at the sampling location. The drop camera surveys will be conducted from the same fishing vessel as the fishing effort. Video images transmitted to the surface will be stored on a hard drive for post processing. We will use software developed by Euan Harvey and Jim Seager (www.seagis.com.au/) to obtain lengths and density of fishes surrounding the lander. Video from the drop camera will be reviewed at MLML and data collected from the video will include fine-scale habitat type observed, depth, species observed, and size ranges of species observed.

The biological samples will provide stock assessors with additional fine-scale information on the Central Coast stocks of bocaccio, canary rockfish, widow rockfish and other species. All biological analyses will conform to accepted protocols identified by NMFS and will be performed at either the NWFSC lab or the SWFSC Santa Cruz, CA lab.

k) How vessels will be chosen:

Vessels that have the appropriate gear, research experience, and local knowledge will be selected by the EFP applicant and project partners.

l) Time / Place / Gear Used in Fishing:

The drop camera surveys will be conducted in the fall season of 2012, 2013, and 2014. The directed fishing activity will take place in the fall season (approximately September) in 2013 and 2014 to be consistent with the timing of the trawl survey data upon which the predictive maps were derived. To provide for contingency and efficiency in planning and operations we request an EFP approval from July 1, 2013 to December 31, 2014.

The directed fishing effort design will maximize available resources to generate statistically robust sample sizes from a minimum of 9 sites (3 hotspots, 3 warm spots, and 3 cold spots as identified by the spatial analysis) inside the trawl RCA between Point Reyes and Pt. Conception, California. The EFP partners will select from among candidate sites with input from local fishermen to ensure a robust study design. Fishing will occur inside the trawl RCA (100-150 fathoms).

The gear to be used will include:

- Vertical hook and line gear: (e.g. Hydraulic snapper reel with 15-20 hooks per line, stainless hooks baited with squid)
- Traps: To survey juveniles that may not take a hook we will use conventional 2 chamber 1"X1" wire coated spot prawn traps with 3 and 1/4" round tunnel entrances (overall trap size 24" X 28" X 10") or customized juvenile rockfish traps.
- As mentioned, if our quota permits we will test additional selective lingcod traps measuring 36" X 48" X 18" with 2" X 4" mesh wire, and a 3 ¼" in escape ring. Funnel size will be determined.

m) Signature of applicant

Signature Roger Cullen **Date:** 5/30/12

Roger Cullen, President

Central Coast Sustainable Groundfish Association

Figure 1. Map of potential study site at Monterey Canyon with 500 x 500 m cells, some randomly selected for surveys, to illustrate study design.

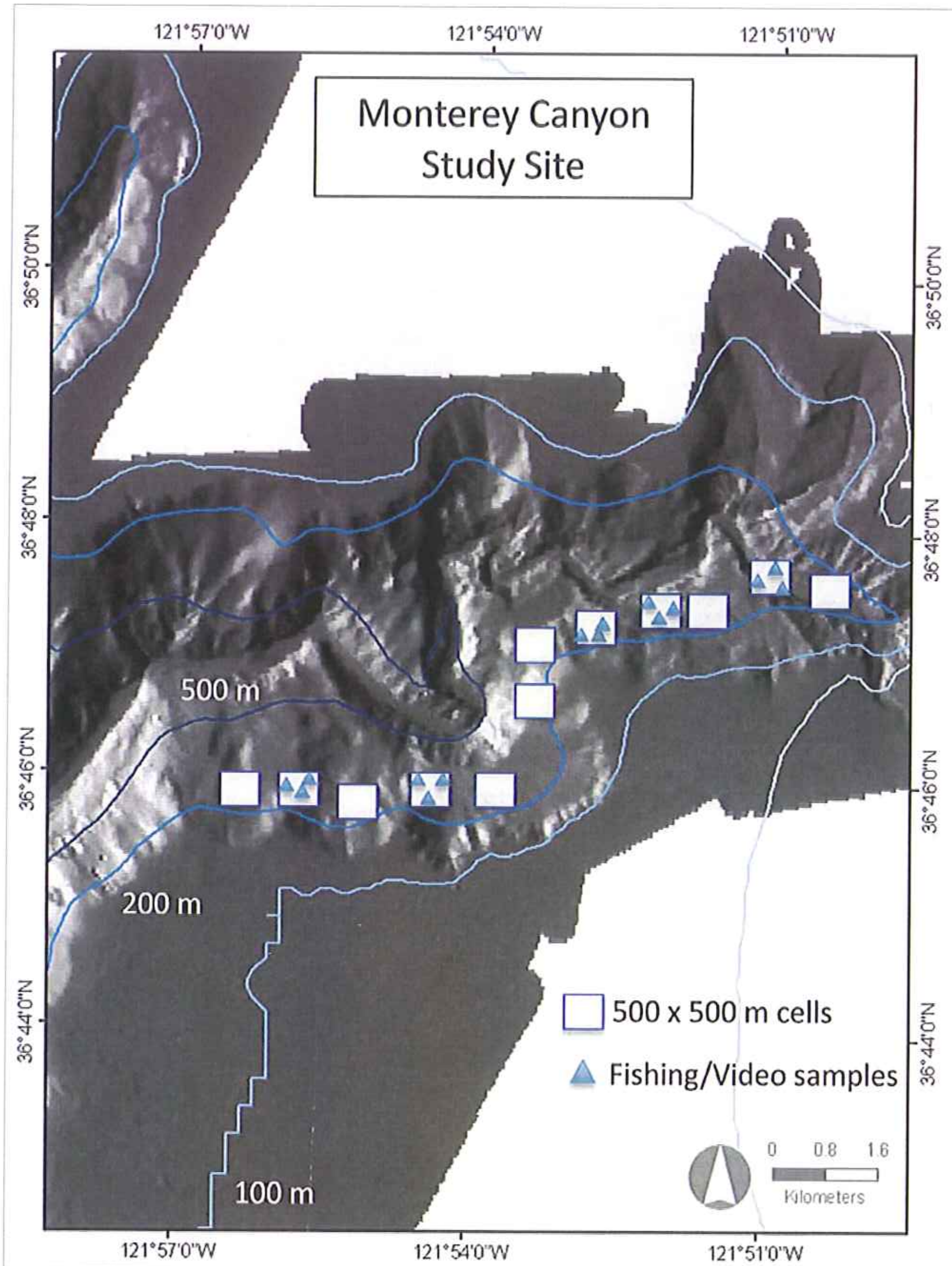
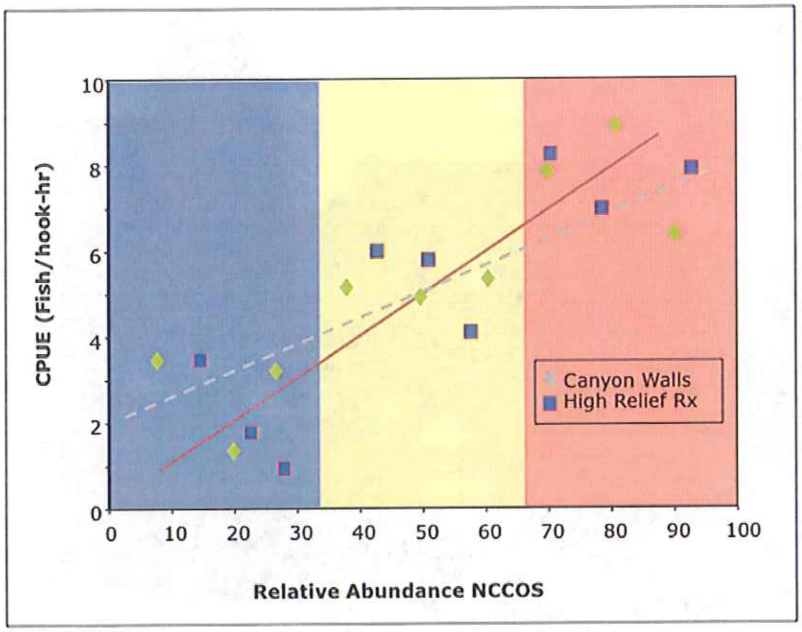


Figure 2. Example data showing regression approach for comparing predicted abundance based on the NCCOS predictive modeling with observed CPUE from the proposed site surveys. Blue background indicates predicted "coldspots", yellow predicted "warmspots", and red predicted "hotspots".



Agenda Item D.4.b
Supplemental EC Report
June 2012

ENFORCEMENT CONSULTANTS REPORT ON EXEMPTED FISHING PERMITS FOR 2013-2014 FISHERIES

The Enforcement Consultants (EC) appreciates the modifications to the exempted fishing permit proposals to address concerns with gear measurements and the attempts to differentiate vessels operating in the Rockfish Conservation Area.

However, the broader concerns for fleetwide applicability and the burden on individual expertise remain. If these gears are found to be successful, safeguards such as 100 percent observer coverage should remain.

PFMC
06/22/12

GROUNFISH ADVISORY SUBPANEL REPORT ON EXEMPTED FISHING PERMITS FOR 2013-2014 FISHERIES

The Groundfish Advisory Subpanel (GAP) received information from three applicants on exempted fishing permit (EFP) applications for the 2013-2014 groundfish fisheries. The GAP recommends all three applications be forwarded for approval subject to the following comments.

The GAP recommends a total canary rockfish EFP set-aside of 1.5 metric tons. The distribution between the two EFP's requiring canary allocation be set at 0.5 metric tons for the longline and 1.0 metric tons for the yellowtail EFPs, respectively. This is agreeable to both applicants. These EFPs are:

1. **Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish off California .**
2. **Yellowtail rockfish jig fishing off California.**
   The GAP supports language contained in the Groundfish Management Team statement regarding this EFP.

The GAP believes that the EFPs listed above provide good flexibility in their plans.

The GAP supports the Central Coast Sustainable Groundfish Association EFP as originally presented. This EFP should provide valuable information through the use of hook-and-line gear. This will be information not available from normal trawl survey methods which are normally unable to sample high relief areas.

A discussion took place regarding EFPs where no set-aside of fish is required. Since the EFP process requires significant workload and lead time crafting Terms and Conditions and permits, perhaps another process vehicle could be employed. Since the spex process is not required for set-asides of impacts, perhaps a research type assignment could be used. This could reduce staff and applicant time to implement.

PFMC
06/22/12

GROUNDFISH MANAGEMENT TEAM REPORT ON PRELIMINARY REVIEW OF EXEMPTED FISHING PERMITS FOR 2013-2014 GROUNDFISH FISHERIES

The Groundfish Management Team (GMT) reviewed three exempted fishing permit (EFP) applications for 2013-2014 that were forwarded for review at the November 2011 Council meeting and submitted for approval at this meeting. The GMT's review was based on the evaluation criteria in the Council Operating Procedure (COP) 19 on EFPs. The GMT would like to thank the applicants for their dialogue with the team and for addressing our recommendations from November in the revised applications submitted for this meeting.

The GMT reviewed the EFPs based on their technical merits and points out that the Council will likely need to make their final decision based partially on the availability of overfished species, relative to the 2013-2014 harvest specifications. At this meeting, the Council will be considering and adopting final preferred set aside amounts to be deducted from the annual catch limits (ACLs) or annual catch targets (ACTs) under Agenda Items D.5 and D.9. The total set aside amount will include those reserved for EFPs under this agenda item. Table 1 summarizes the set asides by species and EFP requested by the applicants and the Council's preliminary preferred alternative set asides for 2013-2014 adopted in November for use in the analysis in the draft Environmental Impact Statement.

COP 19 outlines several questions for the GMT to consider when reviewing EFP applications. A primary requirement of EFPs is the evaluation of fishing gear or management measures that can be transferred into regulation and eventually applied fleet-wide. EFPs that rely upon operator experience, skill, or abilities that cannot be harnessed through a regulation or readily replicated by other fishermen, fail to meet this requirement because the resulting bycatch rates may differ from those estimated in the EFP. In addition, the groundfish Fishery Management Plan (FMP) also states that the purpose for EFPs is "to promote increased utilization of underutilized species, realize the expansion potential of the domestic groundfish fishery, and increase the harvest efficiency of the fishery consistent with the Magnuson-Stevens Act and the management goals of the FMP."

During discussions with the GMT, the applicants suggested that there was strong market demand for hook-and-line caught fish due to differences in product quality and increasing consumer sensitivity to how seafood is caught. They suggested that this contributes to hook-and-line fisheries becoming more profitable for fishery participants. They also anticipate this market will increase into the future. Given the opportunity to prosecute their EFP applications, the applicants suggested that these gear and fishing methods may provide more opportunities for existing and new entrants into the fishery by lowering barriers to entry (e.g., in terms of cost to enter the fishery) and making this fishery more attractive. This may be particularly important for fishing communities that no longer have a strong trawl presence. The GMT notes that this discussion and potential implications for fishery participants and communities is consistent with some of the stated purposes in COP 19.

Evaluation of an epibenthic trolled longline to selectively catch chilipepper rockfish (Sebastes goodei) off California – Kathy Fosmark.

The goal of this EFP (Agenda Item D.4.a, Attachment 1) is to evaluate the effectiveness of a longline fishing technique that targets chilipepper rockfish in the mid-water area (80-120 fm) of the rockfish conservation area (RCA) in central California, while avoiding overfished species. The GMT notes that the Council approved a similar EFP application submitted by the same applicants proposing to use this fishing technique in 2009 but the fishery never got underway. The application submitted for approval at this Council meeting is essentially the same as what was approved in the past, with revisions to better describe the components of the gear configuration, provide historical catch information intended to support the need to access inside the non-trawl RCA, and address concerns with fishing in the RCA.

In November (Agenda Item E.3.b, Supplemental GMT Report), the GMT suggested that while we understood the applicants need to maximize the harvest of target species to pay for fishing operations that includes 100 percent observer coverage, fewer than 1,000 hooks per set should be deployed per set to avoid the possibility of large catches of overfished species. The GMT notes the revision to the application that explains that a minimum of 500 hooks per set is needed to fund the observer coverage and that no more than 1,000 hooks would be deployed per set. The GMT discussed the value of the “test set” proposed in the application to assess the fishing grounds for the presence of overfished species before the longline is deployed and that this should help avoid a large catch of overfished species.

The GMT sees the value in the data that could be gathered from this EFP and based on technical merit supports Council approval for 2013-2014.

Yellowtail rockfish jig fishing off California – San Francisco Community Fishing Association / Barbara Emley and Dan Platt.

This EFP (Agenda Item E.4.a Attachment 2) is intended to test commercial jig gear that is configured to selectively target yellowtail rockfish in mid-water (30-100 fm) areas of the RCA in northern California while avoiding harvest of overfished species. The GMT discussed the applicants revisions to their proposal from November to address concerns expressed by the GMT and other advisory bodies such as; reporting trips to the West Coast Groundfish Declaration Line and using banners to identify vessels fishing inside the RCA as “EFP Fishing”, to better describe the gear configuration to avoid the bottom and document past yelloweye catch.

The applicants explained that the majority of fishing under this EFP would occur in the area south of 40°10’ N. lat. with less targeted to the north. To more clearly describe the estimated catch relative to species specific and species complexes in the area north and south of 40°10’ N. lat., the set aside for chilipepper S. of 40°10’ N. lat. was reduced from 12 mt to 10 mt and the minor shelf rockfish N. of 40°10’ N. lat. was increased from 1 mt to 3 mt to account for potential catch north and south of 40°10’ N. lat. The set aside for yellowtail rockfish, the target species for this EFP, was reduced from 30 to 10 mt in the area north of 40°10’ N. lat. and the minor shelf rockfish complex south of 40°10’ N. lat. was increased from 1 mt to 30 mt to address the catch of yellowtail managed in the shelf complex in this area. The applicants explained that while the minor shelf complex south of 40°10’ N. lat. was increased, they expect the majority of the catch to be comprised of yellowtail rockfish.

The applicant also requested 1.0 mt of black rockfish to cover any catches that may occur while fishing in the shallower depths. The GMT notes that black rockfish are covered under a state issued nearshore permit and cannot be landed without this permit. It is uncertain at this time whether the applicants have the appropriate permit necessary to land black rockfish (note: nearshore permits are issued to individuals, not vessels). As such, the GMT recommends removing black rockfish from the list of species to be retained.

The GMT sees the value of the data that could be gathered from this EFP and based on its technical merits, supports Council approval with suggested modifications to list of species, for 2013-2014.

Supporting a spatial analysis of the distribution and size of rebuilding stock in the Rockfish Conservation Area through directed fishing surveys – Central Coast Sustainable Groundfish Association / Roger Cullen and Chris Kubiak.

This EFP is intended to use fishing and remotely operated vehicles (ROV) surveys within the RCAs to generate new data on the presence of rebuilding stocks and their stock status (Agenda Item D.4.a, Attachment 3). Hook and line and trap surveys within the RCA would allow for mapping the distribution of rebuilding species and collection of biological information on stock status to inform spatial fishing plans, potential future reconfiguration of the RCA, and stock assessments. The proposed ROV surveys are intended to assess rebuilding species densities and habitat association. This EFP was recommended for SSC review and the application submitted for Council approval at this meeting includes revisions based on the SSC's input.

In addition to those revisions, the GMT appreciates the discussion and clarification by the applicants on several other issues outlined below.

The application requests exemption from the trawl RCA but an exemption from the non-trawl RCA will be needed since they will be using non-trawl gear. This is only a minor change and the applicants noted it would not impact the proposed fishing areas as described in the EFP.

Since the applicant is proposing to cover catches with individual fishing quotas (IFQ), the GMT notes an exemption from the vessel cap use limits may be needed to prosecute this EFP more effectively. Non-IFQ species would be subject to the IFQ trip limits.

The GMT recommends that if the applicants want to test the use of descending devices that they should focus this on the area outside the RCA during normal fishing activities where it wouldn't require an EFP. While this information would be extremely valuable, we don't see that it fits within the purpose of the EFP.

The GMT notes that the updated application includes a new proposal to test traps to effectively catch lingcod without impacts to overfished species that was not included in the original proposal approved for public review. The applicants explained that it was added to collect some additional data opportunistically if time and quota allow but the results won't be used in the core analysis. The GMT does not support the inclusion of this gear test in the EFP as it doesn't fit with the original purpose. It was also not reviewed by the SSC nor was it available for public review.

The applicants have proposed to use line gear as part of this EFP yet there is no clear description of this gear. Based on discussions with the applicants, the GMT believes that this gear would qualify as a "legal gear", but notes that further discussions with Enforcement Consultants may be warranted.

The GMT sees the value of the data that could be gathered from this EFP and based on technical merit supports Council approval for 2013-2014, with the exception of evaluating descending devices in the RCA and the proposal to test lingcod traps. Because IFQ catch in this EFP is covered by quota pounds and non-IFQ catch is covered by trip limits from the trawl allocation; there are no considerations for set aside amounts.

Consideration of Set-Asides

The GMT discussed the two mid-water EFP applications that rely on set asides relative to the differences between the Council PPA set aside amounts approved in November, and the set aside estimates provided by the applicants.

The applicants have requested set asides that are higher for bocaccio, canary, and yelloweye rockfish than the Council PPA. Based on our discussion with the applicants, the GMT understands that the set aside amounts proposed by the applicants are the minimum amount they estimate is needed to prosecute their EFPs.

If the Council chooses to revise their set aside amounts from the PPA to accommodate what is needed by the applicants the GMT notes that it would change the off the top deductions from the ACL which would affect the fishery harvest guideline. Depending on the species and fishery sector, there may be changes to sector specific allocations. At the applicant requested set aside amounts, if there are no other changes to the off the top deductions, the range of changes may not be enough to impact management measures analyzed in the DEIS for species other than yelloweye rockfish. For yelloweye rockfish the difference may be enough to impact one or more sectors allocation enough to impact management measures.

If the Council recommends the EFP's for 2013-2014 the GMT understands that the set-aside values in Table 1 would be necessary for the applicants to complete their proposed EFPs.

GMT Recommendations:

1. The GMT finds technical merit in all three EFP applications.
2. The GMT recommends approval of all three EFP applications.
3. If the Council adopts the EFPs, the GMT recommends amendment of the EFPs as outlined above**.**

Table 1. Applicant requested EFP set asides for 2013 and 2014 in mt. (SFSCA = San Francisco Community Fishing Association; CCSGA = Central Coast Sustainable Groundfish Association.

	Species	**Fosmark[a] (Attachment 1)**	**SFCFA[b] (Attachment 2)**	**CCSGA[c] (Attachment 3)**	**EFP Total**	**Council PPA**
Overfished Species	Bocaccio	3.000	3.000	covered with IFQ quota lbs.	6.0	2.6
	Canary	1.500	1.500		3.0	0.8
	Cowcod	0.015	0.015		0.03	0.02
	Darkbl	0.100	0.100		0.2	0.2
	POP	-	-		0.0	0.0
	Widow	9.000	9.000		18.0	18.0
	Yelloweye[d]	0.023	0.023		0.05	0.02
	Petrale	-	-		0.0	0.0
Non-Overfished Species	Lingcod N of 42° N lat. (OR & WA)	-	-	covered with IFQ quota lbs.	0.0	0.0
	Lingcod S of 42° N lat. (CA)	0.500	1.500		2.0	1.9
	Pacific Cod	-	-		0.0	0.0
	Sablefish N. of 36° N lat.[2]	3.000	1.000		4.0	10.0
	Sablefish S. of 36° N lat.	-	-		0.0	0.0
	Dover Sole	-	-		0.0	0.0
	English Sole	-	-		0.0	0.0
	Arrowtooth Flounder	-	-		0.0	0.0
	Starry Flounder	-	-		0.0	0.0
	Other Flatfish	-	-		0.0	0.0
	Chilipepper S. of 40° 10' N lat.	200.000	10.000		210.0	200.0
	Splitnose S of 40° 10' N. lat.	1.500	1.500		3.0	0.5
	Yellowtail N of 40° 10' N. lat.	-	10.000		10.0	30.0
	Shortspine Thornyhead N. of 34° 27' N. lat.	-	-		0.0	0.0
	Shortspine Thornyhead S. of 34° 27' N. lat.	-	-		0.0	0.0
	Longspine Thornyhead N. of 34° 27' N. lat.	-	-		0.0	0.0
	Longspine Thornyhead S. of 34° 27' N. lat.	-	-		0.0	0.0
	Minor Slope Rockfish N. of 40° 10' N. lat.	-	1.000		1.0	0.0
	Minor Slope Rockfish S. of 40° 10' N. lat.	1.000	1.000		2.0	5.2
	Minor Shelf Rockfish N. of 40° 10' N. lat.	-	3.000		3.0	0.0
	Minor Shelf Rockfish S. of 40° 10' N. lat.	1.000	30.000		31.0	30.2
	Black Rockfish N. of 46° 16' N. lat. (WA)	-	-		0.0	0.0
	Black Rockfish S. of 46° 16' N. lat. (OR & CA)	-	1.000		1.0	0.0
	Pacific Whiting	1.000	1.000		2.0	2.3
	Cabezon N. of 42° N. lat. (OR)	-	-		0.0	0.0

	Cabezon S. of 42° N. lat. (CA)	-	-	-	0.0	0.0
	Shortbelly	-	-	-	0.0	0.0
	California Scorpionfish	-	-	-	0.0	0.0
	Longnose Skate	-	-	-	0.0	0.0
	Other Fish[e]	1.000	1.000	1.0	3.0	3.0

- = no impacts requested

[a] set aside amounts updated at the June Council meeting based on input from the applicants

[b] set aside amounts updated at the June Council meeting based on input from the applicants to better estimate catch north and south of 40-10 which for some species are managed either as a single species or under a complex.

[c] all impacts will come from quota pounds of applicants, except for non-IFQ species

[d] there are yelloweye impacts in attachments 1 and 2 however they round to less than 0.1 mt (0.023 mt for each one, totaling 0.045 mt)

[e] 1.0 mt put in as a place holder

PFMC
06/22/12

Agenda Item D.4.b
Supplemental SSC Report
June 2012

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON EXEMPTED FISHING PERMITS FOR 2013-2014 FISHERIES

The Scientific and Statistical Committee (SSC) reviewed the revised the Exempted Fishing Permit (EFP) application "Supporting a spatial analysis of the distribution and size of rebuilding stocks in the Rockfish Conservation Area (RCA) through directed fishing surveys" (Agenda Item D.4.a, Attachment 3). The main goal of the proposed project is to synthesize fishery-dependent and fishery-independent information to generate spatial distribution maps of rebuilding stocks within the RCA, in order to help inform bycatch avoidance and increase fishing opportunity for healthy stocks.

The SSC first reviewed this EFP application at its March 2012 meeting, and suggested a number of issues to be addressed. At this meeting, Ms. Mary Gleason and Dr. Rick Starr presented an overview of a revision that was done in accordance with the SSC comments, and answered further questions regarding the application. The revised application addressed issues identified by the SSC at the March meeting to some degree. The application, however, is still lacking a detailed description of methods to be used for compiling species distribution maps.

The SSC supports an effort to build more information on spatial distribution and habitat association of rebuilding stocks, but is concerned with potential challenges in identifying areas of high, medium, and low catch rates of rebuilding stocks ("hot," "medium," and "cold" spots, as they were referred to in the application), given temporal variability in species occurrence, though it is less of a concern for yelloweye rockfish and cowcod, the most sedentary species out of those listed in the application. The SSC also suggests using results from camera and hook-and-line surveys (to be conducted as part of the proposed project) to not only "ground truth" information synthesized from different sources, but also to quantitatively evaluate predictive power of the species distribution maps, in order to help evaluate usefulness of the results for the Council management process.

PFMC
06/22/12

I would like to voice my support for the EFP targeting yellowtail rockfish.

The council has given the majority of it's time to the details of the trawl fishery and I wonder if the hook and line fishermen could have a turn.
All the EFP proposals that include small boats have been denied in the past and our fishery faces extinction.
I hope the council will approve the EFP for yellowtail rockfish and many others.....In time to save us
Current laws give us an allocation without access,

Josh Churchman

David Bitts
President
Larry Collins
Vice-President
Duncan MacLean
Secretary
Mike Stiller
Treasurer

PACIFIC COAST FEDERATION of FISHERMEN'S ASSOCIATIONS

W.F. "Zeke" Grader, Jr.
Executive Director
Glen H. Spain
Northwest Regional Director
Vivian Helliwell
Watershed Conservation Director
In Memoriam:
Nathaniel S. Bingham
Harold C. Christensen

Please Respond to:

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30 May 2012

Sent via E-Mail and Fax

Dr. Dan Woford, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

ATTN: Dr. Don McIsaac, Executive Director

RE: Agenda Item D.4, June 2012 PFMC Meeting
Exempted Fishery Permits - Groundfish

Dear Chairman Wolford and Council Members:

The Pacific Coast Federation of Fishermen's Associations (PCFFA) represents working men and women in the West Coast commercial fishing fleet. Those belonging to PCFFA member associations are vessel owner/operators and crew engaged in a portfolio of different fisheries utilizing a variety of fishing gears.

Many of the men and women PCFFA represents have lost fishing opportunity to harvest abundant rockfish ("underutilized") due to the closure within the Council's Rockfish Conservation Area (RCA) to all fishing on the *Sebastes* complex. This has resulted in economic loss and, in some instances, financial hardship or even permanent departure from commercial fishing. It has caused underemployment, job and businesses losses – much of which could have been avoided if fishing men/women were allowed to develop gear to target abundant, "underutilized" rockfish species within the vast RCA.

While PCFFA fully supports the protection and rebuilding of rockfish stocks of concern ("overfished') it believes, based on the extensive fishing experience of its members, that it is possible to target abundant, underutilized species within the RCA while avoiding, or minimizing contact with, those rockfish species of concern (e.g., Canary rockfish, *Sebastes pinniger*; and Yelloweye rockfish, *Sebastes ruberrimus*)

PCFFA, therefore, strongly supports and urges immediate Council approval of two exempted fishing permit applications before you to test two different types of hook-and-line fishing targeting two separate species of underutilized rockfish within the RCA.

The first application is by KATHLEEN FOSMARK (on behalf of herself and her husband Steve Fosmark, *F/V Seeadler*) for midwater longlines, utilizing fly gear and floats, to target Chilipepper rockfish (*Sebastes goodei*), a greatly underutilized species within the RCA. This application was developed in consultation with NMFS personnel to address issues of avoidance of bycatch of species of concern, observers, etc.

The second application is by BARBARA EMLEY (on behalf of the San Francisco Community Fishing Association, Inc.) and DANIEL PLATT for the use of vertical line, jig fishing, hook-and-line gear to target Yellowtail rockfish (*Sebastes flavidus*). This, application, too, was developed in consultation with NMFS personnel.

It is important the Council approve both applications, here, not only to determine whether one or both will be successful – PCFFA believes both will achieve their purpose – but to develop gears be best suited for one type of vessel or another, and for fishing men/women seeking to target different species of underutilized species within the RCA.

PCFFA also asks the Council to note:

No Bottom Contact. First, neither of the gear types in these two EFP applications are "bottom contact." This is important in operating in such areas as the Cordell Bank where bottom contact gear is prohibited. It is also important to point out that the Council is allowing bottom contact trawling now within the RCA, (with reports of success in avoiding overfished species). Moreover, hook-and-line gear is generally regarded as more selective than otter trawls, thus the gear proposed in the above EFP applications should be more selective and have far less impact than gear (trawl) the Council is already allowing in parts of the RCA.

Experiment, Not a Fishery. Second, the two EFPs above are submitted by three individuals for three different vessels operating two gear types along three areas of the California coast. The participation was deliberately limited because a) it's an experiment, and b), pursuant to concerns from the Council's Groundfish Advisory Subpanel (GAP), the EFP itself should not become a fishery. Although limited to three individuals in these two applications, these EFPs, if successful, will benefit the whole fishing fleet in the non-trawl small to mid-size fishing vessel range (the vast majority of vessels and fishing men/women in the Pacific Coast fishery).

Workshops, EFP Policy. Third**,** some have suggested that no EFPs be granted until a workshop is held and NMFS develop gears for fishermen to try. PCFFA does not oppose a workshop on EFPs for testing gear in the RCA, however, that probably should have been done when the RCA was established, and not waiting until years later to simply delay or deny sound EFP applications before the Council. A workshop is fine, particularly in the development of some policy related to EFP's and gear development, but the two EFPs before you need to proceed now. Moreover, gear development is what fishermen are experts at, not NMFS. The economic consequences for the fleet are just too great to allow any further delay in development of selective fishing gear for use in the RCA. And, finally, any attempt to reallocate groundfish from the fixed gear fleet to trawlers, claiming the fixed gear fleet didn't use the fish, (because the Council wouldn't allow non-trawl fishermen access to the RCA to test selective gear) will not be tolerated.

The Council's prompt approval of the above two EFP applications is prudent and necessary in the effort to restore employment and economic vitality to our West Coast fishing communities while protecting and rebuilding overfished rockfish species. PCFFA appreciates your attention to this issue and will be happy to answer any questions or request for further information Council or staff may have.

Sincerely,

W.F. "Zeke" Grader, Jr.
Executive Director

Agenda Item D.5
Situation Summary
June 2012

TENTATIVE ADOPTION OF 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The process to adopt the 2013-2014 harvest specifications and management measures began in 2011 and culminates at this meeting with tentative action under Agenda Item D.5 and final action under Agenda Item D.9. Agenda Item D.5.a, Attachment 1 summarizes the anticipated Council actions and references that inform the decisions. Under this agenda item, the Council is scheduled to tentatively adopt harvest specifications and management measures, including allocations, and identify any further analysis or cross-checks needed in preparation for Agenda Item D.9. Under Agenda Item D.9, the Council will take final action by confirming or modifying actions from Agenda Item D.5.

At its April 2012 meeting, the Council adopted overfishing limits (OFLs) as recommended by the Scientific and Statistical Committee, acceptable biological catches (ABCs) that incorporate scientific uncertainty buffers, and preferred annual catch limits (ACLs) for stocks and stock complexes (Agenda Item D.5.a, Attachment 2). Additionally, this attachment contains the estimated time to rebuild the overfished species under each alternative ACL – an important consideration for deciding those ACLs and the associated rebuilding plans. Agenda Item D.5.a, Attachment 3 includes the Executive Summary from the preliminary draft Environmental Impact Statement (DEIS), which provides an overview of the proposed action alternatives and environmental impacts. Further, the attachment summarizes the Council's preliminary preferred season structures and management measures for the 2013-2014 fisheries. Agenda Item D.5.a, Supplemental Attachment 4 contains supplementary information related to comments received to date on preliminary Council actions.

The process and schedule for adopting the 2013-2014 harvest specifications and management measures is different from past cycles in that it relies on a narrow scope of action, earlier decision-making, and the publication of a DEIS prior to final Council action at this meeting (Agenda Item D.5.a, Attachment 5: *Available on CD and the Pacific Council's Website Only*). It is important to note there is less scope for the Council to make substantial changes when crafting the final preferred alternative because of this altered schedule made necessary by the National Environmental Policy Act requirements and a January 1, 2013 implementation target. The final preferred alternative can only vary slightly from any one of the alternatives evaluated in the DEIS so that forecasted impacts fall within the range of those disclosed in the DEIS. If the final preferred alternative does not meet those criteria, it is likely that the DEIS would have to be revised to disclose any substantially different impacts, republished for public review, and scheduled for final decision-making at a future Council meeting. This would jeopardize the objective of implementing new regulations on January 1, 2013 (the start of the next management period).

The Council is scheduled to adopt final set-asides from the ACLs and, for some species, set-asides from the trawl allocations (see Agenda Item D.5.a, Attachment 1, item 3.a). It is expected that the preliminary set-asides adopted by the Council and used in the analysis of the integrated alternatives will be updated based on the tribal requests from April (see Agenda Item I.3.b, Supplemental Tribal Report, April 2012) and final adoption of exempted fishing permits, which occurs under Agenda Item D.4. Further, a National Marine Fisheries Service (NMFS) letter is included in the reference materials that details incidental catches in the at-sea Pacific whiting fisheries in 2011 (Agenda Item D.5.b, NMFS Letter). The Council should consider this information when establishing set-asides from the trawl allocation for the at-sea sectors.

Agenda Item D.9 is scheduled later in the Council meeting to provide the opportunity for the Groundfish Management Team (GMT) and Groundfish Advisory Subpanel (GAP) to prepare any additional analysis or material relevant to completing the Council tasks required at the June Council meeting. Under this agenda item, the Council should identify any outstanding questions or analytical needs and task advisory bodies accordingly to enable timely completion of Agenda Item D.9.

Council Action:

1. **Tentatively adopt final 2013 and 2014 harvest specifications for all groundfish stocks and stock complexes.**
2. **Tentatively adopt final management measures, including allocations.**
3. **Task the GMT and GAP with further analysis needed for final action under Agenda Item D.9.**

Reference Materials:

1. Agenda Item D.5.a, Attachment 1: Anticipated Council Actions and References Relevant to Decision-Making.
2. Agenda Item D.5.a, Attachment 2: Table 1. Preferred 2013 and 2014 overfishing limits (OFLs in mt), acceptable biological catches (ABCs in mt), and annual catch limits (ACLs in mt) for west coast groundfish stocks and stock complexes; and Table 2. Estimated time to rebuild and spawning potential ratio (SPR) harvest rate relative to alternative 2013-2014 ACLs for overfished west coast groundfish stocks.
3. Agenda Item D.5.a, Attachment 3: Executive Summary and Description of the Preferred Season Structures and Management Measures, An Excerpt from the Preliminary DEIS.
4. Agenda Item D.5.a, Supplemental Attachment 4: Supplementary Information Related to Comments Received to Date on Preliminary Council Actions.
5. Agenda Item D.5.a, Attachment 5: Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Fishery Management Plan; Preliminary DEIS. (**Available Electronically on CD and the Pacific Council's Briefing Book Website Only**).
6. Agenda Item D.5.b, NMFS Letter: At-Sea Pacific Whiting Incidental Catch in 2011.
7. Agenda Item D.5.c, Public Comment.

Agenda Order:

a. Agenda Item Overview John DeVore and Kelly Ames
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Adopt Tentative Final Annual Catch Limits and Management Measures and Allocations

PFMC 05/31/12

Agenda Item D.5.a
Attachment 1
June 2012

ANTICIPATED COUNCIL ACTIONS AND REFERENCES RELEVANT TO DECISION-MAKING

Under Agenda Item D.5, the Council is scheduled to tentatively adopt final harvest specifications and management measures, including allocations. Under Agenda Item D.9, the Council will take final action by confirming or modifying actions from Agenda Item D.5.

Anticipated Actions	**Preliminary Draft Environmental Impact Statement (EIS) Section**
1. Final Non-Overfished Species Harvest Specifications	Table ES-1, Section 2.1, 4.1-4.4, Appendices B and C
2. Final Overfished Species Harvest Specifications and Rebuilding Plans	Table ES-1, Section 2.1, 4.1-4.4, Appendices B and C
3. Final Set-Asides and Allocations	
3a. Adopt set-asides from the annual catch limits (ACL) and, for some species, the trawl allocations **a/**	Section 2.2.1
3b. Two-year trawl and non-trawl allocations for bocaccio, canary, cowcod, petrale, and yelloweye	Section 2.2.2.2, Appendices B and C
3c. Confirm or modify the Fishery Management Plan (FMP) within trawl allocations for widow rockfish	Section 2.2.3.1, Appendix C
3d. Adopt bocaccio, canary, and yelloweye harvest guidelines (HG) for the recreational fisheries	Section 2.2.3.2, Appendices B and C
3e. HGs for black rockfish (OR and CA), blackgill (south of 40°10), blue rockfish (CA), longnose skate **b/**	Section 2.2.3.2
4. Final Season Structures	
4a. Shorebased Individual Fishing Quota (IFQ) Fishery --Trawl rockfish conservation area (RCA) configurations	Section 2.4, 4.2-4.4, Appendix B
4b. Non-Nearshore --Non-trawl RCA seaward configurations	Section 2.4, 4.2-4.4, Appendix B
4c. Nearshore --Non-trawl RCA shoreward configurations	Section 2.4, 4.2-4.4, Appendix B
4d. Washington Recreational --Season dates --Bag limits --Area closures	Section 2.4, 4.2-4.4, Appendix B
4e. Oregon Recreational --Season dates --Bag limits	Section 2.4, 4.2-4.4, Appendix B

Anticipated Actions	Preliminary Draft Environmental Impact Statement (EIS) Section
--Area closures	
4f. California Recreational --Season dates --Bag limits --Area closures	Section 2.4, 4.2-4.4, Appendix B
5. Final Management Measures	
5a. RCA boundary modifications --Washington and Oregon 150 and 200 fm lines --Oregon 200 fm line --California Usal and Noyo Canyons 150 fm line	Section 2.2-2.4, 4.2-4.4, Appendix C
5b. Management of ACL set-asides	Section 2.2-2.4, 4.2-4.4, Appendix C
5c. Sorting requirement for aurora (north 40°10), shortraker (north 40°10), rougheye (north 40°10)	Section 2.2-2.4, 4.2-4.4, Appendix C
5d. Catch accounting between limited entry and open access	Section 2.2-2.4, 4.2-4.4, Appendix C
5e. Related regulatory and FMP language clarifications --Offload requirements --Relationship between open access fishery regulations and the IFQ fishery	Section 2.2-2.4, 4.2-4.4, Appendix C
5f. Modifications to the shorebased IFQ accumulation limits	Section 2.2-2.4, 4.2-4.4, Appendix C
5g. Modifications to the shorebased IFQ surplus carry-over	Section 2.2-2.4, 4.2-4.4, Appendix C
5h. Remove or reduce to 20 inches the minimum length limit for lingcod in the shorebased IFQ fisheries (all legal gears)	Section 2.2-2.4, 4.2-4.4, Appendix C
5i. Threshold for moving between the sablefish primary fishery to the daily trip limit fishery north of 36°	Section 2.2-2.4, 4.2-4.4, Appendix C
5j. Proposed changes to sablefish limited entry and open access bi-monthly cumulative landing limits	Section 2.2-2.4, 4.2-4.4, Appendix C
5k. Modifications to blackgill rockfish (south of 40°10) bi-monthly cumulative landing limits for limited entry and open access fixed gear	Section 2.2-2.4, 4.2-4.4, Appendix C
5l. Modifications to longnose skate bi-monthly cumulative landing limits and RCAs	Section 2.2-2.4, 4.2-4.4, Appendix C
5m. Modifications to spiny dogfish bi-monthly cumulative landing limits and RCAs	Section 2.2-2.4, 4.2-4.4, Appendix C
5n. Recreational shelf rockfish retention in the Cowcod Conservation Area	Section 2.2-2.4, 4.2-4.4, Appendix C
5o. Remove the California recreational bocaccio size limit	Section 2.2-2.4, 4.2-4.4, Appendix C
5p. Increase the California recreational bocaccio bag limit	Section 2.2-2.4, 4.2-4.4, Appendix C
5q. Increase the California recreational greenling bag limit	Section 2.2-2.4, 4.2-4.4, Appendix C

a/ It is expected that the preliminary set-asides adopted by the Council and used in the analysis of the integrated alternatives will be updated based on the tribal requests from April (see Agenda Item I.3.b, Supplemental Tribal Report, April 2012) and final adoption of exempted fishing permits for 2013-2014 under Agenda Item D.4. The best reference for this action will be a GMT report under Agenda Item D.5.

b/ Sorting, prior to the first weighing after offloading, is required for species with a HG; see regulations at 660.12 (a)(8).

Table 1. Preferred 2013 and 2014 overfishing limits (OFLs in mt), acceptable biological catches (ABCs in mt), and annual catch limits (ACLs in mt) for west coast groundfish stocks and stock complexes (stocks with new assessments in bold).

Stock	2013 OFL	2014 OFL	2013 ABC	2014 ABC	2012 ACL	Preferred ACLs	
						2013	2014
OVERFISHED STOCKS							
BOCACCIO S. of 40°10'	**884**	**881**	**845**	**842**	274	**320**	**337**
CANARY	**752**	**741**	**719**	**709**	107	**116**	**119**
COWCOD S. of 40°10'	11	12	9	9	3	3	3
DARKBLOTCHED	**541**	**553**	**517**	**529**	296	**317**	**330**
PACIFIC OCEAN PERCH	**844**	**838**	**807**	**801**	183	**150**	**153**
PETRALE SOLE	**2,711**	**2,774**	**2,592**	**2,652**	1,160	**2,592**	**2,652**
YELLOWEYE	**51**	**51**	**43**	**43**	17	**18**	**18**
NON-OVERFISHED STOCKS							
Arrowtooth Flounder	7,391	6,912	6,157	5,758	12,049	6,157	5,758
Black Rockfish (OR-CA)	1,159	1,166	1,108	1,115	1,000	1,000	1,000
Black Rockfish (WA)	430	428	411	409	415	411	409
Cabezon (CA)	170	165	163	158	168	163	158
Cabezon (OR)	49	49	47	47	48	47	47
California scorpionfish	126	122	120	117	126	120	117
Chilipepper S. of 40°10'	1,768	1,722	1,690	1,647	1,789	1,690	1,647
Dover Sole	**92,955**	**77,774**	**88,865**	**74,352**	25,000	**25,000**	**25,000**
English Sole	7,129	5,906	6,815	5,646	10,151	6,815	5,646
Lingcod N. of 40º10' a/	3,334	3,162	3,036	2,878	NA	3,036	2,878
Lingcod S. of 40º10' a/	1,334	1,276	1,111	1,063	NA	1,111	1,063
Longnose skate	2,902	2,816	2,774	2,692	1,349	2,000	2,000
Longspine Thornyhead (coastwide)	3,391	3,304	2,825	2,752	NA	NA	NA
Longspine Thornyhead N. of 34°27'	NA	NA	NA	NA	2,064	2,009	1,958
Longspine Thornyhead S. of 34°27'	NA	NA	NA	NA	366	356	347
Pacific Cod	3,200	3,200	2,221	2,221	1,600	1,600	1,600
Sablefish (coastwide)	**6,621**	**7,158**	**6,045**	**6,535**	NA	**NA**	**NA**
Sablefish N. of 36°	**NA**	**NA**	**NA**	**NA**	5,347	**4,012**	**4,349**
Sablefish S. of 36°	**NA**	**NA**	**NA**	**NA**	1,298	**1,439**	**1,560**
Shortbelly	6,950	6,950	5,789	5,789	50	50	50
Shortspine Thornyhead (coastwide)	2,333	2,310	2,230	2,208	NA	NA	NA
Shortspine Thornyhead N. of 34°27'	NA	NA	NA	NA	1,556	1,540	1,525
Shortspine Thornyhead S. of 34°27'	NA	NA	NA	NA	401	397	393
Splitnose S. of 40°10'	1,684	1,747	1,610	1,670	1,538	1,610	1,670
Starry Flounder	1,825	1,834	1,520	1,528	1,360	1,520	1,528

Widow	**4,841**	**4435**	**4,598**	**4,212**	600	**1,500**	**1,500**
Yellowtail N. of 40°10’	4,579	4,584	4,378	4,382	4,371	4,378	4,382
STOCK COMPLEXES							
Minor Nearshore Rockfish North	110	110	94	94	99	94	94
Minor Shelf Rockfish North	2,183	2,195	1,920	1,932	968	968	968
Minor Slope Rockfish North	1,518	1,553	1,381	1,414	1,160	1,160	1,160
Minor Nearshore Rockfish South	1,164	1,160	1,005	1,001	990	990	990
Minor Shelf Rockfish South	1,910	1,913	1,617	1,620	714	714	714
Minor Slope Rockfish South	681	685	618	622	626	618	622
Other Flatfish	10,060	10,060	6,982	6,982	4,884	4,884	4,884
Other Fish b/	6,832	6,802	4,717	4,697	5,575	4,717	4,697

a/ The Council requested analysis of shifting the lingcod management line from the OR-CA border at 42° N. latitude to 40°10’ N. latitude. An analysis using swept area biomass estimates of lingcod derived from the NWFSC trawl survey indicates 48% of the biomass south of 42° N. latitude occurs north of 40°10' N. latitude. The 40°10' N. latitude management line for lingcod is the Council preferred alternative for lingcod specifications to be analyzed in the DEIS.

b/ Values for these specifications are the sum of known contributions of component stocks.

Table 2. Estimated time to rebuild and spawning potential ratio (SPR) harvest rate relative to alternative 2013-2014 ACLs for overfished west coast groundfish stocks (alphabetic alternatives are those that were decided for detailed analysis in the DEIS).

Stock	Current Ttarget	Current SPR or Harvest Control Rule	Pref. Ttarget	ACL Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax
					2013	2014					
Bocaccio S of 40°10' N lat. a/	2022	77.7%	2022		0	0	100%	2019	0	88.0%	99.0%
					133	143	90.0%	2019	0	77.0%	97.0%
					248	263	82.3%	2020	1	67.6%	93.0%
				a, Pref.	320	337	77.7%	2021	2	60.0%	90.0%
					453	471	70.0%	2023	4	49.0%	70.0%
					691	705	60.0%	2027	8	33.0%	63.0%
					837	843	53.9%	2031	12	23.0%	51.0%
Canary	2027	88.7%	2030	a	0	0	100%	2028	0	48.2%	75.0%
				b	48	49	95.1%	2028	0	41.2%	75.0%
				c	101	104	90.0%	2029	1	36.4%	75.0%
				d, Pref.	116	119	88.7%	2030	2	34.4%	75.0%
				e	147	151	85.9%	2030	2	31.7%	75.0%
					184	187	82.9%	2031	3	29.9%	75.0%
				f	216	220	80.3%	2032	4	27.9%	74.9%
					302	306	74.0%	2035	7	26.1%	73.6%
					394	397	67.9%	2040	12	25.1%	66.3%
					449	451	64.7%	2045	17	25.0%	59.4%
					752	753	62.2%	2050	22	25.0%	50.0%
Cowcod b/	2068	82.7%	2068		0	0	100%	2060	0	NA	78.4%
					2	2	90.0%	2064	4	NA	72.4%
				a, Pref.	3	3	82.7%	2068	8	50.0%	66.2%
					4	4	79.0%	2071	11	NA	66.2%
					5	5	74.2%	2074	14	NA	66.2%
					9	9	59.7%	2097	37	NA	53.3%

Stock	Current Ttarget	Current SPR or Harvest Control Rule	Pref. Ttarget	ACL Alt.	ACLs (mt)		SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax
					2013	2014					
Darkblotched	2025	64.9%	2025		0	0	100%	2016	0	100.0%	100.0%
				a, Pref.	317	330	64.9%	2017	1	100.0%	100.0%
					347	360	62.6%	2017	1	100.0%	100.0%
					353	366	62.1%	2018	2	100.0%	100.0%
					372	385	60.7%	2018	2	100.0%	100.0%
					423	437	57.1%	2018	2	100.0%	100.0%
					488	501	53.0%	2020	4	72.8%	91.0%
					553	565	49.0%	2025	9	50.0%	77.0%
					676	685	43.0%	2037	21	23.0%	50.0%
POP	2020	86.4%	2051	a	0	0	100%	2043	0	25.0%	85.5%
					16	17	98.4%	2043	0	25.0%	84.0%
					35	36	96.5%	2044	1	25.0%	83.0%
					58	60	94.3%	2045	2	25.0%	81.0%
				b	74	76	92.9%	2046	3	25.0%	79.0%
					89	91	91.6%	2047	4	25.0%	78.0%
					106	108	90.1%	2048	5	25.0%	77.0%
					122	124	88.8%	2049	6	25.0%	76.0%
					131	134	88.0%	2050	7	25.0%	75.0%
					136	139	87.6%	2050	7	25.0%	75.0%
				c, Pref.	150	153	86.4%	2051	8	25.0%	73.0%
					158	161	85.8%	2052	9	25.0%	72.6%
					163	167	85.4%	2052	9	25.0%	72.0%
					175	178	84.5%	2053	10	25.0%	71.0%
					182	186	83.9%	2054	11	25.0%	70.1%
					199	203	82.6%	2055	12	25.0%	68.0%
					209	213	81.9%	2056	13	25.0%	66.2%
				d	222	226	80.9%	2057	14	25.0%	65.0%
				e	247	251	79.2%	2060	17	25.0%	62.0%
					291	295	76.2%	2065	22	25.0%	55.8%
					328	333	73.8%	2071	28	25.0%	50.0%

Stock	Current Ttarget	Current SPR or Harvest Control Rule	Pref. Ttarget	ACL Alt.	ACLs (mt) 2013	ACLs (mt) 2014	SPR or Harvest Control Rule	Median Time to Rebuild	Rebuilding Duration Beyond T@F=0 (yrs.)	Prob. of Rebuilding by Ttarget	Prob. of Rebuilding by Tmax
Petrale	2016	25-5 Rule	2016		0	0	100%	2013	0	100.0%	100.0%
					867	1,008	60%	2013	0	100.0%	100.0%
					1,265	1,432	50%	2013	0	100.0%	100.0%
					1,831	1,994	40%	2013	0	100.0%	100.0%
				a, Pref.	2,592	2,652	25-5 Rule (=ABC @ 28% depletion in 2013)	2013	0	100.0%	100.0%
Yelloweye	2074	76.0%	2074		0	0	100%	2045	0	99.2%	99.9%
					9	9	86.4%	2053	8	85.3%	93.7%
					14	14	80.5%	2060	15	75.1%	82.8%
					15	15	79.5%	2061	16	73.2%	81.0%
					17	18	76.5%	2066	21	64.1%	73.9%
				a, Pref.	18	18	76.0%	2067	22	62.1%	72.9%
					21	21	72.7%	2074	29	50.0%	61.3%
					24	25	69.7%	2083	38	37.2%	50.0%

a/ All bocaccio alternatives have been reduced from the rebuilding analysis results by 6% to represent the portion of the stock south of 40°10' N lat.
b/ All cowcod alternatives have been doubled from the rebuilding analysis to account for the Monterey contribution.

EXECUTIVE SUMMARY AND DESCRIPTION OF THE PREFERRED SEASON STRUCTURES AND MANAGEMENT MEASURES, AN EXCERPT FROM THE PRELIMINARY DRAFT ENVIRONMENTAL IMPACT STATEMENT

The following document includes the Executive Summary from the preliminary draft Environmental Impact Statement (DEIS), which provides an overview of the proposed action alternatives and environmental impacts. Further, the attachment summarizes the Council's preferred harvest specifications, management measures, and season structures for the 2013-2014 fisheries. For the most part, the description is excerpted from the preliminary DEIS. As such, the original section references and table numbers have been preserved so the reader can easily refer to the DEIS for more information (Agenda Item D.5.a, Attachment 5 – available electronically).

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Executive Summary

The Pacific Fishery Management Council (Council) develops and recommends harvest specifications and management measures to the National Marine Fisheries Service (NMFS). Examples of a harvest specification include annual catch limits (ACLs) for a species or species complex. Examples of management measures include trip limits for commercial fisheries, rockfish conservation area (RCA) boundary adjustments, bag limits, and seasons. The biennial management process was implemented in 2003 through Amendment 17 to the groundfish Fishery Management Plan (FMP). Under this biennial cycle, management measures are implemented for a two-year period, with the expectation that the measures will likely be adjusted within the biennium to attain, but not exceed, the ACLs. Adjustments during the biennium are, in part, based on catch estimate updates and the latest information from the West Coast Groundfish Observer Program. Separate harvest specifications (including acceptable biological catches and annual catch limits) are identified for each year in the two-year period by groundfish species or species complexes. This cycle provides more time for the Council and NMFS to work on other critical groundfish issues, and more time for public comment. This document provides information about, and analyses of, alternatives for the 2013–14 biennial harvest specifications and management measures, for fisheries covered by the Pacific Coast Groundfish FMP (PFMC 2011b). These alternatives were developed by the Council in collaboration with NMFS.

The Proposed Action

Using the "best available scientific information," the proposed action is to implement harvest specifications for calendar years 2013 and 2014 for 32 "management units"[1] managed under the Groundfish FMP and to implement new or revised management measures to address resource conservation concerns, habitat conservation concerns, socioeconomic objectives, and other purposes as described in the sections 2.1 and 6.2 of the FMP (PFMC 2011b). The specifications must be consistent with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), particularly the 10 National Standards enumerated in §301(a) of the MSA and other applicable law. Seven Pacific Coast groundfish species are currently "overfished" and managed under rebuilding plans implemented by secretarial amendment (bocaccio rockfish south of 40°10' N. latitude, canary rockfish, south of 40°10' N. latitude, cowcod south of 40°10' N. latitude, darkblotched rockfish, Pacific ocean perch north of 40°10' N. latitude or POP, petrale sole, and yelloweye rockfish). Within the rebuilding plans, T_{TARGET} is the key rebuilding parameter. T_{TARGET} is the projected year that an overfished species will be rebuilt with at least a 50 percent probability. Any change to T_{TARGET} must be demonstrated by the need to rebuild the stock as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock within the marine ecosystem. The intent is that 2014 harvest specifications will remain in place until replaced by the 2015 harvest specifications and management measures. The proposed action also includes an amendment to the Pacific Coast Groundfish FMP (Amendment 21-2) to reinstate a provision that was inadvertently deleted in a previous FMP amendment.

The purpose of the proposed action is to conserve and manage Pacific Coast groundfish fishery resources to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of essential fish habitats (EFH), and to realize the full potential of the Nation's fishery resources (MSA §2(a)(6)). The need for this proposed action is to set catch limit specifications for 2013-

[1] The count of management units is the number of individual ACLs. These are stocks occurring throughout the west coast EEZ ("coastwide"), geographic subdivisions of stocks in the EEZ, and geographically subdivided stock complexes composed of more than one managed species (see Table ES-2).

2014 that are consistent with existing or revised overfished species target years and harvest control rules for all stocks. These harvest specifications are set consistent with the optimum yield (OY) harvest management framework described in Chapter 4 of the Groundfish FMP.

The Alternatives

This Environmental Impact Statement (EIS) evaluates nine "integrated" alternatives (including the alternative of No Action). The action alternatives incorporate the best available scientific information from current stock assessments to estimate stock status and harvestable yield projections, while the No Action Alternative harvest specifications and management measures are those specified in regulation for 2012. The No Action Alternative is a required element of the EIS that allows the action alternatives to be compared to "'no change' from current management direction or level of management intensity."[2] The integrated alternatives include the following elements:

- **Setting harvest specifications** for the 32 groundfish management units. Harvest specifications are developed consistent with the OY harvest management framework described in Chapter 4 of the Groundfish FMP (PFMC 2011b). Harvest specifications include maximum sustainable yield (MSY or proxy), a long-term objective, the overfishing limit (OFL), acceptable biological catch (ABC), and the ACL. Identification of the OFL is intended to meet the primary management objective of preventing overfishing, which occurs when this level of harvest is exceeded. The ABC is a downward adjustment of the OFL to account for scientific uncertainty surrounding the scientific estimates of the OFL. The ACL is the limit for total fishing mortality, addressed by management measures intended to keep catch below this level. The ACL is usually set equal to the ABC unless a further reduction is deemed appropriate. One noteworthy special case is overfished stocks managed under rebuilding plans. There are seven such stocks in the groundfish fishery. The ACLs for these stocks are set according to rebuilding analyses (based on information from the most recent stock assessment) that estimate the short-term harvest level (ACL) needed to meet the rebuilding plan objective expressed by the target year for when the stock is expected to rebuild to its MSY biomass. The No Action Alternative employs the 2012 ACLs specified in Federal regulations, applied in both years of the 2013-14 cycle. The No Action Alternative does not employ harvest specifications based on the best available science represented by stock assessments and rebuilding analyses completed since 2010, when stock assessment were adopted by the Council to set 2011-12 harvest specifications. But for 16 management units the No Action ACLs are equal to or less than those identified for the 2013-14 period (see Table ES-1), and therefore the reapplication of these ACLs would not have adverse biological consequences. Conversely, the No Action ACLs greater than action alternative ACLs are inconsistent with stock conservation objectives identified in the Groundfish FMP.
- **Applying deductions to the ACLs** to account for activities not directly managed through this action. These activities include fisheries conducted by Indian tribes pursuant to treaties with the U.S. government, research catches, fishing under exempted fishing permits (EFPs) (which allow fishing otherwise prohibited in regulations), and incidental catch in fisheries targeting species other than groundfish. The quantity once these deductions are made is referred to as the fishery harvest guideline (HG).
- **Allocating fishing opportunity** to different groundfish fisheries based on the fishery HG. For the 2013-14 biennium allocations between trawl and nontrawl portions of the fishery for 21 management units are based on pre-specified proportions enumerated in the allocation

[2] Question 3, *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 46 FR 18026 (March 23, 1981) and 51 FR 15618 (April 25, 1986).

scheme described in the Groundfish FMP (PFMC 2011b, Section 6.3).[3] Another eight allocations are determined as part of this biennial decision process, when a fixed allocation is suspended because a stock is overfished, for example. Within the trawl fishery, Pacific whiting is allocated between shoreside and at-sea components of the fishery along with "set asides" of certain overfished species, to account for catches in the at-sea whiting fishery. Allocations are particularly important for IFQ and co-op management since harvesters receive individual allocations of harvest opportunity based on the allocation to the sector, but for some sectors and stocks they are adjusted biennially. The Council considered alternate allocation schemes for these management units and sectors but in all but one case a single, preferred allocation scheme is carried forward into the integrated alternatives. The exception is the allocation scheme for the nearshore fishery where there are sub-alternatives that explore alternative allocations between Oregon and California.

- **Identifying accountability measures** used to prevent harvest from exceeding the ACLs adopted for each stock and achieve other conservation and management objectives described in the groundfish FMP. These measures are described in more detail below.

While incorporating these elements, the action alternatives apply status quo harvest management policies in most cases, but the best available scientific information (more recent stock assessments) is used to determine ACL values. For five of the seven overfished species new information confirms that the harvest rate in the current rebuilding plan will result in the stock being rebuilt by the target year and no changes in their rebuilding plans are proposed. For two overfished species, canary rockfish and POP, the most recent scientific information reveals that it is unlikely that they can rebuild by the current target year even if all catch of these stocks was prohibited beginning in 2013. For these two stocks the harvest rate in the rebuilding plan is maintained, resulting in a revision in the target rebuilding year. Experience in managing groundfish fisheries provides evidence that it is extremely difficult, if not impossible, for harvesters to avoid all catch of these stocks (even when retention is prohibited) so a "zero harvest" scenario (resulting in the fastest possible rebuilding time) would likely involve severely restricting or closing many groundfish fisheries, with significant adverse socioeconomic impacts. Therefore, the rebuilding times for these two stocks should be adjusted consistent with the need to consider the status and biology of the stocks and the impacts of different policies on harvesters and coastal communities. Applying the rebuilding plan harvest rate, canary rockfish is projected to rebuild in 2030 rather than the rebuilding plan target year of 2027, while POP is projected to rebuild by 2051 rather than the current rebuilding plan target year of 2020.

The integrated alternatives are built around these needed changes to the rebuilding plans for canary rockfish and POP north of 40°10 N. latitude. Canary rockfish and POP ACLs are strategically arrayed in the integrated alternatives to illuminate how each species might differentially constrain fishing opportunities by sector (or gear type) and region along the west coast, depending on the amount of allowable harvest of each species (see Table ES-2). The analysis of the integrated alternatives illuminates the tradeoffs between MSA conservation and socioeconomic objectives in terms of alternative ACLs for overfished species (specifically, canary rockfish and POP).

In November 2011 and April 2012 the Council identified a preferred alternative for analysis in this EIS. Under the Council's decision-making schedule the preferred alternative will be confirmed, with possible modifications, at the June 2012 Council meeting. Any modifications to the preferred alternatives made in June 2012 will be described in the Final EIS (FEIS).[4]

[3] Sablefish, because of its value in both trawl and fixed gear fisheries, has a different, more complicated allocation scheme.

[4] Consistent with Council on Environmental Quality (CEQ) regulations (40 CFR 1502.9), if the "agency makes substantial changes in the proposed action that are relevant to environmental concerns" the DEIS must be

The June Council meeting occurs during the 45-day public comment period on the DEIS. To help those planning to comment, information about the Council's decision will be made available after the June 2012 Council meeting on the Council website (www.pcouncil.org).

Table ES-1. Comparison of No Action and Action Alternatives ACLs.

Stock	No Action (2012 ACL)	Action Alternatives ACLs		No Action ACL less than/equal Action ACL?
		2013	2014	
OVERFISHED STOCKS				
Bocaccio S. of 40^{o}10'	274	320	337	Yes
Canary	107	a//	a/	N/A
Cowcod S. of 40^{o}10'	3	3	3	Yes
Darkblotched	296	317	330	Yes
Pacific Ocean Perch	183	a/	a/	N/A
Petrale Sole	1,160	2,592	2,652	Yes
Yelloweye	17	18	18	Yes
NONOVERFISHED STOCKS				
Arrowtooth Flounder	12,049	6,157	5,758	**No**
Black Rockfish (OR-CA)	1,000	1,000	1,000	Yes
Black Rockfish (WA)	415	411	409	**No**
Cabezon (CA)	168	163	158	**No**
Cabezon (OR)	48	47	47	**No**
California scorpionfish	126	120	117	**No**
Chilipepper S. of 40^{o}10'	1,789	1,690	1,647	**No**
Dover Sole	25,000	25,000	25,000	Yes
English Sole	10,151	6,815	5,646	**No**
Lingcod N. of 42º (OR & WA) b/	2,151	2,010	1,897	**No**
Lingcod S. of 42º (CA) b/	2,164	2,137	2,044	**No**
Lingcod N. of 40º10' b/	N/A	3,036	2,878	N/A
Lingcod S. of 40º10' b/	N/A	1,111	1,063	N/A
Longnose skate	1,349	2,000	2,000	Yes
Longspine Thornyhead (coastwide)	N/A	N/A	N/A	N/A
Longspine Thornyhead N. of 34°27'	2,064	2,009	1,958	**No**
Longspine Thornyhead S. of 34°27'	366	356	347	**No**
Pacific Cod	1,600	1,600	1,600	Yes
Sablefish (coastwide)	NA	NA	NA	N/A
Sablefish N. of 36°	5,347	4,012	4,349	**No**
Sablefish S. of 36°	1,298	1,439	1,560	Yes
Shortbelly	50	50	50	Yes
Shortspine Thornyhead (coastwide)	NA	NA	NA	Yes
Shortspine Thornyhead N. of 34°27'	1,556	1,540	1,525	**No**

recirculated or supplemented. Since meeting this requirement would likely delay implementation of the regulations for the 2013-14 fishery, the Council is not likely to recommend substantial changes at the June 2012 meeting.

Stock	No Action (2012 ACL)	Action Alternatives ACLs		No Action ACL less than/equal Action ACL?
Shortspine Thornyhead S. of 34°27'	401	397	393	**No**
Splitnose S. of 40°10’	1,538	1,610	1,670	Yes
Starry Flounder	1,360	1,520	1,528	Yes
Widow c/	600	1,500	1,500	Yes
Yellowtail N. of 40°10’	4,371	4,378	4,382	Yes
STOCK COMPLEXES				
Minor Nearshore Rockfish North	99	94	94	**No**
Minor Shelf Rockfish North	968	968	968	Yes
Minor Slope Rockfish North	1,160	1,160	1,160	Yes
Minor Nearshore Rockfish South	990	990	990	Yes
Minor Shelf Rockfish South	714	714	714	Yes
Minor Slope Rockfish South	626	618	622	**No**
Other Flatfish	4,884	4,884	4,884	Yes
Other Fish d/	5,575	2,286	2,265	**No**

a/ A range of alternatives is considered for these stocks; see Table ES-2.
b/ Under the Action Alternatives the lingcod management line is shifted from the OR-CA border at 42° N. latitude to 40°10’ N. latitude. The ACLs for the new management line cannot be compared to No Action.
c/ Alternative ACLs for widow are evaluated, but are not included in the integrated alternatives.
d/ Values for these specifications are the sum of known contributions of component stocks.

TableES-2. 2013-14 ACLs for overfished species (mt) under the integrated alternatives.

Species	No Action		Alt. 1		Alt. 2		Alt. 3		Alt. 4		Alt. 5		Alt. 6		Alt. 7		Alt. 8	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Bocaccio	274	274	320	337	320	337	320	337	320	337	320	337	320	337	320	337	320	337
Canary	**107**	**107**	**116**	**119**	**101**	**104**	**116**	**119**	**48**	**49**	**216**	**220**	**101**	**104**	**147**	**151**	**147**	**151**
Cowcod	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Darkblotched	296	296	317	330	317	330	317	330	317	330	317	330	317	330	317	330	317	330
POP a/	**183**	**183**	**150**	**153**	**150**	**153**	**74**	**76**	**247**	**251**	**74**	**76**	**222**	**226**	**222**	**226**	**150**	**153**
Petrale	1,160	1,160	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652	2,592	2,652
Yelloweye	17	17	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

a/ Under No Action, a 157 mt annual catch target (ACT) is implemented.

Accountability Measures

Accountability measures applied under the integrated alternatives are summarized in Table ES-3. Existing measures are described under the No Action Alternative in Chapter 2 and would be reapplied in 2013-14 with any necessary adjustments. The proposed action also includes proposed new accountability measures not yet included in Federal groundfish regulations. Existing and new measures are summarized below.

Existing Accountability Measures

The groundfish fishery is managed using an array of measures that vary by different user groups or what fishery managers refer to as "sectors." These sectors and the management approach used are:

- The shorebased IFQ fishery is managed with individual fishing quotas for most management units and cumulative landing limits ("trip limits") for some non-target species. All vessels must carry observers to monitor catch and discards.
- At-sea Pacific whiting with cooperative (co-op) fisheries include the mothership-catcher vessel sector managed by co-op participation established in Federal regulation and the catcher-processor managed by a single voluntary co-op. The mothership-catcher vessel sector must organize as one or more co-ops, or a vessel could participate in the non-co-op fishery. For 2013-14, it is expected that there will be a single mothership-catcher vessel co-op. Mothership-catcher vessel co-op(s) receive a Pacific whiting catch allocation based on the catch history of participants. The catcher-processer sector receives an allocation for the single voluntary co-op. Observers monitor catch aboard the processing vessel. Allocations for those overfished groundfish normally caught in these fisheries are also assigned to the co-ops.
- Limited entry fixed gear (longline and pot): A gear-endorsed limited entry permit is required to participate; vessels may receive an allocation of sablefish to harvest during the "primary or tier fishery" (which is open April to October) based on the permits "stacked" on their vessel. Outside the primary season, vessels fish under daily trip limits. Observers monitor catch and discards on about a fifth of the fleet. These data are used to estimate total mortality of overfished species.
- The "directed open access" sector describes vessels that do not possess a Federal groundfish limited entry permit and target groundfish, principally with fixed gear. These vessels may target sablefish in the "non-nearshore" fishery (i.e., seaward of the RCA) or rockfish in the nearshore fishery. Like the limited entry fixed gear sector this fishery is subject to partial observer coverage, which varies annually between 4 and 15 percent.
- Other vessels catch groundfish incidentally while targeting species not managed under the groundfish FMP. In general, this incidental catch is estimated as part of the effort to track total catch against ACLs.

Groundfish conservation areas are also used to manage bycatch in commercial and recreational groundfish fisheries. These closed areas include gear-specific, depth-based time/area closures—most notably, RCAs—intended to reduce bycatch of overfished rockfish, and other closed areas for bycatch reduction and habitat protection. Section 6.8 in the Groundfish FMP (PFMC 2011b) describes these areas.

Several Washington Coast Indian tribes have treaty rights to fish for groundfish in their usual and accustomed fishing grounds. The Federal government has accommodated these fisheries through a regulatory process described at 50 CFR 660.50. The Council works through the tribes' representative on the Council to set aside a portion of the ACLs or establish a formal allocation for groundfish to account for tribal harvests.

Recreational fisheries are managed by the states, with their management proposals coordinated through the Council process to ensure these measures are consistent with harvest policies and other elements of the Groundfish FMP. Management measures include seasonal closures by state marine region, bag and size limits, time-area closures, and other closed areas. These measures are used to manage catch of recreational target species but are particularly aimed at limiting the catch of overfished species, most often yelloweye and canary rockfish. State representatives on the Council develop their recreational management proposals consistent with the ACLs and HGs discussed above.

The states have primary management responsibility for managing fisheries in state waters (generally, within 3 miles of shore). California and Oregon limit entry to the nearshore groundfish fishery by requiring a state limited entry permit to take commercial quantities of nearshore groundfish species. Washington does not allow a nearshore commercial fishery. State harvest targets or guidelines are lower than those specified in Federal regulations for most nearshore species, and state trip limits take precedence over Federal limits in these cases. State trip limits are designed to keep fishing mortality within nearshore species limits while providing year-round fishing opportunity, if possible. Federal management measures for west coast nearshore commercial groundfish fisheries are typically stratified north and south of 40°10' north latitude (near Cape Mendocino, California).

New Accountability Measures

The Council considered several new accountability measures, adopting a subset to recommend for implementation, as indicated below. These measures are primarily intended to improve program performance. For the purpose of evaluating their environmental impacts, the Council-preferred measures are considered to be part of all the action alternatives while under the No Action Alternative none of these measures would be implemented. Appendix C contains more detailed evaluations of these measures. The measures considered by the Council are:

- Modifications to the boundaries defining RCAs (Council preferred)
- Allowing unused amounts of the ACL set aside for certain purposes to be allocated to commercial fisheries (Council preferred)
- Sorting requirements for aurora, shortraker, and rougheye rockfish north of 40°10’ N. latitude
- A technical correction for catch accounting between limited entry and open access portions of the fishery (Council preferred)
- Revising requirements for vessel offloading
- Revising within-trawl allocations of widow rockfish
- Revising accumulation limits for the shorebased IFQ fishery
- Specifying a process for determining the carryover of surplus quota pounds from one year to the next in the shorebased IFQ fishery
- Removing the lingcod length limit in the shorebased IFQ fishery (Council preferred)
- Allowing recreational shelf rockfish retention in the Cowcod Conservation Area (Council preferred)
- Removing the California recreational bocaccio size limit (Council preferred)
- Correction to regulations for vessels switching from the primary sablefish fishery to the daily trip limit fishery (Council preferred)

Table ES-3. Summary description of accountability measures in the integrated alternatives

No Action – Section 2.4.1		
2012 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-67	
Canary rockfish and POP ACLs (mt)	107	183
Accountability Measures	In place January 1, 2012	
ACL deductions and allocations	See Table 2-70– Table 2-76	
Routine management measures	Sections 2.4.12 – 2.4.1.6	
New management measures	N/A	
Alternative 1 (Preliminary Preferred) – Section 2.4.2		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-48 and Table 2-49	
Canary rockfish and POP ACLs (mt)	116/119	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in section 2.2; overfished species allocations in Table 2-82; option to change trawl-nontrawl cowcod allocation	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery off Oregon 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 2 – Section 2.4.3		
2013-14 Harvest Specifications	OFLs and ABCs described and enumerated in section 2.1; ACLs listed in Table 2-46 and 2-47 except for canary and POP (see Table 2-67 and Table 2-68)	
Canary rockfish and POP ACLs (mt)	101/104	150/153
Accountability Measures		
ACL deductions and allocations	Described and enumerated in section 2.2; overfished species allocations in Table 2-80 except canary and POP allocations in Table 2-88	
Routine management measures	Same as No Action for most fisheries; changes to management for 1) nearshore fixed gear fishery with options for Oregon and California, 2) recreational fisheries in California with options to change current depth restrictions in Southern California	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 3 – Section 2.4.4		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	116/119	74/76
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-90	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	

Alternative 4 – Section 2.4.5		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	48/49	247/251
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-92	
Routine management measures	Changes needed mainly because of the low canary rockfish ACL; adjustments to RCAs for the shorebased IFQ fishery and nonnearshore fixed gear fishery; changes to Oregon and California recreational fisheries; various suboptions included for these management measure changes	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 5– Section 2.4.6		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	216/220	74/76
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-96	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 6 – Section 2.4.7		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	101/104	222/226
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-97	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 7 – Section 2.4.7		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	147/151	222/226
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-100	
Routine management measures	As described for Alternative 2	
New management measures	Described in section 2.3; apply across all the action alternatives	
Alternative 8 – Section 2.4.7		
2013-14 Harvest Specifications	As described for Alternative 2	
Canary rockfish and POP ACLs (mt)	147/151	150/153
Accountability Measures		
ACL deductions and allocations	As described for Alternative 2 except canary and POP allocations in Table 2-102	
Routine management measures	As described for Alternative 2	

New management measures	Described in section 2.3; apply across all the action alternatives

Impacts of the Alternatives

Groundfish Species

Table ES–1 compares the groundfish ACLs between No Action and the action alternatives. As discussed above, in terms of biological impact, No Action ACLs that are less than the action alternatives ACLs would also have a less adverse biological impact, although they could result in less socioeconomic benefit. In Table ES–1, there are 15 cases where the No Action ACL exceeds the action alternative ACL, which is inconsistent with the harvest management framework and could result in greater adverse impacts. Pacific whiting is not included in Table ES–1 because this species is assessed annually and the harvest limit is set based on the terms of the Agreement with Canada on Pacific Hake/Whiting (discussed further below). For the purposes of analysis, the 2011 value is used along with a discussion of potential impacts if the actual total allowable catch (TAC) in 2013-14 differs from that level.

Overfished Species

Only the ACLs for canary rockfish and POP vary both between the No Action and the action alternatives and among the action alternatives. Thus, comparing biological impacts of the alternatives focuses on these two overfished stocks. The ACLs can be compared to rank the alternatives. ACLs represent a short-term biological impact in terms of the potential fishing mortality that would be authorized. In addition, since the ACLs are determined from the harvest rate that would be incorporated into the revised rebuilding plan they can serve as a proxy for the long-term rebuilding objective. Comparing the action alternatives to No Action is problematic since the No Action ACL for these two stocks is based on different assumptions about the status of these stocks, using information on older stock assessments. But for comparison only, these No Action ACLs may be associated with a harvest rate that, if applied for the duration of the rebuilding period, would result in a corresponding target rebuilding year earlier than a target year associated with a higher ACL. Using this logic, Figure ES-1 shows how the alternatives rank in terms of the canary rockfish and POP ACLs. A lower rank value corresponds to a lower ACL and presumed less adverse biological impact. One way to compare the alternatives with respect to both ACLs is to simply re-rank them based on the individual rankings for the two species. Using that approach, Alternative 2 has the least adverse biological impact while the Preferred Alternative (Alternative 1) ranks third after Alternative 3 and tied with No Action, Alternative 4, and Alternative 6.

Table ES-4 and ES-5 show estimates of the projected catch of overfished species under the alternatives and these estimates as a percentage of the ACL. It can be seen that for many of the overfished species this attainment rate is well below 100 percent. Over time, if actual catches stay proportionately below the implemented ACL, the overfished species are likely to rebuild earlier than predicted based on the ACLs.

Species	No Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Canary	3	4	2	4	1	6	2	5	5
POP	3	2	2	1	5	1	4	4	2

Figure ES–1. Rank of canary rockfish and POP ACLs across the integrated alternatives. 1=lowest ACL/least adverse impact.

Table ES–4. Projected 2013 mortalities (landings plus discard mortalities in mt) of overfished west coast groundfish stocks under the integrated alternatives.

Species		No Action Alt.	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Bocaccio	mt	67.9	59.2	59.2	59.2	30.8	59.2	59.2	59.2	59.2
	% of ACL	24.8%	18.5%	18.5%	18.5%	9.6%	18.5%	18.5%	18.5%	18.5%
Canary	mt	53.6	54.6	52.6	54.3	37.7	67.1	52.6	58.5	58.5
	% of ACL	50.1%	47.1%	45.4%	46.8%	32.5%	57.8%	45.4%	50.5%	50.5%
Cowcod	mt	0.6	0.3	0.3	0.3	0.1	0.3	0.3	0.3	0.3
	% of ACL	20.6%	11.2%	11.2%	11.2%	4.6%	11.2%	11.2%	11.2%	11.2%
Darkblotched	mt	92.5	86.6	86.6	76.4	81.5	76.4	86.6	86.6	86.6
	% of ACL	31.3%	27.3%	27.3%	24.1%	25.7%	24.1%	27.3%	27.3%	27.3%
POP	mt	62.3	57.6	57.6	47.9	57.8	47.9	59.8	59.8	57.6
	% of ACL	34.1%	38.4%	38.4%	31.9%	38.5%	31.9%	39.9%	39.9%	38.4%
Petrale	mt	675.9	618.7	618.7	546.7	550.0	546.7	618.9	618.9	618.7
	% of ACL	58.3%	23.9%	23.9%	21.1%	21.2%	21.1%	23.9%	23.9%	23.9%
Yelloweye	mt	15.8	15.9	15.9	15.9	13.8	15.9	15.9	15.9	15.9
	% of ACL	93.2%	88.6%	88.6%	88.5%	76.4%	88.5%	88.6%	88.6%	88.6%

Table ES-5. Projected 2014 mortalities (landings plus discard mortalities in mt) of overfished west coast groundfish stocks under the integrated alternatives.

Species		No Action	Alt. 1b Pref.	Alt. 2b	Alt. 3b	Alt. 4b	Alt. 5b	Alt. 6b	Alt. 7b	Alt. 8b
Bocaccio	mt % of ACL	67.9 24.8%	59.2 17.6%	59.2 17.6%	59.2 17.6%	33.8 10.0%	59.2 17.6%	59.2 17.6%	59.2 17.6%	59.2 17.6%
Canary	mt % of ACL	53.6 50.1%	55.1 46.3%	53.1 44.6%	54.4 45.7%	38.3 32.2%	67.7 56.9%	53.1 44.6%	59.2 49.8%	59.2 49.8%
Cowcod	mt % of ACL	0.6 20.6%	0.3 11.2%	0.3 11.2%	0.3 11.2%	0.1 4.6%	0.3 11.2%	0.3 11.2%	0.3 11.2%	0.3 11.2%
Darkblotched	mt % of ACL	92.5 31.3%	87.4 26.5%	87.5 26.5%	77.3 23.4%	82.6 25.0%	77.3 23.4%	87.5 26.5%	87.5 26.5%	87.4 26.5%
POP	mt % of ACL	62.3 34.1%	57.4 37.5%	57.6 37.7%	47.9 31.3%	58.1 37.9%	47.9 31.3%	60.2 39.4%	60.0 39.2%	60.0 39.2%
Petrale	mt % of ACL	675.9 58.3%	616.3 23.2%	618.7 23.3%	546.7 20.6%	550.0 20.7%	546.7 20.6%	618.9 23.3%	618.9 23.3%	616.3 23.2%
Yelloweye	mt % of ACL	15.8 93.2%	16.0 89.1%	16.0 89.1%	16.0 89.1%	13.7 75.8%	16.0 89.1%	16.0 89.1%	16.0 89.1%	16.0 89.1%

Change in the Target Year for Canary Rockfish and POP

Applying the current rebuilding plan SPR harvest under Preferred Alternative 1 using information in the latest stock assessments and rebuilding analyses results in increasing the canary rockfish ACL by 9 mt while the POP ACL is reduced by 30 mt compared to No Action.[5] As discussed above, the target year for canary rockfish changes by 3 years, from 2027 to 2030 and the target year for POP changes by 31 years, from 2020 to 2051.

The current rebuilding plan harvest rate produces different results for POP compared to canary rockfish because of revised estimates of certain stock parameters. Figure ES-2 depicts estimates for unfished spawning biomass and current spawning biomass from 2009 and 2011. For both stocks the estimate of terminal year (i.e., the last year modeled in each respective assessment) spawning biomass increased slightly between 2009 and 2011: by 16 percent for POP and 5 percent for canary rockfish. The estimate of POP unfished spawning biomass increased dramatically, with a 74 percent higher estimate than that estimated in 2009. Since depletion, the metric used to gauge stock status expresses the ratio of current to unfished spawning biomass; this change resulted in the estimate of depletion declining from 27 percent in 2009 to 16 percent in 2011 (i.e., in 2011 the stock was slightly less than about one-sixth the size it would be if no fishing had occurred).[6] The resetting of the depletion level, because of the re-estimation of unfished biomass, means that POP has “farther to go” to get to the rebuilt target biomass. Also, new information indicates POP is a less productive stock than previously thought, as measured by the

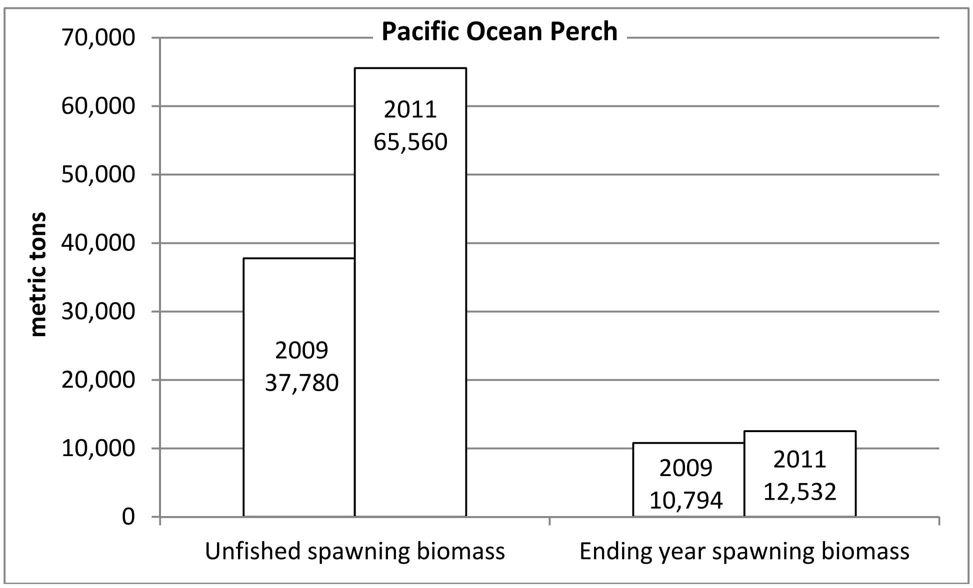
5 Harvest rates are presented in terms of the spawning potential ratio (SPR). This is a percent value indicating an effective harvest rate that would return the population to a given level of spawning potential (reproductive output) in relation to the spawning potential of the unfished population. A *higher* SPR harvest rate value corresponds to a *lower* effective fishing mortality rate. (An SPR harvest rate of 100%, for example, corresponds to the zero harvest level.) Expressing the harvest policy in terms of an SPR rate allows more straightforward comparison across a range of species and policy choices.

6 Under the groundfish FMP a rockfish stock is considered overfished when the current biomass falls to one-quarter of its estimated unfished biomass.

steepness of the stock-recruitment relationship. This means that—other things being equal—the rate of natural increase in the population is slower than previously thought. Even if no POP were caught in fisheries the estimated time to rebuild the stock changed from 2018 based on information available in 2009 to 2043 using the most recent, 2011, information.

For canary rockfish estimated unfished spawning biomass increased by only 7 percent resulting in a small change in the depletion estimate (from 23.7 to 23.2 percent). In contrast to POP, applying the current SPR harvest rate results in small increases in the canary ACLs for 2013-14, because there was no change to the assumed steepness value in the most recent canary stock assessment model—the estimated productivity or rate of natural increase remained the same. Therefore the estimated increase in population size translates directly into an increase in the ACL. Furthermore, different assumptions were used in the most recent canary rockfish rebuilding analysis about the relative catch by different gear types so that the portion of the biomass vulnerable to the fishery was determined to be higher, affecting the computation of the ACLs.

a.



b.

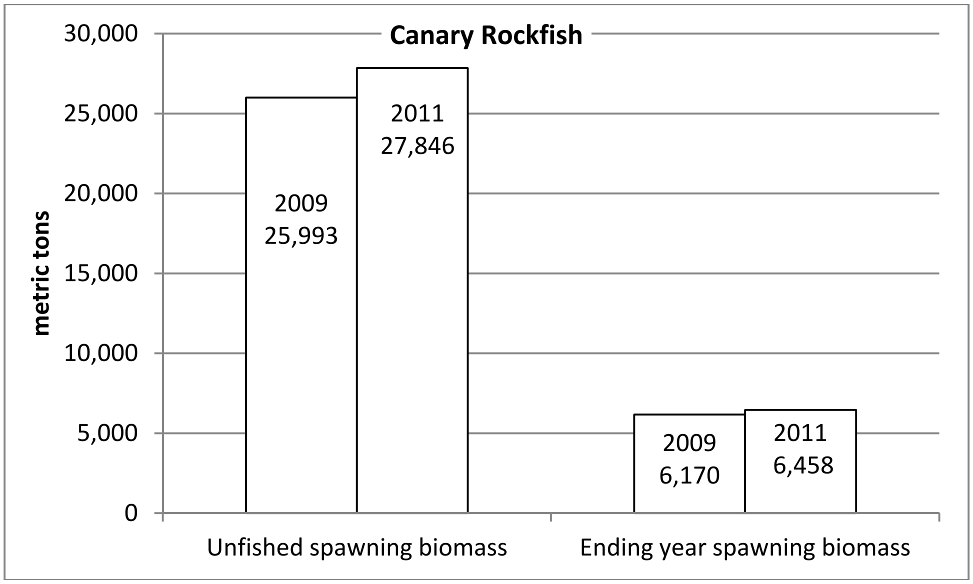


Figure ES-2. Estimates of unfished spawning biomass and current year spawning biomass from 2009 and 2011 for a.) Pacific ocean perch and b.) canary rockfish.

The Council is recommending keeping to a constant harvest rate because, as stock biomass increases, the ACL increases correspondingly (essentially, a constant fraction of the population, rather than quantity, is removed from the population). Maintaining the No Action ACL of 107 mt would imply a constant catch policy in which the ACL would be set at a fixed value for the duration of the rebuilding period. This strategy is problematic if, as the stock becomes more abundant, harvesters have a harder time avoiding incidental catch. Fishery managers would then have to impose even more restrictive measures to prevent the ACL from being exceeded. Furthermore it is not clear that a harvest rate associated with this lower ACL would rebuild the stock any faster than the Preferred Alternative since decreasing the SPR harvest rate from the default 88.7 percent to 90 percent—an ACL of 101 mt in 2013—shortens rebuilding by only one year.

Slight absolute changes in the canary rockfish ACL (such as the 9 metric tons referenced above) can disproportionately affect performance of the fishery because this species is distributed across a wide depth range, increasing the risk of catching them across a variety of groundfish fisheries. The shoreside IFQ fishery offers an example of how the canary rockfish ACL can affect fishing. The IFQ fishery caught 17 percent of their canary rockfish allocation in 2011, which likely reflects a high level of risk aversion, because of the unpredictability and potentially high cost of a tow containing a large amount of canary rockfish that would have to be covered by purchased quota pounds (Holland and Jannot 2012). Since canary rockfish are more likely to be caught in shallower depths on the continental shelf, IFQ fishery participants avoided fishing in these areas, also foregoing some target species catch, such as flatfish, that are also more abundant on the continental shelf. This is reflected in the 21 percent reduction from 2010 to 2011in flatfish landings during the months of June to August.[7] Flatfish are caught almost exclusively on the continental shelf during these months.

Widow Rockfish and Pacific Whiting

In addition to the variation in the canary rockfish and POP ACLs that form the basis of the integrated alternatives, this EIS also evaluates alternate ACLs for widow rockfish and Pacific whiting. Widow

[7] Based on a query of PacFIN data, May 16, 2012.

rockfish, a previously overfished species, was determined to be rebuilt to the target biomass in 2011. The widow rockfish ACL included in the No Action Alternative (600 mt) represents a continuation of the current harvest policy. However, this stock could sustain higher harvest levels, which could allow limited target fishing opportunities to develop. Conversely, given scientific uncertainty about its status, the Council wants to proceed cautiously in recommending higher harvest limits. To this end, the action alternatives include an ACL of 1,500 mt and a 2,500 mt ACL is evaluated outside the integrated alternatives.[8] A directed fishery could yield additional ex-vessel revenue of $1.2 to 4.2 million. Pacific whiting is managed consistent with the Agreement with Canada on Pacific Hake/Whiting (the Agreement) and the Pacific Whiting Act (the Act). The Joint Management Committee established pursuant to the Agreement and the Act recommends the coastwide TAC and corresponding U.S. TAC for Pacific whiting no later than March 25 of each year. Therefore, the actual U.S. TACs for 2013 and 2014 were not known when this EIS was prepared. Instead, for the purpose of analysis, the 2011 harvest level is used in the integrated alternatives. The effects of higher and lower TACs are then analyzed outside the integrated alternatives. Potential revenues, if 2013 or 2014 TACs varied from the 2011 harvest level in this range, could be between $12.1 and $98.1 million compared to 2011 ex-vessel revenue of $53.3 million.

Groundfish Fisheries

Table ES–5 shows the change in projected ex-vessel revenue from No Action across the integrated alternatives by fishery sector. All sectors show a decline in ex-vessel revenue compared to the No Action alternative.

- The shoreside IFQ fishery (shoreside whiting and nonwithing trawl) shows the smallest decline from No Action under Alternatives 6 and 7 followed by Alternatives 1, 2, and 8. Alternatives 3 and 5 show the largest decline from No Action.
- Limited entry fixed gear shows the same decline in ex-vessel revenue of $3.8 million across all the alternatives. This change is mainly due to the lower ACL for sablefish, which is the most valuable species coastwide.
- Nearshore open access fixed gear ex-vessel revenue changes depending on the two sub-alternatives considered. Under sub-alternative A revenue declines by $733,000 under Alternatives 1-3 and 5-8 and $698,000 under Alternative 4. Under sub-alternative B revenue declines by $539,000 under Alternatives 1-3 and 5-8 and $1.5 million under Alternative 4.
- Non-nearshore open access fixed gear shows the same decline in revenue across all the alternatives of $539,000 and tribal fisheries show a decline of $1million across all the alternatives.
- Across all groundfish fishery sectors Alternative 4 would result in the largest decline in ex-vessel revenue of between $14.70 and $15.53 million while Preferred Alternative 1 shows a decline of between $8.98 and $9.17 million.

West Coast Fishing Communities Engaged in Groundfish Fisheries

Table ES–7 summarizes the impacts of the alternatives on fishing communities expressed as the change in personal income from No Action. Summarizing this information still further at the state level, in absolute terms Oregon shows the largest absolute decline in revenue, ranging between $5.0 and $11.8 million depending on the alternative, followed by Washington ($2.5-$3.6 million) and California ($1.3-$8.9

[8] The socioeconomic impacts of projected landings (ex-vessel revenue, personal income, employment) are estimated for the integrated alternatives. These “outside” variations in ACLs are evaluated with respect to potential ex-vessel revenue but personal income impact estimates were not made, since such estimates require modeling coastwide fisheries for each different ACL.

million). Similar to the change in ex-vessel revenue, the largest decline in personal income would be experienced under Alternative 4 ($16.8-$23.9 million depending on sub-alternative). Changes in coastwide personal income from No Action under Preferred Alternative 1 declines between $9.0 to $9.2 million (depending on sub-alternative), the second lowest decline behind Alternatives 6 and 7.

Table ES-6. Change in groundfish ex-vessel revenues from No Action by groundfish harvest sector under the 2013-14 integrated alternatives ($1,000).

Alternative:	No Action	1	2	3	4	5	6	7	8
Shoreside Sectors:									
Whiting	*23,650*	-278	-278	-2,296	-2,584	-2,296	-110	-110	-278
Nonwhiting Trawl	*26,912*	-3,175	-3,175	-6,238	-5,157	-6,238	-3,162	-3,162	-3,175
Limited Entry Fixed Gear	*19,068*	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782	-3,782
Nearshore Open Access (A)	*4,218*	733	733	733	-698	733	733	733	733
Nearshore Open Access (B)		539	539	539	-1,531	539	539	539	539
Non-nearshore Open Access	*7,687*	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436	-1,436
Incidental Open Access	*151*	-	-	-	-	-	-	-	-
Tribal (incl. whiting)	*11,825*	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042	-1,042
At-Sea Sectors:									
Non Tribal Whiting	*30,890*	-	-	-	-	-	-	-	-
Tribal Whiting	*9,675*	-	-	-	-	-	-	-	-
TOTAL CHANGE IN SHORESIDE REVENUES ($1,000)	*93,512*								
Nearshore Sub-alternative A		**-8,980**	**-8,980**	**-14,061**	**-14,698**	-14,061	-8,798	-8,798	**-8,980**
Nearshore Sub-alternative B		**-9,174**	**-9,174**	**-14,255**	**-15,531**	-14,255	-8,992	-8,992	**-9,174**

Table ES-7. Change in combined commercial plus recreational fishery income impacts (from No Action) by community group ($1,000).*

Community Groups	*No Action*	Alternative 1A	Alternative 2A	Alternative 3A	Alternative 4A	Alternative 5A	Alternative 6A	Alternative 7A	Alternative 8A
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*16,905*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*27,877*	-1,888	-1,888	-5,540	-5,826	-5,540	-1,700	-1,700	-1,888
Newport	*16,025*	-1,558	-1,558	-1,937	-2,180	-1,937	-1,526	-1,526	-1,558
Coos Bay-Brookings	*13,881*	-1,810	-1,810	-2,026	-2,453	-2,026	-1,810	-1,810	-1,810
Crescent City-Eureka	*7,937*	-902	-902	-1,735	-907	-1,735	-889	-889	-902
Fort Bragg - Bodega Bay	*5,786*	-600	-600	-629	-496	-629	-600	-600	-600
San Francisco Area	*7,616*	-299	-299	-302	-624	-302	-299	-299	-299
SC – Mo - MB	*13,948*	+453	+453	+431	-1,120	+431	+453	+453	+453
SB – LA - SB	*52,167*	+69	+69	+69	+25	+69	+69	+69	+69
Coastwide Total	*164,518*	-8,996	-8,996	-15,297	-16,830	-15,297	-8,761	-8,761	-8,996

Community Groups	*No Action*	Alternative 1B	Alternative 2B	Alternative 3B	Alternative 4B	Alternative 5B	Alternative 6B	Alternative 7B	Alternative 8B
Puget Sound	*2,376*	-509	-509	-610	-513	-610	-509	-509	-509
Washington Coast	*16,905*	-1,952	-1,952	-3,019	-2,736	-3,019	-1,952	-1,952	-1,952
Astoria-Tillamook	*27,877*	-1,909	-1,909	-5,561	-5,941	-5,561	-1,721	-1,721	-1,909
Newport	*16,025*	-1,564	-1,564	-1,943	-3,197	-1,943	-1,532	-1,532	-1,564
Coos Bay-Brookings	*13,881*	-1,925	-1,925	-2,140	-2,650	-2,140	-1,924	-1,924	-1,925
Crescent City-Eureka	*7,937*	-902	-902	-1,735	-1,401	-1,735	-889	-889	-902
Fort Bragg - Bodega Bay	*5,786*	-600	-600	-629	-1,406	-629	-600	-600	-600
San Francisco Area	*7,616*	-299	-299	-302	-2,642	-302	-299	-299	-299
SC – Mo - MB	*13,948*	+453	+453	+431	-3,387	+431	+453	+453	+453
SB – LA - SB	*52,167*	+69	+69	+69	-28	+69	+69	+69	+69
Coastwide Total	*164,518*	-9,138	-9,138	-15,439	-23,901	-15,439	-8,903	-8,903	-9,138

Note: upper panel shows A sub-alternatives for nearshore open access and recreational sectors; lower panel shows B sub-alternatives. SC- Mo –MB: Santa Cruz - Monterey - Morro Bay; SB – LA – SB: Santa Barbara - Los Angeles - San Diego.

* Although strictly speaking, the two measures are not directly additive due to the slightly different estimation procedures used, combined income impacts generated by commercial and recreational fishing activities are displayed here in order to facilitate comparison of the alternatives.

Comparison of the Socioeconomic Impacts of Alternative 1 and Alternative 8

At the April 2012 meeting, the Council added Alternative 8 to the analysis to evaluate the effect of proceeding with the preferred alternative (Alternative 1) but substituting a higher canary rockfish ACL of 147 mt in 2013 and 151 mt in 2014. These ACLs are associated with a higher SPR harvest rate (85.9 percent versus 88.7 percent) but the estimated target rebuilding year of 2030 does not differ from the preferred alternative. (A higher harvest rate assumes a slightly higher risk of not rebuilding by the target year.) The evaluation of socioeconomic impacts in terms of projected ex-vessel revenue and personal income does not differ between Alternatives 1 and 8, however, even with the higher ACL. This lack of contrast is likely a limitation of the models used to project landings and resulting revenue and income.

Target species catch in fixed gear fisheries is affected the most by management controls needed to limit yelloweye rockfish catch so model projections for these fisheries are less sensitive to changes in the canary rockfish ACL. The shoreside trawl (IFQ) fishery has historically accounted for almost 45 percent of coastwide groundfish ex-vessel revenue (see Table 3-23) so modeling of this fishery has a big effect on overall revenue projections. In addition, trawl gear, especially when used on the continental shelf, does not catch yelloweye rockfish as frequently (because this species lives in rocky habitat inaccessible to trawl gear) but does catch canary rockfish. Catch projection for this fishery is based on catch in 2011—the first year under IFQ management—which may not accurately characterize the future performance of this dynamic fishery. Furthermore, because of the scheduling of this EIS process, data for the last months of 2011 were not yet available at the time catch projection modeling was conducted. As a result fishing patterns in late 2011 had to be inferred from the seasonal distribution in prior years. However as it turned out, catch rose dramatically in December 2011, likely because harvesters were more assured that their quota pound (QP) holdings were sufficient to last the year. Once fishermen have gained more experience with IFQ fishery management, behavior in the future is likely to be different than 2011. For example, an increase in the diversity of species caught is already evident from comparing the first three months of 2012 to 2011 (Sean Matson, NMFS NWR, pers. comm., April 2012). Under IFQ management, where harvesters are individually accountable for covering their catch with matching quota pounds, rebuilding stocks function like performance standards.

Model projections of landings and revenue may not therefore capture the actual benefit of a higher canary rockfish ACL in terms of resulting catch of target species. While the direct revenue realized from landing the small amounts of available rebuilding species stocks is negligible, these stocks leverage access to much higher levels of target species landings. Consequently a higher allocation of canary rockfish to the shoreside IFQ fishery may generate more actual revenue than is forecast using the current catch projection models. As discussed above, the ACL and allocation to the shoreside IFQ fishery dictates the amount of QP available to the fleet based on quota share holdings. Smaller canary rockfish QP holdings in relation to potential unavoidable high bycatch events (so called “disaster tows”) increase risk aversion, affecting fishing behavior (Holland and Jannot 2012). The higher ACL under Alternative 8 could reduce perceived risk, affecting behavior and resulting fleetwide landings and revenue from higher target species landings. These effects are not captured in the catch projection models.

Other Environmental Components

The EIS also evaluates impacts to nongroundfish species, the California current large marine ecosystem, essential fish habitat, and protected species. No models have been developed to predict effects on these environmental components as a result of changes to harvest specifications and management measures established under the proposed action. General inferences may be based on an assumed positive correlation between catch limits and fishing effort and the size and configuration of area closures (e.g., RCAs) that differ under the alternatives. However, given that only ACLs for canary rockfish and POP vary among the action alternatives, and the management measures are similar across the alternatives it is difficult to differentiate between the alternatives in terms of effects to these resources. Because the proposed changes to management are slight in comparison to No Action it is likely that effects of similar type and magnitude would be experienced during the 2013-14 management period as have occurred in previous years. These resources and the effects of fishing on them are described in Chapter 3. Potentially different impacts among the alternatives are as follows:

- **Ecosystem and habitat**: Because a larger RCA would be implemented under Alternative 4 effects may be reduced under this alternative
- **Nongroundfish species**: Alternative 1, 3, 5, and 8 would have greater effects on inshore species while Alternatives 4 and 6 would have greater effects on offshore species. Alternative 7 would affect nongroundfish species equally in both areas.
- **Protected species**: Effects cannot be distinguished among the alternatives. NMFS NWR Sustainable Fisheries Division is consulting with the Protected Resources Division on the likelihood that groundfish fisheries in 2013 and beyond would jeopardize the continued existence of any species listed under the Endangered Species Act pursuant to section 7 of the Act. Any jeopardy finding would be addressed through mandatory or discretionary measures to avoid jeopardy.

Summary Ranking of the Alternatives

Figure ES–3 provides a summary ranking of the alternatives using the ACLs for canary rockfish and POP and the projected coastwide personal income under the alternatives as metrics. The alternatives are ranked for each of these metrics. To arrive at the overall ranking the individual rank values were summed and the alternatives re-ranked. This approach assigns equal weight to the rebuilding decisions for canary rockfish and POP and the associated personal income estimated to result. This approach relates to the tradeoff established in MSA §304(e)(4) between rebuilding in a time "as short as possible" while, among other things, taking into account the "needs of fishing communities." The rebuilding rankings can be compared to socioeconomic costs ("needs of fishing communities"). From a policy or legal perspective equal weighting of these metrics may not be appropriate but there is no clear guidance on an alternative weighting.

Metric	No Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Canary	3	4	2	4	1	6	2	5	5
POP	3	2	2	1	5	1	4	4	2
Income	1	3	3	4	5	4	2	2	3
Overall	**1**	**3**	**1**	**3**	**5**	**5**	**2**	**5**	**4**

Figure ES–3. Rank of canary rockfish and POP ACLs (from Figure ES–1) and coastwide personal income (from Table ES–7). Overall score sums individual metric scores and re-ranks the alternatives. 1=lowest impact/highest benefit.

2.2 Accountability Measures

Accountability measures, which are also referred to as management measures, are used to meet the goals of the MSA and groundfish FMP, including preventing the ACL from being exceeded and correcting or mitigating overages of the ACL if they occur. For the 2013-14 cycle, the first set of AMs are implemented when deductions from the ACL, also called set-asides, are made to account for groundfish mortality in other sectors. The ACL less the set-asides is called the fishery HG or commercial HG (sablefish north of 36° N. latitude and Pacific whiting), which is the amount available for the sector-specific allocations. Sector allocations include formal long-term allocations (e.g., Amendments 6 and 21) and short-term allocations implemented for the biennial period. Section 2.2 details the proposed set-asides and allocations for 2013-14. Section 2.3 and Section 2.4 detail the remaining AMs including groundfish conservation areas (including recreational and commercial area closures), season dates, cumulative landing limits for the commercial fisheries, and bag limits for the recreational fisheries.

2.2.1 Deductions from the ACL

Deductions from most groundfish ACLs are made to account for groundfish mortality in the Pacific Coast treaty Indian tribal fisheries, scientific research, nongroundfish target fisheries (hereinafter incidental open access fisheries), and, as necessary, EFPs. Set-asides from the sablefish north of 36° N. latitude ACL are slightly different due to the sablefish allocation framework (see DEIS Section 2.2.2.1, Amendment 6). Set-asides from the sablefish north of 36° N. latitude ACL include groundfish mortality in tribal fisheries, research, recreational fisheries, and EFPs. The Council and NMFS do not have direct management control over these activities, except for EFPs and recreational fisheries. While NMFS has direct control over the terms and conditions of the EFP permits and recreational fishery management, sufficient yield set-aside must be available to accommodate the anticipated groundfish impacts. Deductions from the ACL to account for these activities are important accountability measures that increase the probability that catches will remain below the ACLs.

If the Council discovers that groundfish mortality in tribal fisheries, scientific research, nongroundfish fisheries, recreational fisheries (sablefish only), and EFPs is higher than estimated during the biennial process, inseason adjustments to management measures may be needed. A wide range of management measure adjustments can be considered for the nontrawl sector (e.g., bag limits, trip limits, season dates), however, limited adjustments can be made in the trawl sector since quota pounds (QP) for the year have already been issued.

Under the No Action Alternative, if the deductions from the ACL are higher than actual mortality, unused portions of the set-aside could allow management measures in the nontrawl fisheries to be adjusted through inseason action to allow for harvest that attains the fishery HGs and ultimately the ACLs. Under No Action, additional catch cannot be reassigned to the trawl sector without recalculating QP for the year, an action which is not considered routine. A proposed action for 2013-2014 would allow the ACL set-asides to be redistributed to the trawl and nontrawl sectors in the event that the amounts set aside are higher than necessary to accommodate groundfish mortality in research, EFP, and incidental open access fisheries. Any amount available for reapportionment would be reapportioned to the sectors in proportion to the original allocations for the calendar year, modified to account for Council recommendations with respect to reapportionment to: 1) sectors that are closed, 2) for reapportionments after September 1 in the IFQ sector, and 3) sectors for which catch of the species to be reapportioned would not be projected to be reached (see Appendix C Section C.2 for more information).

Table 2-48 and Table 2-49 detail the deductions from the preferred ACLs for the 2013-14 cycle, which were used in the analysis of the integrated alternatives. The ACLs for canary and POP vary between the integrated alternatives (see DEIS Section 2.4); however, the set-aside values remain constant. The set-asides for sablefish north of 36° N. latitude are outlined in Table 2-50 and were also used in the analysis of the integrated alternatives. The approach used to calculate appropriate set-asides is similar to the approach used in 2011-2012 (No Action). A brief summary of the calculations behind the set-asides follows below.

2.2.1.1 Tribal Fishery Set-Asides

Tribal fisheries consist of trawl (bottom, mid-water, and whiting), fixed gear, and troll. The requested tribal set-asides are based on the amounts in the January 1, 2012 regulations except for petrale sole and widow rockfish, which were updated based on the projected catches outlined in a letter received from Makah at the November 2011 Council meeting (Agenda Item E.4.b, Supplemental Tribal Report, November 2011). The 2011-2012 set-aside of 45.4 mt for petrale sole was used in the analysis of the integrated alternatives, instead of the tribal projected catches for 2012 of 70 mt noted in the Tribal Report, which was an error. Further, at the April Council meeting, the Makah requested changes to the minor shelf rockfish and shortspine thornyhead set-asides (Agenda Item I.3.b, Supplemental Tribal Report, April 2012). Revisions to the tribal fishery set-asides will be included in the analysis of the final preferred alternative for the FEIS.

2.2.1.2 Research Set-Asides

Research activities include the NMFS trawl survey, International Pacific Halibut Commission longline survey, and other Federal and state research. The Council approach is that set-asides should be equal to the maximum historical scientific research catch from 2005-2010, except for canary rockfish and yelloweye rockfish. The maximum historical catch for canary rockfish was considered a rare event and therefore not used. The yelloweye rockfish set-aside was set higher than the historical maximum to accommodate anticipated research. The Council adopted set-aside values for darkblotched, POP, and widow rockfish, which were used in the integrated alternatives analysis, were incorrectly specified. The Council will be asked in June 2012 to adopt the maximum values, consistent with their preferred approach. There is no practical impact of this error on the results of the integrated alternatives since the maximum value is only slightly higher than the value used in the analysis (see footnote b in Table 2-48 and Table 2-49). The corrected set-asides will be included in the analysis of the final preferred alternative for the FEIS.

As stated above, the Council policy for canary and yelloweye rockfish was not based on the maximum historical value. The Council considered the high canary rockfish research catches of 7.2 mt in 2006 a rare event. The largest catches came from the NMFS trawl survey, and surveys in later years encountered substantially less canary. The Council adopted a 4.5 mt canary rockfish set-aside, which is higher than the average research catch from 2005-2010. For yelloweye rockfish, the Council adopted a 3.3 mt research set-aside based on anticipated research needs of the International Pacific Halibut Commission (1.1 mt), Washington Department of Fish and Wildlife (1 mt), Oregon Department of Fish & Wildlife (1 mt), and other projects (0.2 mt).

2.2.1.3 Incidental Open Access Set-Asides

Deductions from ACLs are made to account for groundfish mortality in the incidental open access fisheries. The set-asides for all species, except longnose skate, were derived from the maximum historical values in the 2007-2010 WCGOP Total Mortality reports. The recommended set-aside for longnose skate was based on data from the 2009 and 2010 Total Mortality reports, the years in which longnose skate were reported separately from the Other Fish category.

2.2.1.4 EFP Set-Asides

The Council adopted three EFPs and set-asides for public review at their November 2011 meeting. The first EFP seeks to test the effectiveness of trolled longline gear to selectively harvest chilipepper rockfish in waters off central California (Agenda Item E.3.a, Attachment 1, November 2011). The second EFP seeks to test the effectiveness of vertical hook-and-line gear to selectively harvest midwater species such as yellowtail rockfish (Agenda Item E.3.a, Attachment 2, November 2011). The third EFP seeks to survey the distribution and size of overfished species in the Rockfish Conservation Area (RCA) off the central coast of California using hook-and-line and trap gear (Agenda Item E.3.a, Attachment 3, November 2011).

The Council adopted a range of EFP total catch limits for the trolled longline and the vertical hook-and-line EFPs but narrowed the values for use in the integrated alternatives analysis. No total catch limits or yield set-asides are required for the third EFP since those catches will be covered using QP allocated in the shorebased IFQ fishery.

2.2.1.5 Recreational (Sablefish north of 36° N. latitude only)

The allocation framework for sablefish north of 36° N. latitude specifies that anticipated recreational catches of sablefish be deducted from the ACL prior to the commercial limited entry and open access allocations. For 2013-2014, the set-aside is the maximum historical value from recreational fisheries from 2004-2011.

Table 2-48. 2013 preferred ACLs and estimates of tribal, EFP, research (Res.), and incidental open access (OA) groundfish mortality in metric tons, used to calculate the fishery harvest guideline, under all integrated alternatives.

Species	Area	ACL	Tribal a/	EFP	Res. b/	OA	Fishery HG
Arrowtooth flounder	Coastwide	6,157	2,041	0	8	30	4,078.0
Black rockfish	N of 46º16' N. lat.	411	14	0	0	0	397.0
Black rockfish	S of 46º16' N. lat.	1,000	0	0	0	0	1,000.0
Bocaccio	S of 40º10' N. lat.	320	0	2.6	1.7	0.7	315.0
Cabezon	46º16' to 42º N.	47	0	0	0	0	47.0
Cabezon	S of 42º N. lat.	163	0	0	0	0	163.0
California scorpionfish	S of 34°27' N. lat.	120	0	0	0	2	118.0
Canary rockfish	Coastwide	116	9.5	0.8	4.5	2	99.2
Chilipepper	S of 40º10' N. lat.	1,690	0	200	9	5	1,476.0
Cowcod	S of 40º10' N. lat.	3	0	0.02	0.1	0	2.9
Darkblotched rockfish	Coastwide	317	0.1	0.2	1.4	18	297.3
Dover sole	Coastwide	25,000	1,497	0	38	55	23,410.0
English sole	Coastwide	6,815	91	0	5	7	6,712.0
Lingcod	N of 40'10º N. lat.	3,036	250	0	5	16	2,765.0
Lingcod	S of 40'10º N. lat.	1,111	0	1.9	0	7	1,102.1
Longnose skate	Coastwide	2,000	56	0	3	3	1,938.0
Longspine thornyhead	N of 34º27' N. lat.	2,009	30	0	13	3	1,963.0
Longspine thornyhead	S of 34º27' N. lat.	356	0	0	1	2	353.0
Minor nearshore rockfish	N of 40º10' N. lat.	94	0	0	0	0	94.0
Minor nearshore rockfish	S of 40º10' N. lat.	990	0	0	0	0	990.0
Minor shelf rockfish north	N of 40º10' N. lat.	968	9	0	3	26	930.0
Minor shelf rockfish south	S of 40º10' N. lat.	714	0	30.2	6	9	668.8
Minor slope rockfish north	N of 40º10' N. lat.	1,160	36	0	6	19	1,099.0
Minor slope rockfish south	S of 40º10' N. lat.	618	0	5.2	2	17	593.8
Other fish	Coastwide	2,286	0	3	0	0	2,283.0
Other flatfish	Coastwide	4,884	60	0	17	125	4,682.0
Pacific cod	Coastwide	1,600	400	0	0	2	1,198.0
Pacific whiting	Coastwide	TBD	TBD	2.3	133	2,000	
Petrale sole	Coastwide	2,592	45.4	0	4.7	0.1	2,541.8
POP	Coastwide	150	10.9	0	1.6	0.4	137.1
Sablefish	N of 36º N. lat.	4,012	401	12.2	26	35	Table
Sablefish	S of 36º N. lat.	1,439	0	0	3	2	1,434.0
Shortbelly	Coastwide	50	0	0	2	0	48.0
Shortspine thornyhead	N of 34º27' N. lat.	1,540	38	0	5	2	1,495.0
Shortspine thornyhead	S of 34º27' N. lat.	397	0	0	1	41	355.0
Splitnose	S of 40º10' N. lat.	1,610	0	0.5	9	0	1,600.5
Starry flounder	Coastwide	1,520	2	0	0	5	1,513.0
Widow	Coastwide	1,500	60	18	1.6	3.3	1,417.1
Yelloweye rockfish	Coastwide	18	2.3	0.02	3.3	0.2	12.2
Yellowtail	N of 40º10' N. lat.	4,378	490	30	4	3	3,851.0

a/ The tribal set-aside for petrale sole was mis-specified as 45.4 mt (No Action value) and should be 70.0 mt. Analysis of the final preferred alternative will include the correct set-aside.
b/ Slight increases to the research set-aside values for darkblotched (from 1.4 to 2.1 mt), POP (from 1.6 to 2.7 mt), and widow (1.6 to 5.3 mt) are anticipated under the final preferred alternative.

Table 2-49. 2014 preferred ACLs and estimates of tribal, EFP, research (Res.), and incidental open access (OA) groundfish mortality, used to calculate the fishery harvest guideline, under all integrated alternatives.

Species	Area	ACL	Tribal a/	EFP	Res. b/	OA	Fishery HG
Arrowtooth flounder	Coastwide	5,758	2,041	0	8	30	3,679.0
Black	N of 46º16' N. lat.	409	14	0	0	0	395.0
Black	S of 46º16' N. lat.	1,000	0	0	0	0	1,000.0
Bocaccio	S of 40º10' N. lat.	337	0	2.6	1.7	0.7	332.0
Cabezon	46º16' to 42º N.	47	0	0	0	0	47.0
Cabezon	S of 42º N. lat.	158	0	0	0	0	158.0
California scorpionfish	S of 34°27' N. lat.	117	0	0	0	2	115.0
Canary rockfish	Coastwide	119	9.5	0.8	4.5	2	102.2
Chilipepper	S of 40º10' N. lat.	1,647	0	200	9	5	1,433.0
Cowcod	S of 40º10' N. lat.	3	0	0.02	0.1	0	2.9
Darkblotched rockfish	Coastwide	330	0.1	0.2	1.4	18	310.3
Dover sole	Coastwide	25,000	1,497	0	38	55	23,410.0
English sole	Coastwide	5,646	91	0	5	7	5,543.0
Lingcod	N of 40'10º N. lat.	2,878	250	0	5	16	2,607.0
Lingcod	S of 40'10º N. lat.	1,063	0	2.6	0	7	1,053.4
Longnose skate	Coastwide	2,000	56	0	3	3	1,938.0
Longspine thornyhead	N of 34º27' N. lat.	1,958	30	0	13	3	1,912.0
Longspine thornyhead	S of 34º27' N. lat.	347	0	0	1	2	344.0
Minor nearshore rockfish	N of 40º10' N. lat.	94	0	0	0	0	94.0
Minor nearshore rockfish	S of 40º10' N. lat.	990	0	0	0	0	990.0
Minor shelf rockfish north	N of 40º10' N. lat.	968	9	0	3	26	930.0
Minor shelf rockfish south	S of 40º10' N. lat.	714	0	30.2	6	9	668.8
Minor slope rockfish north	N of 40º10' N. lat.	1,160	36	0	6	19	1,099.0
Minor slope rockfish south	S of 40º10' N. lat.	622	0	5.2	2	17	597.8
Other fish	Coastwide	2,286	0	3	0	0	2,283.0
Other flatfish	Coastwide	4,884	60	0	17	125	4,682.0
Pacific cod	Coastwide	1,600	400	0	0	2	1,198.0
Pacific whiting	Coastwide	TBD	TBD	3.4	133	2,000	TBD
Petrale sole	Coastwide	2,652	45.4	0	4.7	0.1	2,601.8
POP	Coastwide	153	10.9	0	1.6	0.4	140.1
Sablefish	N of 36º N. lat.	4,349	435	16	26	35	Table
Sablefish	S of 36º N. lat.	1,560	0	0	3	2	1,555.0
Shortbelly	Coastwide	50	0	0	2	0	48.0
Shortspine thornyhead	N of 34º27' N. lat.	1,525	38	0	5	2	1,480.0
Shortspine thornyhead	S of 34º27' N. lat.	393	0	0	1	41	351.0
Splitnose	S of 40º10' N. lat.	1,670	0	0.5	9	0	1,660.5
Starry flounder	Coastwide	1,528	2	0	0	5	1,521.0
Widow	Coastwide	1,500	60	18	1.6	3.3	1,417.1
Yelloweye rockfish	Coastwide	18	2.3	0.02	3.3	0.2	12.2
Yellowtail	N of 40º10' N. lat.	4,382	490	30	4	3	3,855.0

a/ The tribal set-aside for petrale sole was mis-specified as 45.4 mt (No Action value) and should be 70.0 mt. Analysis of the final preferred alternative will include the correct set-aside.

b/ Slight increases to the research set-aside values for darkblotched (from 1.4 to 2.1 mt), POP (from 1.6 to 2.7 mt), and widow (1.6 to 5.3 mt) are anticipated under the final preferred alternative.

Table 2-50. Sablefish ACLs and estimates of tribal, research, recreational, and EFPs mortality in metric tons used to calculate the commercial harvest guideline, under all integrated alternatives.

Year	ACL	Tribal	Research	Recreational	EFP	Commercial HG
2013	4,012	401	26	6.1	10	3,569
2014	4,349	435	26	6.1	10	3,872

2.2.2 Allocations

The fishery HGs (Table 2-48 and Table 2-49) for most species are further allocated between the trawl and nontrawl fisheries. The trawl and nontrawl allocations are based on the percentages adopted under Amendment 21 to the groundfish FMP or decided during the 2013-14 biennium. Sablefish north of 36° N. latitude is allocated under the Amendment 6 framework, which allocates the commercial HG (Table 2-50) between the limited entry (trawl and fixed gear) and open access sectors. Further, the FMP outlines criteria for allocating Pacific whiting between the shorebased IFQ, catcher-processor, and mothership sectors. For some species, no allocations are necessary since ACL attainment has historically been low due to the lack of market demand, limited access as a result of the RCA configurations, or the need to limit overfished species interactions. Further, some species are managed and allocated by the west coast states (e.g., nearshore species).

For any stock that has been declared overfished, the formal trawl/nontrawl and open access/limited entry allocation established under provisions of the FMP and regulations (50 CFR 660.50) may be temporarily revised for the duration of the rebuilding period. Details of formal allocations that are temporarily suspended are detailed in the following sections.

2.2.2.1 Long-Term Allocations

Amendment 6

Amendment 6, established allocation procedures in the FMP between the open access (including directed and incidental open access) and limited entry sectors. Amendment 21-1 modified the list of species subject to Amendment 6 allocations. The species and complexes that continue to have open access and limited entry allocations, unless modified by the biennial actions, are found in Table 2-51. The species that comprise the nearshore and shelf complexes are outlined in Chapter 2.1, Table 2-40, Table 2-41, Table 2-43, and Table 2-44.

The limited entry and open access allocations for bocaccio, canary, cowcod, and yelloweye are temporarily suspended since the stocks are overfished. Further, the shelf rockfish allocations are suspended since access is limited by RCAs and the need to limit overfished species catches. Nearshore rockfish allocations are also suspended due to overfished species constraints. As such, the Council adopted two-year allocations, except for nearshore rockfish, which are described in Section 2.2.2.2. The nearshore rockfish complex is managed by the west coast states which implement allocations through state regulations.

Detailed descriptions of the allocations for sablefish north of 36° north latitude can be found in Chapter 6 of the FMP. Table 2-52 to Table 2-57 detail the sablefish allocations calculations for use in the 2013-2014 cycle.

Table 2-51. Limited entry and open access allocations established by FMP Amendment 6.

Stock or Stock Complex	Limited Entry Share	Open Access Share
Nearshore and Shelf Rockfish North of 40°10 N. latitude	91.7%	8.3%
Nearshore and Shelf Rockfish South of 40°10 N. latitude	55.7%	44.3%
Sablefish north of 36° N. latitude	90.6%	9.4%

Table 2-52. Limited entry and open access FMP allocations applied to the 2013-2014 ACLs and resulting commercial harvest guideline for sablefish north of 36° N. latitude (in mt).

			Limited Entry Harvest Guideline		Open Access Harvest Guideline	
Year	**ACL**	**Commercial HG (MT) a/**	%	MT	%	MT
2013	4,012	3,569	90.6%	3,233	9.4%	335
2014	4,349	3,872	90.6%	3,508	9.4%	364

a/ Set-asides from the ACL used to calculate the commercial HG can be found in Table 2-48 and Table 2-49.

Table 2-53. Sablefish north of 36° N. latitude allocations, in metric tons, between limited entry fixed gear and limited entry trawl for 2013-2014.

	Limited Entry HG	Limited Entry Fixed Gear		Limited Entry Trawl	
Year	MT	%	MT	%	MT
2013	3,233	42%	1,358	58%	1,875
2014	3,508	42%	1,473	58%	2,035

Table 2-54. Sablefish north of 36° N. latitude allocations, in metric tons, within the limited entry fixed gear sector for 2013-2014. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

	Limited Entry Fixed Gear			
Year	**Total Catch Share (mt)**	**Landed Catch Share (mt)**	**Primary Season Share (mt)**	**LEFG DTL Share (mt)**
2013	1,358	1,315	1,118	197
2014	1,473	1,427	1,213	214

Table 2-55. Tier limits in pounds for the primary season for sablefish north of 36° N. latitude.

	Limited Entry Fixed Gear			
Year	**Primary Season Share (mt)**	**Tier 1 (lbs)**	**Tier 2 (lbs)**	**Tier 3 (lbs)**
2013	1,118	34,455	15,661	8,949
2014	1,213	37,383	16,992	9,710

Table 2-56. Sablefish north of 36° N. latitude allocations, in metric tons within the limited entry trawl sector for 2013-14.

	Limited Entry Trawl		
Year	**All Trawl (mt)**	**At-sea Whiting (mt)**	**Shorebased IFQ (mt)**
2013	1,875	50	1,825
2014	2,035	50	1,985

Table 2-57. Open access allocations in metric tons for sablefish north of 36° N. latitude allocations for 2013-14. Sablefish mortality in nongroundfish fisheries is accounted for in the incidental OA column. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

Year	**Open Share (OA) (mt)**	**Incidental OA Removals (mt)**	**Directed OA Total Catch Share (mt)**	**Directed OA Landed Catch Share (mt)**
2013	335	35	300	291
2014	364	35	329	319

Amendment 21

Amendment 21 to the FMP specified allocations between the trawl and nontrawl sectors. The trawl allocation is necessary for the shorebased IFQ and at-sea co-op programs. Long-term, formal allocations are expected to provide more stability to the trawl fishery sectors by reducing the risk of the trawl sector being closed as a result of a nontrawl sector exceeding an allocation or HG (e.g., recreational fisheries).

The Council recommended suspending the allocation of petrale sole (95 percent to trawl and 5 percent to nontrawl) during rebuilding and using a two-year allocation of 35 mt to nontrawl with the remainder allocated to trawl (Table 2-58 and Table 2-59). This same approach was used in 2011-2012. The 35 mt value represents roughly twice the maximum nontrawl catch of petrale from 2004-2008 (see Figure 2 in Agenda Item B.7.b, Supplemental GMT Report, June 2010).

Amendment 21 also specified procedures for Pacific halibut bycatch allocations to the shorebased IFQ fishery. The FMP and regulations sets the trawl bycatch mortality limit at 15 percent of the Area 2A total constant exploitation yield (TCEY) for legal size halibut (net weight), not to exceed 130,000 pounds annually for legal size halibut (net weight) for 2012 through 2014 and, beginning in 2015, not to exceed 100,000 pounds annually for legal size halibut (net weight). Details of the Pacific halibut calculation can be found in 50 CFR 660.55(m). The Pacific halibut harvest specifications and associated allocations have not yet been specified for 2012, therefore the analysis of the integrated alternatives uses the 2011 values.

Pacific Whiting
Pacific whiting is managed consistent with the agreement with Canada on Pacific hake/whiting and the Pacific Whiting Act. The Joint Management Committee (U.S. and Canada) recommends the coastwide TAC and corresponding U.S. TAC for Pacific whiting no later than March 25 of each year. Except for establishing the catch level, all other aspects of Pacific whiting management are subject to the MSA. The FMP states that the commercial HG for Pacific whiting is allocated among three sectors, as follows: 42 percent to the shorebased IFQ program, 34 percent for the catcher-processor co-operative program, and 24 percent for the mothership co-operative program. The Pacific whiting harvest specifications and associated allocations have not yet been specified for 2012, therefore the analysis of the integrated alternatives uses the 2011 allocations.

2.2.2.2 Short-Term Allocations

Two-year trawl and nontrawl allocations are decided during the biennial process for those species without long-term allocations or species where the long-term allocation is suspended. The preferred ACLs and allocations for species subject to short-term allocations are indicated in Table 2-58 and Table 2-59. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10 N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation scheme for 2013-2014 (Table 2-59). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C Section C.3). Further, the integrated alternatives explore a range of canary and POP ACLs and allocations which are described by alternative in Section 2.4.

The Council recommended a two-year trawl and nontrawl HG for longnose skate of 90 percent to the trawl fishery and 10 percent to the nontrawl fishery. The allocation percentages reflect historical catch of longnose skate between the two sectors (see Appendix C, Table C-54).

2.2.2.3 Species Without Allocations

Species without trawl and nontrawl or limited entry and open access allocations include: black rockfish, cabezon (Oregon and California), California scorpionfish, longspine thornyhead south of 34° 27' N. latitude, minor nearshore rockfish north and south, shortbelly, and the Other Fish complex, including spiny dogfish. The nearshore species, including nearshore rockfish, are managed and allocated by the west coast states. For the remaining species, ACL attainment has historically been low due to the lack of market demand, limited access as a result of the RCA configurations, or the need to limit overfished species interactions. While there is no need for allocations between sectors, management measures for these species are proposed to keep total catch within the ACL (e.g., trip limits, bag limits, etc.).

Table 2-58. Species-specific fishery harvest guidelines and allocations, in metric tons, for 2013.

				Allocations			
				Trawl		Nontrawl	
Species	**Area**	**Fishery HG**	**Allocation Type**	**%**	**Mt**	**%**	**Mt**
Arrowtooth flounder	Coastwide	4,078.0	FMP	95%	3,874	5%	204
Black	N of 46º16' N. lat.	397.0	None				
Black	S of 46º16' N. lat.	1,000.0	None				
Bocaccio	S of 40º10' N. lat.	315.7	Biennial	NA	76.9	NA	243.1
Cabezon	46º16' to 42º N.	47.0	None				
Cabezon	S of 42º N. lat.	163.0	None				
California scorpionfish	S of 34°27' N. lat.	118.0	None				
Canary rockfish	Coastwide	99.2	Biennial	NA	53.1	NA	46.4
Chilipepper	S of 40º10' N. lat.	1,476.0	FMP	75%	1,107	25%	369
Cowcod	S of 40º10' N. lat.	2.9	Biennial	NA	1.9	NA	1
Darkblotched rockfish	Coastwide	297.3	FMP	95%	282	5%	15
Dover sole	Coastwide	23,410.0	FMP	95%	22,240	5%	1,171
English sole	Coastwide	6,712.0	FMP	95%	6,376	5%	336
Lingcod	N of 40'10º N. lat.	2,765.0	FMP	45%	1244	55%	1,521
Lingcod	S of 40'10º N. lat.	1,102.1	FMP	45%	496	55%	606
Longnose skate	Coastwide	1,938.0	Biennial	90%	1,744	10%	194
Longspine thornyhead	N of 34º27' N. lat.	1,963.0	FMP	95%	1,865	5%	98
Longspine thornyhead	S of 34º27' N. lat.	353.0	None				
Minor nearshore	N of 40º10' N. lat.	94.0	None				
Minor nearshore	S of 40º10' N. lat.	990.0	None				
Minor shelf rockfish	N of 40º10' N. lat.	930.0	Biennial	60.2	560	39.8	370
Minor shelf rockfish	S of 40º10' N. lat.	668.8	Biennial	12.2	82	87.8	587
Minor slope rockfish	N of 40º10' N. lat.	1,099.0	FMP	81%	890	19%	209
Minor slope rockfish	S of 40º10' N. lat.	593.8	FMP	63%	374	37%	220
Other fish	Coastwide	2,283.0					
Other flatfish	Coastwide	4,682.0	FMP	90%	4,214	10%	468
Pacific cod	Coastwide	1,198.0	FMP	95%	1,138	5%	60
Pacific whiting	Coastwide	TBA		100%	TBA	0%	TBA
Petrale sole	Coastwide	2,541.8	Biennial	NA	2,507	NA	35
POP	Coastwide	137.1	FMP	95%	130	5%	7
Sablefish	N of 36º N. lat.	See Table 2-52 to Table 2-57					
Sablefish	S of 36º N. lat.	1,434.0	FMP	42%	602	58%	832
Shortbelly	Coastwide	48.0	None				
Shortspine thornyhead	N of 34º27' N. lat.	1,495.0	FMP	95%	1,420	5%	75
Shortspine thornyhead	S of 34º27' N. lat.	355.0	FMP	NA	50	NA	305
Splitnose	S of 40º10' N. lat.	1,600.5	FMP	95%	1,520	5%	80
Starry flounder	Coastwide	1,513.0	FMP	50%	757	50%	757
Widow	Coastwide	1,417.1	FMP	91%	1,290	9%	128
Yelloweye rockfish	Coastwide	12.2	Biennial	NA	1	NA	11.2
Yellowtail	N of 40º10' N. lat.	3,851.0	FMP	88%	3,389	12%	462

Table 2-59. Species-specific fishery harvest guidelines and allocations, in metric tons, for 2014.

				Allocation			
				Trawl		Nontrawl	
Species	**Area**	**Fishery HG**	**Allocation Type**	**%**	**Mt**	**%**	**Mt**
Arrowtooth flounder	Coastwide	3,679.0	FMP	95%	3,495	5	184
Black	N of 46º16' N. lat.	395.0	None				
Black	S of 46º16' N. lat.	1,000.0	None				
Bocaccio	S of 40º10' N. lat.	332.7	Biennial	NA	79.8	N	252.2
Cabezon	46º16' to 42º N.	47.0	None				
Cabezon	S of 42º N. lat.	158.0	None				
California scorpionfish	S of 34°27' N. lat.	115.0	None				
Canary rockfish	Coastwide	103.7	Biennial	NA	54.7	N	47.8
Chilipepper	S of 40º10' N. lat.	1,433.0	FMP	75%	1,075	25	358
Cowcod	S of 40º10' N. lat.	2.9	Biennial	NA	1.9	N	1
Darkblotched rockfish	Coastwide	310.3	FMP	95%	295	5	16
Dover sole	Coastwide	23,410.0	FMP	95%	22,240	5	1,171
English sole	Coastwide	5,543.0	FMP	95%	5,266	5	277
Lingcod	N of 40'10º N. lat.	2,607.0	FMP	45%	1173	55	1,434
Lingcod	S of 40'10º N. lat.	1,053.4	FMP	45%	474	55	579
Longnose skate	Coastwide	1,938.0	Biennial	90%	1,744	10	194
Longspine thornyhead	N of 34º27' N. lat.	1,912.0	FMP	95%	1,816	5	96
Longspine thornyhead	S of 34º27' N. lat.	344.0	None				
Minor nearshore rockfish	N of 40º10' N. lat.	94.0	None				
Minor nearshore rockfish	S of 40º10' N. lat.	990.0	None				
Minor shelf rockfish north	N of 40º10' N. lat.	930.0	Biennial	60.2	560	39	370
Minor shelf rockfish south	S of 40º10' N. lat.	668.8	Biennial	12.2	82	87	587
Minor slope rockfish north	N of 40º10' N. lat.	1,099.0	FMP	81%	890	19	209
Minor slope rockfish south	S of 40º10' N. lat.	597.8	FMP	63%	377	37	221
Other fish	Coastwide	2,283.0					
Other flatfish	Coastwide	4,682.0	FMP	90%	4,214	10	468
Pacific cod	Coastwide	1,198.0	FMP	95%	1,138	5	60
Pacific whiting	Coastwide	TBA		100	TBA	0	TBA
Petrale sole	Coastwide	2,601.8	Biennial	NA	2,567	N	35
POP	Coastwide	140.1	FMP	95%	133	5	7
Sablefish	N of 36º N. lat.	See Table 2-52 to Table 2-57					
Sablefish	S of 36º N. lat.	1,555.0	FMP	42%	653	58	902
Shortbelly	Coastwide	48.0	None				
Shortspine thornyhead	N of 34º27' N. lat.	1,480.0	FMP	95%	1,406	5	74
Shortspine thornyhead	S of 34º27' N. lat.	351.0	FMP	NA	50	N	301
Splitnose	S of 40º10' N. lat.	1,660.5	FMP	95%	1,577	5	83
Starry flounder	Coastwide	1,521.0	FMP	50%	761	50	761
Widow	Coastwide	1,417.1	FMP	91%	1,290	9	128
Yelloweye rockfish	Coastwide	12.4	Biennial	NA	1	N	11.2
Yellowtail	N of 40º10' N. lat.	3,855.0	FMP	88%	3,392	12	463

2.2.3 Within Sector Allocations

2.2.3.1 Within Trawl Allocations

Amendment 21 Within Trawl Allocations

Amendment 21 and implementing regulations specified that the within trawl whiting allocations of darkblotched, POP, and widow would be done pro-rata to the sector's whiting allocation. The whiting allocations are 42 percent to shoreside, 34 percent to the catcher-processor, and 24 percent to the mothership sector. The whiting shoreside sector allocations are combined with the nonwhiting shorebased allocations to create the total shorebased IFQ sector allocation. Table 2-60 and Table 2-61 detail the allocation calculations for darkblotched, POP, and widow for 2013 and 2014.

The Council adopted the rebuilt widow rockfish Amendment 21 within trawl allocation as the preferred alternative, as specified in the FMP and regulations. Additionally, the Council requested analyzing a range of widow rockfish within trawl allocations to the whiting sectors. The requested range for the at-sea sector is the status quo 2012 level (147.9 mt) to 300 mt, which would be further allocated between the mothership and catcher-processor sector pro-rata to the sectors whiting allocation. The remainder would be allocated to the shoreside whiting sector which is combined with the nonwhiting shorebased allocations to create the total shorebased IFQ sector. This analysis can be found Appendix C and in Chapter 4.

Table 2-60. Darkblotched, POP, and widow within trawl FMP allocations for 2013.

		Allocation Formula			
Species	**Trawl Allocation (mt)**	**Nonwhiting**	**Whiting**	**Nonwhiting (mt)**	**Whiting (mt)**
Darkblotched	282	The rest	9% or 25 mt, whichever is greater	257	25
POP	130	The rest	17% or 30 mt, whichever is greater	100	30
Widow	1,290	The rest	10% or 500 mt, whichever is greater	790	500

	Within Whiting Sector Allocations			
Species	**Whiting Sector Total (mt)**	**Shorebased 42% (mt)**	**Catcher-processor 34% (mt)**	**Mothership 24% (mt)**
Darkblotched	25	10.7	8.6	6.1
POP	30	12.6	10.2	7.2
Widow	500	210.0	170.0	120.0

Shorebased IFQ Total Allocations			
Species	**Shorebased Whiting (mt)**	**Nonwhiting (mt)**	**Shorebased IFQ Total (mt)**
Darkblotched	10.7	257	268
POP	12.6	100	113
Widow	210.0	790	1,000

Table 2-61. Darkblotched, POP, and widow within FMP trawl allocations for 2014.

Species	Trawl Allocation (mt)	Allocation Formula: Nonwhiting	Allocation Formula: Whiting	Nonwhiting (mt)	Whiting (mt)
Darkblotched	295	The rest	9% or 25 mt, whichever is greater	268	27
POP	133	The rest	17% or 30 mt, whichever is greater	103	30
Widow	1,290	The rest	10% or 500 mt, whichever is greater	790	500

	Within Whiting Sector Allocations			
Species	Whiting Sector Total (mt)	Shorebased 42% (mt)	Catcher-processor 34% (mt)	Mothership 24% (mt)
Darkblotched	27	11.1	9.0	6.4
POP	30	12.6	10.2	7.2
Widow	500	210.0	170.0	120.0

Shorebased IFQ Allocation Calculations			
Species	Shoreside Whiting (mt)	Shorebased Nonwhiting (mt)	Shorebased IFQ Total (mt)
Darkblotched	11.1	268	279
POP	12.6	103	116
Widow	210.0	790	1,000

At-Sea Whiting Set-Asides

Unlike set-asides that are taken as off-the-top deductions after setting the ACL, set-asides for some species are taken from the trawl allocation to accommodate bycatch in the at-sea whiting fishery (catcher-processor and mothership). Like other set-asides, these catches are not actively managed inseason, therefore the set-aside amounts need to be set high enough to accommodate the historical maximum or any increased catch that is anticipated. Recent catch in the at-sea sectors from 2009-2010 was evaluated and set-asides were recommended by the Council in November 2011 (Table 2-62). The proposed changes from No Action for arrowtooth flounder, lingcod north of 42° N. latitude, and minor slope rockfish north of 40°10 N. latitude were calculated by roughly doubling the maximum value.

Table 2-62. At-sea whiting set-asides, which are deducted from the trawl allocation, for 2013-14.

Species or Species Complex	Area	Set Aside (mt)
Arrowtooth Flounder	Coastwide	20
Dover Sole	Coastwide	5
English Sole	Coastwide	5
Lingcod	N. of 40°10 N. lat.	15
Longnose Skate	Coastwide	5
Longspine Thornyhead	N. of 34°27 N. lat.	5
Minor Shelf Rockfish	N. of 40°10 N. lat.	35
Minor Slope Rockfish	N. of 40°10 N. lat.	100
Other Fish	Coastwide	520
Other Flatfish	Coastwide	20
Pacific Cod	Coastwide	5
Pacific Halibut	Coastwide	10
Petrale Sole	Coastwide	5
Sablefish	N. of 36° N. lat.	50
Shortspine Thornyhead	N. of 34°27 N. lat.	20
Starry Flounder	Coastwide	5
Yellowtail	N. of 40°10 N. lat.	300

2.2.3.2 Within Nontrawl Allocations

The Council adopted two-year within nontrawl allocations for bocaccio, canary, and yelloweye for 2013-2014 under the preferred alternative (Table 2-63). The recreational values would be implemented as HGs. The canary within nontrawl allocations vary by alternative and are further explained under the analysis of the integrated alternatives (Section 2.4).

The Council recommended trip limits for sablefish south of 36º N latitude be modeled assuming a 55 percent to limited entry and 45 percent to open access allocation, based on the historical landings from 2000-2009 (see Table 9 in Agenda Item E.9.b, Supplemental GMT Report 3, November 2011). These percentages are not implemented as HGs but influence the catch and revenue for each sector under the integrated alternatives.

Table 2-63. Preferred two-year within nontrawl allocations for bocaccio, canary, and yelloweye for 2013-2014.

2013			
Sector	**Bocaccio (mt)**	**Canary (mt)**	**Yelloweye (mt)**
ACL	320	116	18
Total Set-Asides	5	16.8	5.82
Fishery Harvest Guideline	315.0	99.2	12.2
Non-Nearshore	74.2	3.6	1.1
Nearshore Fixed Gear	0.9	6.2	1.2
Washington Recreational HGs	N/A	3.1	2.9
Oregon Recreational HGs	N/A	10.9	2.6
California Recreational HGs	167.9	22.6	3.4
2014			
Sector	**Bocaccio (mt)**	**Canary (mt)**	**Yelloweye (mt)**
ACL	337	119	18
Total Set-Asides	5	17	5.8
Fishery Harvest Guideline	332.0	102.0	12.2
Non-Nearshore	77	3.7	1.1
Nearshore Fixed Gear	0.9	6.4	1.2
Washington Recreational HGs	N/A	3.2	2.9
Oregon Recreational HGs	N/A	11.2	2.6
California Recreational HGs	174.2	23.3	3.4

Harvest Guidelines

Accountability measures that increase the likelihood that total catch stays within the ACL include HGs, which are a specified numerical harvest objective that is not a quota. Attainment of an HG does not require closure of a fishery. Species with HGs are required to be sorted prior to first weighing.

<u>Black Rockfish (OR and CA)</u>

HGs are recommended for the southern component of the black rockfish stock with 58 percent to Oregon and 42 percent to California. This allocation scheme is based on recent year landings, consistent with allocations that have been in place since 2004 (Agenda Item E.9.b, Supplemental Joint ODFW/CDFG Report, November 2011). Both states further allocate black rockfish between commercial and recreational nearshore fisheries; however, those allocations are not implemented in Federal regulations.

Blackgill South of 40°10 N. latitude

Blackgill rockfish is part of the minor slope rockfish complex south of 40°10’ N. latitude and subject to an Amendment 21 allocation (63 percent to trawl and 37 percent to nontrawl). To improve inseason tracking of blackgill rockfish south of 40°10’ N. latitude, the Council recommended HGs for 2013-2014 of 106 mt and 110 mt, respectively. Further, the Council provided guidance that the commercial nontrawl apportionment of blackgill should be 60 percent to limited entry and 40 percent to open access fixed gears. This apportionment reflects the historical distribution of catch between the limited entry and open access fixed gear sectors from 2005-2010 (Table 3 in Agenda Item E.9.b, GMT Report 2, November 2011).

Table 2-64. Blackgill rockfish within nontrawl allocations for limited entry and open access fixed gears for 2013-2014.

Year	Nontrawl Allocation (mt)	Limited Entry Fixed Gear (mt)	Open Access Fixed Gear (mt)
2013	44	26.4	17.6
2014	45	27	18

Blue Rockfish South of 42° N. latitude

Since 2009, blue rockfish south of 42° N. latitude has been managed with an HG to prevent overfishing blue rockfish, which is in the precautionary zone (below B_{MSY}). Table 2-65 shows the OFL contribution, ABC contribution, and 40-10 adjusted values for both the assessed and unassessed portions of the blue rockfish stock both north and south of 40º10’ N. latitude within California. For development of the integrated alternatives, the Council recommended specifying a 2013-2014 blue rockfish HG of 236 mt for California fisheries. This HG was calculated from the 2007 assessment (Key, *et al.* 2008), which was conducted for the portion of the stock in waters off California north of Point Conception at 34º27’ N. latitude. The OFLs were derived from the assessment. The ABCs were derived using a P* of 0.45 for category 2 stocks, which was then adjusted using the 40-10 default harvest policy, as specified in the FMP for species in the precautionary zone. The HG contribution for the unassessed portion of the stock south of Point Conception was calculated by first estimating an OFL using the DCAC methodology and then applying an ABC adjustment (using a P* of 0.45 for a category 3 stock). The HG contribution for the unassessed area was set equal to the ABC since the stock is assumed to be above B_{MSY}. The 2013 and 2014 blue rockfish HG contributions for the assessed and unassessed areas are then summed to determine the HG.

Table 2-65. Blue rockfish harvest guideline calculations for both the assessed and unassessed areas within California for 2013-2014.

Area	OFL contribution by area		ABC contribution by area		40-10 adjusted HG contribution by area	
	2013	2014	2013	2014	2013	2014
North of 34°27’ N. lat. (assessed area)	215	215	196	196	175	175
South of 34°27’ N. lat. (unassessed area)	73	73	61	61	61	61
Total for California	288	288	257	257	236	236

2.3 New Accountability Measures

Several new accountability measures, designed to meet the goals and objectives specified in the FMP, were analyzed for use in 2013-2014. The following section provides an overview of the measures considered within the integrated alternatives. Section 2.4 describes the integrated alternatives and discusses the performance of these new measures in relation to the objectives of the proposed action. A focused evaluation of the performance and effects of the new accountability measures and range of options considered can be found in Appendix C.

Implementation of these new measures is considered under all of the integrated alternatives described in Section 2.4, except under No Action. The new measures would not be implemented under the No Action Alternative.

In April 2012, the Council adopted a preferred suite of management measures for 2013-2014 fisheries, including some of the new measures described below. At the June 2012 Council meeting, the Council is scheduled to take final action on management measures for 2013-2014; the Council will confirm or modify the decisions made at their April 2012 meeting.

2.3.1 Modifications to the Boundaries Defining RCAs

RCAs are large area closures intended to protect a complex of species, such as the overfished shelf rockfish species. The boundaries for RCAs are defined by straight lines connecting a series of latitude and longitude coordinates that approximate depth contours. A set of coordinates are defined for each depth contour and the RCA structures are implemented by gear and/or fishery (e.g., trawl RCA, a nontrawl RCA, and a recreational RCAs). For the 2013-2014 cycle, changes to selected coordinates are proposed that more closely approximate the boundaries with depth contours based on the best available data (Table 2-66). These modifications should provide improved and more efficient access to target species while minimizing interactions with overfished species. The analysis of the integrated alternatives examines the impacts of the proposed changes.

Table 2-66. Summary of boundary adjustments proposed for 2013-2014 and included in the analysis of the integrated alternatives.

Area	Proposed Modifications
Washington and Oregon	150 and 200 fm lines
Oregon	200 fm lines
California – Usal and Noyo Canyons	150 fm lines

2.3.2 Management of ACL Set-Asides

The Council considered a range of options for reapportioning the ACL set-asides used to account for groundfish mortality from scientific research, incidental open access fisheries, and EFPs (see Section 2.3 for details on the ACL set-asides proposed for 2013-2014). The Council considered whether to release the ACL set-asides for reapportioning based on real time catch accounting (i.e., final estimates) or projected catch accounting (see Appendix C for detailed analysis). Projected catch accounting was adopted as the preferred methodology since it is consistent with the best available data approach used by the Council for inseason management of the fisheries. The Council also considered whether the reallocation of set-asides should be done based on the original allocations prescribed at the start of the year or whether modifications could be made to account for fishery progress to date. The Council chose the latter approach as the preferred option to provide maximum flexibility to attain the OY.

2.3.3 Catch Accounting between Limited Entry and Open Access

This Council-proposed FMP amendment would reinstate a provision that was inadvertently deleted when Amendment 21 was implemented, and clarifies the application of that provision with respect to catch accounting[9] for set-asides. The provision that was inadvertently deleted specified the decision rules for determining the allocation against which a vessel's catch would count, i.e. whether it would count against the limited entry or the open access allocation. As it was specified, the provision also set up the situation in which catch might be deducted from both the ACL before sector allocations are made and deducted from an open access or limited entry sector allocation. In this regard, this amendment would add a clarification to eliminate the possibility of a duplicate deduction.

2.3.4 Related Regulatory and FMP Language Clarifications

Complete Offloading (Regulatory Clarification)
As part of the trawl rationalization program, regulations were adjusted for the trawl sector to clarify that once the transfer of fish begins all fish on board a vessel count toward a landing and that the offload must be completed prior to the start of a subsequent trip. The purpose of this measure is to ensure all fish harvested on a trip are clearly associated with the landings receipts and permit status. A similar clarification is needed for other segments of the fishery for accurate catch accounting between sector allocations.

In April 2012, the Council did not adopt this regulatory adjustment; therefore the regulations under No Action would apply for the 2013-2014 fisheries. The Council could adopt this measure in June 2012 under final action, if desired.

Clarification in how the Open Access Sector Regulations Apply to IFQ Participants (FMP Clarification)
As part of the trawl rationalization program Section 11.2.5 paragraphs a and b of the FMP were expanded to specify the regulations which would apply when vessels with trawl endorsed limited entry permits use longline or fishpot gear with (paragraph a) or without (paragraph b) endorsements for those gears. Paragraph b states that when LE trawl vessels are using longline or fishpot gear without an endorsement for the gear being used, landings must be covered with trawl IFQ and that the vessel must comply with the provisions of the trawl IFQ program. A sentence at the end of the section states that under such circumstances open access regulations would not apply, i.e., even though a trawl vessel is using open access gear (using longline or fishpot gear without an LE permit) the open access sector regulations will not apply. This sentence needs to be modified to clarify that it is only the open access trip limits which will not apply, unless explicitly stated elsewhere (e.g. the catch accounting rules for limited entry trawl vessels using an open access gear are different than for an open access sector vessel using open access gear).

[9] The terms "catch accounting" and "catch," as used in this section, cover the application of a vessel's harvest against a sector allocation. Depending on how the allocations and management measures are specified, harvest may be measured as landings (catch minus discards), catch (including discards), or total mortality (catch minus discard survival). Regardless of the measure used in a particular situation, the management objective is to maintain total mortality within the ACLs.

2.3.5 Sorting Requirements for Aurora, Shortraker, and Rougheye Rockfish north of 40°10 N. latitude

Sorting requirements for aurora, shortraker, and rougheye rockfish north of 40°10 N. latitude and are considered for 2013-2014. The measures would require processors to sort and report these species from the slope rockfish complex prior to the first weighing after offload. The purpose of a sorting requirement would be to improve the accuracy of total mortality estimates for these stocks and the frequency with which they are reported. Improved monitoring would improve the ability to evaluate the need for inseason management action to keep catch within the complex harvest specifications.

The Council did not select the sorting requirement for aurora, shortraker, and rougheye rockfish north of 40°10 N. latitude as part the preferred alternative because it was unclear if the measure would meet the objective of improving the accuracy of total mortality estimates for these stocks or whether minor modifications to the No Action procedures (e.g., increased frequency of sampling and reporting by either state port biologist or shorebased IFQ catch monitors) are more appropriate. The Council could adopt sorting requirement for all or none of these species (No Action) in June 2012 under final action, if desired.

2.3.6 Widow Rockfish Within-Trawl Allocation

The Council considered but rejected a change to the widow rockfish allocation to the trawl sectors specified in the FMP which would have provided more widow to the shoreside sector to allow greater opportunity to target widow and yellowtail rockfish. The needs of the shoreside trawl sector would best be met by allocating as much of the trawl allocation of widow rockfish as possible since a healthy widow rockfish stock is a valuable target for that sector. The needs of the at-sea sectors would best be met by allocating enough widow rockfish to prevent impeding the ability of these sectors to target Pacific whiting. While widow rockfish are not a target species in the at-sea whiting fisheries, the amount of widow rockfish allocated to the at-sea sectors has the potential to limit their ability to attain whiting allocations. If the total catch of widow rockfish hits the allocation for an at-sea sector, the season ends for that sector even if they have not attained their allocation of whiting. The analysis of sector needs for widow therefore compared the recent historical catches and catch rates of widow with respect to whiting by the at-sea sectors to understand whether the widow allocation options meet the needs of the at-sea sectors (see Appendix C). The Council rejected the option to reallocate widow rockfish because historical data and public testimony from the at-sea sectors indicated that a lower allocation could reduce the sector's ability to efficiently access Pacific whiting. Final action on the widow rockfish within-trawl allocation is scheduled for June 2012.

2.3.7 Shorebased IFQ Accumulation Limits

The maximum number of quota shares (QSs) and quota pounds (QPs) an entity may control in the shorebased IFQ fishery is limited by accumulation limits (defined in regulation at 50 CFR 660.111). These limits vary according to the management unit for the stock or stock complex and are intended to restrict the consolidation of quota holdings by just a few entities. The QS limits restrict the amount an individual or entity may control through ownership or other means. The annual QP limits refer to the maximum amount that may be assigned to any one vessel during a given year to cover catch. The annual QP vessel limits are larger than control limits to allow several QS holders to work together on a single vessel. Additionally, there are daily vessel limits that regulate the unused QP in vessel accounts for Pacific halibut and overfished species.

Performance of the accumulation limits was evaluated based on fishery performance in 2011 (see Appendix C); however, in April 2012 the Council chose not to modify the limits for the 2013-2014 cycles since the limits appeared to be meeting the Council's objective to prevent consolidation of quota holdings by just a few entities. The Council could modify accumulation limits in June 2012 under final action, if desired.

2.3.8 Shorebased IFQ Surplus Carry-Over

Current regulations provide for a carry-over provision that allows a limited amount of surplus QP or IBQ pounds in a vessel account to be carried over from one year to the next or allows a deficit in a vessel account in one year to be covered with QP or IBQ pounds from a subsequent year, up to a carryover limit (50 CFR 660.140(e)(5)). The carry-over provision is anticipated to increase individual flexibility for harvesters, improve economic efficiency, and achieve optimum yield (OY) while preserving the conservation of stocks. This measure seeks to clarify regulations with regard to current accountability measures, which include modifications (reductions or suspension) to the eligible surplus carry-over percentages, in the event it is necessary to address MSA conservation requirements. The measure seeks to implement such accountability measures through routine[10] inseason adjustments recommended at a Council meeting. Lastly, the current list of automatic actions that may be implemented by NMFS would be revised to include closing the nonwhiting shorebased IFQ fisheries, in addition to the IFQ shorebased whiting fishery (see regulations at 660.60 (d)).

In April 2012, the Council rejected the modifications to the surplus carry-over program because the fleet will likely attempt to maximize harvest of QPs and revenue annually (i.e., fish every last pound for maximum economic benefit) since the QP may not be available in the following year (i.e., there is no guarantee that surplus carry-over in one year would be available for harvest in the following year). Attempting to harvest all QPs may increase the risk of fishing into deficit, which results in a negative socioeconomic impact, since it is a multispecies fishery and there is limited precision in the harvesting activities. The Council requested further analysis and development of options to ensure the surplus carry-over program is consistent with the MSA conservation requirements and consistent with the Council's objectives for the program.

2.3.9 Remove or Reduce the Minimum Lingcod Length Limit in the Shorebased IFQ Fishery

Lingcod length limits have been in place since the late 1990's and were implemented to minimize harvest of immature fish while maintaining the reproductive potential of the stock. Current commercial length limits vary north and south of 42° N. latitude, and are 22 inches and 24 inches, respectively. In 2011, the limited entry trawl fishery was rationalized with total catch IFQ issued for many species, including lingcod. Since the IFQ program monitors total catch, the existing length limit induces regulatory discards for some fish that may be marketable. The purpose of the proposed management measures would be to remove the lingcod length limit or reduce it to 20 inches coastwide while still maintaining the reproductive potential of the stock.

The analysis indicated that removing the minimum lingcod length limit was unlikely to cause a biological impact; therefore, the Council selected it as the preferred alternative in April 2012, rejecting the option to

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[10] Regulations at 660.60(c) outline routine management measures. Modifications and/or issuance of surplus carry-over does not require changes to regulations; therefore classifying this measure as routine may not be appropriate. As such, a Council recommendation may be more appropriate.

reduce or maintain the limit. In June 2012, the Council will finalize this decision, reduce the limit to 20 inches, or maintain the existing 22 and 24 inch limits north and south of 42° N. latitude, respectively.

2.3.10 Threshold for Switching from the Primary to Daily Trip Limit Fishery for Sablefish North of 36° N. Latitude

The purpose of the proposed action is to remedy unforeseen complications to the limited entry fixed gear sablefish primary fishery north of 36° N. latitude, which resulted from the 2009 elimination of the daily trip limit (DTL) in the sablefish DTL fishery in this area. Elimination of the daily limit inadvertently impacted the amount of sablefish that primary fishery participants are allowed land, as they conclude fishing on their tier limits. The Council-proposed action would implement a 300 pound threshold, in the absence of a daily limit established in regulation, to facilitate the transition of a vessel from the sablefish primary fishery to the sablefish DTL fishery. The 300 pound threshold was the most common DTL in this fishery over the past seven years, and would give maximum access of a fisher to their tier pounds.

2.3.11 Recreational Shelf Rockfish Retention in the Cowcod Conservation Area

In 2001, CCAs were implemented as part of the cowcod rebuilding strategy. As specified in the FMP Appendix F (see Cowcod Rebuilding Strategy), as new information becomes available on cowcod behavior and fisheries interactions with cowcod, the boundaries or related regulations concerning the current CCAs may change, and additional CCAs may be established by regulation. Some recreational fishing is currently permitted within the CCA (see regulations at 660.360(3)(B)). During these fishing operations, shelf rockfish, including bocaccio, are encountered but are required to be discarded, resulting in bycatch. Modifications to the retention allowances for shelf rockfish in the CCA are proposed by the Council to reduce bycatch (i.e., regulatory discards) by recreational fisheries operating in the CCAs, while still rebuilding cowcod and bocaccio.

2.3.12 Remove the California Recreational Bocaccio Size Limit

Federal regulations for the California recreational fisheries implement a 10 inch minimum size limit for bocaccio. The size limit was implemented in 2001 to protect juveniles from pier and jetty anglers during years of heavy recruitment. At that time, managers believed that bocaccio below that size would have a high survival rate when caught in shallow water. Recent data suggest that there have been very few encounters of small bocaccio during good recruitment years (e.g., 2003, 2005, and 2009), and even fewer discards, suggesting the size limit is ineffective. The Council-proposed management measure would remove the recreational bocaccio size limit for 2013-2014, while still rebuilding the bocaccio stock consistent with Council objectives.

2.4 Integrated Alternatives

This section contains a description of the integrated alternatives which link the ACL alternatives described in Section 2.1 to the management measures necessary to meet the goals and objectives outlined in the FMP and MSA. Prior to the 2011-2012 cycle, the integrated alternatives were referred to as the strategic rebuilding alternatives or the holistic approach to rebuilding. The integrated alternatives contain the preferred nonoverfished species ACLs along with a strategically arrayed range of overfished species ACLs (including the preferred). The results of the integrated analysis demonstrate how rebuilding overfished species within the complex structure of a fishery constrains fishing opportunities by sector (or gear type) and region and how those constraints affect communities along the west coast. Constraining fishing opportunity, in this context, refers the number and degree of management controls necessary to keep overfished species mortality within the ACLs. Previous analyses conducted for biennial cycle management have generally demonstrated that as overfished species ACLs are reduced, more management measures are required to keep overfished species mortality within the harvest specifications, which, in turn, limits access to healthy stocks. At some level, when access to healthy stocks is limited, communities are impacted.

Under the preferred alternative, harvest rates, or in the case of petrale sole, the harvest control rule, specified in the current rebuilding plans is recommended to rebuild all overfished species. As discussed in Section 2.1, the target years for canary and POP must be modified because new scientific information shows that T_{TARGET} is less than $T_{F=0}$ for both these stocks (in other words, even if no fishing mortality were to occur, the new information tells us these stocks could not be rebuilt by the T_{TARGET} specified in the current rebuilding plans). Therefore, the integrated alternatives in 2013-2014 explore a range of canary and POP ACLs, while maintaining the current rebuilding plans for the other overfished species showing steady progress towards rebuilding. The results inform whether the preferred alternative rebuilds these stocks as quickly as possible, while taking into account the needs of the fishing communities and other MSA requirements. As such, the canary and POP ACLs and allocations vary between the alternatives while all other variables remain constant. Table 2-67 and Table 2-68 outline the overfished species ACLs used in the integrated alternatives analysis, detailed descriptions of each alternative follow.

Management measures under the action alternatives (i.e., Alternatives 1-8) include adjustments to routine measures as well as the new measures described in Section 2.3. Further, suboptions are explored for various management measures (e.g., ranges of allocations, depth closures, bag limits, trip limits, etc.). Appendix B contains detailed analysis of the integrated alternatives and Appendix C contains detailed analysis of the management measures included in the integrated alternatives.

Table 2-67. 2013 Integrated Alternatives for Overfished Species (in mt).

Species	No Action	Alt. 1 Preferred	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Bocaccio	274	320							
Canary	107	116	101	116	48	216	101	147	147
Cowcod	3	3							
Darkblotched	296	317							
POP a/	183	150	150	74	247	74	222	222	150
Petrale	1,160	2,592							
Yelloweye	17	18							

a/ Under No Action, a 157 mt ACT is implemented.

Table 2-68. 2014 Integrated Alternatives for Overfished Species (in mt).

Species	No Action	Alt. 1 Preferred	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Bocaccio	274	337							
Canary	107	119	104	119	49	220	104	151	151
Cowcod	3	3							
Darkblotched	296	330							
POP a/	183	153	153	76	251	76	226	226	153
Petrale	1,160	2,652							
Yelloweye	17	18							

a/ Under No Action, a 157 mt ACT is implemented.

2.4.1 No Action Alternative

The No Action Alternative represents the 2012 harvest specifications and management measures specified in regulation as of January 1, 2012 (76 FR 77415). The No Action Alternative does not incorporate the best available scientific information represented by new stock assessments, projections from previous stock assessments, and new rebuilding analyses (where applicable) adopted by the Council in 2011 for use in 2013-14. Therefore, for some species the ACLs and other stock reference points (e.g., OFL, ABC) may not be consistent with the harvest management framework outlined in the FMP. That is, for some species, carrying the 2012 harvest specifications forward to 2013-2014 would result in unsustainable harvest levels.

CEQ regulations at 40 CFR 1502.14 require an EIS to include the No Action Alternative. While in this case this alternative is inconsistent with the purpose and need for the proposed action, it is used to compare the effects of continuing to manage the fishery using current measures versus implementing new harvest specifications and any adjustments to management measures associated with those specifications (for example, to prevent ACLs from being exceeded).

Other constructs of a No Action Alternative were explored, including incorporating the best available science developed since 2009 (when the previous round of stock assessments was completed) and applying the results to status quo harvest policies. However, this construct would not reflect current conditions in the fishery to which the action alternatives could be compared. In fact, as discussed below, the Council’s preferred alternative, Alternative 1, represents new science applied to status quo policies for overfished species. The current conditions in the fishery are best reflected by the regulations in place on January 1, 2012 and the associated estimates of landings, revenue, and community impacts.

2.4.1.1 No Action Allocation Scheme

Section 2.1 describes the harvest specifications considerations and the OFLs and ABCs under the No Action Alternative. The ACLs and associated allocations under the integrated alternatives analysis of No Action are summarized Table 2-69. Table 2-70 through Table 2-75 detail the allocation of sablefish north of 40°10 N. latitude among sectors. (Because sablefish is the most valuable commercial groundfish species and is caught in a number of different groundfish fisheries, its allocation scheme is complex.) Table 2-76 summarizes the allocations of overfished species under the No Action Alternative.

Table 2-69. No Action Alternative: 2012 ACLs, Fishery Harvest Guidelines, and Allocations. All areas are north latitude.

				Trawl		Nontrawl	
Species	**Area**	**ACL**	**Fishery HG**	**% of HG**	**Mt**	**% of HG**	**Mt**
Arrowtooth flounder	Coastwide	12,049	9,971.0	95%	9,472	5%	499
Black	N of 46º16'	415	401.0				
Black	S of 46º16'	1,000	1,000.0				
Bocaccio	S of 40º10'	274	260.6	N/A	60.0	N/A	189.6
Cabezon	46º16' to 42º	48	48.0				
Cabezon	S of 42º	168	168.0				
California scorpionfish	S of 34°27'	126	124.0				
Canary rockfish	Coastwide	107	87.0	N/A	34.8	N/A	29.8
Chilipepper	S of 40º10'	1,789	1,775.0	75%	1,331	25%	444
Cowcod	S of 40º10'	3	2.7	N/A	1.8	N/A	1
Darkblotched rockfish	Coastwide	296	277.3	95%	263	5%	14
Dover sole	Coastwide	25,000	23,410.0	95%	22,240	5%	1,171
English sole	Coastwide	10,150	10,050.0	95%	9,548	5%	503
Lingcod	N of 40'10º	2,151	1,880.0	45%	846	55%	1,034
Lingcod	S of 40'10º	2,164	2,157.0	45%	971	55%	1,186
Longnose skate	Coastwide	1,349	1,220.0	95%	1,159	5%	61
Longspine thornyhead	N of 34º27'	2,064	2,020.0	95%	1,919	5%	101
Longspine thornyhead	S of 34º27'	366	363.0				
Nearshore rockfish north	N of 40º10'	99	99.0				
Nearshore rockfish south	S of 40º10'	990	990.0				
Minor shelf rockfish north	N of 40º10'	968	925.0	60.2%	557	39.8%	368
Minor shelf rockfish south	S of 40º10'	714	701.0	12.2%	86	87.8%	615
Minor slope rockfish north	N of 40º10'	1,160	1,092.0	81%	885	19%	207
Minor slope rockfish south	S of 40º10'	626	599.0	63%	377	37%	222
Other fish	Coastwide	5,575	5,575.0		5,575		0
Other flatfish	Coastwide	4,884	4,686.0	90%	4,217	10%	469
Pacific cod	Coastwide	1,600	1,200.0	95%	1,140	5%	60
Pacific whiting	Coastwide	0	0.0	100%	0	0%	0
Petrale sole	Coastwide	1,160	1,094.6	N/A	1,060	N/A	35
POP	Coastwide	157	144.1	95%	137	5%	7
Sablefish	N of 36º	5,347	See Table 2-70 to Table 2-75				
Sablefish	S of 36º	1,258	1,224.0	42%		58%	710
Shortbelly	Coastwide	50	49.0		49		0
Shortspine thornyhead	N of 34º27'	1,556	1,511.0	95%	1,435	5%	76
Shortspine thornyhead	S of 34º27'	401	359.0	NA	50	NA	309
Splitnose	S of 40º10'	1,538	1,531.0	95%	1,454	5%	77
Starry flounder	Coastwide	1,360	1,353.0	50%	677	50%	677

Species	Area	ACL	Fishery HG	Trawl % of HG	Trawl Mt	Nontrawl % of HG	Nontrawl Mt
Widow	Coastwide	600	539.1	91%	491	9%	49
Yelloweye rockfish	Coastwide	17	11.1	N/A	0.6	N/A	10.5
Yellowtail	N of 40º10'	4,371	3,872.0	88%	3,407	12%	465

Table 2-70. No Action: Allocations, in metric tons, of the sablefish north of 36° N. latitude commercial harvest guideline, between limited entry and open access for 2012.

		Limited Entry Harvest Guideline		Open Access Harvest Guideline	
Year	**Commercial HG (MT)**	% Comm. HG	MT	% Comm. HG	MT
2012	4,790	90.6%	4,340	9.4%	450

Table 2-71. No Action. Sablefish north of 36° N. latitude allocations, in metric tons, between limited entry fixed gear and limited entry trawl for 2012.

	Limited Entry HG	Limited Entry Fixed Gear		Limited Entry Trawl	
Year	MT	% of LE HG	MT	% of LE HG	MT
2012	4,340	42%	1,823	58%	2,517

Table 2-72. No Action. Sablefish north of 36° N. latitude allocations, in metric tons, within the limited entry fixed gear sector for 2012. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

	Limited Entry Fixed Gear			
Year	**Total Catch Share (mt)**	**Landed Catch Share (mt)**	**Primary Season Share (mt)**	**LEFG DTL Share (mt)**
2012	1,823	1,764	1,500	265

Table 2-73. No Action. Tier limits in pounds for the primary season for sablefish north of 36° N. latitude in 2012.

	Limited Entry Fixed Gear			
Year	**Primary Season Share (mt)**	**Tier 1 (lbs)**	**Tier 2 (lbs)**	**Tier 3 (lbs)**
2012	1,500	46,237	21,017	12,010

Table 2-74. No Action. Sablefish north of 36° N. latitude allocations, in metric tons within the limited entry trawl sector for 2012.

	Limited Entry Trawl		
Year	**All Trawl (mt)**	**At-sea Whiting (mt)**	**Shorebased IFQ (mt)**
2012	2,517	50	2,467

Table 2-75. No Action. Open access allocations in metric tons for sablefish north of 36° N. latitude allocations. Sablefish mortality in nongroundfish fisheries is accounted for in the incidental OA column. The total catch share is reduced by approximately 16 percent to account for discard mortality, a value calculated from WCGOP observations.

Year	Open Share (OA) (mt)	Incidental OA Mortality (mt)	Directed OA Total Catch Share (mt)	Directed OA Landed Catch Share (mt)
2012	450	17	433	419

Table 2-76. No Action Allocation of Overfished Species.

No Action - 2012							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP a/**	**Petrale**	**Yelloweye**
ACL	274	107	3	296	157	1160	17
Total Set-Asides	13.4	20	0.3	18.7	12.9	65.4	5.9
Fishery Harvest Guideline	260.6	87	2.7	277.3	144.1	1094.6	11.1
Trawl Allocation							
Shorebased IFQ	60	26.2	1.8	248.9	119.5	1054.6	0.6
At-Sea Whiting	N/A	8.2	N/A	14.5	17.4		N/A
Catcher Processor	N/A	4.8	N/A	8.5	10.2	5	N/A
Mothership	N/A	3.4	N/A	6	7.2		N/A
Nontrawl Allocation			0.9	14	7	35	
Non-Nearshore Fixed Gear	57.9	2.3					1.3
Nearshore Fixed Gear	0.7	4					1.1
Washington Recreational [b/]	N/A	2					2.6
Oregon Recreational [b/]	N/A	7					2.4
California Recreational [b/]	131	14.5					3.1
a/ The POP ACL is 183 and the ACT is 157 mt. The set-asides are subtracted from the ACT.							
b/ Values represent HGs.							

2.4.2 Alternative 1 (Preferred) – 116 mt Canary Rockfish ACL and 150 mt POP ACL

Alternative 1, the Council's preferred alternative, (and all of the action alternatives) incorporates the best available scientific information for stock assessment projections described in Section 2.1.

Alternative 1 represents the continuation of status quo harvest management policies for overfished species while contemplating several new management measures, as described in Section 2.3. New stock assessments and rebuilding analyses show that the current target rebuilding years for canary rockfish and POP are less than the re-estimated minimum feasible rebuilding time ($T_{F=0}$, or prohibiting all harvest).[11]

[11] Put another way, even if all harvest of these two species were to be prohibited (likely requiring closure of many fisheries) the likelihood of canary rebuilding by 2027 is 48 percent and POP rebuilding by 2020 is 25 percent.

Under Alterative 1, the target year for canary rockfish would be changed by three years (from 2027 to 2030), which is two years longer than the re-estimated $T_{F=0}$. The target year for POP would be changed by 31 years (from 2020 to 2051), which is 8 years longer than $T_{F=0}$. Overfished species ACLs are derived using a constant SPR harvest rate for rockfish that is specified in the current rebuilding plans and the harvest control rule for petrale sole, applied to the latest stock assessment and rebuilding analyses.

Alternative 1 is consistent with the FMP and SSC recommendations. Maintaining the current rebuilding plans for species other than canary and POP is consistent with FMP section 4.6.3.4. That is, the new rebuilding analyses for the species other than canary and POP are showing steady progress to rebuilding and changes are not required. The SSC recommended the canary and POP rebuilding plans be revised since current target rebuilding years are less than the re-estimated minimum feasible rebuilding time ($T_{F=0}$). The target years and associated harvest rates for canary and POP under this alternative result in ACLs that are intended to rebuild the stocks in a time period that is as short as possible, taking into account the status and biology of overfished stocks and the needs of the fishing communities.

2.4.2.1 Alternative 1 Allocation Scheme

The ACLs and allocations under Alternative 1 are detailed in 2.4.2. A summary of the overfished species ACLs and allocations that influence the projected amount of target species attained and the recommended management measures under this alternative is presented in Table 2-82. The No Action trawl and nontrawl allocation percentages for cowcod south of 40°10 N. latitude (66 percent to trawl, 34 percent to nontrawl) were identified as the preferred allocation for 2013-2014 (Table 2-82). Additionally, an option is analyzed that would allocate 34 percent of the cowcod HG to the trawl sector and 66 percent to the nontrawl sector (see Appendix C).

Table 2-82. Alternative 1. Overfished species ACLs and allocations for 2013-2014.

Alternative 1. 2013							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	320	116	3	317	150	2,592	18
Total Set-Asides	5	16.8	0.12	19.7	12.9	74.8	5.82
Fishery Harvest Guideline	315.0	99.2	2.9	297.3	137.1	2,517.2	12.2
Trawl Allocation	76.9	53.1	1.9	282.7	130.4	2482	1
Shorebased IFQ	76.9	40.3	1.9	268	113	2,477	1
At-Sea Whiting	N/A	12.8	N/A	14.7	17.4	5	--
Catcher Processor	N/A	7.5	N/A	8.6	10.2		--
Mothership	N/A	5.3	N/A	6.1	7.2		--
Nontrawl Allocations	243.0	46.4	1.0	15.0	7.0	35.0	11.2
Non-Nearshore	74.2	3.6					1.1
Nearshore Fixed Gear	0.9	6.2					1.2
Washington Recreational [a/]	N/A	3.1					2.9
Oregon Recreational [a/]	N/A	10.9					2.6
California Recreational [a/]	167.9	22.6					3.4
a/ Values represent HGs.							

Alternative 1. 2014							
Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	337	119	3	330	153	2,652	18
Total Set-Asides	5	16.8	0.12	19.7	12.9	74.8	5.8
Fishery Harvest Guideline	332.0	102.2	2.9	310.3	140.1	2,577.2	12.2
Trawl Allocation	79.8	54.70	1.9	294.4	133.4	2542	1
Shorebased IFQ	79.8	41.5	1.9	279	116	2,537	1
At-Sea Whiting	N/A	13.2	N/A	15.4	17.4	5	--
Catcher Processor	N/A	7.7	N/A	9	10.2		--
Mothership	N/A	5.5	N/A	6.4	7.2		--
Nontrawl Allocations	252.1	47.8	1	16	7	35	11.2
Non-Nearshore	77	3.7					1.1
Nearshore Fixed Gear	0.9	6.4					1.2
Washington Recreational [a/]	N/A	3.2					2.9
Oregon Recreational [a/]	N/A	11.2					2.6
California Recreational	174.2	23.3					3.4
a/ Values represent HGs.							

2.4.2.2 Alternative 1 Management Measures

The following bullet points summarize management measure changes by sector under Alternative 1 compared to No Action. The No Action management measures are those specified in regulation as of January 1, 2012 (76 FR 77415). A more detailed discussion of management measures by sector follows. Selected new measures, discussed under Section 2.3 and analyzed in Appendix C, would be implemented. Overarching changes include modifications to the boundaries defining the RCAs, inseason reapportionments of unused ACL set-asides to the trawl and nontrawl sectors, and modifications to catch accounting language between the limited entry and open access sectors. New management measures that are specific to a sector are described below.

- The shorebased IFQ fishery would operate under the same management measures as No Action,[12] except that the minimum lingcod length limit would be removed which would reduce regulatory discards.
- At-sea whiting co-ops would continue to be managed under the co-op program and the same management measures as No Action.
- Tribal fisheries would operate under the same management measures as No Action (Table 2-80) except the changes to set-asides and a trip limit would be implemented. Increases to widow rockfish (45 mt to 60 mt), petrale sole (45.4 to 70 mt), minor shelf rockfish (9 to 30 mt), and shortspine thornyhead (38 to 50 mt) set-asides are proposed under Alternative 1 (and all action alternatives). Further, an 800 pound per trip limit for redstripe rockfish would be established in addition to the 300 pound per trip limit for all other minor shelf rockfish.
- The non-nearshore fixed gear fishery would operate under the same management measures as the No Action Alternative. The No Action nontrawl RCA configuration would be maintained. Routine adjustments to sablefish and blackgill south of 40°10 N. latitude bimonthly trip limits are proposed to keep mortality within the harvest specifications.
- There are two sub-alternatives for the nearshore fixed gear fishery analyzed under Alternative 1 (Alternative 1a and 1b). The Council's preferred alternative is Alternative 1b. In the area north of 42° N. latitude under Alternative 1b, the nontrawl RCA would be moved from 20 fm to 30 fm in the area 42° N. latitude to 43° N. latitude, and landings would increase 8 percent compared to No Action to stay within the overfished species allocations. South of 42° N. latitude, the No Action nontrawl RCA configuration could be maintained, and landings are projected to be the same as No Action, except for increases to greenling and lingcod under Alternatives 1a and 1b.
- Washington and Oregon recreational fisheries would operate under the same management measures as No Action.
- For California recreational fisheries, the season length in the Mendocino Management Area would be increased relative to No Action (from 104 days to 111 days). The Council's preferred management measures include increases to the bocaccio and greenling bag limits, removing the bocaccio length limit, and providing for shelf rockfish retention (including bocaccio rockfish) in the CCA. A range of depth closures are analyzed for the Southern Management Area to reduce cowcod bycatch – from 60 fm to 40 fm; the Council's preferred depth closure is 50 fm.

[12] A variety of program changes are planned for the shorebased IFQ fishery during 2013-14 under separate regulatory actions. For the purposes of this evaluation "No Action" assumes these changes are external actions contributing to cumulative effects.

Shorebased IFQ Fishery

The minimum lingcod length limit in the shorebased IFQ fishery would be removed in 2013-2014 (see analysis in Appendix C). Further, detailed analysis of routine adjustments to longnose skate and spiny dogfish trip limits and/or RCAs is provided in Appendix C, in the event adjustments are needed to keep mortality within the harvest specifications.

Limited Entry and Open Access Fixed Gear

Non-nearshore

Under Alterative 1, the non-nearshore fishery would operate under the management measures described under No Action. Routine adjustments to sablefish and blackgill south of 40°10 N. latitude trip limits are proposed and detailed below. Further, selected new measures discussed under Section 2.3 and analyzed in Appendix C, would be implemented.

Under this alternative, the sablefish north of 36° N. latitude ACL decreases substantially, from 5,347 mt in 2012 to 3,569 mt and 3,872 mt in 2013 and 2014, respectively (Table 2-18). These amounts represent a 19-25 percent decrease relative to the No Action Alternative. Landings for other species encountered in the non-nearshore fishery are anticipated to be the same as in 2011, except blackgill south of 40°10' N. latitude.

The decrease in the sablefish landings translates directly into lower expected catch of the rebuilding stocks for the non-nearshore sector that are within the proposed allocations (Table 2-82). Since the projected mortality of overfished species is within the allocations, the No Action nontrawl RCA structure is proposed (Table 2-77). The expected decrease in yelloweye and canary bycatch are not substantial enough to consider modifying the seaward boundary of the nontrawl RCA to provide greater access to fishing grounds since such action would be expected to increase encounters with canary, yelloweye, and other shelf rockfish stocks like bocaccio. The nontrawl RCA was established at 100 fm because the 100 fm depth contour marks the transition between shelf and slope habitats. If fishing areas are reopened on the shelf, catch of shelf rockfish stocks like canary and yelloweye could increase. In addition, estimates of yelloweye catch in these sectors have shown variability in recent years with estimates of actual catch differing by more than 50 percent higher and lower than the bycatch projections from the non-nearshore model. Such volatility requires some caution when interpreting and planning based on projected mortality.

Adjustments to sablefish trip limits to coincide with the lower sablefish ACLs are proposed for the both the limited entry and open access fixed gear sectors (Table 2-83 and Table 2-84). These trip limits are estimated to attain approximately 91 percent of the allocations and may be adjusted inseason as necessary. The proposed trip limits apply under all of the integrated alternatives.

A range of blackgill rockfish trip limits south of 40°10' N. latitude were explored to keep landings within the blackgill HG (see Appendix C). The Council recommended trip limits of 1,375/2 months for the limited entry and 475 lb/2 months for open access fixed gears. These trip limits are projected to attain 100 percent of the nontrawl blackgill allocation.

Further, detailed analysis of routine adjustments to longnose skate and spiny dogfish trip limits and/or RCAs is provided in Appendix C, in the event adjustments are needed to keep mortality within the harvest specifications.

Table 2-83. 2013 Sablefish trip limits for all alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N.	1,100 lb. per week, not to exceed 4,200 lb. per 2 mo.					
	OA N.	300 lb. per day, or 1 landing per week of up to 610 lb., not to exceed 1,220 lb. per 2 mo.					
South of 36° N. lat.	LE S.	1,880 lb. per week					
	OA S.	300 lb. per day, or 1 landing per week of up to 1,460 lb., not to exceed 2,920 lb. per 2 mo.					

Table 2-84. 2014 Sablefish trip limits for all alternatives other than No Action.

Area	Fishery	Jan-Feb	Mar-Apr	May-Jun	July-Aug	Sept-Oct	Nov-Dec
North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)	LE N	1,100 lb. per week, not to exceed 4,400 lb. per 2 mo.					
	OA N	300 lb. per day, or 1 landing per week of up to 675 lb., not to exceed 1,350 lb. per 2 mo.					
South of 36° N. lat.	LE S	1,930 lb. per week					
	OA S	300 lb. per day, or 1 landing per week of up to 1,525 lb., not to exceed 3,050 lb. per 2 mo.					

Nearshore

Under Alterative 1, the nearshore fishery would operate under the management measures described under No Action. The same trip limit adjustments for sablefish as presented in Table 2-83 and Table 2-84 would apply (some are caught shoreward of the nontrawl RCA).

Under Alternative 1, the allocations of canary and yelloweye rockfish to the nearshore fishery are higher (Table 2-82) than the No Action Alternative (Table 2-76). Although both California and Oregon would have some increased opportunity compared to the No Action Alternative, management measures and projected landings are lower than years prior to 2009 (PFMC 2008a).

Similar to the No Action Alternative, the preferred alternative is modeled assuming the bycatch rates, weather, and market conditions experienced in 2011 would be the same in 2013 and 2014, and assumes no variation in landings. If catches are higher than projected, few management measures are available to further reduce yelloweye catch in this fishery (if needed). Further reductions in yelloweye catch would require substantial reductions to landed catch or total fishery closure between 43° N. latitude and 40° 10' N. latitude, the area with the highest yelloweye bycatch rates. Depth restrictions shallower than 10 fm are not advised because of vessel safety concerns.

Alternative 1 was analyzed with status quo catch sharing between Oregon and California for canary (OR = 26.7 percent; CA = 73.3 percent) and yelloweye rockfish (OR = 72.7 percent; CA = 27.3 percent). Under this alternative, the tradeoffs between more restrictive depth restrictions and higher reductions in landed catch were explored (Alternatives 1a and 1b). In Oregon, mortality of overfished species is modeled assuming the same nontrawl RCA under No Action (20 fm depth restriction between 42° N.

latitude to 43° N. latitude, 30 fm from 43° to 46°16 N. latitude) (Alternative 1a) and a 30 fm depth restriction statewide (Alternative 1b). The Council's preferred option is Alternative 1b.

In California, mortality of overfished species is modeled assuming the same nontrawl RCA under No Action for both Alternative 1a and 1b (20 fm between 42° N. latitude and 40° 10' N. latitude; 30 fm between 40° 10' N latitude and 34° 27' N. latitude; 60 fm south of 34° 27' N. latitude).

North of 42° N. latitude – under Alternative 1a, the nontrawl RCA configuration would be the same as No Action, and landings would be increased 12 to 33 percent (species-specific) relative to No Action to reflect state landing caps. Lingcod would also be increased by 40 percent relative to the No Action. The overall increase in landings under Alternative 1a would be 25 percent compared to No Action. Under Alternative 1b, the preferred option, a 30 fm nontrawl RCA configuration would be implemented statewide and landings increased 8 percent (overall) relative to No Action.

Under Alternative 1a, current state landing caps could be reached, assuming bycatch rates, weather, and other unforeseen circumstances are similar to 2011. However, the shoreward nontrawl RCA in southern Oregon would still be restricted to 20 fm in the area between 42° N. latitude to 43° N. latitude; the same configuration as under No Action.

Pre-2009 fishing grounds would be reopened under Alternative 1b, where the nontrawl RCA would be returned to 30 fm statewide. However, under Alternative 1b, landings would be restricted to levels well below historical landing caps for the state of Oregon.

South of 42° N. latitude – under Alternatives 1a and 1b, the nontrawl RCA configuration and landings would be the same as No Action, except for greenling and lingcod. Landings of greenling would be increased statewide to maintain consistency with state regulations, and are within the greenling contribution to the Other Fish complex. A small increase in lingcod landings could also be afforded statewide while staying within overfished species allocations.

Alternative Allocation Options for the Nearshore Fixed Gear Fishery

In addition to the status quo allocation percentages for yelloweye and canary, two alternate catch sharing options between Oregon and California were analyzed to demonstrate the tradeoffs (Table 2-85). The allocation options include an equal catch sharing (50:50) and a reverse status quo (i.e., reverse the percentages to each state for both species) to bracket the upper and lower ranges of landings and corresponding management measures. Table 2-86 details the proposed management measures under each scenario, which is summarized below.

Under the equal sharing scenario, Oregon would receive more canary and less yelloweye compared to the status quo catch sharing (Table 2-85). Since less catch has historically originated from depths deeper than 20 fm, few reductions to yelloweye rockfish mortality is afforded by changing the RCA from 30 fm to 20 fm from 43° to 46°16 N. latitude. As a result, landed catch would need to be reduced by 14 percent relative to No Action Alternative to stay within overfished species allocations under this scenario. Under this same scenario, California would be allocated less canary rockfish compared to status quo, but more yelloweye rockfish. The current 20 fm RCA between 42° N. latitude and 40° 10' N. latitude could be changed to 30 fm, yet a 35 percent reduction in landed catch of nearshore species would be needed to stay within overfished species allocations. Changing the shoreward nontrawl RCA from 20 to 30 fm would reduce gear conflicts, reduce the potential for localized depletion, and increase opportunities to fish in productive areas that have been closed for four years. It would also reduce competition for space when the recreational fishery is open. For the area south of 40° 10' N. latitude, the nontrawl RCA configuration and landings under No Action could be afforded (including an increase for lingcod and greenling) and stay within overfished species allocations.

Under the reverse status quo, Oregon would be allocated more canary rockfish, yet substantially less yelloweye rockfish, compared to status quo (Table 2-85). As described above, few reductions to yelloweye rockfish mortality is afforded by restricting the fishery to 20 fm statewide in Oregon, therefore, reductions in landed catch of up to 53 percent would be necessary to stay within the yelloweye allocation. Under this scenario, mortality of canary rockfish is well within the allocation and not the limiting factor that restricts access to target species.

Under the reverse status quo, California would receive substantially more yelloweye rockfish and less canary rockfish compared to status quo. The small allocation of canary rockfish under this scenario would require substantial reductions to target species. Generally, canary bycatch is common in all areas of the state, except for south of 34º 27' N. latitude. As a result, a 20 fm depth restriction would need to be implemented for all areas, except south of 34º 27' N. latitude to stay within the canary allocation in addition to a 10 percent reduction in landed catch.

In summary, access to target species in the nearshore fishery is primarily limited by yelloweye rockfish. An additional increase in the yelloweye rockfish allocation to the nearshore fishery may allow for a modification of the nontrawl RCA back to 30 fm for the area between 42º N. latitude and 40º 10' N. latitude, and may allow landings that are closer or equal to historic state landing caps.

Table 2-85. Alternative 1: Allocations of canary and yelloweye rockfish for 2013-14 under alternate nearshore catch sharing options.

		Status Quo	Equal Sharing	Reverse Status Quo
OR	Canary	1.7	3.1/3.2	4.5/4.7
	Yelloweye	0.87	0.6	0.33
CA	Canary	4.5/4.7	3.1/3.2	1.7
	Yelloweye	0.33	0.6	0.87

Table 2-86. Alternative 1: Description of management measures under alternate nearshore catch sharing options.

		Catch Sharing		
	AREA	Status Quo	Equal Sharing	Reverse Status Quo
OR	north of 43º	(Alt a): RCA=30 fm; Landings=12%-40% increase (Alt b): RCA = 30 fm; Landings=8% increase	RCA=30fm; Landings=14% reduction	RCA=30 fm; Landings=53% reduction
	42º-43º	(Alt a): RCA=20 fm; Landings=12%-40% increase (Alt b): RCA = 30 fm; Landings=8% increase	RCA=20 fm; Landings=14% reduction	RCA=20 fm; Landings=53% reduction
CA	42º - 40º10'	(Alt a): RCA=20 fm; Landings=status quo with higher greenling and lingcod (Alt b): same as Alt a	RCA=30 fm; Landings=35% reduction	RCA=20 fm; Landings=10% reduction
	40º10' to 34º27'	(Alt a): RCA=30 fm; Landings=status quo with higher greenling and lingcod (Alt b): same as Alt a	RCA=30 fm; Landings=status quo with higher greenling and lingcod	RCA=20 fm; Landings=10% reduction
	south of 34º27'	(Alt a) RCA=60 fm; Landings=status quo with higher greenling and lingcod (Alt b) same as Alt a	RCA=60 fm; Landings=status quo with higher greenling and lingcod	RCA=60 fm; Landings=10% reduction

Tribal Fisheries

Tribal fisheries would operate under the same management measures as No Action (Table 2-80) except the changes to set-asides and a trip limit would be implemented based on a request from the Makah (Agenda Item I.3.b, Supplemental Tribal Report, April 2012). The tribes requested increases to widow rockfish (45 mt to 60 mt), petrale sole (45.4 to 70 mt), minor shelf rockfish (9 to 30 mt), and shortspine thornyhead (38 to 50 mt) set-asides under all action alternatives (i.e., Alternatives 1-8). Further, an 800 pound per trip limit for redstripe rockfish would be established, in addition to the 300 pound per trip limit for all other minor shelf rockfish.

Recreational

California

The California recreational fishery would operate under the management measures described below. Additionally, new measures described below and in Section 2.3 and analyzed in Appendix C would be implemented. The Alternative 1 allocations to the California recreational fishery are higher (Table 2-82) than the No Action Alternative (Table 2-76). Although there would be some increased opportunity compared to No Action, management measures would still have to be more restrictive than previous years (PFMC 2002).

Groundfish Seasons and Area Restrictions:
Under Alternative 1, the season structure would be similar to the No Action Alternative except for an increase in the season length for the Mendocino Management Area and a change in the depth restriction from 60 to 50 fm in the Southern Management Area (Figure 2-12). A range of depth closures (60 fm to 40 fm) for the Southern Management Area was analyzed in Appendices B and C. All divers and shore-based anglers are exempt from the seasonal closures for rockfish, cabezon, greenlings, lingcod, and California scorpionfish.

Similar to No Action, YRCAs would be available under this alternative and could be implemented inseason if catches are projected to exceed HGs.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 15 – Oct 31 <20fm						Closed	
Mendocino	Closed				May 15 – Sept 2 <20fm				Closed			
San Francisco	Closed					Jun 1 – Dec 31 <30fm						
Central	Closed				May 1 – Dec 31 <40fm							
Southern	Closed		Mar 1 – Dec 31 <50fm									

Figure 2-12. Alternative 1: California recreational groundfish season structure and depth constraints for 2013-2014.

Groundfish Bag Limits and Size Limits

The Alternative 1 groundfish bag limits and size limits are the same as No Action, except for the following:

Bocaccio – The No Action sub-bag limit for bocaccio is two fish, with a minimum size limit of 10 inches. The proposed action would increase the sub-bag limit from two fish to three fish. The increase in the sub-bag limit is expected to increase total California recreational mortality of bocaccio by 11.5 percent. The proposed action also removes the minimum size limit of ten inches. Removing the size limit is expected to increase total bocaccio mortality by 1.0 percent. The proposed changes are not mutually exclusive, and the projections are additive. Currently bocaccio is the only rockfish species in the recreational sector that has a size limit. Removing the size limit would reduce regulatory complexity. Catch of other overfished species, as a result of these management measures, is not expected to increase.

Greenlings – The No Action status quo sub-bag limit for greenlings is two fish. The proposed action would increase the sub-bag limit to 10 fish to maintain consistency with state regulations and stay within the greenling contribution to the Other Fish complex. By increasing the sub-bag limit, the estimated take would be approximately 23.8 mt. The Council is not proposing any changes to the minimum size restriction for greenling. There are no expected changes to catch of overfished species as a result of this increase.

Additional Management Measures Analyzed

<u>Shelf Rockfish Retention in CCA</u>

Under the Alternative 1, the Council proposes to modify existing regulations governing recreational groundfish fishing within the CCA to allow retention of shelf rockfish taken during the open season for groundfish within the existing depth constraint of 20 fm. No changes to nongroundfish recreational fisheries or corresponding management measures are being proposed. Under this proposal, if the season for groundfish is open, anglers could retain shelf rockfish, including bocaccio. Removing the prohibition on shelf rockfish retention, including bocaccio, in depths of 20 fm or less in the CCA when fishing for rockfish is open, is intended to reduce bycatch that currently occurs when shelf rockfish are caught while in pursuit of other species within the 10 fish rockfish, cabezon, and greenling (RCG) bag limit. Under the proposed action, recreational anglers would be expected to meet their RCG bag limit sooner, which would reduce bycatch of shelf rockfish and may reduce encounters with overfished species. Also, this change would make regulations more consistent with retention regulations outside the CCA.

Increased mortality of shelf rockfish is expected to be minimal and can be accommodated within the recreational HG with a minimal risk of exceeding the ACLs. No ACLs for target or overfished species are expected to be exceeded as a result of this action.

Inseason Management Response

Similar to the No Action Alternative, inseason management response would include closing one or more recreational groundfish management areas for boat-based anglers, restricting recreational fishery seasons, and/or modifying depth restrictions.

COUNCIL STAFF AND GROUNDFISH MANAGEMENT TEAM SUBGROUP REPORT ON CONSIDERING RISK IN THE IFQ TRAWL SECTOR WHEN SETTING ANNUAL CATCH LIMITS FOR CANARY ROCKFISH AND PACIFIC OCEAN PERCH

Summary

In this report, we used risk measures adapted from Holland and Jannot (2012) as a method of comparing bycatch risk among areas of the coast, and among ACL alternatives for canary rockfish and Pacific ocean perch (POP). Their study focused on the design of risk pools yet is also relevant to the question of how different ACLs might affect bycatch risk of fishermen using bottom trawl gear in the IFQ sector, and in turn, affect the "needs of fishing communities."

Bycatch rates used in the paper were from pre-IFQ years, and given the comparatively much lower catch of most rebuilding species in 2011, the risk estimates in this paper likely represent an upper bound where vessels did not actively avoid canary or POP. However, the data from this period is useful for comparing bycatch risk among areas of the coast and among ACL alternatives.

Holland and Jannot (2012) estimate that fishermen in northern CA and southern OR (e.g., Brookings, Crescent City, Eureka area), and northern WA (e.g., Bellingham and Neah Bay) are at higher risk than other areas for exceeding their quota pounds (QP) of canary rockfish, using pre-IFQ trawl bycatch rates, and 2011 IFQ QP amounts, with those at highest risk likely to incur multiple transaction costs, and possibly needing to "tie up" until acquiring the necessary QP. For POP, fishermen in northern Oregon and Washington are estimated to be at highest risk (e.g., Astoria, Westport, Ilwaco, Bellingham and Neah Bay). Risk pools, further developments in QP trading, and the coming trading of QS will provide fishery participants with the means of addressing bycatch risk.

Applying this method to the alternatives under Council consideration yields some apparent differences in estimated bycatch risk among them (e.g., Alternatives 1, 2, 8), for fishermen in certain areas in each alternative, using the metric of 95th percentile TCE to non-zero QP allocation. TCE is a measure of "value at risk" or expected shortfall, expressed here in terms of pounds of catch. Translating that catch into an economic cost would depend on a number of factors.

Introduction

In this report, we used risk measures explored in Holland and Jannot (2012) as an additional method of comparing and contrasting ACL alternatives for canary rockfish and Pacific ocean perch (POP).[1] We consider these two stocks in this analysis because they are the two rebuilding stocks that the Council is most focused on in this cycle.

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[1] Danel S. Holland and Jason E. Jannot, "Bycatch risk pools for the U.S. West Coast Groundfish Fishery." 78 Ecological Economics 132 (2012).

Holland and Jannot's paper focuses on the design of risk pools, yet their data and methods are also relevant to the question of how different ACLs might affect actual and perceived bycatch risk in the bottom trawl IFQ sector. In turn, this risk affects the "needs of fishing communities" by influencing who participates in the fishery, where they choose to fish, and where they deliver their fish.

As we have highlighted over the past couple of meetings, risk is not something that our current models and projections in the DEIS take into account explicitly in projections of catch, effort, and distribution of landings and economic benefits among fishing communities. Evidence and theory suggests that risk and attitudes toward risk are important factors in how the IFQ program operates and on where quota and landings flow in the program. These factors were prominent in the Council's consideration of the IFQ program and were explored qualitatively in the Amendment 20 EIS, in Appendix C and Appendix E in particular.

The TCE Risk Measure

In their analysis, Holland and Jannot used a risk measure used in the insurance and financial industries called the tail conditional expectation (TCE) (a.k.a. expected tail loss or tail value at risk).[2] In general, risk is thought of as the consequences of an event times the probability of that event occurring. For this analysis, the risk and event of concern is the incidental catch ("bycatch") of canary and POP. Instead of focusing on a particular event and its probability of occurring, the TCE risk measure focuses on a broader range. Holland and Jannot use the 95th percentile TCE, which they define as the average of the highest 5-percentile catch events in their data (i.e., those catch events in the upper tail of the distribution, occurring with a probability of 5 percent or less). This TCE measure is not the same as the "worst case" scenario or the largest catch possible. Instead, the TCE averages that worst case scenario against all the possible catches in that upper 5th percentile.

Risk measures like the TCE are only as reliable as the information on probabilities and consequences of events on which they are based. We are fortunate in that Holland and Jannot used tow by tow data from bottom trawl trips observed by the West Coast Groundfish Observer Program over 2002-2009 (for a total of over 26,000 tows). In brief, their methods involved splitting all observed tows into eight areas (Figure 1) corresponding to major groundfish ports and then randomly sampling 100 tows over 1,000 replicates in each area to calculate the frequency of catch by species. Their TCE measure is the average catch across the upper 95th percentile of the distributions produced by this method. They chose 100 tows as roughly equivalent to the 2010 average annual activity level. They also report the median (50th percentile) catches from this method.

The TCE and median catch measures and the ratio between them as calculated by Holland and Jannot for canary and POP are reproduced in Table 1. For comparison, Table 2 reproduces these same measures for the other key groundfish bycatch stocks in the IFQ fishery.

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[2] http://en.wikipedia.org/wiki/Tail_value_at_risk.

The GMT views the Holland and Jannot approach as an informative measure of gauging actual and perceived bycatch risk in the bottom trawl sector.[3] During 2002-2009, there was no direct incentive for vessels to avoid canary or POP. Bycatch was instead managed through adjustments to trip limits and RCA boundaries. Therefore, the 2002-2009 data that they use gives some baseline indication of what catch variability is like when most vessels were unconcerned with lowering their catch of canary and POP (although this time period was greatly restricted in some respects compared to the pre-RCA management).

The IFQ program now places strong incentives and direct accountability, and hence financial risk, on fishery participants. Under these circumstances, vessels are expected to mitigate their bycatch risk by changing fishing behaviors. Yet the IFQ program is new and involves learning and chance. Even if risks are controllable to some degree, fishery participants may be uncertain as to how much mitigation is possible. Participants may be acting on perceptions about bycatch rather than on what is actually achievable. The 2002-2009 data may provides some sense of what those perceptions might be. It may be that changed behavior can lower the TCE and median measures from those seen in the 2002-2009 data. Yet a relevant analytical question to the setting of ACLs is what cost or difference such changes entail relative to higher ACLs. Risk can be thought of as one such difference.

Bycatch Variability and Need

The risk measures discussed in Holland and Jannot speak to two characteristics of bycatch. First, they help describe the variability, and in turn, the uncertainty fishery participants have with their quota needs. Second, and more directly related to the Council's ACL decision, the measures they use can help describe the potential gap between what may be needed in high bycatch years and the typical (median) quota holdings under each ACL alternative. In addition, this gap relative to typical allocations can also be relevant to the functioning of quota markets because of the effect of high transaction costs. We discuss these points below.

Comparing TCE and median catch – Evaluating the Degree of variability

As described above, the TCE measure characterizes what a 1-in-20 or less type fishing year (defined as 100 tows) would look like in the bottom trawl fishery, expressed in terms of pounds of catch for the eight areas used in the study. In comparison, catches near the median catch (i.e., the 50th percentile) represent what we would expect most vessels to experience. As shown, both measures show considerable variation between areas and species (Table 1 and Table 2).

The distance between the TCE and median catch levels, expressed here as a ratio, gives a sense of how variable catch is for each species and area with variability proportional to the ratio of TCE. Variability is an important factor in risk and the perception of risk. More variability creates more uncertainty for fishery participants and the possibility of risk-averse behavior, which in turn, can negatively affect quota trading and choices on where to fish or even whether

[3] We did not have time to replicate Holland and Jannot's analysis. If we had, we would have added data from 2010, which was the final year under the trip limit fishery.

to fish at all.[4] Variability can be equal or more important than the amount of catch when predicting fishing behaviors. For example, Pacific halibut bycatch has been a big concern to fishery participants because halibut is frequently encountered in the fishery. Yet as Holland and Jannot point out, the TCE catch for halibut is only twice the median catch (Table 2). The gap between what may be considered most likely to happen and what can happen with a less than 5 percent probability is small, relatively speaking. In contrast, that same gap for widow rockfish is relatively large. For widow, the TCE is over 500 times greater than the median catch in a couple of areas and over 2,500 times the median catch in another (Table 2). Widow bycatch can be very uncertain and fishery participants will be uncertain about how much quota they need to cover their desired fishing activities.

The variability for canary and POP bycatch is shown in Table 2. It is relatively high in some areas, especially in the area between 40°10' and 42°30' N. latitude where the TCE is almost 40 times greater than the median catch for of canary and over 60 times greater than the median catch of POP.

Comparing TCE to allocations

The magnitude of the TCE measure is also important. For example, small ratios between the TCE and the median catch mean that there is less uncertainty expected with quota needs. cAt the same time, the relative certainty about need does little good if quota is scarce relative to that need. Likewise, large ratios between the TCE and the median catch can result from a large TCE, a small median catch, or both. A large ratio may be less worrisome if the TCE level is not large relative to quota holdings. For these reasons, Holland and Jannot suggest the ratio of the TCE to median quota holdings as another informative indicator of risk:

> When TCE is many times median quota holdings, individuals that end up with high catches are not only more likely to have to acquire additional quota, they may have to acquire quota from a number of different individual [sic], thereby increasing transaction costs.

Holland and Jannot point to two things here. One, the bigger the gap between the TCE and the typical allocation, the more quota that will have to be acquired to cover a TCE-type year. Two, the smaller the typical allocation is relative to the TCE, the more people someone needing to cover a TCE event will need to deal with to acquire the quota. As Holland and Jannot discuss, such transaction costs can be an important factor. High transaction costs can work against the benefits expected from the tradability of quota. These costs are not the price that would be paid to acquire a given amount of quota, but rather, the costs necessary to complete the transaction (e.g., from the time spent looking for a buyer to the time it takes to fill out the transaction paperwork with NMFS). The "tie up" provisions of the IFQ program could also be considered a related cost. Longer QP acquisition times could lead to longer time out of the fishery. Low ACLs, relative to higher ACLs, can raise transaction costs by reducing the average quota holding, and in turn, the number of transactions needed to acquire the quota necessary to cover

[4] Daniel S. Holland. Markets, pooling, and insurance for managing bycatch in fisheries. Ecological Economics. 70(1): 121-133 (2010). The Amendment 20 EIS.

expected or actual bycatch (i.e., the average quota holder, and hence the average trading partner, holds less quota).

To explore how the distance between the TCE and quota holdings vary between the canary and ACL alternatives, we calculated the quota pounds (QP) that would be distributed to each quota share (QS) account holder under each alternative. To do so, we multiplied the IFQ sector allocation by the QS in each QS account. For purposes of this analysis, as with the 2013-2014 allocations, the 10 percent adaptive management quota is passed through to QS account holders in proportion to their QS. For ease of analysis, we only analyzed 2013 ACLs. The shifts in ACL from 2013 to 2014 are small enough so that the overall pattern seen in 2013 would hold for 2014. Of note, our analysis is based on QS accounts coastwide. We did not map where QS holders had landed their QP in 2011 or during the pre-IFQ fishery.

Table 3 and Table 4 display the median and average QP allocations for ACL alternatives where the canary ACL and POP ACL differ (i.e., they are constant across some of the integrated alternatives). These tables also display the ratio of the TCE by area to the median coastwide allocations. To be clear, allocations are not split by area, so the ratio is simply the area-specific TCE to the sector wide allocation. Moreover, this measure just captures the median estimates, i.e., the halfway point of the quota distribution. Medians and averages are meant to capture the "central tendency" of a distribution. They do not capture the circumstances of individual quota holder or vessel owners that are well below or above the median. Where the ACL is set affects each individual quota holder differently.

On the patterns seen in Table 3 and Table 4, fishermen in northern CA and southern OR (e.g., Brookings, Crescent City, Eureka area) and northern WA (e.g., Bellingham, Blaine, Neah Bay areas) are at higher risk than other areas for exceeding their quota pounds (QP) of canary rockfish. For POP, fishermen in northern Oregon and Washington are estimated to be at highest risk (e.g., Astoria, Westport, Ilwaco, Bellingham, Blaine, and Neah Bay areas). There are large changes in the ratio of the TCE to median catch within the alternatives under consideration by the Council. At this time, this concept is new enough to us that we cannot draw concrete conclusions about differences in this ratio. That is, we cannot draw conclusions about the difference between, for example, TCE to median allocations of 6.8 and 5.2 and what those differences mean to the "needs of fishing communities" in 2013 and 2014. We do see risk as a relevant factor and recommend further investigation of these measures in coming cycles.

Lastly, Holland and Jannot examined fishery performance in 2011 and include some statements about risk and performance in 2011. Based on these observations, they noted that the fishery showed signs of "highly risk-averse behavior" and speculated that this may "have been due to fears about being able to acquire quota to cover bycatch." They also noted that fishermen appeared to avoid areas of high bycatch risk and focused effort in deeper water where bycatch of key stocks tends to be lower.

We have not had time to examine the 2011 fishery data to evaluate their claims independently. We do agree that bycatch risk, the actual risk and the perceptions about that risk, is a factor influencing dynamics in the IFQ fishery and worthy of close attention in future cycles. The indicators they use do show variation between areas and between ACL alternatives.

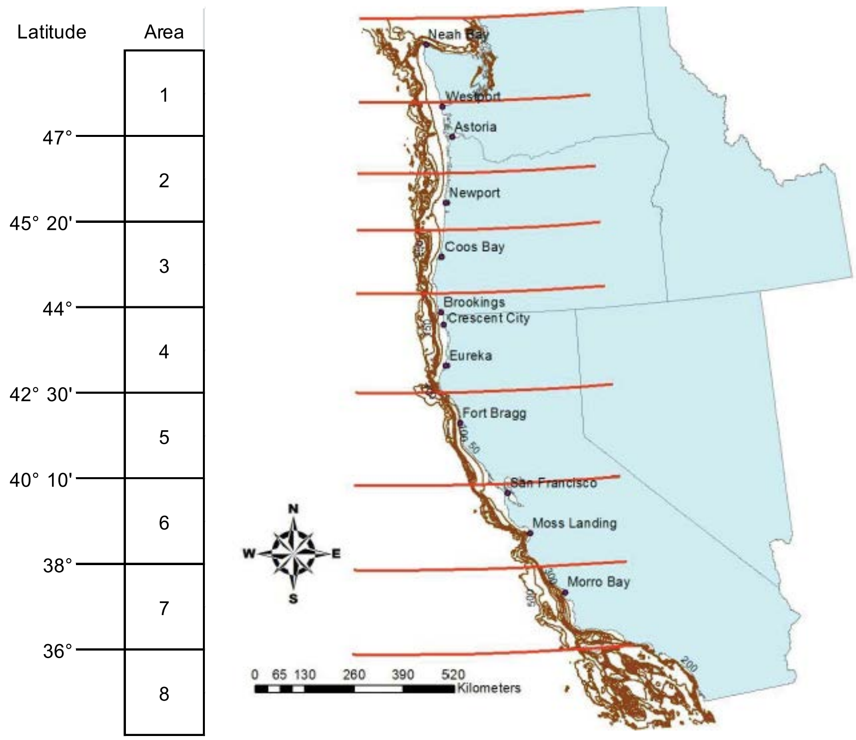

Figure 1. The areas used by Holland and Jannot (2012) and a key to match those areas in the tables below.

Table 1. The 95th percentile TCE catch (lbs), median catch (lbs), and ratio between them for canary and POP as calculated by Holland and Jannot (2012).

	TCE		Median Catch		Ratio: TCE to Median	
Area	*Canary*	*POP*	*Canary*	*POP*	*Canary*	*POP*
1	3,627	24,537	1,101	9,225	3.3	2.7
2	1,148	23,026	150	4,643	7.7	5.0
3	1,413	6,773	576	580	2.5	11.7
4	2,502	2,794	490	502	5.1	5.6
5	7,504	1,056	192	17	39.1	62.1
6	326	NA	73	NA	4.5	NA
7	1,150	NA	79	NA	14.6	NA
8	9	NA	–	NA	NA	NA

Table 2. The 95th percentile TCE catch, median catch, and ratio between the two as calculated by Holland and Jannot (2012).

	TCE catch (lbs)					
Area	*Bocaccio*	*Cowcod*	*Darkblotched*	*Widow*	*Yelloweye*	*Halibut*
1	NA	NA	8,398	11,444	212	22,574
2	NA	NA	7,339	28,279	52	3,575
3	NA	NA	8,133	400	74	14,841
4	NA	NA	16,911	240	91	5,254
5	NA	NA	11,645	19,274	11	3,566
6	4,081	251	7,159	2,138	55	NA
7	8,787	242	2,244	4,386	33	NA
8	763	166	896	15	0	NA
	Median catch (lbs)					
Area	*Bocaccio*	*Cowcod*	*Darkblotched*	*Widow*	*Yelloweye*	*Halibut*
1	NA	NA	1,969	22	18	12,428
2	NA	NA	1,890	48	0	2,052
3	NA	NA	735	24	4	9,278
4	NA	NA	5,243	9	0	2,297
5	NA	NA	1,332	8	0	2,002
6	759	6	1,478	221	0	NA
7	2,026	42	53	26	0	NA
8	204	0	248	4	0	NA
	Ratio of TCE to Median Catch					
Area	*Bocaccio*	*Cowcod*	*Darkblotched*	*Widow*	*Yelloweye*	*Halibut*
1	NA	NA	4.3	520.2	12.1	1.8
2	NA	NA	3.9	585.5	1.0	1.7
3	NA	NA	11.1	16.4	18.6	1.6
4	NA	NA	3.2	26.1	1.0	2.3
5	NA	NA	8.7	2,536.0	1.0	1.8
6	5.4	44.9	4.8	9.7	1.0	NA
7	4.3	5.7	42.7	168.7	1.0	NA
8	3.7	1.0	3.6	3.9	1.0	NA

Table 3. Canary – Median and average allocations and ratio of TCE to median allocations by area and alternative.

	Median and Average of QP allocations (non-zero) to QS Accounts					
	Alt 4	*No Action*	*Alt 2*	*Alt 1*	*Alt 8*	*Alt 5*
Median	169	346	451	532	698	1,067
Average	220	451	589	694	911	1,393
	Ratio of TCE to Median QP Allocation					
Area	*Alt 4*	*No Action*	*Alt 2*	*Alt 1*	*Alt 8*	*Alt 5*
1	21.5	10.5	8.0	6.8	5.2	3.4
2	6.8	3.3	2.5	2.2	1.6	1.1
3	8.4	4.1	3.1	2.7	2.0	1.3
4	14.8	7.2	5.5	4.7	3.6	2.3
5	44.4	21.7	16.6	14.1	10.8	7.0
6	1.9	0.9	0.7	0.6	0.5	0.3
7	6.8	3.3	2.5	2.2	1.6	1.1
8	0.1	0.0	0.0	0.0	0.0	0.0

Table 4. POP – Median and average allocations and ratio of TCE to median allocations by area and alternative. (note: POP is managed as part of the minor slope rockfish in the areas south of 40°10' N. latitude (i.e., areas 6-8)).

	Median and Average of QP allocations (non-zero) to QS Accounts				
	Alt 3	*Alt 1*	*No Action*	*Alt 6*	*Alt 4*
Median	394	1,086	1,149	1,721	1,923
Average	706	1,946	2,058	3,083	3,445
	Ratio of TCE to Median QP Allocation				
Area	*Alt 3*	*Alt 1*	*No Action*	*Alt 6*	*Alt 4*
1	62.2	22.6	21.4	14.3	12.8
2	58.4	21.2	20.0	13.4	12.0
3	17.2	6.2	5.9	3.9	3.5
4	7.1	2.6	2.4	1.6	1.5
5	2.7	1.0	0.9	0.6	0.5

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
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MAY 3 1 2012

Mr. Dan Wolford, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

RE: Final 2013-2014 Biennial Harvest Specifications and Management Measures, Agenda Item D.5, June 2012

Dear Chairman Wolford:

This letter pertains to the incidental catch set-asides for the at-sea Pacific whiting (whiting) trawl sectors. Amendment 21 to the groundfish FMP established long-term allocations between the trawl and non-trawl sectors, and among other things it established incidental catch set-asides for the at-sea whiting trawl sectors (mothership and catcher/processor sectors). While set-aside amounts were preliminarily decided under Amendment 21, the set-aside amounts were intended to be reconsidered in the biennial harvest specifications and management measures decision process using the best available information.

Regulations at 660.55(j) establish regulatory provisions for the at-sea whiting trawl sector set-asides. The set-asides for the catcher/processor and mothership sectors are also specified in regulations at Table 1d (for 2011) and Table 2d (for 2012) to part 660 subpart C. The set-aside amounts are deducted from the limited entry trawl fishery allocations and the remaining amount is made available to the IFQ fishery. The final 2011 catch data for the at-sea whiting trawl sectors are provided below in Table 1, as are the set-aside amounts by species.

Comparisons between the at-sea whiting trawl sector set-asides and the 2011 total catch estimates show that the set-aside for most species or species complexes were well within the specified set-aside. However, the estimated total catch of three species, arrowtooth flounder, minor slope rockfish, and other fish did exceed the set-asides. The estimated catch of arrowtooth flounder is 45.2 mt as compared to the set-aside of 10 mt (452% of the set-aside). The estimated catch of minor slope rockfish is 78.81 mt as compared to the set-aside of 55 mt (143% of the set-aside). Of the "other fish" complex nearly 100% was dogfish (725.31 mt out of 725.84 mt). The estimated catch of "other fish" was 140% of the set-aside of 520 mt.

The information provided here is considered to be the best available information on total catch for the 2011 at-sea whiting trawl sectors. This information should be taken into consideration when making recommendations for the 2013-2014 harvest specifications and management measures.

Sincerely,

Frank Lockhart
Assistant Regional Administrator
Sustainable Fisheries
NOAA Fisheries, Northwest Region

cc: Don McIsaac
Kelly Ames
John DeVore
Corey Niles

Table 1: Pacific Whiting Summary for the At-sea Whiting Trawl Sectors, 2011

	Mothership	Catcher/ Processors	Total	At-sea set-asides (Table 1d, part 660 subpart C)
ROUNDFISH (mt)				
Pacific whiting	50,051	71,679	121,730	NA
Pacific cod	0.00	0.01	0.01	5
Lingcod	0.12	0.04	0.16	6
Sablefish N.	2.04	2.94	4.98	50
FLATFISH (mt)				
Arrowtooth	7.23	37.98	45.21	10
Dover sole	0.25	0.93	1.18	5
English sole	0.00	0.02	0.02	5
Petrale sole	0.00	0.00	0	5
Starry flounder	0.00	0.00	0	5
Other flatfish	1.91	3.95	5.86	20
ROCKFISH (mt)				
POP	0.66	6.51	7.17	NA
Shortbelly	0.00	0.00	0	NA
Widow	12.85	24.41	37.26	NA
Canary	0.08	0.46	0.54	NA
Chilipepper	0.01	0.00	0.01	NA
Splitnose	7.13	4.78	11.91	NA
Yellowtail N.	66.67	14.70	81.37	300
Shortspine thornyhead	1.44	11.84	13.28	20
Longspine thornyhead	0.02	0.37	0.39	5
Thornyhead,unident.	0.00	0.13	0.13	NA
Darkblotched	1.70	10.29	11.99	NA
Yelloweye	0.00	0.00	0	0
Minor Shelf N	0.41	0.27	0.68	35
Minor Slope N	4.08	74.73	78.81	**55**
Rockfish unidentified	0.03	0.00	0.03	NA
REMAINING GROUNDFISH				
Longnose Skate	0.12	0.29	0.41	5
Spiny Dogfish	85.01	640.30	725.31	520
Other Fish	0.12	0.41	0.53	
PROHIBITED and PROTECTED SPECIES (numbers)				
Chinook salmon	1,296	2,695	3991	
Coho salmon	5	0	5	
Chum salmon	12	34	46	
Pink salmon	2	10	12	
Sockeye salmon	0	0	0	
Salmon, unident.	0	6	6	
Steelhead	0	0	0	
Pacific Halibut	12	55	67	
Dungeness crab	4	0	4	
Eulachon	54	1,268	1,322	
NON-GROUNDFISH SPECIES (mt)				
American shad	17.99	15.75	33.74	
Pacific Herring	0.00	0.00	0	
Squid (unidentified)	19.63	58.58	78.21	
Jack Mackerel	13.90	0.33	14.23	
Pacific Mackerel	0.11	0.00	0.11	
Pacific Sardine	0.00	0.01	0.01	
All other non-groundfish	31.49	160.63	192.12	

ENFORCEMENT CONSULTANTS REPORT ON TENTATIVE ADOPTION OF 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The Enforcement Consultants (EC) has reviewed Agenda Item D.5.a, Attachment 3, June 2012 Executive Summary and Description of the Preferred Season Structures and Management Measures and have the following comments.

2.3.4 Related Regulatory and Fishery Management Plan Language Clarifications
Complete Offloading (Regulatory Clarification)

Federal law has long required that once an offload begins, the entire offload must be completed prior to starting a subsequent trip. The states have interpreted this language with slight variations, but within the requirements of the Federal law. In development of the individual fishing quota (IFQ) fishery, allowances were made for split deliveries in all states, including transiting to a different port as long as the observer stays with the vessel until the entire offload is completed. This allowance only pertains to the IFQ fishery. Open access and limited entry fixed gear are more constrained, primarily by the state requirements. The EC endorses this proposal to clarify the Federal landing and reporting requirements for the non-IFQ sectors, while maintaining the status quo requirements currently in place.

2.3.9 Remove or Reduce the Minimum Lingcod Length Limit in the Shorebased IFQ Fishery

The EC examined this management measure and has concerns over the proposed change or removal of the Lingcod size limit for the shoreside IFQ fishery. Such a change would create a size limit inconsistency between the IFQ and non-IFQ fisheries, which would still be held to the 22-inch minimum North of 42° N. Latitude and 24 inches South of 42° N. Latitude. This discrepancy will cause enforcement to verify the source during dealer and market inspections to ensure that inspected lingcod under current size limits originated from a vessel participating in the shoreside IFQ fishery. Fish are often comingled when transported and different size limits may cause potential conflicts and delays as enforcement verifies the source. The EC recommends that if a lingcod size limit adopted for the shoreside IFQ fishery, that this change be implemented in the non-IFQ sectors as well.

2.3.10 Threshold for Switching from the Primary to Daily-Trip-Limit (DTL) Fishery for Sablefish North of 36° N. Latitude

The idea of a threshold for switching from primary to a DTL originated with the EC. We believe adopting a proposed 300 lb limit, will greatly diminish future confusion over when and how the switching threshold is applied.

PFMC
06/22/12

GROUNDFISH ADVISORY SUBPANEL REPORT ON TENTATIVE ADOPTION OF 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The Groundfish Advisory Panel (GAP) heard presentations from Mr. John DeVore, Mr. Frank Lockhart, and Ms. Jamie Goen regarding adoption of harvest specifications and management measures for 2013-14.

The GAP discussed at length several of the issues and recognized many of the others are ones we have commented on before. Therefore, we discuss thoroughly our reasoning here for issues we feel require further attention. For easy reference, the last five pages include the summaries of our determinations, presented using the format of Agenda Item D.5.a, Attachment 1, "Anticipated Council Actions and References Relevant to Decision-Making."

Referencing the actions numbered on that document, we suggest modifications to the following:

2. Final Overfished Species Harvest Specifications and Rebuilding Plans

For canary rockfish, the GAP recommends a 2013 ACL of 147 mt and a 2014 ACL of 151 mt. This corresponds to either Alternative 7 or Alternative 8; the ACLs and accountability measures are the same for canary.

The GAP discussed a recent paper published by Daniel S. Holland and Jason E. Jannot, of the Northwest Fisheries Science Center ("*Bycatch risk pools for the US West Coast Groundfish Fishery*"), relating to the trawl rationalization program and the use of risk pools. One of the most compelling arguments for higher ACLs for canary is evidence of risks associated with low canary quotas in the rationalized fishery. The Holland and Jannot analysis indicates that low quotas do not correspond with the risk of high unexpected bycatch events. This leads to hoarding of canary quota, higher quota transaction costs, low attainment of shelf species' quotas, and a less efficient and less profitable IFQ system. Furthermore, it's worth reiterating that the low canary harvest in the trawl fishery is a poor indicator of the needs of the fleet. Fishermen avoided targeting shelf species for fear of exceeding their canary quotas.

This goes back to the "sticky quota" issue: at lower levels of canary ACLs, fishermen tend to hoard their canary quota to use if they have a lightning strike. That very problem goes against one of the guiding philosophies of the trawl individual quota program, since that quota is not being traded or used. The program was designed with the idea that fishermen could trade their quota to cover mishaps, but if the overall ACL is low, individual quota is unintentionally stranded due to hoarding. The GAP believes the higher canary ACL may not solve all of these problems but will help mitigate these risks. Further, the GAP maintains that a higher canary allocation is not likely to result in a significantly higher attainment of the canary allocation.

Trawl fishermen will still be highly risk-averse by not fishing in high canary bycatch areas. The higher ACL will likely improve the individual quota system without a high conservation cost of significantly higher canary catches.

The GAP reiterates what it said in its statements from April (Agenda Item 1.3.b, http://www.pcouncil.org/wp-content/uploads/I3b_SUP_GAP_APR2012BB.pdf, and Item 1.8.b, http://www.pcouncil.org/wp-content/uploads/I8b_SUP_GAP_APR2012BB.pdf, Harvest Specifications for 2013-14, and request their inclusion here): That higher ACLs would provide direct benefits to the trawl sector and communities; that the trawl fleet caught only 14 percent of its canary quota in 2011; that increased canary quota would allow for a targeted midwater widow/yellowtail fishery; and that all sectors of the fishery would benefit from higher ACLs.

One of the problems with arguing for higher ACLs is that fishery managers look primarily at data and numbers related to models, fish stocks, landings, fishermen, etc. The behaviors and changes in the fleet and fishing business practices when a management regime is changed – such as the introduction of the individual quota program – are not taken into account. There is little room for predictability when new management is implemented; a little wiggle room in the aspects of the management program over which we DO have control can help mitigate problems that arise from changes in fishery management.

From our April statement:

> "It is also worth noting that the amount of canary landed and quota trading in the 2011 rationalized trawl fishery had unanticipated effects. …
>
> "The industry's hesitancy to trade quota had the end result of a stagnant market or poor economy. There was no way to encourage trading, no way to urge fishermen to target nearshore healthy species, no mechanism to minimize their risks, whether those risks were real or perceived. Regarding quota trading of canary, only 1,200 pounds – less than half a metric ton and only a fraction of the landed catch – were traded on a public trawl fishery trading site. …
>
> " As we've noted before, full accountability in the rationalized trawl fishery should lessen projected mortality, therefore decreasing the estimated time to rebuild."

Regarding one of the public comment submissions on this issue, the argument has been made that the needs of the fishing communities have not changed since the last harvest specifications cycle, when the ACL was lower than the Council's preferred option for 2013-14. This is an erroneous argument, as the only way to get an accurate picture of the groundfish fishery is to take a historical snapshot covering more than one or two years.

3a. Adopt set-asides from the annual catch limits (ACL) and, for some species, the trawl allocations

For at-sea whiting: The GAP feels at this time that no changes in the set-asides are necessary. Regarding the issue discussed in Agenda Item D.5.b, the NMFS letter, set-asides in the at-sea whiting fishery, the GAP believes the 2011 fishing year was an anomaly and that the higher than anticipated incidental catches were due to atypical fishing patterns. The at-sea sectors were delayed in returning to the whiting season because of the lateness of the pollock B-season. A large part of the 2011 season occurred after mid-November and extended well into December. This timing, in combination with schools of whiting more highly dispersed than usual, resulted in atypical bycatch patterns. This confluence of events is highly unlikely to happen again. Moreover, the at-sea whiting sectors have a demonstrated history of taking proactive measures to address bycatch concerns (for example, darkblotched rockfish in 2004 and Chinook salmon in 2006). Therefore, the GAP is hesitant to incorporate into specifications a change based on an anomaly and believes the at-sea sectors will take proactive measures.

For tribal petrale set-asides: With reference to Agenda Item D.3.B, "Supplemental Makah Report," the GAP suggests any increase to the tribal set-aside should be proportional to the increase in the petrale ACL. A proportional increase would result in approximately 156 mt, which is 6 percent of the coastwide 2013 ACL and 159 mt in 2014. The supplemental request for 220 mt is approximately 8 percent of the ACL.

3b. Two-year trawl and non-trawl allocations for bocaccio, canary, cowcod, petrale, and yelloweye

For **cowcod, the GAP agrees the Council-preferred option (1.9 mt trawl/1 mt non-trawl) is the best**. One year of trawl data under a rationalized fishery is insufficient to show that bycatch of cowcod is near non-existent, especially as it is anticipated that more trawlers may move onto the shelf to fish in the future. However, recognizing the considerable difficulties of the southern California recreational fleet, a different allocation may be in order – something along the lines of 1.5 mt for trawl and 1.4 mt for non-trawl, for example.

4a. Shoreside IFQ fishery, trawl RCA line modifications

The trawl fishery currently is working under inseason changes made to the RCA lines for 2012. The Groundfish Management Team (GMT) brought to the GAP's attention that these changes could be rolled over into the harvest specifications for 2013-14. The GAP feels this is a reasonable idea and one that would encompass requests the GAP has often made during inseason discussions in the past.

From the GMT's statement:

Trawl RCA boundaries as of June 21, 2012 (published in inseason action, 76 FR 22679 on April 17, 2012, effective May 1, 2012).

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td>North of 48°10' N. lat.</td><td>shore - modified[2/] 200 fm line[1/]</td><td>shore - 200 fm line[1/]</td><td colspan="2">shore - 150 fm line[1/]</td><td>shore - 200 fm line[1/]</td><td>shore - modified[2/] 200 fm line[1/]</td></tr>
<tr><td>48°10' N. lat. - 45°46' N. lat.</td><td rowspan="2">75 fm line[1/] - modified[2/] 200 fm line[1/]</td><td>75 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>75 fm line[1/] - 150 fm line[1/]</td></tr>
<tr><td>45°46' N. lat. - 40°10' N. lat.</td><td>75 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>75 fm line[1/] - modified[2/] 200 fm line[1/]</td></tr>
<tr><td>South of 40°10' N. lat.</td><td colspan="6">100 fm line[1/] - 150 fm line [1/ 2/]</td></tr>
</table>

4f. California Recreational season dates, bag limits, area closures

The GAP agrees with keeping the status quo of retaining the 60-fathom line south of Pt. Conception (34°27' N lat.) throughout the year, but if that is not possible, a compromise of adopting a 50-fathom line in period six could be an option. The GAP requested an analysis of a change to 50 fathoms at the April 2012 meeting.

Moving the line from 60 to 50 fathoms for the whole year would be a huge hit to the southern California recreational fleet, which depends on fishing the grounds between 40 and 60 fathoms. The fleet is the victim of the increasing implementation of conservation areas closed to fishing and further restriction could be disastrous.

The compromise to a 50-fathom line in period six would likely reduce incidental cowcod impacts, the species driving consideration for further restricting this fishery. Most of the increased recreational catch of cowcod in 2011 occurred late in the year.

5f. Modifications to the shorebased IFQ accumulation limits

The GAP suggests the following changes to the vessel accumulation limits, to better reflect the nature of the fishery under trawl rationalization:

<table>
<tr><th>Species</th><th>Existing cap</th><th>Proposed cap</th><th>Percentage harvested</th></tr>
<tr><td>Chilipepper</td><td>15%</td><td>20%</td><td>21%</td></tr>
<tr><td>Minor slope rock North</td><td>7.5%</td><td>15%</td><td>17.5%</td></tr>
<tr><td>Minor slope rock South</td><td>9%</td><td>20%</td><td>13.6%</td></tr>
<tr><td>Sablefish north</td><td>4.5%</td><td>3%</td><td>94%</td></tr>
<tr><td>Lingcod north</td><td rowspan="2">3.8% coastwide</td><td>5.3%</td><td rowspan="2">15% coastwide</td></tr>
<tr><td>Lingcod south</td><td>13.3%</td></tr>
</table>

For chilipepper and minor slope rockfish north and south, the GAP suggests the above changes to allow greater flexibility for fishermen to catch species for which the overall harvest has been quite low.

For sablefish, a lower use cap would ensure a broader distribution of that fish, rather than the aggregation of sablefish quota in the hands of only a few. With the ACLs of sablefish going down in 2013 and 2014, it is more important than ever to ensure the distribution of this primary species.

For lingcod, the changes in vessel caps will produce the equivalent of equal sharing that was in place prior to the change to a management line for north and south, rather than a coastwide management. This was first brought up in November 2011 (reference our GAP statement under E.4: http://www.pcouncil.org/wp-content/uploads/E4b_SUP_GAP_NOV2011BB.pdf), at which time we introduced a formula that would provide the correct percentages.

ANTICIPATED COUNCIL ACTIONS AND REFERENCES RELEVANT TO DECISION-MAKING,
INCORPORATING GAP RECOMMENDATIONS

Under Agenda Item D.5, the Council is scheduled to tentatively adopt final harvest specifications and management measures, including allocations. Under Agenda Item D.9, the Council will take final action by confirming or modifying actions from Agenda Item D.5. The following is a summary of the Groundfish Advisory Panel's discussions and suggestions.

Anticipated Actions	Preliminary Draft Environmental Impact Statement (EIS) Section
1. Final Non-Overfished Species Harvest Specifications *The GAP agrees with the Council's preferred alternative for this section.*	Table ES-1, Section 2.1, 4.1-4.4, Appendices B and C
2. Final Overfished Species Harvest Specifications and Rebuilding Plans ***Canary rockfish:*** *A* ***2013 ACL of 147 mt*** *and a* ***2014 ACL of 151 mt (alternative 7 or 8 for canary only).*** ***Bocaccio:*** *There is an adequate buffer at an ACL of 320 mt.* *The GAP agrees with the Council's preferred options for all other species*	Table ES-1, Section 2.1, 4.1-4.4, Appendices B and C
3. Final Set-Asides and Allocations *The GAP agrees with all the Council-preferred options for final set-asides and allocations, with the exception of:* ***3a****,* ***set-asides in the at-sea whiting fishery, and 3b, cowcod and petrale allocations****.*	
3a. Adopt set-asides from the annual catch limits (ACL) and, for some species, the trawl allocations **a/** ***Set-aside in the whiting fishery:*** *No change in existing set-asides.* ***Petrale tribal set-aside:*** *Any increase in tribal petrale set-aside should be proportional to any increase in the ACL*	Section 2.2.1
3b. Two-year trawl and non-trawl allocations for bocaccio, canary, cowcod, petrale, and yelloweye ***Cowcod: The GAP agrees with the Council-preferred option*** *(1.9 mt for trawl; 1 mt for non-trawl), but is open to a potential different allocation arrangement, as yet to be determined.*	Section 2.2.2.2, Appendices B and C
3c. Confirm or modify the Fishery Management Plan (FMP) within trawl allocations for widow rockfish	Section 2.2.3.1, Appendix C
3d. Adopt bocaccio, canary, and yelloweye harvest guidelines (HG) for the recreational fisheries	Section 2.2.3.2, Appendices B and C

Anticipated Actions	Preliminary Draft Environmental Impact Statement (EIS) Section
3e. HGs for black rockfish (OR and CA), blackgill (south of 40°10), blue rockfish (CA), longnose skate **b/**	Section 2.2.3.2
4. Final Season Structures	
The GAP agrees with all the Council-preferred options for final RCA configurations and season structures, with the exception of: ***4a, RCA lines in the shorebased IFQ fishery and 4f, California recreational****.*	
4a. Shorebased Individual Fishing Quota (IFQ) Fishery --Trawl rockfish conservation area (RCA) configurations	Section 2.4, 4.2-4.4, Appendix B
The GAP agrees with the GMT's analysis of rolling over the RCA line changes made during inseason action in 2012 to 2013-14.	
4b. Non-Nearshore --Non-trawl RCA seaward configurations	Section 2.4, 4.2-4.4, Appendix B
4c. Nearshore --Non-trawl RCA shoreward configurations	Section 2.4, 4.2-4.4, Appendix B
4d. Washington Recreational --Season dates --Bag limits --Area closures	Section 2.4, 4.2-4.4, Appendix B
4e. Oregon Recreational --Season dates --Bag limits --Area closures	Section 2.4, 4.2-4.4, Appendix B
4f. California Recreational --Season dates --Bag limits --Area closures ***The GAP agrees with the Council-preferred option, but if that is not possible, a potential compromise*** *would be keeping the 60 fathom line for periods two through five, but changing the line to 50 fathoms in period six (November and December).*	Section 2.4, 4.2-4.4, Appendix B
5. Final Management Measures	
The GAP agrees with the Council-preferred options in this section, with the ***exception of 5f, accumulation limits and 5g, surplus carryover provisions****, as noted below.*	
5a. RCA boundary modifications	Section 2.2-2.4, 4.2-4.4, Appendix C

Anticipated Actions	Preliminary Draft Environmental Impact Statement (EIS) Section
--Washington and Oregon 150 and 200 fm lines --Oregon 200 fm line --California Usal and Noyo Canyons 150 fm line	
5b. Management of ACL set-asides	Section 2.2-2.4, 4.2-4.4, Appendix C
5c. Sorting requirement for aurora (north 40°10), shortraker (north 40°10), rougheye (north 40°10)	Section 2.2-2.4, 4.2-4.4, Appendix C
5d. Catch accounting between limited entry and open access	Section 2.2-2.4, 4.2-4.4, Appendix C
5e. Related regulatory and FMP language clarifications --Offload requirements --Relationship between open access fishery regulations and the IFQ fishery	Section 2.2-2.4, 4.2-4.4, Appendix C
5f. Modifications to the shorebased IFQ accumulation limits	Section 2.2-2.4, 4.2-4.4, Appendix C

The GAP suggests the following changes to accumulation limits, to better reflect the prosecution of the fishery under trawl rationalization:

Species	Existing cap	Proposed cap	Percentage harvested
Chilipepper	*15%*	*20%*	*21%*
Minor slope rock North	*7.5%*	*15%*	*17.5%*
Minor slope rock South	*9%*	*20%*	*13.6%*
Sablefish north	*4.5%*	*3%*	*94%*
Lingcod north	*3.8% coastwide*	*5.3%*	*15% coastwide*
Lingcod south		*13.3%*	

5g. Modifications to the shorebased IFQ surplus carry-over	Section 2.2-2.4, 4.2-4.4, Appendix C

The GAP supports ***suspending the carryover provision in 2013-14 for petrale and sablefish*** *until a long-term fix is in place*

5h. Remove or reduce to 20 inches the minimum length limit for lingcod in the shorebased IFQ fisheries (all legal gears)	Section 2.2-2.4, 4.2-4.4, Appendix C
5i. Threshold for moving between the sablefish primary fishery to the daily trip limit fishery north of 36°	Section 2.2-2.4, 4.2-4.4, Appendix C
5j. Proposed changes to sablefish limited entry and open access bi-monthly cumulative landing limits	Section 2.2-2.4, 4.2-4.4, Appendix C
5k. Modifications to blackgill rockfish (south of 40°10) bi-monthly cumulative landing limits for limited entry and open access fixed gear	Section 2.2-2.4, 4.2-4.4, Appendix C
5l. Modifications to longnose skate bi-monthly cumulative landing limits and RCAs	Section 2.2-2.4, 4.2-4.4, Appendix C

Anticipated Actions	Preliminary Draft Environmental Impact Statement (EIS) Section
5m. Modifications to spiny dogfish bi-monthly cumulative landing limits and RCAs	Section 2.2-2.4, 4.2-4.4, Appendix C
5n. Recreational shelf rockfish retention in the Cowcod Conservation Area	Section 2.2-2.4, 4.2-4.4, Appendix C
5o. Remove the California recreational bocaccio size limit	Section 2.2-2.4, 4.2-4.4, Appendix C
5p. Increase the California recreational bocaccio bag limit	Section 2.2-2.4, 4.2-4.4, Appendix C
5q. Increase the California recreational greenling bag limit	Section 2.2-2.4, 4.2-4.4, Appendix C

a/ It is expected that the preliminary set-asides adopted by the Council and used in the analysis of the integrated alternatives will be updated based on the tribal requests from April (see Agenda Item I.3.b, Supplemental Tribal Report, April 2012) and final adoption of exempted fishing permits for 2013-2014 under Agenda Item D.4. The best reference for this action will be a GMT report under Agenda Item D.5.
b/ Sorting, prior to the first weighing after offloading, is required for species with a HG; see regulations at 660.12 (a)(8).

Agenda Item D.5.b
Supplemental GMT Report
June 2012

GROUNDFISH MANAGEMENT TEAM REPORT ON TENTATIVE ADOPTION OF 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The Groundfish Management Team (GMT) reviewed and discussed the materials provided under Agenda Item D.5 including Attachment 1, which itemizes the anticipated Council actions. For several items, the GMT did not identify a need for further discussion, therefore, those items are not detailed in this report. The remaining items are covered in the order in which they were presented in Attachment 1. If the Council requests further input or analysis on any item, such information could be provided under Agenda Item D.9.

GMT Recommendations (in addition to action items in Attachment 1)

1. **Adopt all set-aside updates provided in Supplemental GMT Report 2.**
2. **Increase the arrowtooth flounder at-sea set-aside from the trawl allocation from 20 to 50 mt to accommodate catch in the at-sea sectors.**
3. **Consider 2011 catch of spiny dogfish in the at-sea sector when establishing the at-sea whiting set-aside from the trawl allocation. Options include**
    a. **Increase the Other Fish set-aside from 520 mt to 726 mt to account for the 2011 catches in the at-sea sectors, or**
    b. **Continue with the preferred Other Fish set-aside of 520 mt.**
4. **Require that all fish from any trip be offloaded prior to the commencement of a subsequent trip to ensure accurate catch accounting.**
5. **Adopt modifications to the Fishery Management Plan and regulations to specify that shorebased individual fishing quota (IFQ) participants fishing with a non-endorsed gear be exempt from the open access trip limits since catch is covered by quota pounds.**
6. **Adopt the shorebased IFQ option for enhanced accountability measures.**

Contents

1. Final Non-overfished Species Harvest Specifications

<u>Stock Complexes</u>

The Council continues to improve methodologies to estimate harvest specifications for species without stock assessments (i.e., data-poor species) and evaluate the performance of the existing stock complexes relative to the revised National Standard 1 Guidelines. Based on the National Marine Fisheries Service (NMFS) Northwest Fishery Science Center (NWFSC) presentation under Agenda Item D.1 (D.1.c, Supplemental NWFSC PowerPoint) the GMT would like to work with the Science Centers and Council staff to ensure that an adequate range of stock complex reconfiguration and management options are explored, if tasked to do so by the Council. It is our understanding that this work would have to be largely completed by the end of this year to avoid overlap with the Science Center’s stock assessment duties. As such, we suggest a working group be convened to address this issue in the fall. The GMT anticipates commenting further on workload matters under Agenda Item G.7, Future Meeting Planning.

2. Final Overfished Species Harvest Specifications and Rebuilding Plans

Canary Rockfish

Agenda Item D.5.a, Attachment 2 identifies the probability of rebuilding canary rockfish by 2027, which is the median time to rebuild in the current rebuilding plan. The new stock assessment and rebuilding analysis indicates canary rockfish cannot rebuild by 2027, even under a zero harvest strategy. In April, the Council selected 2030 as the preferred T_{TARGET} under the proposed changes to the canary rockfish rebuilding plan. Table 1 shows the probability of rebuilding canary rockfish in 2030, which is the median time to rebuild under Alternative 1 (preferred) and Alternative 8. The Council's preferred alternative is expected to rebuild with a greater than 50 percent probability by 2030. Alternative 8 has a 50 percent probability, while Alternative 2 has a 55.8 percent probability of rebuilding by 2030.

Table 1. Probability of rebuilding for 2030, the Council's preferred T_{TARGET}.

Canary 2013 ACL	**2030**
101 mt (ALT 2)	55.8%
116 mt (ALT 1, **PPA**)	54.6%
147 mt (ALT 8)	**50.0%**

3. Final Set-Asides and Allocations

The GMT will provide updated set-aside estimates for tribal fisheries, exempted fishing permits (EFPs), research, and open access fisheries in Agenda Item D.9.b, Supplemental GMT Report 2. The updates will result in changes to the fishery harvest guidelines and sector allocations. The rationales for the changes are outlined below.

a. Adopt set-asides from the annual catch limits (ACL) and, for some species, the trawl allocations

Set-asides updates

EFP

If the Council modifies the PPA for EFP set-asides under Agenda Item D.4.b, the GMT will revise the EFP set-asides in Agenda Item D.9.b, Supplemental GMT Report 2. Depending on the magnitude of the changes, such updates may require further discussion under Agenda Item D.9.

Tribal

The tribal set-aside values used in the DEIS analysis need to be updated based on recent tribal requests. At the April Council meeting, the Makah requested changes to the minor shelf rockfish, shortspine thornyhead, and widow rockfish set-asides (Agenda Item I.3.b, Supplemental Tribal Report, April 2012). At this meeting, the Makah submitted a letter requesting the petrale sole set-aside be updated to 220 mt for both 2013-2014 (Agenda Item D.5.b, Supplemental Makah Report).

Research

The Council adopted preliminary research set-asides for 2013-2014 in November 2011. The GMT recently received updated information from NMFS on anticipated research projects by the NWFSC, and set-asides were updated accordingly.

Other Fish

Set-asides for Other Fish are updated, based on the maximum historical catch in the tribal, research, EFP, and incidental open access fisheries.

At-Sea Whiting Set-Asides

Unlike set-asides that are taken as off-the-top deductions after setting the ACL, set-asides for some species are taken from the trawl allocation to accommodate bycatch in the at-sea whiting fisheries (catcher-processor and mothership). Like other set-asides, these catches are not typically managed inseason. Therefore the Council has generally established set-aside amounts high enough to accommodate the historical maximum or any increased catch that is anticipated. Inseason action may be taken if there is a risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns.[1] Potential inseason action for the at-sea sectors include implementing bycatch reduction areas (BRA) which would prohibit vessels from fishing shoreward of a boundary line approximating the 75-fm, 100-fm or 150-fm depth contours and would be expected to reduce catches of some species.

In November 2011, catch in the at-sea sectors from 2009-2010 was evaluated and set-asides were recommended by the Council for the DEIS analysis. At this meeting, the NMFS submitted a letter detailing the catch estimates from the 2011 at-sea fishery (Agenda Item D.5.b, NMFS Letter). Two species had catches higher than the preferred set-asides for 2013-2014.

The arrowtooth flounder catch in 2011 was 45.2 mt while the set-aside proposed for 2013-2014 is only 20 mt. **The GMT recommends increasing the arrowtooth flounder set-aside from 20 to 50 mt to accommodate catch in the at-sea sectors.**

Catch of Other Fish in 2011 was higher than the proposed set-aside for 2013-2014; 726 mt compared to a 520 mt set-aside. The highest proportion of catch in the Other Fish set-aside was spiny dogfish, which occurred in the catcher-processor sector (Agenda Item D.5.b, NMFS Letter). **The Council could increase the Other Fish set-aside from 520 mt to 726 mt to account for the 2011 catches.** Preliminary analysis indicates that neither the Other Fish harvest specifications nor the spiny dogfish contributions to the Other Fish complex (e.g., ABC and OFL) would be exceeded if the historical maximum mortality in all sectors was encountered in 2013-2014. However, if non-trawl mortality is higher than the historical maximums, inseason adjustments to non-trawl routine management measures (i.e., RCA and trip limit adjustments) may be needed. Given the depth and geographic distribution of spiny dogfish (see DEIS and Appendix C), BRAs should be an effective management tool to reduce catch in the at-sea sector if the set-aside is projected to be exceeded.

The Council could continue with the proposed set-aside of 520 mt, track catches inseason, and consider inseason adjustments to BRAs, if necessary. Given the depth and geographic distribution of spiny dogfish (see DEIS and Appendix C), BRAs should be an effective management tool to reduce catch.

The GMT notes that the catcher-processor co-op has successfully resolved emerging inseason issues in the past. For example, in 2004 when catches of darkblotched rockfish was a concern for all fisheries, the catcher-processor sector worked closely with the NMFS to harvest their

[1] See 660.150(c)(2)(i)(B)(2)

remaining whiting allocation while avoiding darkblotched. We would anticipate a similar response in the rationalized fishery yet we cannot predict whether catches would remain within the set-aside.

In the next management cycle, the Council may wish to evaluate whether set-asides are the most appropriate tool for managing spiny dogfish in the at-sea fisheries. For example, a direct allocation to the co-op may be more effective and efficient than actively managing the set-aside inseason with command and control measures such as BRAs.

4. Final Season Structures

a. Shorebased Individual Fishing Quota (IFQ) Fishery

The preferred rockfish conservation area (RCA) configuration represents the structure in regulation on January 1, 2012 (Table 2). If desired, the Council could adopt the current RCA configuration (as of May 11, 2012, Table 3). There have been several small changes to the trawl RCA between 40°10’ and 48°10’ N. lat. throughout 2012: in Period 2, moving the seaward line from 200 fm to 150 fm; in Periods 3 and 5, moving the shoreward line from 75 fm to 100 fm; and in Period 6, moving the seaward line from the modified 200 fm to 150 fm, between 45°46’ and 48°10’. Adjustments to the RCA and associated changes in impacts cannot be modeled; yet projected attainment for overfished species under the preferred alternative for 2013-2014 are very low and therefore impacts can likely be accommodated.

Table 2. Trawl RCA boundaries as of January 1, 2012 (published in 2011-2012 Final Rule, 76 FR 27508, p. 27548).

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
North of 48°10' N. lat.	shore - modified[2/] 200 fm line[1/]	shore - 200 fm line[1/]	shore - 150 fm line[1/]		shore - 200 fm line[1/]	shore - modified[2/] 200 fm line[1/]
48°10' N. lat. - 45°46' N. lat.	75 fm line[1/] - modified[2/] 200 fm line[1/]	75 fm line[1/] - 200 fm line[1/]	75 fm line[1/] - 150 fm line[1/]	100 fm line[1/] - 150 fm line[1/]	75 fm line[1/] - 200 fm line[1/]	75 fm line[1/] - modified[2/] 200 fm line[1/]
45°46' N. lat. - 40°10' N. lat.			75 fm line[1/] - 200 fm line[1/]	100 fm line[1/] - 200 fm line[1/]		
South of 40°10' N. lat.	100 fm line[1/] - 150 fm line [1/ 2/]					

Table 3. Trawl RCA boundaries as of June 21, 2012 (published in inseason action, 76 FR 22679 on April 17, 2012, effective May 1, 2012).

	JAN-FEB	MAR-APR	MAY-JUN	JUL-AUG	SEP-OCT	NOV-DEC
North of 48°10' N. lat.	shore - modified[2/] 200 fm line[1/]	shore - 200 fm line[1/]	shore - 150 fm line[1/]		shore - 200 fm line[1/]	shore - modified[2/] 200 fm line[1/]
48°10' N. lat. - 45°46' N. lat.	75 fm line[1/] - modified[2/] 200 fm line[1/]	**75 fm line1/ - 150 fm line1/**	**100 fm line[1/] - 150 fm line[1/]**	100 fm line[1/] - 150 fm line[1/]	**100 fm line[1/] - 150 fm line[1/]**	**75 fm line[1/] - 150 fm line[1/]**
45°46' N. lat. - 40°10' N. lat.		75 fm line[1/] - 200 fm line[1/]	**100 fm line[1/] - 200 fm line[1/]**	100 fm line[1/] - 200 fm line[1/]	**100 fm line[1/] - 200 fm line[1/]**	75 fm line[1/] - modified[2/] 200 fm line[1/]
South of 40°10' N. lat.	100 fm line[1/] - 150 fm line [1/ 2/]					

5. Final Management Measures

b. Management of ACL set-asides

The GMT notes that decisions on IFQ surplus carryover are anticipated to occur in the spring while decisions on reapportioning set-aside amounts is anticipated to occur in the fall after research and EFPs are typically completed. Currently the issuance of IFQ surplus carryover takes into consideration projections to evaluate the risk of exceeding harvest specifications (see Agenda Item D.8.b, NMFS Report). Under attainment of the research and EFP set-asides could be an important consideration in evaluating the risk of issuing surplus carry-over. The Council may wish to consider moving the decision on surplus carry-over to the fall so that both issues can be considered concurrently.

c. Sorting requirement for aurora (north of 40° 10), shortraker (north of 40’10), rougheye (north of 40° 10)

In examining the slope rockfish landings data, the Washington Department of Fish and Wildlife (WDFW) discovered that its species compositions from pre-2010 were not being applied to slope rockfish landed by hook and line gears. Catch of aurora, rougheye, and shortraker rockfishes was therefore reported as being zero in PacFIN for these gears. That error was corrected and the PacFIN estimates are now shown in Table 4. These estimates include both tribal and non-tribal landings into the state. Of note, the catch history on which the overfishing level (OFLs) were calculated for these stocks were based on the erroneous landings data in PacFIN. The landings are significant enough for rougheye that we suspect the OFL calculation would differ if it were rerun. The GMT recommends that this be looked at for the next harvest specification cycle.

Table 4. WDFW Corrected PacFIN hook and line landing estimates for aurora, rougheye, and shortraker rockfish (in mt).

Year	Aurora	Rougheye	Shortraker
2000	0.12	25.64	5.62
2001	0.01	13.94	1.99
2002	0.05	24.69	2.75
2003	0.63	19.41	0.83
2004	0.04	32.07	5.83
2005	0.20	40.71	2.03
2006	0.01	54.28	3.16
2007	0.04	51.36	2.24
2008	0.06	44.81	3.29
2009	0.03	79.80	2.45
2010	0.09	45.30	4.27
2011	0.05	40.16	3.84
2012	0.00	7.92	0.29

e. Related regulatory and FMP language clarifications

The GMT would like to clarify some information for Council consideration relative to item 5e. The first is a regulation clarification regarding offloading language. The second is an FMP and possible regulations clarification regarding how the open access regulations apply to IFQ participants when they fish with non-trawl gear for which the vessel is not endorsed.

Offloading

Current regulations at 660.60(h)(2) require those vessels participating in the IFQ fishery to fully offload their catch before starting a new fishing trip. When this regulation was implemented as part of the trawl program components final rule it was specific to IFQ landings. The DEIS for 2013-2014 analyzed modifying regulations to apply this requirement to all fisheries. The GMT supports this change because requiring all fisheries to fully offload before the start of a subsequent trip will aid in catch accounting, because it will be easier to track the landed species associated with a particular fishing trip. **The GMT recommends modifying regulations to require all landings in all fisheries to be offloaded prior to the start of a new trip.**

Relationship between open access fishery regulations and the IFQ fishery

This issue relates to how open access (OA) regulations apply when an IFQ participant is fishing with gear for which the vessel does not have an endorsement (i.e., non-endorsed gear). Current groundfish FMP language (section 11.2.5) states that when an IFQ participant fishes with gear for which the vessel does not have an endorsement they must cover their landing with trawl IFQ, comply with the trawl IFQ program provisions, and open access sector regulations will not apply. The FMP clarification analyzed in the DEIS would modify the FMP to specify that IFQ participants fishing with gear for which the vessel does not have an endorsement would only be exempt from the open access trip limits and would remain silent on how other open access regulations would apply. As stated in the DEIS, “Gear and other regulations having to do with the open access fishery may continue to apply, however, this adjustment will not prevent NMFS and the Council from providing exceptions to other open access regulations as necessary and appropriate”. Additionally, NMFS may need to amend regulations, including the gear switching regulations at 660.140(k) to be consistent with this FMP change. **The GMT recommends adopting modifications to the FMP and regulations to specify that IFQ participants fishing with a non-endorsed gear be exempt from the open access trip limits.**

g. Modifications to the shorebased IFQ surplus carry-over

The GMT recommends that the Council consider the enhanced accountability option for the IFQ surplus carry-over (see Appendix C of the DEIS). Under this option, the GMT could work with the NWR to analyze the projected impacts. This analysis would allow for discussion with other advisory bodies (i.e., the GAP) and the public to ensure the best available data is used for decision-making, and to bring the risk call to the Council, like is done with inseason actions now. Some on the GMT do not understand the "process" issue that has been raised with the carryover. The Magnuson-Stevens Act and National Standard Guidelines are designed to prevent overfishing and all involved here seem in agreement that the carryover does not raise such a risk (see Agenda Item I.3.b, Supplemental SSC Report, April 2012.

h. Remove or reduce to 20 inches the minimum length for lingcod in the shorebased IFQ fisheries (all legal gears)

Although the DEIS determines that there would be no significant biological impact by removing or reducing to 20 inches the minimum length for lingcod in the shorebased IFQ fishery using all legal gears, the GMT would like to provide additional context to this determination. Analysis of the difference between the projected amount of caught and retained currently sub-legal lingcod, in comparison to what is currently allowed, has not been conducted largely due to uncertainties around minimum market thresholds. That is, there is likely a minimum marketable size for lingcod at which point lingcod below this threshold will be discarded, regardless of whether or not it is legal. Input via public comment from industry processors may be valuable to the Council in understanding lingcod marketability relative to this proposed minimum size change. Since the assessment assumes that the full ACL is taken, it may be safe to assume that removing the size limit will not have a biological effect on the resource. Therefore, it may be worthwhile to eliminate the current lingcod size limit for the 2013-2014 biennium and potentially revisit this issue for the 2015-2016 management cycle.

m. Modifications to spiny dogfish bi-monthly cumulative landing limits and RCAs

The preferred action from April was to include all routine management measures to address spiny dogfish catches inseason. The GMT notes that for the next cycle, the Council may want to evaluate whether the current management measures are sufficient or if issuing spiny dogfish IFQ would be more efficient. A similar consideration may need to be given for longnose skate.

n, o, and p. Changes to California recreational management measures

The Council's PPA is to allow shelf rockfish retention in Cowcod Conservation Area (CCA), removal of bocaccio size limit, and increase bocaccio bag limit.

New information reveals that recreational impacts in 2011 were higher for bocaccio than previously thought. These data were not included in the recreational model and not analyzed in the DEIS. The GMT notes that the proposed changes to recreational management measures (e.g., bag limit, size limit) are all considered routine inseason measures. If these measures are implemented, and there are unanticipated consequences, adjustments can be made inseason.

PFMC
06/22/12

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Via Email and First Class Mail

June 20, 2012

William W. Stelle, Jr.
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way NE
Seattle, WA 98115-0070

Re: Makah Treaty Groundfish Fisheries in 2013 and 2014

Dear Mr. Stelle:

On March 29, 2012, we wrote to you on behalf of the Makah Indian Tribe. Pursuant to 50 C.F.R. § 660.324(d), we advised you that the Tribe intended to continue all of its existing groundfish fisheries in 2013 and 2014, and requested that, with certain exceptions, all existing treaty groundfish regulations and allocations be continued.

One of the exceptions was the Tribe's request for an annual tribal set aside of 70 metric tons (mt) petrale sole in 2013 and 2014, associated with the Tribe's bottom trawl fishery. However, since developing that proposal, the Tribe has experienced greatly increased encounters of petrale sole in its bottom trawl fishery, including encounters throughout the shelf area. As a result of those increased encounters, the Tribe has imposed new restrictions on its fishery to limit the catch of petrale sole.

In light of this experience, the Tribe now requests a tribal set aside of 220 mt of petrale sole in 2013 and 2014. To put this request in context, it appears that the Pacific Fishery Management Council will recommend an increase in the coast-wide annual catch limit (ACL) for petrale sole from 1,160 metric tons (mt) in 2012 to 2,592 mt in 2013 and 2,652 mt in 2014. The Tribe's request for an annual tribal set aside of 220 mt of petrale sole in 2013 and 2014 is less than 10 percent of the anticipated ACL in each year.

In all other respects, the Tribe's requests as set forth in our March 19, 2012, letter remain unchanged.

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

Sincerely,

ZIONTZ, CHESTNUT, VARNELL,
BERLEY & SLONIM

Marc Slonim

Marc D. Slonim

cc (via email only):

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Agenda Item D.5.c
Public Comment
June 2012

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May 31, 2012

Mr. Dan Wolford, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

RE: Agenda Item D.5, Biennial Harvest Specifications for 2013-14 Groundfish Fishery

Dear Chairman Wolford and Council Members:

The Natural Resources Defense Council (NRDC) would like to take this final opportunity to advise the Pacific Fishery Management Council against further increases in the canary rockfish Annual Catch Limits (ACLs) for 2013 and 2014.

At its April meeting, the Council adopted preferred harvest specifications for the groundfish fishery for 2013 and 2014. *See* April 2012 Decision Document, at 4. The preferred harvest specifications included ACLs of 116 and 119 metric tons of canary rockfish for 2013 and 2014, respectively.

As noted by NRDC in previous comment letters,[1] these catch levels already represent an increase both in tons harvested and in harvest rate, when compared to the 2011-12 catch levels. In particular, the 2011-12 ACLs of 102 and 107 metric tons correspond to a SPR of approximately 90%, *see* John R. Wallace, *Rebuilding Analysis for Canary Rockfish Based on the 2011 Updated Stock Assessment*, at 8, whereas the preferred 2013-14 ACLs of 116 and 119 metric tons correspond to a SPR of 88.7%, *see* April 2012 Briefing Book, Agenda Item I.3.a Attachment 5, at 38.

Despite the increases in both catch level and harvest rate contained in the preferred ACLs, industry is pushing for even higher canary ACLs. In April, the Council heard repeated requests to raise canary ACLs

[1] *See* April 2012 Briefing Book, Agenda Item I.3.c Supplemental Public Comment 3, at 4 (Letter from NRDC dated April 2, 2012); April 2012 Briefing Book, Agenda Item I.8.c Supplemental Public Comment (Letter from NRDC dated April 5, 2012).

to 147 and 151 metric tons for 2013-14, based on the fact that canary bycatch is a limiting factor in access to other stocks, and that less than the full ACL of canary was caught in 2011.

Canary rockfish is a rebuilding species. Accordingly, it is subject to the strict legal requirement that catch levels allow rebuilding in as short a time as possible, with flexibility only to avoid "disastrous short-term consequences for fishing communities." *NRDC v. NMFS*, 421 F.3d 872, 880 (9th Cir. 2005); *see also* 16 U.S.C. § 1854(e)(4)(A); *NRDC v. Locke*, No. 01-cv-421, Slip Op. at 9 (N.D. Cal. Apr. 23, 2010). Increasing the ACLs to 147 and 151 metric tons would increase canary's rebuilding time—albeit less than a year—so it must be justified legally by the need to avoid disastrous short-term consequences for fishing communities.

No new information suggests that higher canary ACLs are necessary in 2013-14 to avoid disaster for fishing communities. It is true that canary was a constraining stock in 2011, and it is true that the full canary quota was not actually caught in 2011. However, nobody has argued that 2011 was an economic disaster for the fishing industry. So even if these same things hold true in 2013-14, there is no particular reason to believe disaster will befall fishing communities.[2] Phrased differently, the needs of fishing communities have not *changed* since the last specs cycle, and therefore there is no cognizable reason under the Magnuson-Stevens Act for increasing canary harvest rates. *See NRDC v. NMFS*, 421 F.3d at 880.

By contrast, the conservation outlook for canary rockfish is different today than it was during the last specs cycle. The 2011 assessment indicates there is less canary biomass in the ocean today than would have been projected by the prior assessment, and that canary has farther to go before it reaches fully-rebuilt status.[3]

Because canary rockfish has less biomass in the water and is farther from rebuilding than previously believed, while the needs of the community apparently have not changed, NRDC would have serious doubts about the legality of raising catch levels beyond the preferred ACLs of 116 and 119 metric tons for 2013-14. *See NRDC v. NMFS*, 421 F.3d at 880; *NRDC v. Locke*, Slip Op. at 9. Indeed, the preferred

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[2] If the Council is concerned with canary being a constraining stock, or with fishermen not having caught the full canary quota in 2011, these issues should be dealt with by working within the ITQ system and not by undercutting the scientifically- and legally-based rebuilding ACLs.

In terms of canary being a constraining stock, part of the purpose of the ITQ system was to facilitate innovation in gear and fishing techniques, to improve bycatch rates and reduce this very problem. Moreover, the ITQ system allows quota pounds to be traded to the cleanest operators, so that—working within the rebuilding ACL—the largest possible amount of healthy stocks can be harvested. The Council should give the ITQ system time to shake out the kinks and start showing these benefits, before taking any hasty action

In terms of fishermen catching less than the full 2011 canary ACL, the same logic holds true: the problem will likely diminish in 2013 and 2014 as fishermen get accustomed to doing business under the ITQ system and liquidity increases in the market for quota pounds. If the issue remains a problem after a few years have passed, there remain various types of modifications the Council can make within the ITQ system, to help fishermen catch more of the allocated quota—such as trailing actions to promote trading, facilitate risk pools, and so forth. All of this can be done without changing ACLs.

[3] For further detail, see April 2012 Briefing Book, Agenda Item I.3.c Supplemental Public Comment 3, at 3-4 (Letter from NRDC dated April 2, 2012). *See also* John R. Wallace, *Rebuilding Analysis for Canary Rockfish Based on the 2011 Updated Stock Assessment*; June 2011 Briefing Book, Agenda Item E.2.b Supplemental SSC Report, at 5.

ACLs already represent an increase over 2011-12 ACLs, in both absolute and relative terms, and this may already make them too high under the rebuilding requirements of the Magnuson-Stevens Act.[4]

Finally, NRDC would like to point out that it is simply bad policy to consider raising catch levels, upon learning that a stock has farther to go to rebuild than previously believed. If a rebuilding plan has to be revised because a stock can no longer meet its goals, the situation calls for increased conservation, not increased exploitation. This is a matter of common sense, in addition to being well-established by the past ten years of litigation.

NRDC urges the Council to avoid creating serious legal infirmities in the 2013-14 groundfish harvest specifications—as well as avoid bad policymaking—and take the 147/151 metric ton canary ACL option off the table.

We hope these comments are helpful, and we thank you for your consideration.

Sincerely,

Seth Atkinson
Oceans Program Attorney
Natural Resources Defense Council

[4] See April 2012 Briefing Book, Agenda Item I.3.c Supplemental Public Comment 3, at 3-4 (Letter from NRDC dated April 2, 2012)..

NEWPORT LANDING SPORTFISHING www.newportlanding.com

May 31, 2012

Ladies and Gentlemen,

It has come to my attention that there has been an increase in the incidental catch of cow cod by the CPFV fleet in the last 6 months. There is a great deal of alarm in regard to the potential measures which may be taken by the Calif. Dept. of Fish & Game and the PFMC to minimize this interaction. Without getting into the details of" who or where" these encounters occurred I would like to make some suggestions about how to address the situation. We are all aware that we are dealing with a stock that is undergoing a long term rebuilding process. After 12 years of rebuilding one would expect to start seeing an increase in incidental by-catch. We should be pleased that we are seeing these fish as an indicator that the stock is rebuilding. In fact this is really one of the few indicators we have since actual stock assessment data for this species is negligible. I hope that all of these fish have been taken to the lab and all available data collected and not just tossed overboard after they were measured. Some education of all CPFV operators might also be in order. If the guys are repeatedly catching cow cod in certain areas then these areas should be voluntarily avoided. Please give us a chance to police ourselves on this issue. Perhaps the mandatory use of rockfish descending devices for some species should be considered.

With the huge section of habitat encompassed by the cow cod conservation area and the associated complete protection of a majority of the existing cow cod biomass, I just can't imagine that a small increase in incidental catch in other areas can possibly be of any consequence. I am aware that all the governing entities involved in fishery management cringe at the thought of more lawsuits from NGO's. However it is time to start taking a stand against unreasonable threats to public access to fishing grounds. Several other options are available for consideration. The Calif. Dept. of Fish and Game could recommend that the council change the trawl / non trawl allocation to provide more incidental catch for the non-trawl sector. It is my understanding that this would have no effect on the trawl vessels since they don't approach their ACL for cow cod. Also it would seem reasonable for the council to raise the cow cod ACL as rebuilding continues in order to ensure opportunity for all fisheries as incidental bycatch increases over time. Or perhaps we should take no action at all and see what happens. We have enough restrictions for now and taking severe action at this time will seem unreasonable to a majority of the fishing public.

Sincerely,

Mike Thompson
Owner Operator Newport Landing Sportfishing
Member HMSAS / Pacific Fisheries Management Council
CC: CA. Department of Fish and Game, CA. Fish and Game Commission, and Pacific Fisheries Management Council

Newport Landing Sportfishing – 309 Palm St #A – Newport Beach – CA – 92661 | (949) 675-0551

Hi Marija,

I just wanted to check in with you and give you my perspective on whats been going on in regards to Cow Cod interaction in the fleet as far as damage control. Also, I would like to ask the state to support the "status quo" option for the ground fish regs for the 2013-2014 management cycle in the Southern Ca Byte at the June Council meeting.

First, my thoughts on the spike in interaction with CowCod. In my mind the two contributing factors to the interaction is irresponsible fishing habits by our fleet and a Juvenal year class that thrived in the current cold water regime. We have done wide spread aggressive out reach in our fleet to fish responsible and educated our fleet on how to use as well as provided descending devices to the boats. And as far as the conditions go we are facing a change in conditions to a warm water cycle and we are not likely to see another anomaly to this magnitude of Cow Cod recruitment in the next management cycle. With this being said, I would hope that we will not act on a knee jerk reaction and veer from our "Status quo" for the 13-14 cycle in the byte.

Moving us from 60 fathoms to 50 fathoms is going to be a huge hit to our fleet. 80% of the geographical distribution of habitat for ground fish in the byte is between 40 and 60 fathoms. To take the 50 to 60 fathom range from the fleet will be crippling and in these poor economic times, we simply just can't take anymore hits. With the new implementation of the MLPA's the RCA, CCA and the Channel Islands reserves the tightening of the noose on our remaining geographical options is going to create a public perception that will create a negative impact financially to our fleet. Another issue is the depletion to remaining habitat caused by the shift of effort inside 50 fathom's.

How do we deal with the allocation? When NMFS trumped your motion and strangled the ACL down to 3 metric ton of Cow Cod from 4, in my mind it has painted us into a corner and we have to revisit the way we allocate and manage allocation. In reality 3 metric ton is not enough to support the TIQ program, open access, limited entry and the Rec fisheries in California. We need the ability to move allocation to the best of our ability in the term of the management cycle. We are in a position that as these fish show up in the fisheries that we need the ability to volleyball if you will, the allocation. To me NMFS' move to a 3 ton ACL of Cow Cod does not reflect the courts decision that NMFS's used to drive down the ACL. There movement from 4 to 3 ton's weighs far heavier on the economic burden to the community's than it adds to the rebuilding program.

With the ability to track our catch with the TIQ program having full accountability and observers to the rest of the sectors we have the ability to move the depth in mid cycle down but we don't have the ability that I would be confident in if it even exists to give us back the 10 fathom range from 50 to 60 fathoms, if we track well and stay away from these fish. I am confident we can track well, and if we do have an encounter we can lower the mortality rate with descending devices.

With all of this being said, I hope it will help the state give support to the "Status Quo" option for the Rec season for the next management cycle South of Conception.

Joe Villareal

June 12, 2012

Dan Wolford
Chair
Pacific Fishery Management Council
7700 NE Ambassador Place
Suite 101
Portland, OR 97220

Dear Dan:

The Fishermen's Marketing Association represents commercial groundfish and shrimp trawl fishermen in Washington, Oregon, and California.

One of the provisions of the Trawl Groundfish IFQ program was to allow a fisherman to carry-over a portion of their unused quota from one year into the following year. Last fall, nine months into the new program, the National Marine Fishery Service (NMFS) informed the Council and the industry that they may be unable to allow the approved carry-over because it conceptually could be seen as exceeding the new Annual Catch Limits (ACL).

In early May, the NMFS announced that they would release carry-overs for all species with the exception of Northern Sablefish, Southern Sablefish, and Pacific whiting.

Unfortunately, believing the carry-over would occur, many fishermen either stopped fishing early to save quota for the following year, or they purchased quota from other fishermen with the intent of using this acquired quota in the following year.

This decision by NMFS to not allow the carry-over for these species has come as a shock to some fishermen and represents a huge financial set back with the loss of this quota. Additionally, given the uncertainty that carry-overs will occur in the future, fishermen will likely fish harder to ensure that they leave no quota unfished each year, even if this means exceeding their quota holdings.

We are requesting that the Council urge NMFS to reconsider this decision and to take steps to ensure that these carry-overs will occur in future years. Such step could include sector ACL's and multi-year ACL's, both of which are provided for under the National Standard 1 Guidelines.

Sincerely

Peter Leipzig
Executive Director

1585 HEARTWOOD DRIVE • SUITE E • McKINLEYVILLE, CA 95519 • 707-840-0182 • 707-840-0539 FAX

Canary Bycatch Risk Analysis Results

Area	Relative "Risk" Metric a/ ACL Alts. (2013 mt/2014 mt)		
	101/104	116/119 (pref.)	147/151
N of 47º	**8.0**	**6.8**	**5.2**
42º30' to 44º	**5.5**	**4.7**	**3.6**
40º10' to 42º30'	**16.6**	**14.1**	**10.8**
38º to 40º10'	0.7	0.6	0.5
36º to 38º	**2.5**	**2.2**	**1.6**
S of 36º	0.0	0.0	0.0

a/ TCE/Median QP Alloc. from Holland and Jannot (2012). GMT to expound on this under D.5.

Agenda Item D.6
Situation Summary
June 2012

TRAWL RATIONALIZATION TRAILING ACTIONS

At its April 2012 meeting, the Council completed action on a number of trailing actions (Agenda Item D.6.a, Attachment 1) and delayed action on others, pending completion of reconsideration of the allocations periods for whiting catch shares (Agenda Item D.7). The two trailing action issues scheduled to be addressed under this agenda item are a continuation of the moratorium on quota shares (QS) trading to facilitate reconsideration of the widow rockfish QS allocation as a result of its status change from overfished to healthy, and the ongoing study of at-sea electronic monitoring being conducted by Pacific States Marine Fisheries Commission. In September the Council will scope for the next suite of trailing actions, which may be implemented as part of the third phase of program improvements and enhancement (PIE 3).

In April, the Council decided to move ahead with consideration of reallocating widow rockfish QS. It will select a suite of alternatives this November and finalize a recommendation in the Spring of 2013 (see calendar in Agenda Item D.6.a, Attachment 1). At this meeting, the Council is scheduled to decide whether QS trading needs to be suspended until Council deliberations are completed and National Marine Fisheries Service (NMFS) has implemented any widow reallocations. Quota share trading is proposed to be temporarily suspended in conjunction with reconsideration of the whiting catch shares allocation (Agenda Item D.7). That suspension is proposed to apply to all QS species and go through the fall of 2013. Under this agenda item, the Council will decide whether a suspension of trading is needed for widow QS reallocation, whether the suspension would apply just to widow QS or to other species as well, and the length of the suspension that will likely be needed (e.g. widow QS trading suspended through a specific date or until Council deliberations are completed and any changes implemented, whichever comes first). A suspension of trading for widow QS may have implications for the QS divesture period, which ends December 31, 2014. This is the period of time during which QS owners who initially issued amounts of QS in excess of accumulation limits must divest themselves of those excesses. The divestiture period will also be addressed under Agenda Item D.7.

Identification of cost efficiencies for the trawl rationalization program continues to be an important Council priority. In this regard, observer costs and the opportunity for gaining efficiencies through the use of at-sea electronic monitoring has been an area of emphasis. Moving from 100 percent observer coverage would have a variety of implications for other provisions of the trawl rationalization program. The Council received a number of presentations on this issue at its April meeting, including one on an electronic monitoring field study being conducted by Pacific States Marine Fisheries Commission (PSMFC). At this meeting, PSMFC is expected to provide an update on the study. After reviewing this update, the Council should consider discussing possible regulatory processes to implement any changes that result from the study.

While not the subject of this agenda item, there has been much Council discussion on trailing actions to address potential problems with the surplus quota pound carryover provision. For 2012, NMFS will speak to problems and solutions under Agenda Item D.1, NMFS Report, and

Agenda Item D.8, Inseason Management. For 2013-2014, problems and interim improvements to the situation are the subject of Agenda Items D.5 and D.9, the management specifications for the next cycle. For the long-term, problems and solutions might be addressed at least partially through revisions to the National Standard 1 Guidelines under Agenda Item G.3.

Council Action:

1. **Take final action on a suspension of widow QS trading while widow QS reallocation is being considered.**
2. **Consider the status of the 2012 field study for at-sea electronic monitoring and discuss a process for regulatory implementation of any changes in the 100% observer requirement policy, if appropriate.**

Reference Materials:

1. Agenda Item D.6.a, Attachment 1, Status of Trailing Actions and Calendar.
2. Agenda Item D.6.a, Supplemental Attachment 2, PSMFC Status Report on the 2012 Electronic Monitoring Field Study.

Agenda Order:

a. Agenda Item Overview — Jim Seger
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action**: Make recommendation on extension of quota share (QS) trading moratorium to facilitate reallocation of QS for widow rockfish, provide guidance on a electronic monitoring regulatory process if appropriate, and provide other direction as needed.

PFMC
06/04/12

STATUS OF TRAILING ACTIONS AND CALENDAR

Council Actions From April 2012

See Agenda Item I.4, April 2012 for a complete description of action items.

PIE Rule 2, Council list	Council Action
1. Allow fixed gear and trawl permits to be registered to the same vessel at the same time (but do not allow fixed gear freezer vessel participation in the trawl fishery).	Approved FPA
2. Change the opt-out requirement for QP deficits	Approved FPA
3. Eliminate the double filing of co-op reports	Approved FPA
4. Whiting season opening date and southern allocation (also see Agenda Item I.4.a, Attachment 2)	Delay consideration (PPA Remains in place)
5. Chafing gear (also see Agenda Item I.4.a, Attachment 3)	Approved FPA
PIE Rule 2, NMFS list	
1. First receive site license changes	Approved NMFS Proposed Change
2. Catch monitor certification requirements	Approved NMFS Proposed Change
3. Start renewal process 9/15 for LE permit, vessel account, and QS permits	Approved NMFS Proposed Change
4. Remove 12/15-31 ban on QP transfer	Approved NMFS Proposed Change
5. Observer provider certification	Approved NMFS Proposed Change
6. Clarify processor obligation	Approved NMFS Proposed Change
7. Observer program regulatory changes	Approved NMFS Proposed Change
8. Change “permit holder” to “vessel owner”	Approved NMFS Proposed Change
9. Process for changes vessel ownership	Approved NMFS Proposed Change

Status on Other Actions Completed and Moving Forward for Implementation January 1, 2013
(for additional detail see March 2012, Agenda Item F.8.a, Attachment 1)

Cost Recovery - Trailing actions will be proceeding on cost recovery with regulations to be drafted for deeming by the executive director. The final rule is expected to be in place by November.

Status on Other Delayed Actions (for additional detail see March 2012, Agenda Item F.8.a, Attachment 1)

Risk Pools - Safe Harbor from Control Rules – The Council has finalized action on safe harbors for risk pools. Council transmittal and NMFS decision processes are delayed to prioritize quota reallocation for the whiting fishery.

Lenders - Safe Harbor from Control Rules – The Council has selected a preliminary preferred alternative (PPA) on safe harbors for lenders. Selection of a final preferred alternative (FPA) has been delayed to prioritize quota reallocation for the whiting fishery.

Other Lender Issues – The Council has not selected a PPA for other lender issues. The topics under this category have been narrowed to the question of whether the NMFS QS tracking system should include a capability that would allow the QS owner and lender to attach lender information to the QS account. In March, the GAP recommended no action on this issue. Further consideration has been delayed to prioritize quota reallocation for the whiting fishery.

Gear Issues – Gear issues include multiple gears on a trip, gear modifications to increase efficiency, and restrictions on areas in which gears may be used. Action on all of gear issues (except chafing gear) was delayed pending the results from a one day gear workshop to be convened by the Enforcement Consultants. That workshop, originally scheduled for the the June Council meeting, has now been tentatively rescheduled for September.

Calendar on Trawl Rationalization Actions

Table. Council schedule for trawl rationalization related actions.

	Council Meetings					
	June	Sept	Nov	Mar	Apr	June
Current Trailing Actions						
Lender Issues		FPA				
Gear		Gear Workshop Results		PPA		FPA
Other Remaining PIE 2 Issues (NMFS List, Whiting Season Date)		FPA				
Widow QS Reallocation Amendment [a/]	Final Decision on Moratorium Extension		Range of Alternatives	PPA		FPA
Electronic Monitoring	Discussion		Study Report	Study Report		
Whiting Fishery Catch Share Reallocation	PPA	FPA				
Carry-over – Intermediate Term Response	Biennial Spex (not part of PPA)					
Carry-over –Long Term Solution	National Standard 1 Guidelines Discussions					
PIE 3 (Implementation in 2014)		Scoping	Alternatives for Analysis[b/]	PPA	FPA	
Adaptive Management Program QP Distribution Methodology (Implement by 2015)						

a/ A trading moratorium for widow QS, if extended, would likely need to cover all of 2013.
b/ Final Action required by April 2013 for implementation by January 1, 2014.

ELECTRONIC MONITORING UPDATE – PSMFC, June 8, 2012

A. Project overview

This project will be done in a staged process with a Core program and several Option components, each containing discrete fisheries, as described below. Option components are designed to be added on to the project in any order as funds become available and no component, core or option, will be undertaken unless it is fully supported.

Core program:

- Carry out project design work for whiting (at-sea and shoreside)
- Installation of EM systems on six vessels for early season at-sea whiting fishery
- Continue with these vessels as they move to shoreside for total duration of six months (~30 system months total)
- Add new vessels if one drops off the list.
- Create data analysis framework and EMI (the analysis software tool used to interpret raw EM data) configuration
- Carry out Data analysis training, support and QA/QC roles
- Complete season end evaluation and project report.

Option 1 – Addition of Fixed Gear (potentially Morro Bay/Half Moon Bay)

- Addition of four Fixed Gear vessels for duration of 5 months (~20 system months total)
- Establish locally based field services support
- Add incremental data analysis framework and EMI configuration
- Add incremental data analysis training, support and QA/QC roles
- Add incremental season end evaluation and project report.

Option 2 – Addition of Trawl Vessels (seaward of RCA)

- Addition of 4 trawl vessels (Newport only) for a total of 5 months (~20 system months total)
- Add incremental data analysis framework and EMI configuration
- Add incremental data analysis training, support and QA/QC roles
- Add incremental season end evaluation and project report.

Option 3 – Augment vessel counts for the three identified fleets

- Addition of four more boats to shore side component of the whiting fleet for five months (~20 system months total)
- Add incremental data analysis training, support and QA/QC roles
- Add incremental season end evaluation and project report.

B. Data Analysis and Reporting

Core Program and incremental effort for each Option

Archipelago staff will work closely with PSMFC to design the data input structure and create a custom configuration for EMI, the analysis software tool used to interpret raw EM data, for each fishery involved. The configuration(s) will be tested on the first round of data collected from participating vessels and adjusted as necessary. Upon completion of this testing, Archipelago will supply EM Interpret Pro™, complete with this configuration, to PSMFC to be trained on and used in data analysis for Phase II.
Archipelago will be responsible for:

- Creating a standardized data structure to facilitate EM data interpretation;
- Evaluating and developing a suitable configuration of the EM Interpret Pro™;
- Writing annotation methodology; and
- Working with the local data analyst to ensure that the video is reviewed properly.

PSMFC will be responsible for reviewing the proposed data structure(s) and providing feedback to Archipelago.

C. <u>Status to date</u>

There are currently 6 at-sea whiting vessels equipped with cameras. These systems include the ability to submit hourly 'EM Health Statements' which provides information on the high level operational health of the system. A summary of the health information is included in Table 1 below.

Table 1. Vessel activity and EM System performance for the whiting fishery participants.

Vessel	Left port	First day fishing	Number of hauls	GPS gaps	System down	Satellite gaps	Video Data Collected	Return to port	Successful Trip
A	May 13	May 15	~ 34	2	0	1	100%	May 29	Y
B	May 13	May 15	~ 52	1	0	0	100%	May 29	Y
C	May 13	May 14	~ 44	0	0	1	99%	May 30	Y
D	May 25	May 27	~ 13	0	0	2	100%	N/A	Y
E	N/A	May 30	~ 4	N/A	N/A	N/A	N/A	N/A	N
F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y

Note: The values in each cell are what is called 'interpreted data' in Electronic Monitoring, whereby raw data files are interpreted by trained staff to reflect real life situations as best possible. A definition of the column headings is below.

Left/Return to port: The dates for leaving and returning to port are determined using the hourly GPS locations.

First day fishing/Number of hauls: First day of fishing is based on "fishing" being interpreted as vessel speed being 3-4 knots and there being both pressure and drum rotation at the same time. These instances are interpreted as a haul, but the true number will only be determined after the hard drive is removed from the vessel and the high resolution EM data and associated video is analyzed.

GPS gaps/Satellite gaps/Video Data collected: It's not uncommon for power on fishing vessels to fluctuate, causing EM systems to reboot and return to collecting data. This reboot requires just under three minutes (5% of an hour) so system down, GPS gaps, satellite gaps and video data collected are all based 95% or greater data capture by time. This choice was based on the perceived risk to the fishery that 3 minutes of data could represent.

Successful Trip:Vessels A-D all performed well and completed successful trips. Vessel E encountered EM system trouble after leaving port and is currently working with a technician while at sea to resolve the issue. Vessel F has completed its fishing trip and reports that the EM system appeared to work the entire time despite not sending a health statement file via satellite to be analyzed for this summary.

May 29, 2012

New England Fishery Management Council

MID-ATLANTIC

CFMC

Gulf of Mexico Fishery Management Council
May 16, 2012

Executive Directors
Fishery Management Councils

Dear Executive Directors,

At the recent Council Coordination Committee (CCC) meeting held April 30 – May 2, 2012, the CCC acknowledged that several Council/NMFS regions have conducted studies and programs related to video monitoring and electronic reporting. The CCC also noted that during the fall, NMFS will be completing several papers addressing the following topics:

1. Analysis of Existing EM Technologies/Programs
2. Enforcement Issues/Impediments
3. Legal/Confidentiality Concerns
4. Research & Development Requirements
5. Re-alignment of Management and Monitoring
6. Funding Options

The CCC recommended the establishment of a CCC subcommittee to consider cross-cutting issues between regions in relation to the implementation of video monitoring and other forms of electronic monitoring, and make recommendations to the CCC at its interim meeting in January 2013.

Please send me the name of the person who will represent your Council on this subcommittee and any ideas on how the work of this subcommittee should proceed.

Sincerely,

Kitty

Kitty M. Simonds
Executive Director

CC: FMC Chairs
Sam Rauch

New England
Fishery Management Council

MID-ATLANTIC

CFMC

Gulf of Mexico
Fishery Management Council

Region Fishery Management Council
Chairs & Executive Directors

Western Pacific Council
Manuel Duenas, Chair
Kitty M. Simonds, Executive Director

Pacific Council
Dan Wolford, Chair
Donald O. McIsaac, Executive Director

North Pacific Council
Eric A. Olson, Chair
Chris Oliver, Executive Director

Gulf of Mexico Council
Robert Gill, Chair
Steve Bortone, Executive Director

South Atlantic Council
David M. Cupka, Chair
Robert Mahood, Executive Director

Caribbean Council
Carlos Farchette, Chair
Miguel Rolon, Executive Director

Mid-Atlantic Council
Richard Robins, Jr., Chair
Christopher Moore, Executive Director

New England Council
Rip Cunningham, Chair
Paul Howard, Executive Director

GROUNDFISH ADVISORY SUBPANEL REPORT ON TRAWL RATIONALIZATION TRAILING ACTIONS

Mr. Jim Seger briefed the Groundfish Advisory Subpanel (GAP) on trawl rationalization trailing actions. The GAP offers the following comments and recommendations.

Widow Rockfish Quota Sharing (QS) Trading Moratorium

The GAP recommends suspending widow rockfish QS transfers to prevent confusion and administrative burden now that the Council has decided to move ahead with widow reallocation within the trawl Individual Fishing Quota sector. While there will likely be a QS moratorium through the end of 2013 for all species in response to the *Pacific Dawn* remand, the widow rockfish moratorium should be treated as a separate matter, and should remain in effect until NMFS has implemented widow reallocation.

Electronic Monitoring Timeline

Reducing program costs, including costs of monitoring, is a major priority for the GAP. Assuming electronic monitoring proves feasible, the GAP's basic stance regarding the question of when electronic monitoring (EM) should be implemented is simple – as soon as possible. Presently, target attainment remains low for many species which limits the ability of the fleet to fully cover all costs of the program. Ultimately, the goal of introducing EM is to avoid forced consolidation because of program costs, and increase flexibility, while maintaining 100 percent accountability.

Specifically, the GAP recommends that EM be implemented for all sectors of the trawl fishery (mothership [MS] coefficient of variation [CV], shoreside whiting, fixed gear, and bottom trawl) no later than January 1, 2015, when the transitional funding for observers is expected to phase out. The GAP further recommends that the Council phase in EM for sectors such as MS CV, shoreside whiting, and fixed gear more quickly if possible. Any savings from the reduced observer days in those sectors should be rolled into sectors that retain observers thereby extending the transitional funding.

PFMC
06/24/12

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TRAWL RATIONALIZATION TRAILING ACTIONS

The Scientific and Statistical Committee (SSC) discussed the electronic monitoring project being conducted with Pacific whiting vessels by the Pacific States Marine Fisheries Commission (PSMFC). Mr. Jim Seger was available to facilitate the discussion.

At the April 2012 meeting, in the absence of any specific details regarding the project, the SSC suggested general design considerations to allow rigorous comparison of data collected from electronic monitoring with on-board observer data. Information regarding the project available to the SSC at this meeting included (1) Pacific States Marine Fisheries Commission Report on Electronic Monitoring (Agenda Item I.4.b, Supplemental PSMFC Report from the April 2012 Council meeting) – which was available to the Council but not the SSC in April, and (2) Electronic Monitoring Update (Agenda Item D.6.a, Supplemental Attachment 2). Both reports consist of bulleted points that identify administrative features of the project.

In order to review the electronic monitoring project, the SSC needs detailed information regarding project design and how data obtained from the project will be compared with observer data; general guidance regarding this is contained in our April 2012 statement. The SSC also notes that electronic monitoring is more straightforward for whiting vessels than for other sectors of the fleet. Design features for other sectors will need to be tailored to monitoring requirements for those sectors.

PFMC
06/23/12

RECONSIDERATION OF INITIAL CATCH SHARE ALLOCATIONS IN THE MOTHERSHIP AND SHORESIDE PACIFIC WHITING FISHERIES

The Council is in the process of reconsidering the initial allocations of whiting in the trawl catch shares program, in response to the December 22, 2011 District Court Judge Thelton E. Henderson decision in the case C10-4829-TEH: Pacific Dawn, LLC, et al. v. John Bryson, et al., referred to here as the Pacific Dawn litigation, including the February 21, 2012 Court Order on Remedy (see full March Council meeting reference materials, including public comment at http://www.pcouncil.org/resources/archives/briefing-books/march-2012-briefing-book/#groundfish). This order remands "for further consideration" the regulations addressing the initial allocation of whiting for the shoreside individual quota fishery and the at-sea mothership fishery. In response, the Council adopted a three-meeting process to meet the court-ordered deadline. Under that process, the Council adopted a set of alternatives for analysis in April and is scheduled to select a preliminary preferred alternative at this meeting. Analysis will be completed over the summer, and a final preferred alternative will be selected at the September 2012 meeting. Any changes to the allocations would be implemented on time for the 2013 whiting season.

A preliminary analysis of the alternatives selected by the Council in April is provided in Agenda Item D.7.a, Attachment 1. In particular, please note:

1. Chapter 1 provides a description of the action and the purpose and need. Some initial background information is also provided.
2. Chapter 2 describes the no action alternative (status quo) and four action alternatives. It also includes rationale for excluding some alternatives from further analysis.
2. Chapter 3 provides information on changing conditions in the whiting fishery up through recent years. This chapter is provided in Agenda Item D.7.a, Supplemental Attachment 2 and will continue to be developed over the summer.
3. Chapter 4 provides data indicating how the alternatives will impact initial allocation recipients, processors, communities, etc. This chapter will continue to be developed over the summer.
4. Chapter 5 contains a qualitative analysis of the impacts of alternatives as they relate to Magnuson-Stevens Act, groundfish Fishery Management Plan, and other policy goals and objectives. Each section includes three subsections:
   a. policy guidance related to the topic,
   b. an assessment of how the original allocation provisions affected achievement of the goals and objectives, and
   c. an assessment of the effects of the alternatives on the goals and objectives.

   The quantitative analysis for this chapter will be completed over the summer.

If the allocation period for whiting is changed, there may be a need for a number of corresponding adjustments to the quota share distributions and status quo regulations in order to implement the change while maintaining all other intents and purposes of the program. These topics are addressed in Section 2.1.2 of the preliminary analysis. The primary nonregulatory adjustment to the program would be a redistribution of the nonwhiting quota shares (QS) allocated to cover bycatch on whiting trips; this is not a regulatory change in that the bycatch QS is automatically calculated as a percentage of the whiting allocation (as described in Agenda Item D.7.a, Attachment 3). The corresponding regulatory adjustments would be as follows.

a. Change the recent participation period for processors so that it covers the end of the allocation period (use the most recent seven years within the allocation period). For example, for a 1994-2010 allocation period, the recent participation requirement period would be 2004-2010.
b. Change the qualification period for the mothership catcher vessel endorsements to match the allocation period (current provisions require a permit deliver a total of 500 mt from 1994 through 2003 in order to qualify for an endorsement).
c. Change the regulation for determining the amount of QS to be allocated equally so that the equally allocated portion of the QS will continue to be based on 1994 through 2003 landings by buyback permits (i.e. the equal allocation amounts will not change regardless of the allocation period used for the history-based portion of the allocation).
d. Change the entity to which the QS allocations will be distributed from the permit owner to the owner of the QS account (allocations to QS accounts would be based on the history of the permit which generated each QS account). This change would account for the fact that some permits transferred to different owners after the initial QS allocations were completed.

In addition to selecting a preliminary preferred alternative, the Council should confirm or provide guidance on these corresponding changes to status quo regulations. Also under this agenda item, the Council may wish to provide additional guidance on the analysis.

National Marine Fisheries Service (NMFS) has provided a draft rulemaking schedule for the two rules that are expected to be required if a modification to the whiting catch shares is to be implemented (Agenda Item D.7.b, NMFS Report 1). These two rules are identified as Reconsideration of Allocation of Whiting 1 and 2, (RAW 1 and 2). RAW 1 was published May 21 and is to be implemented by emergency action (NMFS Report 2). The comment period for RAW 1 is open through June 29, 2012. As an emergency rule, it would only be effective for 365 days. Any provision that needs to be effective for more than 365 days would also be included in RAW 2. The following table indicates the issues to be covered in each of these two rules.

	RAW 1 (Proposed Effective Dates: Sept 1, 2012 – Aug, 31 2013)	RAW 2 (Effective Date 4/2013)
a. **Trading Moratorium:** Delay the transfer QS and IBQ between QS accounts in the shorebased IFQ fishery for all species.[a/]	Included	Possibly extend effective dates to cover appeal period.
b. **Divestiture Period:** Delay the requirement to divest excess QS amounts for the shorebased IFQ fishery (December 31, 2014) and the at-sea mothership fishery (December 31, 2012).	Shorebased IFQ delay included	Include, if a delay is implemented in RAW 1 and extend to include at-sea mothership, if necessary.
c. **MS/CV Endorsement Severability:** Delay the ability to move MS/CV endorsement and catch history assignments from one limited entry trawl permit to another.	Included	Possibly extend effective dates to cover appeal period.
d. **Start of Year QP Issuance:** Modify the provisions for the start of year issuance of QP in 2013 to accommodate possible reallocation of QS.	Included	Not needed (fully accomplished in RAW 1)
e. **Catch share Reallocation:** Whiting QS, Bycatch Species QS, and Mothership Sector Endorsement and Catch History Reallocation	-	Include

a/ Other trailing actions are needed to completely specify process for transferring QS (including the process to apply for new QS permits/accounts). These have been delayed due to workload and must be completed prior to the expiration of the trading moratorium. They will be addressed in a future rulemaking.

For most issues, decisions made under RAW 1 will not directly constrain the choices made under RAW 2. The exception may be the divestiture period. Catch share holder expectations based on a RAW 1 extension of the divesture period might make it difficult not to carry through with the extension in RAW 2. At the same time, there may be no immanent need for action on divestiture under RAW 1 since the divestiture deadline is not until December 31, 2014, and a delay can be implemented in a timely fashion through RAW 2. NMFS has provided a report on issues related to the RAW rules (Agenda Item D.7.b, NMFS Report 3).

A decision template for possible Council use in making motions is provided in Agenda Item D.7.d, Attachment 1.

<u>Council Action</u>:

1. **Identify preliminary preferred alternatives for the time periods used for initial whiting catch share allocations.**
2. **Confirm or provide guidance on corresponding regulatory adjustments.**
3. **Provide guidance on analysis, as needed.**
4. **Provide comment on RAW 1 (comment period closes June 29).**

<u>Reference Materials</u>:

1. Agenda Item D.7.a, Attachment 1: Reconsideration of Initial Catch Share Allocations in the Mothership and Shoreside Pacific Whiting Fisheries, Draft Environmental Assessment.
2. Agenda Item D.7.a, Supplemental Attachment 2: Description of the Affected Environment
3. Agenda Item D.7.a, Attachment 3: Description of Segments of the QS Allocations Potentially Affected by Reconsideration of Allocation of Whiting.
4. Agenda Item D.7.b, NMFS Report 1: Draft Rulemaking Schedule for the Reconsideration of Initial Individual Fishery Quotas in the Mothership and Shoreside Pacific Whiting Trawl Fisheries (RAW 1 and 2).
5. Agenda Item D.7.b, NMFS Report 2: Federal Register, 77(98): 29955-29961 (RAW 1, Proposed Rule, Request for Comments).
6. Agenda Item D.7.b, NMFS Report 3: Issues Related to the Reconsideration of Allocation of Whiting: Divestiture and Transfer of Quota.
7. Agenda Item D.7.c, Public Comment (**see briefing book CD-ROM and briefing book website for full version**).
8. Agenda Item D.7.d, Attachment 1: Council Decision Template.

<u>Agenda Order:</u>

a. Agenda Item Overview — Jim Seger
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Select preliminary preferred alternative and provide guidance on analysis, as necessary.

PFMC
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Agenda Item D.7.a
Attachment 1
June 2012

RECONSIDERATION OF INITIAL CATCH SHARE ALLOCATIONS IN THE MOTHERSHIP AND SHORESIDE PACIFIC WHITING FISHERIES,

DRAFT ENVIRONMENTAL ASSESSMENT

Overview of this Document

Chapter 1. Proposed Action and Purpose and Need together with some initial background information.

Chapter 2. Description of alternative. Includes discussion of corresponding regulatory changes needed and alternatives considered but rejected from further analysis at the April Council meeting.

Chapter 3. Information describing the whiting fishery and communities. Focuses on changing conditions on the whiting fishery, particularly after 2003. (***See Agenda Item D.7.A, Supplemental Attachment 2***)

Chapter 4. Includes some basic quantitative estimates of the allocational impacts of the alternatives.

Chapter 5. Contains primarily qualitative analysis framed around the management goals and objectives. The sections on each topic are divided into subsections which cover

a. policy guidance related to the topic,
b. an assessment of how the original provisions affected achievement of the goals and objectives, and
c. an assessment of the effects of the alternatives on the goals and objectives.

RECONSIDERATION OF INITIAL CATCH SHARE ALLOCATIONS IN THE MOTHERSHIP AND SHORESIDE PACIFIC WHITING FISHERIES

Draft Environmental Assessment (May 2012)

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MARCH 2012

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CHAPTER 1 INTRODUCTION

1.1 How This Document is Organized

1.2 Proposed Action

The proposed action is to consider modifying the time period used for determining initial allocations of Pacific whiting made to catcher vessels and shoreside processors participating in the Pacific whiting shoreside and mothership sectors of the Pacific Coast Groundfish fishery. The allocations were based upon each catcher vessel permit's historical whiting trips or each shoreside processor's history of whiting deliveries received, as specified in the Amendment 20 trawl rationalization program.

No other regulations will be reconsidered or altered in relation to this proposed action except as necessary to maintain the intent and purpose of other provisions of the program. This includes the intent that QS for bycatch species be allocated for whiting in proportion to the whiting QS allocation.

1.3 Purpose and Need

The purpose of the proposed action is to provide allocations of quota and catch history for Pacific whiting shoreside and mothership sectors based on time periods that are consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), other applicable law, and the goals and objectives of the Pacific Coast Groundfish Fishery Management Plan, including Amendment 20 to that plan (the trawl rationalization program).

The need is to reconsider the time period used to determine initial allocations for Pacific whiting shoreside and mothership sectors of the Pacific Coast Groundfish fishery by including in the consideration years after 2003. The need for this proposed action is driven by the court order in Pacific Dawn v Bryson which remanded the regulations addressing the initial allocation of whiting. The court found that the previous decision on this issue failed to adequately consider history beyond 2003 for harvesters and 2004 for processors. Absent this reconsideration, there is a high likelihood that current regulations would be vacated, and there would be a return to the seasonal-based management of whiting harvest that was in place prior to implementation of the trawl rationalization program. Seasonal-based management entails fishermen racing to catch fish prior to the closure of the season. Such seasonal management has numerous adverse biological, social, and economic consequences, including the potential for higher mortality of overfished and endangered salmon species, decreased safety, higher harvest costs, and lower product quality.

1.4 Background

[Add context of Council decision to implement trawl rationalization and rationale for Council's original action – everything cited in the Council discussion.]

In January 2011, NMFS implemented the trawl rationalization program for the Pacific coast groundfish fishery's trawl fleet (see 75 FR 78344; Dec. 15, 2010). The program was adopted through Amendment 20 to the Pacific Coast Groundfish Fishery Management Plan (FMP) and consists of an IFQ program for the shoreside trawl fleet (including whiting and non-whiting fisheries); and cooperative (coop) programs for the at-sea mothership (MS) and catcher/processor (C/P) trawl fleets (whiting only). Allocations to the limited entry trawl fleet for certain species were developed under Amendment 21 to the FMP, also implemented in 2011.

These rules became the subject of litigation, in Pacific Dawn, LLC v. Bryson, No. C10-4829 TEH (N.D. Cal.). The plaintiffs, fishing vessel owners and fishing processers represented by the named party, Pacific Dawn, LLC, challenged several aspects of the rules, but in particular the initial allocation of whiting QS in the shoreside IFQ and mothership fisheries. Following a decision on summary judgment that NMFS had not considered recent data in setting its initial whiting allocations, on February 21, 2012, Judge Henderson issued an order remanding the regulations setting the initial allocation of whiting for the shoreside IFQ fishery and the at-sea mothership fishery "for further consideration" consistent with the court's December 22, 2011 summary judgment ruling, the Magnuson-Stevens Act (MSA), and all other governing law. The Order also requires NMFS to implement revised regulations setting the quota before the 2013 Pacific whiting fishing season begins on April 1, 2013.

On February 29, 2012, NMFS informed the Pacific Fishery Management Council (Council) of the order issued in Pacific Dawn, LLC v. Bryson. NMFS also requested that the Council initiate the reconsideration of the initial allocations for QS of whiting in the shoreside IFQ fishery and for whiting catch history assignments in the at-sea mothership fishery. NMFS requested the Council schedule this issue to be discussed at its April, June, and September 2012 meetings. NMFS also stated that a rulemaking was needed to delay or revise portions of the existing regulations setting these allocations while the Council and NMFS reconsidered the initial allocation of whiting, and informed the Council of its intent to publish an Advance Notice of Proposed Rulemaking (ANPR) on that reconsideration.

At the Council's March 2012 meeting, the Council added reconsideration of the allocation of whiting to the agenda for its April, June and September 2012 meetings. At the Council's April meeting, the Council adopted a range of alternatives for analysis. The Council will review a draft analysis of the alternatives and select a preliminary preferred alternative at its June meeting. At its September meeting, the Council will choose a final preferred alternative and make a recommendation to NMFS.

NMFS published an ANPR on April 4, 2012 (77 FR 20337) that, among other things, announced the court's order, the Council meetings that would be addressing the whiting reconsideration, and NMFS' plan to publish two rulemakings in response to the court order. These two rulemakings are referred to as Reconsideration of Allocation of Whiting, Rules 1 and 2 (RAW 1 and RAW 2, respectively). NMFS is using emergency action authority under the MSA 305(c)(1) for RAW 1;

RAW 2 will go through the standard FMP Council process followed by a proposed and final rule. The first rulemaking, RAW 1, which is the subject of this proposed rule, would delay or revise several portions of the regulations while NMFS and the Council reconsider the initial allocation of whiting, and until NMFS implements any necessary new regulations in response to the court order. The second rulemaking, RAW 2, would take in to account the Council's September 2012 recommendation and reconsideration of the dates used for initial allocation of whiting for the shoreside IFQ and at-sea mothership fisheries. The proposed rule for RAW 2 is scheduled to publish in November 2012, and the final rule in March 2013. The RAW 2 rule is scheduled to be effective by April 1, 2013, consistent with the court order.

1.5 Council and Agency Scoping

Include tables listing all actions (and meetings) taken to develop the program and this amendment.

CHAPTER 2 DESCRIPTION OF ALTERNATIVES

2.1 Alternatives

There are four action alternatives under consideration in addition to the No Action alternative for this proposed action. They are as follows.

2.1.1 No Action Alternative

Under the Amendment 20 IFQ program for the shoreside fishery, 80% of the whiting QS was allocated among permits and 20% among processors that meet recent participation requirements. For the mothership sector, 100% of the catch history assignments went to qualified catcher vessel permits. A portion of the whiting QS allocated among permits was allocated based on landings history on whiting trips from 1994 through 2003 (CFR 660.140(d)(8)(iv)(C)(2)); all of the whiting QS allocated among qualified processors was allocated based on whiting deliveries received from 1998 through 2004 (CFR 660.140(d)(8)(iv)(G)); and all of the mothership catch history assignments made to catcher vessel permits were allocated based on whiting deliveries made from 1994 through 2003 (CFR 660.150(g)(6)(iii)(B)) .

Portion of the Shoreside QS Allocated to Catcher Vessels Based on Permit History for Whiting Trips: Of the 80% of the whiting QS allocated among permits, 99.9% was allocated based on landings history in the primary whiting fishery with the remainder (0.1%) allocated based on whiting landings outside the primary whiting fishery. Of the 99.9%, 7.2% was allocated equally among all permits (an amount equivalent to the share of primary whiting fishery landings history associated with the permits that were retired in the 2003 buyback program), and the remainder (92.8%) was allocated among permits based on each permit's landings history of whiting on whiting targeted trips. The period used to allocate the 92.8% of whiting QS allocated for landings on whiting trips was 1994 through 2003.

2.1.2 Action Alternatives

The action alternatives (Alternatives 1-4) being considered would change which years are included in the landings history-based portion of the allocation formula applied to whiting trips for limited entry permits (CFR 660.140(d)(8)(iv)(C)(2) and CFR 660.150(g)(6)(iii)(B)) and the allocation formula for whiting deliveries for processors (CFR 660.140(d)(8)(iv)(G)). Alternative 1 changes the end year from 2004 to 2003 for the shoreside whiting processors, making it the same as for the other two allocation groups under No Action. Alternatives 2 and 3 change the end year for all three allocation groups to 2007 and 2010, respectively. Alternative 4 changes the initial year to 2000 and the end year to 2010 for all three allocation groups.

The alternatives for the allocation periods, including the No Action alternative, are as follows.

Initial Allocation Group	Years Used for History Based Allocation for Whiting Trips				
	Alternatives				
	No Action	Alt 1: thru ‘03	Alt 2: thru ‘07	Alt 3: thru ‘10	Alt 4: thru ‘10
Catcher Vessel Permits – Shoreside History	1994-2003	1994-2003	1994-2007	1994-2010	2000-2010
Whiting Processors – Shoreside History	1998-2004	1998-2003	1998-2007	1998-2010	2000-2010
Catcher Vessel Permits – Mothership History	1994-2003	1994-2003	1994-2007	1994-2010	2000-2010

Corresponding Adjustments to the Amendment 20 Trawl Rationalization Program

If an action alternative is selected (Alternatives 1 through 4), the following additional adjustments to the quota share distributions and existing regulations would need to be made to implement a change in the whiting trip allocation period and whiting QS distributions while being consistent with the purposes of the program.

Redistribution of Nonwhiting Species QS: In addition to the redistribution of whiting QS, the portion of the nonwhiting species QS that is allocated to LE permit holders in proportion to their whiting QS allocated for whiting trips would be redistributed among QS accounts to maintain pro rata proportions, e.g., if an account receives 1% of the whiting QS allocated for whiting trips then the permit will also receive 1% of the widow rockfish QS that is allocated pro-rata for whiting trips (CFR 660.140(d)(8)(iv)(C)(2).[1] Allocations of nonwhiting species were not made to shoreside processors nor to permits in the mothership sector co-op program.[2]

The following portions of the initial allocations would not be affected by this action.

- The portion of the initial QS allocation distributed based on trips that were not targeting on whiting.
- The portion of the initial QS allocation that was distributed equally among all permits.

QS accounts for which the landings-based portion of the allocation was based entirely on nonwhiting trips would not be affected by this action (i.e. QS accounts created for permits associated with vessels that did not target on whiting). For those QS accounts receiving an initial allocation based on both whiting and nonwhiting trips, the portion of the allocation based on nonwhiting trips would not be affected and the portion of the allocation for whiting trips that was allocated equally among all permits would also not be affected.

Processor Recent Participation: Regulatory language would be adjusted so that the “recent participation requirement” for processors (Council, 2010) would line up with the end of the final allocation period. The recent participation requirement in the regulations is: “received deliveries of at least 1 mt of whiting from whiting trips in each of any two years from 1998 through 2004” (CFR 660.140(d)(8)(iv)(G)(1)). Given that this recent participation requirement covered seven years, for each of the above alternatives it is assumed that the original intent would be met by a

[1] The amount to be allocated on a prorata basis is 100 percent, minus the amount allocated for nonwhiting permits, minus the amount allocated equally.
[2] The mothership sector as a whole is limited by sector set-asides for nonwhiting species.

seven-year recent participation requirement that covered the last seven years of the allocation period. Thus the recent participation requirement period for processors for each option would be as follows.

Whiting Processors	Adjusted **Recent Participation Requirement** for Each Alternative				
	Alternatives - receive deliveries of at least 1 mt of whiting from whiting trips in any of two years from				
	No Action	Alt 1: thru '03	Alt 2: thru '07	Alt 3: thru '10	Alt 4: thru '10
Allocation Period	1998-2004	1998-2003	1998-2007	1998-2010	2000-2010
Recent Participation Period	1998-2004	1998-2003	2001-2007	2004-2010	2004-2010

Note that because the allocation period and the recent participation period for processors are identical under No Action (1998-2004), the recent participation period became more of a minimum threshold than a true recent participation requirement. A similar situation applies for Alternative 1, except the recent participation requirement is shortened to six years because the allocation period is only six years.

Mothership Catcher Vessel Whiting Endorsement: Regulatory language would be adjusted so that the 500 mt minimum qualification level would be applied to the final allocation qualification periods. Mothership catcher vessels were required to qualify for a whiting endorsement in order to be allocated a mothership catch history assignment. Qualification for such an endorsement required delivery of a total of 500 mt of whiting to motherships from 1994 through 2003. Whichever allocation period is selected a vessel would be required to have delivered at least 500 mt in that period to qualify for a mothership catcher vessel endorsement and catch history assignment.

Equal Allocation: Regulatory language would be adjusted such that the amount of shoreside QS allocated equally among permits will not change. Currently, the equal allocation element is specified as: "the buyback permit history as a percent of the total fleet history for the allocation period" (CFR 660.140(d)(8)(iv)(B)(2)(i)). The status quo allocation period, and consequently, the period used for determining the equal allocation portion of the QS allocation, is 1994-2003. The buyback program was completed in 2003; therefore, for each year after 2003 the share accounted for by the buyback permits would be zero. Inclusion of years after the buyback period would substantially reduce the portion of QS allocated equally, altering that aspect of the equity balance of the allocation formula. The purpose here is to reconsider only that portion of the allocation on which the allocations specific to individual permit history is based. For this reason, if there is a change from status quo, in order to stay consistent with the original program, the regulations on the amount of QS to be allocated equally would be adjusted to reference the 1994-2003 period instead of "the allocation period." There is no equal allocation component in the allocation formulas for shoreside processors or mothership catcher vessels.

Eligibility for Allocations: The revised allocations would be distributed to QS account owners rather than to limited entry permit owners. Under the existing program, QS allocations were issued to owners of limited entry permits. The initial QS allocations then went into QS accounts which were under the same ownership as the limited entry permits. However since the initial allocation some limited entry permits have traded hands while the QS accounts have remained under the same ownership (due to the prohibition on QS trading[3]). Therefore it would be necessary to adjust regualtions to specify that for QS that is reallocated, the reallocation would go to the existing QS accounts based on the history of the permits that originally generated those accounts. This change would not affect the allocation of whiting QS to processors or the allocation of catch history to mothership catcher vessel permits.

In sum:

1. For eligible harvesters, QS accounts were originally established for limited entry permits but those limited entry permits may no longer be associated with the QS accounts, therefore the allocations will instead go to the QS accounts based on the history of the permit that generated the account.
2. For processors, the QS accounts were established for companies with processing history and those accounts are still associated with those same companies.
3. For mothership catcher vessels, catch history was assigned to the permits and is still associated with those same permits since implementation of provisions which would allow mothership sector catch history to be transferred separately from the permit has been delayed pending resolution of action on whiting QS reallocation.

2.1.3 Alternatives Considered But Rejected From Further Analysis

In written comment received at the April 2012 Council meeting, it was suggested that in conjunction with the extension of the ten year allocation period by from five to seven years under certain alternatives, the number of worst years a permit would be allowed to drop from its catch history calculation should be increased from two to four. The drop year provision was provided to account for mechanical breakdowns, major illnesses or other hardships that might temporarily affect a vessel's ability to participate in the fishery. In part, the provision was viewed as an alternative to creating a cumbersome and costly review and appeal process. The provision also provided an opportunity for more recent entrants to accumulate catch history approaching that of longer term participants. The Council felt that not extending the number of drop years would be appropriate because it would accommodate more breakdowns, health problems or other hardships than would be expected for a truly fishery-dependent vessel. The Council further noted that dropping years hurts those participants that showed consistent dependence on the fishery by fishing every year during the allocation period. Additionally, landings history would be attached to the permit rather than to a vessel. Thus disablement of a vessel would not have prevented the owner from transferring the permit onto another vessel in order to maintain involvement in the fishery while repairs or refitting were being completed.

In written comment received at the April 2012 Council meeting, the following alternative base periods were suggested for consideration: 2001-2010, 2000-2009, and 1999-2008. The Council adopted for consideration a 2000-2010 base period. This alternative split the difference among the alternatives with respect to the initial year for the allocation period and selected 2010 (the most recent year) for the end year of the allocation period. Narrowing the number of alternatives while covering a reasonable range of years was intended to focus the analysis and public discussion. Data in the analysis will show annual participation by permits moving into and out

[3] The moratorium on QS trading was set to expire at the end of 2012 but has been extended to accommodate reallocation of QS for whiting trips.

of the fishery, providing a sense of how performance of the alternatives might vary depending on whether the bookend years of the allocation period are changed slightly.

CHAPTER 3 DESCRIPTION OF THE AFFECTED ENVIRONMENT (SEE SUPPLEMENTAL ATTACHMENT)

TO BE PROVIDED SUPPLEMENTAL

CHAPTER 4 IMPACTS ON THE AFFECTED ENVIRONMENT

In this section the direct and indirect impacts of the actions being considered under each issue will be addressed separately. Within the section on each issue, there will also be a discussion of cumulative impacts. Although CEQ regulations reference the need for a cumulative impact analysis to consider "past, present, and reasonably foreseeable future actions," from an analytical standpoint what is of interest is the net effect of the proposed action and any ongoing effects of these actions because they continue to exist programmatically.

4.1 Direct and Indirect Impacts to the Physical Environment, Including Habitat and Ecosystem

No change in impacts to the physical environment is expected. The alternatives covered by this EA are entirely allocative in nature, changing the allocation among individuals within the shoreside whiting sector and within the at-sea mothership sector but not changing the overall allocations to each sector. Impacts on the physical environment are a primarily function of the areas fished, gear types used, and level of effort. Changing the allocation among individuals is unlikely to change any of these factors. The fleet is highly mobile, particularly the mothership sector fleet. Therefore, the areas fished are more a function of the location of efficiently harvestable populations of this migratory stock (see Section 3.2.1 for a description of whiting biology) and the shoreside receiving and processing locations. There is only one gear type used in the fishery (midwater trawl) and changing the distribution of fishing opportunities among individuals within a sector is not expected to affect total fishing effort using that gear type.

4.2 Direct and Indirect Impacts to the Biological Environment

For the reasons elaborated in Section 4.1, the reallocation of whiting QS and mothership catcher vessel catch history assignments is not expected to have any impacts on the biological environment, including but not limited to the following categories of potentially impacted resources.

- Groundfish, Including Overfished Species
- ESA Listed Salmon
- Other Protected Species
- Other Fish Resources

4.3 Direct and Indirect Impacts to the Socioeconomic Environment

The impact on net benefits generated for the nation as a whole is expected to vary minimally among the alternatives. Alternatives that allocate to those most likely to use the allocation, rather than transfer it to another entity, will have lower transition costs. However the amount of these costs relative to the program as a whole is expected to be minimal and information is not available by which a determination can be made as to which allocation is likely to result in the lowest levels of post allocation transfers.

The primary effects are distributional and will be described in the following sections.

4.3.1 Harvesting Sector Impacts

4.3.1.1 Shoreside Whiting

Changing the allocation history periods will shift QS among recipients. How different allocation periods address policy goals is discussed in Chapter 5. Here the objective is to show the allocational results and discuss impacts.

In general, harvesters who receive lesser or no initial allocations are on a par with those who will enter the fishery at a later time (having to acquire quota in order to enter the fishery). The initial allocation is essentially the granting of a capital asset that will affect harvester competitiveness and assist existing participants in the transition to the new management system. To the degree that initial allocation match up with the harvesters that will use the quota, transition costs and disruption will be lessened. In Figure 4-1, along the bottom of the graph permits are arrayed from those receiving the least allocation under status quo (No Action) to those receiving the most. The allocations to these permits are shown in the solid line marked by diamonds, increasing steadily from the left side to the right side of the graph. The highest allocation to any permit was under 4 percent (far right hand side). Since the allocation period for the No Action Alternative was 1994-2003, this line tracks fairly closely with the 1994-2003 history line. is the No Action allocation line is generally below the history line because 20 percent of the QS allocation went to processors. The line is not exactly 20 percent below because of the provision that dropped each permit's two worst years from the calculation. The 2007-20010 history for each permit is tracked by the dotted line. On the left hand end of the graph it can be seen that there were about 5 permits that had minimal history from 1994-2003 that had over a 1 percent share of the history from 2007-2010. Moving to the right a number of other permits can be seen which had substantially higher histories in recent years relative to their 1994-2003 history and relative to the initial allocations issued for 2011 (No Action). Similarly, on the right hand side of the graph one can see three permits which received initial allocations of over one percent of the QS that had no participation from 2007-2010. There are another five permits that had

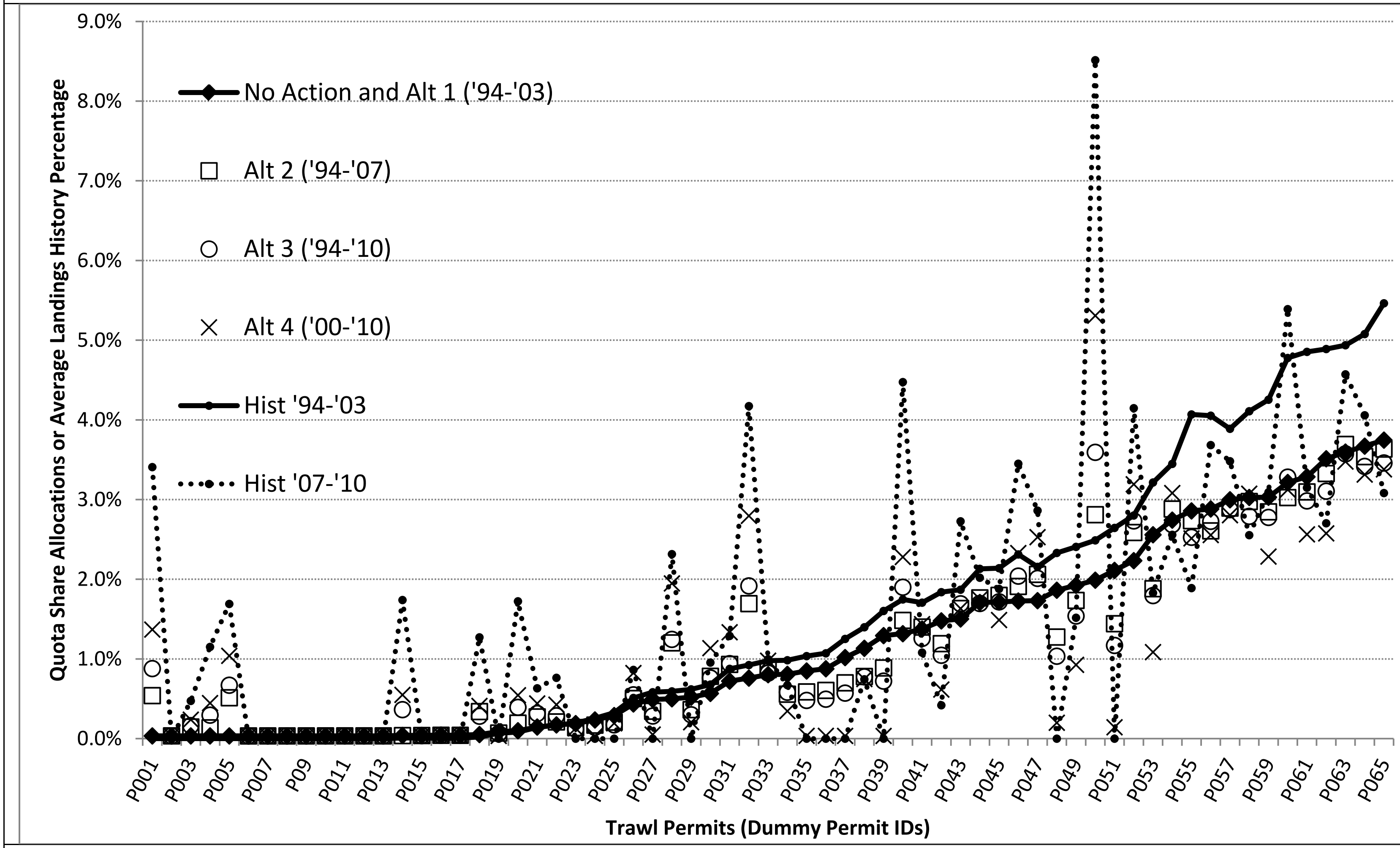


Figure 4-1. Shoreside whiting QS allocations to permits, by alternative, compared to each permit's share of shoreside whiting landings in recent and historic periods (permits ordered from lowest initial allocation to highest initial allocation under status quo (No Action).[a/]

a/ Excludes 102 permits that received only equal allocations of 0.04 percent each, for which the allocation does not change among the alternatives.

not participated from 2007-2010 that received QS amounts of between about one half and one percent in the initial allocation. The allocation results for the other alternatives are shown in the graph by different shape symbols. By picking individual permits and examining the allocational results, one can see that for permits with recent histories (2007-2010) that differ dramatically from their history during the allocation base period (1994-2003), the allocational result moves closer to the more recent history values as the allocation periods are extended into more recent years. For example, the permit with the highest percent of the 2007-2010 landings history (over 8.5 percent) which received about a QS allocation of 2 percent of the allocation under No Action would receive a QS allocation of just under 3 percent if the allocation period is extended through 2007 (Alternative 2), between 3 percent and 4 percent percent if the allocation period is extended to 2010, and over 5 percent if the early years of the allocation period were eliminated (Alternative 4). A similar but inverse result can be observed for those permits with zero or minimal history in recent years (2007-2010).

What follows is a statistical summary of the information provided in Figure 4-1.

Statistical Summary: Comparisons to Status Quo. Relative to status quo, Alternatives 2, 3 and 4 would allocate QS to 6 permits that would not otherwise receive QS based on permit catch history (Table 4-1).[4] Alternative 4 would allocate the most to this group, a total of 3.0 percent to all permits in the group and a maximum of 1.3 percent to any one permit in the group. Alternative 2 would benefit 27 permits (6 newly qualifying permits and 21 previously qualifying permits) while reducing the allocation of 38 permits. A total of 6.3 percent of the QS would be redistributed under alternative 2. Alternative 3 would benefit 25 permits (6 newly qualifying permits and 19 previously qualifying permits, while reducing the allocation of 40 permits. A total of 9.0 percent of the QS would be redistributed under Alternative 3. Alternative 4 would benefit 28 permits (6 newly qualifying permits and 22 previously qualifying permits, while reducing the allocation of 37 permits (25 permits with reduced allocations and 12 permits which would receive no allocation based on permit catch history[4]). A total of 17.4 percent of the QS would be redistributed under Alternative 4.

Table 4-1. Changes in the amount of shoreside whiting QS allocated to permits under the alternatives relative to status quo based on individual permit history of shoreside whiting trips (table excludes the 0.04 percent that each permit received as its share of the equal allocation and permits' share of the 0.1 percent allocated for nonwhiting trips).[a/]

	Alternatives		
	Alt 2: 1994-2007	Alt 3: 1994-2010	Alt 4: 2000-2010
Number of Permits **Not Previously Qualifying** for an Allocation based on Whiting Trip Permit History	6	6	6
Total Allocation Increases for Those Permits	1.2%	1.9%	3.0%
Maximum To Any Permit	0.5%	0.8%	1.3%
Number of Previously Qualifying Permits With **Increased** Allocations Under the Alternative	21	19	22
Total Percent of Increase for Those Permits	5.1%	7.1%	14.4%
Maximum Increases to Any One Permit	0.9%	1.6%	3.3%

[4] These permits would receive a quota share amount of approximately 0.04% as part of equal sharing of the shoreside whiting allocation and may also receive some small amount to cover bycatch on the nonwhiting trips.

Previously Qualifying Permits with **Decreased** Allocations Under the Alternative	38	40	25
Total Percent of Decreases for Those Permits	-6.3%	-9.0%	-13.2%
Maximum Decreases to Any One Permit	-0.7%	-0.9%	-2.0%
Previously Qualifying Permits with **Zero** Permit History-Based Allocations Under Status Quo	-	-	12
Total Percent of Decreases for Those Permits	-	-	-4.2%
Maximum Decreases to Any One Permit	-	-	-1.3%

a/ Alternative 1 is identical to Status Quo for permits.

Statistical Summary: Comparisons to Recent and Historic Periods. Relative to their 1994-2003 historic averages, under the No Action alternative 24 permits would receive allocations very slightly above their 1994-2003 average--amounts of about 0.03 percent each (Table 4-2). Because the permits are allocated only 80 percent of the total QS, most permits receiving larger allocations receive amounts that are below the long term average.[5] For all alternatives, the total amounts by which the QS allocations are below the 1994-2003 average is 15.1 percent (the sum of the increases plus the decreases). One might expect this amount to be zero (increases in shares would exactly balances decreases), however the effect of the 20 percent allocated to processors, the shares taken by buyback permits from 1994-2003, and the QS shares allocated equally among all permits, leads to a different result.

Table 4-2. Differences in allocations of shoreside whiting QS to permits under the alternatives relative to 1994-2003 comparison years.[a/]

	Alternatives				
	No Action	1: 1994-2003	2: 1994-2007	3: 1994-2010	4: 2000-2010
Number of Permits With Allocations **Higher** Than Comparison Period Share	24	24	30	31	32
Total Differences Between Allocations and Comparison Period Shares for Those Permits	0.7%	0.7%	4.9%	7.6%	15.4%
Maximum Amount Above	0.0%	0.0%	0.8%	1.3%	3.0%
Number of Permits With Allocations **Lower** Than Comparison Period Share	41	41	35	34	33
Total Differences Between Allocations and Comparison Period Shares for All of Those Permits	-15.8%	-15.8%	-20.0%	-22.7%	-30.5%
Maximum Amount Above	-1.3%	-1.3%	-1.4%	-1.5%	-2.3%
Sum of Deviations from Comparison Period (Total Absolute Value of Changes For Those With Higher and Lower Allocations)	16.5%	16.5%	24.9%	30.3%	45.9%

a/ The 1994-2003 averages are based on each permit's share of the entire fleet's landings, including those permits that were bought back.

[5] A total of 102 permits receiving only equal shares of the whiting QS and or whiting QS allocated to cover bycatch on non-whiting trips are not included in the figures or the summary tables.

Note that buyback permits were included when each permit's share of the historic harvest was determined for the comparison to 1994-2003 historic shares of harvests. If the buyback permits were omitted from the calculation, the total amount by which the permits would be below their 1994-2003 averages would be 23.5 percent. This underage is the combined effect of the 20 percent of the QS allocated to processors and the 3.5 percent of the QS allocated equally among 102 permits not included in the tables (permits for which results do not vary among alternatives). The comparisons provided in Table 4-3 and Table 4-4 are for periods in which the buyback permits were not present. In both tables the total underage is 23.5 percent for all alternatives.

One measure of the amount which the allocations vary from historic averages is the total amount the allocation to each permit deviates from the averages, summed across all permits. The closer the match between the averages and the allocations, the lower the deviations will be. The worse the match (i.e., with some permits receiving substantially over and others receiving substantially less than their long term averages), the greater th deviations will be.

For example, for the No Action Alternative and Alternative 1, the 24 permits receiving more than the 1994-2003 average receive a total of 0.7 percent more, and the 41 permits that receive less receive a total of 15.8 percent less (Table 4-2). The combined deviation from the long term average is 16.5 percent under these alternatives (last row of Table 4-2). The deviations increase to 24.9, 30.3, and 45.9 percent, for Alternatives 2, 3, and 4, respectively.

Using 2004-2006 as the comparison period (the base period used in the Amendment 20 analysis) it can be seen that the total deviation relative to the 2004-2006 average is 56.9 percent under No Action, decreasing to 34.9 percent under Alternative 4 (Table 4-3). The number of permits receiving greater allocations (between 34 and 36 permits) and lesser allocations (between 29 and 31 permits), relative to the 2004-2006 comparison period, remains relatively stable among the alternatives.

Table 4-3. Differences in allocations of shoreside whiting QS to permits under the alternatives relative to 2004-2006 comparison years.

	Alternatives				
	No Action	1: 1994-2003	2: 1994-2007	3: 1994-2010	4: 2000-2010
Number of Permits With Allocations **Higher** Than Comparison Period Share	35	35	34	36	36
Total Percent of Increases for Those Permits	16.7%	16.7%	11.8%	10.8%	5.7%
Maximum Increases	2.3%	2.3%	1.6%	1.5%	0.8%
Number of Permits With Allocations **Lower** Than Comparison Period Share	30	30	31	29	29
Total Percent of Decreases for Those Permits	-40.2%	-40.2%	-35.3%	-34.4%	-29.2%
Maximum Decreases	-4.4%	-4.4%	-3.5%	-3.1%	-2.2%
Sum of Deviations from Comparison Period (Totals of the Absolute Value of Changes For Those With Higher and Lower Allocations)	56.9%	56.9%	47.1%	45.2%	34.9%

Using 2007-2010 as the comparison period it can be seen that the total deviation relative to the 2007-2010 average is 56.6 percent under No Action, decreasing to 32.2 percent under Alternative 4 (Table 4-4). The number of permits receiving greater allocations (between 33 and 36 permits) and lesser allocations (between 29 and 32 permits), relative to the comparison 2007-2010 comparison period, remains relatively stable among the alternatives.

Table 4-4. Differences in allocations of shoreside whiting QS to permits under the alternatives relative to 2007-2010 comparison years.

	Alternatives				
	No Action	1: 1994-2003	2: 1994-2007	3: 1994-2010	4: 2000-2010
Number of Permits With Allocations **Higher** Than Comparison Period Share	36	36	34	33	33
Total Percent of Increases for Those Permits	16.5%	16.5%	11.4%	8.6%	4.3%
Maximum Increases	2.1%	2.1%	1.4%	1.2%	0.6%
Number of Permits With Allocations **Lower** Than Comparison Period Share	29	29	31	32	32
Total Percent of Decreases for Those Permits	-40.0%	-40.0%	-34.9%	-32.2%	-27.8%
Maximum Decreases	-6.5%	-6.5%	-5.7%	-4.9%	-3.2%
Sum of Deviations from Comparison Period (Totals of the Absolute Value of Changes For Those With Higher and Lower Allocations)	56.6%	56.6%	46.3%	40.8%	32.2%

Allocations Relative to Accumulation Limits

The shoreside quota pound vessel limit is 15 percent, i.e., the maximum amount of quota pounds that can be used on a single vessel in any one year is 15 percent of the total for the shoreside whiting sector. Examination of Figure 4-1 shows that the maximum allocations to any single permit under No Action, and Alternatives 2 and 3 would be just over 3.5 percent. The maximum allocations to a permit under Alternative 4 would be just over 5 percent. The initial allocation to permits would be well below the 15 percent maximum that could be used on any single vessel, leaving substantial room for consolidation through inseason transfers of quota pounds.

A control limit of 10 percent applies to all QS owned by a single entity. Figure 4-2 displays the total QS allocation going to entities holding permits. Whereas one point in Figure 4-1 represented a single permit, each point in Figure 4-2 represents a single entity and the allocations to permits held by that entity. This figure shows that for the portion of the QS allocations made to permits, the most a single entity is expected to receive is just over 8.5 percent under No Action, Alternative 1, Alternative 2 and Alternative 4 and just under 8 percent under Alternative 3. None of these amounts is in excess of the 10 percent control limit. However, under the shoreside IFQ program, entities receive QS for both their permit history and qualified processing activity. The performance of the alternatives with respect to QS issued to entities controlling both permits and processing history is addressed in Section 4.3.2.1.

Exvessel Value Equivalents

To provide some perspective on the economic significance of differences in the allocation levels, Table 4-5 translates a 0.1 percent allocation into an exvessel value equivalent for an array of possible exvessel prices and levels of allocation to the shoreside sector. The values provided in Table 4-5 range from $4,409 per 0.1 percent (for a price of $0.05 per pound and a sector allocation of 40,000 mt) to $24,251 per 0.1 percent (for a price of $0.11 per pound and an allocation of 100,000 mt). From 2006 through 2010, total landings in the shoreside fishery ranged from 40,300 mt to 97,300 mt and averaged 64,900 mt. Exvessel prices ranged from $0.06 per pound to $0.11 per pound and averaged $0.07 per pound (with inflation adjustments).

Table 4-5. Exvessel value equivalent of a 0.1 percent share of the shoreside whiting fishery for a range of prices and sector allocation levels ($).

	Whiting Exvessel Prices ($ per lb)			
Shoreside Sector Allocations (mt)	0.05	0.07	0.09	0.11
40,000	4,409	6,173	7,937	9,700
60,000	6,614	9,259	11,905	14,550
80,000	8,818	12,346	15,873	19,401
100,000	11,023	15,432	19,842	24,251

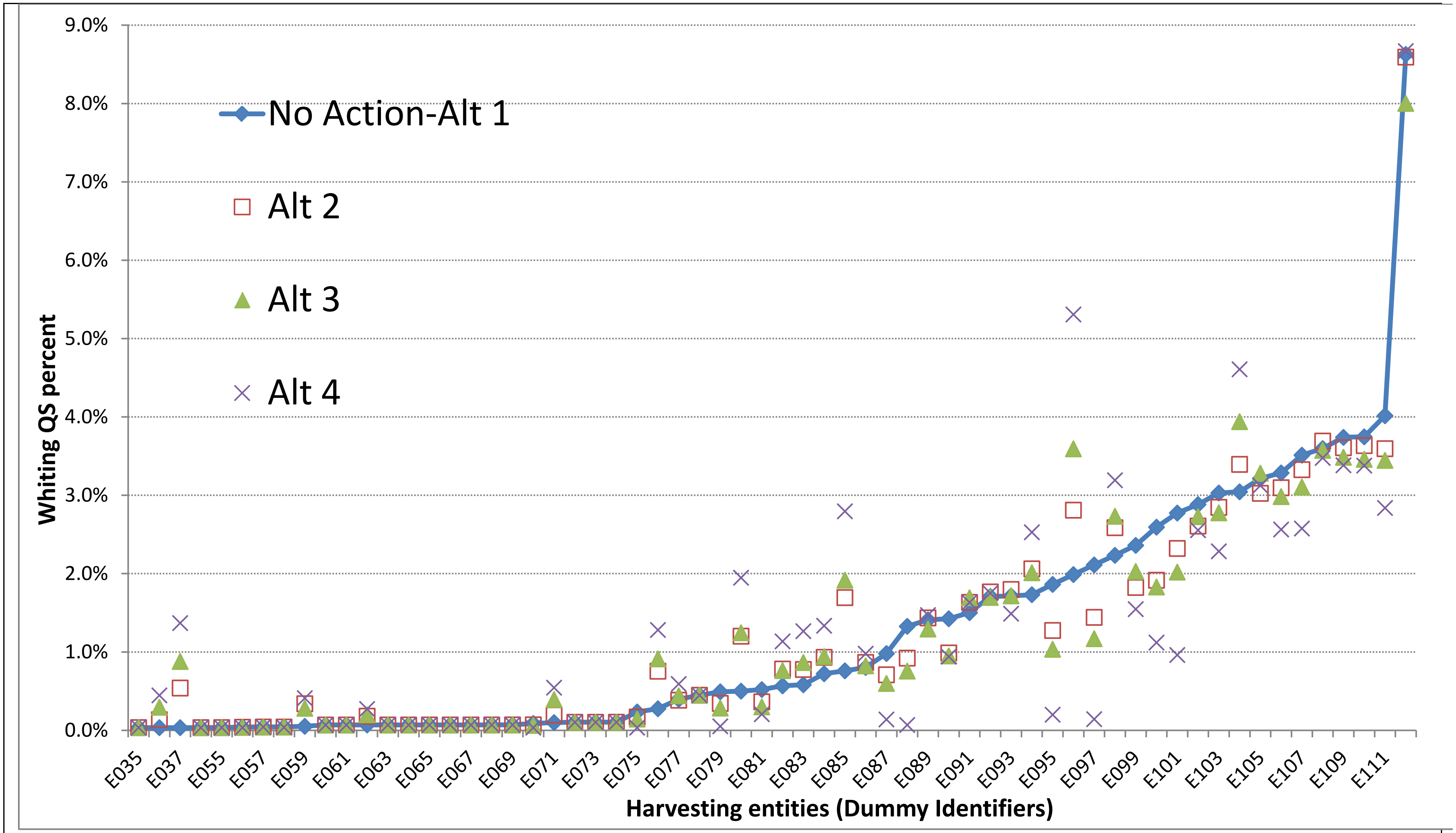


Figure 4-2. Concentration of shoreside whiting QS allocations among entities owning permits by alternative (results ordered from lowest to highest for the No Action alternative).[a/]

a/ Excludes 102 permits that received only equal allocations of 0.04 percent each, for which the allocation does not change among the alternatives

Allocations Relative to Dependency

TO BE COMPLETED.

4.3.1.2 Mothership Catcher Vessels

Changing the allocational periods will shift catch history assignments (CHA) among recipients. How different allocation periods address policy goals is discussed in Chapter 5. Additionally, Section 5.4.2.3 (page 53) contains an evaluation of the effects of the 500 mt threshold that must be met for a permit to qualify for a mothership catcher vessel whiting endorsement. A permit must qualify for such an endorsement in order to receive an allocation. In this chapter, the objective is to show the allocational results and impacts. In Figure 4-3, permits are arrayed along the bottom of the graph from those receiving the least allocation under status quo (No Action) to those receiving the most. The allocations to these permits are shown by the solid line marked with diamonds, increasing steadily from the left side to the right side of the graph. The highest allocation to any permit was almost 10 percent (far right hand side). Since the allocation period for the No Action Alternative was 1994-2003, this line tracks the 1994-2003 history line fairly well. The match is closer than for the shoreside permits shown in Figure 4-1 because there is no processor allocation (all of the catch history allocation goes to the permits). The 2007-20010 history for each permit is tracked by the dotted line. On the left hand end of the graph it can be seen that there was 1 permit that had minimal history from 1994-2003 but over 4 percent of the history from 2007-2010. Moving to the right a number of other permits are shown which had substantially higher histories in recent years relative to their 1994-2003 history and relative to the initial allocations issued for 2011 (No Action). Similarly, on the right hand side of the graph one can spot between four and six permits that received initial allocations of one percent or more of the catch history but had no participation from 2007-2010. The allocation results for the other alternatives are shown by the different shape symbols. By picking individual permits and examining the allocational results, one can see that for permits with recent histories (2007-2010) that differ dramatically from their history during the allocation base period (1994-2003), the allocational result moves closer to the more recent values as the allocation periods are extended into more recent years. For example, the permit with the highest percent of the 2007-2010 landings history (about 12 percent) and receiving a CHA allocation of about 10 percent under status quo, would receive about 12 percent under Alternative 2 (extending the allocation period to 2007) and Alternative 3 (extending the allocation period to 2010), and over 14 percent under Alternative 4 (dropping the early years of the allocation period). Permit P027 with no history in the 2007-2010 comparison period would receive close to 4 percent under No Action and Alternative 1, and would receive successively less as more emphasis is placed on more recent years.

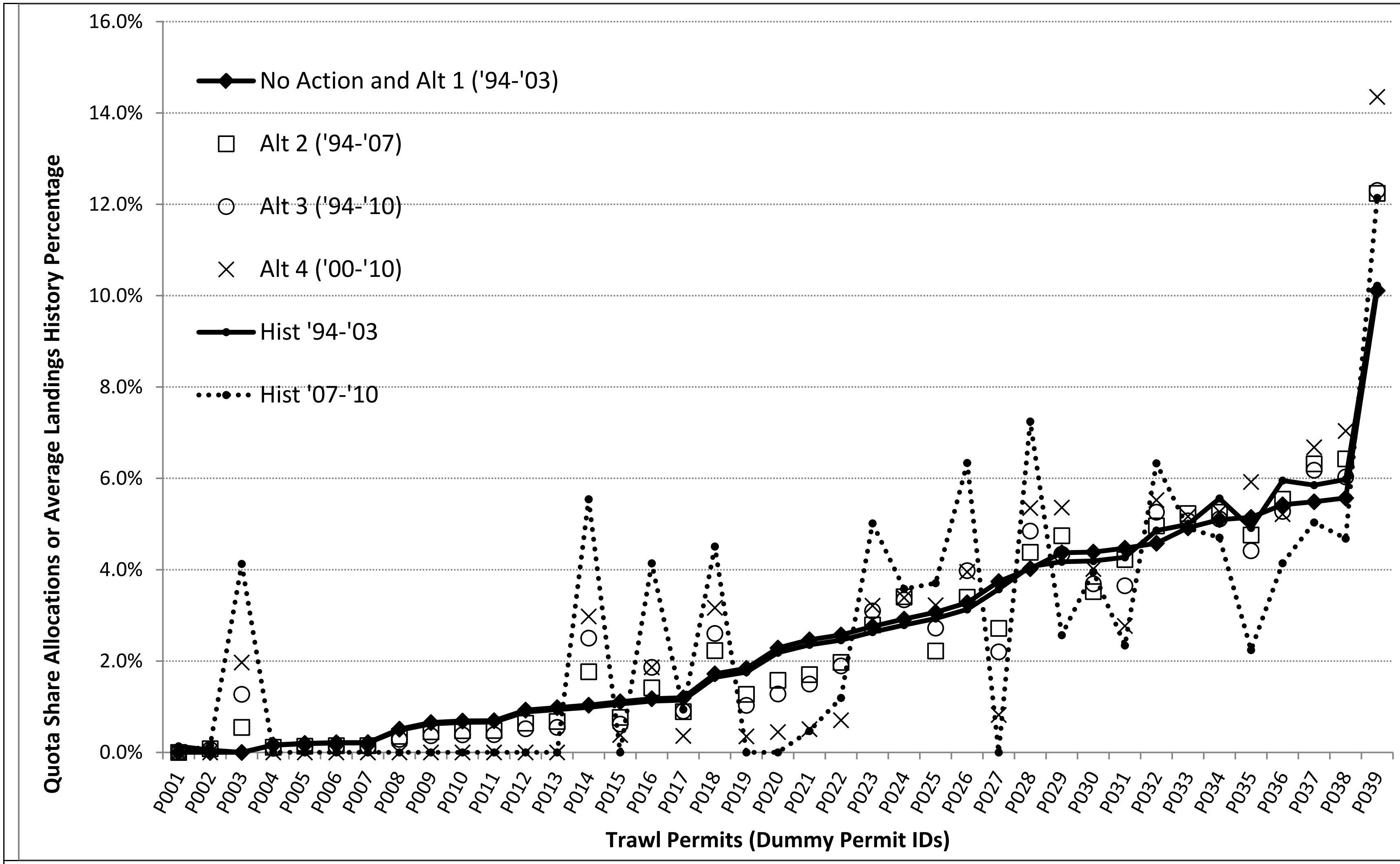


Figure 4-3. Mothership catcher vessel whiting catch history assignments to permits, by alternative, compared to each permit's share of shoreside whiting landings in recent and historic periods (permits ordered from lowest initial allocation to highest initial allocation under status quo (No Action).

What follows is a statistical summary of the information provided in Figure 4-1.

Statistical Summary: Comparisons to Status Quo. Relative to status quo (No Action), Alternatives 2, 3 and 4 would allocate CHA to 2 permits that would not otherwise receive CHA (Table 4-6). Alternative 4 would allocate the most to this group, a total of 2.0 percent. With the elimination of the 1994-1999 qualifying years one permit drops out of this group because without its 1994-1999 landings it does not meet the 500 mt requirement to qualify for a MS/CV endorsement. Alternative 2 would benefit 17 permits (2 newly qualifying permits and 15 previously qualifying permits) while reducing the allocation of 21 permits. A total of 8.3percent of the CHA would be redistributed under alternative 2. Alternative 3 would benefit 15 permits (2 newly qualifying permits and 13 previously qualifying permits, while reducing the allocation of 23 permits. A total of 10.9 percent of the CHA would be redistributed under Alternative 3. Alternative 4 would benefit 17 permits (1 newly qualifying permits and 16 previously qualifying permits, while reducing the allocation of 20 permits (10 permits with reduced allocations and 10 permits which would receive no allocation). A total of 17.2 percent of the CHA would be redistributed under Alternative 4.

Table 4-6. Changes in the amount of whiting CHA allocated to permits under the alternatives relative to status quo (No Action) based on individual permit history of mothership sector whiting trips.

	Alternatives		
	Alt 2: 1994-2007	Alt 3: 1994-2010	Alt 4: 2000-2010
Number of Permits **Not Previously Qualifying** for an Allocation based on Whiting Trip Permit History	2	2	1
Total Allocation Increases for Those Permits	0.6%	1.3%	2.0%
Maximum To Any Permit	0.5%	1.3%	2.0%
Number of Previously Qualifying Permits With **Increased** Allocations Under the Alternative	15	13	16
Total Percent of Increase for Those Permits	7.6%	9.5%	17.2%
Maximum Increases to Any One Permit	2.1%	2.2%	4.2%
Previously Qualifying Permits with **Decreased** Allocations Under the Alternative	21	23	10
Total Percent of Decreases for Those Permits	-8.3%	-10.9%	-13.9%
Maximum Decreases to Any One Permit	-1.0%	-1.5%	-2.9%
Previously Qualifying Permits with **Zero** Permit History Based Allocations Under Status Quo	-	-	10
Total Percent of Decreases for Those Permits	-	-	-5.2%
Maximum Decreases to Any One Permit	-	-	-1.0%

Statistical Summary: Comparisons to Recent and Historic Periods. Relative to their 1994-2003 historic averages, under the No Action alternative 32 permits would receive allocations above their 1994-2003 average (Table 4-7 Under all the alternatives, the total amount by which the CHA allocations are above the 1994-2003 average is 5.9 percent (the sum of the increases plus the decreases). One might expect this amount to be zero (increases in shares would exactly balances decreases), however the effect of the shares of harvest taken by buyback permits during 1994-2003 results in a relative increase in CHA shares to those permits remaining. In the comparisons to 2004-2006 and 2007-2010 the sum of the increases and decreases comes to zero, since there was no buyback permit history in this period to confound the results.

Table 4-7. Differences in allocations of at-sea mothership sector whiting CHA to permits under the alternatives relative to 1994-2003 comparison years.[a/]

	Alternatives				
	No Action	1: 1994-2003	2: 1994-2007	3: 1994-2010	4: 2000-2010
Number of Permits With Allocations **Higher** Than Comparison Period Share	32	32	18	15	18
Total Differences Between Allocations and Comparison Period Shares, for All of Those Permits	6.4%	6.4%	10.8%	13.3%	22.4%
Maximum Amount Above	0.5%	0.5%	2.6%	2.7%	4.7%
Number of Permits With Allocations **Lower** Than Comparison Period Share	5	5	20	23	20
Total Differences Between Allocations and Comparison Period Shares, for All of Those Permits	-0.5%	-0.5%	-4.9%	-7.4%	-16.5%
Maximum Amount Above	-0.2%	-0.2%	-0.7%	-1.2%	-2.5%
Number of Permits with No History in the Comparison Years and No Allocation Under the Alternatives	1	1	-	-	-
Sum of Deviations from Comparison Period (Totals of the Absolute Value of Changes For Those With Higher and Lower Allocations)	6.8%	6.8%	15.7%	20.7%	39.0%

a/ The 1994-2003 averages are based on each permit's share of the entire fleet's landings, including those of the permits that were bought back.

One measure of the divergence between the allocations and historic average catch history is the total amount by which the allocations to each permit deviate from the historical averages, summed across all permits. The closer the match between the averages and the allocation, the lesser the divergence. The worse the match (i.e., with some permits receiving substantially over and others receiving substantially less than their long term averages), the greater this divergence.

For example, for the No Action Alternative and Alternative 1 the 32 permits receiving more than their 1994-2003 average receive a total of 6.4 percent more and the 5 permits that receive less, receive a total of 0.5 percent less (Table 4-7). The combined deviation from the long term average is 6.8 percent under these alternatives (last row of Table 4-7). Those deviations increase to 15.7, 20.7, and 39.0 percent for Alternatives 2, 3 and 4, respectively.

Using 2004-2006 as the comparison period (the base period used in the Amendment 20 analysis) it can be seen that the total deviation relative to the 2004-2006 average ranges from 56.6 percent under No Action to 29.6 percent under Alternative 4 (Table 4-8). The number of permits receiving greater and lesser allocations relative to the comparison period remains relatively stable across the No Action Alternative and Alternatives 1 thru 3, but declines under Alternative 4 because a number of permits drop out with the elimination of the early qualifying years (1994-1999).

Table 4-8. Differences in allocations of at-sea mothership sector whiting CHA to permits under the alternatives relative to 2004-2006 comparison years.

	Alternatives				
	No Action	1: 1994-2003	2: 1994-2007	3: 1994-2010	4: 2000-2010
Number of Permits With Allocations **Higher** Than Comparison Period Share	24	24	25	25	16
Total Percent of Increases for Those Permits	28.3%	28.3%	21.2%	20.9%	14.8%
Maximum Increases	3.2%	3.2%	2.2%	2.3%	2.8%
Number of Permits With Allocations **Lower** Than Comparison Period Share	13	13	13	13	11
Total Percent of Decreases for Those Permits	-28.3%	-28.3%	-21.2%	-20.9%	-14.8%
Maximum Decreases	-9.3%	-9.3%	-7.2%	-7.1%	-5.0%
Number of Permits with No History in the Comparison Years and No Allocation Under the Alternatives	1	1	-	-	11
Sum of Deviations from Comparison Period (Totals of the Absolute Value of Changes For Those With Higher and Lower Allocations)	56.6%	56.6%	42.4%	41.9%	29.6%

Using 2007-2010 as the comparison period it can be seen that the total deviation relative to the 2007-2010 average ranges from 56.3 percent under No Action, decreasing to 34.2 percent under Alternative 4 (Table 4-9). The number of permits receiving greater and lesser allocations relative to the comparison period remains relatively stable across the No Action Alternative and Alternatives 1 through 3 but declines under Alternative 4 because a number of permits drop out with the elimination of the early qualifying years (1994-1999).

Table 4-9. Differences in allocations of at-sea mothership sector whiting CHA to permits under the alternatives relative to 2007-2010 comparison years.

	Alternatives				
	No Action	1: 1994-2003	2: 1994-2007	3: 1994-2010	4: 2000-2010
Number of Permits With Allocations **Higher** Than Comparison Period Share	26	26	25	25	15
Total Percent of Increases for Those Permits	28.2%	28.2%	24.0%	19.4%	17.1%
Maximum Increases	3.7%	3.7%	2.7%	2.2%	3.7%
Number of Permits With Allocations **Lower** Than Comparison Period Share	12	12	13	13	13
Total Percent of Decreases for Those Permits	-28.2%	-28.2%	-24.0%	-19.4%	-17.1%
Maximum Decreases	-4.5%	-4.5%	-3.8%	-3.0%	-2.6%
Number of Permits with No History in the Comparison Years and No Allocation Under the Alternatives	-	-	-	-	10
Sum of Deviations from Comparison Period (Totals of the Absolute Value of Changes For Those With Higher and Lower Allocations)	56.3%	56.3%	47.9%	38.8%	34.2%

Allocations Relative to Accumulation Limits

There is a 20 percent limit on the maximum amount of CHA that can be controlled by a single entity, and a limit of 30 percent on the share of CHA that can be harvested by a single vessel. Figure 4-4 displays the total CHA allocation going to entities holding permits. Whereas one point in Figure 4-3 represented a single permit one point in Figure 4-4 represents a single entity and the allocations to permits controlled by that entity. This figure shows that the most a single entity is believed to have received under the No Action Alternative is about 10 percent. Each of the action alternatives (except Alternative 1 which for permits is identical to No Action) would increase the maximum initial allocations to a single entity to just over 12 percent for Alternatives 2 and 3, and over 14 percent for Alternative 4.

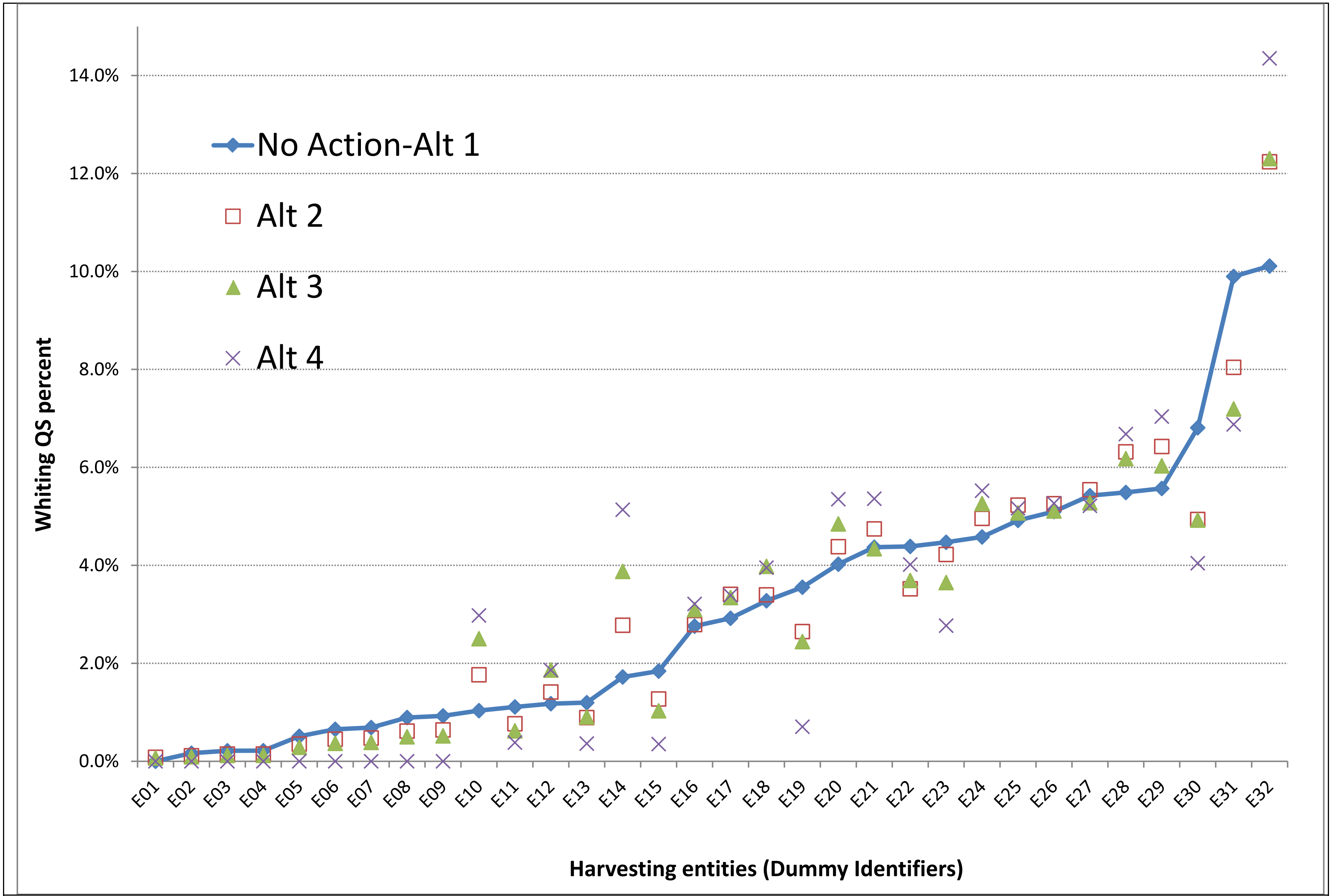


Figure 4-4. Concentration of mothership whiting CHA allocations among entities owning permits, by alternative (results ordered from lowest to highest for the no action alternative).

Exvessel Value Equivalents

To provide some perspective on the economic significance of differences in the allocation levels, Table 4-10 translates a 0.1 percent allocation into an exvessel value equivalent for an array of possible exvessel prices and levels of allocation to the mothership sector. The values provided in Table 4-10 range from $4,409 per 0.1 percent (for a price of $0.05 per pound and an allocation level of 20,000 mt) to $21,164 per 0.1 percent (for a price of $0.12 per pound and an allocation level of 60,000 mt). From 2006 through 2010, total whiting deliveries in the mothership fishery ranged from 24,100 mt to 57,500 mt and averaged 44,100 mt. Exvessel prices ranged from $0.05 per pound to $0.12 per pound and averaged $0.08 per pound (with inflation adjustments).

Table 4-10. Exvessel value equivalent of a 0.1 percent share of the mothership whiting fishery for a range of prices and allocation levels ($).

	Whiting Exvessel Prices ($ per lb)				
Mothership Sector Allocations (mt)	0.05	0.06	0.08	0.10	0.12
20,000	4,409	5,291	7,055	8,818	10,582
40,000	6,614	7,937	10,582	13,228	15,873
60,000	8,818	10,582	14,110	17,637	21,164

4.3.1.3 Other Harvesting Sectors, Including Tribes and Recreational Fisheries

There is a possibility that other commercial sectors might be affected if the initial allocation of QS among shoreside whiting processors increases the probability that a processor serving those fisheries goes out of business. For this result to occur, the lack of an initial allocation (or a low initial allocation relative to other processors) would have to be a severe enough disadvantage that the processor became unable to compete with other processors and hence could not remain in business. The effect on any particular firm will ultimately depend on the fiscal strength of the business. Those who receive an initial allocation may experience a boost in their competitive advantage due to the infusion of new wealth (the value of the QS received). Those who receive lesser amounts relative to other processors or no allocations will be on a competitive par with newly entering processors (i.e., need to offer competitive prices to fishermen without the benefit of the leverage that processor owned QS might provide, or need to purchase QS to use in leveraging more deliveries from harvesters). Ultimately, the effect on other sectors would likely be geographic. If a processor goes out of business and there is not another processor within the community to pick up the slack, then it is likely that landings would shift to other communities, and possibly to harvesters in those other communities, depending on fleet mobility. The distributions of the allocations among processors and potential effects on communities are discussed in Sections 4.3.2 and 4.3.3.

Another potential effect on other sectors concerns the impact of the selected alternative on the effectiveness of control dates which may be used when limited access systems are considered for other fisheries in the future. The effect may be on both fairness and equity considerations for those fisheries and on the fishery conditions that develop during those deliberations. This issue is discussed further in Sections 5.4.5.3 and 5.5.3.

4.3.1.4 Adjacent Council Fisheries

Certain segments of the West Coast groundfish fleet move between Alaskan (North Pacific Fishery Management Council) area fisheries and the West Coast. This is particularly true of the catcher and processing vessels in the West Coast whiting fishery. A reduction in opportunities for participants on the West Coast may cause increased effort in other fisheries and conversely an increase in opportunity for participants on the West Coast may decrease their effort elsewhere. None of the alternatives will affect the fleet's overall opportunity on the West Coast. To the degree that a change in allocations results in a net increase or decrease in opportunities for those West Coast vessels that participate in Alaskan fisheries, the effect is likely to be minor because of the relatively small size of West Coast fisheries relative to those in Alaska.

The issue of reliability of control dates may also affect fisheries in other Councils, as identified in the previous section and discussed in greater in Sections 5.4.5.3 and 5.5.3.

4.3.2 Processing Sector Impacts

4.3.2.1 Shoreside Processors

Allocations to Shoreside Processors for Processing History

Those processors who receive an initial allocation may experience a boost in their competitive advantage due to the infusion of new wealth (the value of the QS received). Whiting processors receiving an initial allocation of QS are advantaged by the value of the asset provided in one of several ways: (1) as an alternative to offering higher prices, processors can use the QP they are issued annually as leverage with harvesters to garner additional landings; (2) the annually issued QP can be sold to harvesters and the annual revenue used to augment prices offered to harvesters, to offer processed product at lower prices, or to otherwise cover costs, augment profit, and improve competitiveness; (3) the QS may be sold for a one time capital infusion that may be used for a variety of business purposes or to augment profits. Those processors who receive lesser amounts relative to other processors or no allocations will be on a competitive par with any newly entering processors (i.e., need to offer competitive prices to fishermen without the benefit of the leverage that processor-owned QS might provide, or need to purchase QS to use in leveraging more deliveries from harvesters).

This section provides figures which show for each alternative the expected distribution of the 20 percent of QS allocated to processors in comparison to recent year and historic deliveries (Figure 4-5, Figure 4-7 and Figure 4-7). Note that because processors receive only 20 percent of the QS, initial allocations for all processors are well below their recent year production levels (Figure 4-5).

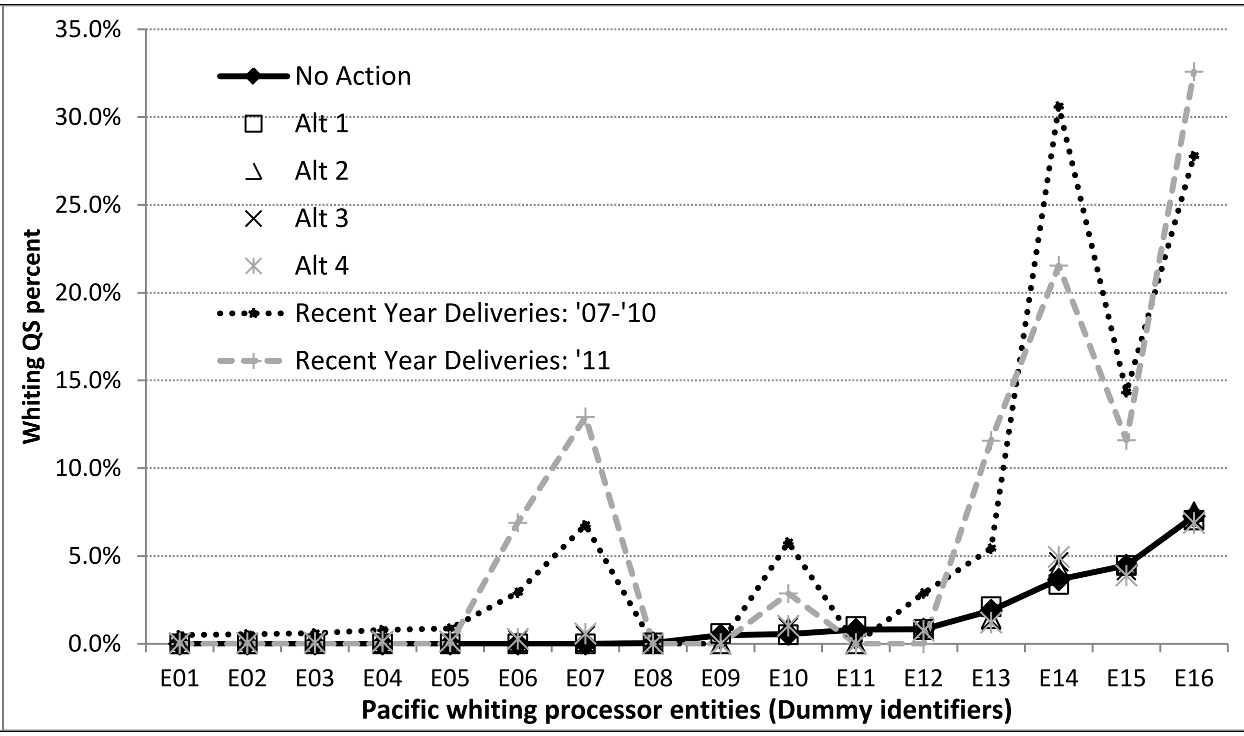


Figure 4-5. Alternatives compared to recent years deliveries to processing companies.

In Figure 4-7 and Figure 4-7 the recent and historic year delivery data are scaled down to 20 percent of actual value in order to provide an easier comparison of the relationship between historical deliveries and each processor's initial allocation. In these figures, a QS allocation equal to 20 percent of a processor's history for a particular period would fall on the history line for that period. An allocation for a processor falling below the history line indicates a processor would be able to cover less than 20 percent of its historical landings with its initial allocation, and an allocation above the history lines indicates a processor would be able to cover more than 20 percent of its landings with QS received at initial issuance. Figure 4-6 shows that under the No Action alternative, four processors (E06, E07, E10, and E14) received allocations that would have covered far less than 20 percent of their 2007-2010 deliveries. Despite the challenges that these low allocations may have created, in 2011 two of the smaller of these processors increased their deliveries to above their 2007-2010 averages (E06 and E07). Another of the processors did not sustain its 2007-2010 share in 2011 but did receive deliveries at a higher level than would be expected if it had to cover 20 percent of deliveries with its own QS (E14). The fourth of these processors (E10) received deliveries in 2011 at a level that it was able to exactly cover 20 percent of its deliveries with the QS received from the initial allocation. Those processors which had participated at relatively low levels or not at all in 2007-2010 (E01 through E05, E08, E09, and E11) did not participate in 2011. Another processor that received a moderate initial allocation, one that was equivalent to more than 20 percent if its 2007-2010 participation level, dropped out (E12).

Alternative 1 would roll back the end of the qualifying period from 2004 to 2003. This one year change appears to make a relatively minor difference in the allocations for most processors, giving a small benefit to some of those receiving lesser allocations (E09, E11, and E13) and reducing the allocations to a few of those receiving larger allocations (E14 and E16). Alternatives 2, 3 and 4 would progressively move the allocations in the favor of those with stronger recent history and away from those with a weaker recent history. The degree of change in going from Alternative 3 to Alternative 4 is not as great among the processors as for permits because for processors there are fewer earlier years (for permits, Alternative 4 drops six years, 1994-1999, and for processors it drops only the two years, 1998 and 1999).

In Figure 4-7 comparisons are provided to historic periods (1998-2003 and 2004-2006). This figure shows that the No Action allocations (based on 1998-2004 history) closely track the 1998-2003 history (as would be expected). The figure also shows that for five out of the six mid-range QS recipients (E09, E10, E11, E13, and E14) the 2004-2006 history deviated substantially from 1998-2003 history. For most of these that shift held into more recent years (as reflected by the data for the same processors in 2007-2010 (Figure 4-6).

Ex-processor prices are not available to provide a sense of the magnitude of the economic impact of changing production levels on processors. However, the QS to be allocated is used to cover vessel deliveries and therefore exvessel prices may provide an indicator of the magnitude of the financial benefit that is provided to processors by the QS they are issued [6]. A range of possible exvessel value per 0.1 percent of the QS is provided in Table 4-5. Export prices might also be used to provide a sense of the economic importance a processor might place on the amounts of QS to be allocated. In 2011, the reported export price per pound of head-and-gut whiting was $0.889. Using a product recovery rate of 0.65 yields a round pound equivalent price of $0.57 per pound. This price applies to the same range of shoreside whiting allocations covered in Table 4-5.

Table 4-11. Export value equivalent for 0.1 percent whiting QS (assuming the 2011 price of $0.57 per pound and a product recovery rate of 0.65) ($).

Shoreside Sector Allocations (mt)	Whiting Export Price per lb 0.58
40,000	51,147
60,000	76,721
80,000	102,294
100,000	127,868

[6] The actual financial value of the QS would depend on the present value of the stream of net revenue in excess of normal profit levels that might be associated with whiting deliveries.

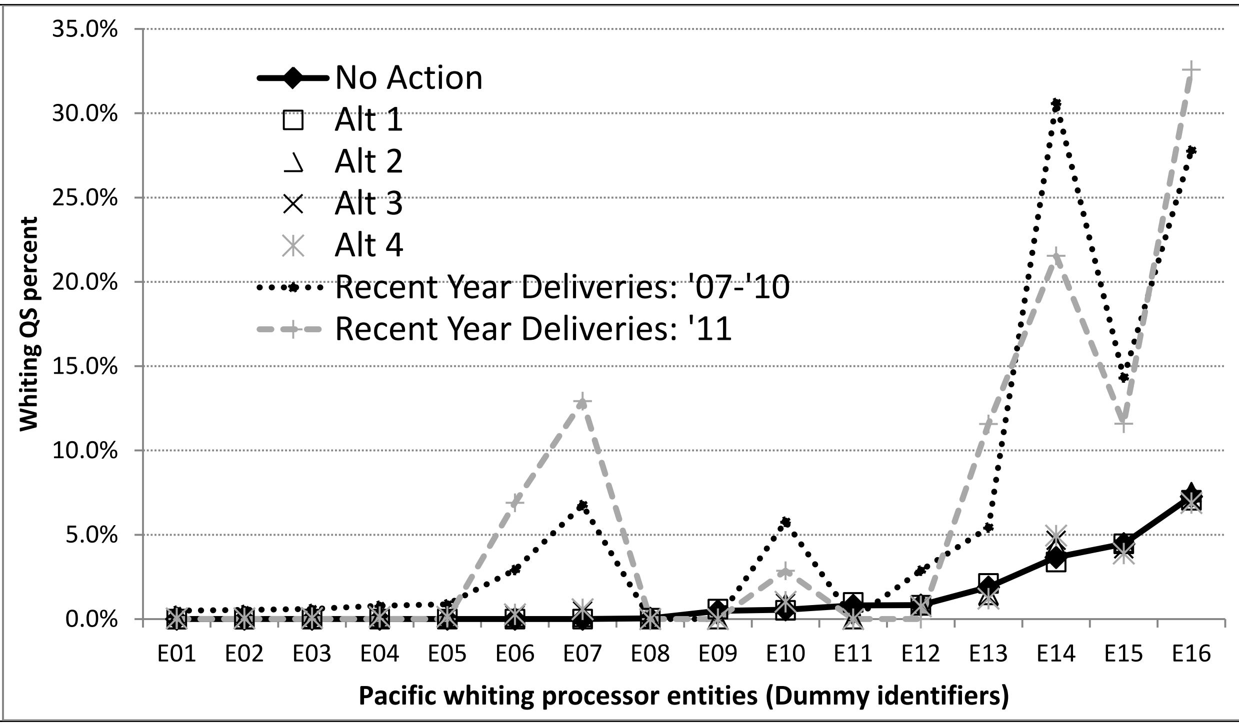


Figure 4-6. Alternative allocations compared to recent years' deliveries (2007-2010 and 2011) to processing companies (deliveries reduced to 20 percent of actual deliveries to provide a scaled comparison with the whiting QS allocated to processors – 20 percent of the total QS was allocated to processors).

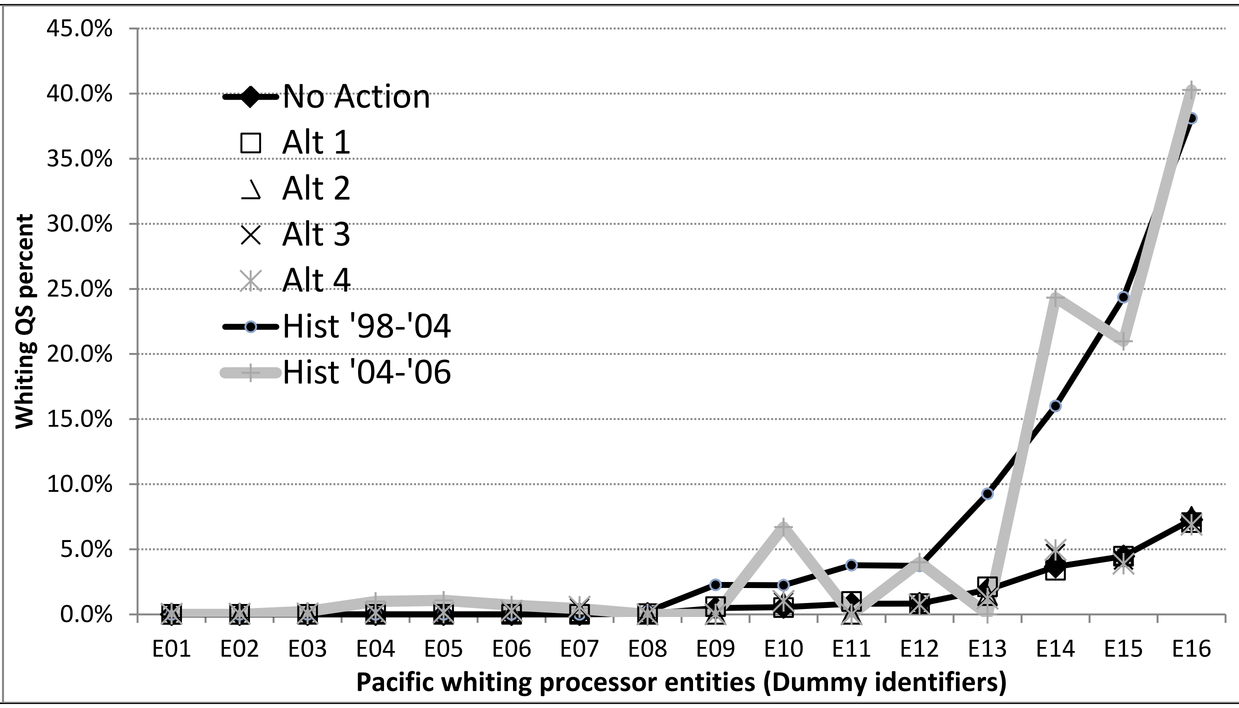


Figure 4-7. Alternative allocations compared to historical deliveries to processing companies (1998-2004 and 2004-2006) (deliveries reduced to 20 percent of actual deliveries to provide a scaled comparison with the whiting QS allocated to processors – 20 percent of the total QS was allocated to processors).

Allocations to Shoreside Processors for Processing and Permit History

Combining QS allocated for permit history along with the QS allocated for processing history shows that only one processor receives a larger whiting allocation as a result of also owning permits (see entity E15 in Figure 4-8 as compared to E-15 Figure 4-6). The overall control limit for whiting QS is 10 percent. When permit and processor allocations are combined, under no alternative would the amount of whiting allocated to a single entity be expected to exceed the control limits.

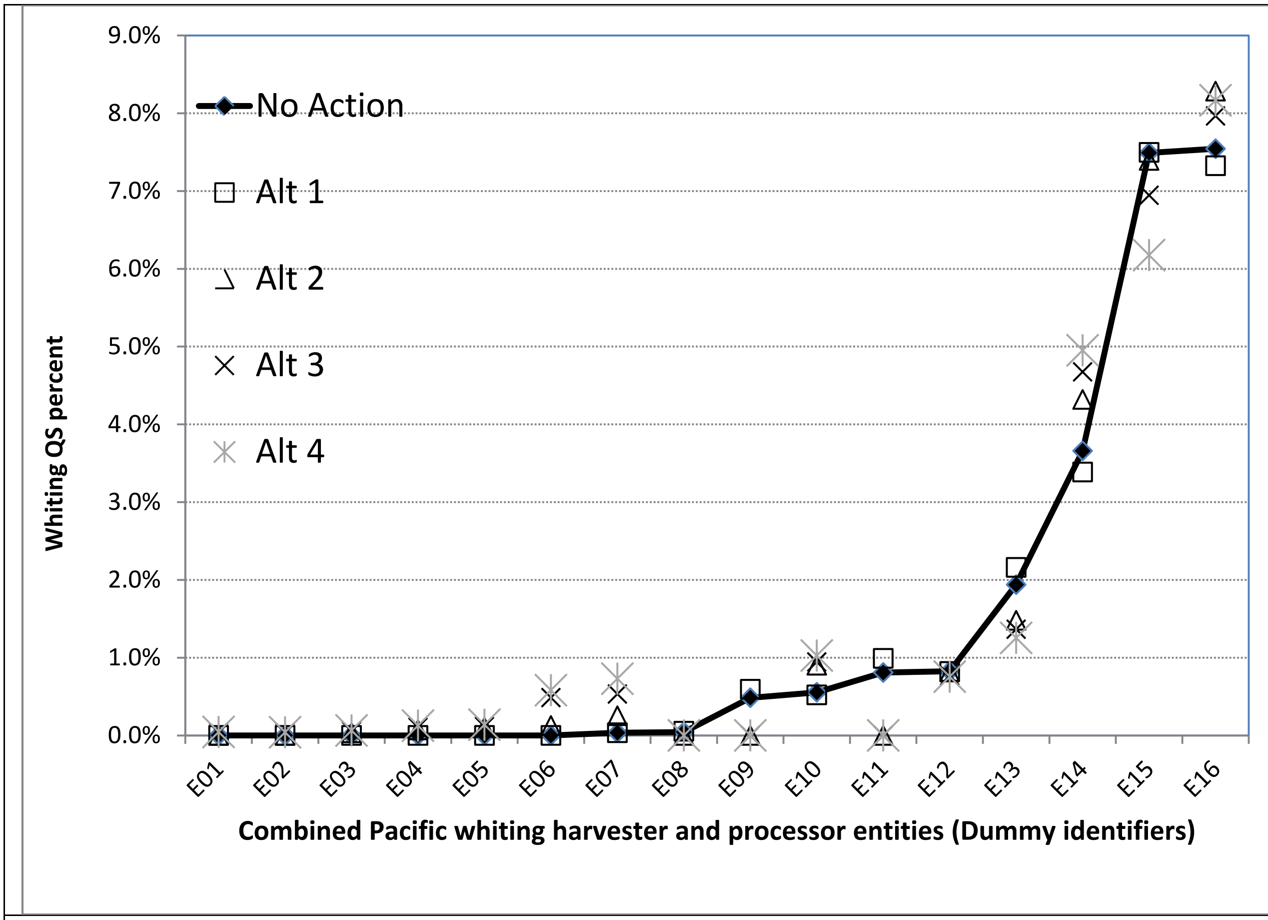


Figure 4-8. Concentration of shoreside whiting QS allocations among processing entities, including allocations of QS to processors owning permits, by alternative (results ordered from lowest to highest for the No Action alternative).

4.3.2.2 Mothership Processors

To the degree that there is an alliance between certain MS/CV permit owners and mothership processors, an increase or decrease in the CHA assignments to the catcher vessel permits may increase or decrease the processing opportunities of allied motherships.

4.3.3 Impacts on Communities

Distribution of the 80 percent of QS to ports based on permit landings history for 2007-2011 is shown in Figure 4-9. Because of consolidation of landings on fewer vessels in 2011 it is difficult to provide a geographic association of QS to ports based on 2011 permit history alone. Based on 2007-2011 landings patterns, the No Action Alternative tends to favor Newport while the alternatives incorporating more recent history tend to favor ports further north, though the exact strength of this trend is difficult to discern with certainty because of permits which were inactive ("Unknown").

The 2011 fishery showed a substantial shift in landings with the share of landings in Astoria increasing substantially while the share of landings in Westport and Newport decreased (Figure 4-10.). Of the 20 percent of the QS allocated to processors just over 30 percent went to Astoria under the No Action alternative, nevertheless processors in Astoria were able to attract over 45 percent of the coastwide landings in 2011(Figure 4-11). In terms of the QS distributed among processors, allocation formulas that emphasize more recent years appear likely to shift allocation toward West Port and Ilwaco and away from Astoria and Newport (Figure 4-11).

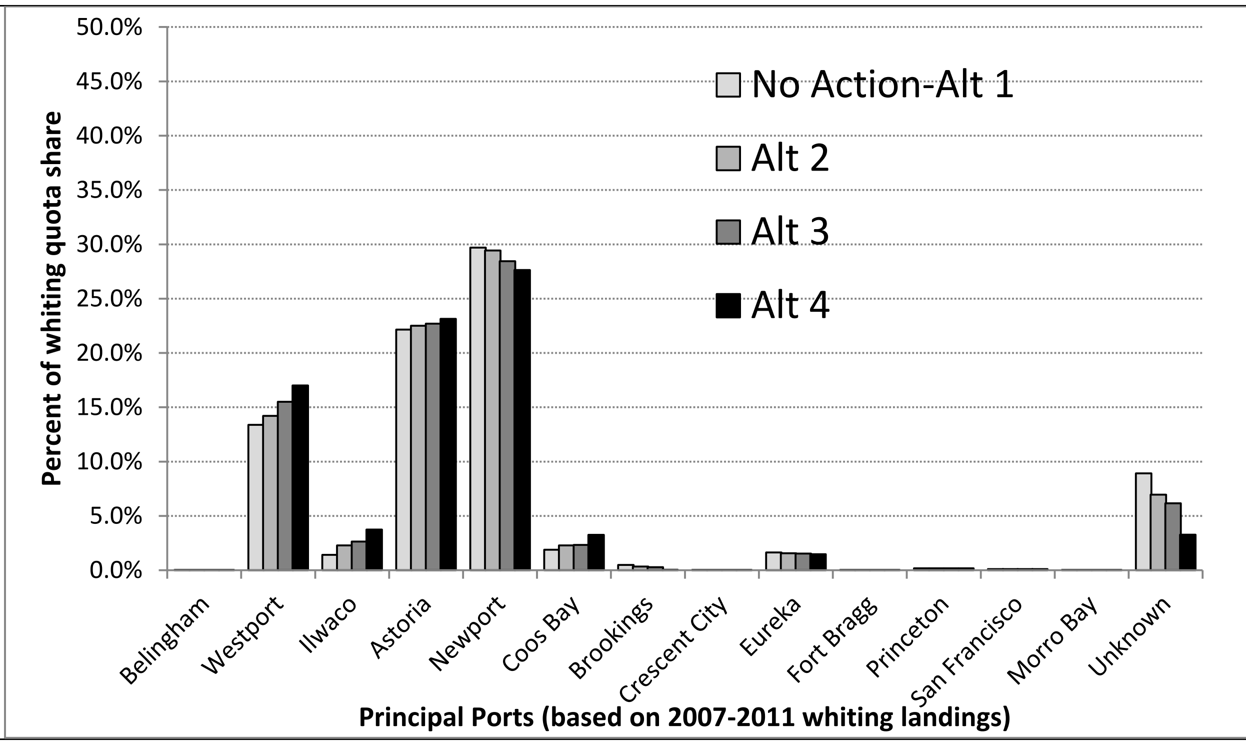


Figure 4-9. Distribution of permits' QS among ports based on principle ports to which permits made deliveries from 2007-2011 (permits not participating during that time are placed in the unknown category).

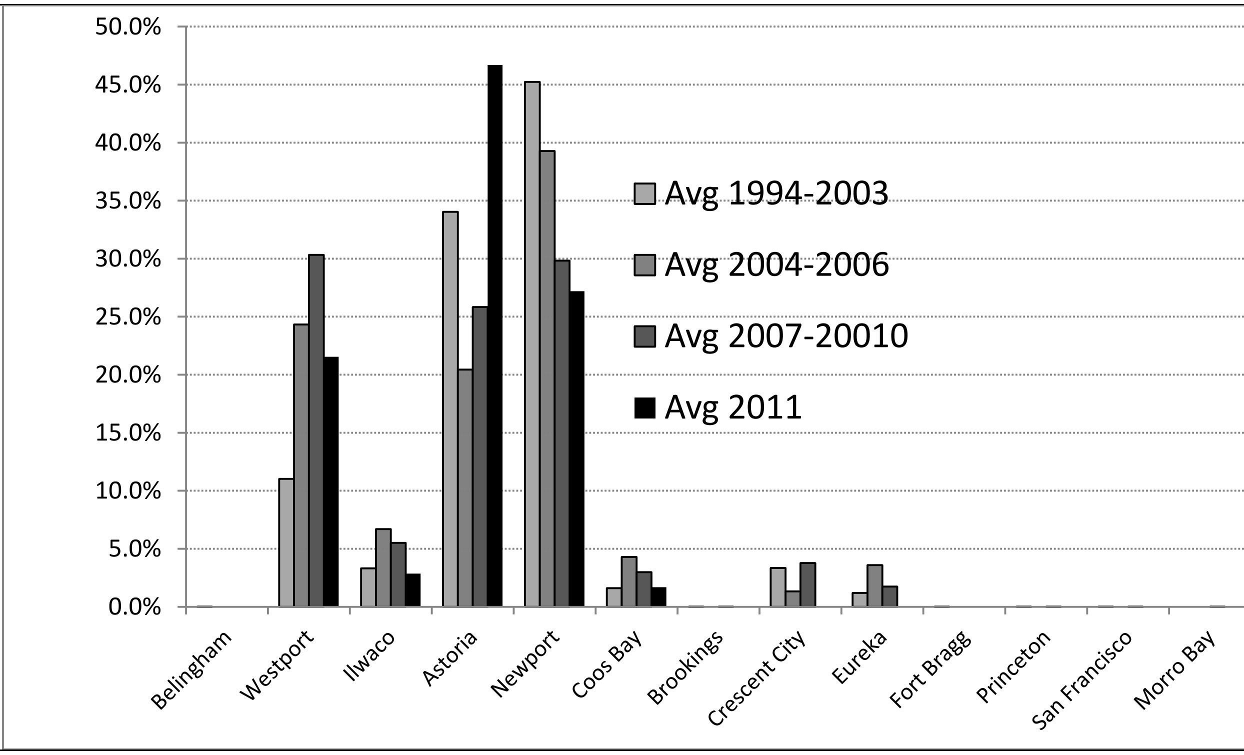


Figure 4-10. Historic distribution of whiting landings among ports.

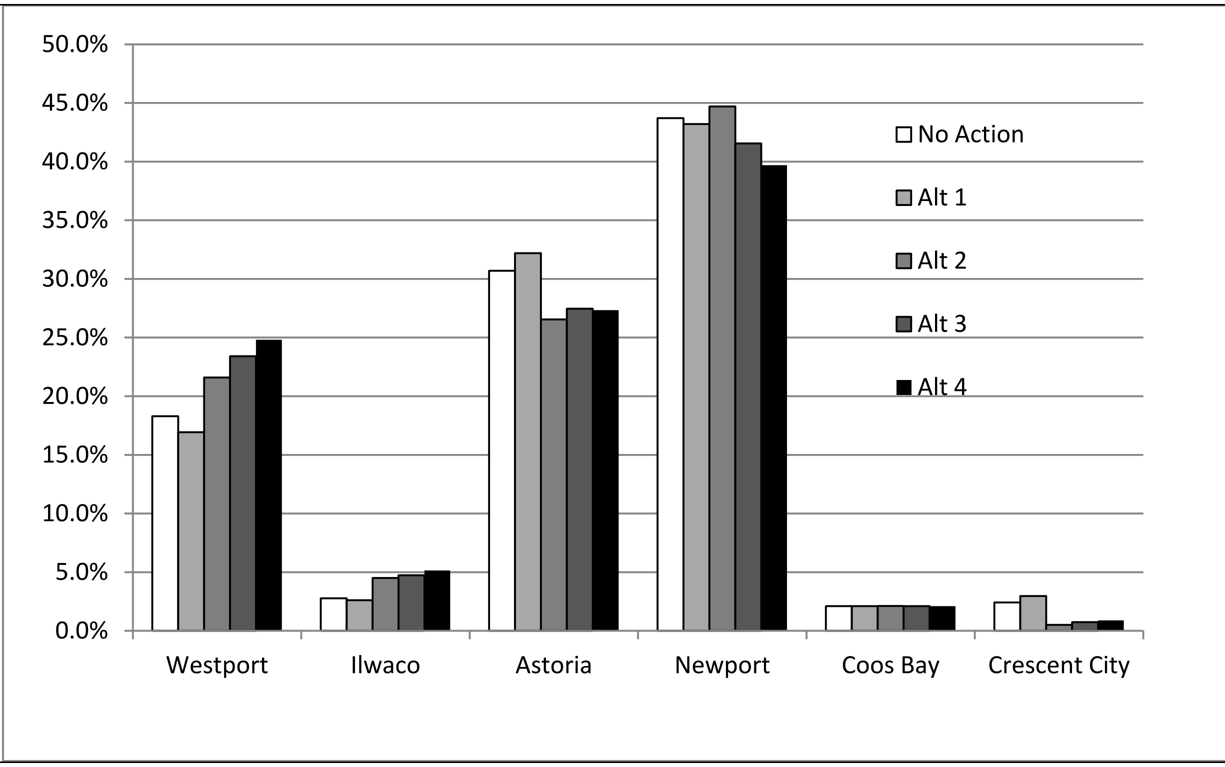


Figure 4-11. Each port's share of the 20 percent of the QS allocated to processors based on the location of processors receiving the shares and the distribution of each processor's 2011 deliveries among ports.

4.3.4 Impacts on Agencies and Public Decision Processes

The cost of reallocating QS has been estimated as the equivalent of the efforts of a single full time employee for three to six months, depending on complexity and extent of changes.

No Action and Alternatives 2, 3 and 4 would not use the control date to establish the end of the allocation period. Alternative 1 would use 2003 as the end of the allocation period. Implications of the choice among the alternatives for the utility of setting control dates in the future are discussed in Section 5.5.

CHAPTER 5 CONSISTENCY WITH THE WEST COAST GROUNDFISH FMP AND MSA NATIONAL STANDARDS AND REQUIREMENTS

"There are literally an infinite number of allocation formulae that are acceptable under the MSA." (NOAA, 2007, p. 71). There are a variety of competing and conflicting criteria against which the allocation formulae must be assessed; in the end, the choice is to select an allocation that is fair and equitable, and that meets the various requirements of the MSA and other applicable law. The management challenge is to select an alternative based on an appropriate balance of these criteria, given the expected performance of the fishery under each allocation alternative. The criteria to be assessed are primarily derived from the MSA, including those contained in the FMP. Those criteria include:

- MSA
- MSA National Standards
- NMFS National Standard Guidelines
- Goals and Objectives of FMP
- Goals and Objectives of Amendment 20 to the FMP (Trawl Rationalization)
- Other Council Statements of Intent.

In this chapter, impacts are summarized by the topic areas covered by these criteria. Many of the requirements of the MSA and National Standard Guidelines are already achieved by the trawl rationalization program as a whole and are not affected by the different alternatives considered here.

5.1 Conservation

The following are some of the main conservation criteria in the MSA that directly pertain to the establishment of a catch shares program.

> SEC. 301. NATIONAL STANDARDS FOR FISHERY CONSERVATION AND MANAGEMENT. (a) . . . . national standards for fishery conservation and management: . . . . (4) If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be . . . (B) reasonably calculated to promote conservation
>
> 303A (c) REQUIREMENTS FOR LIMITED ACCESS PRIVILEGES.— (1) IN GENERAL.— Any limited access privilege program to harvest fish submitted by a Council or approved by the Secretary under this section shall—(A) if established in a fishery that is overfished or subject to a rebuilding plan, assist in its rebuilding;. . . . (C) promote—. . . (ii) fishery conservation and management; . . .

With respect to conservation and management and the allocation of fishing privileges, the National Standard Guidelines state:

> Numerous methods of allocating fishing privileges are considered "conservation and management" measures under 303 of the Magnuson-Stevens Act. An allocation scheme may promote conservation by encouraging a rational, more easily managed use of the resource. Or, it may promote conservation (in the sense of wise use) by optimizing the yield in terms of size, value, market mix, price, or economic or social benefit of the product. (Section 600.325(c)(3)(ii))

The Council's Allocation Framework (Section 6.3.1 of the groundfish FMP) requires that when recommending the direct allocation of resources that the Council consider "Potential biological yield of any species or species complex affected by the allocation."

The trawl rationalization program assists the Council in meeting conservation and management objectives in a number of ways, including:

- providing a greater disincentive for harvest of overfished species.
- providing a disincentive for bycatch waste.
- rationalizing the fishery so it can support the costs of 100% monitoring of catch.
- eliminating the continual erosion of management measures based on input control, which occurs as fishers try to increase harvests by finding ways around the input controls.

Modifying the trawl rationalization program by reallocating QS among vessels and processors is not expected to change total removals; nor alter the gears used, selectivity, harvest areas or targeting strategies. On this basis, a change in allocations would likely not impact on the performance of the management system in meeting conservation objectives.

5.1	Conservation
Effect	No impact on conservation objectives.

5.2 Net Benefits and Efficiency

The following are some of the main economic benefit criteria in the MSA that directly pertain to the establishment of a catch shares program.

> SEC. 301. NATIONAL STANDARDS FOR FISHERY CONSERVATION AND MANAGEMENT. (a) . . . . national standards for fishery conservation and management: . . . . (5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.
>
> 303A (c) REQUIREMENTS FOR LIMITED ACCESS PRIVILEGES.— (1) IN GENERAL.— (B) if established in a fishery that is determined by the Secretary or the Council to have over-capacity, contribute to reducing capacity; . . . . (C) promote— . . . . (iii) social and economic benefits;

The Council's Allocation Framework (Section 6.3.1 of the groundfish FMP) requires that when recommending the direct allocation of resources that the action should achieve at least one of a number of benefits, among which is included: "Increase economic yield."

In addition, the groundfish FMP includes the following related general goals and objectives.

> <u>Goal 2 - Economics</u>. Maximize the value of the groundfish resource as a whole.
> <u>Objective 6</u>. Within the constraints of the conservation goals and objectives of the FMP, attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Similar goals and objectives were included in Amendment 20.

> <u>Goal:</u> Create and implement a capacity rationalization plan that **increases net economic benefits,** creates individual economic stability, provides for full utilization of the trawl sector allocation, considers environmental impacts, and achieves individual accountability of catch and bycatch.
>
> <u>Objectives:</u>
> 2. Provide for a viable, profitable, and efficient groundfish fishery.
> 6. Promote measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry.

The goals related to efficiency, net economic benefits, etc., discussed above will be achieved under any of the alternatives. The expectation is those quota shares allocated to the least efficient harvesters will be traded to those who are able to generate greater profits from the QS. Some alternatives may achieve these goals more quickly than others if, for example, the majority of quota shares are allocated to those who are relatively more efficient as opposed to allocating the majority of quota share to holders who are less efficient. However, given the absence of information on the relative efficiency of harvesters, there is no explicit way to determine which of the alternatives leads to the best long term situation most quickly.

5.2	Net Benefits and Efficiency
Effect	No long-term effect. Information not available to discern differences in short term effects.

5.3 Excessive Shares

The accumulation of control over an excessive proportion of shares in a catch share program can have negative impacts on both net benefits to the nation, and fairness and equity. The following are the MSA criteria on excessive shares that directly pertain to the establishment of a catch shares program.

> SEC. 301. NATIONAL STANDARDS FOR FISHERY CONSERVATION AND MANAGEMENT. (a) . . . . national standards for fishery conservation and management: . . . . (4) . . . . If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocations shall be .... (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.
>
> 303A (c) REQUIREMENTS FOR LIMITED ACCESS PRIVILEGES.— (5) ALLOCATION.—In developing a limited access privilege program to harvest fish a Council or the Secretary shall— . . . . (B) consider the basic cultural and social framework of the fishery, especially through— . . . (ii) procedures to address concerns over excessive geographic or other consolidation in the harvesting or processing sectors of the fishery; . . . (D) ensure that limited access privilege holders do not acquire an excessive share of the total limited access privileges in the program by— (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;

Additionally, Amendment 20 specified as a program constraint in developing the program: “Avoid excessive quota concentration” (Constraint 6).

The Council has accumulation limits for QS and QP to prevent the acquisition of excessive shares in the fishery by any one entity. These limits are likely sufficiently constraining to prevent antitrust violations and achieve other socio-economic goals related to the prevention of excessive concentration. After the initial allocation any individuals receiving QS in excess of the accumulation limits for QS are required to divest themselves of that QS by the end of calendar year 2014. The alternatives considered here would not change the accumulation limits but could result in greater or lesser degrees of QS concentration of, including the possibility of affecting initial allocations in excess of the accumulation limits. Any change in the amount allocated to a single entity in excess of the accumulation limits would be a short-term effect owing to the requirement for divestiture down to limits by the end of 2014. The impact is essentially the selling off of excessive shares from one entity to another. The impacts below indicate the number of entities and amount of quota that may have to be divested.

Effect	A short term impact may result if there is a change in the amount of quota held in excess of the accumulation limits (divesture down to the limits is required by 12/31/2014).				
Metric	Amount of quota allocated in excess of accumulation limits and number of entities holding amounts in excess (Number of entities effected.)				
	Alternatives				
	No Action	1: 2003	2: 2007	3: 2010	4: More Recent
Catcher Vessel Permits – Shoreside History	None of the alternatives would allocate amounts In excess of QS control limits. (See Sections on Accumulation Limits in Sections 4.3.1.1, 4.3.1.2, and 4.3.2.1				
Whiting Processors – Shoreside History					
Catcher Vessel Permits – Mothership History					

5.4 Fairness and Equity

Evaluation of the fairness and equity involves weighing numerous countervailing criteria. Deriving measures for these factors and their relative importance is very difficult. Unlike the economic criterion of "efficiency," for which there are standard, generally agreed upon, quantitative measures that can be objectively evaluated, there is little consensus regarding choice of criteria for evaluating fairness and equity, and even less agreement on yardsticks for measuring those criteria. The fairness and equity issue concerns decisions determining who is allocated a valuable asset (QS and mothership sector history) versus who must, like all other future entrants, purchase their allocations in order to participate. Those receiving initial allocations may be placed at a competitive advantage over new entrants or existing participants who must purchase more QS if they desire to maintain their recent harvest levels.

The following contain the primary legal and policy guidance on fairness and equity.

The National Standards of MSA address fairness and equity issues:

> SEC. 301. NATIONAL STANDARDS FOR FISHERY CONSERVATION AND MANAGEMENT. (a) . . . . national standards for fishery conservation and management: . . . **(4)** Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocations shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Items (B) and (C) of this national standard are addressed in Sections 5.1 and 5.3, respectively. The remaining criteria of this standard are addressed in this section.

The guidelines for National Standard 4 on fairness and equity state that

> An allocation of fishing privileges should be rationally connected to the achievement of OY or with the furtherance of legitimate FMP objectives. Inherent in an allocation is the

> advantaging of one group to the detriment of another. The motive for making a particular allocation should be justified in terms of the objectives of the FMP; otherwise, the disadvantaged user groups would suffer without cause. (600.325(c)(3)(i)(A)).

This chapter shows how each of the alternatives relates to the goals and objectives of the FMP. In this section, issues related to fairness and equity are discussed directly.

There is also an MSA requirement for the consideration of fairness and equity in the development of any limited access programs, which includes LAPPs such as the trawl rationalization program.

> 303 (b) DISCRETIONARY PROVISIONS.—Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, may—. . . (6) establish a limited access system for the fishery in order to achieve optimum yield if, in developing such system, the Council and the Secretary take into account— (A) present participation in the fishery; (B)historical fishing practices in, and dependence on, the fishery; (C) the economics of the fishery; (D) the capability of fishing vessels used in the fishery to engage in other fisheries; (E) the cultural and social framework relevant to the fishery and any affected fishing communities; **(F) the fair and equitable distribution of access privileges in the fishery;** and (G) any other relevant considerations.

With respect to LAPP programs in particular, Section 303A of the MSA provides additional more specific guidance on factors to be considered to ensure that allocations are fair and equitable:

> (c)(5) ALLOCATION.—In developing a limited access privilege program to harvest fish a Council or the Secretary shall—
>
> (A) establish procedures to ensure fair and equitable initial allocations, including consideration of—
>
> (i) current and historical harvests;
> (ii) employment in the harvesting and processing sectors;
> (iii) investments in, and dependence upon, the fishery; and
> (iv) the current and historical participation of fishing communities;

Both of these sections include concepts such as harvests, participation, dependence, and current and historical activities as part of fairness and equity considerations. Other parts of the MSA (303 (b) in particular) also mention some of these concepts as considerations to be taken into account, without specifically linking them to fairness and equity.

Additionally, Section 303A includes the concept of participation specifically in the context of allocation.

> (c)(5) ALLOCATION.—In developing a limited access privilege program to harvest fish a Council or the Secretary shall— (E) authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially

> participate in the fishery, including in specific sector of such fishery, as specified by the Council.

The objectives of the groundfish FMP re-enforce the importance of equity in the development of management measures:

> Objective 12. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

And, Amendment 20 contains some further guidance in the form of a constraint on action related to fairness and equity: "Avoid provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors" (Constraint 5).

5.4.1 Allocations and Imposition of Hardships

Guidelines for National Standard 4 state:

> An allocation may impose a hardship on one group if it is outweighed by the total benefit received by another group or groups. An allocation need not preserve the status quo in the fishery to qualify as "**fair and equitable,"** if a restructuring of fishing privileges would maximize overall benefits. The Council should make an initial estimate of the relative benefits and hardships imposed by the allocation, and compare its consequences with those of alternative allocation schemes, including the status quo. (Section **600.325**(c)(3)(i)(B))

The analysis provided in Section 5.2 indicates that there is no substantial difference between the alternatives with respect to the expected generation of net benefits. At the same time, the program as a whole is generating substantial conservation and economic benefits for the nation (Council, 2010), and some initial allocation must be in place in order to continue to achieve those benefits. As described in Section 600.325(c)(3)(i)(B) of the guidelines "Inherent in an allocation is the advantaging of one group to the detriment of another." Regardless of which alternative is selected there will be some group that is advantaged over another. Those who are advantaged and disadvantaged by the alternatives are described in Chapter 4. Overall, the benefits of the program are sufficient to justify an allocation that may impose relative hardships on certain participants.

5.4.1	Allocations and Imposition of Hardships
Effect	All alternatives would be part of a program that generates sufficient benefits to warrant the imposition of unavoidable hardships on one group over another in order to achieve the greater overall benefit.

5.4.2 Investment and Dependence

5.4.2.1 Policy Guidance

In the development of LAPP programs, the MSA relates investment and dependence to fairness and equity (303A(c)(5)(A)(iii), see page 46). With respect to investment and dependence and the development of limited access systems (of which a LAPP is a type) the MSA requires that the Council take into account historical fishing practices in, and dependence on, the fishery as well as the capability of fishing vessels used in the fishery to engage in other fisheries 303(b)(6)(B)&(D) , see page 46). The NOAA LAPP guidelines (NOAA, 2007) include among the attributes that may be used in allocation formulas:

> various measures of dependence on the fishery including percent of revenue or opportunities to participate in other fisheries, and inter-relations with other fishery related business especially with respect to employment. (p. 62)

Prior to the most recent reauthorization of the MSA, formal allocations to fishing communities (FCs) and participation by regional fishing associations (RFAs) were not covered in the MSA. NOAA LAPP guidelines begin to address the allocation complexities potentially created by adding FCs and RFAs into the mix of participants by first outlining the factors considered in initial allocations. The following discussion from the NOAA LAPP guidelines addresses issues related to investment and dependence and relates them to disruption.

> Given the laws and accepted views on who were potential recipients, historically the main concern was to set up an allocation that would change the fishery from the *status quo* to an IFQ fishery with a *minimum disruption of the current distribution* between the recipients. When that was the goal, the question became what sorts of things could be used to quantitatively compare allocations among the potential recipients? Looking at participation characteristics was a good way to do this. *Catch histories are a way to compare the relative success of various participants. Comparing the financial investments shows, albeit imperfectly, relative commitments to a fishery*, and at the same time, relative differences in amounts that will have to be earned to support the capital equipment. It is interesting to note that the two measures will provide different rankings. A smaller older boat operated by a high-liner could have a very good catch record but could be way low on the financial investment ladder. Which measure is best? That is a judgment call. At the same time, others may not like either of these measures and would argue for years of participation. Finally, others would suggest that the notion of maintaining the existing distribution is not appropriate and would argue for an equal distribution. The allocation formulae actually used in U.S IFQ programs were usually based on more than one of these measures. (emphasis added, NOAA, 2007, pp. 63-64)

This discussion indicates that consideration of investment and dependence is a way to minimize disruption, but that the balance of emphasis between investment and dependence is a judgment call. While not explicitly evaluating amounts of financial investment, the allocation formulas take financial investments and related dependence into account as described below. After describing in general how investment and dependence are taken into account, the analysis will assess how the alternatives may vary in terms of the weight placed on dependence and investment.

5.4.2.2 Relation of Rationalization Program Provisions to Policy

Harvesters: Allocation to Vessel Limited Entry Permits. In the analysis of the decision to allocate QS to harvesters on the basis of permits (rather than allocating on the basis of vessels or other types of investments in harvesting) it was noted that "limited entry permits are highly specific assets, the value of which is likely to decline substantially with the implementation of an IFQ program" (Council FEIS, 2010, p. A-74). Because permits can only have value when used in the limited entry groundfish fishery, the owners of the permits are entirely dependent on that fishery for recovery of their investment. Other harvesting capital assets, such as vessels, usually have some degree of mobility and alternative uses in other fisheries, though in worst case scenarios that alternative use might be only for scrap metal. The decision to allocate shoreside QS and mothership catch history assignments to permit owners emphasizes the specificity of these investments and their dependence on the fishery. The equal allocation component of the shoreside QS allocation formula ensures some protection of that investment in that current ownership of the permit alone (without regard to its level of participation) will be sufficient to garner a substantial portion of the allocation based on the equal sharing of the buyback history (43% of the nonwhiting QS and 7% of the whiting QS is shared equally among all permits), regardless of the level of fishing activity associated with the permit.[7]

Under all alternatives considered here, the decision to allocate to harvesters based on permit ownership and the amount of QS equally divided among permit owners would remain unchanged. The portion of the allocation made to permits based on their landing history varies by the alternatives being considered and is discussed below.

For catcher vessel permits in the mothership fishery, a threshold amount of participation in the fishery is required in order for the permit to qualify for an initial allocation. The assignment under status quo of catch history for mothership permits requires that a permit qualifying for a mothership endorsement must have at least 500 mt of deliveries to motherships during the 1994-2003 allocation period (see discussion Section 2.1). If the endorsement requirement is modified to match the new allocation periods, some permits with pre-2004 catch history that did not meet the threshold might acquire an endorsement and allocation under the alternative allocation period. Conversely, some permits that received an allocation under status quo may not meet the qualifying threshold if some of the earlier years of the allocation period were eliminated (Alternative 4). This change would further increase the emphasis on more recent years of harvest.

Processors: Allocation to Buyers as Recorded on Fish Tickets. The decision to allocate 20% of whiting QS to processors relates to processors' dependence and investment. For the whiting fishery, there was concern that the switch from the derby fishery to the IFQ program would substantially reduce peak processing demand, thereby resulting in some processing capacity

[7] Permits that participate primarily or only in the at-sea whiting fishery also receive a portion of the shoreside equal allocation of QS, providing value to the permit owner which may be sold or traded to acquire allocations in the sector in which it participates.

becoming redundant (Council FEIS, 2010, p. 58). The surplus capacity might then threaten the revenue stream on which processors depend to recover their investment. Lengthening the season would result in some capacity being used more intensely and other capacity being completely unemployed. The effects on investment recovery would depend on the distribution of landings among processors and whether or not all processors were able to maintain enough product flow to recover their investment over the long term. The allocation to processors was intended to increase the probability that whiting processors would be able to maintain some product flow and ability to recover their investment in whiting-specific plants and equipment.

For the nonwhiting fishery, the Council found that while processors are dependent on and invested in the fishery, that dependence and the security of their investments were not contingent on receiving an initial allocation of quota. Prior to IFQs, management of the nonwhiting groundfish fishery was under bimonthly cumulative limits which effectively distributed the harvest of nonwhiting species throughout the year. Therefore there was not the kind of overinvestment in processing equipment to meet peak demand as occurred in the whiting fishery, and hence not the same concern about stranded processing capacity in the nonwhiting fishery. Another reason for allocating QS to processors in the whiting fishery but not the nonwhiting fishery was the difference in the expected balance of market power between these two fisheries. There are substantially fewer harvesters in the whiting fishery than in the non-whiting fishery, therefore it was anticipated that an initial allocation of QS solely to whiting harvesters might be more disruptive of the balance of market power between processors and harvesters than would be the case in the nonwhiting fishery. [8] A 20% allocation of whiting QS to processors was believed to be appropriate to address the issues of surplus investment in the processing sector and the market power concerns. Under all alternatives considered here, the decision to allocate 20 percent to processors based on receiving history (with recognition for successors in interest) would remain unchanged.

Criteria for evaluating investment and dependence of specific processors are more difficult to construct than for harvesters. The first challenge is simply identifying the entity which should qualify. There is no limited entry permit requirement for processors and there may be multiple parties with interest in the processing assets (e.g. the owner of the land and buildings used by the processing company may differ from the owner of the processing company). The Council decided that the entity listed as the buyer on state fish tickets should receive the initial allocations, as opposed to, for example, the entity that actually owns the processing facility land and buildings (in many cases this belongs to the Port). The specific criteria used for attributing history to processors are discussed below in the section “Investment and Dependence of Recent Entrants - Processors.”

Length of Allocation Period and Level of Participation. One indicator of the degree to which a fishing operation is dependent on a particular fishery is its level of participation on a continuing basis. Fishing operations that participate sporadically and/or at low levels are likely to be less dependent on the fishery than ones participating at higher levels over long periods. Moreover, major investments are generally made and based on long term participation levels rather than temporary fluctuations that occur over the course of a few years. Therefore counting

[8] The issue of stranded capital is one of compensating for loss, whereas the balance-of-power issue takes into account fishery dependence and affects the security of investment going forward into the future.

participation over a longer allocation period may tend to provide a better, albeit imperfect, measure of dependence than does focusing on shorter allocation periods.[9] However, a long allocation period does not address the investment and dependence that may be established by entities entering toward the end or after the allocation period but prior to initial allocation. As the number of years between the end of the allocation period and implementation of the initial allocation increases, the degree to which the allocation period alone gives weight to current participation and harvests diminishes (as discussed above there are other program provisions that also address current participation).

Investment and Dependence of Recent Entrants - Harvesters. Longer allocation periods may fail to measure dependence for fishing operations that have very recently invested in and entered the fishery. For harvesters this situation is compensated for by allocating to current participants who have purchased trawl permits, and thereby made a highly specific investment in the groundfish fishery. As discussed above, just by virtue of owning a permit harvesters received an equal share of a significant portion of the total QS allocated: roughly 43% of nonwhiting groundfish QS and 7% of whiting QS. The equal share allocation provided substantial value to all who had invested in a permit, regardless of the participation of the permit owner or the landings history underlying the permit. Thus, even though the equally-divided portion of whiting QS was relatively small, permits that participated primarily in the whiting fishery also received a substantial allocation of nonwhiting species QS. Equally-allocated QS provided substantial value to all participants which, once QS trading starts, can be used to tailor QS portfolios for their particular operations.

The remainder of the QS was allocated based on permit landings history. Using permit history as the basis for the allocations, rather than a fisherman's or a vessel's history, provided a second means by which the investments of recent entrants was taken into account. The requirement to hold a limited entry permit means that any new entrant must displace an existing participant. This creates a chain of events by which a recent entrant in the fishery can be linked back to the history of the entity it displaces, and the new entrant is given credit for the historical landings of the displaced entity. This treatment places some weight on investment and dependence by an operation recently entering the fishery just before or after the end of the allocation period.

Finally, the Council's precedent of allocating quota based on permit history (e.g., the fixed gear sablefish program, Council, 1996) and the allocation options developed early on in the Amendment 20 process which were based on permit history (Council, 2010), resulted in permit prices in the years leading up to the implementation of the program being affected by permits' landings histories. Thus, following through with the allocation to permits based on permit landings history also took some account of the issue of investment and dependence of current participants in the fishery (including recent entrants) up through the time the initial allocation process started in mid-2010.

The formula used for assigning catch history to vessel permits in the mothership sector is similar to the one used in the shoreside fisheries except that there was no equal allocation element for the mothership sector catch history assignments. However owners of catcher vessel permits

[9] The drop year provision (e.g., drop two or three worst years) was intended to take into account operations which due to mechanical or personal difficulties may have had low levels of participation for a period of time.

participating in the mothership sector did also receive an allocation of the portion of shoreside fisheries QS that was equally divided among all permits. Thus although a permit entering the mothership sector toward the end or after the allocation period did not receive a minimum allocation in the mothership fishery (e.g., an equally-shared portion of the mothership sector catch history), the permit did receive some compensation in the form of an allocation of the equally-shared portion of shoreside QS.

Another way to account for more recent entry (current harvest) is to allocate based on periods that include years very close to the year the initial allocation is made. However, even including in the allocation period the year immediately prior to when the allocation occurred could potentially place little emphasis on recent investment and dependence without the existence of other provisions which take into account recent investments. For example, if there were not also the opportunity to acquire credit for earlier years of harvest through acquisition of an existing permit, a harvester entering in the last year of the allocation period would receive credit for only one out of the many years of the allocation period.. Nevertheless, including more recent years of harvest history would tend to help scale the allocations toward the level of harvest of a more recent entrant (whether that level is greater or lesser than that of the harvester the new entrant displaced).

Investment and Dependence of Recent Entrants - Processors. For processors it is more difficult to take into account investments and dependence established just before the end or after the allocation period. In contrast to harvesters, the entry of one processor is not necessarily linked to the exit of another. There is also no key asset, such as a limited entry permit, whereby one processor can be traced to its predecessor, and hence there is no consistent way to link a current processor to its predecessors' histories. Furthermore, it is difficult to identify a specific act which marks the investment of a new processor in a particular fishery, since so many of a processor's assets may serve multiple purposes. The only consistent and definitive signal for entry of a processor into the groundfish fishery is the purchase of groundfish as documented on landings receipts or state fish tickets. Despite these challenges, Council policy included a provision for recognizing a "successor in interest" for processing businesses in cases where successorship could be clearly identified (note: this only occurred in one instance).

The absence of a requirement for new entrants to displace existing participants and the limited cases in which successorship allocation rules applied set up a situation in which use of the same allocation history period for processors and harvesters had a differential effect with respect to the weight the allocational approach places on current investment and dependence.[10] For harvesters, allocations went to current participants at the time the allocation was made (as defined by permit ownership). For processors, a processing company which had exited the whiting fishery (not received whiting since the allocation period) would still receive an allocation while a company which began receiving and processing whiting after the end of the allocation period would not

[10] Amendment 6 (license limitation) provides an example of another way in which investments made just prior to the end of an allocation period have been taken into account. Under Amendment 6, vessels were given a permit based on landing history. Investments made prior to the end of the qualification period which were not yet operational were given an opportunity to "prove-up" via a provisional permit system. For example, if an individual had recently laid a keel they could qualify for a permit by finishing vessel construction within a certain time frame and then meeting certain minimum participation requirements over a number of years.

receive any allocation. Therefore, as the time between the allocation period and initial allocation increases, a greater disjunct between initial allocation recipients and current participation is created for processors than is created for harvesters.[11]

The decision to provide an allocation to processors potentially creates a competitive differential between processors, such that those who receive an initial allocation will be at a competitive advantage over those which do not receive an initial allocation. Those who entered after the allocation period but prior to the initial allocation will be on par competitively with entities which seek to enter as processors after the initial allocations are completed.

5.4.2.3 Analysis of Effects of Alternatives

As discussed above, the alternative allocation formulas for harvesters take into account dependence and investment by crediting permit ownership and historical landings, while the formulas for processors takes dependence and investment into account almost solely[12] by including purchase history criteria throughout the allocation period. The action alternatives vary in the number and recency of the years included in the allocation formulas.

Relationship Between Dependence and Inclusion of More Recent Years' Harvest. Given an allocation based on participation levels and a period of sufficient length to demonstrate reliance on the fishery, the more recent the years of harvest included in the allocation formula, the more likely it is that allocations will reflect current dependence on the fishery. Elimination of earlier years in the allocation period (Alternative 4) increases the influence of more recent years history on the initial allocations.

Inclusion of more recent years' landings in the allocation formula would have a greater differential effect on the initial allocations for processors than for harvesters. As described in the introduction to this section, for harvesters, recent entry and related dependence and investment is accommodated by linking the initial allocation to permit ownership, while for processors entry just prior to the end or after the allocation history period is accommodated only in situations where there is a clear successor in interest, i.e., when a newly entering processor purchased and replaced an existing facility operated by a prior owner. Thus, allocation periods that include more recent years would have a greater effect in aligning the allocation with current investment and dependence for processors than would be the case for vessels.

The following table displays the allocation formula alternatives in order of increasing weight placed on current or recent levels of investment and dependence:

[11] For processors, the situation is more akin to that which occurred with the sablefish and halibut IFQ program in Alaska. In that program, allocations were given to the entities that owned the vessels at the time of harvest. As the time between the allocation period and implementation of the program increased the relevance of the allocation period to current participation decreased. Since the allocation period was the primary way that current participation was taken into account, this raised questions as to whether the program had adequately accounted for current participation.

[12] The exception being the single instance in which a processing company qualified for delivery history through the successor-in-interest provision.

Alternatives ordered from least to most emphasis on current investment and dependence.

Initial Allocation Group	Years Used for Allocation Formula				
	Alt 1: 2003	No Action	Alt 2: 2007	Alt 3: 2010	Alt 4: More Recent
Shoreside Harvesters	1994-2003	1994-2003	1994-2007	1994-2010	2000-2010
Shoreside Whiting Processors	1998-2003	1998-2004	1998-2007	1998-2010	2000-2010
Mothership Catcher Vessels	1994-2003	1994-2003	1994-2007	1994-2010	2000-2010

Actual Effect – Projected Alternative Allocations in Comparison to Levels of Investment and Dependence. Effects under the allocation alternatives are analyzed by comparing resulting allocations against participation and dependence in comparison period (percent of revenue or purchases from West Coast groundfish trawl fisheries. These comparisons are provided for harvesters and processors in Chapter 4. INSERT SUMMARY OF RESULTS HERE.

The threshold level of involvement in the fishery required to qualify for an assignment of mothership sector catch history (qualify for an endorsement) is 500 mt. That threshold has been applied to each of the allocation periods. Under status quo and Alternative 1, the same number of permits qualify for initial allocations in the mothership sector. Under Alternative 2, two additional permits qualify for a total of 0.6% of the allocation, thereby reducing the QS allocated to the other permits by 0.6%. Similarly under Alternative 3, the same two permits qualify for a total of 1.3% of the allocation, again reducing the allocation to the other permits accordingly. Under Alternative 4, permits that only have earlier history are eliminated, reducing the total number of permits receiving an allocation by 10 compared with No Action and by 11 compared with Alternative 3. The permits eliminated under Alternative 4 qualified for 5.2% of the allocation under No Action and 3.0% under Alternative 3, thereby increasing the allocation to the remaining permits under Alternative 4 accordingly.

5.4.3 Harvests and Participants – Current and Historic

Policy Guidance

The MSA provides the following direction regarding considering current and historical participation and harvests when developing a limited access program, including limited access privilege programs.

> **[**Any FMP may] establish a limited access system for the fishery in order to achieve optimum yield if, in developing such a system, the Council and the Secretary take into account—
> (A) present participation in the fishery;
> (B) historical fishing practices in, and dependence on, the fishery;
> (MSA Section 303(b)(6))
>
> (c)(5) ALLOCATION.—In developing a limited access privilege program to harvest fish a Council or the Secretary shall—
> (A) **establish procedures to ensure fair and equitable initial allocations, including consideration of—**
> **(i) current and historical harvests;**

(iv) the current and historical participation of fishing communities;

(E) authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially participate in the fishery, including in specific sector of such fishery, as specified by the Council.

(MSA Section 303A)

Relation of Rationalization Program Provisions to Policy

In subsections below, current and historic harvests and participation are considered separately. Subsequent to considerations of current and historic harvests, a determination must be made as to the manner and degree of emphasis that each will be given in the approach to allocation. The following excerpt from the Amendment 20 EIS discusses the consideration of current and historic participation, the trade-offs between the two, and mitigating provisions of the shoreside IFQ program.

> This section [of the Amendment 20 EIS] will focus on the relevance of history during the allocation period to the current needs of participants in the fishery and customary standards for establishing resource allocations. To the degree that the QS allocation deviates from the current needs of participants, there is likely to be more disruption, which may also affect the distribution of job opportunities on vessels and possibly the distribution of activity among communities. Greater disruption decreases the likelihood that the allocation will be considered fair and equitable. At the same time, longtime participants in the fishery may view it as appropriately fair and equitable that they should receive recognition for the seniority of their participation and thus claim the privilege to use the resource. Seniority of use is often a factor considered in deliberation over who should have claim to future use of a resource (e.g., issues of “beneficial use” and “first-in-time” related to how surface and ground water use rights are assigned) (NRC 1999). Additionally, the MSA requires consideration of both current and historic harvests in determining the initial allocation of QS (MSA 303A(c)(5)(A)(i) and (iv).
>
> Longer allocation periods take more account of seniority and reduce the need for consideration of hardship provisions. At the same time, use of a longer allocation period implies reliance on long-term averages. If there has been a trend in the change from the start to the end of the allocation period, then the average will not reflect recent conditions in the fishery as well as would a shorter period of more recent years. Additionally, in a changing fishery, the amount of change that the initial allocation will induce will increase as the time between the allocation period and the actual allocation increases. Certain features of the IFQ program will mitigate some of these concerns. They include dropping worst years to address hardship (Section A-2.1.3.a, “Drop Years Provision”), using relative history to address changing fishery conditions across time (Section A-2.1.3.a, Relative History”), and the attribution of landing history to a permit to facilitate entry and exit and reduce the disruption that might otherwise occur through the initial allocation (Section A-2.1.1.b).
>
> Longer allocation periods help to address hardships. Temporary circumstances may interfere with a particular vessel’s operations such that its harvests over a certain period

do not reflect its level of investment and dependence on the fishery. There are number of ways to deal with such hardship circumstances. One is to provide hardship exceptions and an appeals process, another is to allow vessels to drop their worst years, and a third is to provide a longer period of time over which level of involvement and dependence is determined. The Council's [F]PA relies on a combination of the latter two mechanisms (the opportunity to drop worst performance years and a long period across which to demonstrate performance).

In the context of a longer allocation period, relative history helps adjust for the variation in fishing opportunity among years. When a longer allocation period is used, it is more likely that it will encompass changes in the fishery such that conditions at the end of the period may vary substantially from those at the start as well as from the average over the period. The use of "relative history" is intended to adjust for changes in the fleet harvest opportunity by measuring each year's landing history for a permit as a percent or share of the total for the fleet rather than in pounds caught (also termed "catch over catch"). This compensates for changing opportunity across time but does not address changes in participants.

The long allocation period and associating the allocation with the permit provides for "seniority" of use, while at the same time new entrants receive an allocation that helps protect their more recent investment. By attributing and accruing landing history to a permit, those who have made investments to enter the fishery more recently do not necessarily lose out to those who made their investments earlier in time. This also allows longtime participants to receive more value for the business that they have built, if they choose to leave the fishery before a privilege system such as IFQs has been developed.

A shorter allocation period would provide less credit for seniority in use while still allocating to those who have invested more recently, according to their level of participation. A shorter period would potentially raise more issues of hardship by making it more difficult to allow an entity to drop enough years to cover hardship issues. Some may experience no hardships during the allocation period while others may have circumstances that affect production for a number of years. Allowing permits to drop any more than their one worst year from a four year allocation period would substantially dampen the amount of QS received by those with a consistent participation history (evening out the allocation). On the other hand dropping the worst 2 or 3 years from an 11-year allocation period can be done with much less impact on the allocation to those with consistent participation. (Council 2010, pp. A-150 – A-151).

5.4.3.1 Current Harvest and Current Community Participation

Policy Guidance

Current harvest level is one of several participation criteria which must be considered and may be used in the initial allocation of quota shares. Other participation-related criteria that must be considered include historic harvests, employment, and investment and dependence (MSA Section 303A(c)(5)).

The NOAA LAPP guidelines mention "current harvest" only three times in the context of initial allocation, twice when directly quoting the act and once when discussing an auction approach to initial allocation and the need to take into consideration current harvests (p. 65). However, the guidelines document inferentially references the current harvest distribution when it notes with respect to LAPP programs such as that implemented here (i.e., ones that do not include FCs and RFAs):

> ... the main concern was to set up an allocation that would change the fishery from the *status quo* to an IFQ fishery with a minimum *disruption of the current distribution* between the recipients. When that was the goal, the question became what sorts of things could be used to quantitatively compare allocations among the potential recipients? Looking at participation characteristics was a good way to do this. Catch histories are a way to compare the relative success of various participants. (NOAA, 2007, p. 63)

Here it is inferred that the goal of taking into account current harvest is to minimize disruption in the fishery as measured against the current distribution of harvest among participants.

Relation of Rationalization Program Provisions to Policy

The allocation formulas directly reflect the distribution of current harvests to the degree that more recent years are included in the allocation formula (years that are reasonably construed to be "current" for purposes of allocation).

Harvesters. Current *participation* of harvesters is taken into account by the allocation to current owners of permits (as of 2010) based on the assumption that current permit owners are current participants. Current *harvest* is taken into account indirectly, again based on the assumptions that those with permits are currently harvesting in the fishery (see Section 5.4.2 for a detailed description of the link between permit ownership and the QS allocation that an individual will receive). While some current permit owners may not take part in the fishery, from a perspective of economic rationality the expectation is that, on average, those owning permits will have sought to use them in order to earn a return on their investments. At the same time, the scale of an entity's current harvest directly determines the initial allocation only to the degree that current years are included in the allocation formulas.

One of the substantial changes occurring in the fishery in more recent years is the imposition of management measures to eliminate targeting on overfished species. Trip limits were reduced substantially in 2000 when 5 stocks were declared overfished. By 2002 a total of seven stocks were declared overfished. In that year rockfish conservation areas were implemented to close the continental shelf to bottom trawling, substantially altered harvest patterns beginning in 2002.

To address these changes, the program includes an allocation adjustment based on post-2003 harvests, but only with respect to the allocation of overfished species to permits in the shoreside fishery (allocations of non-whiting species QS are not provided to processors and the permits in the mothership fishery are assigned catch history only for whiting and not other species). The post-2003 data used was only geographic harvest pattern data, not data on harvest levels. Pre-

2003 permit harvest level information was used to determine the allocations for all non-overfished species, including the amounts allocated equally (shapes 1 and 2 in Figure 5-1). QS for overfished species was allocated proportionally to the allocation of non-overfished species QS (shape 3). The proportional allocation was achieved using fleet average bycatch rates by area for 2004-2006 (shape 4). The average rates used for any particular permit were determined based on the areas in which that permit fished from 2004-2006 (shape 5). These elements of the allocation formula then combine (shape 6) to result in the QS allocation for overfished species (Shape 7).

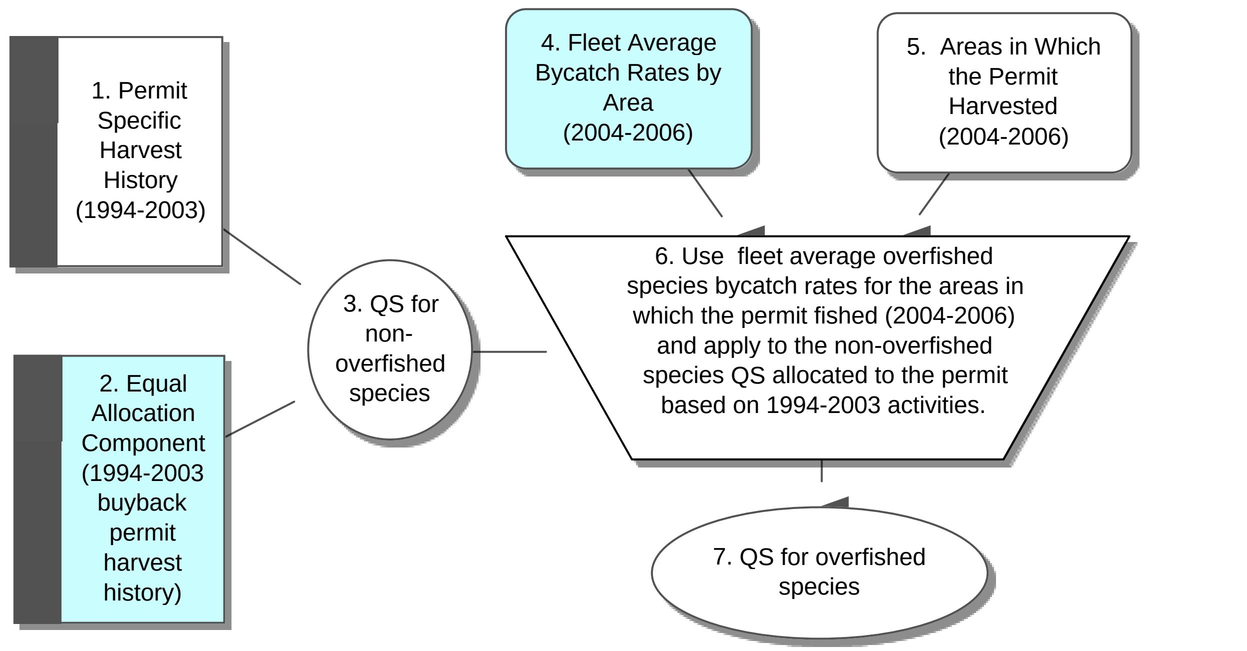


Figure 5-1. Flow chart of steps used to determine the allocation of overfished species (shaded boxes indicate the use of fleetwide data, unshaded boxes indicate permit-specific data and calculations.

Some examples of the importance of the distinction between the 1994-2003 information used and the 2004-2006 information used are as follows.

- If two permits had identical 1994-2003 history, but after 2003 (2004-2006) one landed 1,000,000 pounds and the other only 1,000 pounds, the two permits could receive identical allocations of overfished species as long as the latitudinal and depth distribution of their 2004-2006 harvests were the same.
- If two permits had 2004-2006 history that was identically distributed geographically, but one permit had 10 times the 1994-2003 history of the other permit, then (with respect to the QS allocated based on permit history) one permit would generally receive 10 times the allocation of overfished species than the other permit.
- Regardless of how much a permit harvested during the 2004-2006, if it had no 1994-2003 history it would receive no allocation of overfished species except for the equal allocation component of the allocation formula for canary rockfish.

Thus, using 2004-2006 in this manner did not reward higher levels of 2004-2006 harvest with increased allocations.

The Amendment 20 EIS also discusses the fact that the buyback program implemented in 2003 would have substantial effects on patterns of harvest in the fishery which would not be picked up in allocation formulas that did not take into account harvest levels after 2003.

> One of the major factors that will result in differences between the pattern of initial QS allocation and the patterns of fishery harvest in more recent years will be the effects of the buyback program. The buyback program occurred just after the 2003 control date. It substantially expanded fishing opportunity for all vessels, as reflected by higher trip limits, and initially resulted in a change in the proportional distribution of permits along the coast. The most effective way to address these changes would be to include years after 2003 in the allocation period. However, doing so would reward those who disregarded the control date announcement, create perceptions of inequity, and encourage fishermen to ignore such dates in the future, negatively affecting the Council's ability to credibly use control dates.

As indicated in this paragraph, at that time, the Council considered the post 2003 conditions created by the buyback program but chose not to make a change to the allocation period for the indicated reasons.

Chapter 3 documents changes which have occurred in the whiting fishery after 2003. INSERT SUMMARY OF THE RESULTS HERE. One of the purposes of this EA is to assist the Council in considering shifts in the fishery that occurred after 2003 and determining whether or not those shifts warrant a change in the allocation period to include more recent years (Alternatives 2 and 3) and potentially increase the emphasis on those later years (Alternative 4).

Processors. The MSA identifies the need to consider current and historic harvests for allocations to harvesters; however for allocations to processors the emphasis placed on current participation is less clear. Processing history is not mentioned *per se* but processing employment, investment and dependence, and the current participation of communities (of which processors are a part) are directly mentioned. Together, given that allocations are being made to processors, these factors might indicate that current participation levels for processors (e.g., purchasing or processing activity) have relevance for decision-making. For a processor entering the whiting sector after the allocation period, the only ways to qualify for an initial allocation are through buying out an existing processor (i.e., becoming a successor in interest)[13] or through the acquisition of a limited entry permit (accessing a portion of the initial allocation to harvesters). A whiting processor with history during the initial allocation period that expands operations after the initial allocation may increase its share of the allocation through similar avenues. However, as with harvesters, the scale of a processor's current activities directly determines initial allocations only to the degree that current years are included in the allocation formulas.

In addition to changing the allocation period, the recent participation requirement may also be shifted. For status quo, the recent participation period included the 7 years of the allocation period. For each alternative, the recent participation period has been respecified to cover the most seven six years of the allocation period, or six years in the case of Alternative 2 (1998-2003). As a result, some processors that may have qualified based on their earlier years of

[13] Only in one instance did a processor qualify for initial allocation based on the successor in interest provision.

activity may be eliminated, thereby increasing the allocation going to those processors with more recent activity.

Communities. No separate allocation is made to communities. Current community participation is taken into account via the allocations to harvesters and processors that are members of the communities. In the analysis, information on current participation is presented for communities and the initial allocations to entities in the communities, in order to allow decision makers to assess the likely impacts of the initial allocations on currently-participating communities. The dependence of communities on the viability of the entities receiving the initial allocations is indicated by displaying the amount of fishing activity (processing and harvesting) supported by those entities involved in the directed whiting fishery as compared to those entities not involved.

Analysis of Effects of Alternatives

As was discussed in the Section 5.4.2 on investment and dependence, as the time between the end of the allocation period and the initial allocation increases, there is increased potential for a disconnect between the distribution of activity in years immediately prior to the allocation and the distribution of the initial allocation. This disconnect creates a potential for disruption. There are two factors that help to reduce the degree of disruption that occurs as a result of the initial allocation (whether the distance between the end of the allocation period and the distribution is a few months or many years): (1) the January 2004 advance notice of proposed rule making, and (2) allocation to current owners of permits based on history of the permit. Opportunities to acquire a share of the initial allocation through acquisition of a limited entry permit provide all participants with an opportunity to plan and adjust for the initial allocation.[14] These mitigating factors affect the amount of potential disruption; nevertheless the amount of disruption would decrease as more recent (current) years are included in the initial allocation.

One measure of disruption is the difference between the distribution of harvest for a comparison period and the initial QS allocation. Three comparison periods are presented here: 2004-2006, 2007-2010, and 2011. The 2011 comparison is included because under NEPA all effects of an action must be assessed. However, at issue is whether or not the 2011 allocation (status quo) should have been implemented. The appropriateness of the 2011 baseline for assessing disruption should be considered in this light. A measure of the difference between the comparison periods and the allocations for each entity receiving an allocation is provided in Section 4.3.1.1 (shoreside harvesters), 4.3.1.2 (mothership catcher vessels), and 4.3.2.1 (shoreside processors). One measure of the total amount of disruption is the sum of the distances between entities' shares of the base period harvests and the initial allocations they receive (sum of the absolute values of the differences). The greater the sum, the greater the degree of disruption relative to the baseline. In the referenced sections of Chapter 4, these differences were calculated in terms of shares of harvest in comparison to shares allocated. A summary of the results are provided in Table 5-1.

[14] This opportunity is similar to that afforded new entrants after the program is implemented (the opportunity to buy quota).

Table 5-1. Sum of differences between the initial distribution of QS and historic and recent distribution of harvests during the baseline periods.

	Alternatives				
Historic Period and Recent Baselines	No Action	1: 2003	2: 2007	3: 2010	4: More Recent
Catcher Vessel Permits – Shoreside History					
1994-2003					
2004-2006		TO BE COMPLETED			
2006-2010					
2011					
Whiting Processors – Shoreside History					
1994-2003					
2004-2006					
2006-2010					
2011					
Catcher Vessel Permits – Mothership History					
1994-2003					
2004-2006					
2006-2010					
2011					

Included in Table 5-1 are entities that receive no initial allocations but have some history in a recent base period. Table 5-2 summarizes the number of entities not qualifying for any allocation and the amount of history (average per year of activity) for the base periods (for processors, at least 1 mt of whiting deliveries are required to be included in this table).

Table 5-2. For entities active during comparison periods, the number receiving no allocation and total whiting deliveries or receipts by those entities in the comparison periods.

	Alternatives				
Comparison Periods	**No Action**	**Alt 1: 2003**	**Alt 2: 2007**	**Alt 3: 2010**	**Alt 4: More Recent**
Catcher Vessel Permits – Shoreside History					
2004-2011	All permits received some initial allocation---				
Whiting Processors – Shoreside History					
2004-2006	6 (3.7%)	6 (3.7%)	1 (0.3%)	1 (0.3%)	1 (0.3%)
2007-2010	14 (13.2%)	14 (13.2%)	9 (1.2%)	7 (0.2%)	7 (0.2%)
2011	5 (19.8%)	5 (19.8%)	3 (0.01%)	2 (0.001%)	2 (0.001%)
Catcher Vessel Permits – Mothership History					
2004-2006	1 (1.3%)	1 (1.3%)	0	0	0
2007-2010	2 (4.3%)	2 (4.3%)	0	0	1 (0.15%)
2011	1 (11.3%)	1 (11.3%)	0	0	1 (2.2%)

Note: Permits with history in 2011 but no allocation associated are those which received an inseason transfer of allocation from an initial recipient.

The recent participation requirement for shoreside processors also screens out some entities that would otherwise qualify for allocations. By alternative, the number of processing entities screened out by the recent participation requirement, maximum aggregate annual total whiting harvest, and share of harvest is as follows.

Table 5-3. Processing entities screened by recent participation requirements, by alternative.

	Alternatives				
	No Action" 1998-2004	**1: 1998-2003**	**2: 1998-2007**	**3: 1998-2010**	**4: 2000-2010**
Recent Participation requirement (RP): received at least 1 mt in each of two years during	**1998-2004**	**1998-2003**	**2001-2007**	**2004-2010**	**2004-2010**
Total Processors during the Period	17	16	20	23	20
Number Screened Out by RP	8	7	9	10	7
Share of History Screened Out	0.294%	0.054%	3.857%	3.025%	1.378%
Number of Processors Receiving an Allocation	9	9	11	13	13
	Effects on Status Quo QS Recipients				
Number Screened Out	-	0	3	3	3
No Action Allocation	-	0.000%	1.337%	1.337%	1.337%

Note: Only those whiting processors with at least 1 mt in a single year during the period under consideration are included. Processors receiving less than 1 mt are considered to be receiving incidentally caught whiting, to which this allocation does not apply.

Communities depend on some whiting processors to serve not only the whiting fishery but also other fisheries which support the community. Chapter 3 provides information on the dependence of communities on processors handling whiting. If the allocation among processors is such that some are disadvantaged and so as a result go out of business, and if no other buyers move in to take the place of those processors, then other fisheries in a community and the community as a whole may be adversely impacted. While it is not possible to determine what degree of relative disadvantage in the whiting allocation would cause a processor to go out of business, the potential risk can be assessed by looking at communities' dependence on those processors that receive a lesser allocation than others. On average whiting processors should receive allocations that are approximately 20% of their share of the total whiting deliveries (20% of the QS is being allocated to processors). For the purpose of this analysis, a threshold of receiving 10% of historical landings share is used to identify processors receiving a "low" allocation (i.e. those receiving half of the 20% of historic shares processors would be expected to receive on average). To be included in the analysis a processor must have received at least 1 mt of whiting in any one year during the base period being analyzed. Processors receiving some whiting but receiving no whiting allocation are included in the analysis.

Table 5-4. Processors receiving low allocations and effect on communities using 2004-2006 comparison period.

	Alternatives				
2004-2006	No Action	1: 2003	2: 2007	3: 2010	4: More Recent
Number of Processors Receiving Low Allocations (Total Processors with at Least 1 mt) Maximum Whiting Dependence for Whiting Processors Receiving Low Allocations (%)					
Westport	TO BE COMPLETED				
Ilwaco					
Astoria					
Newport					
Coos Bay					
Crescent City					
Eureka					
[add others]					
Percent of Port Revenues (all fisheries) by Whiting Processors Receiving Low Allocations					
Westport	XX%				
Ilwaco					
Astoria					
Newport					
Coos Bay					
Crescent City					
Eureka					
[add others]					

Table 5-5. Processors receiving low allocations and effect on communities using 2007-2010 comparison period.

	Alternatives				
2007-2010	No Action	1: 2003	2: 2007	3: 2010	4: More Recent
Number of Processors Receiving Low Allocations (Total Processors with at Least 1 mt) Maximum Whiting Dependence for Whiting Processors Receiving Low Allocations (%)					
Westport	TO BE COMPLETED				
Ilwaco					
Astoria					
Newport					
Coos Bay					
Crescent City					
Eureka					
[add others]					
Percent of Port Revenues (all fisheries) by Whiting Processors Receiving Low Allocations					
Westport	XX%				
Ilwaco					
Astoria					
Newport					
Coos Bay					
Crescent City					
Eureka					
[add others]					

Table 5-6. Processors receiving low allocations and effect on communities using 2011 comparison period.

	Alternatives				
2011	No Action	1: 2003	2: 2007	3: 2010	4: More Recent
Number of Processors Receiving Low Allocations (Total Processors with at Least 1 mt) Maximum Whiting Dependence for Whiting Processors Receiving Low Allocations (%)					
Westport	TO BE COMPLETED				
Ilwaco					
Astoria					
Newport					
Coos Bay					
Crescent City					
Eureka					
[add others]					
Percent of Port Revenues (all fisheries) by Whiting Processors Receiving Low Allocations					
Westport	XX%				
Ilwaco					
Astoria					
Newport					
Coos Bay					
Crescent City					
Eureka					
[add others]					

Best estimates of the flow to each community based on mapping of 2011 product flow, adjusted proportionally for the new allocations.

Table 5-7. Projected and geographic historic distributions of whiting (based on 2011 harvest patterns)

	Alternatives					Baselines	
	No Action (2011)	1: 2003	2: 2007	3: 2010	4: More Recent	2004-2006	2007-2010
	TO BE COMPLETED						
Westport							
Ilwaco							
Astoria							
Newport							
Coos Bay							
Crescent City							
Eureka							
[add others]							

Note: The 2011 baseline is the no action alternative.

5.4.3.2 Historic Harvests and Historic Community Participation

Policy Guidance

At the start of Section 5.4.3, the MSA provisions relevant to historic participation are listed. Historic fishing practices and dependence are relevant in the development of limited access systems (MSA 303(b)(6), see page 46) and with respect to LAPP programs, historical harvests and historical participation by communities are cited as being particularly relevant to the fairness and equity of the programs (MSA 303A(c)(5)(A)(i) and (iv), see page 46). One reason for the pertinence of historic harvest to fairness and equity may be our culture's historic reliance on "seniority of use" as "a factor considered in deliberation over who should have claim to future use of a resource (e.g., issues of 'beneficial use' and 'first-in-time' related to how surface and ground water use rights are assigned)" (NRC 1999, as cited in Council, 2010, p. A-150).

Historic harvests and participation are also important from other economic and social perspectives. From an economic perspective, fishing handling and support businesses and infrastructure are developed and positioned based on long-term patterns of activity. Concurrent with the development of the economic relations and infrastructure are the development of the social networks and infrastructure. Historic patterns are therefore an indicator of structures in the human environment which are deeply embedded and difficult to evaluate but nevertheless important to the quality of human life.

Relation of Rationalization Program Provisions to Policy

The existing allocation formulas give a weight to historic participation by extending the allocation period back to 1994 for vessels and to 1998 for processors. The period goes back to 1994 for permits because it is the first year of the license limitation period, which started a new era altering who was able to participate in the fishery and delivery patterns (see Council, 2010, p. 148). For processors there is no limit on new entry. The whiting processor allocation period starts with 1998, the first year after the establishment of the whiting allocation framework which established a 3-way split in the whiting sector allocation (shoreside, mothership, and catcher-processor sectors) and a framework for modifying the allocation. The allocation among these sectors has not changed since that time.

With respect to the importance of historic harvest from other social and economic perspectives, on the one hand, allocation formulas which rely on longer time periods may better reflect some of the patterns within the industry and communities that are established based on long term conditions in the fishery. On the other hand, recent developments in the fishery may cause major disruptions in those patterns. Under such circumstances, if policy adjustments are made that are conducive to their continuation, short term patterns may be able to survive over the long term; or they may no longer exist and attempts to support them may result in further disruption. Assessing these patterns and their dynamics is difficult. The existence of physical infrastructure is amenable to some degree of documentation but the economic and social relations built around the fishery are difficult to document and summarize in a manner and with timeliness that is helpful to decision makers. Further the effects of a particular allocation on relational patterns and infrastructure that are indirectly related to fishing are difficult to project in the context of other changing social and economic conditions. This paucity of information creates a challenge in assessing the appropriate balance of emphasis between current and historical participation and harvests in developing allocation formulas.

Analysis of Effects of Alternatives

For the portion of the QS allocation formula related to individual permit history, Alternative 1 emphasizes entirely historic years (current as of the control date). For processors, No Action (status quo) adds one post-control date year to the allocation period. Other alternatives include more recent years and decrease the emphasis on earlier years in the allocation period. Alternative 4 places the most emphasis on recent years by eliminating the earlier years of the allocation periods (1994-1999). The relative emphasis on each year of the allocation period and different historically important segments is shown in Table 5-8. For example, it is shown that the pre-AFA years have a relative weighting of 50% under No Action, 29% under Alternative 3, and 0% under Alternative 4. Conversely, it is shown that post-AFA implementation years receive a weighting of 30% under status quo, 59% under Alternative 3, and 91% under Alternative 4.

Table 5-8. Relative weighting of historic periods by allocation alternative for permits

		No Action	Alt 1	Alt 2	Alt 3	Alt 4
	Allocation Period:	1994-2003	1994-2003	1994-2007	1994-2010	2000-2010
Number of years in the allocation period.		10	10	14	17	11
Weight Per Year		10%	10%	7%	6%	9%
Pre AFA Years	(1994-1998)	50%	50%	36%	29%	0%
AFA Implementation Years	(1999-2000)	20%	20%	14%	12%	9%
Post AFA Years – Pre-buyback	(2001-2003)	30%	30%	50%	59%	91%
Post Buyback Years	(2004-2010)	0%	0%	29%	35%	55%

Note: The allocation formula uses a relative measure of landings history. Under a relative measure, history for any particular year is measured as a share of all history in that year. Consequently, performance in any given year is measured in comparison to other participants during the year and not affected by changes in total harvest or the OY.

Table 5-9. Relative weighting of historic periods by allocation alternative for processors.

		No Action	Alt 1	Alt 2	Alt 3	Alt 4
	Allocation Period:	1998-2004	1998-2003	1998-2007	1998-2010	2000-2010
Number of years in the allocation period.		7	6	10	13	11
Weight Per Year		14%	17%	10%	8%	9%
Pre AFA Years	(1994-1998)	14%	6%	10%	8%	0%
AFA Implementation Years	(1999-2000)	29%	33%	20%	15%	9%
Post AFA Years	(2001-2010)	57%	50%	70%	77%	91%
Post Buyback Years	(2004-2010)	14%	0%	40%	54%	64%

Note: The allocation formula uses a relative measure of landings history. Under a relative measure, history for any particular year is measured as a share of all history in that year. Consequently, performance in any given year is measured in comparison to other participants during the year and not affected by changes in total harvest or the OY.

Community historic participation in the shoreside whiting fishery is documented in Table 5-10.[15] The allocation to each community is estimated using 2011 per-permit delivery patterns and adjusting those patterns proportionally depending on increases and decreases in allocations. Information on 2011 use of processor quota shares is also incorporated into this model. The dependence of each of these communities on whiting is documented in Chapter 3.

[15] Because the deliveries in the mothership fishery are made at-sea it is difficult to construct a historic data set on community dependence on the whiting fisheries for this sector. Where such dependency assessments are made for the whiting fisheries, they are generally based on assumptions that the vessels participating in the whiting fishery will expend their revenues in their primary delivery port, as determined by the landings in any shoreside fisheries in which they participate. Alternatively, zip code of the permit license is used. Since these assumptions are tenuous, no attempt is made here to assess historic dependence of communities on the mothership fishery.

Table 5-10. Projected and geographic historic distributions of shoreside whiting (based on 2011 harvest patterns)

	Alternatives					Historic Periods					
	No Action (2011)	1: 2003	2: 2007	3: 2010	4: More Recent	1994-1997	1998-2000	2001-2003	2004-2006	2007-2010	1994-2011
Total Whiting Revenue (Average Per Year)											
Westport	TO BE COMPLETED										
Ilwaco											
Astoria											
Newport											
Coos Bay											
Crescent City											
Eureka											
[add others]											
Share of Coastwide Harvest Whiting Exvessel Revenue (Average Per Year)											
Westport											
Ilwaco											
Astoria											
Newport											
Coos Bay											
Crescent City											
Eureka											
[add others]											

5.4.3.3 Employment (processing and harvesting)

The MSA requires consideration of employment in the harvesting and processing sectors when establishing initial allocation for LAPP programs. In general, the provisions have been developed to account for current and historic participation in the fishery while at the same time transitioning to a rationalized fishery. Rationalization inevitably implies a change in the nature and patterns of employment in the processing and harvesting sectors. There is no reason to believe that allocation to certain harvesters or certain processors is more likely to result in more stable or higher employment than allocating to other harvesters or processors. Consequently account is taken of processing and harvesting labor by distributing allocations based on the current and historic harvest patterns in the fishery. As discussed in the previous sections, both current and historic harvest patterns are relevant to existing economic and social networks, and the labor force is positioned within these networks. It is also difficult to predict the effect on labor because of the post-implementation quota trading and consolidation that is likely to occur under rationalization. Overall, it is likely that allocations that are least disruptive to harvesters and processors, as discussed in previous sections, would also be the least disruptive to employment.

5.4.4 Discrimination Between Residents of Different States

MSA National Standard 4 requires that management measures not discriminate between residents of different states. While the alternatives may result in differing distribution of initial allocations among the states (see Section 5.4.3), none of the allocations explicitly discriminate in favor of or against residents of a particular state.

5.4.5 Stability and Minimizing Disruption – Fairness and Equity Considerations

5.4.5.1 Policy Guidance

Section 303(a)(c)(5)(A) of the MSA requires that the Council "establish procedures to ensure fair and equitable initial allocations" and then it lists a number of specific factors related to fairness and equity that should be included in the Council's considerations (see page 46 for the list of factors cited in the section). There are other fairness and equity considerations to be taken into account, including those related to "arbitrary and capricious" actions. In this section, stability and disruption are considered as a fairness and equity issue directly related to concerns about arbitrary and capricious actions. In the following section, other issues related to stability and disruption are addressed.

The introduction to the goals and objectives of the groundfish FMP states:

> The Council is committed to developing long-range plans for managing the Washington, Oregon, and California groundfish fisheries that will promote a ***stable*** planning environment for the seafood industry, including marine recreation interests, and will maintain the health of the resource and environment. (emphasis added Council, 2011, p. XX).

The LAPP guidelines (NOAA, 2007) draw connections between requirements to take into account investment and dependence in a fairness and equity context and minimizing disruption, specifically with respect to allocations among current participants (see page 48). Objective 14 to the groundfish FMP also addresses disruption: “When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.” The issue of recognizing seniority of use also engages fairness and equity sensibilities. The concept of deference to “seniority of use” in allocation decisions (discussed in the Policy Guidance section of Section 5.4.3.2) is also one that tends to reduce disruption (depending on the context in which it is applied) and provide stability.

The concepts of stability and disruption are also closely related to the terms “arbitrary and capricious.” The definitions of “arbitrary” which may apply in the current contexts are “based on or determined by individual preference or convenience rather than by necessity or the intrinsic nature of something” and “existing or coming about seemingly at random or by chance as a capricious and unreasonable act of will.” The relevant definitions of “caprice” may be **“**a sudden, impulsive, and seemingly unmotivated notion or action” and “a sudden usually unpredictable condition, change, or series of changes” Decision that are not based on necessity, and are random, sudden, seemingly impulsive, and unpredictable are likely to be destabilizing and disruptive.

5.4.5.2 Relation of Rationalization Program Provisions to Policy

Issues related to stability and disruption as reflected in considerations of current and historic participation have been addressed in previous sections. This section focuses on other fairness and equity-related aspects of destabilizing or disruptive results of alternatives under consideration, as well as other fairness and equity issues.

In this regard, one of the primary of issues of concern to participants and fishery managers are the control dates that are announced when consideration of a new limited entry program is announced. Legally, these control date announcements are intended to reduce the chances of a takings argument, i.e., that those who do not receive an initial allocation and who can only enter by acquiring permits from others will argue that they had an established right of access which was denied them without compensation. A concern from a management perspective is that the act of considering a limited access system can exacerbate management problems in the fishery during the period while the system is under consideration. These problems can arise either from new entry (where limited entry programs do not already exist or do not prevent shifts between sectors within a program, e.g., a shift from nonwhiting harvest to whiting harvest within the groundfish program), or from the expansion of effort by participants already in the program. Given that control dates have been used in the past and are likely to be used in the future, there are a number of fairness and equity concerns around their use. Particularly, if a control date is announced but not relied on (i.e., fishing activities after the control date augment allocations):

- those who increased their investments and activities despite the caution provided by the control date are rewarded to the disadvantage of those who refrained from increasing investments or activities,
- participants in other segments of the fishery or in other fisheries will be penalized because, in the absence of a credible control date, their fisheries may be destabilized if the Council considers managing those fisheries with a limited access system.

The degree of destabilization of not using a control date depends on whether participants in other fisheries believe that the actions taken in one situation indicate a precedent for the future.[16] If a fishery is destabilized as a result of the consideration of a limited access system, the act of consideration by itself increases the likelihood that the system will be implemented. Such a result would likely seem unfair to those who oppose the new system. Additionally, this dynamic may result in new systems that might not otherwise have been necessary, or in premature implementation of such systems.

For processors, the effect of control dates is different than for harvesters. A processor interested in increasing its allocation during Council consideration of a limited access program might offer higher prices than it might otherwise in order to garner a greater share of deliveries. On the one hand, the direct effect would be beneficial to harvesters. On the other hand, such activities could have adverse effects. First, offering higher prices might have a predatory pricing effect, weakening other processors and inhibiting entry of new processors. Second, higher prices might encourage more activity on the part of harvesters despite the control date, undercutting the effectiveness of the control date with respect to fishery participation.

When the Council implements a new limited access system it generally relies on control dates. The history of use of such control dates is shown in Table 5-11. Note that the Council has also at times announced a control date but then decided not to move forward with programs based on the control date.

[16] This effect could be cross-regional to the degree that fishermen in other regions believe the action taken here sets a precedent that will be followed elsewhere.

Table 5-11. Qualifying dates and control dates for rationalization programs announced in the Federal Register.

Program	Related Program Provision and date	Announced Control Date
Amendment 6, Groundfish License Limitation Program (**Implemented 1994**)	End of qualifying period – **August 1, 1988** (allocations to current owner of vessel based on vessel history)	**August 1, 1988**
Amendment 6, Vessel Construction Cutoff (**Implemented 1994**)	For newly constructed vessels, fishing must commence by **September 30, 1990** in order to qualify for a license. (allocations to current owner of newly constructed vessel)	**September 30, 1990**
Amendment 9, Fixed Gear Sablefish Endorsements (**Implemented 1997**)	End of allocation period – **December 31, 1994** (allocations to current owner of permit based on permit/vessel history)	**June 29, 1995** (there was no substantial fixed gear sablefish fishery between December 31, 1994 and June 29, 1995 therefore the earlier date was used for the end of the allocation period)
Fixed gear sablefish tier assignments. (**Implemented 1998**)	End of allocation period – **December 31, 1994** (allocations to current owner of permit based on permit/vessel history)	**June 29, 1995**
Limitation on new entry into the whiting fishery. (Amendment 15)	End of qualifying period December 31, 2006 (designation based on vessel history)	**a/**

a/ Amendment 15 was originally formulated under the authority provided by the American Fisheries Act but later implemented solely under the Council's MSA authority. Initially, AFA-related control dates were announced: September 16, 1999 (for vessels) and June 29, 2000 (for permits). The Council tabled action on Amendment 15 in 2001 and did not resume action until the fall of 2006—a four year hiatus during which the November 6, 2003 trawl rationalization control date was announced and work on the trawl rationalization program began. At its June 2007 meeting, the Council rejected taking action under the AFA and relied instead on its authority under the MSA. "By rejecting action under the AFA, the Council also rejected participation dates relative to the AFA control dates previously specified by the Council (64 FR 66158 and 65 FR 55214) or the passage of the AFA (1999)" (PFMC 2007, p. 20). The Council took final action on Amendment 15 in September 2007 and the program was implemented beginning in 2009. During Council presentations, public testimony and in description of its actions, the Council made clear that Amendment 15 would be superceded by Amendment 20 with its 2003 control date (e.g., Vessels that qualify for whiting fishery participation under Amendment 15 were not guaranteed future participation or inclusion in the Pacific whiting fishery under Amendment 20 http://www.pcouncil.org/groundfish/fishery-management-plan/fmp-amendment-15/).

The Council has also announced control dates but then after deliberation decided not to recommend implementation of the following programs:

- Limiting Entry to the Open Access Groundfish Fishery – November 5, 1999 and September 13, 2006
- Highly Migratory Species – March 9, 2000
- Spiny Dogfish – April 8, 2005

While there are fairness and equity reasons for relying on a control date (as well as other reasons, see following section), there are also reasons for not relying on a control date. In the current program, the Council explicitly did not rely on the control date with respect to the allocation period for processors. Information was also used from post-control date activities for the allocation of overfished species to permits participating in nonwhiting trips. The reasons for using the post-control date activities for allocation of overfished species are discussed on page 46. The Council discussion of the use of a post-control date qualifying year for allocation to processors included the points that the year 2004 was used because it was part of an industry group compromise to recognize more recent capital investment while staying as close as possible to the control date.[17] Section 5.4.3.1 discusses consideration of current participation and harvest and includes a summary of changes in the fishery occurring after 2003 (This information is fully presented in Chapters 3 and 4).

5.4.5.3 Analysis of Effects of the Alternatives

The No Action alternative, by using 2004 as the end of the allocation period for processors, does not incorporate the control date in the final allocation criteria. This creates fairness and equity issues for those who, based on the control date, chose not to enter or invest in the fishery and thus may degrade the effectiveness of any future control dates, thereby creating fairness issues *vis a vis* other sectors of the groundfish fishery or other fisheries. Additionally, it raises a concern of fairness with respect to those who entered the fishery after 2004 and questions the rationale for extending to 2004 but not beyond.

Alternative 2 uses allocation periods that end with the control date for all sectors. Such an alternative imposes a heavy weight on the importance of the control date with respect to discouraging speculative increases in participation. However, Alternative 2 still leaves in place the use of the 2004-2006 permit catch distributions for the purpose of determining the spatial distribution of effort for allocation of overfished species quota share. While the use of this post-2003 harvest information does not reward increased participation, it does alter initial allocations depending on on how an entity's harvesting effort was distributed geographically, thereby potentially rewarding participants who increased their targeting activity in areas of higher contact with overfished species (again, regardless of the actual level of that harvest).

Alternatives 3, 4 and 5 place progressively more importance on factors other than the control date in determining the allocations that participants receive. Specifically, increasing credit is given for more recent years of participation. The effect is to decrease fairness and equity with respect to factors discussed in this section, but there might also be an increased perception of fairness in equity with respect to factors discussed in other sections.

5.5 Stability and Minimizing Disruption – Other Considerations

5.5.1 Policy Guidance

With respect to the effect of a control on limiting capacity, groundfish FMP objective 2 states that the desired outcome is a fishery that is diverse, *stable*, and profitable (emphasis added Council, 2012, p. XX). As mentioned previously, Objective 14 to the groundfish FMP addresses stability from the standpoint of minimizing disruption: "When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment." The goal of Amendment 20 includes "create individual economic stability."

[17] Concern was also expressed that there had been some very poor years at the end of the allocation period which limited the opportunity to establish history. However, it should be noted that the relative share approach to allocation measures each entity's performance relative to all others active in that year, reducing the significance of between-year variation in participation levels.

While an objective in itself, stability (minimizing disruption) contributes to other FMP objectives related to total economic benefits and community and sector health, as well as equity (discussed in the previous section).

5.5.2 Relation of Rationalization Program Provisions to Policy

With respect to stability and minimizing disruptions, the effects pertaining to the current action discussed here relate to adopting an allocation period that does not include the control date. Other issues related to stability and minimizing disruption, such as changes imposed on the fishery in 2011 relative to conditions just prior to program implementation and changes from the 2011 allocation (No Action) to a different allocation (Alternatives 2-5) are addressed in the section on current participation and harvest (Section 5.4.3.1).

As identified in the previous section, not using a control date may create more potential for future disruptions in this and other fisheries if the development of limited access systems are taken up for those communities. These disruptions are not only important with respect to the fairness and equity considerations discussed previously but may have other adverse effects as well, depending on the management system in place. In general, conservation objectives will be met regardless of the amount of fishing effort, but an influx or increase of effort may require increased attention on the part of fishery managers, thereby detracting from the resources available to consider the new limited access system proposal or to attend to other needs of the management system. Additionally, constantly changing and increasingly restrictive management measures could have adverse affects on the industry and communities. For a program where effort is controlled primarily through two-month cumulative limits (such as the open access groundfish fishery), heightened fleet effort would be economically disruptive, with the increased effort reducing cumulative limits and reducing profitability of current participants. For a program controlled with season closures, safety concerns might arise with shorter seasons and increased crowding on the fishing grounds. Product quality could suffer as well. Instability and disruptive impacts in the harvest sector would affect overall sector health and reverberate to processors and communities.

5.5.3 Analysis of Effects of Alternatives

As discussed in the previous section, only Alternative 1 incorporates the control date into all of the qualifying periods. No Action incorporates the control date for harvesters but not for processors, for which the end of the allocation period would be 2004. Alternatives 3, 4, and 5 do not incorporate the control date in the allocations periods and are differentiated based on other factors having to do with the recency of the years included. These effects are described above in Section 5.4.3. The effects of not incorporating the control date into the allocation period are discussed in Section 5.5.2.

5.6 Sector Health

TO BE COMPLETED. In general, long-term overall health of the sectors is not expected to be substantially affected by the distribution of QS. within the ranges considered here.

Provide for a viable, profitable . . . groundfish fishery (A-20 Objective 2)

Promote measurable economic . . . benefits through the seafood catching, processing, distribution elements, and support sectors of the industry (A-20 Objective 6)

Maximize the value of the groundfish resource as a whole (GF FMP Goal 2)

Promote year-round marketing opportunities and extend those opportunities as long as practicable during the fishing year (GF FMP Objective 7)

Avoid unnecessary adverse impacts on small entities (GF FMP Objective 15)

5.7 Labor

TO BE COMPLETED. Considered as part of initial allocations to permits and processors.

MSA - 303A(c)(5)(C). Include measures to assist… entry-level and small vessel owner-operators, captains, crew… through set-asides of allocations… or economic assistance in the purchase of quota

Amendment 20. Promote measurable… employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry (A-20 Objective 6)

Promote the safety of human life at sea (MSA - National Standard 10
GF FMP - Objective 17)

5.8 Communities

TO BE COMPLETED. List relevant goals and objectives and reference earlier Chapter 5 section on current and historic harvests and Chapters 3 and 4.

Consider importance of fishing to communities in order to provide sustained participation and to minimize adverse impacts
(MSA - National Standard 8, GF FMP Objective 16, A-20 Objective 5)

MSA - 303A(c)(5)
(B) Consider basic cultural and social framework of the fishery through
(i) the development of policies to promote sustained participation of… fishing communities that depend on the fisheries, including regional or port-specific landing and delivery requirement;
(ii) procedures to address concerns over excessive geographic or other consolidation in the harvesting or processing sectors of the fishery
(C) Include measures to assist, when necessary and appropriate… fishing

communities through set-asides of harvesting allocations… or economic assistance in the purchase of quota

Minimize negative impacts resulting from localized concentrations of fishing effort (this constraint is also listed under "Conservation") A-20 Constraint 3

Include social and cultural framework here. (see relevant MSA sections)

5.9 Other Goals and Objectives

There are numerous other standards, goals, and objectives for fishery managment actions that are not implicated in the current action. For reference, a complete list of the MSA National Standards, sections of the MSA pertinent to initial allocations in LAPP programs, groundfish FMP goals and objectives, FMP allocation criteria, and Amendment 20 goals and objectives are provided in Chapter 6.

WHITING AND NONWHITING ALLOCATIONS POTENTIALLY AFFECTED BY A CHANGE IN THE WHITING ALLOCATION PERIOD

With respect to the whiting quota shares (QS), changing the rellocation period would only affect certain parts of the initial whiting QS allocation, that portion allocated based on catch history. As a consequence of the change in the whiting QS allocations, the portion of the nonwhiting QS distributed to cover bycatch on whiting trips would be reallocated as well. Nonwhiting QS to cover bycatch on whiting trips was allocated proportionally to the whiting QS. Processors were not provided with an initial allocation of nonwhiting species.

The following figure provides a flow chart showing the steps by which QS is distributed to groups and allocated among initial recipients. The steps affected by a change in the allocation period for whiting are identified with shading. The steps in which the allocation period directly affects the calculation are shown with a bold border. The end result for each group of recipients and species group is indicated by a round edged box.

The 20% whiting QS allocated to processors (Box 1 in the figure) may be reallocated among shoreside processors with a change in the processor allocation period. Of the 80% whiting QS allocated among permits, 0.01% goes to cover whiting bycatch on nonwhiting trips and 99.9% goes to cover whiting on whiting directed trips. Taking 99.9% of that 80% yields the 79.92% of the total whiting QS to be allocated for whiting directed trips (Box 2.2). Of this 79.92%, 7.2% is allocated equally among all permits and 92.8% allocated based on a permit's whiting history. Taking 92.8% of that 79.92% yields the 74.17% of the total whiting QS which may be subject to reallocation with a change in the initial allocation period for permits (Box 2.2.2).

As a consequence of the reallocations of whiting, the nonwhiting QS allocated proportionally to whiting would change (Box 4.1.1). This amount varies by species. The figure uses as an example the 1.8% of the sablefish north QS which is allocated to cover sablefish bycatch on whiting trips. .

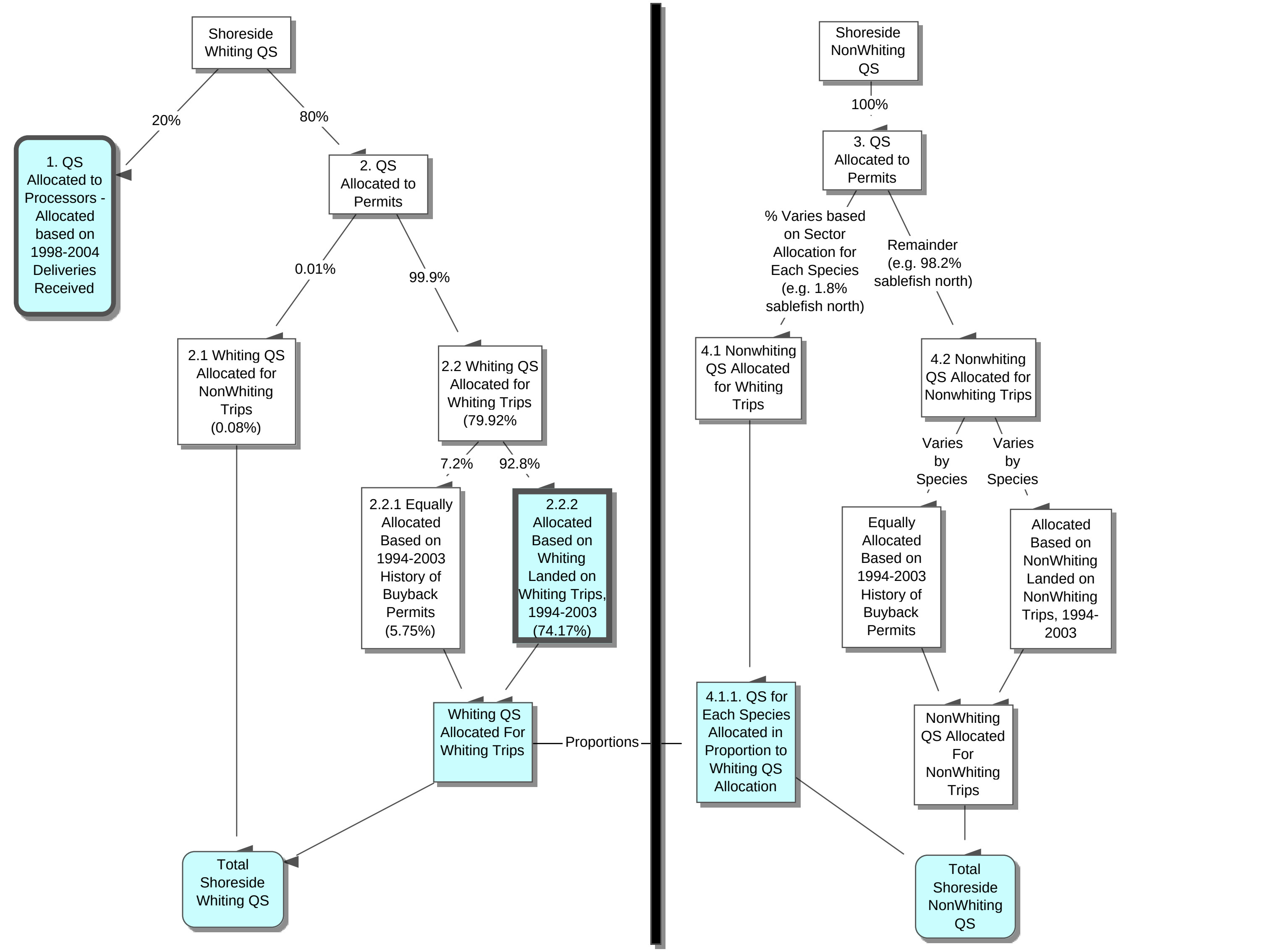


Figure. Steps in the QS allocation calculations for shoreside whiting QS and nonwhiting QS (shaded boxes indicate the steps in the allocation calculations that could be affected by a change in the allocation periods, rounded boxes are the final steps in the allocation calculations).

Agenda Item D.7.a
Supplemental Attachment 2
June 2012

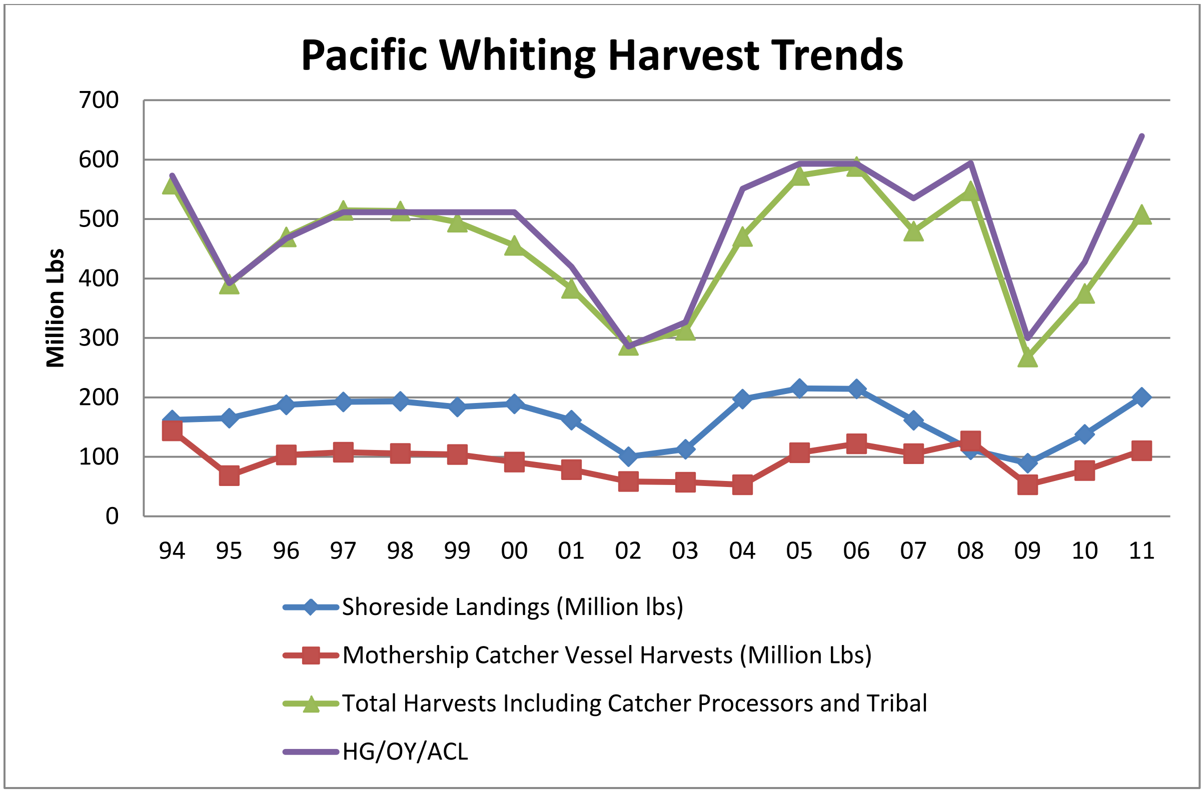
DESCRIPTION OF THE AFFECTED ENVIRONMENT (KEY SOCIO-ECONOMIC TRENDS) AND SUPPLEMENTAL ANALYSIS OF THE ALTERNATIVES

The following discussion provides information on the whiting fishery and communities especially for the three sectors affected by the "Reconsideration of Initial Catch Share Allocations in the Mothership and Shoreside Pacific Whiting Fisheries."

1. Major Events Affecting the Whiting Fishery

1976	Passage of the Magnuson-Stevens Act
1982	Pacific Groundfish FMP established
1988	Foreign Fishing for Pacific Whiting ends
1990	Joint Venture Fishing for Pacific Whiting ends
1992	Limited Entry implemented
1994	Tribal treaty rights to groundfish formally recognized.
1997	First year Pacific whiting specifically allocated between sectors
1998	American Fisheries Act passed into legislation
1999	Pacific Ocean Perch declared overfished
2000	Canary rockfish declared overfished
2000	Pacific Groundfish Disaster declared
2001	Darkblotched rockfish and Widow rockfish declared overfished
2002	Yelloweye rockfish declared overfished
2002	Pacific Whiting declared overfished
2003	U.S.–Canada Whiting Agreement signed
2003	Pacific Groundfish Trawl Buyback Program Implemented (December)
2004	Advance notice of proposed rulemaking for TIQ program and notice of control date (November 6, 2003) for the Pacific Coast groundfish fishery
2004	Pacific whiting no longer considered overfished
2004	Market conditions for Pacific Whiting start changing, ex-vessel prices, export prices, and exports of H&G whiting start rising significantly
2007	Temporary rules prohibiting any vessel from participating in either the mothership, catcher-processor or shoreside delivery sector of the directed Pacific whiting (whiting) fishery off the West Coast in 2007 if it does not have a history of sector-specific participation in the whiting fishery between January 1, 1997, and January 1, 2007. (Effective May 2007 to May 2008)
2009	Amendment 15 Pacific Whiting Vessel License Limitation implemented
2011	Trawl Rationalization Program implemented
2012	U.S.-Canada Whiting Agreement implemented
2012	Widow Rockfish declared rebuilt

2. Harvests-1994-2011 Total, Shoreside, and Mothership



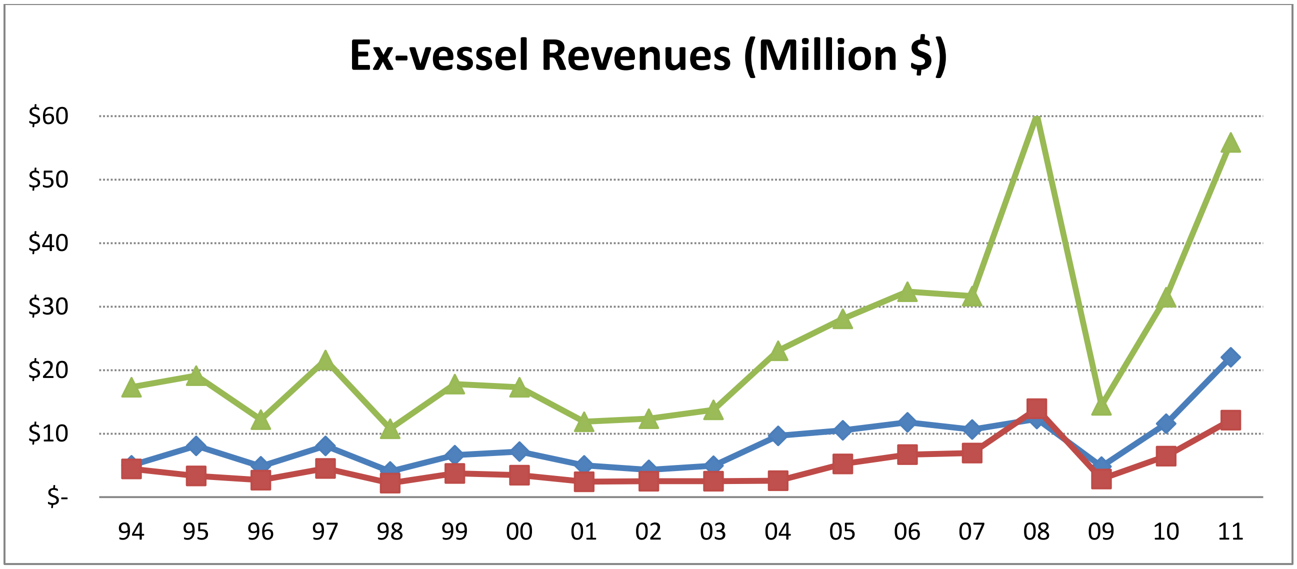
Notes and Observations on Whiting Harvests:

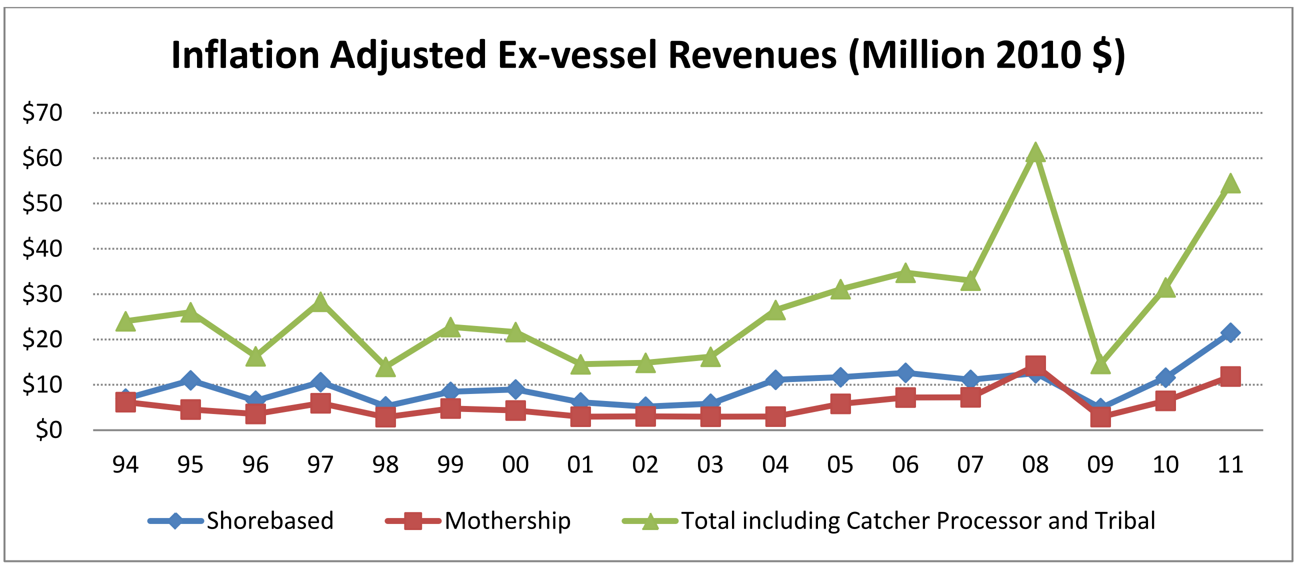
Total whiting harvests have varied over the years.

Harvests track closely with HG/OY/ACL levels.

Highest harvests (2006-589 million lbs) and lowest harvests (2009-268 million lbs) both occurred after 2003.

3. Ex-Vessel Revenues-1994-2011





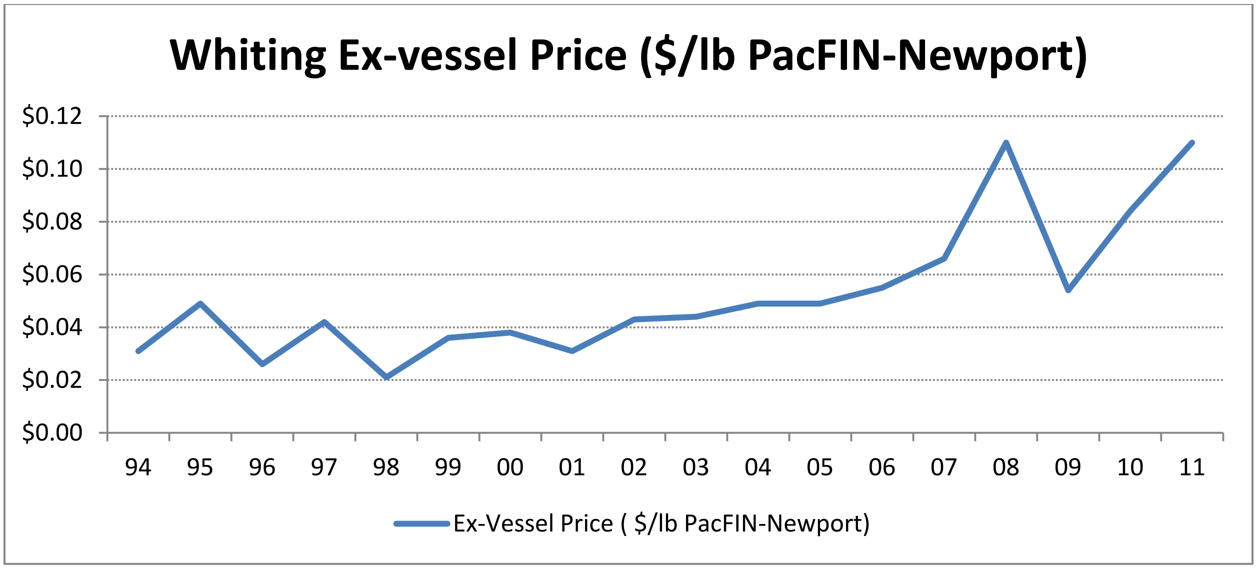
Notes and Observations on Ex-vessel Revenues

Whiting ex-vessel revenues (including imputed exvessel revenues for CP sector) have ranged from a low of $12 million in 1996 to a peak of $60 million in 2008.

Ex-vessel revenues began an increasing trend in 2003. It is presumed that the declines in 2009 and 2010 are due to the status of world economy and with OY/ACL levels. (See ex-vessel price and export trend below.).

When adjusted for inflation, similar trends appear.

4. Whiting Ex-Vessel Prices

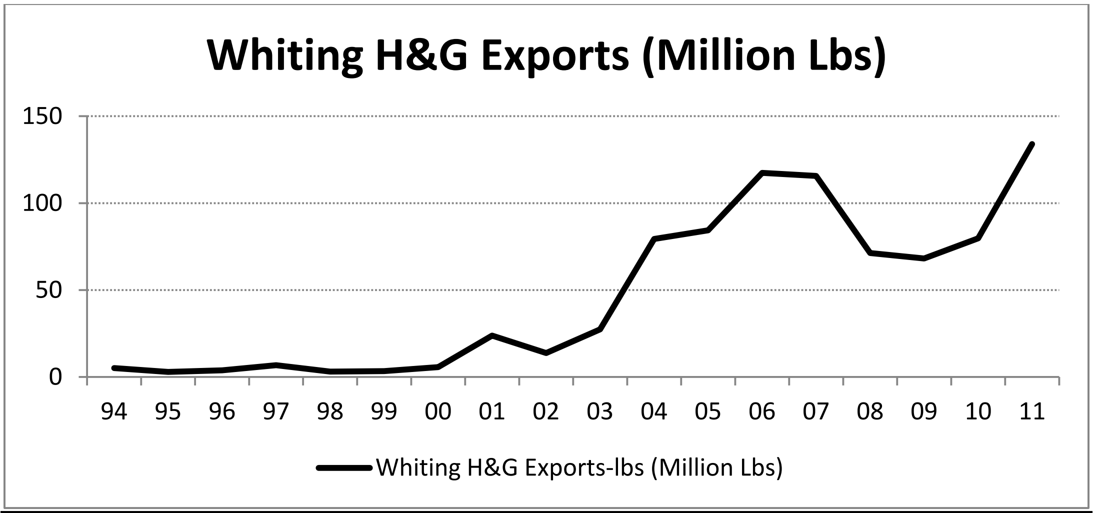


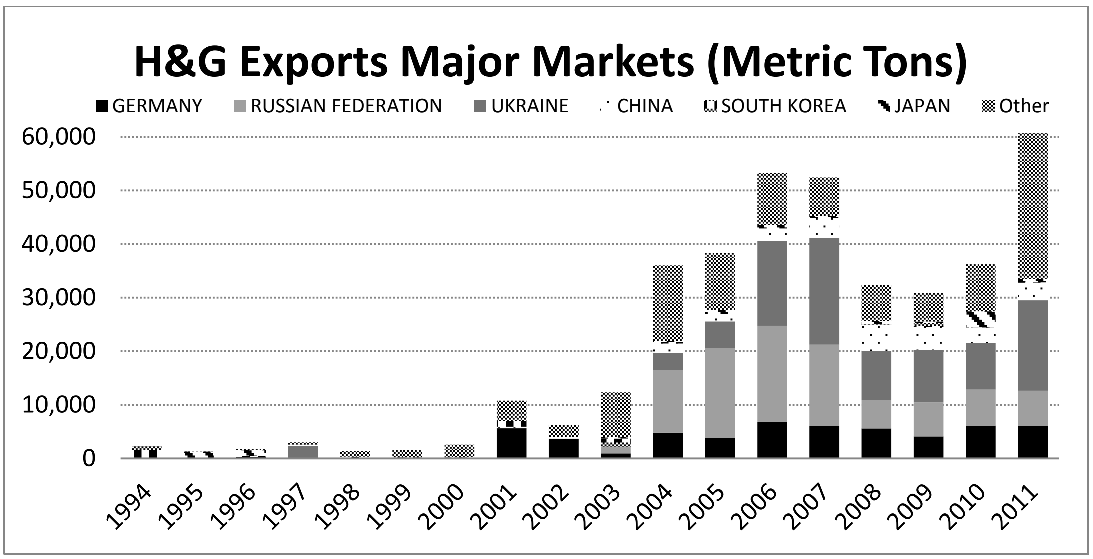
Notes and Observations on Whiting Ex-vessel Prices

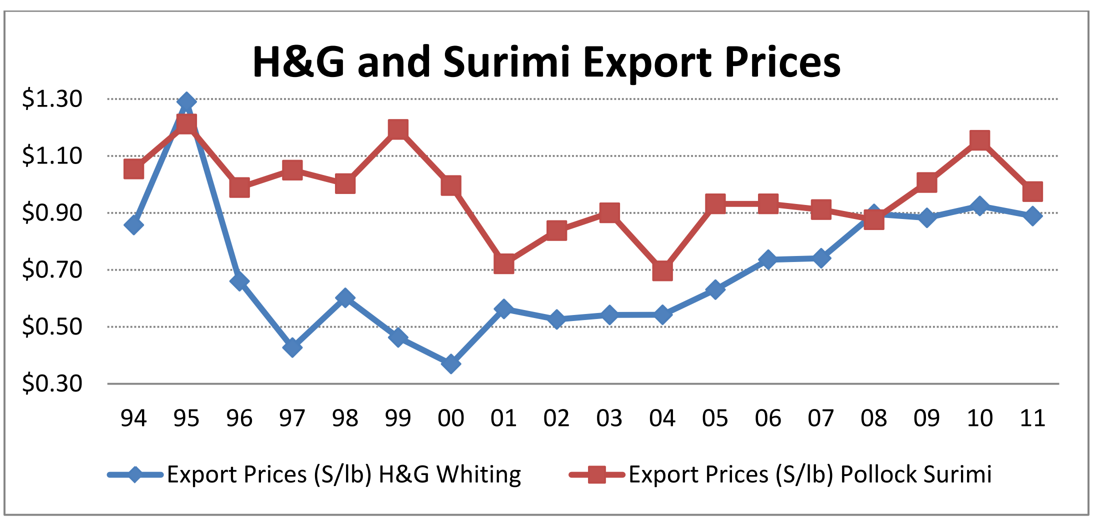
Ex-Vessel prices show similar trends as revenues.

After taking into account the world recession in 2008- 2011, ex-vessel prices increasing since 2003 even as total harvests increasing too.

5. Whiting Export Markets







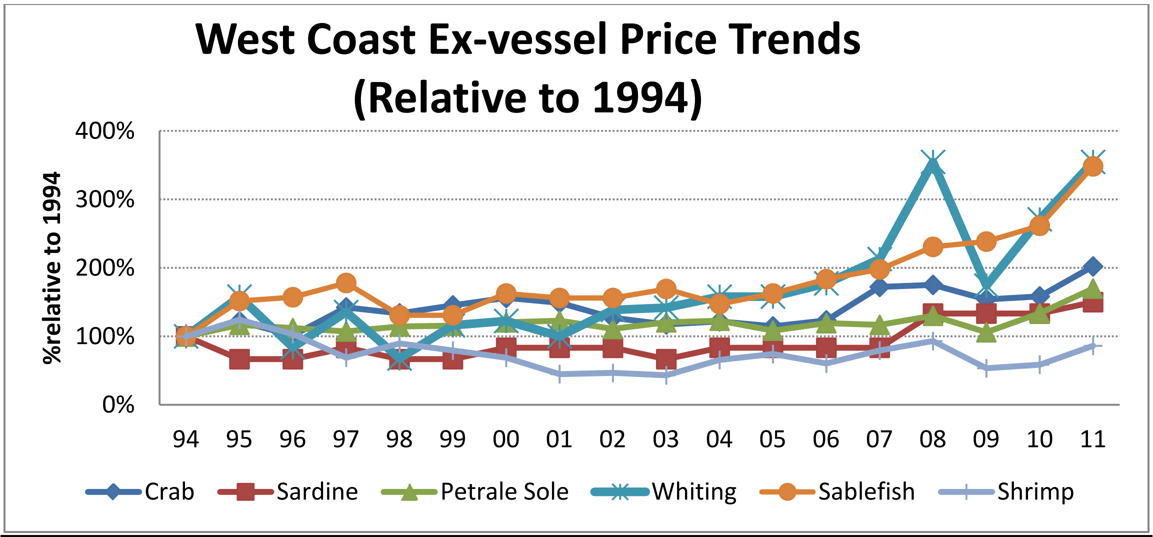
Notes and Observations on Export Markets

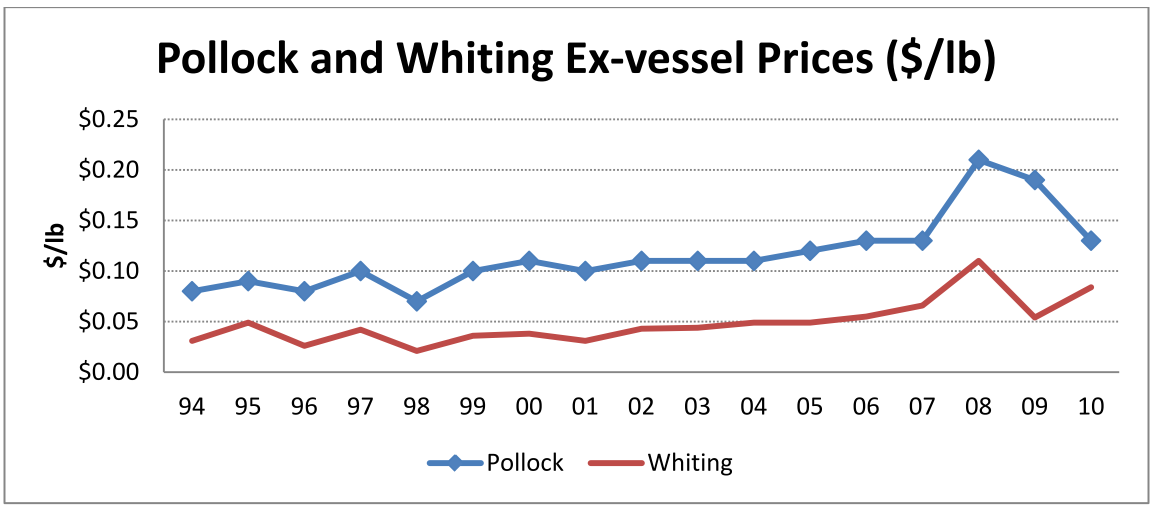
Exports of H&G Whiting started increasing trend in 2001.

Export market growth starts in 2001 but increases significantly after 2003; especially exports to Germany, Russian Federation, and Ukraine.

Relative difference between H&G export prices and Pollock surimi prices start to narrow in 2001. Prices become equivalent in 2008.

6. Related Species Ex-vessel Price Trends





Notes and Observations on Other Related Species Ex-vessel Price Trends

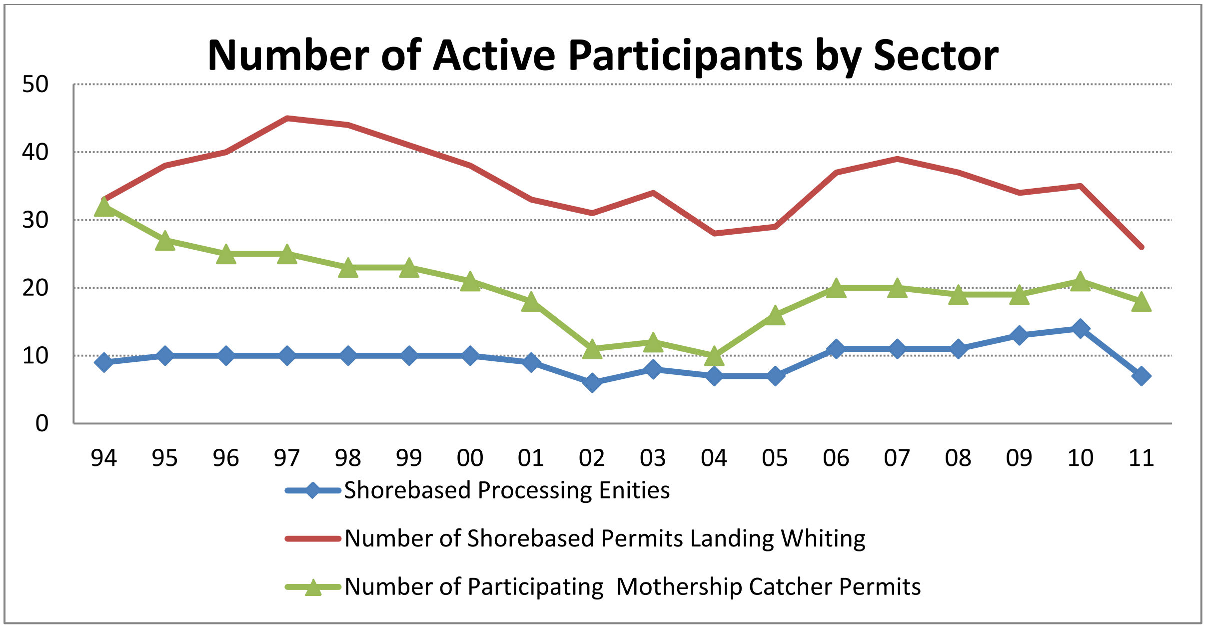
Price levels species shown vary. For example, 2011 ex-vessel prices for Dungeness Crab ($2.77), and Sablefish ($3.17) are much higher than Petrale Sole ($1,41), Shrimp ($0.50), Sardines ($0.09), and whiting ($0.11).

Because of these differences it is hard to discern trends by plotting prices on a common $/lb scale. Therefore prices are scaled using 1994 price levels as the basis. For example, the 2008 ex-vessel price for whiting ($0.110) is approximately 350% of the 1994 price level ($0.031).

Except for shrimp, species generally show rising trends relative to 1994. However, both whiting and sablefish show the most significant rising trends, especially since 2003.

Price trend for whiting mirrors that of pollock caught Pollock off Alaska except for 2010 when whiting price increased but pollock decreased.

7. Participation- Active Numbers of Permits and Shoreside Entities



Notes and Observations on Participation

"Active" = permit fished or entity received fish that year.

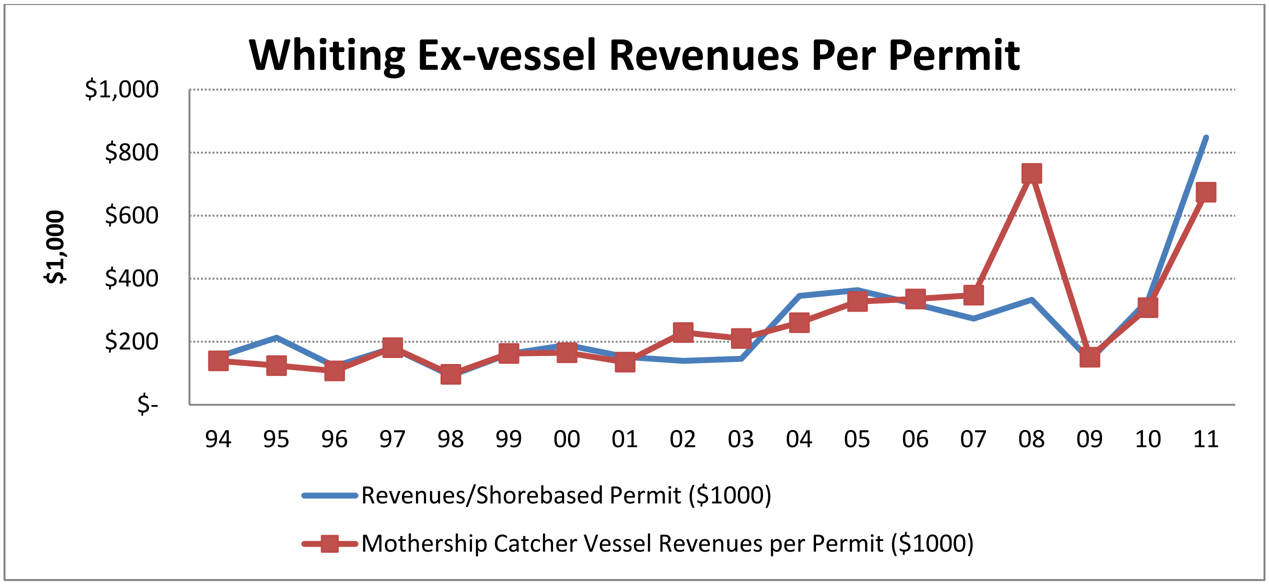
Whiting is landed either at buying stations or directly at processing sites. Analysts have related landings to processors based on buying station linkages, where known. If a company processes whiting at multiple sites, landings have been summed to reflect a single processing entity.

Number of permits fished includes buyback permits in years prior to 2004 (Buyback occurred in December 2003). Twenty two buyback permits were involved in Pacific whiting. (See Entry and Exit Analysis below)

Number of active shorebased processing entities increased from 7 in 2005 to 14 in 2010.

All sectors had lower numbers of active participants in 2011 than in 2010.

8. Ex-vessel Revenues per Permit



Notes and Observations on Ex-Vessel Revenues per Permit

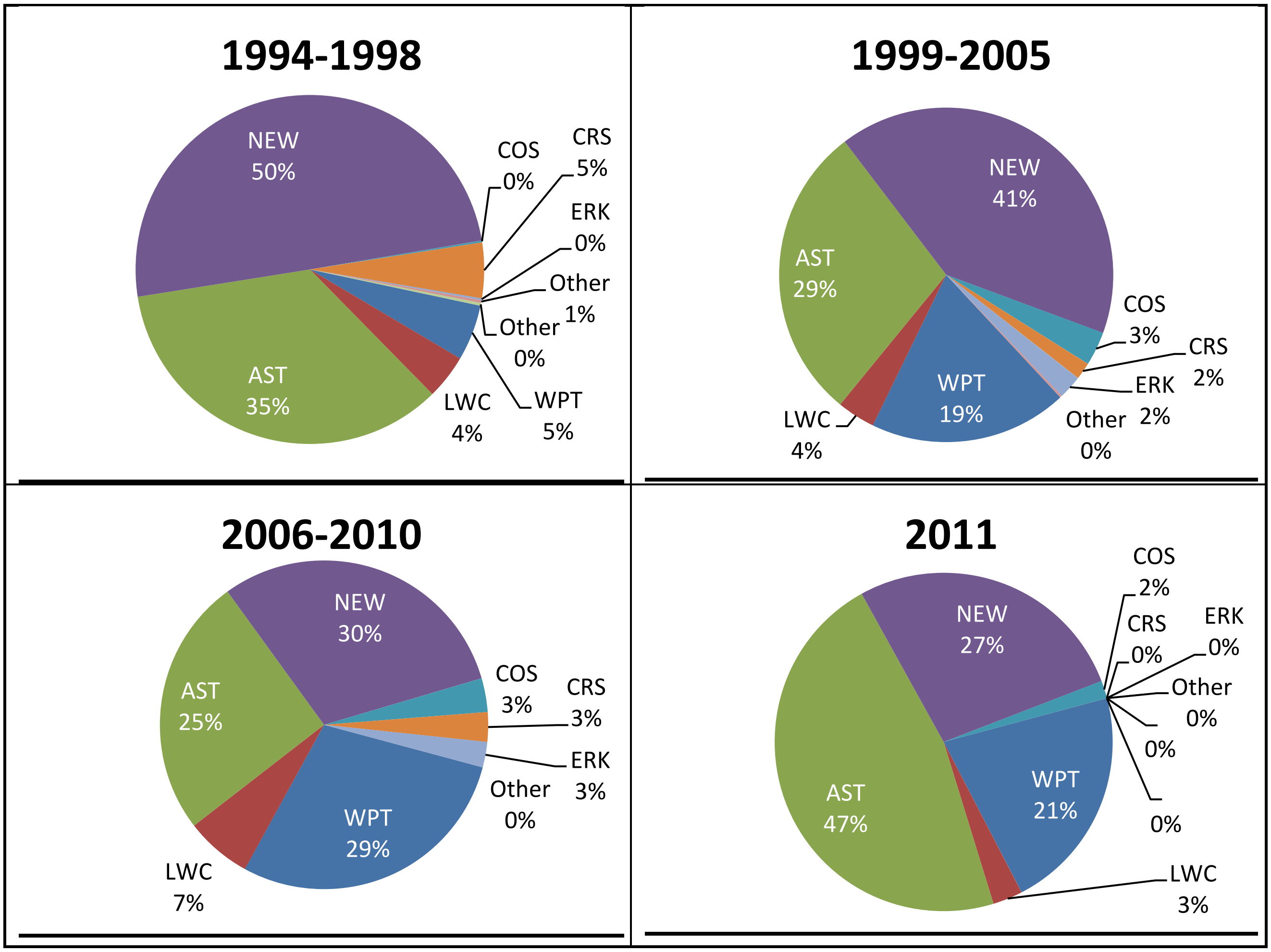
Revenues per mothership catcher-vessel permit generally increasing after 2003 and in line with sector allocation.

Revenues per shorebased permit similar to mothership trend except for 2008.

In 2008, the whiting fishery was closed early because the best available information on August 18, 2008 indicated that the 4.7 metric tons (mt) canary rockfish bycatch limit for the non-tribal whiting fisheries was projected to be reached. The shorebased fishery was not re-opened while unused shorebased allocations were distributed to the mothership and catcher processor sectors during the fall and winter.

Relatively high revenues per permit in 2011 reflect increases in OY/ACL, high ex-vessel prices, and decreases in the number of active permits. Permit revenue also likely high due to the Trawl Rationalization Program. Shorebased permits were able to fish quota pounds of other vessels. Mothership catcher-vessel permits were able to fish the catch history assignments of other permits.

9. Community Shares of Whiting Harvests-Trends



Notes and Observations on Community Whiting Harvest Trends

Over the years the following have been the major communities receiving whiting:, Westport (WPT), Ilwaco (LWC), Astoria (AST), Newport (NEW), Coos Bay (COS, Crescent City (CRS), and Eureka (ERK). "Other" includes Blaine, and Brookings.

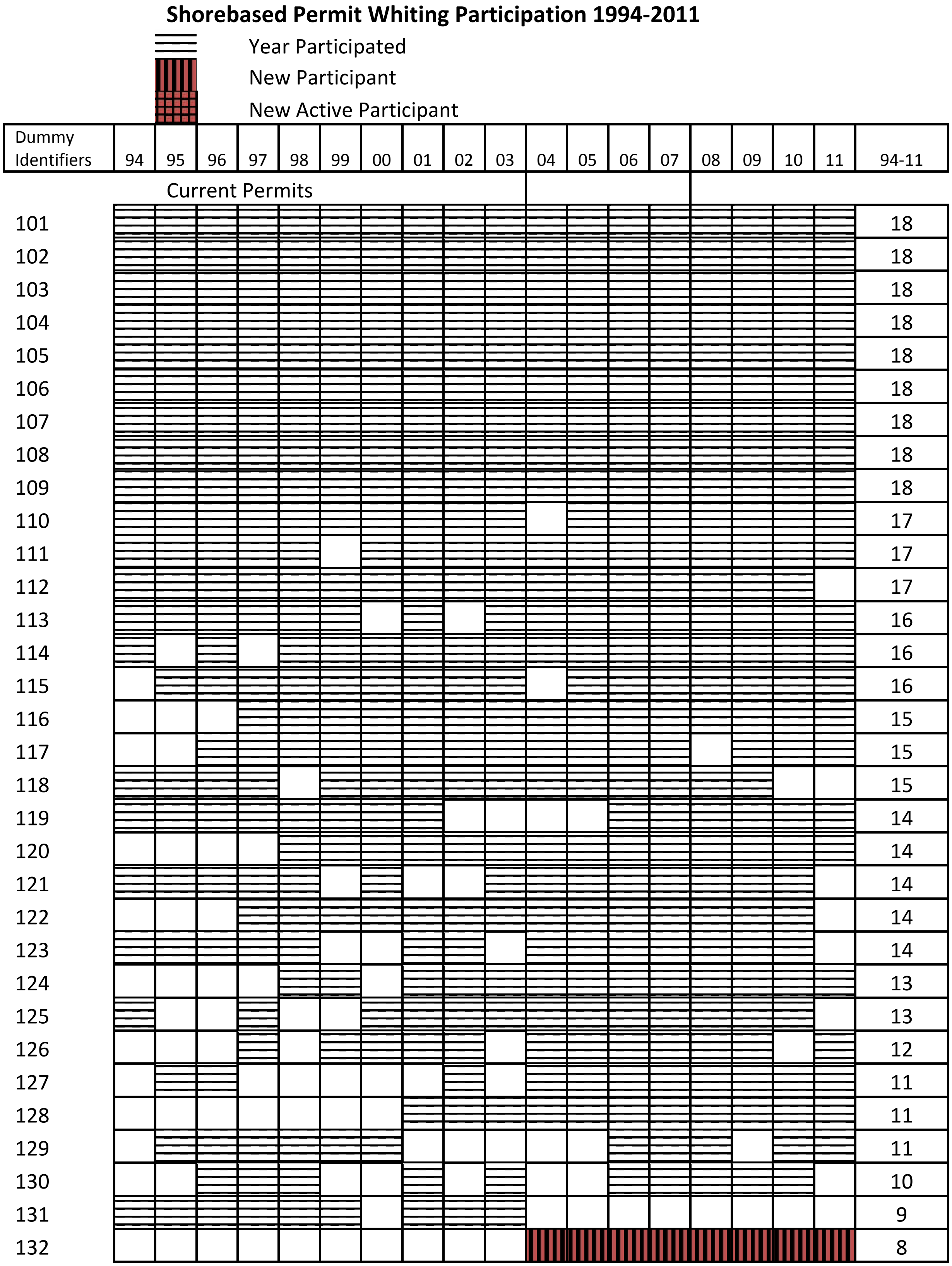
Newport, Astoria and Westport are the major centers of shorebased whiting processing.

The proportion of landings by community has varied over several periods: 1994-1998; 1999-2005; 2006-2010; and 2011. (Note that these estimates do not include tribal whiting.)

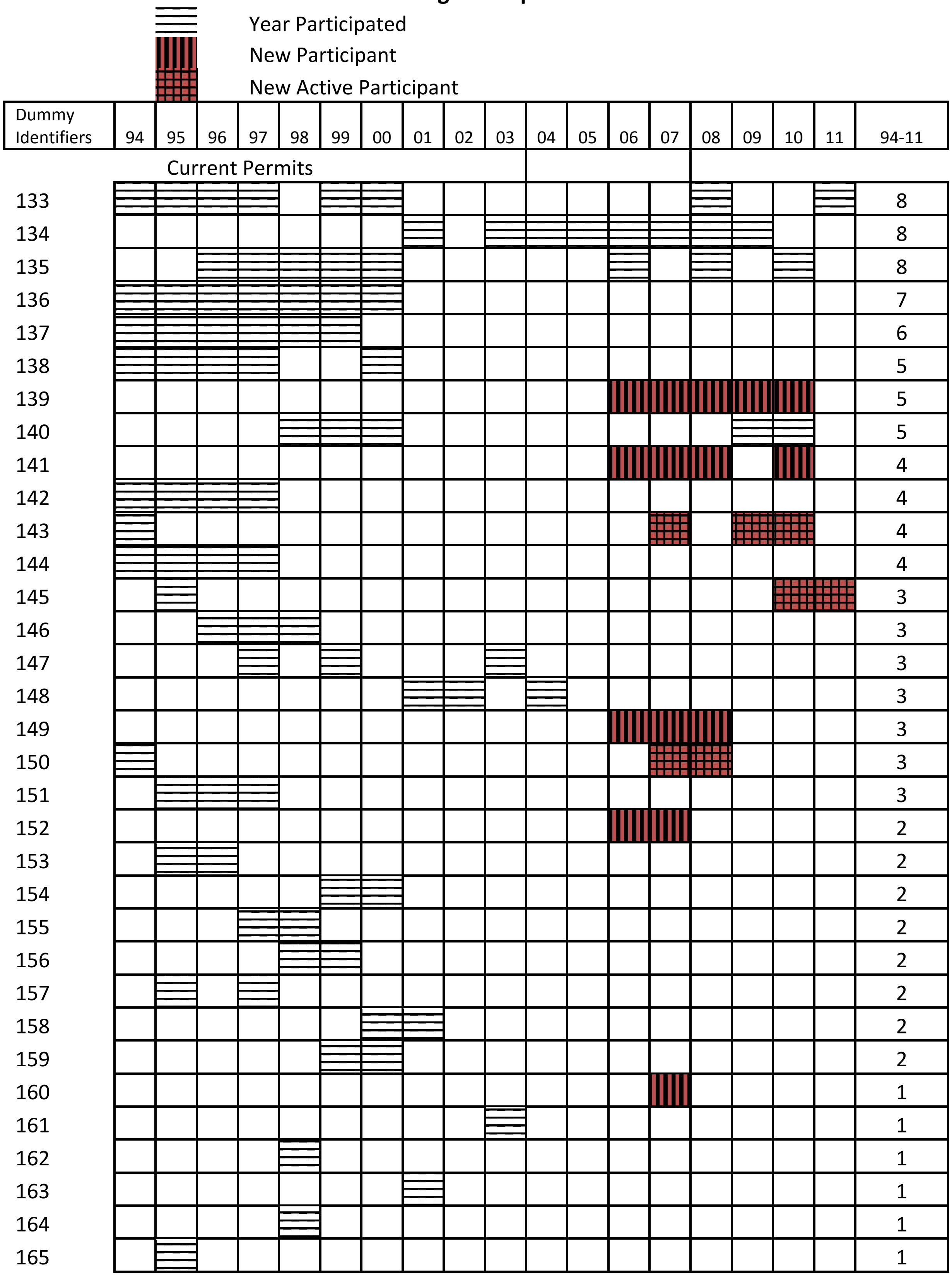
In the early years Newport was the lead port, but Westport has been steadily increasing. In 2011 Astoria was the lead port.

None of the California ports received landings in 2011.

10. Entry and Exit Patterns- Permits Landing Shorebased Whiting



Shorebased Permit Whiting Participation 1994-2011



Notes and Observations on Permit's Shorebased Whiting Participation

9 permits fished the maximum number of years (18)

30 permits fished 10 or more years.

22 permits did not fish after 2003.

6 permits entered after 2003

3 permits are "New Active Participants"—these permits left the shorebased fishery in either 1994 or 1995 and did not return until 2007 or later.

For completeness, activity of the buyback, lapsed, and combined permits is shown below:

Dummy Identifiers	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	94-11
201	■	■	■	■	■	■	■		■	■									9
202				■	■	■	■	■	■	■									7
203	■			■	■	■	■			■									6
204					■	■	■		■	■									5
205			■	■	■		■												4
206			■		■	■													3
207		■							■	■									3
208				■	■														2
209			■	■															2
210	■	■																	2
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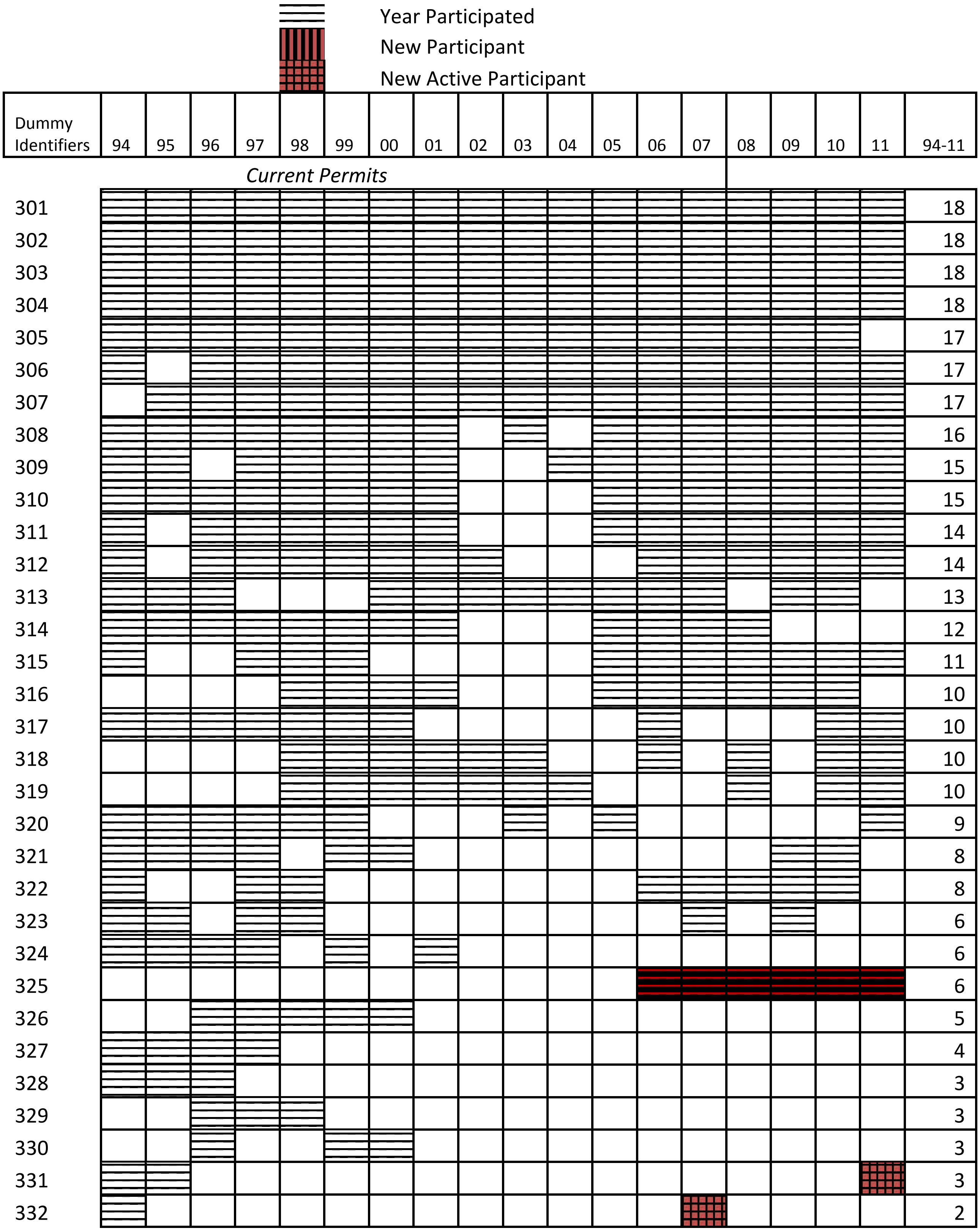
220						■													1
221						■													1
222						■													1
223	■																		1

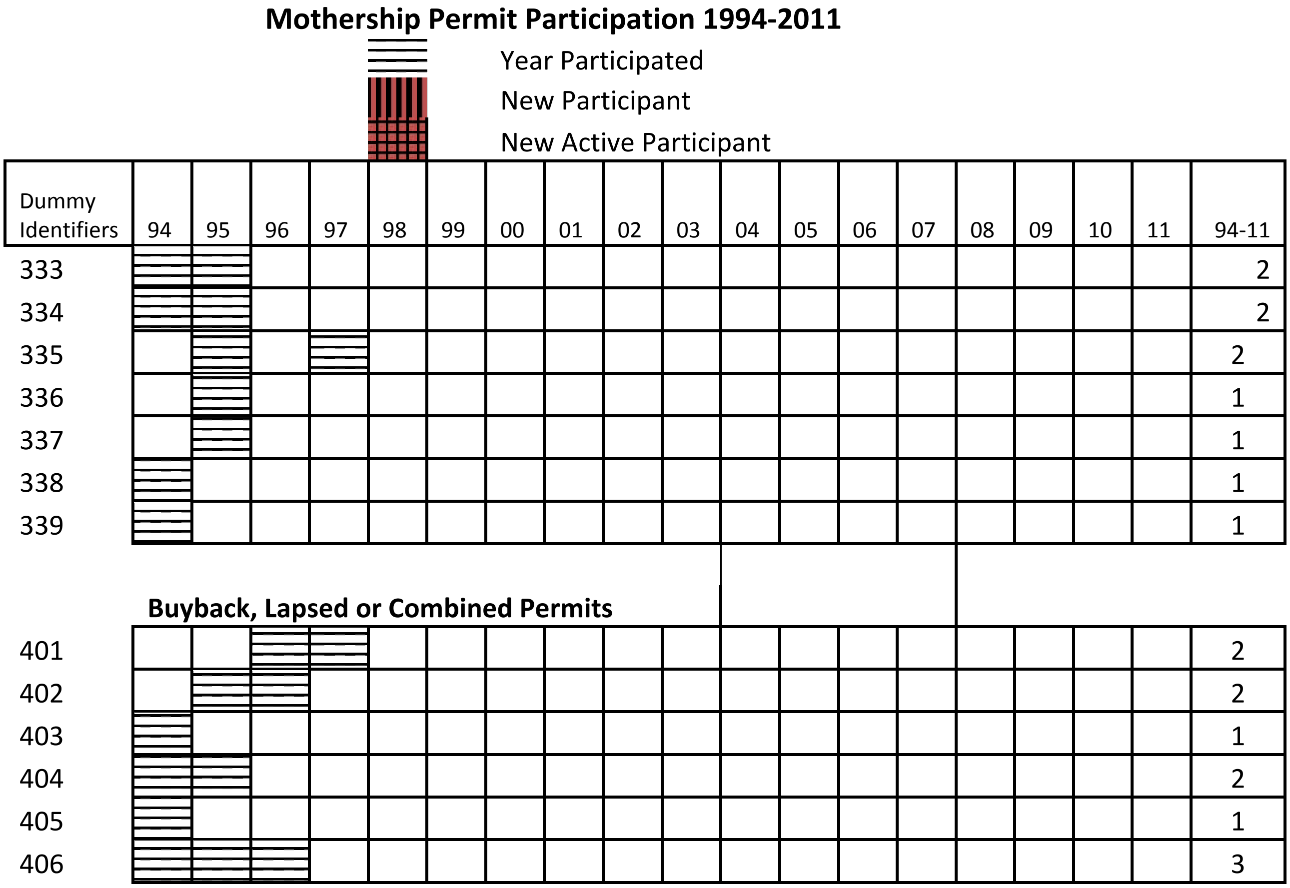
Notes and Observations on Buyback Permit Participation

The buyback permit portion of shorebased landings from 1994 to 2003 was about 7%.

12. Entry and Exit Patterns-Mothership Catcher-Vessel Permits

Mothership Permit Participation 1994-2011





<u>Notes and Observations on Mothership Catcher Vessel Permit Participation</u>

4 permits fished the maximum number of years (18).

19 permits fished 10 years or more.

11 permits did not fish after 2003.

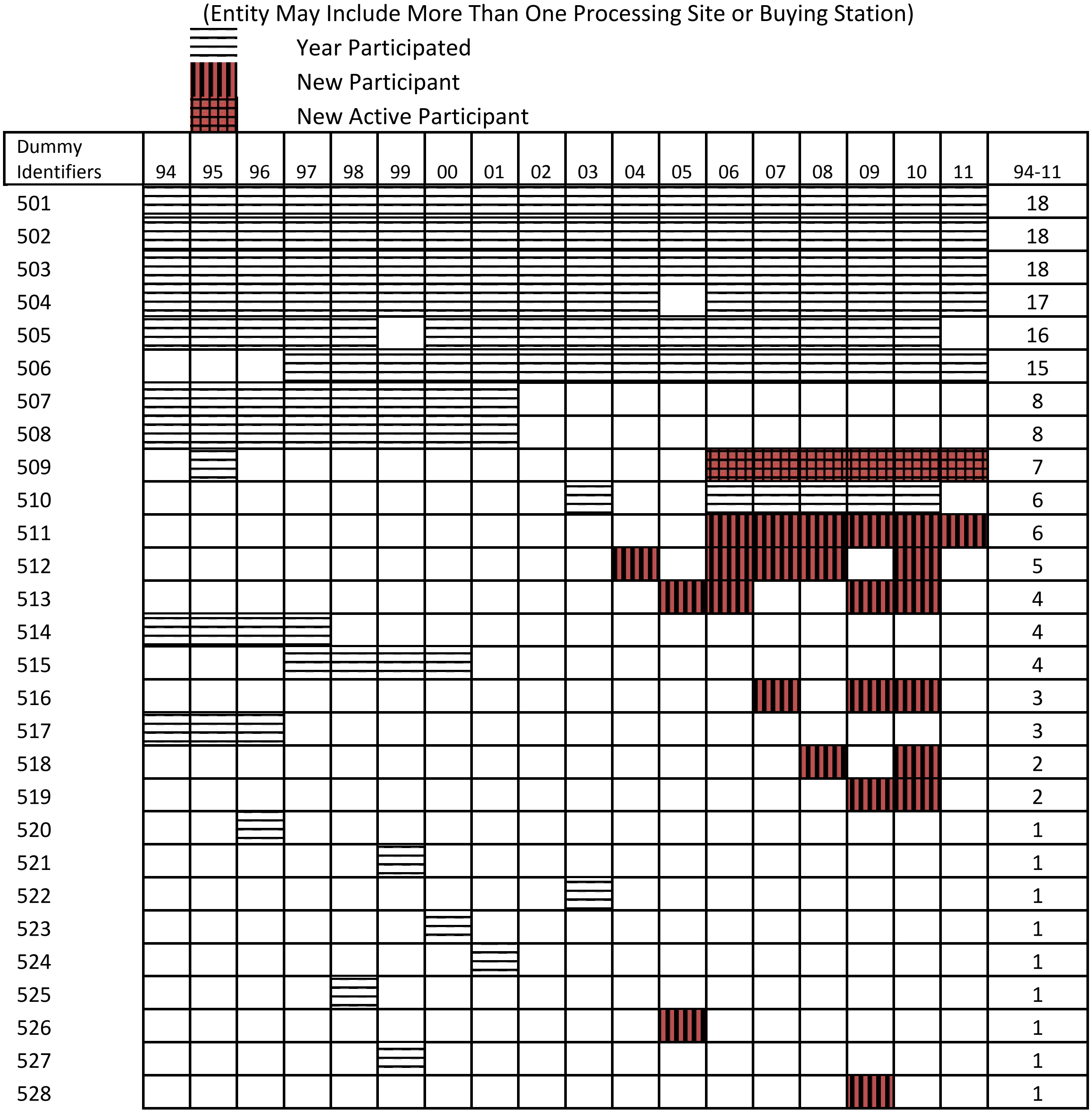
1 new entrant after 2003

2 current permits entered after 2003 after leaving in 1994 or 1995.

13. Entry and Exit Patterns-Shorebased Processing Entities

Shorebased Whiting Processor Entity Participation 1994-2011

(Entity May Include More Than One Processing Site or Buying Station)



Notes and Observations on Shorebased Processor Entity Participation

3 shorebased entities processed whiting the maximum number of years.

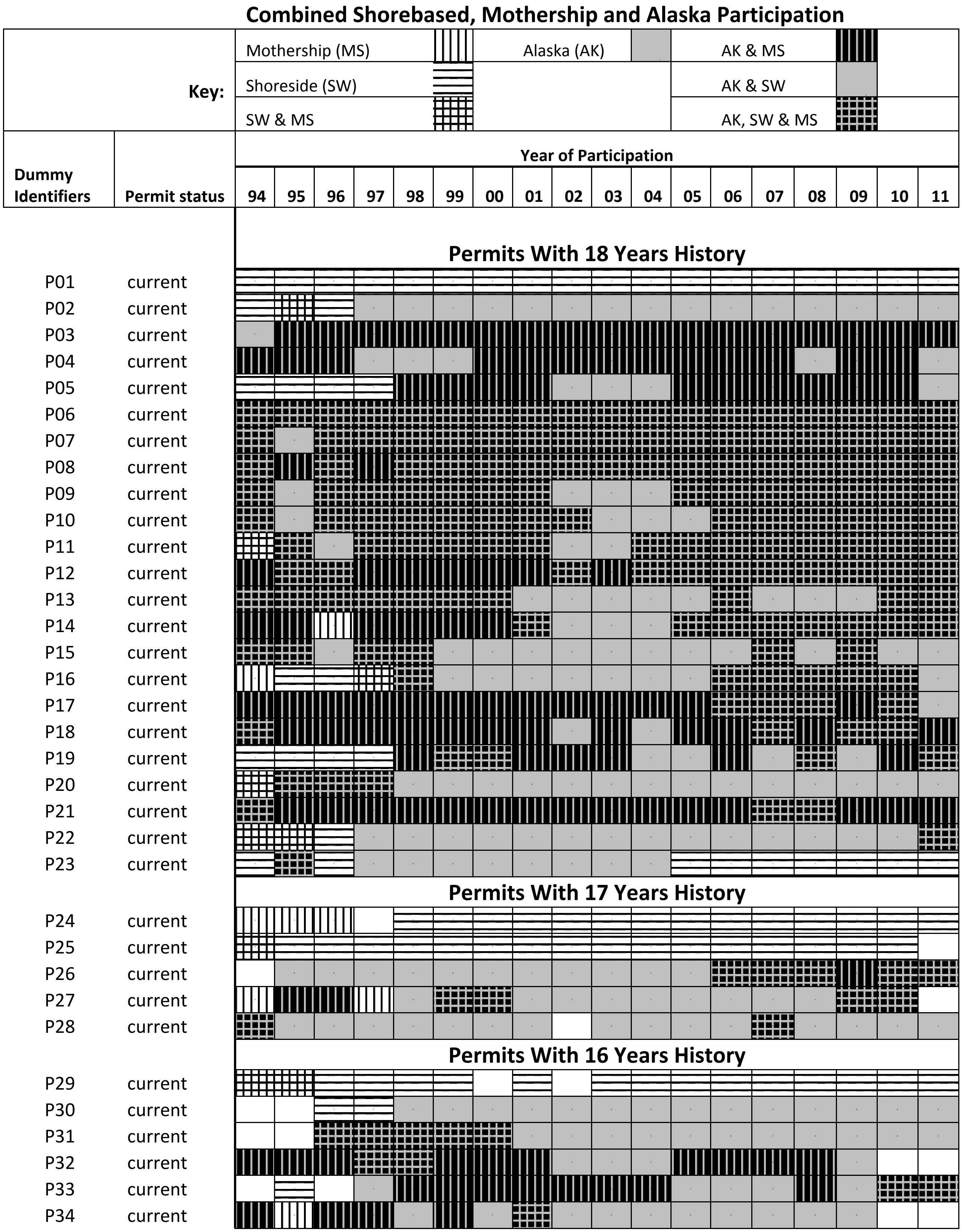
6 shorebased entities processed whiting 15 years or more.

11 shorebased entities did not process whiting after 2003.

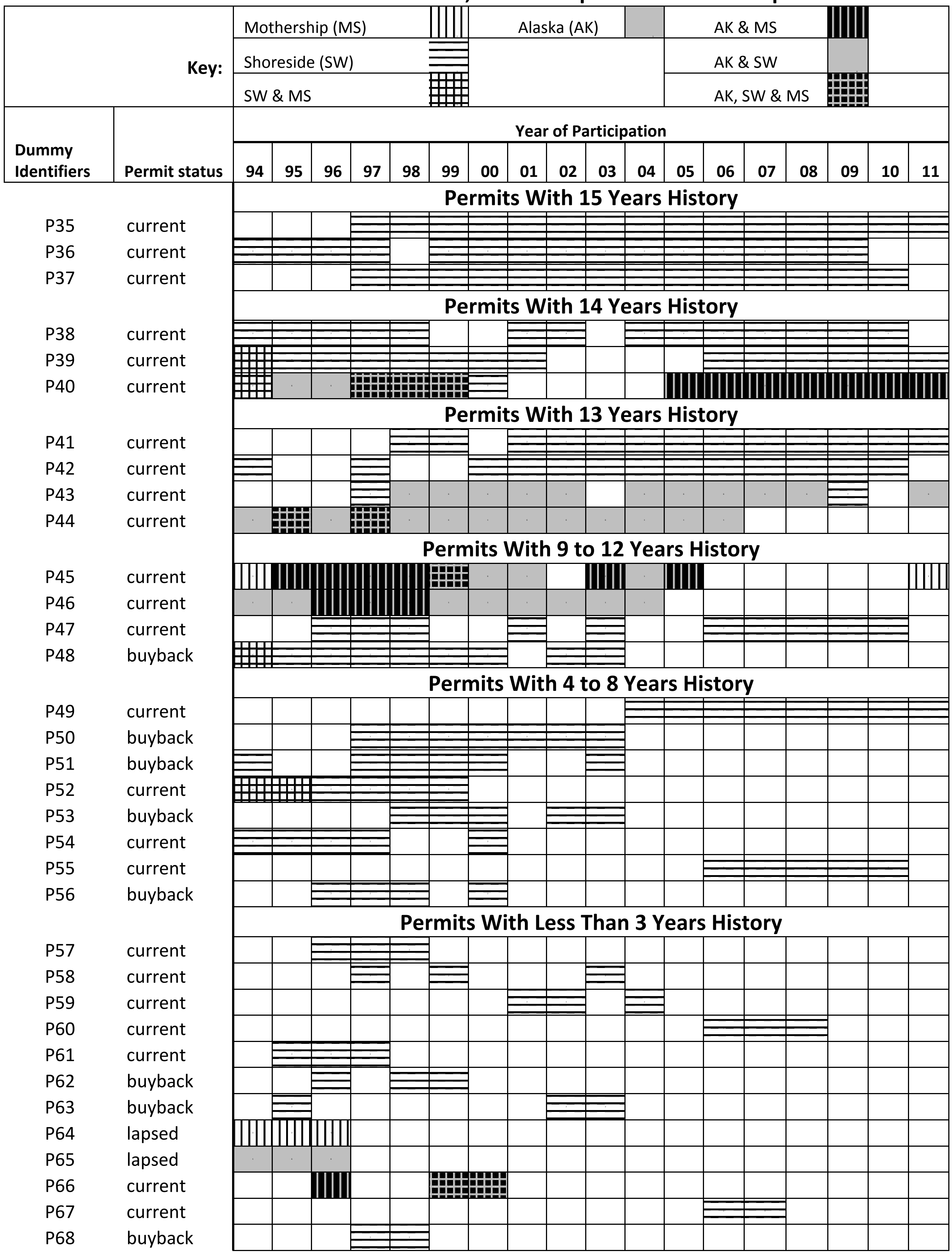
8 shorebased entities entered the fishery after 2003

1 shorebased entity re-entered the fishery after leaving in 1995.

14. Cross-Participation by Vessels in West Coast and Alaska Fisheries



Combined Shorebased, Mothership and Alaska Participation



Combined Shorebased, Mothership and Alaska Participation

Key:

Mothership (MS)	vertical lines	Alaska (AK)	grey	AK & MS	black vertical lines
Shoreside (SW)	horizontal lines			AK & SW	grey
SW & MS	grid			AK, SW & MS	dark grid

Dummy Identifiers	Permit status	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
		Year of Participation																	
P69	current		SW	SW															
P70	buyback			SW	SW														
P71	current					SW	SW												
P72	current		SW		SW														
P73	current							SW	SW										
P74	current														AK / AK & SW	AK / AK & SW			
P75	buyback		AK & MS	AK & MS															
P76	buyback			AK & MS	MS														
P77	combined	AK, SW & MS	AK, SW & MS																
P78	buyback					SW													
P79	buyback					SW													
P80	combined	SW																	
P81	current										SW								
P82	buyback							SW											
P83	buyback				SW														
P84	buyback	SW																	
P85	buyback		SW																
P86	buyback			SW															
P87	current					SW													
P88	current								SW										
P89	current					SW													
P90	current		SW																
P91	buyback		SW																
P92	buyback						SW												
P93	buyback						SW												
P94	buyback						SW												
P95	combined	AK & MS																	

Number participating each year:

		94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
WC and AK	MS,SW&AK	11	9	9	12	12	13	11	8	5	3	5	7	12	15	13	12	15	13
	MS&AK	7	11	13	10	11	10	10	10	6	9	5	9	8	5	6	7	6	4
	SW&AK	1	7	7	5	8	8	10	9	12	14	11	10	8	7	8	6	6	5
WC only	MS&SW	9	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MS only	5	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	SW only	12	18	24	27	24	20	17	16	14	17	12	12	17	17	16	16	14	8
AK only		3	1	0	2	4	5	4	7	9	7	13	7	4	5	5	5	1	6
TOTAL		48	53	56	59	59	56	52	50	46	50	46	45	49	49	48	46	42	37

Notes and Observations on Vessel Cross-Participation

4 permits entered the West Coast whiting fishery for the first time after the 2003 control date (there are eight years of data after 2003).

Of the four entering the fishery after the control date, only two participated in more than two years.

42 permits had no West Coast whiting fishery participation after 2003 (i.e., they participated only in the 10 years prior to the control date). 27 of these were no longer valid trawl permits after 2003 (i.e., buyback, lapsed or combined permits).

1 permit had participation prior to the control date but only one year after the control date (in 2004).

The year with the lowest numbers of vessels participating in all three fisheries (Shorebased whiting, Mothership whiting and Alaska) was 2003 (three vessels), followed by 2002 and 2004 (five vessels), 2005 (seven vessels) and 2001 (eight vessels).

2004 was the year with the largest number of vessels participating only in Alaska fisheries (thirteen vessels). The next largest number was nine vessels in 2002.

Despite higher ex-vessel prices and new buyers, there was apparently little movement into or out of the whiting fishery after the 2003 control date.

15. Allocations to AFA and Non-AFA Vessels under the Reallocation Alternatives

	No Action	Alt 1	Alt 2	Alt 3	Alt 4
Shorebased Whiting Quota Share:					
AFA Vessels	41.0%	41.0%	40.8%	41.2%	40.5%
Non-AFA Vessels	39.0%	39.0%	39.2%	38.8%	39.5%
Mothership Whiting Catch History Share:					
AFA Vessels	91.1%	91.1%	91.5%	91.5%	92.9%
Non-AFA Vessels	8.9%	8.9%	8.5%	8.5%	7.1%
Combined Shorebased-Mothership Whiting (weighted) "Quota":					
AFA Vessels	59.2%	59.2%	59.2%	59.5%	59.6%
Non-AFA Vessels	28.0%	28.0%	28.1%	27.8%	27.7%

Notes and Observations on Allocations to AFA and Non-AFA Vessels

Share of shoreside whiting quota allocated to the 30 AFA vessels associated with permits receiving initial allocations varies only slightly under the reallocation alternatives.

Share of mothership whiting catch history allocated to the 30 AFA vessels associated with permits receiving initial allocations is highest under reallocation Alternative 4.

GUIDANCE FOR MAKING ALLOCATION DECISIONS RELATED TO CATCH SHARES

This document contains guidance on allocation issues that the Council should take into account in its reconsideration of the quota share allocations for the shorebased whiting fishery and the catch history allocations to catcher vessel permits the mothership whiting fishery. The guidance is drawn from the Magnuson Stevens Act (MSA), related NOAA/NMFS guidance, and the groundfish FMP.

Contents

MSA

MSA § 303(b)(6) 16 U.S.C. § 1853(b)(6)

> [Any FMP may] establish a limited access system for the fishery in order to achieve optimum yield if, in developing such a system, the Council and the Secretary take into account—
> (A) present participation in the fishery;
> (B) historical fishing practices in, and dependence on, the fishery;
> (C) the economics of the fishery;
> (D) the capability of fishing vessels used in the fishery to engage in other fisheries;
> (E) the cultural and social framework relevant to the fishery and any affected fishing communities;
> (F) the fair and equitable distribution of access privileges in the fishery; and
> (G) any other relevant considerations

The phrase “take into account” means only that the council and NMFS must consider the factors listed in section 303(b)(6) and must balance the factors against each other and against any other relevant considerations. *Sea Watch Int’l v. Mosbacher*, 762 F. Supp. 370, 379 (D.D.C. 1991).

MSA § 303A—LIMITED ACCESS PRIVILEGE PROGRAMS - 16 U.S.C. §1853a

(c)(5) ALLOCATION.—In developing a limited access privilege program to harvest fish a Council or the Secretary shall—

(A) **establish procedures to ensure fair and equitable initial allocations, including consideration of—**

(i) current and historical harvests;

(ii) employment in the harvesting and processing sectors;

(iii) investments in, and dependence upon, the fishery; and

(iv) the current and historical participation of fishing communities;

(B) consider the basic cultural and social framework of the fishery, especially through…

(C) include measures to assist, when necessary and appropriate, entry-level…

(D) ensure that limited access privilege holders do not acquire and excessive share…

(E) authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially participate in the fishery, including in specific sector of such fishery, as specified by the Council.

MSA National Standards

An allocation must be consistent with:

National Standard 2: Conservation and management measures shall be based on the best scientific information available.

National Standard 4: Conservation and management measures shall not discriminate between residents of different States. **If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocations shall be (A) fair and equitable to all such fishermen**; (B) reasonably calculated to promote conservation; and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

National Standard 8: Conservation and management measures shall, consistent with the conservation requirements of this Act…take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (AP provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Agency Guidance

National Standard Guidelines

600.325 National Standard 4 – Allocations

****

(c)(2) ***Analysis of allocations.*** Each FMP should contain a description and analysis of the allocations existing in the fishery and of those made in the FMP. The effects of eliminating an existing allocation system should be examined. Allocations schemes considered but rejected by the Council, should be included in the discussion. The analysis should relate the recommended allocations to the FMP's objectives and OY specification, and discuss the factors listed in (c)(3) of this section.

(c)(3) ***Factors in making allocations.*** An allocation of fishing privileges must be fair and equitable, must be reasonably calculated to promote conservation, and must avoid excessive shares. These tests are explained in paragraphs (c)(3)(i) though (c)(3)(iii) of this section.

(i) ***Fairness and equity***.

(A) An allocation of fishing privileges should be rationally connected to the achievement of OY or with the furtherance of legitimate FMP objectives. Inherent in an allocation is the advantaging of one group to the detriment of another. The motive for making a particular allocation should be justified in terms of the objectives of the FMP; otherwise, the disadvantaged user groups would suffer without cause. For example, an FMP objective to preserve the economic status quo cannot be achieved by excluding a group of longtime participants in the fishery. On the other hand, there is a rational connection between an objective of harvesting shrimp at their maximum size and closing a nursery area to trawling.

(B) An allocation may impose a hardship on one group if it is outweighed by the total benefit received by another group or groups. An allocation need not preserve the status quo in the fishery to qualify as "**fair and equitable,"** if a restructuring of fishing privileges would maximize overall benefits. The Council should make an initial estimate of the relative benefits and hardships imposed by the allocation, and compare its consequences with those of alternative allocation schemes, including the status quo. Where relevant, judicial guidance and government policy concerning the rights of treaty Indians and aboriginal Americans must be considered in determining whether an allocation is fair and equitable.

(ii) ***Promotion of conservation.*** Numerous methods of allocating fishing privileges are considered "conservation and management" measures under 303 of the Magnuson-Stevens Act. An allocation scheme may promote conservation by encouraging a rational, more easily managed use of the resource. Or, it may promote conservation (in the sense of wise use) by optimizing the yield in terms of size, value, market mix, price, or economic or social benefit of the product. To the extent that rebuilding plans or other conservation and management measures that reduce the overall harvest in a fishery are necessary, any harvest restrictions or recovery benefits must be allocated fairly and equitably among the commercial, recreational, and charter fishing sectors of the fishery.

(iii) ***Avoidance of excessive shares*.** An allocation scheme must be designed to deter any person or other entity from acquiring an excessive share of fishing privileges, and to avoid creating conditions fostering inordinate control, by buyers or sellers, that would not otherwise exist.

(iv) ***Other factors.*** In designing an allocation scheme, a Council should consider other factors relevant to the FMP's objectives. Examples are economic and social consequences of the scheme, food production, consumer interest, dependence of the fishery by present participants and coastal communities, efficiency of various types of gear used in the fishery, transferability of effort to and impact on other fisheries, opportunity for new participants to enter the fishery, and enhancement of opportunities for recreational fishing.

§ 600.345 National Standard 4—Communities.

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(b)(2) This standard does not constitute a basis for allocating resources to a specific fishing community nor for providing preferential treatment based on residence in a fishing community.

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(c)(3)To address the sustained participation of fishing communities that will be affected by management measures, the analysis should first identify affected fishing communities and then assess their differing levels of dependence on and engagement in the fishery being regulated. The analysis should also specify how that assessment was made. The best available data on the history, extent, and type of participation of these fishing communities in the fishery should be incorporated into the social and economic information presented in the FMP. The analysis does not have to contain an exhaustive listing of all communities that might fit the definition; a judgment can be made as to which are primarily affected. The analysis should discuss each alternative's likely effect on the sustained participation of these fishing communities in the fishery.

(4) The analysis should assess the likely positive and negative social and economic impacts of the alternative management measures, over both the short and the long term, on fishing communities. Any particular management measure may economically benefit some communities while adversely affecting others. Economic impacts should be considered both for individual communties and for the group of all affected communities identified in the FMP….

(5) A discussion of social and economic impacts should identify those alternatives that would minimize the adverse impacts on those fishing communities within the constraints of conservation and management goals of the FMP, other national standards, and other applicable law.

NOAA Guidance on LAPP Programs

Selected portions relevant to the "reconsideration of the qualifying time periods for the initial allocations of whiting" from *The Design And Use Of Limited Access Privilege Programs*, NOAA Technigcal Memoradum NMFS-F/SPO-86, November 2007

In summary, the allocations must be fair and equitable and they should consider the cultural and social framework of the fishery. However, given the use of term "including consideration of" there is some allowable flexibility beyond the four required considerations in determining exactly how the harvest privileges will be distributed. The discussion here will not attempt to list all of the things that cannot be done other than to say any distribution that showed blatant favoritism or utter disregard to the "fair and equitable" standard in the law would likely not be approved nor would it withstand legal challenge. Similarly there will be no attempt to make a list of all the permissible procedures or formulae that could be used. Rather the discussion will focus on procedures and lessons learned. The goal will be to assist the Councils as they use their ingenuity and inventiveness to develop allocation procedures that support their objectives, taking into account the recent changes in the Act.

The initial allocation task can be broken down into two parts.[7] Note however that the material under (B) has more to do with restrictions on the use of the harvesting privilege than it does with initial allocation, but the two are related. First, it is necessary to select the pool of entities that will be eligible to receive harvest privileges. The basics of this step have already been discussed in the section on "Eligibility." It is possible however, that the pool of potential recipients can be a subset of those who are qualified to own privileges. The Council may approve of certain types of entities being able to acquire privileges in the open market, but may feel that they do not merit an initial allocation. Congress has placed RFAs in this category.

The second step is to determine how the privileges will be distributed among those in the designated pool. Under the reauthorized MSA, there are two ways that this can be accomplished. As has been done in the past, the privileges can be given away according to specified allocation formulae. It is also possible to use auctions to sell the initial privileges as long as the auctions are constrained such that they meet the "fair and equitable" standards specified in the Act. If auctions are to be used, they would be most appropriate in traditional IFQ programs, but Councils may also wish to use them in more general LAP programs as well. The two possible ways of allocating the privileges will be discussed in turn. The revised MSA also allows rent collection with formula-based allocations, and this will be treated in a separate section.

B. Free Formula-Based Allocations

There are literally an infinite number of allocation formulae that are acceptable under the MSA. It is possible, however, to list some of the attributes upon which the formulae can be based. In the IFQ programs that have already been adopted under the MSA, the attributes were related to various aspects of participation in the fishery, primarily catch, capital investment, and number of years fished over a reference period.

In response to suggestions to expand the pool of eligible recipients that lead to some of the most recent revisions in the Act, characteristics of entities have become other attributes to consider. Examples are size, ownership characteristic (owner-operated), and operating location of the firm, various measures of dependence on the fishery including percent of revenue or opportunities to participate in other fisheries, and inter-relations with other fishery related business especially with respect to employment.

The participation attributes, though not without controversy, are relatively easy to handle both conceptually and with respect to data availability. For example, in the surf clam and ocean quahog program, the allocation formula was based on a weighted average of a relative catch index and a relative investment index. Working with characteristic attributes will likely be a different story. Coming up with appropriate measures of the specific characteristics that can be calculated given existing or readily available data, and then using several of them to come up with an actual allocation formula will be more difficult. Nonetheless it is a task that will have to be accomplished by those Councils who choose to broaden the potential range of eligible entities.

The following discussion starts of with a consideration of the relatively easy participation attributes in the context of traditional IFQ fisheries. Using that as a base, the discussion will turn to a preliminary assessment of the consideration of both types of attributes in the context of more general LAP programs.

Traditional IFQ Programs.

If the eligible group is restricted to vessel owners, the allocation formula could be based on equal shares (for all individuals satisfying some minimum requirements), vessel size, catch history, the number of consecutive years of participation in the fishery, or some combination of two or more of these factors. One problem with equal shares is that part-timers will have their relative shares increased, and highliners (those who have historically accounted for a disproportionate share of the landings) will be brought down to the level of the average fisherman. If the eligible group also includes crew members, it might be difficult to use catch histories for logistic reasons (turnover rates of crew are high and there may be no records of who was on which boat when catches were taken). Allocations to crew members could be based on either equal shares or the number of years of participation in the fishery or both.

If both vessel owners and crew members are considered to be eligible to receive an initial allocation, it would probably be necessary to include several of the above categories in the allocation formula. For example, 30 percent of the total quota could be divided equally among all eligible parties, 30 percent could be divided on the basis of the number of years of full-time participation in the fishery, and 40 percent could be split among vessel owners on the basis of vessel size. Strategies of this nature (with the percentages split out differently) should be explored with the industry as alternatives to strategies that rely on catch histories especially where catch documentation is weak or missing. An alternative that avoids the necessity of deriving an allocation formula is to use a lottery system.

Identified options for allocations:

1. Allocate shares equally among eligible recipients.
2. Allocate shares on the basis of vessel size.
3. Allocate shares on the basis of catch histories.
4. Allocate shares on the basis of historical participation.
5. Use a lottery to allocate shares.
6. Allocate shares using combinations of two or more of the above.

General LAP Programs.

There is little new in the above discussion for those individuals who have watched the current IFQ programs being developed. It is all second nature. However, to consider how to approach more complicated cases where LAPs are given to both traditional recipients and to FCs and may be available for purchase by RFAs, it will be useful to go back and recreate the mental process through which the above potential options were developed.

Given the laws and accepted views on who were potential recipients, historically the main concern was to set up an allocation that would change the fishery from the *status quo* to an IFQ fishery with a minimum disruption of the current distribution between the recipients. When that was the goal, the question became what sorts of things could be used to quantitatively compare allocations among the potential recipients? Looking at participation characteristics was a good way to do this. Catch histories are a way to compare the relative success of various participants. Comparing the financial investments shows, albeit imperfectly, relative commitments to a fishery, and at the same time, relative differences in amounts that will have to be earned to support the capital equipment. It is interesting to note that the two measures will provide different rankings. A smaller older boat operated by a high-liner could have a very good catch record but could be way low on the financial investment ladder. Which measure is best? That is a judgment call. At the same time, others may not like either of these measures and would argue for years of participation. Finally, others would suggest that the notion of maintaining the existing distribution is not appropriate and would argue for an equal distribution. The allocation formulae actually used in U.S IFQ programs were usually based on more than one of these measures (see the initial allocation entries in the LAP Program Spotlights in Appendix 1).

Consider now the problem of coming up with an allocation formula or procedure for a more general LAP program. It would certainly be permissible to use the same type of measures that have been used in IFQ programs. However, such measures may miss some of the elements or issues that are being addressed by allowing FCs to receive harvesting privileges. It may be possible to correct for this by only using a subset of the measures or to use different weights to make weighted averages.

If Councils want to do more, it may be useful to go through the same type of exercise as described above. For example, what are the motivations for choosing to use a RFA-type organization in a particular case? Assume that it is the ability to look at the full range of fishery related businesses including processing, supply companies, and downstream marketers. In that case it will be necessary to find some measures that capture the specific issues that are being addressed, and can be quantitatively measured. Some possibilities include total employment, employees per unit of fish, percentage of net revenue that remains in the area, etc. The final step would be to turn these measures into an allocation formula. This is but one example of many options, and simply demonstrates a process that the Councils can use to expand the standard ways of calculating allocation formula if they choose to do so.

It would also be possible to use different types of formulae within the general LAP program. The Council may split the TAC into two parts and allocate one part as IFQs according to more or less traditional methods and allocate the second part to other entities with other methods.

Even with this vast array of choices, it is probably impossible to devise a system that will be perceived as equally fair by all eligible entities. To improve the perceived fairness it would be essential for the Council to repeatedly consult with the members of the selected pool and the broader suite of stakeholders.

FMP Goals, Objectives, and Guidance on Allocations

The guidelines for National Standard 4 state with respect to analysis of allocation

> **"The analysis should relate the recommended allocations to the FMP's objectives and OY specification ...." 600.325(c)(2)**

To that end, the Council FMP goals and objectives and the goals and objectives for Amendment 20 are provided here.

Section 2.1 Goals and Objectives for Managing the Pacific Coast Groundfish Fishery

The Council is committed to developing long-range plans for managing the Washington, Oregon, and California groundfish fisheries that will promote a stable planning environment for the seafood industry, including marine recreation interests, and will maintain the health of the resource and environment. In developing allocation and harvesting systems, the Council will give consideration to maximizing economic benefits to the United States, consistent with resource stewardship responsibilities for the continuing welfare of the living marine resources. Thus, management must be flexible enough to meet changing social and economic needs of the fishery as well as to address fluctuations in the marine resources supporting the fishery. The following goals have been established in order of priority for managing the west coast groundfish fisheries, to be considered in conjunction with the national standards of the Magnuson-Stevens Act.

Management Goals

Goal 1 - Conservation. Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources.

Goal 2 - Economics. Maximize the value of the groundfish resource as a whole.

Goal 3 - Utilization. Within the constraints of overfished species rebuilding requirements, achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

Objectives. To accomplish these management goals, a number of objectives will be considered and followed as closely as practicable:

Conservation

Objective 1. Maintain an information flow on the status of the fishery and the fishery resource which allows for informed management decisions as the fishery occurs.

Objective 2. 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 appropriate for a sustainable harvest and low discard rates, and which results in a fishery that is diverse, stable, and profitable. This reduced capacity should lead to more effective management for many other fishery problems.

Objective 3. For species or species groups that are overfished, develop a plan to rebuild the stock as soon as possible, taking into account the status and biology of the stock, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock within the marine ecosystem.

Objective 4. Where conservation problems have been identified for non-groundfish species and the best scientific information shows that the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a non-groundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of non-groundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.

Objective 5. Describe and identify EFH, adverse impacts on EFH, and other actions to conserve and enhance EFH, and adopt management measures that minimize, to the extent practicable, adverse impacts from fishing on EFH.

Economics

Objective 6. Within the constraints of the conservation goals and objectives of the FMP, attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors fishing and marketing opportunities as long as practicable during the fishing year.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable. Encourage development of practicable gear restrictions intended to reduce regulatory and/or economic discards through gear research regulated by EFP.

Utilization

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvesting and processing), in accordance with conservation goals, of the Pacific Coast groundfish resources by domestic fisheries.

Objective 10. Recognize the multispecies nature of the fishery and establish a concept of managing by species and gear or by groups of interrelated species.

Objective 11. Develop management programs that reduce regulations-induced discard and/or which reduce economic incentives to discard fish. Develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. Promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.

Social Factors.

Objective 12. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

Objective 13. Minimize gear conflicts among resource users.

Objective 14. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.

Objective 15. Avoid unnecessary adverse impacts on small entities.

Objective 16. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable.

Objective 17. Promote the safety of human life at sea.

[Amended; 7, 11, 13, 16-1, 18, 16-4]

FMP Allocational Guidelines

Section 6.2.3 Non-biological Issues—The Socioeconomic Framework

From time to time, non-biological issues may arise that require the Council to recommend management actions to address certain social or economic issues in the fishery. Resource allocation, seasons, or landing limits based on market quality and timing, safety measures, and prevention of gear conflicts make up only a few examples of possible management issues with a social or economic basis. In general, there may be any number of situations where the Council determines that management measures are necessary to achieve the stated social and/or economic objectives of the FMP.

Either on its own initiative or by request, the Council may evaluate current information and issues to determine if social or economic factors warrant imposition of management measures to achieve the Council's established management objectives. Actions that are permitted under this framework include all of the categories of actions authorized under the points of concern framework with the addition of direct resource allocation.

If the Council concludes that a management action is necessary to address a social or economic issue, it will prepare a report containing the rationale in support of its conclusion. The report will include the proposed management measure, a description of other viable alternatives considered, and an analysis that addresses the following criteria: (a) how the action is expected to promote achievement of the goals and objectives of the FMP; (b) likely impacts on other management measures, other fisheries, and bycatch; (c) biological impacts; (d) economic impacts, particularly the cost to the fishing industry; (e) impacts on fishing communities; and (f) how the action is expected to accomplish at least one of the following, or any other measurable benefit to the fishery:

1. Enable a quota, HG, or allocation to be achieved.
2. Avoid exceeding a quota, HG, or allocation.
3. Extend domestic fishing and marketing opportunities as long as practicable during the fishing year, for those sectors for which the Council has established this policy.
4. Maintain stability in the fishery by continuing management measures for species that previously were managed under the points of concern mechanism.
5. Maintain or improve product volume and flow to the consumer.
6. Increase economic yield.
7. Improve product quality.
8. Reduce anticipated bycatch and bycatch mortality.
9. Reduce gear conflicts, or conflicts between competing user groups.
10. Develop fisheries for underutilized species with minimal impacts on existing domestic fisheries.
11. Increase sustainable landings.
12. Reduce fishing capacity.
13. Maintain data collection and means for verification.
14. Maintain or improve the recreational fishery.

The Council, following review of the report, supporting data, public comment, and other relevant information, may recommend management measures to the NMFS Regional Administrator accompanied by relevant background data, information, and public comment. The recommendation will explain the urgency in implementing the measure(s), if any, and reasons therefore.

The NMFS Regional Administrator will review the Council's recommendation, supporting rationale, public comments, and other relevant information, and, if it is approved, will undertake the appropriate method of implementation. Rejection of the recommendation will be explained in writing.

The procedures specified in this chapter do not affect the authority of the Secretary to take emergency regulatory action as provided for in Section 305(c) of the Magnuson-Stevens Act if an emergency exists involving any groundfish resource, or to take such other regulatory action as may be necessary to discharge the Secretary's responsibilities under Section 305(d) of the Magnuson-Stevens Act.

If conditions warrant, the Council may designate a management measure developed and recommended to address social and economic issues as a routine management measure, provided that the criteria and procedures in Section 6.2.1 are followed.

Quotas, including allocations, implemented through this framework will be set for one-year periods and may be modified inseason only to reflect technical corrections to an

ABC. (In contrast, quotas may be imposed at any time of year for resource conservation reasons under the points of concern mechanism.)

Section 6.3.1 Allocation Framework

Allocation is the apportionment of an item for a specific purpose or to a particular person or group of persons. Allocation of fishery resources may result from any type of management measure, but is most commonly a numerical quota or HG for a specific gear or fishery sector. Most fishery management measures allocate fishery resources to some degree, because they invariably affect access to the resource by different fishery sectors by different amounts. These allocative impacts, if not the intentional purpose of the management measure, are considered to be indirect or unintentional allocations. Direct allocation occurs when numerical quotas, HGs, or other management measures are established with the specific intent of affecting a particular group's access to the fishery resource.

Fishery resources may be allocated to accomplish a single biological, social or economic objective, or a combination of such objectives. The entire resource, or a portion, may be allocated to a particular group, although the Magnuson-Stevens Act requires that allocation among user groups be fair and equitable, reasonably calculated to promote conservation, and determined in such a way that no group, person, or entity receives an undue excessive share of the resource. The socioeconomic framework described in Section 0 provides criteria for direct allocation. Allocative impacts of all proposed management measures should be analyzed and discussed in the Council's decision-making process.

In addition to the requirements described in Section 0, the Council will consider the following factors when intending to recommend direct allocation of the resource.

1. Present participation in and dependence on the fishery, including alternative fisheries.
2. Historical fishing practices in and historical dependence on the fishery.
3. The economics of the fishery.
4. Any consensus harvest sharing agreement or negotiated settlement between the affected participants in the fishery.
5. Potential biological yield of any species or species complex affected by the allocation.
6. Consistency with the Magnuson-Stevens Act national standards.
7. Consistency with the goals and objectives of the FMP.

The modification of a direct allocation cannot be designated as routine unless the specific criteria for the modification have been established in the regulations.

Amendment 20 Goals and Objectives

Section 1.2.3 Purpose of the Proposed Action

In 2003, the Council established a Trawl Individual Quota Committee (TIQC), which was charged with assisting the Council in identifying the elements of a trawl individual quota program and scoping alternatives and potential impacts of those alternatives in support of the requirements of the MSA and NEPA. At its first meeting in October 2003, the TIQC drafted a set of goals and objectives, which another Council-established committee, the Independent Experts Panel (IEP), subsequently recommended modifying. The Council adopted this list in June 2005, but at their March 2007 meeting, the Council adopted a further revision of the goals and objectives. The participation of the TIQC, the IEP, and other entities in the scoping process is described below in Section 1.6. To pursue the goal thus developed and shown below, the Council considered alternatives that would rationalize the west coast trawl fishery and provide incentives to reduce bycatch, either through an IFQ program for all groundfish LE trawl sectors and/or through cooperatives for the fishery sectors targeting Pacific whiting. Under either alternative, allocations would be made to eligible fishery participants as a privilege to harvest a portion of fish, and not as a property right. Though structurally different, the Council's intention is that both the IFQ and co-op alternatives fulfill the goal of the program.

The following goal objectives outline the purpose of the proposed action:

<u>Goal</u>

Create and implement a capacity rationalization plan that increases net economic benefits, creates individual economic stability, provides for full utilization of the trawl sector allocation, considers environmental impacts, and achieves individual accountability of catch and bycatch.

<u>Objectives</u>

The above goal is supported by the following objectives:

1. Provide a mechanism for total catch accounting.
2. Provide for a viable, profitable, and efficient groundfish fishery.
3. Promote practices that reduce bycatch and discard mortality and minimize ecological impacts.
4. Increase operational flexibility.
5. Minimize adverse effects from an IFQ program on fishing communities and other fisheries to the extent practical.
6. Promote measurable economic and employment benefits through the seafood catching, processing, distribution elements, and support sectors of the industry.
7. Provide quality product for the consumer.
8. Increase safety in the fishery.

Constraints and Guiding Principles

The above goals and objectives should be achieved while the following occurs:

1. Take into account the biological structure of the stocks including, but not limited to, populations and genetics.
2. Take into account the need to ensure that the total OYs and allowable biological catch (ABC) are not exceeded.
3. Minimize negative impactsresulting from localized concentrations of fishing effort.
4. Account for total groundfish mortality.
5. Avoid provisions where the primary intent is a change in marketing power balance between harvesting and processing sectors.
6. Avoid excessive quota concentration.
7. Provide efficient and effective monitoring and enforcement.
8. Design a responsive mechanism for program review, evaluation, and modification.
9. Take into account the management and administrative costs of implementing and oversee the IFQ or co-op program and complementary catch monitoring programs, as well as the limited state and Federal resources available.

WHITING CATCH SHARE ALLOCATIONS: SUPPLEMENTAL ANALYSIS

Historic Distributions and the 2011 Fishery

The following graphs and tables provide information on the historic distribution of harvest among permits and, for the 2011 fishery, the distribution of harvest and allocations among permits, for the shoreside whiting and mothership fisheries.

In each figure, the permits have been ordered along the horizontal axis from those receiving the least to those receiving the greatest catch share allocations for 2011. The allocations are based on 1994-2003 history, so the 2011 allocations track that history fairly closely for the shoreside fishery (Figure 1) and mothership fishery (Figure 3). However, the shoreside allocations are generally about 23.5% below the landing history because 20% of the allocation went to processors and 3.5% went to nonwhiting permits (not included in the graph) as part of the equal allocation. Other variations are due to the provision which drops the two worst years of history from the calculation of each permit's allocation.

In some cases, the share of each permit's harvest in 2011 varied substantially from 2011 allocations, running either substantially higher or lower (Figure 2 and Figure 4, for the shoreside and mothership fisheries, respectively).

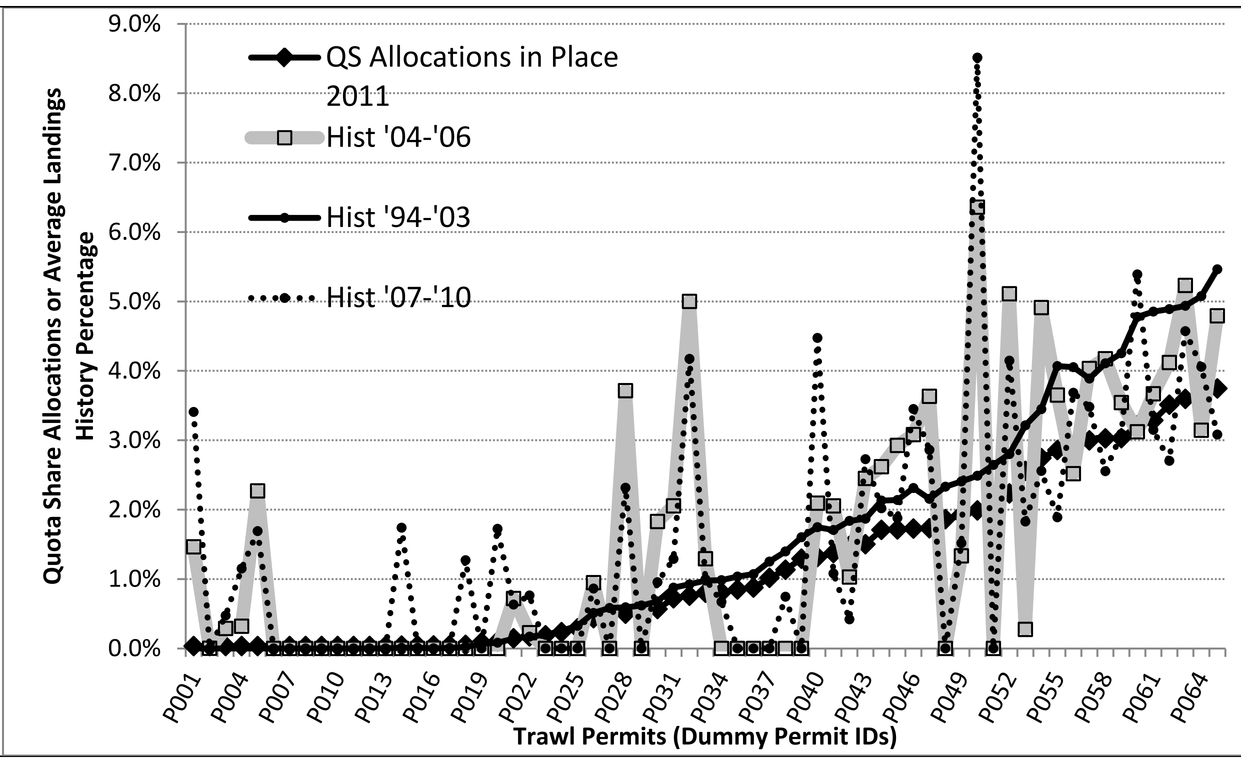


Figure 1. Amounts of shoreside whiting QS permits were allocated in 2011 compared to recent and historic harvests (1994-2003, 2004-2006, 2007-2010).

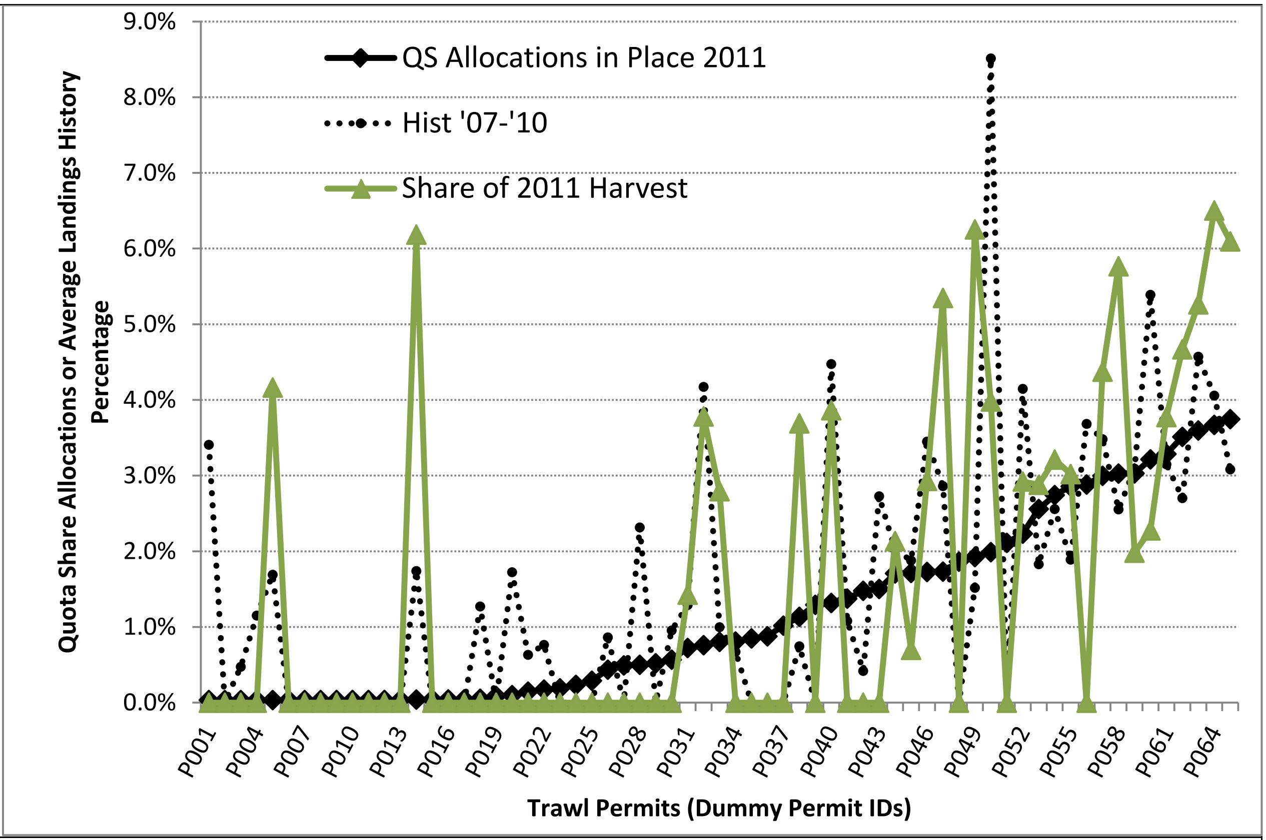


Figure 2. Amounts of shoreside whiting QS permits were allocated in 2011 compared to recent and historic harvests (2007-2010 and 2011).

Data from Figure 2 are summarized in the following table. A total of 39 permits with landings history in the shoreside whiting fishery did not participate in the 2011 fishery. Most permits that were active in 2011 landed substantially more fish than they received in their initial allocation (23 permits). This was partially because 20% of the QS was allocated to processors and the resulting QP were transferred to vessels. Only 3 active permits landed less than their initial allocations.

Table 1. Shoreside permit share of harvest in 2011 compared to permit catch share allocations.

Permits not fishing (received allocations for whiting trips but did not participate in 2011)	39
Shares for those dropping out.	-20.4%
Maximum reduction for those not fishing.	-2.9%
Permits landing less than their allocations.	3
Shares unfished by those permits	-3.0%
Maximum reduction for any one permit	-1.0%
Max reduction as a % of original allocation	-34.5%
Permits landing more than their allocations.	23
Additional shares of harvest by those permits	46.9%
Maximum increase for any one permit	6.1%
Max increase as a % of original allocation	15,000%

Note: the increases relative to allocations (46.9%) are greater than the reductions (23.4%) because the initial allocations to permits with whiting fishery participation was reduced by 20% due to the allocation to processors and by 3.5% due to the amounts equally allocated among all permits (only those permits with whiting directed trips are included in the table and previous figure).

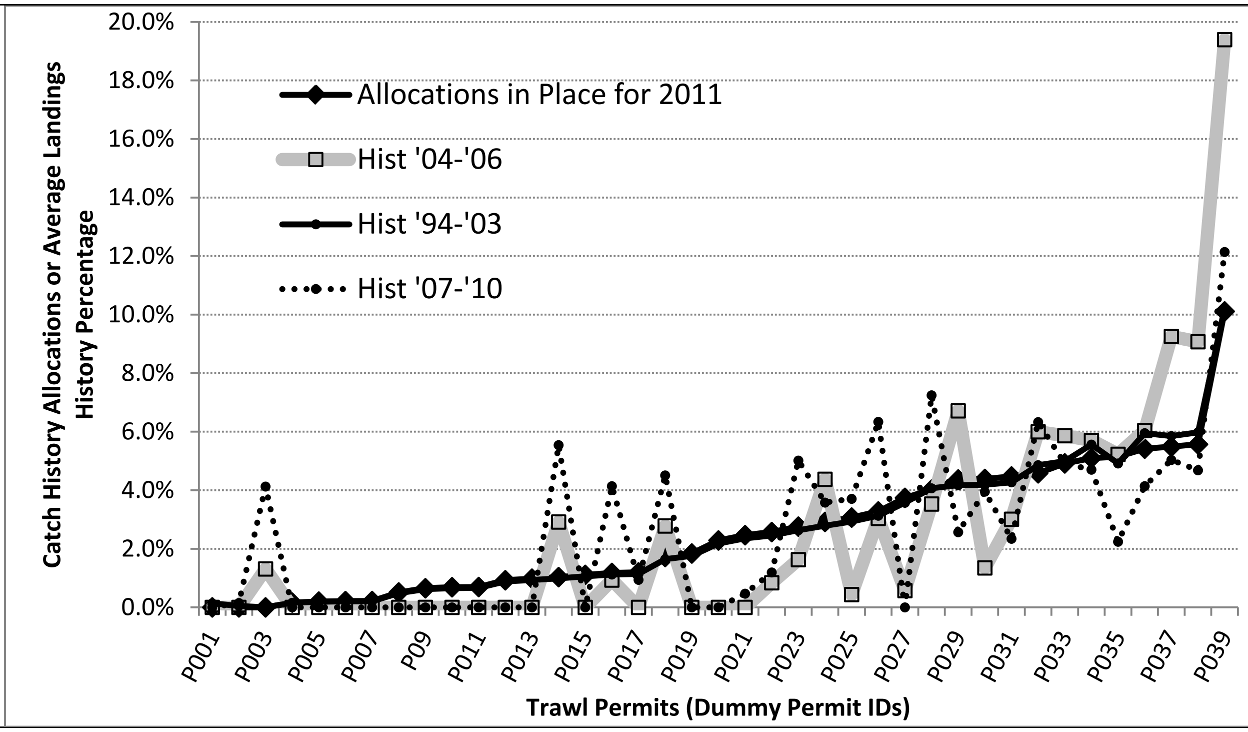


Figure 3. Mothership whiting sector catch history allocations for 2011 compared to recent and historic harvests (1994-2003, 2004-2006, 2007-2010).

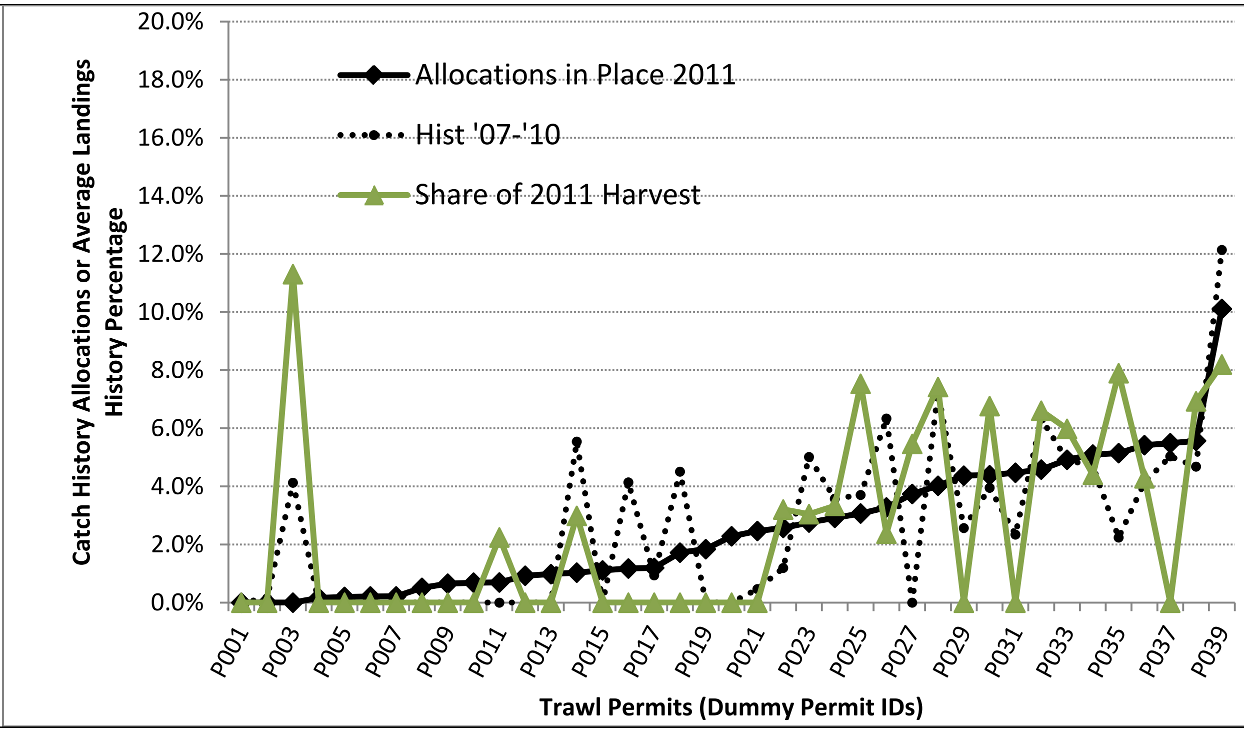


Figure 4. Mothership whiting sector catch history allocations for 2011 compared to recent and historic harvests (2007-2010 and 2011).

Data from Figure 4 are summarized in the following table. A total of 19 permits with delivery histories in the mothership whiting fishery did not participate in the 2011 fishery. Most permits that were active delivered substantially more fish than they received in their initial allocation (14 permits). Only 4 permits remained active and delivered less than their initial allocations.

Table 2. Mothership whiting sector permit share of harvest in 2011 compared to permit catch share allocations.

Permits not fishing (received allocations but did not participate in 2011)	19
Shares for those dropping out.	-30.7%
Maximum reduction for those not fishing.	-5.5%
Permits landing less than their allocations.	4
Shares unfished by those permits	-4.6%
Maximum reduction for any one permit	-1.9%
Max reduction as a % of original allocation	-18.9%
Permits landing more than their allocations.	14
Additional shares fished by those permits	35.3%
Maximum increase for any one permit	11.3%
Max increase as a % of original allocation	Original allocation was zero

Effects on Allocations by Years of Participation

The following two tables compare the allocations received by permit holders, grouped by the duration of their participation and recent participation. For example the first set of rows in Table 3 show that there were 16 permits with at least 15 years of participation and that the allocations to these permits decreases with each successive option, starting at 43.250% under Alternative 1 and ending at 41.781% under Alternative 4. The most allocated to any single permit declines from 3.746% under Alternative 1 to 3.477% under Alternative 4.

Table 3. Shoreside whiting QS allocations to permits under the reallocation alternatives.

	No Action- Alt 1	Alt 2	Alt 3	Alt 4
Permits with at least 15 yrs participation 1994-2010				
# of permits	16	16	16	16
Amount of QS allocated	43.3%	42.7%	42.5%	41.8%
Max QS allocation	3.7%	3.7%	3.6%	3.5%
Permits with less than 15 yrs participation 1994-2010				
# of permits	49	49	49	49
Amount of QS allocated	33.2%	33.8%	34.0%	34.7%
Max QS allocation	2.7%	2.9%	3.6%	5.3%
Permits with at least 1 yr participation 2000-2010				
# of permits	53	53	53	53
Amount of QS allocated	71.9%	73.2%	73.8%	76.1%
Max QS allocation	3.7%	3.7%	3.6%	5.3%
Permits with no participation 2000-2010				
# of permits	12	12	12	12
Amount of QS allocated	4.6%	3.2%	2.7%	0.4%
Max QS allocation	1.3%	0.9%	0.7%	0.0%
Permits with at least 1 yr participation 2004-2010				
# of permits	44	44	44	44
Amount of QS allocated	66.3%	69.4%	70.6%	75.0%
Max QS allocation	3.7%	3.7%	3.6%	5.3%
Permits with no participation 2004-2010				
# of permits	21	21	21	21
Amount of QS allocated	10.2%	7.1%	5.9%	1.5%
Max QS allocation	2.1%	1.4%	1.2%	0.2%

Table 4. Mothership whiting CV Catch History allocations to permits under the reallocation alternatives

	No Action- Alt 1	Alt 2	Alt 3	Alt 4
Permits with at least 15 yrs participation 1994-2010				
# of permits	8	8	8	8
Amount of QS allocated	45.2%	50.4%	50.1%	54.6%
Max QS allocation	10.1%	12.2%	12.3%	14.4%
Permits with less than 15 yrs participation 1994-2010				
# of permits	28	30	30	19
Amount of QS allocated	54.8%	49.6%	49.9%	45.4%
Max QS allocation	5.1%	4.8%	4.4%	5.9%
Permits with at least 1 yr participation 2000-2010				
# of permits	23	25	25	24
Amount of QS allocated	89.5%	92.8%	94.1%	98.8%
Max QS allocation	10.1%	12.2%	12.3%	14.4%
Permits with no participation 2000-2010				
# of permits	13	13	13	3
Amount of QS allocated	10.5%	7.2%	5.9%	1.2%
Max QS allocation	2.3%	1.6%	1.3%	0.4%
Permits with at least 1 yr participation 2004-2010				
# of permits	26	28	28	27
Amount of QS allocated	94.8%	96.4%	97.1%	100.0%
Max QS allocation	10.1%	12.2%	12.3%	14.4%
Permits with no participation 2004-2010				
# of permits	10	10	10	0
Amount of QS allocated	5.2%	3.6%	2.9%	-
Max QS allocation	1.0%	0.7%	0.5%	-

Processors

For the figures for processors in the EA (Figures 4-6, 4-7, and 4-8) it is difficult to discern the differences among the alternatives because of the scale of the graphs. The following two figures provide a magnification of the allocational results displayed in the lower and upper range of the graphs. A statistical summary of the graph is provided after the figures.

Please note that the captions to Figures 4-6 and 4-7 of the draft EA incorrectly state the data on deliveries were reduced to 20% to provide a scaled comparison with the 20% of the QS allocated to processors. Deliveries reported in Figures 4-6 and 4-7 have not been scaled.

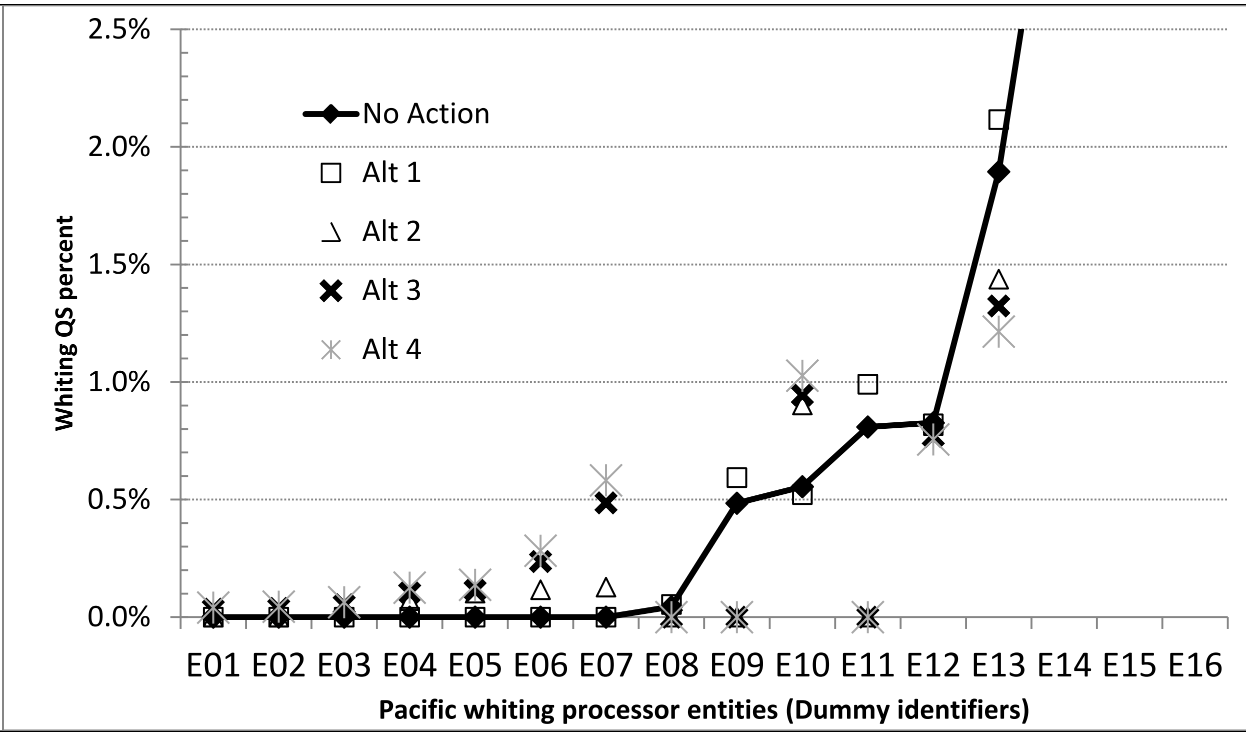


Figure 5. Magnification of the allocational results displayed in the lower end of the Figures 4-6 and 4-7 of the draft EA.

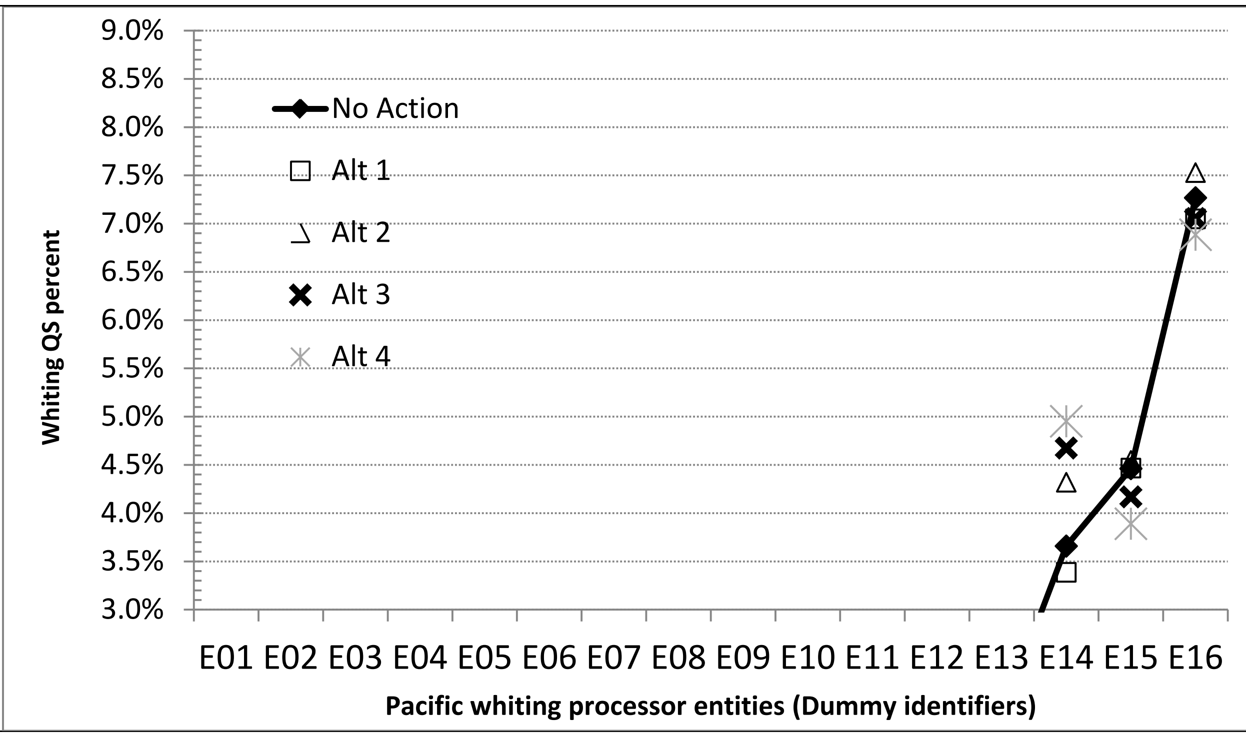


Figure 6. Magnification of the allocational results displayed in the upper end of the Figures 4-6 and 4-7 of the draft EA.

Table 5. Changes in the amount of whiting QS allocated to processors under the alternatives relative to status quo (No Action) based on individual processor history of shoreside sector whiting trips.

	Alternatives			
	Alt 1: 1998-2003	Alt 2: 1998-2007	Alt 3: 1998-2010	Alt 4: 2000-2010
Number of Processors **Not Previously Qualifying** for an Allocation	0	5	7	7
Total Allocation Increases for Those Processors	0.0%	0.5%	1.1%	1.3%
Maximum To Any Processor	0.0%	0.1%	0.5%	0.6%
Number of Previously Qualifying Processors With **Increased** Allocations Under the Alternative	5	4	2	2
Total Percent of Increase for Those Processors	0.5%	1.4%	1.4%	1.8%
Maximum Increases to Any One Processor	0.2%	0.7%	1.0%	1.3%
Max Increase as a Percent of Status Quo Allocation	11.7%	18.1%	27.8%	35.3%
Previously Qualifying Processors with **Decreased** Allocations Under the Alternative	4	2	4	4
Total Percent of Decreases for Those Processors	-0.5%	-0.5%	-1.1%	-1.7%
Maximum Decreases to Any One Processor	-0.3%	-0.5%	-0.6%	-0.7%
Max Decrease as a Percent of Status Quo Allocation	-7.4%	-24.1%	-30.1%	-35.9%
Previously Qualifying Processors with **Zero** Allocations Under Status Quo	0	3	3	3
Total Percent of Decreases for Those Processors	-	-1.3%	-1.3%	-1.3%
Maximum Decreases to Any One Processor	-	-0.8%	-0.8%	-0.8%
Max Decrease as a Percent of Status Quo Allocation	-	-100.0%	-100.0%	-100.0%

PFMC
06/23/12

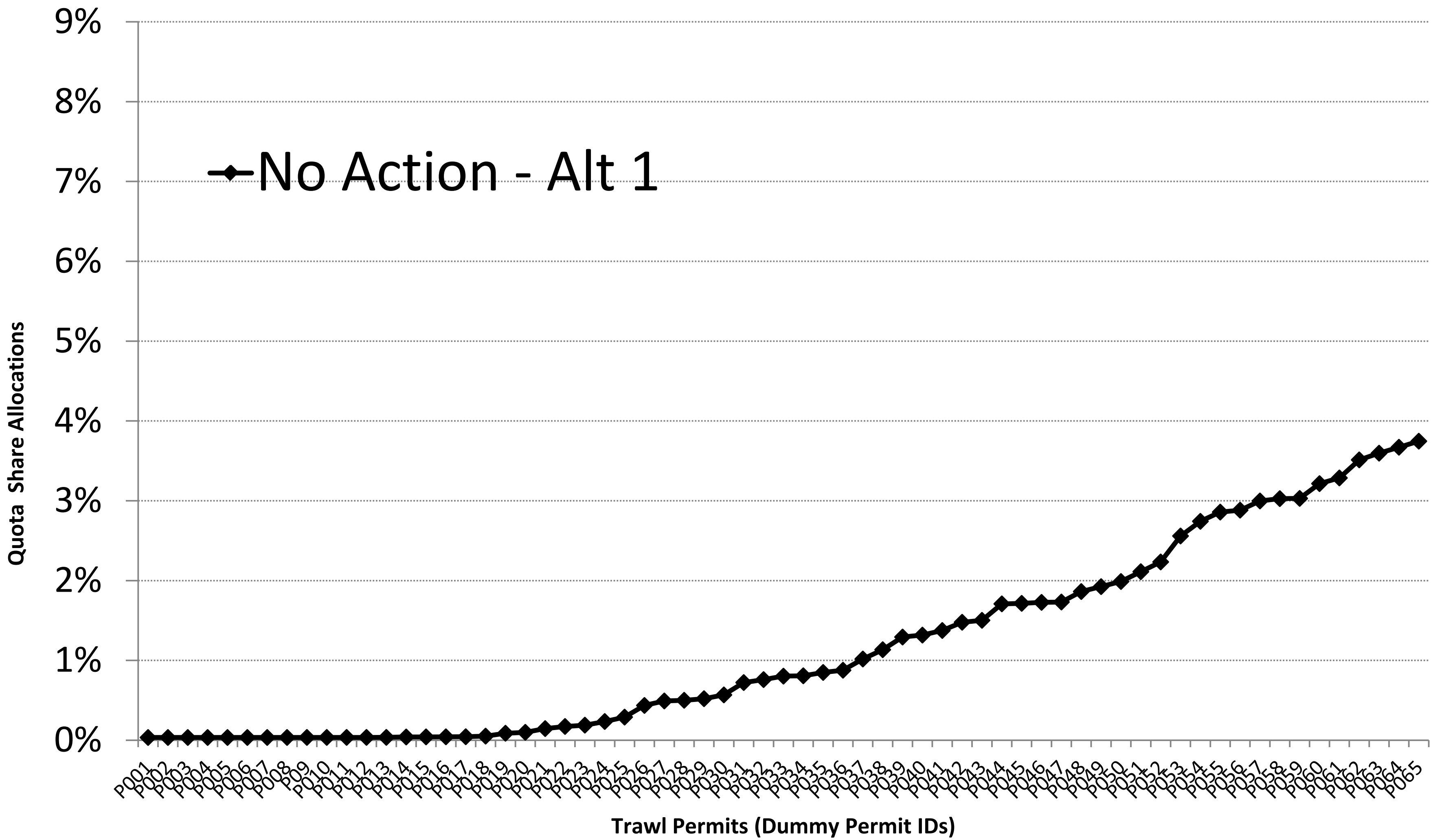
Whiting Reallocation Analysis

Chapter 4 - Impacts on the Affected Environment

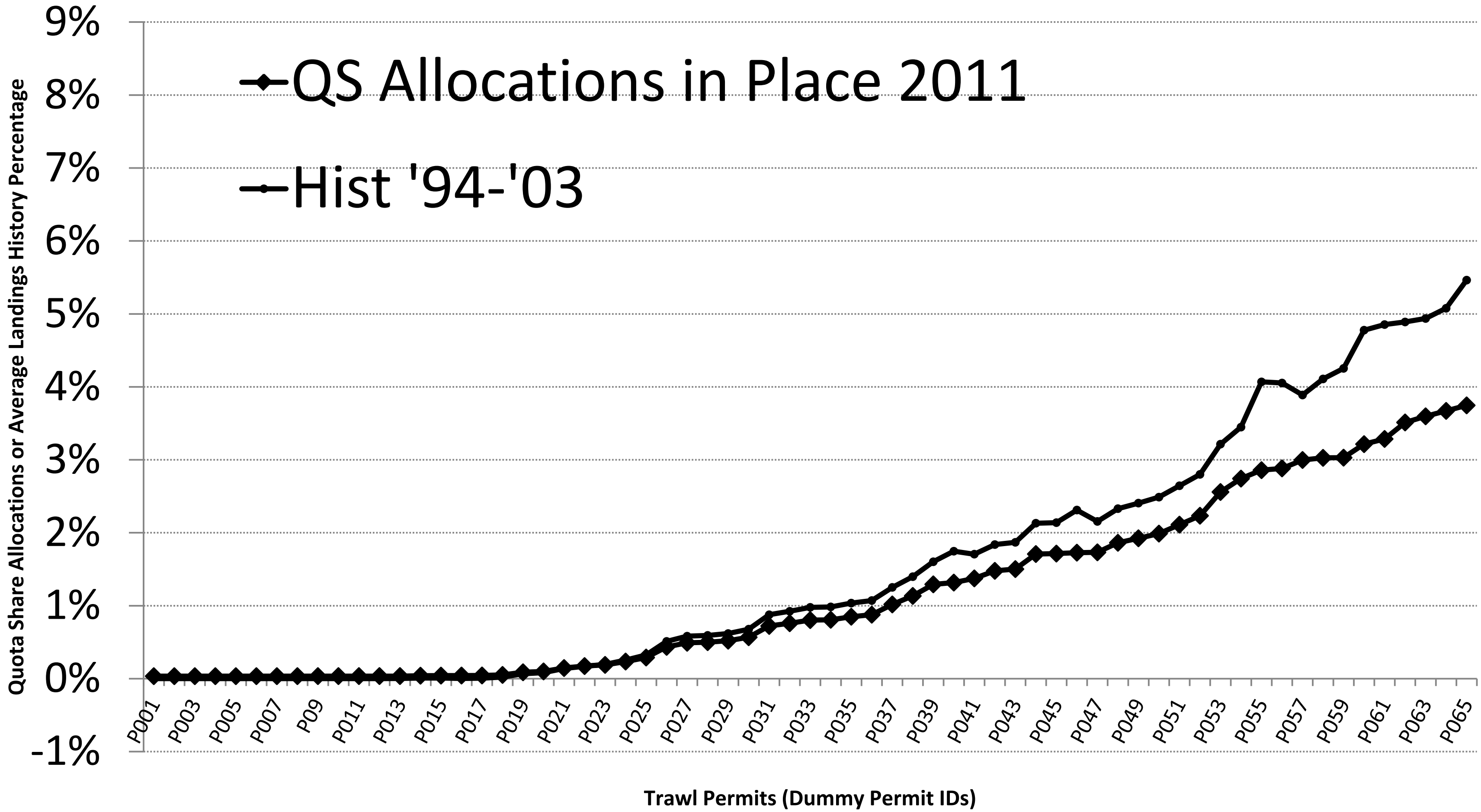
2011 Allocation and History

- Example deconstruction of figures in Chapter 4 of the draft EA: Shoreside whiting
- Plus 2011 data provided in Agenda Item D.7.a, Supplemental Attachment 5

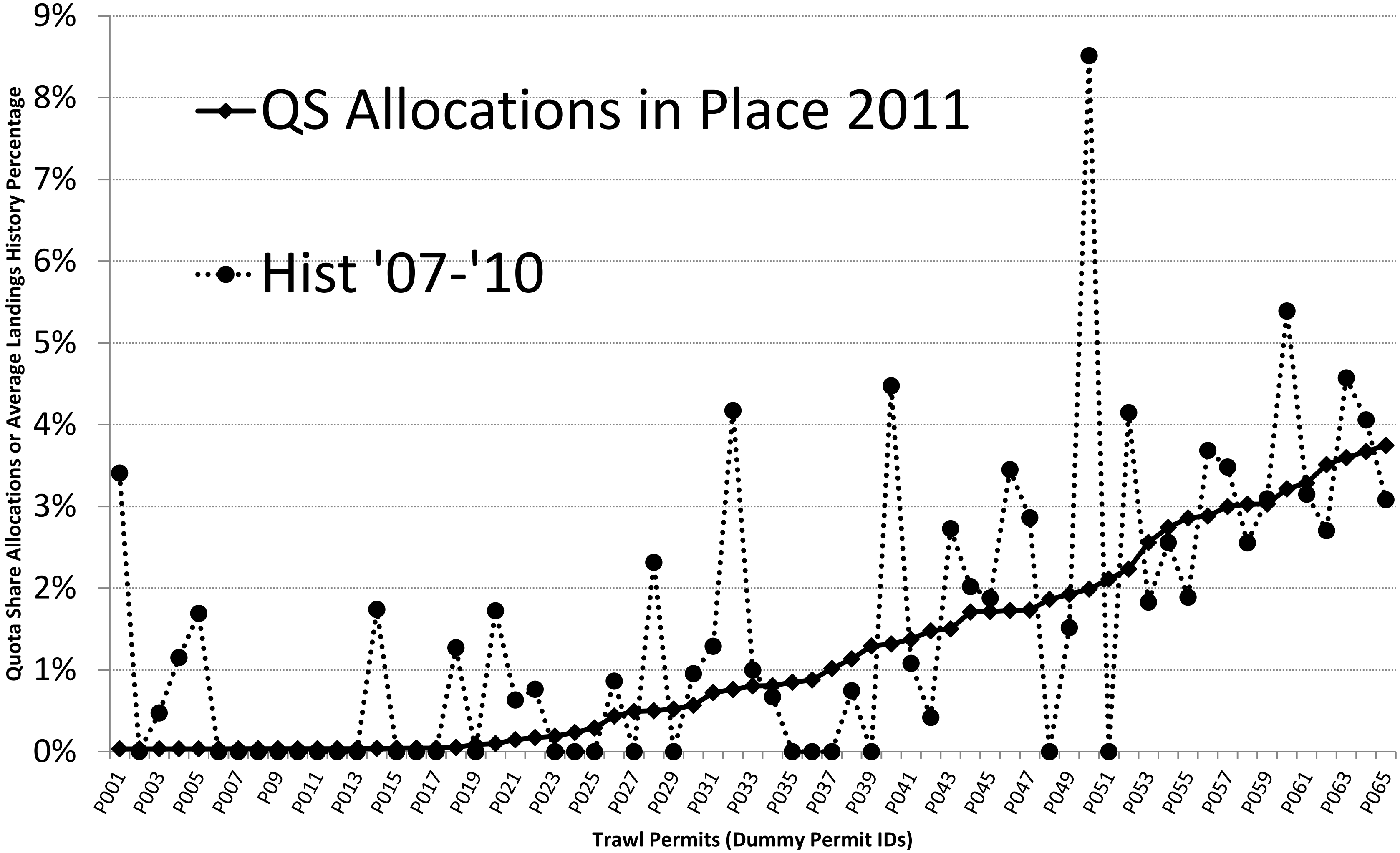
Shoreside Permits – EA - Fig 4-1



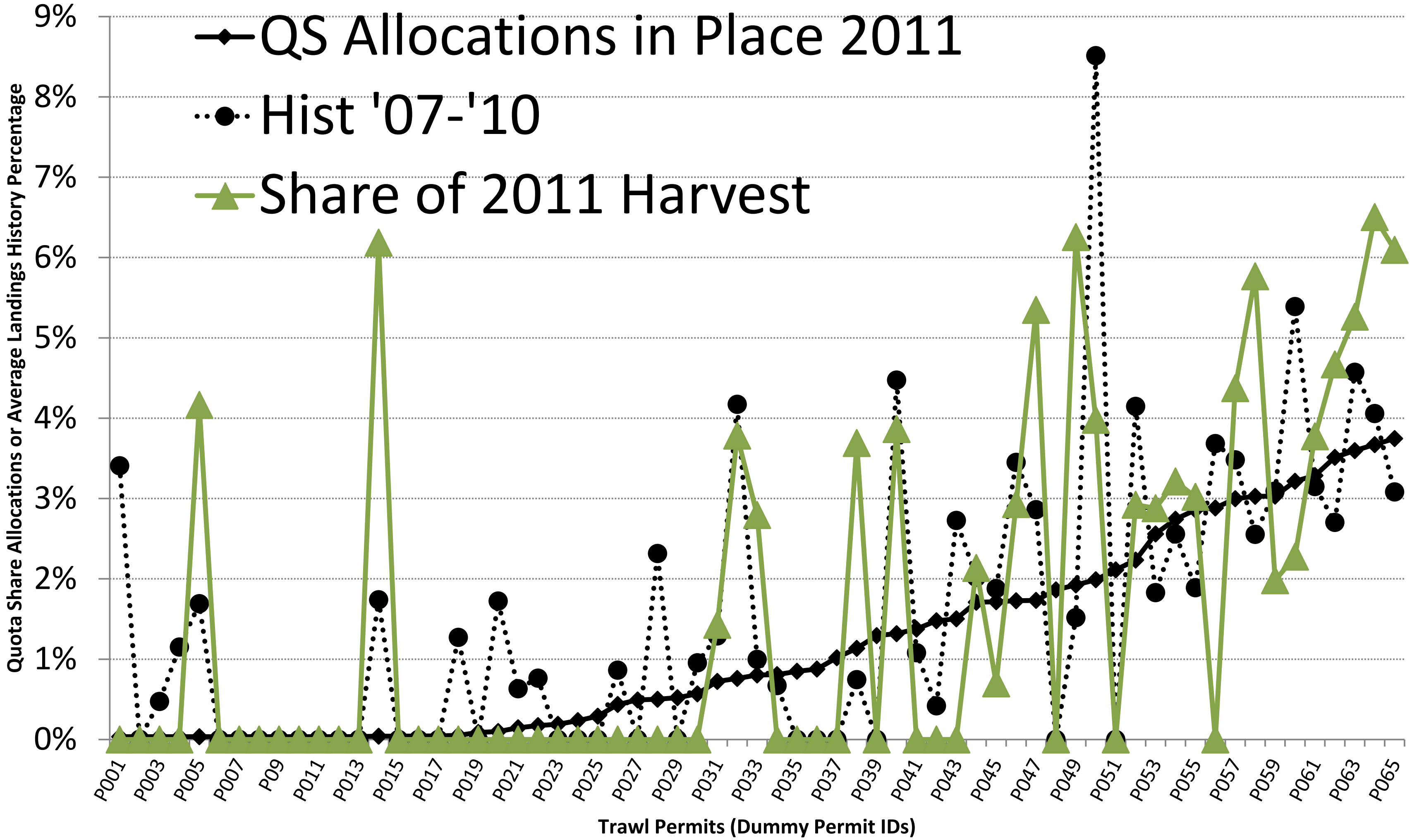
Shoreside Permits – EA - Fig 4-1



Shoreside Permits – EA - Fig 4-1



Shoreside Permits 2011 Harvest Information - D.7.a, Supp Att 5, Table 2



Summary Statistics on 2011 Participation Relative to Allocation

Agenda Item D.7.a, Attachment 5, Table 1	
Permits not fishing -- received allocations for whiting trips but did not participate in 2011	39
Shares for those dropping out.	-20.4%
Permits landing less than their allocations.	3
Shares unfished by those permits	-3.0%
Permits landing more than their allocations.	23
Share of harvest in excess of allocation	46.9%

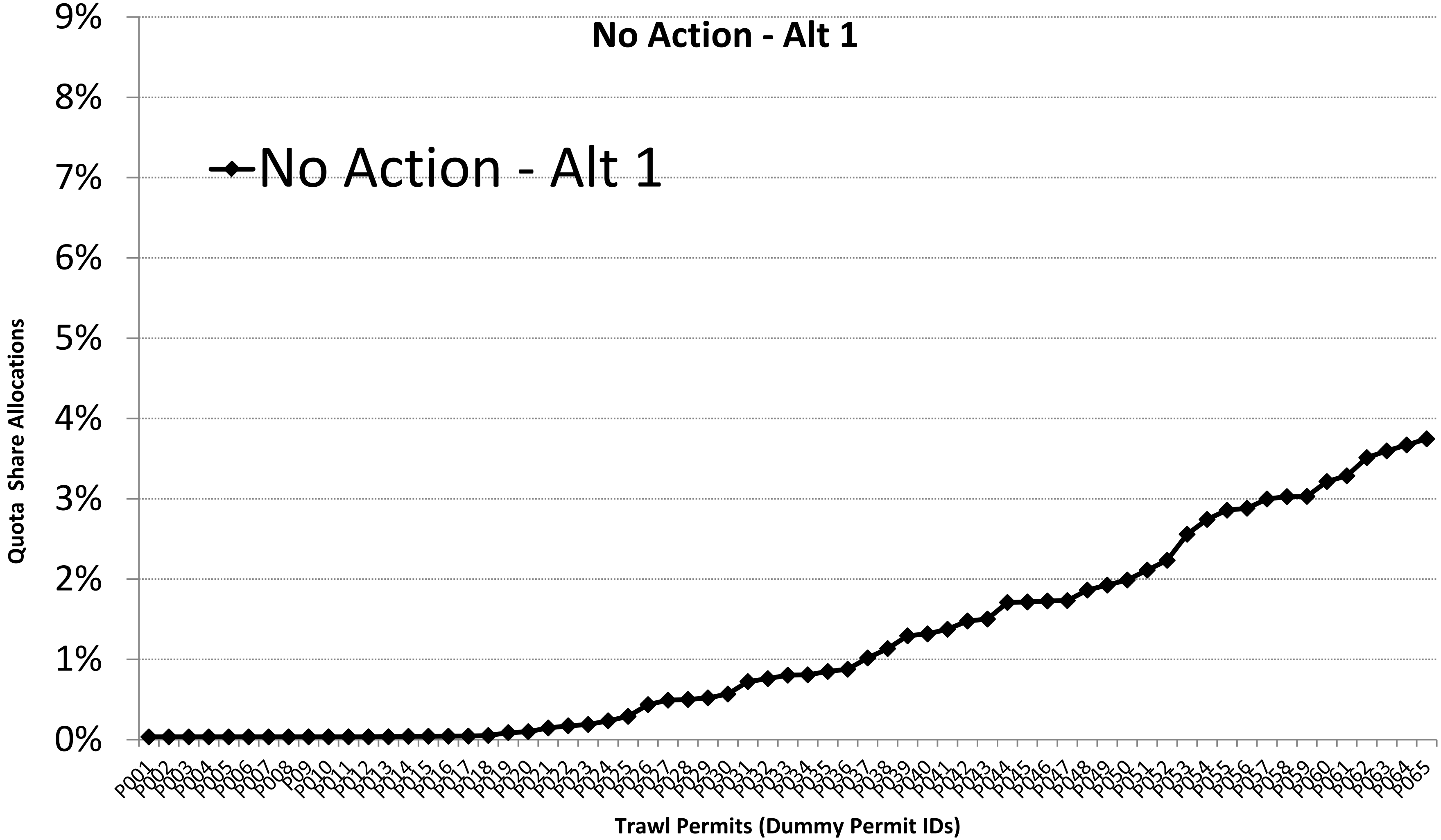
49.9% = 23.4% of permits which caught a share of harvest less than their allocation and + 20% from processors + 3.5% equal allocation

Questions?

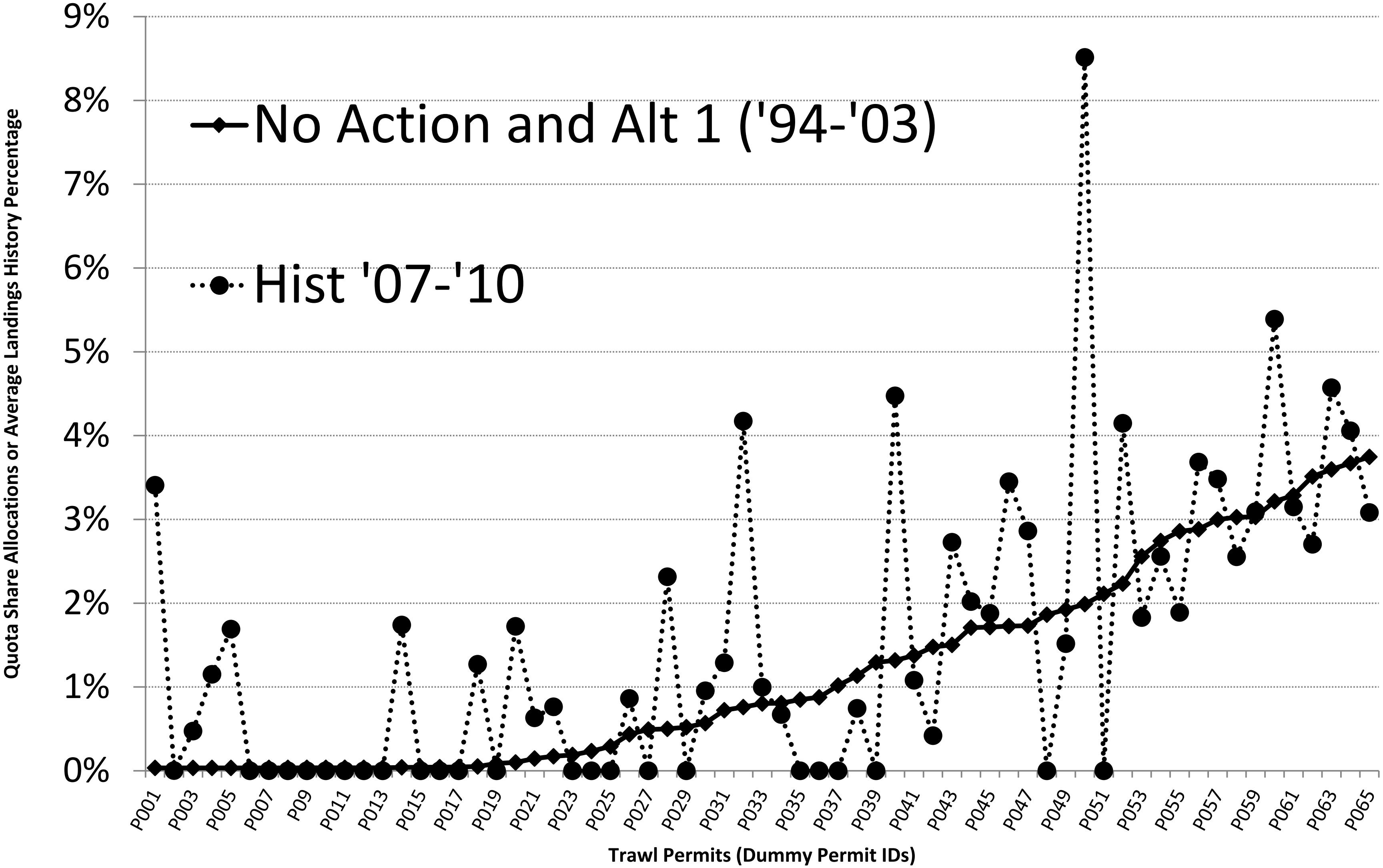
Allocation Alternatives

- Example deconstruction of figures in Chapter 4 of the draft EA: Shoreside whiting

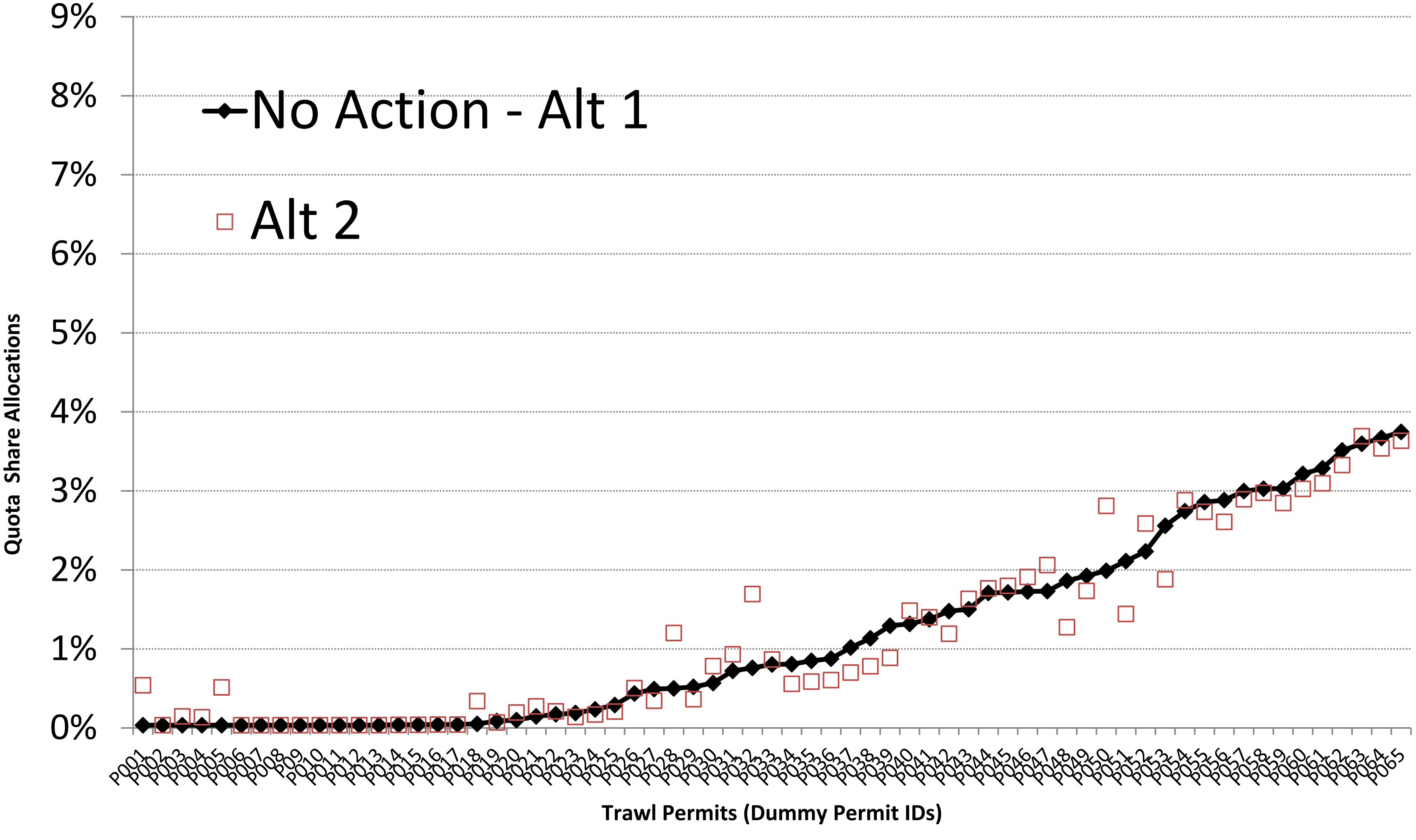
Shoreside Permits – EA - Fig 4-1



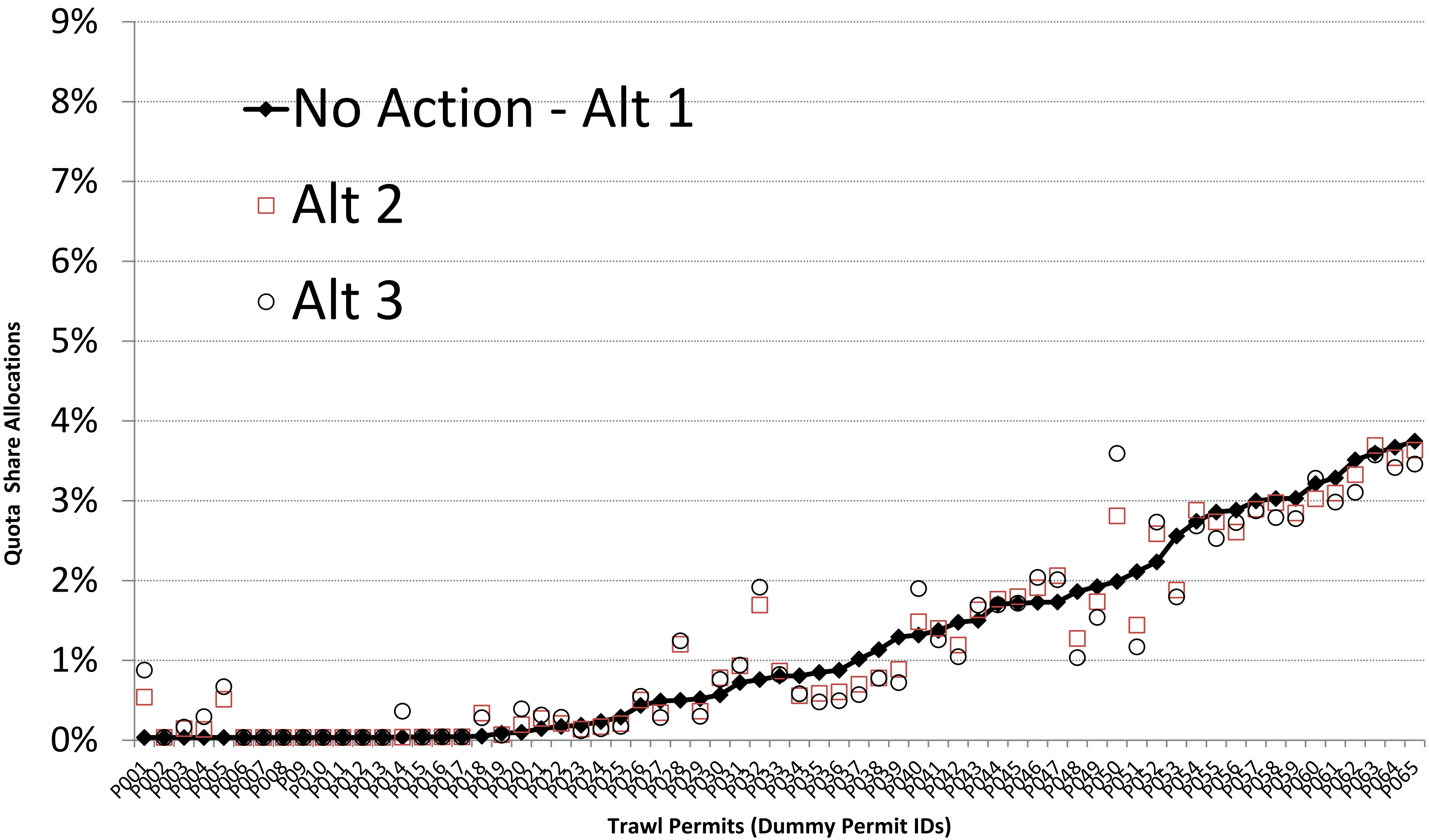
Shoreside Permits – EA - Fig 4-1



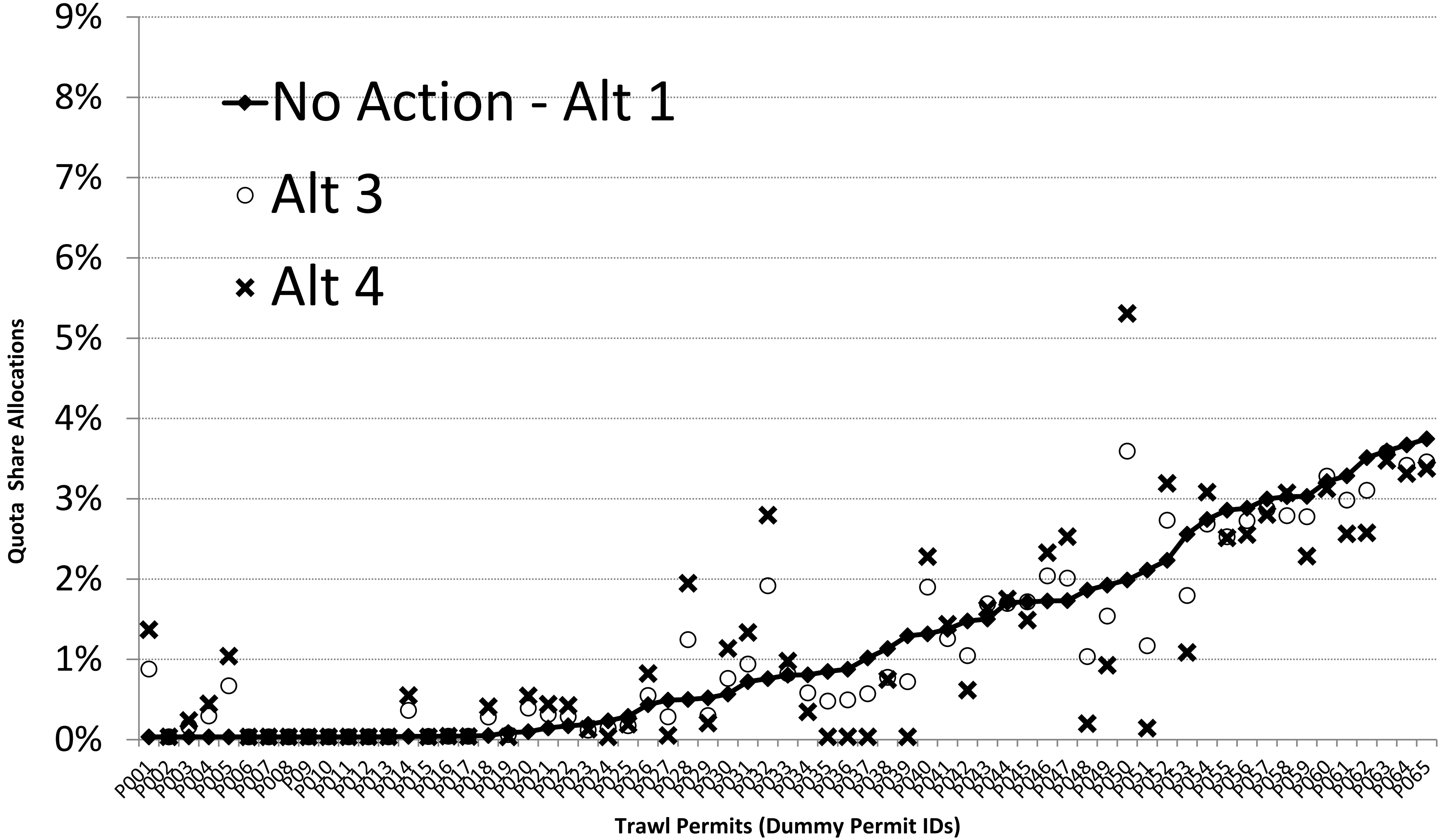
Shoreside Permits – EA - Fig 4-1



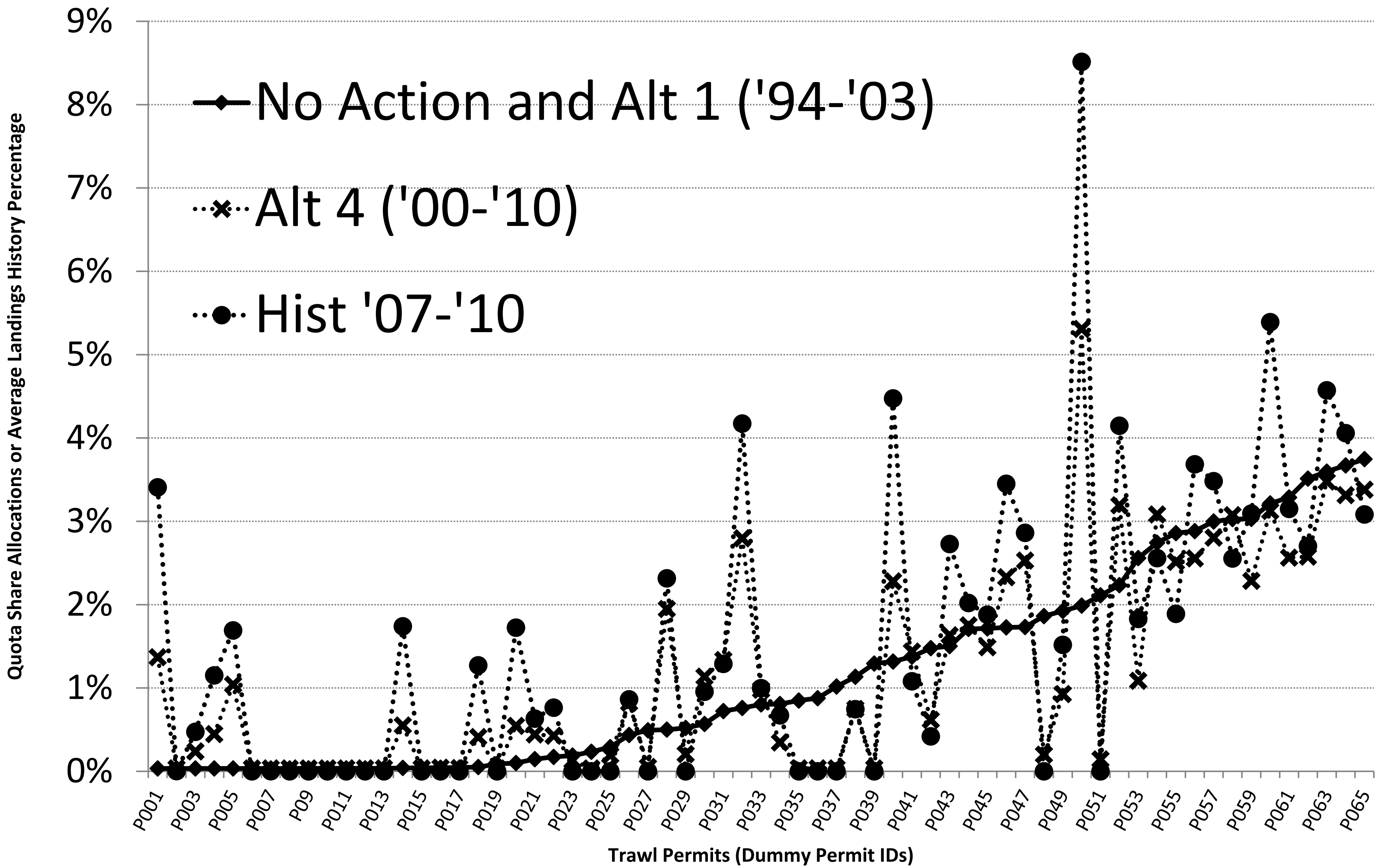
Shoreside Permits – EA - Fig 4-1



Shoreside Permits – EA - Fig 4-1



Shoreside Permits – EA - Fig 4-1

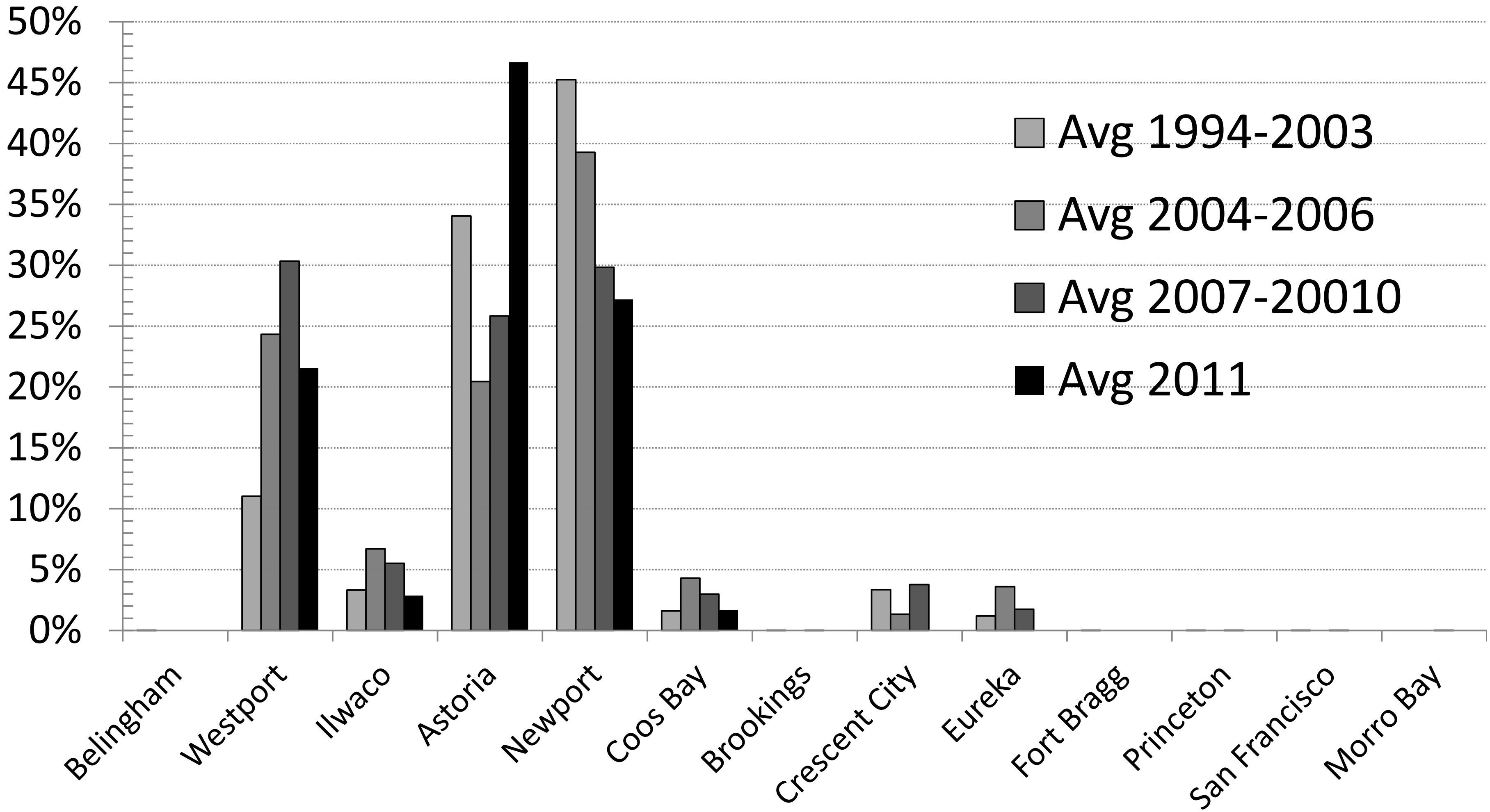


Shoreside Permits (with whiting trips) Draft EA - Table 4-1

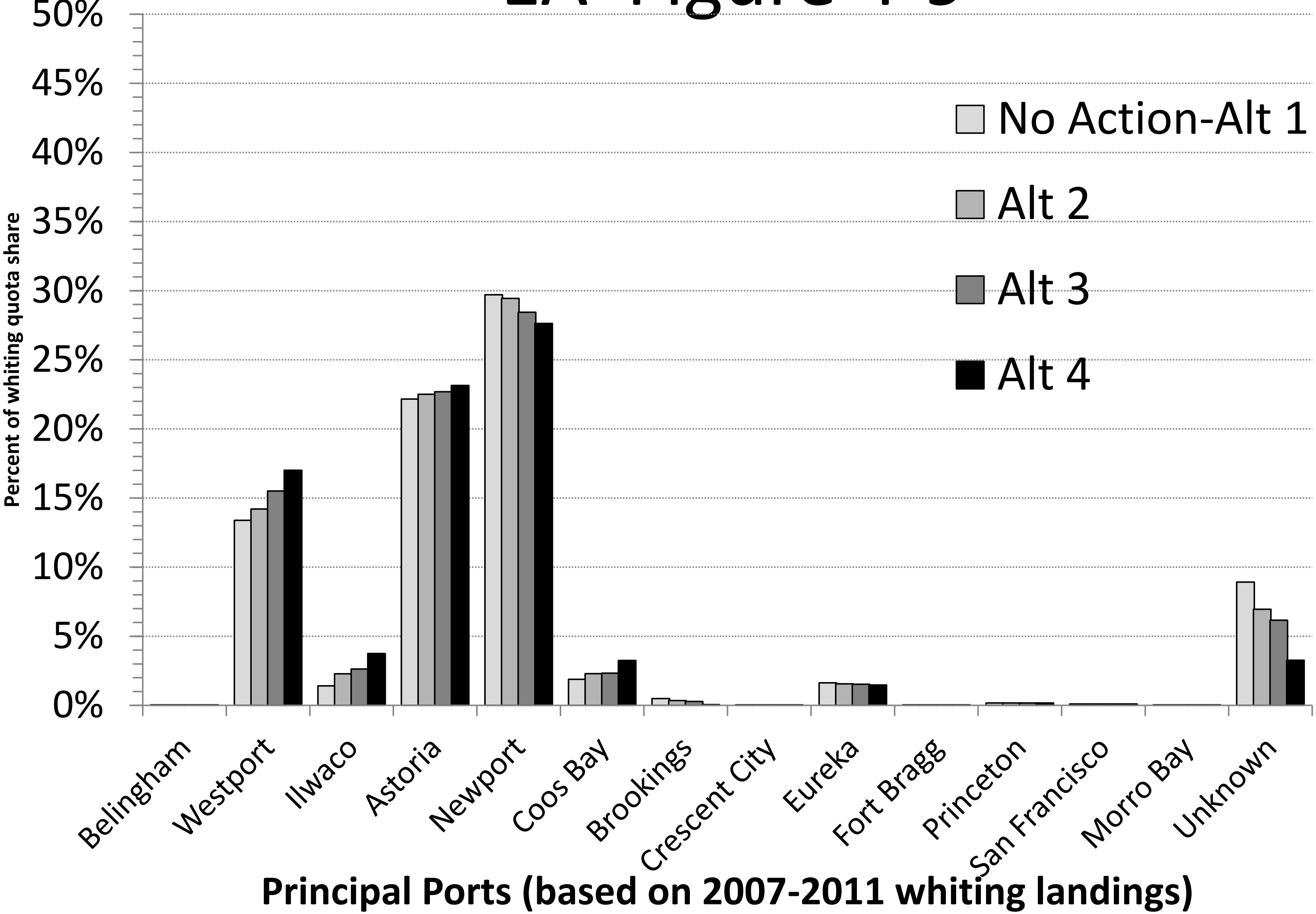
	Alternatives		
	Alt 2: 1994-2007	Alt 3: 1994-2010	Alt 4: 2000-2010
	Newly Qualifying Permits		
Number of Permits	6	6	6
Allocation Increases	1.20%	1.90%	3.00%
Maximum to a Permit	0.50%	0.80%	1.30%
	Permits with Increases		
Number of Permits	21	19	22
Allocation Increases	5.10%	7.10%	14.40%
Maximum to a Permit	0.90%	1.60%	3.30%
	Permits with Decreases		
Number of Permits	38	40	25
Allocation Decreases	-6.30%	-9.00%	-13.20%
Maximum from a Permit	-0.70%	-0.90%	-2.00%
	No Longer Qualifying		
Number of Permits	-	-	12
Allocation Decreases	-	-	-4.20%
Maximum from a Permit	-	-	-1.30%

Questions?

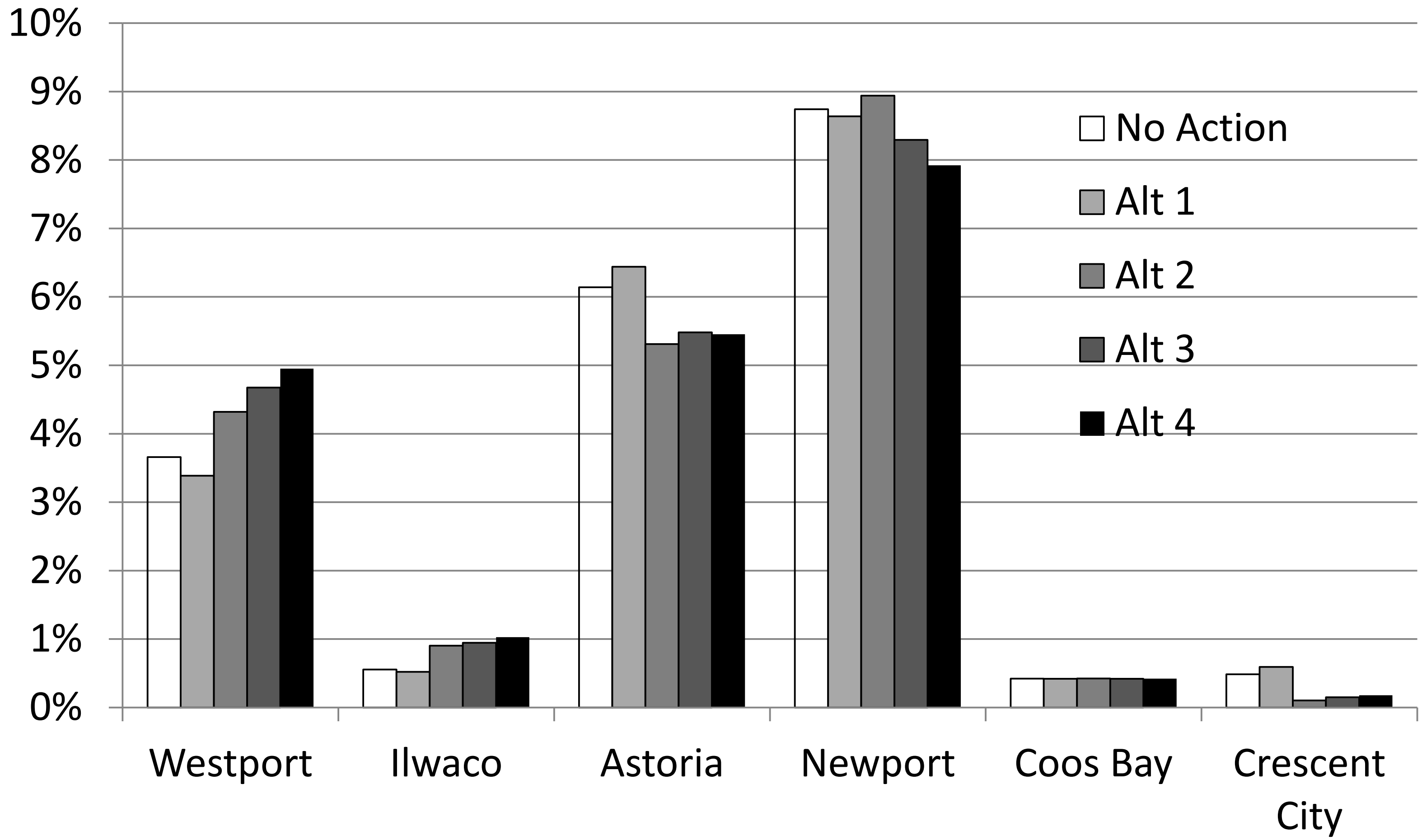
Communities Share of Landings – EA Figure 4-10



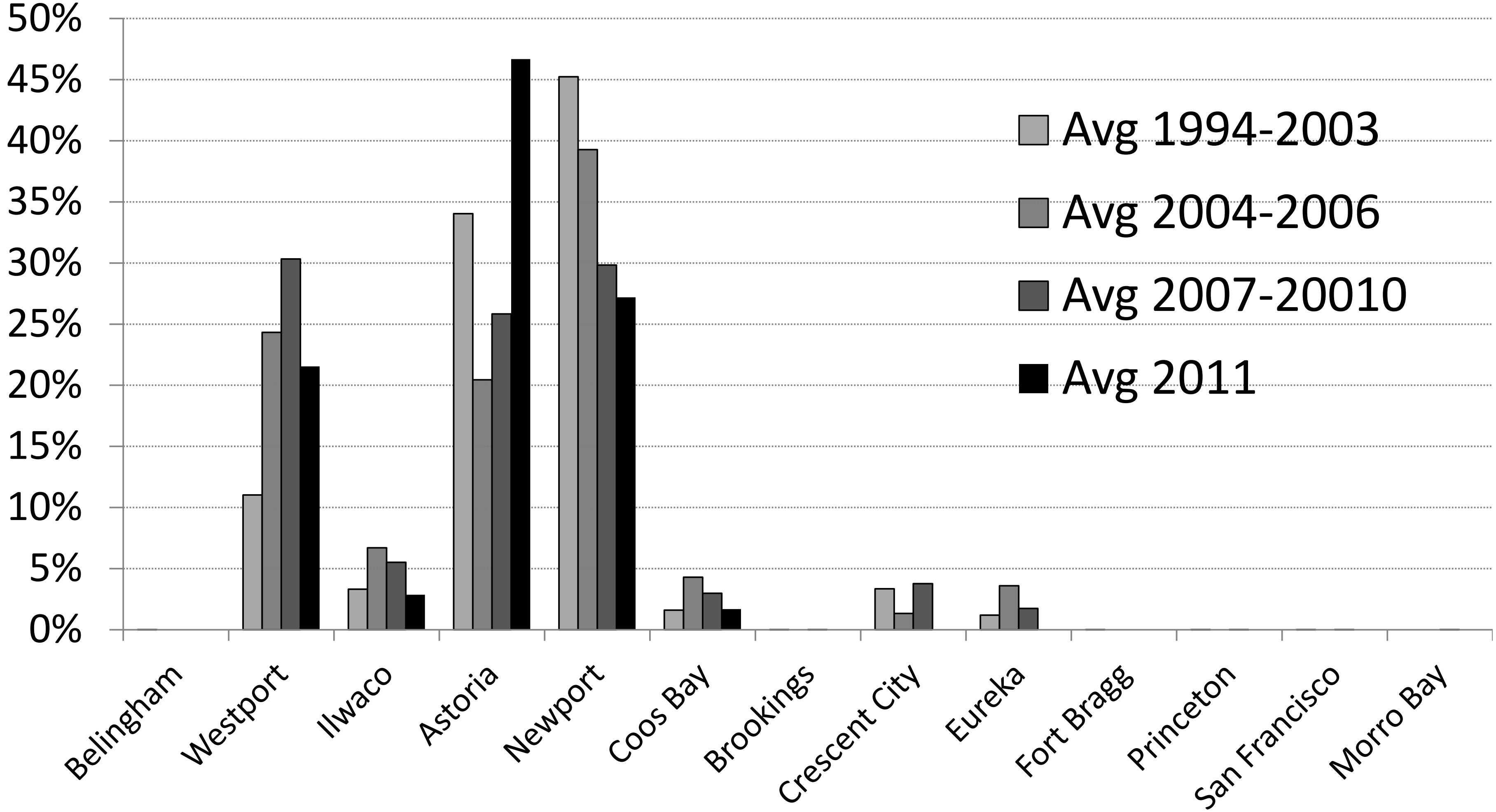
Communities (permit allocations) – EA Figure 4-9



Communities (Allocation to Processors) – EA Figure 4-11 (On a Different Scale)



Communities Share of Landings – EA Figure 4-10



Questions?

Chapter 5 – Consistency with the West Coast Groundfish FMP and MSA National Standards and Requirements

- Subsections in each topic in Chapter 5
    1. Standards, criteria, goals, and objectives to consider
    2. How those that are related to initial allocation are addressed in the current program
    3. How the alternatives affect achievement of goals, objectives, etc.

Areas of No or Minimal Impact

- Conservation
- Net Benefits to the Nation
- Excessive Shares
- Sector Health
- Labor

Primary Areas of Impact

- Fairness and Equity –
  - including stability and disruption as factors affecting fairness and equity (control date)
- Stability and Disruption –
  - affecting fishery management (control date)
- Communities

Fairness and Equity

- Investment and Dependence
- Harvests and Participation – Current and Historic
  - Harvesters and Communities
  - Employment
  - Processors
- Stability and Disruption – Control Date

Investment and Dependence

- Investment, Dependence, Recent/Current and Historic Harvests and Participation Are Interrelated

- Examples

  – Those invested in a fishery are more likely to be dependent on it when they need revenues from the fishery to recover their investments

  – Those with more recent participation are more likely to be dependent on the fishery than those who have not participated more recently

  – Those who have participated longer (historic participation) are more likely to have physical, human, and social capital invested in the fishery and local communities

Investment & Dependence: Features of Current Program

- Permits
  - Permit ownership is the primary investment by harvesters recognized in the program
    - A highly specialized asset
    - Dependent on fishery for recovering investment
    - Investment most likely to decline in value with trawl rationalization
  - Equal allocation component assures that every permit owner receives some value (QS) for permit
      - Plus credit for whatever history comes with the permit
      - Including permits used in mothership sector
      - Benefits those entering (buying permits) very late in process, e.g. 2010

Investment & Dependence: Features of Current Program

- Processors
  - Reason for 20% QS allocation to processors –
    - Concern that whiting vessels, because of their relatively small number, could exert excessive market power
    - Concern over capital investments to handle peak production left idle with end of olympic fishery
    - Intent to encourage community stability (because 20% was given to processors 10% of the whiting was not set aside for the Adaptive Management Program)
    - Help processors maintain some product flow and opportunity to recover investment in now surplus capital
  - Allocation goes to entities listed on state fish tickets
    - Successor in interest
    - Purchases from vessels (without processing) excluded

Investment & Dependence: Allocation Period Considerations

- Longer periods:
  - Address seniority of use ("Sharing the Fish," NRC, 1999)
  - Longer participation indicates higher likelihood that more physical, human, and social capital are tied to an operation
  - Place less emphasis on investment and dependence by recent entrants
- Shorter periods:
  - Give more recent entrants more opportunity to qualify for allocations on a par with longer term participants – comparing similar sized operations
  - Reduces emphasis on consistent long-term participation
- Greater lag between end of allocation period and implementation
  - Reduces direct allocation credit for most recent years of harvest
  - For permits, may increase importance of allocation to <u>current</u> permit owners and importance of equal allocation to ensures all permit owners some value
  - For processors, creates a greater disjuncture between current participants and allocations. There is no permits system which requires that new processors displace existing processors (transferring history) and no equal allocation component.
    - A processor no longer participating qualifies for an allocation
    - New processors do not (unless a successor in interest)

Stability and Disruption: Control Date

- Fairness and equity issues surround how people responded to the control dates and the pay-offs (allocations) for that response

- Fishery management concern that credible control dates are useful for inhibiting existing and potential participants from expanding effort and exacerbating management problems resulting from the race for fish while catch share programs are considered
  - Harvesters – direct concern
  - Processors – theoretical indirect concern – price inducement

- Concern that reduced credibility will result in diminished effectiveness of future control dates, adversely impacting other fisheries (a fairness and equity and management concern for those fisheries).

Community

- Looked at Distributions of Landings and Allocations
- Dependence: summaries displaying whiting as a percent of community landings are being developed

Questions?

DRAFT RULEMAKING SCHEDULE FOR THE RECONSIDERATION OF INITIAL INDIVIDUAL FISHERY QUOTAS IN THE MOTHERSHIP AND SHORESIDE PACIFIC WHITING TRAWL FISHERIES (RAW 1 AND 2)

ITEM	DATE
Advanced Notice of Proposed Rulemaking (ANPR) Published	April 4, 2012
ANPR Public Comment Period	April 4 to May 4, 2012
Reconsideration of Allocation of Whiting, Delay of Relevant Regulations (RAW 1) Proposed Rule Published	May 21, 2012
RAW 1 Public Comment Period	May 21- June 29, 2012
PPA selected- June PFMC Meeting	June 20-26, 2012
RAW 1 Final Rule Scheduled Publish/ Effective Date	August 2012/ September 1, 2012
FPA Selected- September PFMC Meeting	September 13-18, 2012
Reconsideration of Allocation of Whiting (RAW 2) Proposed Rule Scheduled to Publish	November 2012
RAW 2 Final Rule Scheduled Publish/ Effective Date	March 2013/ April 1, 2013

National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, Seattle, WA 98115
www.nwr.noaa.gov

PUBLIC NOTICE

For Information Contact:
Groundfish Branch (206) 526-6140
Fisheries Permit Office (206) 526-4353

NMFS-SEA-12-11
FOR IMMEDIATE RELEASE
May 21, 2012

PACIFIC COAST GROUNDFISH FISHERY

Trawl Rationalization Program:

Reconsideration of the Allocation of Whiting, Delay of Relevant Regulations Proposed Rule, Available for Public Comment

The National Marine Fisheries Service (NMFS) announces the publication of a *Federal Register* notice related to the trawl rationalization program, a catch share program. A proposed rule to delay or revise several portions of the regulations potentially impacted by the reconsideration of allocation of whiting (RAW 1) published on May 21, 2012 (77 FR 29955). The public comment period on the proposed rule is open through June 29, 2012.

This proposed rule is available on the NMFS Northwest Region website at http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Regulations/Index.cfm.
More information on this proposed rule follows.

Public Comment Open on Proposed RAW 1 Rule

NMFS announces publication of a proposed rule which would delay or revise several portions of the Pacific Coast Groundfish Fishery Trawl Rationalization Program (program) regulations. These changes are necessary to enable the NMFS to implement new regulations for the program to comply with a court order requiring NMFS to reconsider the initial allocation of Pacific whiting (whiting) to the shorebased Individual Fishing Quota (IFQ) fishery and the at-sea mothership fishery. The proposed rule would affect the transfer of quota share (QS) and individual bycatch quota (IBQ) between QS accounts in the shorebased IFQ fishery, and severability in the mothership fishery, both

NOTE:

Beginning October 1, 2012, NMFS will no longer mail paper copies of public notices.

Public notices will continue to be available through our groundfish email group or on our website (links below).

• • •

Groundfish E-mail Group

Subscribe to **"wcgroundfish"** by visiting the following website:
http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Public-Notices/Index.cfm
and clicking "sign up".

NMFS Trawl Program Website

http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Trawl-Program/index.cfm of which would be delayed until NMFS can implement any necessary new regulations in those areas required by the court's order.

NMFS solicits written public comments on the proposed RAW 1 rule. **Comments must be received by NMFS no later than 5 p.m. local time on June 29, 2012.**

You may submit written comments, identified by NOAA-NMFS-2012-0062, by any of the following methods:

- *Electronic Submissions:*
  Submit all electronic public comments via the Federal e-Rulemaking Portal, at http://www.regulations.gov. To submit comments via the e-Rulemaking Portal, first click the "submit a comment" icon, then enter NOAA-NMFS-2012-0062 in the keyword search. Locate the document you wish to comment on from the resulting list and click on the "Submit a Comment" icon on the right of that line.
- *Fax:* 206-526-6736; Attn: Ariel Jacobs.
- *Mail:* William W. Stelle, Jr., Regional Administrator
  Attn: Ariel Jacobs
  Northwest Region, NMFS
  7600 Sand Point Way NE
  Seattle, WA 98115-0070

All comments received are a part of the public record and will generally be posted to http://www.regulations.gov without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information. NMFS will accept anonymous comments (if submitting comments via the Federal e-Rulemaking portal, enter ''N/A'' in the relevant required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word or Excel, WordPerfect, or Adobe PDF file formats only.

Issued this 13th day, of April 2012.

Dorval R. Carter, Jr.,

Chief Counsel, Federal Transit Administration.

[FR Doc. 2012–9698 Filed 5–18–12; 8:45 am]

BILLING CODE P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 660

[Docket No. 120509433–2433–01]

RIN 0648–BC00

Fisheries Off West Coast States; Pacific Coast Groundfish Fishery Management Plan; Trawl Rationalization Program

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: This proposed action would delay or revise several portions of the Pacific Coast Groundfish Fishery Trawl Rationalization Program (program) regulations. These changes are necessary to enable the National Marine Fisheries Service (NMFS) to implement new regulations for the program to comply with a court order requiring NMFS to reconsider the initial allocation of Pacific whiting (whiting) to the shorebased Individual Fishing Quota (IFQ) fishery and the at-sea mothership fishery. The proposed rule would affect the transfer of Quota Share (QS) and Incidental Bycatch Quota (IBQ) between QS accounts in the shorebased individual IFQ fishery, and severability in the mothership fishery, both of which would be delayed until NMFS can implement any necessary new regulations in those areas required by the court's order.

DATES: Comments on this proposed rule must be received no later than 5 p.m., local time on June 29, 2012.

ADDRESSES: You may submit comments on this document, identified by NOAA–NMFS–2012–0062, by any of the following methods:

- *Electronic Submissions:* Submit all electronic public comments via the Federal e-Rulemaking Portal, at *http://www.regulations.gov.* To submit comments via the e-Rulemaking Portal, first click the ''submit a comment'' icon, then enter NOAA–NMFS–2012–0062 in the keyword search. Locate the document you wish to comment on from the resulting list and click on the ''Submit a Comment'' icon on the right of that line.
- *Fax:* 206–526–6736; Attn: Ariel Jacobs.
- *Mail:* William W. Stelle, Jr., Regional Administrator, Northwest Region, NMFS, 7600 Sand Point Way NE., Seattle, WA 98115–0070; Attn: Ariel Jacobs.

Instructions: All comments received are a part of the public record and will generally be posted to *http://www.regulations.gov* without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information. NMFS will accept anonymous comments (if submitting comments via the Federal e-Rulemaking portal, enter ''N/A'' in the relevant required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word or Excel, WordPerfect, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Ariel Jacobs, 206–526–4491; (fax) 206–526–6736; *Ariel.Jacobs@noaa.gov.*

SUPPLEMENTARY INFORMATION:

Background

In January 2011, NMFS implemented the trawl rationalization program for the Pacific coast groundfish fishery's trawl fleet (see 75 FR 78344; Dec. 15, 2010). The program was adopted through Amendment 20 to the Pacific Coast Groundfish Fishery Management Plan (FMP) and consists of an IFQ program for the shorebased trawl fleet (including whiting and non-whiting fisheries); and cooperative (coop) programs for the at-sea mothership (MS) and catcher/processor (C/P) trawl fleets (whiting only). Allocations to the limited entry trawl fleet for certain species were developed under Amendment 21 to the FMP, also implemented in 2011.

These rules became the subject of litigation, in *Pacific Dawn, LLC* v. *Bryson,* No. C10–4829 TEH (N.D. Cal.). The plaintiffs, fishing vessel owners and fishing processers represented by the named party, Pacific Dawn, LLC, challenged several aspects of the rules, but in particular the initial allocation of whiting QS in the shorebased IFQ and mothership fisheries. Following a decision on summary judgment that NMFS had not considered the correct data in setting its initial whiting allocations, on February 21, 2012, Judge Henderson issued an order remanding the regulations setting the initial allocation of whiting for the shorebased IFQ fishery and the at-sea mothership fishery ''for further consideration'' consistent with the court's December 22, 2011 summary judgment ruling, the Magnuson-Stevens Act (MSA), and all other governing law. The Order also requires NMFS to implement revised regulations setting the quota before the 2013 Pacific whiting fishing season begins on April 1, 2013.

On February 29, 2012, NMFS informed the Pacific Fishery Management Council (Council) of the order issued in *Pacific Dawn, LLC* v. *Bryson.* NMFS also requested that the Council initiate the reconsideration of the initial allocations for QS of whiting in the shorebased IFQ fishery and for whiting catch history assignments in the at-sea mothership fishery. NMFS requested the Council schedule this issue to be discussed at its April, June, and September 2012 meetings. NMFS also stated that a rulemaking was needed to delay or revise portions of the existing regulations setting these allocations while the Council and NMFS reconsidered the initial allocation of whiting, and informed the Council of its intent to publish an Advance Notice of Proposed Rulemaking (ANPR) on that reconsideration.

At the Council's March 2012 meeting, the Council added reconsideration of the allocation of whiting to the agenda for its April, June and September 2012 meetings. At the Council's April meeting, the Council adopted a range of alternatives for analysis. The Council will review a draft analysis of the alternatives and select a preliminary preferred alternative at its June meeting. At its September meeting, the Council will choose a final preferred alternative and make a recommendation to NMFS.

NMFS published an ANPR on April 4, 2012 (77 FR 20337) that, among other things, announced the court's order, the Council meetings that would be addressing the whiting reconsideration, and NMFS' plan to publish two rulemakings in response to the court order. These two rulemakings are referred to as Reconsideration of Allocation of Whiting, Rules 1 and 2 (RAW 1 and RAW 2, respectively). NMFS is using emergency action authority under the MSA 305(c)(1) for RAW 1; RAW 2 will go through the standard FMP Council process followed by a proposed and final rule. The first rulemaking, RAW 1, which is the subject of this proposed rule, would delay or revise several portions of the regulations while NMFS and the Council reconsider the initial allocation of whiting, and until NMFS implements any necessary new regulations in response to the court order. The second rulemaking, RAW 2, would take in to account the Council's September 2012 recommendation and reconsideration of the dates used for initial allocation of whiting for the shorebased IFQ and at-sea mothership fisheries. The proposed rule for RAW 2 is scheduled to publish in November 2012, and the final rule in March 2013. The RAW 2 rule is scheduled to be effective by April 1, 2013, consistent with the court order.

Comments on the ANPR

NMFS received four substantive comments on the ANPR that addressed how delaying the ability to transfer QS and IBQ between QS accounts in the shorebased IFQ fishery might impact the 2-year period QS holders have to divest themselves of excess QS (the divestiture period). After considering these comments, NMFS proposes allowing additional time for divestiture, such that once QS transfer is allowed, QS participants in the shoreside IFQ fishery would then have 2 years to divest QS in excess of the accumulation limit.

As stated above, NMFS is using emergency action authority under MSA 305(c)(1) for RAW 1. Under that authority, NMFS, by delegation from the Secretary, can implement regulations for an FMP without going through the Council process where NMFS finds that an emergency involving a fishery exists. 16 U.S.C. 1855(a). The rules promulgated under such circumstances must ''address the emergency.'' 16 U.S.C. 1855(c)(1) and (2). NMFS' internal guidance defining ''an emergency'' is in the **Federal Register**. 62 FR 44421; August 21, 1997. This guidance defines an emergency as a situation that (1) Arose from recent, unforeseen events, (2) presents a serious conservation problem in the fishery, and (3) can be addressed through interim emergency regulations for which the immediate benefits outweigh the value of advance notice, public comment, and the deliberative consideration of the impacts on participants to the same extent as would be expected under the formal rulemaking process.

Here, NMFS finds that an emergency exists that can only be addressed through this emergency action. Due to the court's order in *Pacific Dawn,* several existing provisions of trawl regulations must be delayed while NMFS and the Council reconsider the initial allocation of Pacific whiting. Specifically, regulations with an effective date of September 1, 2012, which would allow catch history assignment severability from the mothership/catcher-vessel (MS/CV) endorsed limited entry trawl permit, and other relevant provisions with an effective date of January 1, 2013, need to be delayed. However, there is insufficient time to go through the standard FMP Council process prior to the required effective date of this proposed rule. If NMFS does not take this action, then NMFS would not be able to implement the following rulemaking (RAW 2) that is required by the court's order. Accordingly, NMFS finds an emergency exists that can only be remedied through this emergency action.

The emergency action authority allows NMFS to delay this and other regulations related to the reconsideration of allocation of whiting for 180 days, with the possibility for an additional 185 day extension if there is a public comment period and the Council is concurrently addressing the reconsideration. NMFS intends to extend the delay of regulations for the additional 185 days, and relevant regulations may be further delayed as a part of the RAW 2 rulemaking. The RAW 2 rulemaking will be done through a three-meeting Council process with a preliminary preferred alternative selected at the June 2012 Council meeting, and a final preferred alternative selected at the September Council meeting, followed by the publication of proposed and final rules. Replacement provisions for the delayed regulations and the reconsideration will be included in RAW 2. RAW 2 is scheduled to publish by the beginning of the 2013 fishing season.

This proposed action for RAW 1 would:

(1) Delay the ability to transfer QS and IBQ between QS accounts in the shorebased IFQ fishery;

(2) Delay the requirement to divest excess quota share amounts for the shorebased IFQ fishery and the at-sea mothership fishery;

(3) Delay the ability to change MS/CV endorsement and catch history assignments from one limited entry trawl permit to another;

(4) Modify the issuance provisions for quota pounds (QP) for the beginning of fishing year 2013 to preserve NMFS' ability to deposit the appropriate final amounts into IFQ accounts based on any recalculation of QS allocations. In the meantime, NMFS proposes to deposit into accounts an interim amount of QP based on the shorebased trawl allocation, as reduced by the amount of QP for whiting trips for whiting, and for species caught incidentally in the whiting fishery (including lingcod, Pacific cod, canary, bocaccio, cowcod, yelloweye, Pacific ocean perch, widow, English sole, darkblotched, sablefish N. of 36°N lat., yellowtail N. of 40°10′ N. lat., shortspine N. of 34°27′ N. lat., minor slope rockfish N. of 40°10′ N. lat., minor slope rockfish S. of 40°10′ N. lat., minor shelf rockfish N. of 40°10′ N. lat., minor shelf rockfish S. of 40°10′ N. lat., and other flatfish). The remainder of the interim QP would be deposited in accounts at the start of the whiting primary season.

This action also advises the at-sea mothership fishery that the response to the court order may impact processor obligations and cooperative (coop) formation if whiting catch history assignments are recalculated, and announces further details on the process for the affected public to review and correct, if necessary, their landings and delivery data through 2010, since this data may be used for reallocation.

Each of these elements is described in further detail below in this preamble.

Delay Transfer of QS and IBQ

The trawl rationalization program, as implemented in January 2011, delayed QS holders' ability to transfer QS and IBQ between QS accounts in the Shorebased IFQ fishery through December 31, 2012 (i.e., transfer could begin in 2013). This proposed action would further delay QS holders' ability to transfer QS and IBQ between QS accounts. This suspension of QS transfers would be a temporary action, but is necessary to avoid complications which would occur if QS permit owners in the shorebased IFQ fishery were allowed to transfer QS percentages prior to the whiting allocation reconsideration. Due to the complexity of online transactions occurring within the fishery, NMFS has determined that it is necessary to suspend QS transfers for all species, not just those directly impacted by the reconsideration. If QS permit owners were allowed to transfer QS percentages of whiting and incidentally caught species prior to the completion of the reconsideration, then it would be difficult, if not impossible, to track QS in order to resolve discrepancies or changes to QS allocations. Additionally, if QS transfers were allowed before the completion of the reconsideration of whiting allocations, QS permit owners would be transferring QS amounts that potentially could increase or decrease after the reconsideration, possibly undermining business relationships and confusing buyers and sellers.

Also, if whiting QS is reallocated, depending on the formula used, there may be new QS permit owners, while some current QS permit owners who received initial whiting QS allocations may not receive any under a recalculation. Moreover, because QS units do not have a unique identifier, QS loses its identity following a transfer; therefore tracking QS through transfers is extremely difficult. This rule would re-write § 660.140(d)(3)(ii)(B), paragraph (*2*) to state that QS or IBQ cannot be transferred, except under U.S. court order or authorization, and as approved by NMFS. Additionally, the rule would state that QS and IBQ cannot be transferred to another QS permit owner, except under U.S. court order or authorization and as approved by NMFS.

Delay the Requirement To Divest Excess QS in the Shorebased IFQ Fishery and the At-sea Mothership Fishery

Delayed implementation of regulations that allow for the transfer of QS could impact divestiture for those QS permit owners with QS over the accumulation limits (also called QS control limits) in the shorebased IFQ fishery. The current regulations give QS permit owners with excess QS two years after QS transfer begins to divest their excess QS amounts. In other words, during 2013 and 2014, QS permit owners with QS over the accumulation limits specified at § 660.140(d)(4)(i) must sell their excess QS by the end of 2014. At the start of 2015, any excess QS owned by QS permit owners would be permanently revoked by NMFS and redistributed to other QS permit owners in proportion to their current QS and IBQ holdings. Delaying QS transfers would shorten the divestiture period because QS could not be transferred during the reconsideration.

After considering informal public comments at the April 2012 Council meeting that the QS permit owners should retain a full two-year period for divestiture, NMFS proposes to revise the regulations at § 660.140(d)(4)(v) to state that any person that has an initial allocation of QS or IBQ in excess of the accumulation limits will be allowed to receive that allocation, but must divest themselves of the excess QS or IBQ during the first two years once QS transfers are allowed. Maintaining the full two years for divestiture would provide QS permit owners with sufficient time to plan and arrange sales of excess QS, as originally recommended by the Council for this provision of the trawl rationalization program.

Divestiture for the at-sea mothership sector will be addressed as necessary in RAW 2, because MS/CV endorsed limited entry trawl permit holders must divest their excess QS by December 31, 2012. Currently no member of the mothership sector has QS in excess of the accumulation limits. However, some members of this sector may exceed the accumulation limits following the reconsideration. Thus, NMFS will consider through the Council process for RAW 2 whether it is necessary to reinstate a divestiture period based on the reconsideration.

Delay the Ability To Change MS/CV Endorsement and Catch History Assignment

This proposed action would delay the ability of limited entry trawl permit owners in the mothership sector to transfer MS/CV endorsements and catch history assignments (CHA) between limited entry trawl permits. The rationale for this action is similar to that for delaying QS transfers in the shorebased IFQ sector; if permit owners are allowed to transfer ownership of catch history assignments before the reconsideration takes place, then it will be difficult for NMFS to track changes to the initial allocations of whiting and other incidentally caught species. Delaying CHA transfers is necessary because the values of CHA could change following the reconsideration, and it's possible that some CHA allocations could be reduced to zero. Accordingly, this rule would revise § 660.150 (g)(2)(iv)(B) and (C) to change MS/CV endorsement registration in order to temporarily delay severability, except in the cases of permit combination.

As described earlier in the preamble, NMFS will not suspend transfer of the limited entry trawl permit between permit owners (i.e., changes in permit ownership) or between vessels (i.e., change in permit registered to vessel). If NMFS reissues catch history assignments on MS/CV-endorsed limited entry trawl permits as a result of the reconsideration, NMFS will issue those permits to the permit owner of record with NMFS at the time of reissuance. Any person who is considering purchasing or otherwise obtaining ownership of an MS/CV endorsed permit should be aware that NMFS may change (increase or decrease) the current whiting catch history assignment given on the permit as a result of the reconsideration of the allocation whiting.

Deposit Interim QP Based on the Shorebased Trawl Allocation as Reduced by the Amount of QP for Whiting Trips for Whiting, and Species Caught Incidentally in the Whiting Fishery

NMFS proposes to add regulatory language to allow it to deposit into QS accounts, on or about January 1, 2013, interim QP based on the shorebased trawl allocation as reduced by the amount of QP for whiting trips for whiting, and species caught incidentally in the whiting fishery. This proposal would enable the agency to allocate the appropriate final amounts based on any recalculation of QS allocations. Species caught incidentally in the whiting fishery (during whiting directed trips) include lingcod, Pacific cod, canary, bocaccio, cowcod, yelloweye, Pacific ocean perch, widow, English sole, darkblotched, sablefish N. of 36°N lat., yellowtail N. of 40°10′ N. lat., shortspine N. of 34°27′ N. lat., minor slope rockfish N. of 40°10′ N. lat., minor slope rockfish S. of 40°10′ N. lat., minor shelf rockfish N. of 40°10′ N. lat., minor shelf rockfish S. of 40°10′ N. lat., and other flatfish. These are the species for which the initial issuance allocation percentages for the whiting sector were greater than zero, as listed in the table at § 660.140(d) (8)(iv)(A)(10), or species for which the initial allocation is determined through the biennial specifications process (§ 660.140(d) (8)(iv)(A)(10)). In other words, NMFS would not deposit all of the QP to QS accounts at the beginning of the year regardless of whether the final harvest specifications for 2013 are effective. NMFS will only deposit sufficient whiting QP for non-whiting directed trips; all other QP will be issued following the reconsideration and recalculation of initial allocations of whiting and associated, incidentally caught species. Therefore, NMFS proposes to add temporary regulations to § 660.140(d)(1)(ii)(A) and (B) to specify that NMFS will hold back QP at the start of 2013.

Potential Impact on Processor Obligations and Coop Formation

NMFS advises the at-sea mothership fishery that the response to the reconsideration may impact processor obligations and coop formation if whiting catch history assignments are recalculated. NMFS intends to announce any changes to the amount of catch history assignments associated with MS/CV-endorsed limited entry trawl permits by April 1, 2013. The mothership sector has until March 31, 2013, to submit their coop permit applications to NMFS for that fishing year. The coop permit application includes a list of the catch history amounts associated with specific MS/CV-endorsed limited entry permits and which MS permit those amounts are obligated to. In addition, MS/CV-endorsed permit owners must obligate their associated catch history assignment to an MS permit by

September 1 of the prior year. Because both of these requirements may happen before NMFS has made its determination on the 2013 catch history assignments associated with MS/CV-endorsed permits, participants in the mothership fishery should be aware that this proposal may potentially impact their processor obligations, coop formation, and coop permit application. NMFS does not anticipate a need for regulatory changes to address these potential impacts and will work with any MS coop permit applicants if there are changes in catch history assignments from that noted in the 2013 coop permit application. For example, in the initial administrative determination for any 2013 MS coop permit application, NMFS could notify the coop manager of any changes in catch history assignments for MS/CV-endorsed permits associated with that coop. NMFS solicits public comment on this approach and any potential impacts on processor obligations or MS coop formation.

Process to Review, and if Necessary, Correct Data

Potential participants of the trawl rationalization program should be aware that NMFS intends to continue to use landings data from the Pacific States Marine Fisheries Commission's PacFIN database and NMFS' Northwest Fisheries Science Center's Pacific whiting observer data from NORPAC (the North Pacific database) in reconsidering QS distribution for the trawl rationalization program, consistent with the approach used in 2009–2010. Landings data from state fish tickets, as provided by the states to the PacFIN database, would be used to determine allocations of IFQ QS for the shore-based whiting and nonwhiting harvesters and for the shore-based whiting processors. Landings data from the NORPAC database would be used to determine allocations of at-sea QS for the whiting mothership catcher vessels.

NMFS intends to follow the process it followed in 2009–2010, working with the PacFIN and NORPAC databases, to reevaluate the whiting allocations. Accordingly, NMFS will ''freeze'' the databases for the purposes of initial allocation on the date the proposed rule for RAW 2 publishes in the **Federal Register** to allow NMFS time to compile the dataset and cross check the data for any errors. ''Freezing'' the databases means that NMFS will extract a snapshot of the databases as of the proposed rule publication date, and use those data to allocate QS. ''Freezing'' the databases is necessary to hold them constant for use during qualification and initial issuance of the trawl rationalization program, and to form an administrative record of the database at a given point in time. Following the ''freezing'' of the databases, any corrections to the ''frozen'' database would be made with NMFS through the processes set forth in future trawl rationalization rules. After NMFS extracts a copy of the databases, the PacFIN and NORPAC databases will continue to exist and be updated through their normal processes, but such updates may not be used for reconsidered allocations of QS.

If potential participants in the trawl rationalization program have concerns over the accuracy of their data through 2010 in the PacFIN database, they should contact the state in which they landed those fish to correct any errors. Any revisions to an entity's fish tickets would have to be approved by the state in order to be accepted. State contacts are as follows: (1) Washington—Carol Turcotte (360–902–2253, *Carol.Turcotte@dfw.wa.gov*); (2) Oregon—Michelle Grooms (503–947–6247, *Michelle.L.Grooms@state.or.us*); and (3) California—Jana Robertson (562–342–7126, *jroberts@dfg.ca.gov*). For concerns over the accuracy of NORPAC data, contact Neil Riley (206–861–7607, *neil.riley@noaa.gov*). NMFS urges potential QS owners to go directly to the source where fisheries data is entered in the database to get it corrected before NMFS extracts the data for reconsideration of QS allocation.

For limited entry permit or permit combination data, check NMFS Web site at *http://www.nwr.noaa.gov/GroundfishHalibut/Groundfish-Permits/index.cfm* or contact Kevin Ford (206–526–6115, *kevin.ford@noaa.gov*).

NMFS also considered whether to allow limited entry permit transfers (i.e., changes in permit ownership) for all limited entry trawl endorsed permits, except for those with a catcher/processor endorsement, for a period of time during the reconsideration. This allowance would simplify reissuance of QS permits in the shorebased IFQ fishery or catch history assignments on MS/CV-endorsed limited entry trawl permits in the at-sea mothership fishery. After assessing this step, NMFS has determined that it is not necessary because RAW 2 has no planned application process. The initial allocation had a lengthy application process that necessitated not allowing limited entry permit (LEP) transfers while NMFS reviewed applications. For this time, NMFS will issue an initial administrative determination (IAD), but not an application. Accordingly, there should not be a need to freeze LEP transfers. If NMFS reissues QS permits and/or catch history assignments on MS/CV-endorsed limited entry trawl permits, NMFS proposes that those permits be issued to the permit owner of record with NMFS at the time of reissuance. These details will be developed as part of the RAW 2 rulemaking.

Classification

Pursuant to section 305(c)(1) of the MSA, the NMFS Assistant Administrator has determined that this proposed rule is consistent with the Pacific Coast Groundfish FMP, other provisions of the MSA, and other applicable law, subject to further consideration after public comment.

The Council prepared a final environmental impact statement (EIS) for Amendment 20 and Amendment 21 to the Pacific Coast Groundfish FMP; a notice of availability for each of these final EISs was published on June 25, 2010 (75 FR 36386). The Amendment 20 and 21 EISs and the draft EA are available on the Council's Web site at *http://www.pcouncil.org/* or on NMFS' Web site at *http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Trawl-Program/index.cfm.* The regulatory changes in this proposed rule were categorically excluded from the requirement to prepare a NEPA analysis.

This proposed rule has preliminarily been determined to be not significant for purposes of Executive Order 12866.

NMFS prepared an initial regulatory flexibility analysis (IRFA), as required by section 603 of the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq*). The IRFA describes the economic impact this proposed rule, if adopted, would have on small entities. A description of the action, why it is being considered, and the legal basis for this action are contained at the beginning of this section in the preamble and in the **SUMMARY** section of the preamble. A copy of the IRFA is available from NMFS (see **ADDRESSES**).

The Small Business Administration has established size criteria to define small entities under the RFA for all major industry sectors in the US, including fish harvesting and fish processing businesses. Under these criteria, a business involved in fish harvesting is a small entity if it is independently owned and operated and not dominant in its field of operation (including its affiliates), and if it has combined annual receipts not in excess of $4.0 million for all its affiliated operations worldwide. A seafood processor is a small entity if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small entity if it meets the $4.0 million criterion for fish harvesting operations. A wholesale business servicing the fishing industry is a small entity if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. For marinas and charter/party boats, a small entity is one with annual receipts not in excess of $7.0 million.

These regulations directly affect holders of QS and CHA, which include both large and small entities. Quota shares were initially allocated to 166 limited entry trawl permit holders (permits held by catcher processors did not receive QS, while one limited entry trawl permit did not apply to receive QS) and to 10 whiting processors. Thirty-six limited entry permits also have MS/CV endorsements and catch history assignments. Because many of these permits were owned by the same entity, these initial allocations were consolidated into 138 quota share permits/accounts. Of the 166 limited entry permits, 25 limited entry trawl permits are either owned or closely associated with a ''large'' shorebased processing company or with a non-profit organization who considers itself a ''large'' organization. Nine other permit owners indicated that they were ''large'' companies. Almost all of these large companies are associated with the shorebased and mothership whiting fisheries. The remaining 133 limited entry trawl permits are likely held by ''small'' companies. Of the 10 shorebased processing companies (whiting first receivers/processors) that received whiting QS, three are ''small'' entities.

NMFS is postponing the ability of QS permit owners to trade QS, as well as ability of MS/CV to trade their endorsements and catch history assignments separately from their limited entry permits. NMFS proposes this delay for QS species/species groups, because for many affected parties, their QS allocations (especially for bycatch species) are composed of whiting-trip calculations and non-whiting trip calculations. Currently, QS and IBQ trading has been prohibited for all species/species categories until January 1, 2013. By postponing these activities while NMFS and the Council reconsider the initial whiting allocations and implement any changes that result, NMFS seeks to minimize confusion and disruption in the fishery from trading quota shares that have not yet been firmly established by regulation. For example, as discussed above, if QS trading is not delayed, QS permit owners would be transferring QS amounts that potentially could change (increase or decrease) after the reconsideration. This situation would undermine business relationships and create confusion among buyers and sellers. As discussed above, RAW2 will implement any revised allocations of QS and MS/CV history assignments. RAW2 is expected to be effective by April 1, 2013 in time for the first whiting season opener off California, and before the major June 15 coastwide season opener. Similarly, NMFS also proposes to delay MS/CV's ability to transfer endorsement and associated catch history assignments from one limited entry trawl permit to another. However, the MS/CV's retain the ability to sell or trade a limited entry permit with the endorsement and catch history. All other MS/CV regulations remain unchanged. NMFS intends to announce any changes to the amount of catch history assignments associated with MS/CV-endorsed limited entry trawl permits by April 1, 2013, prior to the May 15 start date for the whiting mothership fishery.

Note that NMFS is not postponing fishing. To accommodate non-whiting fisheries that begin at the beginning of the year, NMFS will provide QP to QS holders, but hold back sufficient QPs for whiting and all other incidentally caught species from the annual allocation of QPs to QS accounts made on or about January 1, 2013 to allocate the appropriate final amounts based on any recalculation of the whiting QS allocations. The proposed process of ''holding'' back sufficient QP is similar to the current process of starting the year with an interim low estimate of the annual whiting trawl allocation and then in the spring of each year adjusting the QP in the QS accounts with any additional QP, based on the final whiting trawl allocation. The final whiting trawl allocation is typically not established until early May, to incorporate the latest stock assessment information, review tribal allocation requests, and receive Pacific Fishery Management Council recommendations. In 2012, this process was modified to include the processes of the U.S.-Canada Pacific Whiting Treaty.

These delays will be temporary in nature and will benefit both small and large entities. NMFS proposes these delays to help smooth the transition to any changes in Pacific whiting allocations, and to reduce uncertainty for existing and potential new holders of these allocations.

No Federal rules have been identified that duplicate, overlap, or conflict with the alternatives. Public comment is hereby solicited, identifying such rules. A copy of this analysis is available from NMFS (see **ADDRESSES**).

NMFS issued Biological Opinions under the Endangered Species Act (ESA) on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999 pertaining to the effects of the Pacific Coast groundfish FMP fisheries on Chinook salmon (Puget Sound, Snake River spring/summer, Snake River fall, upper Columbia River spring, lower Columbia River, upper Willamette River, Sacramento River winter, Central Valley spring, California coastal), coho salmon (Central California coastal, southern Oregon/northern California coastal), chum salmon (Hood Canal summer, Columbia River), sockeye salmon (Snake River, Ozette Lake), and steelhead (upper, middle and lower Columbia River, Snake River Basin, upper Willamette River, central California coast, California Central Valley, south/central California, northern California, southern California). These biological opinions have concluded that implementing the FMP for the Pacific Coast groundfish fishery is not expected to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS, or result in the destruction or adverse modification of critical habitat.

NMFS issued a Supplemental Biological Opinion on March 11, 2006, concluding that neither the higher observed bycatch of Chinook in the 2005 whiting fishery nor new data regarding salmon bycatch in the groundfish bottom trawl fishery required a reconsideration of its prior ''no jeopardy'' conclusion. NMFS also reaffirmed its prior determination that implementation of the Groundfish PCGFMP is not likely to jeopardize the continued existence of any of the affected ESUs. Lower Columbia River coho (70 FR 37160, June 28, 2005) and Oregon Coastal coho (73 FR 7816, February 11, 2008) were recently relisted as threatened under the ESA. The 1999 biological opinion concluded that the bycatch of salmonids in the Pacific whiting fishery were almost entirely Chinook salmon, with little or no bycatch of coho, chum, sockeye, and steelhead.

On February 9, 2012, NMFS Protected Resources Division issued a Biological Opinion (BO) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the operation of the Pacific coast groundfish fishery in 2012. In this Opinion, NMFS concluded that the operation of the groundfish fishery is not likely to jeopardize the continued existence of green sturgeon (Acipenser medirostris), eulachon (Thaleichthys pacificus), humpback whales (Megaptera novaeangliae), Steller sea lions (Eumetopias jubatus), and leatherback sea turtles (Dennochelys coriacea). NMFS also concluded that the operation of the groundfish fishery is not likely to destroy or adversely modify designated critical habitat of green sturgeon or leatherback sea turtles. Furthermore, NMFS concluded that the operation of the groundfish fishery may affect, but is not likely to adversely affect the following species and designated critical habitat: Sei whales (Balaenoptera borealis); North Pacific Right whales (Eubalaena japonica); Blue whales (Balaenoptera musculus); Fin whales (Balaenoptera physalus); Sperm whales (Physter macrocephalus); Southern Resident killer whales (Orcinus orca); Guadalupe fur seals (Arctocephalus townsendi); Green sea turtles (Chelonia mydas); Olive ridley sea turtles (Lepidochelys olivacea); Loggerhead sea turtles (Carretta carretta); critical habitat of Southern Resident killer whales; and critical habitat of Steller sea lions. This proposed rule does not modify any activities that would affect listed species; and thus the February 9, 2012 BO conclusions are applicable.

On August 25, 2011, NMFS Sustainable Fisheries Division initiated consultation with U.S. Fish and Wildlife Service (USFWS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the operation of the Pacific coast groundfish fishery. The

Biological Assessment (BA) was revised and re-submitted to USFWS on January 17, 2012. The BA concludes that the continued operation of the Pacific Coast Groundfish Fishery is likely to adversely affect short-tailed albatross; however, the level of take is not expected to reduce appreciably the likelihood of survival or significantly affect recovery of the species. The BA preliminarily concludes that continued operation of the Pacific Coast Groundfish Fishery is not likely to adversely affect California least terns, marbled murrelets, bull trout, and Northern or Southern sea otters. USFWS formally responded with a letter dated March 29, 2012 and advised NMFS that formal consultation has been initiated. Marine Mammal Protection Act (MMPA) impacts resulting from fishing activities proposed in this final rule are discussed in the FEIS for the 2011–12 groundfish fishery specifications and management measures. As discussed above, NMFS issued a biological opinion addressing impacts to ESA listed marine mammals. NMFS is currently working on the process leading to any necessary authorization of incidental taking under MMPA section 101(a)(5)(E).

List of Subjects in 50 CFR Part 660

Fisheries, Fishing, and Indian fisheries.

Dated: May 15, 2012.

Alan D. Risenhoover,

Acting Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For the reasons stated in the preamble, 50 CFR part 660 is proposed to be amended as follows:

PART 660—FISHERIES OFF WEST COAST STATES

1. The authority citation for part 660 continues to read as follows:

Authority: 16 U.S.C. 1801 *et seq.,* 16 U.S.C. 773 *et seq.,* and 16 U.S.C. 7001 *et seq.*

2. In § 660.140, revise paragraphs (d)(1)(ii)(A)(*1*) and (*2*), (d)(1)(ii)(B)(*1*) and (*2*), (d)(3)(ii)(B)(*2*) and (d)(4)(v) to read as follows:

§ 660.140 Shorebased IFQ Program.

* * * * *

(d) * * *

(1) * * *

(ii) * * *

(A) * * *

(*1*) In years where the groundfish harvest specifications are known by January 1, deposits to QS accounts for IFQ species will be made on or about January 1. For 2013, NMFS will issue QP in two parts. On or about January 1, 2013, NMFS will deposit QP based on the shorebased trawl allocation as reduced by the amount of QP for whiting trips as specified at paragraph (d)(8)(iv)(A)(*10*) of this section for the initial issuance allocations of QS between whiting and non-whiting trips. In the spring of 2013, after NMFS has made a determination on the QS for QS permit owners, NMFS will deposit additional QP to the QS account, as appropriate.

(*2*) In years where the groundfish harvest specifications are not known by January 1, NMFS will issue QP in two parts. On or about January 1, NMFS will deposit QP based on the shorebased trawl allocation multiplied by the lower end of the range of potential harvest specifications for that year. For 2013, that amount will be further reduced by the amount of QP for whiting trips as specified at paragraph (d)(8)(iv)(A)(*10*) of this section for the initial issuance allocations of QS between whiting and non-whiting trips. After the final harvest specifications are established later in the year, NMFS will deposit additional QP to the QS account. For 2013, this will occur in the spring after NMFS has made a determination on the QS for QS permit owners.

(B) * * *

(*1*) In years where the Pacific whiting harvest specification is known by January 1, deposits to QS accounts for Pacific whiting will be made on or about January 1. For 2013, NMFS will issue QP in two parts. On or about January 1, 2013, NMFS will deposit QP based on the shorebased trawl allocation as reduced by the amount of QP for whiting trips as specified at paragraph (d)(8)(iv)(A)(*10*) of this section for the initial issuance allocations of QS between whiting and non-whiting trips. In the spring of 2013, after NMFS has made a determination on the QS for QS permit owners, NMFS will deposit additional QP to the QS account, as appropriate.

(*2*) In years where the Pacific whiting harvest specification is not known by January 1, NMFS will issue Pacific whiting QP in two parts. On or about January 1, NMFS will deposit Pacific whiting QP based on the shorebased trawl allocation multiplied by the lower end of the range of potential harvest specifications for Pacific whiting for that year. For 2013, that amount will be further reduced by the amount of QP for whiting trips as specified at paragraph (d)(8)(iv)(A)(*10*) of this section for the initial issuance allocations of QS between whiting and non-whiting trips. After the final Pacific whiting harvest specifications are established later in the year, NMFS will deposit additional QP to QS accounts. For 2013, this will occur in the spring after NMFS has made a determination on the QS for QS permit owners.

* * * * *

(3) * * *

(ii) * * *

(B) * * *

(*2*) *Transfer of QS or IBQ between QS accounts.* QS or IBQ cannot be transferred to another QS permit owner, except under U.S. court order or authorization and as approved by NMFS. QS or IBQ may not be transferred to a vessel account.

* * * * *

(4) * * *

(v) *Divestiture.* Accumulation limits will be calculated by first calculating the aggregate non-whiting QS limit and then the individual species QS or IBQ control limits. For QS permit owners (including any person who has ownership interest in the owner named on the permit) that are found to exceed the accumulation limits during the initial issuance of QS permits, an adjustment period will be provided after which they will have to completely divest their QS or IBQ in excess of the accumulation limits. QS or IBQ will be issued for amounts in excess of accumulation limits only for owners of limited entry permits as of November 8, 2008, if such ownership has been registered with NMFS by November 30, 2008. The owner of any permit acquired after November 8, 2008, or if acquired earlier, not registered with NMFS by November 30, 2008, will only be eligible to receive an initial allocation for that permit of those QS or IBQ that are within the accumulation limits; any QS or IBQ in excess of the accumulation limits will be redistributed to the remainder of the initial recipients of QS or IBQ in proportion to each recipient's initial allocation of QS or IBQ for each species. Any person that qualifies for an initial allocation of QS or IBQ in excess of the accumulation limits will be allowed to receive that allocation, but must divest themselves of the excess QS or IBQ during the first two years once QS transfers are allowed (the divestiture period). Holders of QS or IBQ in excess of the control limits may receive and use the QP or IBQ pounds associated with that excess, up to the time their divestiture is completed. Once the divestiture period is completed, any QS or IBQ held by a person (including any person who has ownership interest in the owner named on the permit) in excess of the accumulation limits will be revoked and redistributed to the remainder of the QS or IBQ owners in proportion to the QS or IBQ holdings in the immediately following year. No compensation will be due for any revoked shares.

* * * * *

3. In § 660.150,

a. Revise paragraph (g)(2)(iv)(B);

b. Remove and reserve paragraph (g)(2)(iv)(C) to read as follows:

§ 660.150 Mothership (MS) Coop Program.

* * * * *

(g) * * *

(2) * * *

(iv) * * *

(B) *Application.* NMFS is not accepting applications for a change in MS/CV endorsement registration at this time.

(C) *[Reserved]*

* * * * *

[FR Doc. 2012–12265 Filed 5–18–12; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 679

RIN 0648–BB42

Fisheries of the Exclusive Economic Zone off Alaska and Pacific Halibut Fisheries; Observer Program

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of public hearing.

SUMMARY: On April 18, 2012, we, NMFS, published a proposed rule in the **Federal Register** to restructure the funding and deployment system for observers in North Pacific groundfish and halibut fisheries via Amendment 86 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI FMP) and Amendment 76 to the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA FMP). The public comment period for the subject proposed rule closes on June 18, 2012. We will hold a public hearing in Seattle, WA, to receive oral and written comments on the proposed regulations during the public comment period.

DATES: The public hearing will be held on June 1, 2012, 10 a.m. to 12 p.m., Pacific daylight time, at the NOAA Alaska Fisheries Science Center, 7600 Sand Point Way NE., Building 4, Observer Training Room (1055), Seattle, WA 98115. Written comments must be received no later than 5 p.m., Alaska local time, June 18, 2012.

ADDRESSES: You may submit comments, identified by FDMS Docket Number NOAA–NMFS–2011–0210, by any one of the following methods:

- *Electronic Submissions:* Submit all electronic public comments via the Federal eRulemaking Portal Web site at *http://www.regulations.gov.* To submit comments via the e-Rulemaking Portal, first click the ''Submit a Comment'' icon, then enter NOAA–NMFS–2011–0210 in the keyword search. Locate the document you wish to comment on from the resulting list and click on the ''Submit a Comment'' icon on the right of that line.
- *Mail:* Address written comments to Glenn Merrill, Assistant Regional Administrator, Sustainable Fisheries Division, Alaska Region NMFS, Attn: Ellen Sebastian. Mail comments to P.O. Box 21668, Juneau, AK 99802–1668.
- *Fax:* Address written comments to Glenn Merrill, Assistant Regional Administrator, Sustainable Fisheries Division, Alaska Region NMFS, Attn: Ellen Sebastian. Fax comments to 907–586–7557.
- *Hand delivery to the Federal Building:* Address written comments to Glenn Merrill, Assistant Regional Administrator, Sustainable Fisheries Division, Alaska Region NMFS, Attn: Ellen Sebastian. Deliver comments to 709 West 9th Street, Room 420A, Juneau, AK.
- Submit oral or written comments to NMFS at the public hearing listed in this notice.

Comments must be submitted by one of the above methods to ensure that the comments are received, documented, and considered by NMFS. Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered.

All comments received are a part of the public record and will generally be posted to *http://www.regulations.gov* without change. All Personal Identifying Information (e.g., name, address) voluntarily submitted by the commenter will be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

NMFS will accept anonymous comments (enter N/A in the required fields, if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe portable document file (pdf) formats only.

Electronic copies of the proposed rule to implement Amendment 86 to the BSAI FMP and Amendment 76 to the GOA FMP and the Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis prepared for this action may be obtained from *http://www.regulations.gov* or from the NMFS Alaska Region Web site at *http://alaskafisheries.noaa.gov.*

FOR FURTHER INFORMATION CONTACT: Brandee Gerke, (907) 586–7228.

SUPPLEMENTARY INFORMATION: On April 18, 2012, we, NMFS, published a proposed rule in the **Federal Register** (77 FR 23326) to restructure the funding and deployment system for observers in the North Pacific groundfish and halibut fisheries via Amendment 86 to the BSAI FMP and Amendment 76 to GOA FMP. The proposed rule was prepared under the authority of section 313 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). MSA section 313 requires NMFS

ISSUES RELATED TO THE RECONSIDERATION OF ALLOCATION OF WHITING: DIVESTITURE AND TRANSFER OF QUOTA

The purpose of this document is to describe issues related to the reconsideration of allocation of whiting rulemakings, and to seek public comment regarding how best to address these issues.

Transfer of Quota Shares (QS) and Individual Bycatch (IBQ) in the Shorebased IFQ Program

Background

Transfer of QS and IBQ was scheduled to begin January 1, 2013. However, response to the court order may require reissuance of QS for some species after January 1, 2013. Reissuance of QS is difficult once trading begins. Due to the complexity of online transactions occurring within the fishery, NMFS is proposing to suspend QS transfers for all species, not just those directly impacted by the reconsideration. If QS permit owners were allowed to transfer QS percentages of whiting and incidentally caught species prior to the completion of the reconsideration, then it would be difficult, if not impossible, to track QS in order to resolve discrepancies or changes to QS allocations. Specifically, QS is highly divisible and may be traded (and retraded) multiple times in units as little as .001%. NMFS does not have the tools to allow tracking at any level (e.g. by creating serialized units of QS). Once QS percentages are transferred they will be comingled with other QS amounts in a QS account. If QS permit owners make multiple transfers both in and out of an account for various units of QS for a particular species, it is extremely difficult for NMFS to track a particular unit of QS back to its original owner. In short, once transfer of QS begins, individual units lose their identity. Additionally, if QS transfers were allowed before the completion of the reconsideration of whiting allocations, QS permit owners would be transferring QS amounts that potentially could increase or decrease after the reconsideration, possibly undermining existing contracts and business relationships and confusing buyers and sellers.

Therefore, the Reconsideration of Allocation of Whiting, Delay of Relevant Regulations Rule (RAW 1) proposes to delay transfer of QS and IBQ until the reconsideration and appeals processes have taken place. Because the RAW 1 rule, if implemented, would be a temporary rule (lasting not more than 365 days), the Council and NMFS need to consider including the delay of QS and IBQ transfers in the permanent rulemaking that is scheduled to follow the September Council meeting (RAW 2). NMFS anticipates any appeals process being completed by the fall of 2013.

NMFS seeks Council guidance regarding:

As part of RAW 2, the Council will need to consider when transfer of QS and IBQ should be reinstated. In deciding when to reinstate QS and IBQ transfers, the Council and NMFS will need to further define the process to allow for transfers of QS and IBQ, including how to apply for a QS permit. The PIE 2 rulemaking would have dealt with this issue. However, because PIE 2 has been delayed and because this issue will need to be in place when QS transfers are allowed, NMFS may need to include it with the RAW 2 rulemaking.

Divestiture Periods for the Shorebased IFQ Program and Mothership Coop Program

Background- Shorebased IFQ Program Divestiture

The current regulations for the Shorebased IFQ Program give QS permit owners with excess QS two years after QS transfer begins to divest their excess QS amounts. In other words, during

2013 and 2014, NMFS anticipates that QS permit owners with QS over the accumulation limits specified at §660.140(d)(4)(i) will sell their excess QS. At the start of 2015, any excess QS owned by QS permit owners would be permanently revoked by NMFS and redistributed to other QS permit owners in proportion to their current QS and IBQ holdings.

For the Shorebased IFQ sector, NMFS seeks Council guidance regarding:
Since NMFS is proposing in RAW 1 to delay transfer of QS and IBQ, the Council may want to consider whether the divestiture period should also be delayed. The Council could consider recommending language for RAW 2 that is similar to what is being proposed in the RAW 1 temporary rulemaking. RAW 1 proposes to temporarily revise the current regulations to state that any person that has an initial allocation of QS or IBQ in excess of the accumulation limits would be allowed to receive that allocation, but must divest themselves of the excess QS or IBQ during the first two years once QS transfers are allowed.

Background –MotherShip (MS) sector Divestiture
The current regulations for MS/Catcher Vessel(CV)-endorsed permit owners in the Mothership Coop Program outline a divestiture period which ends December 31, 2012 (§660.150(g)(3)(i)(D)). Currently no member of this sector owns MS/CV-endorsed permits in excess of the accumulation limits.
However, it’s possible that as a result of the reconsideration, some member of this sector may receive a new allocation in excess of the accumulation limits.

For the MS sector, NMFS seeks Council guidance regarding:
The Council may want to consider establishing a new or prolonged divestiture period in response to the reconsideration.

<u>Recipients for the reconsidered quota allocations</u>
NMFS has identified an issue that may arise depending on the outcome of the reconsideration effort before the Council. Because some of the permits have changed ownership, it creates a problem if quota were to be reissued. In other words, if the ownership of affected permits has changed and if initial whiting quota allocations change, who would get the revised quota amounts?

The RAW 1 proposed rule stated the following on p.29958 of the Federal Register, “Accordingly there should not be a need to freeze LEP transfers. If NMFS reissues QS permits and/or MS/CV endorsed LEPs, NMFS **proposes** that those permits be **issued to the permit owner of record with NMFS at the time of reissuance”** [emphasis added].

The Agenda Item D.7 Situation Summary notes the following at 1d, “Change the entity to which the QS allocations will be distributed from the permit owner to the owner of the QS account (allocations to QS accounts would be based on the history of the permit which generated each QS account).”
NMFS seeks Council guidance regarding:
The Council may want to consider how to best allocate whiting following the reconsideration if permits have changed ownership.

GROUNDFISH ADVISORY SUBPANEL REPORT ON RECONSIDERATION OF INITIAL CATCH SHARE ALLOCATIONS IN THE MOTHERSHIP AND SHORESIDE PACIFIC WHITING FISHERIES

The Groundfish Advisory Subpanel (GAP) received a report from Mr. Jim Seger on the need to identify a preliminary preferred alternative for whiting catch share allocations and associated regulatory adjustments. The task before the GAP, and ultimately the Council, is to select a preliminary preferred allocation alternative based on the goals and objectives of the program, guidance from the Magnuson-Stevens Act (MSA) and national standards, and the goals and objectives of the Groundfish Fishery Management Plan (FMP). It is the GAP's strong belief that the Council did just that in the plan it adopted in November 2008. Taking a fresh look at the five allocation alternatives before the Council, the GAP believes status quo remains the most fair and equitable option, and believes that the following rationale will assist the Council by building support for the status quo alternative.

Before getting into specifics, the GAP offers the following comments to help frame the decision. This is an allocation decision. The Council must consider the relevant factors and make a determination about which alternative best satisfies those factors (National Standard Guidelines, 50 C.F.R. §600.325(c)(3)(i)). Further, as the judge noted in his remand order, the Council is required to consider current harvest, but no particular outcome is mandated (*Pacific Dawn* Order at 6). In fact, there are many other co-equal factors the Council must consider, including historic harvest and community participation, dependence, investments, and employment in harvesting and processing (Magnuson-Stevens Fishery Conservation and Management Act 303a(c)(5)). Finally, because we are looking at these options now, the Council must also consider the disruptive effect of changing the allocation more than a year and a half into the program, because to do otherwise would be to fail to adequately consider current harvest and participation.

The goal of the trawl rationalization program was to create a capacity rationalization plan that increases net economic benefits, generates individual economic stability, and drives better stewardship of the resource through individual accountability. By all accounts the plan is achieving those desired outcomes (See West Coast Groundfish Individual Fishing Quota Fishery Catch Summary for 2011: First Look, Agenda Item F.6.b Supplemental NMFS Report, March 2012 describing a longer whiting season with nearly full attainment, increased revenue across the fleet and decreased bycatch). Upending the existing plan would create significant instability and jeopardize the benefits already accruing in this fishery. Moreover, there would be harmful impacts to other fisheries across the country hoping to rationalize. These outcomes would be especially unfair when one takes into account the years of open and transparent public process that went into the initial decision, and the fact that many of the plaintiffs testified in favor of the program adopted by the Council.

The status quo option is most fair and equitable to harvesters

Of the five options before the Council, three include window years well beyond the publicized control date. Harvest control dates play a vital role in fisheries management. While not legally binding, they are meant to send a signal to industry that any activity after the announcement of the date may not count towards catch history or qualification for a particular program. The purpose of the control date in this fishery was to prevent speculative fishing for history in a fishery that was already overcapitalized and in desperate need of capacity reduction. Selecting any alternative that moves the window period beyond the control date is a dangerous precedent, and would also be disruptive, unfair, and inequitable to the majority of the industry who abided by the date.

In fact, even looking at catch beyond 2003 is misleading because there are many participants who could have dramatically increased their participation after the control date (e.g. fishermen with other boats that fish elsewhere), but did not do so. Had they known that speculating might give them access to more fish, they would no doubt have introduced that additional capacity, despite the explicit goals of the program. Therefore, looking at history and basing an allocation on history beyond 2003 unfairly disadvantages those who played by the rules. This effect is exacerbated the further away from the control date that the allocation years are set.

Likewise, adopting more recent years may also lead to a double-dipping effect – some limited entry trawl participants who received a full allocation of non-whiting trawl species based on 1994-2003 catch history, but then started fishing for whiting after 2003 might receive another full complement of fish, depending on the years selected. Every year included in the allocation formula after 2003 increases the inequity.

In addition, the interplay between the allocation decision and other program components must be taken into account. Many of the elements work together and radically changing one of those elements upsets the basis for other Council decisions. For example, the 20 percent processor allocation was designed to protect shoreside communities and infrastructure dependent on the fishery at the time of program development. If there is a reallocation and more recent years are selected, boats affiliated with processors with stronger recent participation will also receive more history thereby shifting quota away from the historically dependent plants and communities. Put another way, both harvester catch history and processing history will shift in unison, moving quota away from historically dependent communities. As the goal of the processor allocation decision was to maintain, rather than shift landings and infrastructure, selecting more recent years will upset the delicate balance struck by the Council. (See Groundfish Fishery Management Plan Objective 17 requiring that Council actions minimize adverse impacts on communities to the extent practicable. The action at issue here is potential reallocation of whiting QS to harvesters and processors.)

Ultimately, the Magnuson-Stevens Act is paramount in this decision. When developing a LAPP program, it requires procedures to ensure fair and equitable allocations, including consideration of current and historical harvests and community participation, employment in harvesting and processing sectors, and investments and dependence on the fishery. (§303A(c)(5)) Selecting more recent window years prioritizes current participation over historical participation and dependence. This effect is compounded for those fishermen who could have increased capacity and effort (either number of boats or hold size) after the 2003 control date, but, in good faith, did not do so. The effect can be most clearly seen in option 4 which truncates history before 2000, but applies as well to options 2 and 3, which consider history beyond 2003. And, as mentioned above, the interaction between the processor allocation decision and modified window years would serve to shift quota away from historically active fishing communities, contrary to the Council's intent.

The status quo option is most fair and equitable to processors

The rationale supporting the status quo processor window years is similar to that for harvesters. Those years strike an appropriate balance between consideration of recent and historic participation. In fact, that was the exact purpose for the dates selected. Many of the pioneers of whiting processing, with large histories in the early 90s, gave up the years from 1992-1997 in exchange for a 2004 end date to the window period. Those dates were explicitly designed to recognize significant recent investments in processing capacity while protecting historic infrastructure and communities.

Adopting more recent window years would devalue the investments and dependence of some of the longest participating processors in the industry. Similarly, it would shift quota away from communities with a significant historic reliance on whiting landings and processing. As such, it is neither a fair nor equitable outcome.

As can be seen in attached Agenda Item D.7.a, Supplemental Attachment 5, Table 5, alternatives that extend the window period beyond 2004 advantage few participants at the expense of many (e.g. alternative 4 grants 2 processors a total of 1.8 percent increase in allocation while 4 processors lose 1.7 percent, and 3 previously participating and qualifying processors would not receive any allocation). That affects not only those processors, but also the affiliated communities and harvesters. This runs contrary to Council intent and Groundfish FMP objectives.

Overarching considerations

In addition to jeopardizing the benefits already accruing under this program, abrogating the harvester control date would have a dampening effect on future catch share programs. The clear outcome of rewarding those who increase capacity and effort after the control date would be that no one would abide by established dates in other programs under development and speculative fishing would increase. This would likely lead to conservation and management problems, such as exceeding TACs and difficulty controlling bycatch.

Moreover, litigation would be all but guaranteed. Any fisherman who had increased catch history relative to the control date would have a significant incentive to litigate to receive a greater proportion of the allocation. Knowing that path awaits a fishery hoping to rationalize, it is likely that fishermen and managers would avoid pursuing rationalization programs, even where desperately needed.

If the Council does not select the status quo option, the GAP recommends alternative 1 as it is the most surgical and least disruptive of the alternatives. Much of the rationale presented for status quo also applies to alternative 1. Alternative 1 has the added benefit of directly addressing the control date issue for processors by making the end date for window periods even across the board. However, after reviewing the Federal Register notices surrounding establishment of the control date, the GAP has come to the conclusion that the 2003 date for processors should not be controlling. It was simply not clear from the Federal Register notices that the control date was meant to apply to processors until 2004. (The GAP notes apparent disparities between Council statements and intent on this issue and control date language published by NMFS on January 9, 2004, May 24, 2004, and June 28, 2004 that could have confused processing participants.)

As a final point the GAP notes that there are relative winners and losers in every allocation system. But as one of the funders of the lawsuit said in support of the Council decision in public testimony in November 2008, "… the long-term benefits are going to outweigh the short-term compromises that we make. And that is truly in the betterment of the industry." Those benefits are already accruing. A shift away from the plan as adopted would jeopardize that.

Related matters

On the associated regulatory issues, the GAP offers the following comments:

Regarding issue 1, the GAP supports a moratorium on permanent transfer of quota share (QS) through the beginning of 2014. This is necessary to accommodate an appeals process. If another legal challenge is brought, the moratorium could be extended.

Regarding issue 2, the GAP supports extending the divestiture period by the length the QS moratorium is extended. This complies with council intent on providing those needing to divest with adequate time to do so. The GAP notes this should apply to shoreside as well as MS divestiture periods.

Regarding issue 3, the GAP supports the staff alternative allocating quota to the owner of the QS account.

Table 1. Changes in the amount of whiting QS allocated to processors under the alternatives relative to status quo (No Action) based on individual processor history of shoreside sector whiting trips.

	Alternatives			
	Alt 1: 1998-2003	Alt 2: 1998-2007	Alt 3: 1998-2010	Alt 4: 2000-2010
Number of Processors **Not Previously Qualifying** for an Allocation	0	5	7	7
Total Allocation Increases for Those Processors	0.0%	0.5%	1.1%	1.3%
Maximum To Any Processor	0.0%	0.1%	0.5%	0.6%
Number of Previously Qualifying Processors With **Increased** Allocations Under the Alternative	5	4	2	2
Total Percent of Increase for Those Processors	0.5%	1.4%	1.4%	1.8%
Maximum Increases to Any One Processor	0.2%	0.7%	1.0%	1.3%
Max Increase as a Percent of Status Quo Allocation	11.7%	18.1%	27.8%	35.3%
Previously Qualifying Processors with **Decreased** Allocations Under the Alternative	4	2	4	4
Total Percent of Decreases for Those Processors	-0.5%	-0.5%	-1.1%	-1.7%
Maximum Decreases to Any One Processor	-0.3%	-0.5%	-0.6%	-0.7%
Max Decrease as a Percent of Status Quo Allocation	-7.4%	-24.1%	-30.1%	-35.9%
Previously Qualifying Processors with **Zero** Allocations Under Status Quo	0	3	3	3
Total Percent of Decreases for Those Processors	-	-1.3%	-1.3%	-1.3%
Maximum Decreases to Any One Processor	-	-0.8%	-0.8%	-0.8%
Max Decrease as a Percent of Status Quo Allocation	-	-100.0%	-100.0%	-100.0%

PFMC
06/24/12

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON RECONSIDERATION OF INITIAL CATCH SHARE ALLOCATIONS IN THE MOTHERSHIP AND SHORESIDE PACIFIC WHITING FISHERIES

The Scientific and Statistical Committee (SSC) met with Mr. Jim Seger to discuss the reconsideration of initial catch shares in the mothership and shoreside Pacific whiting fisheries. Although most of the information presented in the briefing book deals solely with distributional or policy issues, there are several scientific components the SSC wishes to highlight.

The way the fisheries are actually prosecuted (geographic location of fishing and landings, timing of fishing, and participants) will in the long-term tend not to be affected by who receives the initial allocation of catch shares. Over time, the use of the catch shares will likely migrate through leases or sales to the participants who can put them to their most profitable use. This means that the eventual biological, ecological, and economic performance of the fisheries will be relatively independent of the initial allocation of catch shares. It has been the experience of many catch share programs that such transitions occur rather quickly, often within the first few years. As a consequence, the initial allocation of quota shares is not an effective tool to direct fishing or processing effort to particular geographic locations.

Furthermore, it is not evident whether, and to what degree, changes in fishing effort between the ports would affect the Pacific whiting resource. The harvest control rule for Pacific whiting is robust to changes in the distribution of effort, thus there is unlikely to be a conservation issue. However, the overall yield from the resource may be affected, and a bioeconomic model would need to be developed to answer this question.

A control date for quota share allocation can be an effective tool to discourage excessive resource expenditures intended exclusively to secure additional quota shares. This applies equally to catcher vessels, at-sea processors, and shoreside processors.

PFMC
06/23/12

May 29, 2012

RECEIVED
MAY 2 9 2012
PFMC

Mr. Dan Wolford, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Re: Reconsideration of the IFQ Allocation for Pacific Whiting June 20-26, 2012 Before the Pacific Fishery Management Council

I represent Ocean Gold Seafoods, Inc. and present this statement to the Council for inclusion in the record of reconsideration of the IFQ allocation to harvesters and processors in the Pacific whiting fishery that is pending before the Council.

Introduction

Judge Henderson reversed the IFQ allocation decision because, in the Judge's view, the allocation was the product of political compromise, lacking an administrative record supporting the factors upon which the decision must be based. The purpose of this letter is to provide the type of data to support an allocation decision which, as Judge Henderson has directed, must consider recent years. As the Magnuson-Stevens Act envisions, the purpose of the allocation is to help ensure the continued economic and biological sustainability of the fishery. That purpose can only be accomplished by a careful evaluation of the economic and biological realties of the fishery in its current state. The best reflection of the current state of the fishery is the most recent catch and processing history years.

As anyone involved in the whiting fishery knows, over the last ten years the fishery has experienced dramatic changes. There has been a greater diversification of product forms, new international markets for whiting products have developed, new processors have entered the market, ex-vessel prices have increased, and the overall economic stability and value of the fishery has improved for a greater number of participants.

These recent changes, and the positive impacts they have had on the fishery, must be considered if the Council's IFQ allocation is to meet the requirements of the Magnuson-Stevens Act, be approved by the Secretary of Commerce, and survive judicial review. Those who, like Ocean Gold, helped pioneer these developments and have invested millions in the whiting fishery should be given the appropriate incentives to continue the progress that has already occurred. For Ocean Gold and the more than 700 people it employs each year, its continued success in the international marketplace depends on the allocations of IFQ it receives. At the same time the Council considers the recent changes to the fishery, the Council should avoid using years when the fishery was unstable, unsustainable, less efficient and on the verge of collapse as a basis for allocating IFQs.

Discussion

A. Evolution of the Onshore Whiting Fishery: From Surimi to H&G.

The most significant influence on the onshore whiting fishery in recent years has been the transition from dependence on surimi to the development and expansion of diversified product forms like H&G, fillets, and whole round. Several decades ago, whiting was considered a trash fish that had no domestic market and was caught by fleets of factory fishing vessels from Russia and Eastern Europe. The onshore whiting fishery started in 1992 when Arctic Alaska built the first onshore whiting plant in Newport, Oregon. That plant was dedicated to processing whiting exclusively into surimi that was exported to Japan. Others soon followed.

The construction of surimi plants in Newport and later in Astoria "led to a rapid expansion of shore-based landings in the early 1990s." 2003 FEIS at p. 3-38. At the peak of the surimi market, there were five shoreside surimi processors on the West Coast with the capacity to process up to 20 million pounds of fish per week.[1] But the dependence of the whiting fishery on a single product form and an Asian market exposed it to the unleveraged risk that the market might falter. That risk was soon recognized. By the late 1990s, the market for surimi was in trouble. The confluence of a depressed Japanese economy and concerns that the bovine plasma used in surimi might be infected with mad-cow disease led to a near collapse in the surimi market. In 1998, whiting ex-vessel prices had reached all time lows and by 2004, all but one surimi processor remained. Had the whiting fishery retained its dependence on surimi and its limited export markets, the long-term economic viability of the fishery would have been threatened.

Surimi's decline spurred changes to product form. In 1997, Ocean Gold constructed a new plant in Westport, Washington designed to process whiting into headed and gutted ("H&G") products. It was the first shore-based plant on the West Coast dedicated exclusively to an H&G product form. At that time, there was not a significant domestic market for H&G whiting. Instead, Ocean Gold built the plant believing that there would be a demand for H&G whiting in Russia and other Eastern European countries. In the 1970s and 80s, when foreign fleets could still fish in U.S. coastal waters, Russian and Polish ships harvested whiting and processed it into an H&G product. It became a staple protein for many Eastern European countries. Though the foreign fishing fleets had long since left by 1997, the demand for whiting in those countries remained.

The Eastern European markets took time to develop. According to NOAA's trade database, the first exports to Ukraine occurred in 1997, with 5.1 million pounds being exported. There were not significant exports to Ukraine again until 2003, the same year the first exports to Russia were made.[2] At that time, the combined volume of exports to Russia and the Ukraine was 3.1 million pounds, approximately 10% of the total exports for that year. Two years later, in 2005, the combined exports to Russia and Ukraine were 57 million pounds, 60% of all the

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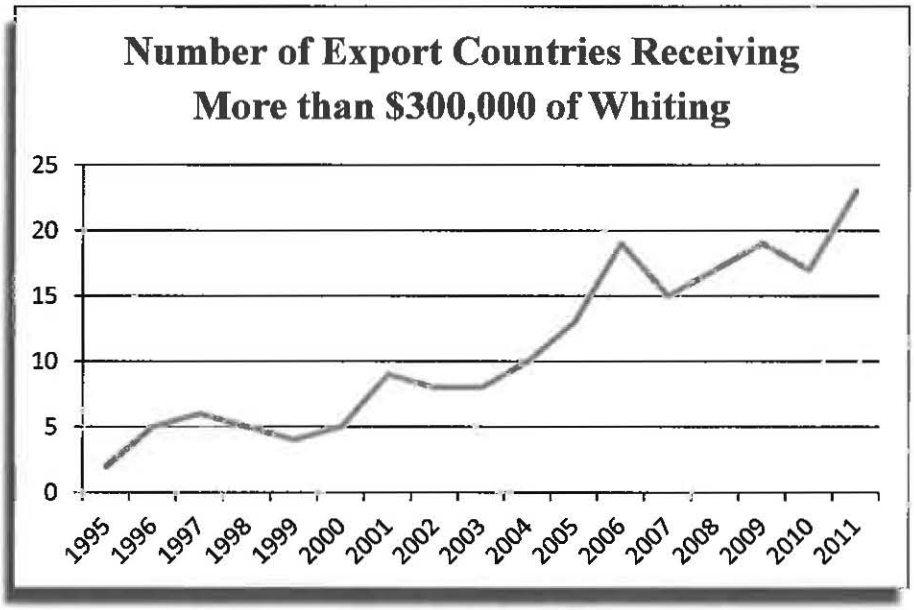
[1] Ex. 1, Excerpts of H. Radtke, S. Davis, Description of the U.S. West Coast Commercial Fishing Fleet and Seafood Processors, (2000), at p. 92.

[2] Ex. 2, 1995-2012 Export Trade Data from NMFS Trade Database

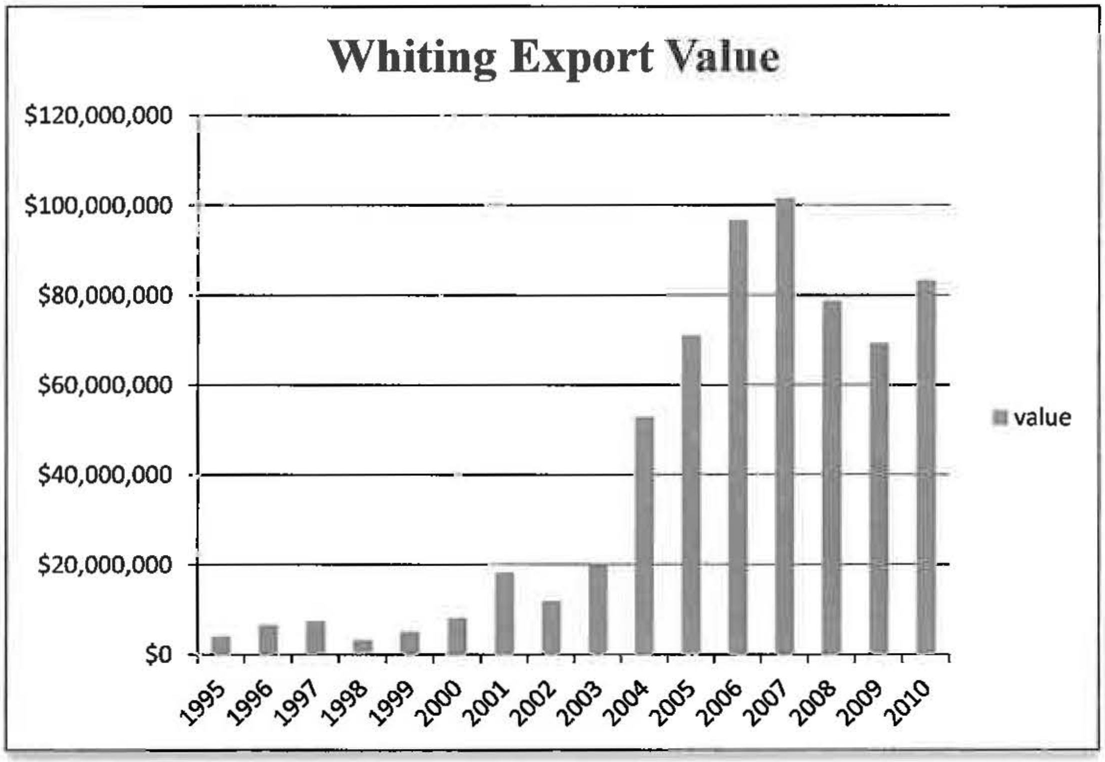
exports that year.[3] The change in product form from surimi to H&G also led to less dependence on Asian markets. Between 1995 and 1999, there were on average five countries receiving whiting exports. According to NMFS trade database (summarized below), the number of countries receiving Pacific whiting steadily grew from two in 1995 to twenty-three in 2011.



B. Transition to H&G and International Market Diversification Increase the Value of the Whiting Fishery.

The transition of product form and diversification of markets also increased the overall value of whiting exports. According to NOAA's trade statistics (summarized in the chart below), the value of whiting exports increased five-fold between 2004 and 2008.

[3] *Id.*

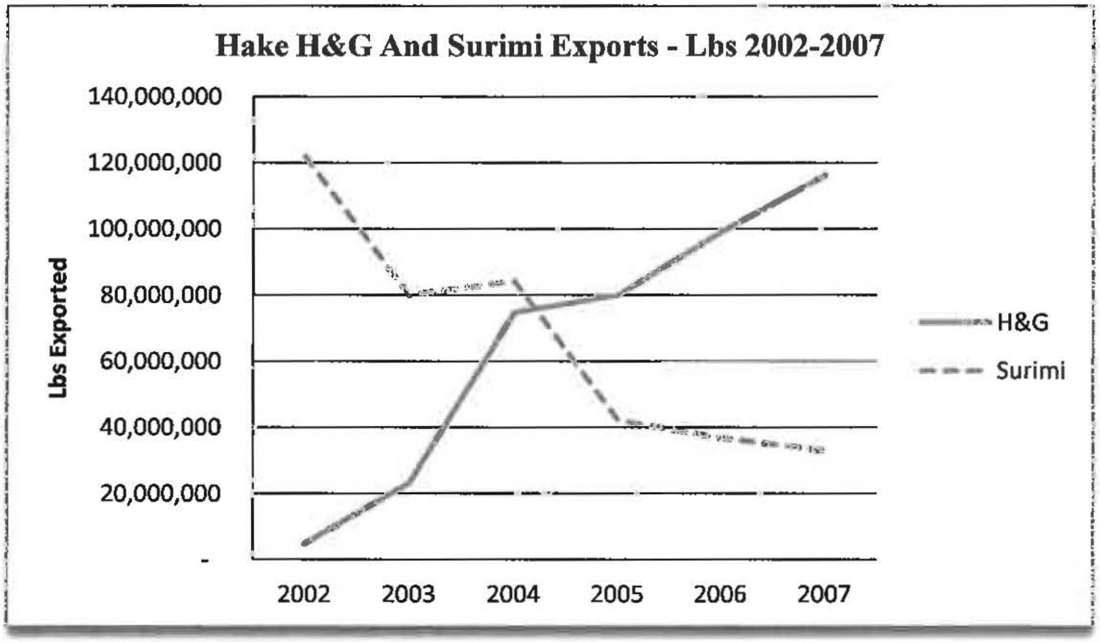


The significant increase in the export value of whiting coincided with the transition from the surimi product form to H&G. In a 2007 report, NMFS recognized the importance this transition played to the whiting fishery:

> During the 2000-2006 period, there was a shift in the major whiting products being produced. * * * In the early 2000s, the amount of Pacific whiting being processed into surimi for export was far greater than that of H&G products. Simultaneous with the decline in the Pacific whiting OY, one of the three major surimi processors stopped production in 2003 and has yet to return to production. Meanwhile, a new foreign market has spurred the production of H&G products to the extent that in 2006, H&G exports greatly exceeded surimi exports.

D. Robert Lohn, NOAA—National Marine Fisheries Service, A limited Entry Program for the Non-Tribal Sectors of the Pacific Whiting Fishery (2007) at 56. The chart below indicates the critical transition point occurred in 2004.[4]

[4] Ex. 3, Data From NMFS Trade Database.



In terms of value, H&G has several advantages over surimi. Surimi is more expensive to manufacture with variable costs that are twice those of H&G.[5] The recovery rates for surimi are much lower. A report prepared by The Research Group for the Pacific States Marine Fisheries Commission noted that recoveries for surimi were 22% compared to 61% for H&G.[6] This means that nearly three times as much raw fish is required to produce a single pound of surimi as would be required to produce a single pound of H&G whiting. The greater recoveries mean less waste with H&G, more products to sell, and a greater overall value. As the chart below illustrates, the increased value that H&G brought has also translated into higher ex-vessel prices.[7]

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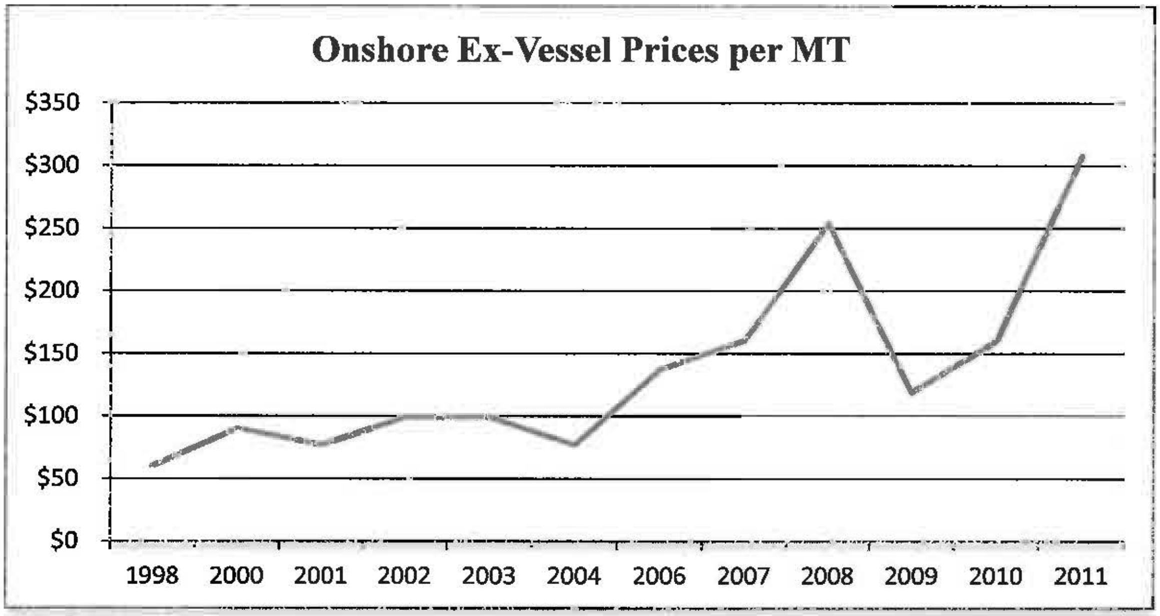
[5] Ex. 4, Excerpts from, The Research Group, Review of the West Coast Commercial Fishing Industry in 2004, Prepared for Pacific States Marine Fisheries Commission, September 2006 at p. V-10.
[6] *Id.*
[7] *See,* 72 FR 27760 (May 17, 2007) (identifying ex-vessel prices for 2004, and 2006); 75 FR 11832 (March 12, 2010 (identifying ex-vessel prices for 2007, 2008, and 2009); and .D. Robert Lohn, NOAA, Environmental Assessment of Management Measures to Prevent Harm to the Pacific Whiting Fishery (Sept. 2007) (identifying ex-vessel prices for 1998-2004) at pp. 40, 59.



The Amendment 20 FEIS recognized that increases in the export prices for finished whiting products tracked increases in ex-vessel prices. June 2010 FEIS at p. 278 (between 2004-2007, "increases in export price are paralleled by an increase in ex-vessel price.") Thus, these economic benefits of the new product forms and the markets they helped develop benefited all in the whiting fishery. For instance, average gross revenues for whiting vessels more than doubled between 2002 and 2006.[8]

The diversification of whiting product forms and a wider variety of international markets has been critical to ensuring the economic stability of the whiting fishery. A 2003 article funded in part by NOAA explained why the whiting fishery's dependence on surimi left it unstable and at risk, noting the critical importance of product and market diversification to sustaining the success of the fishery:

> Increasing the economic stability of the seafood processing sector by reducing the risks associated with sales in output markets can indirectly reduce the financial risks in the harvest sector, thereby sustaining the success of the fishery. By producing a more diverse portfolio of products, processors can accomplish two objectives. First, they can maximize profits through a wider variety of production alternatives that can be matched with the intrinsic characteristics of the raw product. * * * This production strategy can increase the profits or reduce the risks associated with seasonal variability in the biological characteristics of the raw input product. Second, seafood markets can be extremely volatile due to both

[8] D. Robert Lohn, NOAA, Environmental Assessment at p. 48 (average gross revenues from Pacific whiting in 2002 were approximately $139,606 per vessel and increased to $454,728 and $379,014 per vessel in 2005 and 2006).

> supply and demand variability including seasonal annual changes in resource stocks, harvests, and output market prices.[9]

Simply put, product and market diversification reduces risks, provides economic stability, and ensures a more efficient use of the resource. With these basic economic facts in mind, the article concluded that the dependence on surimi at that time (estimated to be 70% of the 2003 production mix) was "suboptimal and inefficient for all interest groups."[10]

C. Ocean Gold's Capital Investments That Benefitted the Fishery

The transition from surimi to other product forms could not have been accomplished without a significant capital investment. "[T]he development of markets for nontraditional and new products requires time and investment"[11] Ocean Gold, in particular, has spent nearly $40 million in the last decade to upgrade its facilities and increase its production capacity. During the period from 2004-2010, it made major capital investments including a state-of the art unloading facility at the dock, a wastewater treatment system meeting the most stringent environmental requirements, an expanded processing facility, a fish meal plant, and a cold storage facility with a capacity to freeze and store 50 million pounds of seafood. That freezer capacity was absolutely critical to creating the new markets for frozen H&G products which require high-volumes and the ability to inventory frozen product. At the same time, Ocean Gold and other H&G processors were making significant investments in the fishery; surimi processors were either going out of business or making no new investments.

Ocean Gold's expansion also led to a broader range of fishery beneficiaries. When Ocean Gold first began its whiting operations, it had 50 employees and only one vessel delivering to it. Over the last 5 years, it has employed as many as 700 annually, making it the second largest employer in Gray's Harbor County, and has on average 12 vessels making deliveries to it.

D. Applying the Factors the Council Must Consider Supports More Heavily Weighting Recent Processing History Years.

No one can legitimately dispute that the changes that have occurred to the whiting fishery in the last ten years have made it a more economically stable and valuable fishery that has expanded the number of participating beneficiaries. The key transitional point in which these changes began to occur happened after 2004 when the fishery disentangled itself from the unleveraged and risky dependence on surimi and began diversifying its product forms and international markets in which they are sold. Because the recent changes in the fishery that have made it more efficient, economically stable and valuable occurred after 2004, the post-2004 years must be taken into account and more heavily weighted if the underlying policies of the

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[9] Ex. 5, S. Larkin, G. Sylvia, & C. Tuininga, Portfolio Analysis for Optimal Seafood Product Diversification and Resource Management, JOURNAL OF AGRICULTURAL AND RESOURCE ECONOMICS 28(2):252-271, at 253 (2003).
[10] *Id.* at 268.
[11] *Id.* at 270

Magnuson-Stevens Act are to be applied fairly and equitably with the goal of obtaining a sustainable fishery in the future.

1. <u>Using more recent processing years ensures allocations to stakeholders with the greatest interest in the future of the fishery.</u>

At the core of a fair and equitable allocation is one that maximizes allocations to true stakeholders who are active participants in the fishery today and intend to be in the future. The Magnuson-Stevens Act recognizes this when it directs allocations to be made to "persons who substantially participate in the fishery." Magnuson-Stevens Act 16 U.S.C. § 1853a(c)(5)(E). It would be neither fair nor equitable to give away the resource to those who are not active harvesters or processors and have no more than a financial stake in the fishery. The more an allocation system is based on older years, the further removed it becomes from true stakeholders and active participants.

This was born out in the last allocation. For example, Crystal Ocean, which processed surimi up until 2000 when it went out of business, was given quota. Yet Da Yang Seafoods, Inc., which began processing whiting in 2006 and has risen to become a significant player in the whiting market, received no quota. There simply is no rational basis to allocate quota to a processor no longer in the fishery while excluding quota from one that is.

2. <u>Using more recent years promotes conservation.</u>

The MSA requires an allocation system to promote conservation which, according to NOAA, includes "optimizing the yield in terms of size, value, market mix, price, or economic or social benefit of the product." 50 C.F.R. 600.325(c)(3)(ii). Those goals are most closely aligned with the recent changes in the whiting fishery and transition from surimi dependence to product diversification.

As discussed above, surimi has a much lower recovery rate than H&G and creates more waste. H&G therefore optimizes product yield and has contributed to an increase in the overall value of the fishery. The last five years have also seen the greatest market mix in terms of product forms and export markets. Additionally, since the groundfish disaster declaration in 2000, fishing practices have improved to ensure less bycatch of overfished species. Using years predating 2000, irrationally would be making allocation decisions based on a time when the market was less efficient, more at risk, and fishing practices resulted in a disaster declaration. There is no reasoned basis to allocate quota based on years when processors were going out of business and disasters were declared while watering down the years in which the fishery is thriving and is more environmentally sound.

There is another reason why more heavily weighting recent years promotes conservation. As the whiting fishery has matured, the concentration of processing capacity and fishing effort has shifted north. One reason for this is because whiting are generally larger and better quality in the northern part of the fishery. According to a NOAA technical memo, "Pacific hake grow to a larger size and mature at a larger size in the northern part of their range, when comparing Pacific hake from southern Baja California to Puget Sound."[12] And it is generally "[o]lder Pacific hake [which] exhibit the greatest northern migration each season."[13]

The fish that migrate north and grow larger as the season progresses have also been found to have a higher protein content, "indicat[ing] improved condition of the fish and better overall quality."[14] Because fish are larger in the north, fewer fish are needed to achieve the optimum yield, leaving more fish in the water to spawn and sustain the fishery. The larger fish also have greater recovery rates and are more valuable. An environmental assessment prepared for the Council in 1997 noted that "[d]elaying all or part of the whiting harvest to later in the season allows the fish to grow; consequently, fewer fish need to be caught to achieve the harvest guideline. This could equate to as much as a 10% impact on long-term yield."[15]

Research from the Oregon State University Seafood Laboratory has analyzed "how fisheries management plans can incorporate seafood science data to increase economic benefits and help conserve the resource."[16] Providing the appropriate incentives to direct fishing at the time and place when fish are of their greatest value, simultaneously maximizes economic benefits and conservation goals:

> For many species, management has disregarded the inseason timing of harvest in order to focus on the issues including allocating the annual quota among the competing harvest sectors. Failure to consider inseason intrinsic variability, however, results in sub optimal management of fast-growing or rapidly changing stocks. The result is decreased benefits to society and potentially the ecosystem. More importantly, management goals may not be mutually exclusive if harvest policies are dictated by the characteristics of the individual fish; that is goals such as conservation, efficiency, and utilization may often be complementary.

For whiting, this means developing an IFQ program that focuses fishing effort toward the northern sector of the fishery and at the end of the season when the whiting have the highest protein content, are the largest, and are at the peak of their economic value.

The fishing over this past year illustrates the problems with an IFQ allocation that places too much weight on older years. This past year saw the departure of a race for the fish, with

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[12] Ex. 6, Excerpt from NOAA Technical Memo No. 44, Pacific Hake.
[13] Status of the Pacific Hake (Whiting) stock in U.S. and Canadian Waters in 2011, Joint U.S. and Canadian Hake Technical Working Group, at 23
[14] Ex. 7, M. Morrissey, G. Sylvia, & S. Larkin, Does Seafood Science Have a Role in Fisheries Management: A Case Study of the Pacific Whiting Fishery
[15] Environmental Assessment and Regulatory Impact Review of the Anticipated Biological, Social, and Economic Impacts of a Proposal to Allocate Pacific Whiting Among Non-Tribal Sectors and to Establish a Framework for Modifying Season Opening Dates, prepared for the Pacific Fisheries Management Council (Feb. 1997), at p. 3-3.
[16] Ex. 7, M. Morrissey, G. Sylvia, & S. Larkin at p. 1.

more fish caught at the end of the season and further north where they are larger and more valuable. The problem is that for those whose quota is tied to processors in the south, they have to make a much longer return trip and as a result will have more fish waste.[17] If conservation goals are to play an important role in the Council's decision, as they must under the Magnuson-Stevenson Act, the Council then needs to consider the inseason variability of the whiting stocks and develop an allocation that will appropriately concentrate fishing effort to the north and at the end of the season. The alternative currently under consideration which would best accomplish those objectives is Alternative 5, 2000-2010, which more accurately reflects the northerly shifting trend of whiting processing capacity and fishing effort.

3. <u>Using more recent years more appropriately reflects the most relevant investments in the fishery and the current state of employment and dependence on the fishery.</u>

The Magnuson-Stevens Act directs that a fair and equitable allocation is one that takes into account "investment in, and dependence upon, the fishery." The most significant capital investment in the onshore whiting fishery over the last decade has occurred in Westport, Washington with Ocean Gold's construction of its whiting processing facilities, cold storage, and fish meal plant – a $40 million investment. The cold storage, which was completed in 2007, enables Ocean Gold to freeze and store 50 million pounds of frozen fish with significant collateral benefits to the fishery. These investments have helped Ocean Gold develop a diversified frozen fish market, enabled it to employ 700 people annually and provided it with the ability to buy millions of pounds of whiting from twelve vessels each year.

Any allocation proposal which excludes years after 2007, would unreasonable fail to take into account the most significant investment in the fishery, the positive impact it has had on employment in Grays Harbor County (where Ocean Gold is now the second largest employer), and ignore two important factors under the Magnuson-Stevens Act (investment and dependence) for making a fair and equitable allocation. Using years prior to 2000 when the whiting fishery was on the decline and dependent on an unsustainable surimi market would arbitrarily allocate quota in a way that is not a fair reflection of either where the fishery is today or where it will be headed for the future.

4. <u>The control date should not control.</u>

When the PFMC announced the November 6, 2003 control date, the whiting fishery was on the cusp of significant transition in product form and international markets. The control date was not intended to impede this progress which no one can legitimately dispute has increased the stability and overall economic value of the fishery. Rather, the control date had modest goals: "to discourage increased fishing effort in the limited entry trawl fishery based on economic speculation while the Pacific Council develops and considers a trawl IQ program." 69 Fed. Reg. 1563 (June 9, 2004). There are sound policy reasons for preventing speculators from owning the

[17] Pacific whiting is known for having high levels of protease enzymes which are associated with parasites that infect the flesh. Research has shown that if the fish is not processed with 24 hours of being caught, quality suffers. *Id.* at p. 3.

resource: they lack the sincere interests, investment, and dependence in the fishery that the allocation system seeks to affirm.

By all accounts, the modest goals of the control date were achieved. New entrants into the whiting fishery after the control date were not doing so on speculation of future resource ownership but instead because of the economic opportunities the fishery began to present as ex-vessel prices rose. Indeed, when Amendment 15 was proposed in 2007 to limit entry into the fishery, no one expressed any concern that new entrants were speculating on future resource allocation rewards. Rather, NMFS's report on Amendment 15 explained that "[a] significant increase in the whiting ex-vessel price attracted several new vessels to the fishery."[18] There is nothing in the record to indicate that new processors or vessels entered the whiting fishery after the control date for the purpose of obtaining a quota allocation. As Judge Henderson noted, "it could very well be that the announcement of a control date is what curbed any such speculation." And without any evidence that speculation did occur after 2003, excluding post-control date years lacks a reasoned basis particularly given the significant and beneficial changes that occurred in the fishery after that date.

Ocean Gold did not make a $40 million investment in its facilities based on the speculative hope of increasing its quota allocation. At the time it was making those investments, there was no guarantee processors would get any quota share. Ocean Gold made those investments because its founders Dennis Rydman and Francis Miller wanted their legacy to be a long-lasting and sustainable fishery in the town they grew up in. They will not take their quota and run. Ocean Gold fully intends to use its quota to maximize its plant and cold storage capacity, keep employed its more than 700 employees, and to pay its fishermen good prices. Exactly the type of uses the quota was intended for.

For these reasons we believe that the alternative that is currently under consideration, which would result in the fair and equitable allocation required under the Magnuson-Stevens Act, is alternative 5, applying processing history years 2000-2010.

Very truly yours,

Christopher J. Kayser
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CJK\lss

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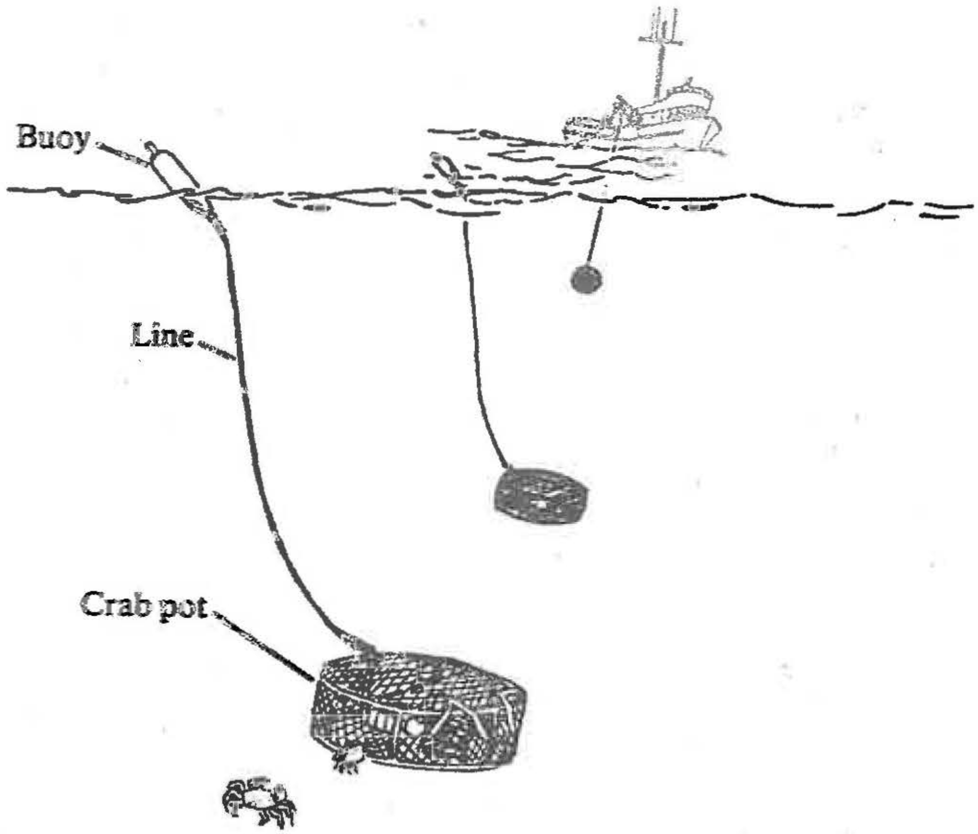
[18] D. Robert Lohn, NOAA, Environmental Assessment on Amendment 15 at p. 6.

DESCRIPTION OF THE U.S. WEST COAST COMMERCIAL FISHING FLEET AND SEAFOOD PROCESSORS



Pacific States Marine Fisheries Commission

February 2000

DESCRIPTION OF THE U.S. WEST COAST COMMERCIAL FISHING FLEET AND SEAFOOD PROCESSORS

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together the many overlapping data sets used in the analysis. While these individuals and other contributors provided information and comments, the authors take sole responsibility for describing project results.

The authors' interpretations and conclusions should prove valuable for the project's purposes, but no absolute assurances can be given that the described results will be realized. Government legislation and policies, market circumstances, and other situations can affect the basis of assumptions in unpredictable ways and lead to unanticipated changes. The methodologies used to determine estimates were adopted with the understanding that technically sound and defensible approaches would be used. Where judgment was necessary, conservative interpretation was employed. Because this philosophy was strictly adhered to in all aspects of the report, the authors represent that the descriptions presented herein are reasonable.

Authorization is granted for the project report contents to be quoted either orally or in written form without the prior consent of the authors. Customary reference to authorship, however, is requested.

Hans D. Radtke
Shannon W. Davis

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Appendices

EXECUTIVE SUMMARY

The fishing fleet making landings at ports in the states of Washington, Oregon, and California has changed dramatically in recent years due to changes in fish resource levels, fishery management plan amendments, and market forces. Vessels have had to switch to other than their primary fisheries, and many times several different fisheries, to sustain revenue levels. Many vessel owners have simply elected to quit commercial fishing. This project is to describe the trends and characteristics of the U.S. West Coast fishing fleet and processors to show how numbers, revenues, and participation in fisheries has changed. A special analysis was completed to find descriptive vessel and processor categories. The classification scheme used 1997 landing data to determine the vessel and processor categories.

Information Sources

There is no single source of information for all of the fisheries in which the U.S. West Coast fleet may participate. Four different sources, including anecdotal information, were used to track revenues for this project (Table E1).

Definition of the U.S. West Coast Fishing Fleet and Processors

There are many vessels listed in the sources of information used in this project that have ties to U.S. West Coast states, as defined by owners and crews with residency in U.S. West Coast states. However, the vessel's homeport may not necessarily be in U.S. West Coast states and the vessel may not make deliveries to U.S. West Coast ports. It was decided that the U.S. West Coast fleet would be defined by only those vessels that make at least one landing in U.S. West Coast states. If they did make one landing, then all revenues received by that vessel would be included in the analysis. This definition may undercount vessels in some ports that have a high proportion of vessels that participate solely in distant water fisheries.

The U.S. West Coast fishing industry is also made up of businesses and industries that process and distribute finfish and shellfish products and the businesses and industries that furnish supplies and services to them. While some smaller fishing, processing, and marketing firms may deal with a single species or species group, the majority of the U.S. West Coast seafood production comes from firms involved in a variety of species and products. This industry is diverse and complex, and many of the businesses along the U.S. West Coast are also involved in Alaska and foreign fisheries as well. A seafood processor was included in the analysis if at least one purchase from a harvester was made at a U.S. West Coast port. There are other businesses that produce secondary seafood products (such as breaded products) and use raw products from non-U.S. West Coast landings that are not included in project investigations.

Table E1
Data Sources

Fishery	Data Source	Status
Washington, Oregon, and California onshore fisheries	PSMFC PacFIN Program	Vessel specific landing information
Alaska onshore fisheries	CFEC and anecdotal	Summary landings by species and gear, and vessel specific lists
U.S. West Coast and Alaska offshore fisheries	PSMFC AKFIN Program and NMFS Blend File	Vessel specific landing information
Other Pacific Ocean waters	Anecdotal	Expert estimate

Notes: 1. CFEC - Alaska Commercial Fisheries Entry Commission
PSMFC - Pacific States Marine Fisheries Commission
NMFS - National Marine Fisheries Service
AKFIN - Alaska Fisheries Information Network
PacFIN - Pacific Fisheries Information Network
USCG - U.S. Coast Guard
Source: Study.

Annual Fishing Cycle

There is a seasonal pattern to U.S. West Coast fisheries. However, not every active vessel participates in all fisheries in this cycle. Below is a description of the cycle and following sections discuss the counts and characteristics of vessels that do participate in the different fisheries.

Different species are available at different times of the year, and general fishing, processing, and marketing patterns have developed over time. It is more appropriate to view the fishing year as a pattern of activities rather than in terms of individual species seasons. Individual species, when viewed in isolation, may not appear important, but these often affect the harvesting, processing, and marketing of other species and the fishing industry as a whole. Fishing vessels as well as crew members move from one fishery to another, depending on seasons and alternatives available. Offshore and Alaska fisheries are important for the total fish harvesting/processing industries in coastal communities. During the year, some crew members and fishing vessels will travel to Alaska to fish for salmon, halibut, sablefish, shellfish, and groundfish. The Pacific whiting fishery has been an integral part of the annual fishing cycle, and revenues generated in that fishery were an important part of the total revenues of a large segment of the trawl fleet and support industries.

The U.S. West Coast annual fishing cycle begins with the Dungeness crab fishery, which typically has its highest landings from December into March. The Puget Sound Dungeness crab fishery begins in October. The larger vessels involved in this fishery may move south to the Crescent City, California fishing grounds in early December for two weeks and the north to Alaska. Groundfish fishing, often greatly restricted at year's end, begins to pick up early in the year, especially the trawl fishery for widow rockfish ("brownies") and other species. Widow rockfish is taken to a large extent with midwater (pelagic) trawls, the same gear used in the whiting fishery. Only vessels with more powerful engines and winches can operate this gear. As crabbing declines and weather along the northern coast improves, fishing activity for on-bottom groundfish species increases. Pink shrimp fishing generally begins in April and continues in earnest through July, dropping off somewhat in August and September. The pelagic fishery depends on timing of the runs. Purse seiners may be harvesting squid, sardines, and mackerel off California in April. Many other California fisheries will peak in the winter months when weather and harvest conditions are favorable. The whiting fishery begins in April and traditionally continues into or through the summer; the off-shore factory trawler harvests peak in late spring while the shoreside harvest continues during the summer. This sequence may be changing as the offshore whiting fishery develops its "co-op" concept. In this strategy, the available resource is divided among participating boats, therefore reducing the need to harvest the resource as quickly as possible. Groundfish trawl landings accelerate in April and May, especially in years of poor shrimp fishing. Small hook and line boats provide a steady flow of product throughout the year. The larger nontrawl (longline and pot) sablefish (black cod) fishery begins in May; sablefish is an important species for both trawl and nontrawl gears during spring and summer. Trawl landings continue through the summer, but the nontrawl black cod season has ended earlier each of the past several years due to quota attainment. Salmon trolling starts in May and peaks in June and July. In the Puget Sound, Washington areas, net boats harvest much of the Fraser River origin sockeye and pink salmon in July and August as well as some chinook and coho salmon in the fall. The salmon gill net season peaks later in the fall. Small diving boats harvest species such as sea urchins and sea cucumbers through most of the year. Larger seine boats as well as "bait boats" will harvest a variety of tuna species. Some of these landings will be made in California. Other landings will be delivered to islands such as Guam for canning. Near-shore ocean water temperatures dictate the size of the fleet that shifts to albacore tuna fishing. If warmer temperatures are closer, then a growing number of vessels displaced by closed access fisheries and declining fish resources start fishing in June and July and continue to the first major storms in October when the fish migrate farther offshore. A few vessels from U.S. West Coast ports spend the winter in the south Pacific fishing for tuna. Local processors buy tuna, although there is an increasing trend toward direct sales and loined sales. Most albacore tuna is frozen and shipped to southern California and/or Guam to be canned, although a small "home canning" industry is developing in some U.S. West Coast ports. In September many of the fisheries directed at specific species begin to taper off. The nontrawl sablefish fishery is over (except for limited incidental catches), shrimp catches decline, and most salmon fishing is completed. Much of the groundfish harvest remains steady; however, the harvest of widow rockfish generally increased after the whiting fishery closes. October, November, and December are usually the slowest months in the fish harvesting and processing industries. Although there are exceptions, such as swordfish fishing which peaks later in the year, one key factor in the groundfish fishery is the status of quotas for species managed by trip limits (such as widow rockfish, yellowtail rockfish, and sablefish). Earlier landing rates determine how much remains to be harvested during this period, and trip limits are often more restrictive late in the year to prevent premature closures.

Distant Water Fisheries

The U.S. West Coast based fishing fleet also lands fish in other parts of the Pacific Ocean. These landings are an integral part of the U.S. West Coast fishing industry. There are several distinct components of this distant water fishery. Perhaps the oldest component is the gillnet salmon fishery in Bristol Bay and Cooks Inlet in Alaska waters. The Alaskan vessels are stored in Alaskan ports, usually under a contract with a processor. Some of these gillnetters also participate in the Grays Harbor, Washington gillnet fishery as well as the Columbia River gillnet fishery. The second component is the longline and pot fleet that fishes for crab and groundfish. This segment had its start from the old "halibut schooners" that sent salted and iced fish to eastern U.S. markets. Many of these vessels also do some fishing off the Pacific Northwest Coast and tend to homeport their vessels in Astoria, Oregon and Bellingham, Washington. The Magnuson Act of 1976 created an opportunity for midwater trawlers (the third component) to fish for pollock in Alaska and Pacific whiting off the Pacific Northwest. The earlier ventures included foreign "motherships" that received their catch in the open ocean. Many of these vessels are now bringing their catch onshore in Alaska or U.S. West Coast states. The major homeports for these trawlers is Newport, Oregon or at marinas in Puget Sound, Washington.

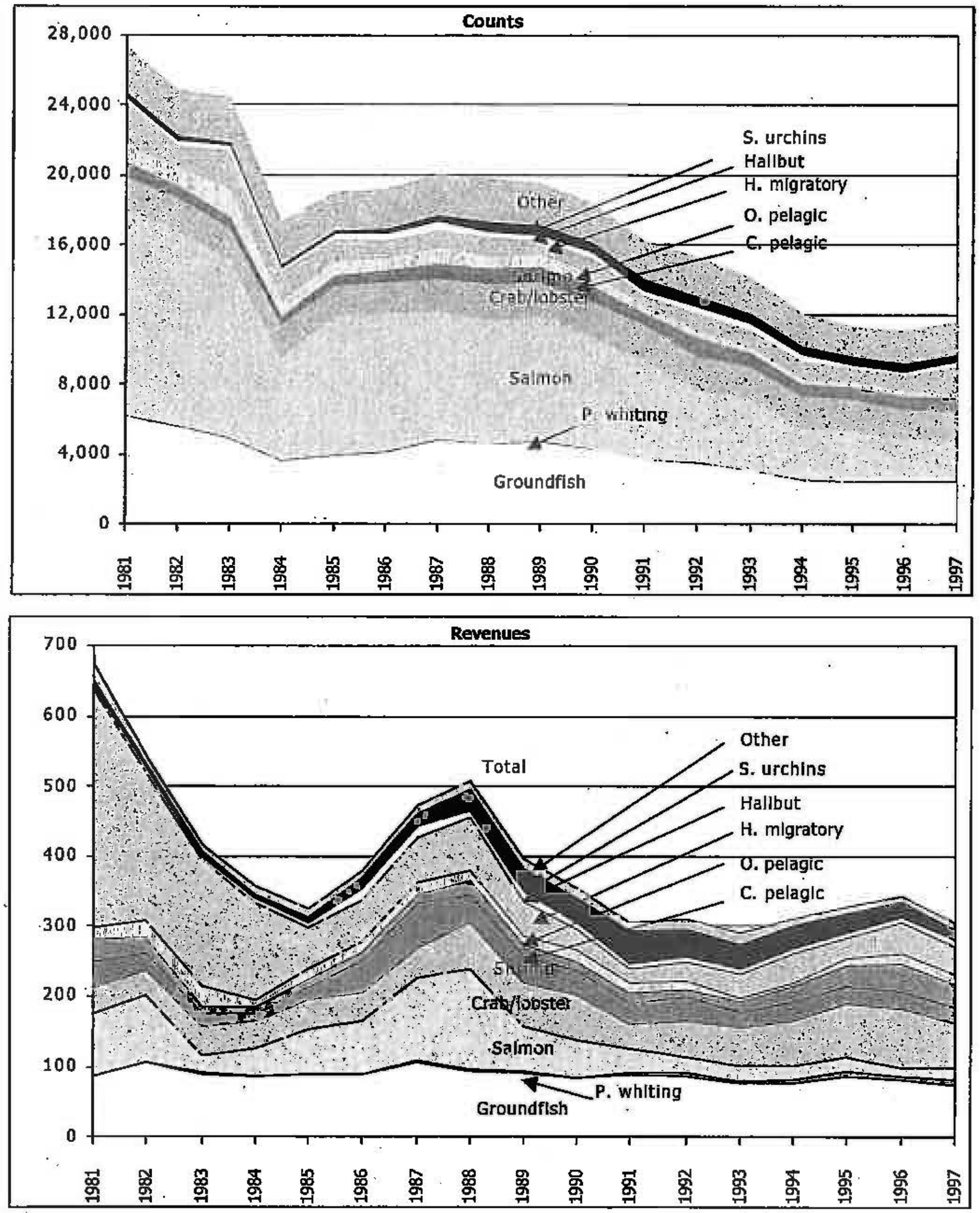
During the 1970's and 1980's, increasing salmon supplies and prices also attracted new American immigrants to the salmon fisheries in lower Alaska. This component consists of a large number of "Russian Old Believers" from all over the world who settled near Woodburn, Oregon. Many of them now fish in Alaska waters with purse seines for salmon and long line for halibut in Alaska based combination vessels. The last component is the tuna boats that fish in waters off the Pacific Northwest and the western Pacific. Some of their albacore catch is landed in iced or frozen form in U.S. West Coast coastal communities. However, sometimes they will offload at sea for deliveries to American Samoa or Hawaii in the southern Pacific Ocean. The large purse seiners may deliver their catch of skipjacks and yellowfin tuna to island canners or bring a portion to southern California ports.

In recent years, there have been over 500 vessels with ownership ties to U.S. West Coast states that made landings in other U.S. West Coast states, Alaska, or other Pacific locations. Of these, the number that also made deliveries in U.S. West Coast states in 1996 is 64 at U.S. West Coast ports; 11 delivered to Alaska motherships or acted as catcher-processors, 15 delivered to motherships and acted as catcher-processors off the U.S. West Coast, and 148 delivered elsewhere in Hawaii and other western Pacific Ocean nations. Distant water fisheries provide a significant source of revenue for some vessels and definitions were needed to categorize the vessels that deliver in U.S. West Coast states, but whose revenue is mostly from elsewhere. If a vessel's distant water fisheries revenues were greater than 50 percent of its total revenues, then it is treated in a special category for vessel classification purposes.

Fishing Fleet Trends and Characteristics

The aggregate number of vessels landing at U.S. West Coast ports has decreased almost 63 percent since 1981. Figure E1 and Figure E2 show how participation has decreased by species and gear types, respectively. The number of salmon troll vessels declined dramatically since 1981 and there is a large drop in the count of vessels delivering in the El Niño year of 1984. The large drop in revenue derived from net gear during the 1980's is from both salmon and tuna fisheries using gillnets, set nets, and purse seines.

Figure E1
Vessel Counts and Revenues by Species Group for
Vessels Landing at U.S. West Coast Ports in 1981-1997



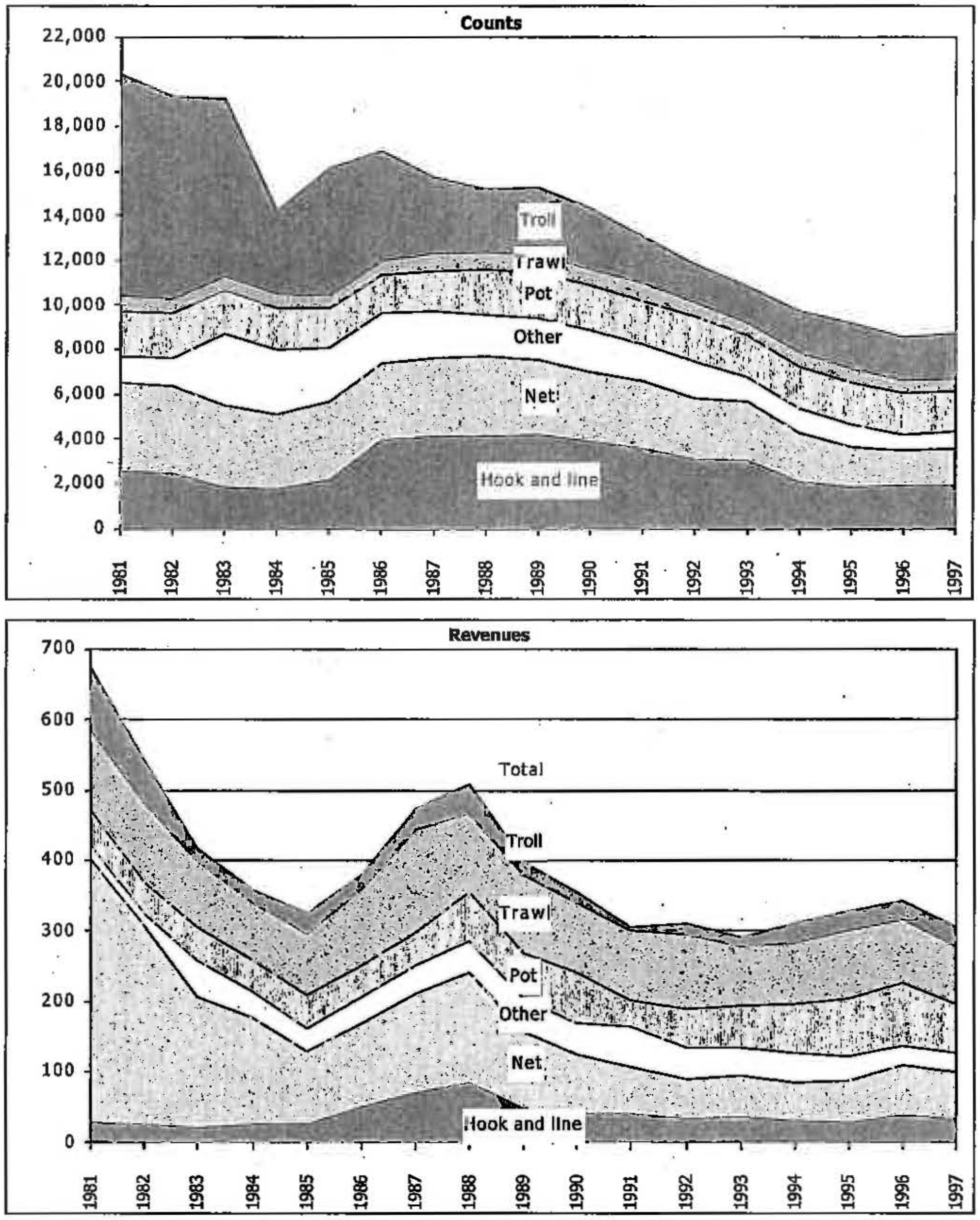
Notes: 1. Vessel total counts are not for unique vessels because vessels land within more than one species group. Counts and revenues exclude vessels with identifier codes "ZZ..." or "NONE."

2. Total revenue does not include deliveries to offshore processors or revenues from distant water fisheries.

3. Revenue in millions adjusted for inflation using the GDP Implicit Price Deflator, 1997=100.

Source: Annual vessel summary information extracted from PacFIN in September 1998.

Figure E2
Vessel Counts and Revenues by Gear Groups for
Vessels Landing at U.S. West Coast Ports in 1981-1997



Notes: 1. Vessel total counts are not for unique vessels because vessels use more than one gear group. Counts and revenues exclude vessels with identifier codes "ZZ..." or "NONE."

2. Total revenue does not include deliveries to offshore processors or revenues from distant water fisheries.

3. Revenue in millions adjusted for inflation using the GDP Implicit Price Deflator; 1997=100.

Source: Annual vessel summary information extracted from PacFIN in September 1998.

Revenues are not evenly distributed among vessels (Figure E3). In 1997, 74 percent of the vessels landed 15 percent of the total ex-vessel value. The average per vessel revenues for the other 26 percent that land 85 percent of the value is $172,373, while the average for the rest of the fleet is $11,134. This characteristic is not unique to 1997; the distribution has been about the same following the El Niño years of 1983-1984. Prior to those years, landings were spread somewhat more evenly among vessel revenue categories.

The multi-species fisheries participation by the U.S. West Coast fleet for higher volume vessels is also shown in Table E2. The percentage of vessels fishing with one gear group is 82 percent for vessels landing between $500 and $5,000 total revenue and 46 percent for vessels landing greater than $50,000. Predictably, the higher volume vessels land a much greater share by trawl gear (32 percent) than the low volume vessels (two percent).

Vessel participation among fisheries has been discussed in previous sections, especially for vessels in the higher total revenue categories. However, vessel participation within a single fishery will vary over the years. Vessels fishing shrimp (29 percent), crab/lobster (38 percent), and sea urchins (34 percent) tend to stay in the fisheries each year. Vessels participating in the other fisheries shown on Figure E4 will exit and enter fisheries at a higher rate. Reductions in open access fisheries through limited entry and area licensing management schemes will undoubtedly reduce the mobility rate even further in the future.

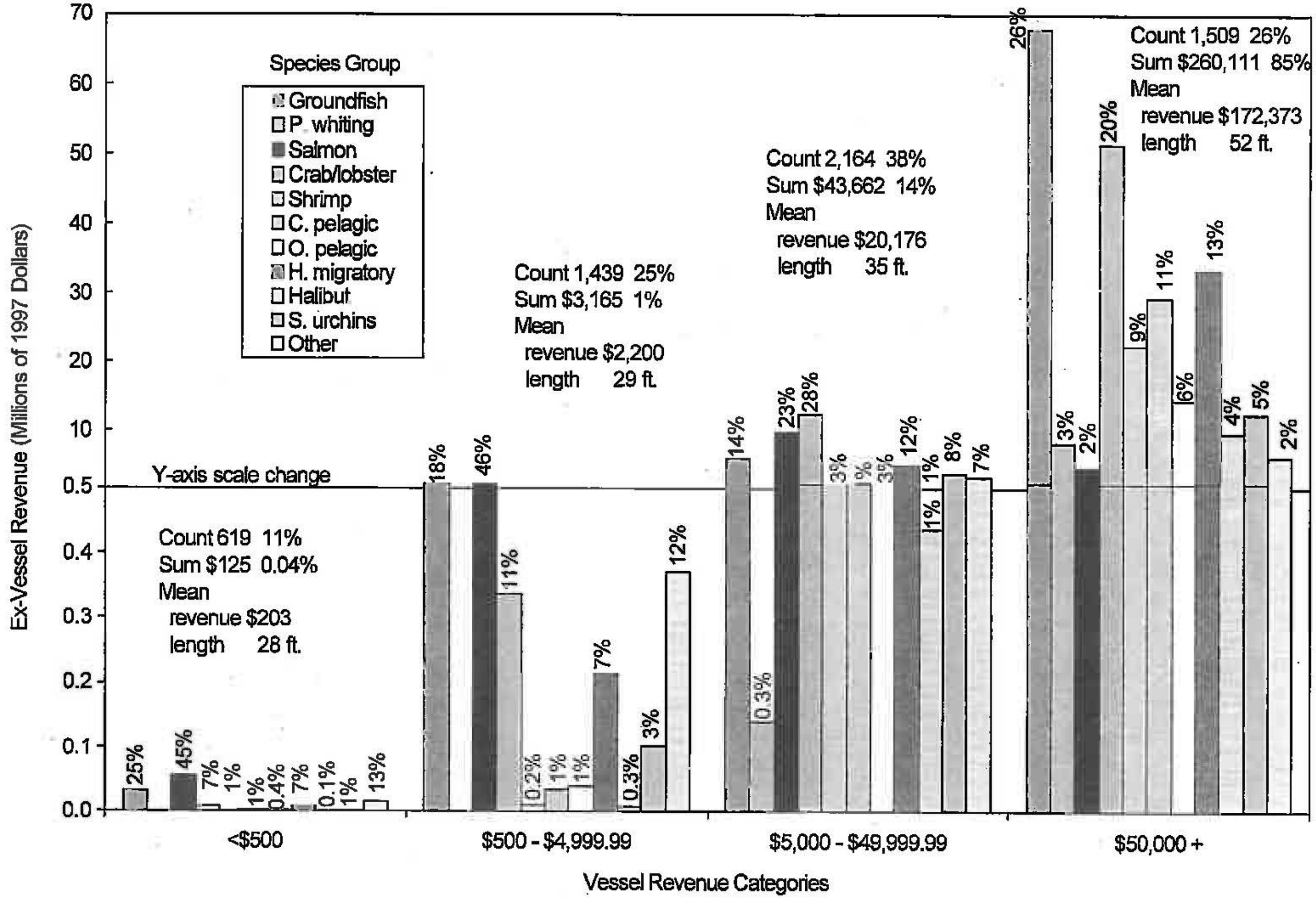
Vessel Classifications

For purposes of describing the U.S. West Coast fishing fleet, it is problematic to lump vessels into classes that might be descriptive of common vessel traits. As previously described, most of the more active fishing vessels harvest in more than one species group and use more than one gear type. A vessel on December 1 may be equipped and fishing for something quite different than on June 1. Some vessels participate in only single fisheries and others will move into other fisheries only when prices and abundances appear lucrative. Insight on unique vessel types and fishing capability can be shown by analyzing a vessel's landings using species and gear combinations. Vessel expenditures, physical attributes, and homeport locations can also be variables that are important in classifying vessels.

Table E2 shows the revenue distribution by species and gear groups in 1997. The analytical problem is to determine thresholds and limits on species and gear combinations that generate unique vessel types. Several analytical approaches were used to find unique vessel categories, based on a vessel's specialization in species and gear revenue groupings and total revenue volume. Table E3 shows the count of U.S. West Coast vessels that fall within categories for 33 percent, 50 percent, and 90 percent specialization levels. Figure E5 is an example scattergram to show where vessels landing groundfish are clustered according to the three revenue specialization.

Categorization of fishing vessels into groups that have similar fishing strategies and revenue/cost streams is dependent on available data and knowledge of the fishing industry. The vessel

Figure E3
Revenue by Species Group for Revenue Categories in 1997



Notes:
1. Sum of revenue in thousands of 1997 dollars.
2. Excludes vessels identified as "NONE" or "ZZ..."
3. Length mean excludes 0 length vessels. Where a vessel has more than one reported length, the smallest non-zero assignment is used.
4. Revenue excludes offshore and distant water fisheries sources.

Source: PacFIN March 1999 extraction and Study.

Table E2

Vessel Counts and Characteristics by Species and Gear Groups for Revenue Categories in 1997

All Vessel Volume Categories

Vessel count: (5,705 + 26 with length 0)		5,731
Per vessel mean landings (revenue)		$53,579
Per vessel std. dev. landings (revenue)		$117,389
Vessel mean length (excluding 0 length)		37 ft.
Vessel std. dev. length (excluding 0 length)		23 ft.
Multi-gear profile (vessels):	1 gear	65%
	2 gears	24%
	3 gears	9%
	4+ gears	2%

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	6.48%	0.12%	0.00%	0.94%	16.59%	0.15%	$74,564	24%
2 Pacific whiting	0.00%	0.00%			2.72%		$8,356	3%
3 Salmon	0.01%	2.00%		0.00%	0.00%	3.21%	$16,038	5%
4 Crab/lobster	0.00%	0.01%	0.00%	20.83%	0.00%	0.00%	$63,995	21%
5 Shrimp		0.26%	0.06%	0.63%	6.72%		$23,525	8%
6 Coastal pelagic	0.04%	9.67%	0.00%	0.00%	0.01%	0.00%	$29,849	10%
7 Other pelagic	0.00%	4.40%	0.71%		0.03%	0.00%	$15,785	5%
8 Highly migratory	1.02%	4.22%	0.28%	0.00%	1.33%	5.82%	$38,910	13%
9 Halibut	3.28%				0.00%	0.02%	$10,112	3%
10 Sea urchins		0.22%	5.04%				$16,124	5%
11 Other	0.26%	0.87%	1.14%	0.25%	0.66%	0.00%	$9,806	3%
All species	$34,046	$66,829	$22,186	$69,560	$86,201	$28,240	$307,063	100%
Percent	11%	22%	7%	23%	28%	9%	100%	

<$500

Vessel count: (616 + 3 with length 0)		619
Per vessel mean landings (revenue)		$203
Per vessel std. dev. landings (revenue)		$139
Vessel mean length (excluding 0 length)		28 ft.
Vessel std. dev. length (excluding 0 length)		17 ft.
Multi-gear profile (vessels):	1 gear	95%
	2 gears	4%
	3 gears	0%
	4+ gears	

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	23.58%		0.01%	1.32%	0.27%	0.31%	$32	25%
2 Pacific whiting							$0	0%
3 Salmon	0.43%	23.95%				20.46%	$56	45%
4 Crab/lobster				6.62%			$8	7%
5 Shrimp		0.35%	0.18%	0.18%	0.28%		$1	1%
6 Coastal pelagic	0.04%	0.48%			0.04%		$1	1%
7 Other pelagic	0.01%	0.43%					$1	0%
8 Highly migratory	3.14%	0.12%	0.11%		0.51%	3.23%	$9	7%
9 Halibut	0.11%					0.03%	$0	0%
10 Sea urchins		0.12%	1.18%				$2	1%
11 Other	7.66%	3.08%	0.24%	1.07%	0.46%		$16	13%
All species	$44	$36	$2	$12	$2	$30	$125	100%
Percent	35%	29%	2%	9%	2%	24%	100%	

$500 - $4,999.99

Vessel count: (1,431 + 8 with length 0)		1,439
Per vessel mean landings (revenue)		$2,200
Per vessel std. dev. landings (revenue)		$1,283
Vessel mean length (excluding 0 length)		29 ft.
Vessel std. dev. length (excluding 0 length)		16 ft.
Multi-gear profile (vessels):	1 gear	82%
	2 gears	15%
	3 gears	3%
	4+ gears	0%

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	16.00%	0.19%	0.02%	1.23%	0.63%	0.32%	$582	18%
2 Pacific whiting							$0	0%
3 Salmon	0.29%	25.68%				20.52%	$1,471	46%
4 Crab/lobster	0.00%		0.04%	10.57%	0.00%		$336	11%
5 Shrimp		0.07%	0.03%	0.20%			$10	0%
6 Coastal pelagic	0.25%	0.82%	0.00%			0.00%	$34	1%
7 Other pelagic	0.01%	1.20%				0.01%	$39	1%
8 Highly migratory	0.98%		0.20%		0.44%	5.09%	$213	7%
9 Halibut	0.15%					0.10%	$8	0%
10 Sea urchins		0.75%	2.45%				$101	3%
11 Other	4.77%	5.96%	0.27%	0.17%	0.52%	0.07%	$372	12%
All species	$711	$1,097	$95	$385	$51	$827	$3,165	100%
Percent	22%	35%	3%	12%	2%	26%	100%	

Table E2 (continued)

$5,000 - $49,999.99

Vessel count: (2,153 + 11 with length 0)		2,164
Per vessel mean landings (revenue)		$20,176
Per vessel std. dev. landings (revenue)		$12,766
Vessel mean length (excluding 0 length)		35 ft.
Vessel std. dev. length (excluding 0 length)		16 ft.
Multi-gear profile (vessels):	1 gear	59%
	2 gears	29%
	3 gears	11%
	4+ gears	2%

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	11.06%	0.32%	0.01%	0.95%	0.89%	0.40%	$5,953	14%
2 Pacific whiting	0.00%	0.00%			0.32%		$141	0%
3 Salmon	0.04%	8.39%		0.00%	0.00%	14.10%	$9,838	23%
4 Crab/lobster	0.00%	0.01%	0.01%	28.10%	0.01%		$12,280	28%
5 Shrimp		0.05%	0.22%	1.02%	1.37%		$1,159	3%
6 Coastal pelagic	0.24%	0.98%	0.00%	0.00%	0.01%	0.00%	$538	1%
7 Other pelagic	0.00%	2.75%	0.08%		0.07%	0.00%	$1,268	3%
8 Highly migratory	0.49%	0.15%	0.61%		1.30%	9.27%	$5,154	12%
9 Halibut	0.92%					0.08%	$435	1%
10 Sea urchins		1.08%	7.32%				$3,670	8%
11 Other	1.10%	3.34%	1.12%	0.64%	1.17%	0.02%	$3,224	7%
All species	$6,046	$7,448	$4,088	$13,411	$2,245	$10,422	$43,662	100%
Percent	14%	17%	9%	31%	5%	24%	100%	

$50,000 +

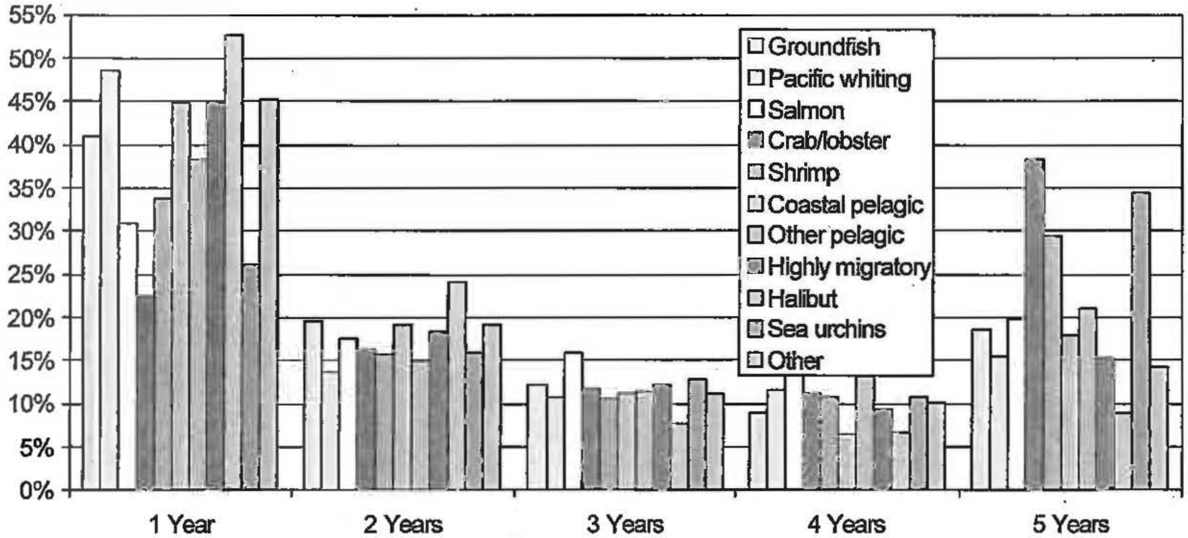
Vessel count: (1,505 + 4 with length 0)		1,509
Per vessel mean landings (revenue)		$172,373
Per vessel std. dev. landings (revenue)		$180,871
Vessel mean length (excluding 0 length)		52 ft.
Vessel std. dev. length (excluding 0 length)		31 ft.
Multi-gear profile (vessels):	1 gear	46%
	2 gears	33%
	3 gears	16%
	4+ gears	5%

	Hook and line	Net	Other	Pot	Trawl	Troll	All gears	Percent
1 Groundfish	5.59%	0.09%	0.00%	0.93%	19.43%	0.11%	$67,997	26%
2 Pacific whiting	0.00%				3.16%		$8,214	3%
3 Salmon	0.00%	0.63%		0.00%	0.00%	1.16%	$4,672	2%
4 Crab/lobster	0.00%	0.00%	0.00%	19.74%	0.00%	0.00%	$51,371	20%
5 Shrimp		0.29%	0.03%	0.57%	7.70%		$22,355	9%
6 Coastal pelagic	0.00%	11.24%	0.00%	0.00%	0.01%	0.00%	$29,276	11%
7 Other pelagic	0.00%	4.72%	0.82%		0.03%	0.00%	$14,477	6%
8 Highly migratory	1.11%	4.96%	0.22%	0.00%	1.35%	5.25%	$33,534	13%
9 Halibut	3.71%				0.00%	0.00%	$9,669	4%
10 Sea urchins		0.06%	4.69%				$12,351	5%
11 Other	0.06%	0.39%	1.16%	0.19%	0.58%	0.00%	$6,194	2%
All species	$27,245	$58,248	$18,001	$55,752	$83,903	$16,961	$260,111	100%
Percent	10%	22%	7%	21%	32%	7%	100%	

Notes: 1. Revenue in thousands of 1997 dollars.
2. Excludes vessel identification codes "NONE" and "ZZ..."
3. Length mean excludes 0 length vessels. Where a vessel has more than one assigned length, the smallest non-zero assignment is used.
4. Revenue excludes offshore and distant water fisheries sources.

Source: PacFIN March 1999 extraction.

Figure E4
Vessel Participation by Fishery During Period 1993-1997



Notes: 1. Includes U.S. West Coast vessels, excludes vessels with identifier "NONE" or "ZZ...", includes only vessels with species revenue >$500.
2. Vessels are tracked over years by their plate numbers. If a vessel is re-documented and continues participation in the same fishery, then its previous experience is omitted. Only vessels that make deliveries in each year are included in the analysis.
3. Revenue excludes offshore and distant water fisheries sources.

Source: PacFIN September 1998 extraction.

classifications in Table E4 are a combination of statistical analysis of available data and information available in published data or from informal surveys.

The results from a previous project by the authors (William Jensen Consulting 1998) provided a starting point for classification procedures. In 1983 the West Coast Fisheries Development Foundation (through S-K funding) developed the Fisheries Economic Assessment Model (FEAM). The purpose was to develop a model to estimate contributions of the fishing industry to regional economies. The only information available was the "fish tickets" or landings. Economic information on vessel revenue and spending flows as well as primary processing products and costs was needed to estimate economic contribution of fish landings. While some cost information was available from literature, most of the information was gathered by informal surveys of individual fishery, processors, and associations.

From these informal surveys several general observations emerged. These were:

- Vessel size and gear combinations are factors for skipper and owner decision making about when and where to go fishing. Other more important factors are the availability of resources and the management measures that allow access to fisheries.

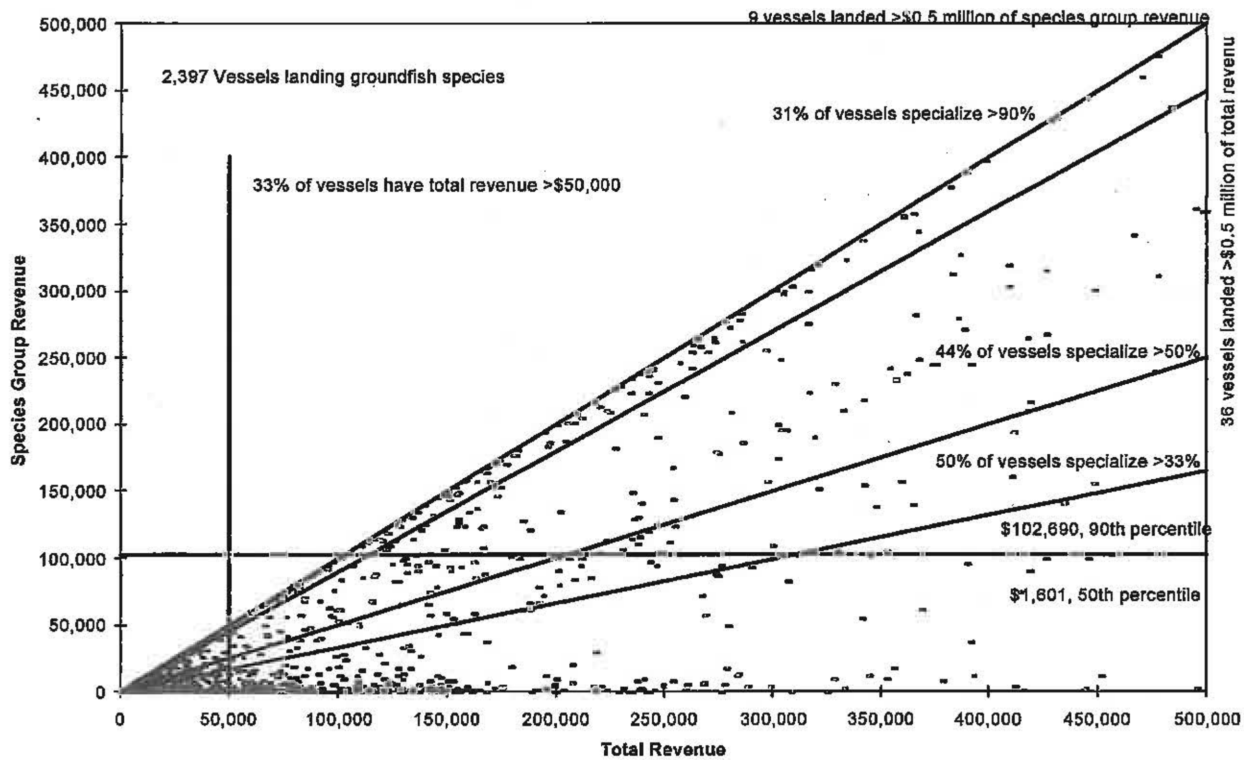
Table E3
Vessel Counts and Revenues by Species and Gear Groups for Specialization Categories in 1997

	>90%			>50% and <=90%			>33% and <=50%			>=0% and <=33%			Total		
Species	Vessel Count	Average Species Revenue	Average Total Revenue	Vessel Count	Average Species Revenue	Average Total Revenue	Vessel Count	Average Species Revenue	Average Total Revenue	Vessel Count	Average Species Revenue	Average Total Revenue	Vessel Count	Average Species Revenue	Average Total Revenue
1 Groundfish	739	52,539	53,416	316	77,290	114,475	147	41,756	99,226	1,197	4,324	62,151	2,399	31,081	68,624
2 Pacific whiting	14	179,516	186,179	14	251,011	360,655	7	199,023	492,574	56	16,698	299,587	91	91,820	306,380
3 Salmon	1,269	6,122	6,187	356	9,652	14,329	148	12,037	29,466	546	5,590	57,983	2,319	6,916	21,117
4 Crab/lobster	695	44,185	44,875	389	52,119	75,587	171	40,924	99,415	335	17,951	112,169	1,590	40,248	72,433
5 Shrimp	84	99,688	101,670	79	107,835	168,047	32	79,573	193,642	189	21,620	198,499	384	61,264	170,648
6 Coastal pelagic	69	226,061	229,227	46	289,872	397,892	15	44,338	103,795	268	938	160,388	398	74,997	197,640
7 Other pelagic	155	71,360	71,904	33	81,573	110,987	10	79,677	195,716	179	6,901	200,847	377	41,869	139,832
8 Highly migratory	360	71,933	72,457	126	29,006	43,568	92	39,964	97,554	824	6,896	98,632	1,402	27,753	86,892
9 Halibut	32	90,916	92,136	41	128,884	188,905	13	61,276	149,588	264	4,250	68,323	350	28,892	87,644
10 Sea urchins	242	52,234	52,945	76	37,405	51,443	23	18,275	44,539	44	5,006	35,488	385	41,881	50,151
11 Other	229	17,080	17,284	217	12,091	17,585	107	11,057	27,376	1,295	1,612	97,972	1,848	5,306	74,446
Total	3,888	41,205	41,776	1,693	53,514	77,926	NA	NA	NA	NA	NA	NA	5,731	53,579	53,579
Gear															
Hook and line	845	25,395	25,565	220	35,880	50,302	112	20,585	48,738	731	3,266	56,654	1,908	17,844	41,688
Net	1,264	48,547	48,649	69	45,401	61,152	46	25,696	62,355	230	5,007	62,795	1,609	41,535	51,599
Other	313	63,810	64,235	44	38,997	53,552	12	19,567	47,878	147	1,789	77,496	516	42,997	66,721
Pot	821	46,804	47,483	368	50,560	72,060	173	38,108	92,705	415	14,302	101,947	1,777	39,145	69,695
Trawl	330	187,817	189,388	148	139,395	191,439	38	65,709	157,179	126	8,683	84,720	642	134,269	167,412
Troll	976	14,890	14,993	257	22,729	34,156	116	27,532	66,451	683	6,842	96,500	2,032	13,898	47,751
Total	4,549	47,864	48,212	1,106	52,279	73,482	NA	NA	NA	NA	NA	NA	5,731	53,579	53,579

Notes: 1. Excludes vessel identification codes reported as "NONE" or "ZZ..."
2. Tables show unique vessels for >50% specialization but vessels are repeated in other species for <=50% specialization.
3. Total revenue does not include deliveries to offshore processors or revenues from distant water fisheries.

Source: PacFIN March 1999 extraction.

Figure E5
Scattergram Showing U.S. West Coast Vessel Species Group Revenue
as Compared to Total Revenue in 1997 for Groundfish



Notes:
1. Vessels with total revenue greater than $0.5 million and/or species revenue greater than $0.5 million not shown.
2. Excludes vessel identification codes reported as "NONE" or "ZZ..."
3. Revenue excludes offshore and distant water fisheries sources.

Source: PacFIN March 1999 extraction.

- Even though there are very broad vessel groups that can be defined by total revenue, most fishermen are opportunists who will move from fishery to fishery within limits of perceived payback.
- Some specialization may develop for species using certain gear types. For example, the Seattle purse seiners will fish Puget Sound salmon, but may also go to California for the pelagic fisheries and then move to Alaska for the herring, salmon fisheries. The timing of fisheries influences many decisions of capital as well as human investments.
- Crew wages (including skipper) tend to average about 39 percent. This may change for the "derby" fisheries and also for the small boat owner/operated boats that require very little capital investment. Deciding which fisheries to pursue may include criteria for keeping experienced crew members retained by participating in fisheries of lower return to owners.

Table E4
Vessel Classification Rules

Order	Vessel Category	Rule Description
1	Mothership/Catcher Processor	Identified by vessel documentation
2	Alaska Fisheries Vessel	Alaska revenue is greater than 50% of that vessel's total revenue
3	Pacific Whiting Onshore and Offshore Trawler	Pacific whiting PacFIN revenue plus U.S. West Coast offshore revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $100,000
4	Large Groundfish Trawler	groundfish (including sablefish, halibut, and California halibut) revenue from other than fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $100,000
5	Small Groundfish Trawler	groundfish (including sablefish, halibut, and California halibut) revenue from other than fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
6	Sablefish Fixed Gear	sablefish revenue from fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
7	Other Groundfish Fixed Gear	groundfish (including halibut and California halibut), other than sablefish, revenue from fixed gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
8	Pelagic Netter	pelagic species revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
9	Migratory Netter	highly migratory species revenue from gear other than troll or line gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
10	Migratory Liner	highly migratory species revenue from troll or line gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
11	Shrimper	shrimp revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
12	Crabber	crab revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
13	Salmon Troller	salmon revenue from troll gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $5,000
14	Salmon Netter	salmon revenue from gill or purse seine gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $5,000
15	Other Netter	other species revenue from net gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
16	Lobster Vessel	lobster revenue is greater than 33% of that vessel's total revenue, and total revenue is greater than $15,000
17	Diver Vessel	revenue from sea urchins, geoduck, or other species by diver gear is greater than 33% of that vessel's total revenue, and total revenue is greater than $5,000
18	Other > $15 Thousand	all other vessels not above who have total revenue greater than $15,000
19	Other <= $15 Thousand	all other vessels not above who have total revenue less than or equal to $15,000

Source: Study.

- Other decisions to define the vessels' classification depend on data availability. For example, distant water fisheries revenue is included because of the substantial amount of revenues that are returned from Alaska and U.S. West Coast offshore fisheries.

A goal of this project was to provide a classification scheme that could be used with available data. While cost and earnings background information was useful in the initial classification procedures, final rules are dependent only upon revenues revealed through the PacFIN, AKFIN, and other fish purchasing based systems.

The classification also included comments from the economic advisory group to this project. For most fisheries, the consensus was to use $15,000 as the dividing point for available fishing operation. The vessel categories that included revenues less than $15,000 were for salmon trollers and diver vessels. Otherwise most trollers as well as diving vessels would have been included in the "other" category. There also developed a need to separate larger groundfish trawlers from small ground trawlers. These small trawlers were mostly California based halibut trawlers. Therefore, since analysis of the data showed two groupings, it was decided to have large trawlers put into categories of $100,000 or more.

The 33 percent specialization rule developed from analysis of the data. Without the 33 percent rule, too many boats would be classified as other. This is especially true for some groups such as shrimpers and sablefish fixed gear. For some groups the total amount of licenses permitted is close to those counted in this vessel classification; e.g. trawlers. This is not the case for other categories such as salmon trollers. In Oregon alone, about 1,100 boats have salmon troll permits. From Washington to California only 367 boats land enough salmon (over $5,000) to be classified to be salmon trollers.

Several scenarios for number of classes, rule series order, and rule criteria were tested to best explain classification fit. It was necessary to itemize the revenue distribution within a species group for three specific species: sablefish, Pacific whiting, and lobster, and certain species harvested with dive gear. These species are either significant sources of revenue for some vessels and/or are managed separately from other complexes.

There is a separate harvest guideline for sablefish caught by trawl gear and fixed gear (pot and hook and line gear groups). Vessels that fish with fixed gear have different physical characteristics and participate in other fisheries differently than vessels that harvest sablefish with trawl gear. They are treated in a special category for further analysis.

Crab and lobster vessels use similar gear types, but the species are managed differently and harvests are geographically separated. California spiny lobster comprises about 15 percent of the crab/lobster species group. Landings are mostly at central and southern California ports while landings for Dungeness crab are in northern California, Oregon, and Washington.

Pacific whiting is also a case of groundfish that is harvested by vessels with special characteristics. These vessels can have expensive handling and processing equipment onboard that is not used on other trawlers. A portion of the vessels that land Pacific whiting deliver only to floating processors. The unique characteristics of vessels that harvest Pacific whiting require that they be treated in special analysis categories.

What is identified as "diving vessels" harvest species such as abalone, sea urchins, geoducks, etc. Some of these species were previously discussed as either a single-species group or lumped with the "other" species group.

The rules "explained" vessel classifications for about 55 percent of the fleet and 97 percent of the revenue in 1997 (Table E5). Despite the scenario testing to make classes more general, two catch-all classifications were needed for vessels that didn't meet other rule criteria. The catch-all classifications were for vessels with total revenue greater than $15,000, representing one percent of the fleet, and vessels less than or equal to $15,000, representing 44 percent of the fleet. These vessels have either very low revenues or such a distributed revenue profile that it was not possible to treat them with any degree of specialization.

Assigning vessels to a certain classification is rule order dependent, i.e. vessel classes are from a hierarchical structure. The hierarchy does not significantly change if vessels were not removed from the pool for being previously classified in another category.

The complexity of the revenue distribution among species and gear groups and for other sources of revenue is shown in Table E6. For vessels classified as groundfish trawlers (large and small), these vessels harvest 63 percent of all groundfish landings off U.S. West Coast ports in 1997. Groundfish revenues make up 80 percent of total revenues for large trawlers and 54 percent of revenues for the small trawlers. In addition, they land 21 percent of the shrimp and five percent of the Dungeness crab. While there are only 273 vessels in this category out of 5,731 making landings in U.S. West Coast states, they produce the highest revenue (16 percent) of all other vessel categories (Table E5). The second highest category is a pelagic netter (14 percent), followed by a crabber (12 percent). Alaska fisheries vessels land 10 percent of all revenue, followed by migratory netters and liners (nine percent), and shrimpers (six percent). Vessels specializing in salmon troll or gillnet gear are second from last when omitting the catch-all categories.

Processor Characteristics

U.S. West Coast fish purchases by processors, dealers, and individual consumers buying directly from vessels totaled 875.4 million pounds with an ex-vessel value of $344.5 million in 1997 (Figure E6). About one half of the volume and value is landed in California (Table E7). Data sources only show where the purchase occurs; not all landings are processed at their geographical location of deliveries. Purchased fish are transported to processors in other locations and there is cross hauling of species between processor facilities.

There were 1,291 unique names of processors or buyers in 1997. These companies include operators of processing plants, buyers that may do little more than hold the fish prior to their shipment to a primary or secondary processor, and consumers buying directly from vessels. Forty-one percent of processors and buyers are simply the owners of vessels who also own

Table E5
Total Counts and Revenues by Vessel Classifications in 1997

	Vessel Category	Total Category Revenue	Percent	Vessel Count	Percent	Average Revenue
1	Mothership/Catcher Processor	13,611	4%	6	0%	2,268
2	Alaska Fisheries Vessel	36,604	10%	224	4%	163
3	Pacific Whiting Onshore and Offshore Trawler	19,481	5%	29	1%	672
4	Large Groundfish Trawler	55,924	15%	195	3%	287
5	Small Groundfish Trawler	3,710	1%	78	1%	48
6	Sablefish Fixed Gear	18,311	5%	167	3%	110
7	Other Groundfish Fixed Gear	15,435	4%	159	3%	97
8	Pelagic Netter	52,306	14%	247	4%	212
9	Migratory Netter	15,871	4%	77	1%	206
10	Migratory Liner	24,747	7%	266	5%	93
11	Shrimper	22,112	6%	140	2%	158
12	Crabber	45,493	12%	601	10%	76
13	Salmon Troller	6,064	2%	364	6%	17
14	Salmon Netter	2,634	1%	170	3%	15
15	Other Netter	1,137	0%	37	1%	31
16	Lobster Vessel	6,908	2%	108	2%	64
17	Diver Vessel	18,989	5%	285	5%	67
18	Other > $15 Thousand	4,362	1%	35	1%	125
19	Other <= $15 Thousand	8,336	2%	2,543	44%	3
	Total	372,034	100%	5,731	100%	65

Notes:
1. Revenue is ex-vessel value in thousands of 1997 dollars.
2. U.S. West Coast onshore revenues exclude landings from vessels with identifier code "ZZ..." or "NONE."
3. Revenue includes U.S. West Coast onshore landings and revenue from offshore and distant water fisheries.

Source: PacFIN March 1999 extraction.

licenses allowing them to sell harvested fish directly to the public or retail markets. A relatively small number of processors and buyers handle most of the deliveries in the U.S. West Coast. An annotated scattergram of revenue versus number of delivering vessels shows that 27 percent of the processors or buyers have deliveries from greater than 10 vessels (Figure E7). The aggregate number of processors and buyers has not changed significantly in recent years (Figure E8).

Volume and Multi-fisheries Dependency of Processors and Buyers

The major processing firms in the U.S. West Coast are multi-species, multi-market oriented. Most of the firms' plants are located in areas where, by natural conditions or by management decisions, the availability of products changes over the year. Out of competitive necessity, they therefore process most species harvested. There is an increasing trend in multi-fisheries dependency for the higher volume processors. Most species groups' landings have seasonal peaks but, because of fishery management regulations, groundfish is now landed on a more even

Table E6
Sources of Revenue by Vessel Classifications in 1997

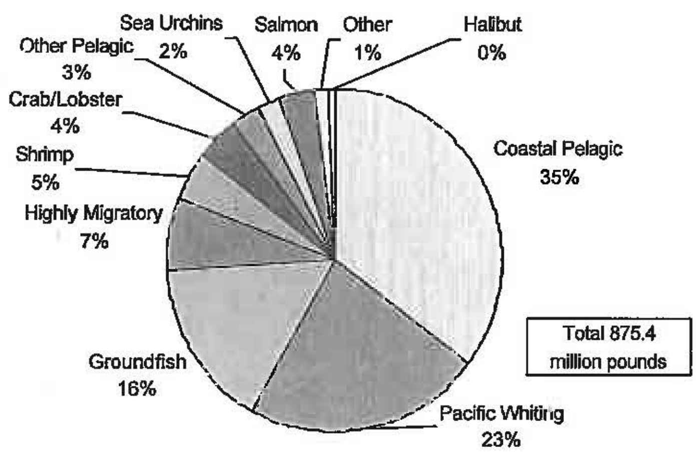
	U.S. West Coast Onshore														U.S. West		
Vessel Category	Ground-fish	Pacific Whiting	Salmon	Crab/ Lobster	Shrimp	Coastal Pelagic	Other Pelagic	Highly Migratory	Halibut	Sea Urchins	Other	Total Onshore	Alaska Onshore	Alaska Offshore	Coast Offshore	Other Offshore	Total
1 Mothership/Catcher	866 6%							94 1%	287 2%		0 0%	1,248 9%	1,105 8%	11,233 83%		25 0%	13,611
Processor	1%							0%	3%		0%	0%	3%	99%		0%	4%
2 Alaska Fisheries Vessel	622 2%		1,405 4%	4,103 11%	89 0%	52 0%	146 0%	513 1%	1,051 3%	56 0%	0 0%	8,038 22%	28,391 78%			175 0%	36,604
	1%		9%	6%	0%	0%	1%	1%	10%	0%	0%	3%	68%			2%	10%
3 Pacific Whiting Onshore	3,154 16%	7,204 37%	3 0%	751 4%	109 1%	3 0%	31 0%	1 0%	0 0%		2 0%	11,259 58%	3,377 17%	90 0%	4,755 24%		19,481
and Offshore Trawler	4%	86%	0%	1%	0%	0%	0%	0%	0%		0%	4%	8%	1%	100%		5%
4 Large Groundfish	44,849 80%	826 1%	26 0%	3,050 5%	4,961 9%	25 0%	163 0%	507 1%	112 0%		1,400 3%	55,718 100%	105 0%			100 0%	55,924
Trawler	60%	10%	0%	5%	21%	0%	1%	1%	1%		14%	18%	0%			1%	15%
5 Small Groundfish	2,016 54%	1 0%	10 0%	237 6%	46 1%	10 0%	4 0%	159 4%		1 0%	1,227 33%	3,710 100%					3,710
Trawler	3%	0%	0%	0%	0%	0%	0%	0%		0%	13%	1%					1%
6 Sablefish Fixed Gear	12,503 68%	0 0%	217 1%	3,006 16%	71 0%	2 0%	12 0%	417 2%	1,098 6%	93 1%	12 0%	17,431 95%	854 5%			25 0%	18,311
	17%	0%	1%	5%	0%	0%	0%	1%	11%	1%	0%	6%	2%			0%	5%
7 Other Groundfish	4,636 30%	0 0%	224 1%	606 4%	2 0%	2 0%	1 0%	302 2%	6,564 43%	32 0%	288 2%	12,658 82%	2,652 17%			125 1%	15,435
Fixed Gear	6%	0%	1%	1%	0%	0%	0%	1%	65%	0%	3%	4%	6%			2%	4%
8 Pelagic Netter	85 0%		824 2%	309 1%	122 0%	29,438 56%	15,076 29%	3,409 7%	45 0%		124 0%	49,432 95%	2,849 5%			25 0%	52,306
	0%		5%	0%	1%	99%	96%	9%	0%		1%	16%	7%			0%	14%
9 Migratory Netter	66 0%		251 2%	37 0%	155 1%	19 0%	1 0%	14,706 93%		19 0%	267 2%	15,521 98%				350 2%	15,871
	0%		2%	0%	1%	0%	0%	38%		0%	3%	5%				5%	4%
10 Migratory Liner	101 0%		939 4%	2,285 9%	268 1%	12 0%	2 0%	15,093 61%	7 0%	220 1%	42 0%	18,969 77%	53 0%			5,725 23%	24,747
	0%		6%	4%	1%	0%	0%	39%	0%	1%	0%	6%	0%			80%	7%
11 Shrimper	741 3%		41 0%	3,916 18%	16,577 75%	10 0%	19 0%	537 2%	62 0%	6 0%	147 1%	22,057 100%	55 0%				22,112
	1%		0%	6%	70%	0%	0%	1%	1%	0%	2%	7%	0%				6%
12 Crabber	1,793 4%		2,490 5%	36,831 81%	638 1%	72 0%	100 0%	1,751 4%	253 1%	75 0%	74 0%	44,076 97%	1,217 3%			200 0%	45,493
	2%		16%	58%	3%	0%	1%	4%	2%	0%	1%	14%	3%			3%	12%
13 Salmon Troller	219 4%		5,146 85%	230 4%		0 0%	14 0%	342 6%	39 1%		30 0%	6,020 99%	44 1%				6,064
	0%		32%	0%		0%	0%	1%	0%		0%	2%	0%				2%
14 Salmon Netter	47 2%		2,278 87%	50 2%	2 0%			0 0%		12 0%	139 5%	2,528 96%	105 4%				2,634
	0%		14%	0%	0%			0%		0%	1%	1%	0%				1%
15 Other Netter	0 0%		33 3%	9 1%	3 0%	1 0%	0 0%	0 0%		342 30%	737 65%	1,125 99%	12 1%				1,137
	0%		0%	0%	0%	0%	0%	0%		2%	8%	0%	0%				0%
16 Lobster Vessel	84 1%		17 0%	5,967 86%	198 3%	7 0%	1 0%	81 1%		28 0%	527 8%	6,908 100%					6,908
	0%		0%	9%	1%	0%	0%	0%		0%	5%	2%					2%
17 Diver Vessel	214 1%		15 0%	43 0%	1 0%	0 0%	5 0%	60 0%	0 0%	15,132 80%	3,507 18%	18,977 100%	12 0%				18,989
	0%		0%	0%	0%	0%	0%	0%	0%	94%	36%	6%	0%				5%
18 Other > $15 Thousand	762 17%	306 7%	326 7%	693 16%	114 3%	15 0%	9 0%	33 1%	564 13%		228 5%	3,051 70%	861 20%			450 10%	4,382
	1%	4%	2%	1%	0%	0%	0%	0%	6%		2%	1%	2%			6%	1%
19 Other <= $15 Thousand	2,004 24%	18 0%	1,792 22%	1,873 22%	169 2%	179 2%	205 2%	904 11%	29 0%	107 1%	1,055 13%	8,336 100%					8,336
	3%	0%	11%	3%	1%	1%	1%	2%	0%	1%	11%	3%					2%
Total revenue	74,564 20%	8,356 2%	16,038 4%	63,995 17%	23,525 6%	29,849 8%	15,785 4%	38,910 10%	10,112 3%	16,124 4%	9,806 3%	307,063 83%	41,693 11%	11,323 3%	4,755 1%	7,200 2%	372,034
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Vessel count	2,399	91	2,319	1,590	384	398	377	1,402	350	385	1,848	5,731	377	14	15	148	5,731

Notes: 1. Revenue is ex-vessel value in thousands of 1997 dollars. Percents are column \ row total revenue shares.
2. U.S. West Coast onshore revenues exclude landings from vessels with identifier code "ZZ..." or "NONE."
3. Vessel counts across species group categories are not unique but the column "total" is for unique vessels.
4. Revenue includes U.S. West Coast onshore landings and revenue from offshore and distant water fisheries.

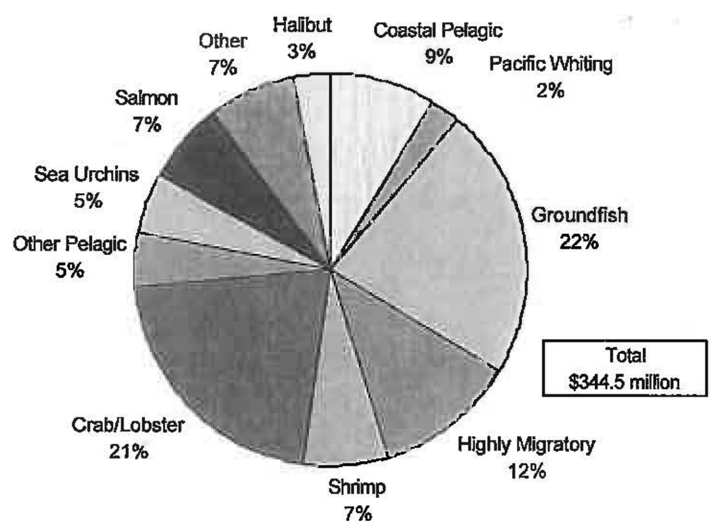
Source: **PacFIN March 1999 extraction.**

Figure E6
Total Landed Volume and Value by Species in 1997

Volume



Value



Note: Volume and value landings are inclusive of "NONE" and "ZZ..." landings.
Source: PacFIN March 1999 extraction.

Table E7
Volume and Value of Fish Landings by State in 1997

	Landed Volume		Ex-Vessel Value	
Area	Volume	%	Value	%
Washington	122.0	14%	$103.6	30%
Oregon	260.9	30%	$69.6	20%
California	492.5	56%	$171.3	50%
Total	875.4	100%	$344.5	100%

Notes: Volume is in millions of pounds and value is ex-vessel value in millions of 1997 dollars.
Source: PacFIN March 1999 extraction.

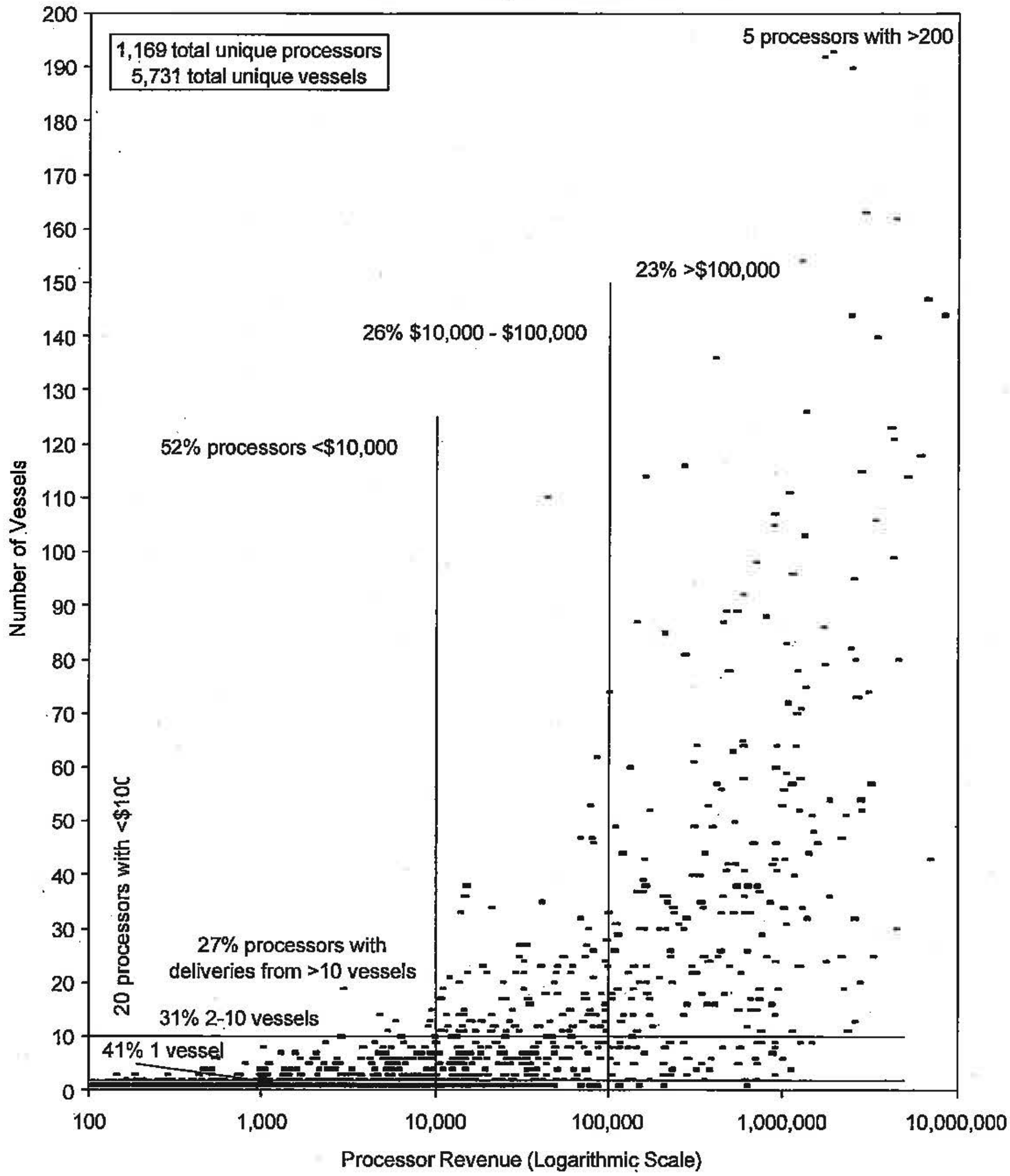
flow throughout the year. Some of these primary processing firms also include distributing and wholesaling as their function.

Processing of fish products includes a variety of functions. For some products, processing involves icing fish and selling the product directly to consumers or shipping the iced or frozen product to be canned. In the case of albacore tuna, more of the product is frozen and shipped offshore to be canned. Other products, such as Dungeness crab and pink shrimp, are cooked and picked for local sale or shipment to final markets. Groundfish are generally filleted. The primary product for fillets is about 30 percent of the total weight. The processing of the residue (carcasses) is therefore an important component in the total value of the product.

The processing and distribution of seafood is complex (Figure E9). Some products flow directly to the consumer, while others are processed, brokered, distributed, and retailed by separate entities. Value may be added to the product at any stage. This may involve selling a product whole, or retaining only a portion of the landed product for sale. Value may be added also by small, local processors that prepare (smoke, can, etc.) specialty items. The preparation and sale of the secondary product then becomes a key consideration in total value of the product.

The higher volume processors and buyers especially depend upon year-around deliveries from many fisheries (Table E8). Many of licensed processor and buyers received salmon, Dungeness crab, pelagics, migratory, and groundfish (other than Pacific whiting) in 1997. However, only the larger volume firms took deliveries of pink shrimp (266 firms of which 42 percent had revenues greater than $1 million) and Pacific whiting (30 firms of which 90 percent had revenue greater than $1 million). The species group causing the greatest specialization was sea urchins (55 percent of processors or buyers had 90 percent specialization within this species group and 62 percent had greater than 50 percent specialization). Predictably, salmon (not considering the other species category) had the lowest average ex-vessel value of deliveries ($49 thousand mean and $3 thousand median) and Pacific whiting had the highest ($279 thousand mean and $20 thousand median).

Figure E7
Scattergram Showing Processors' Revenue Compared to
Number of Vessels Delivering to the Processor in 1997



Note: Excludes deliveries by vessel identification codes reported as "NONE" or "ZZ..." This results in 121 processors not being shown because all deliveries were from "NONE" or "ZZ.." vessels.

Source: PacFIN March 1999 extraction.

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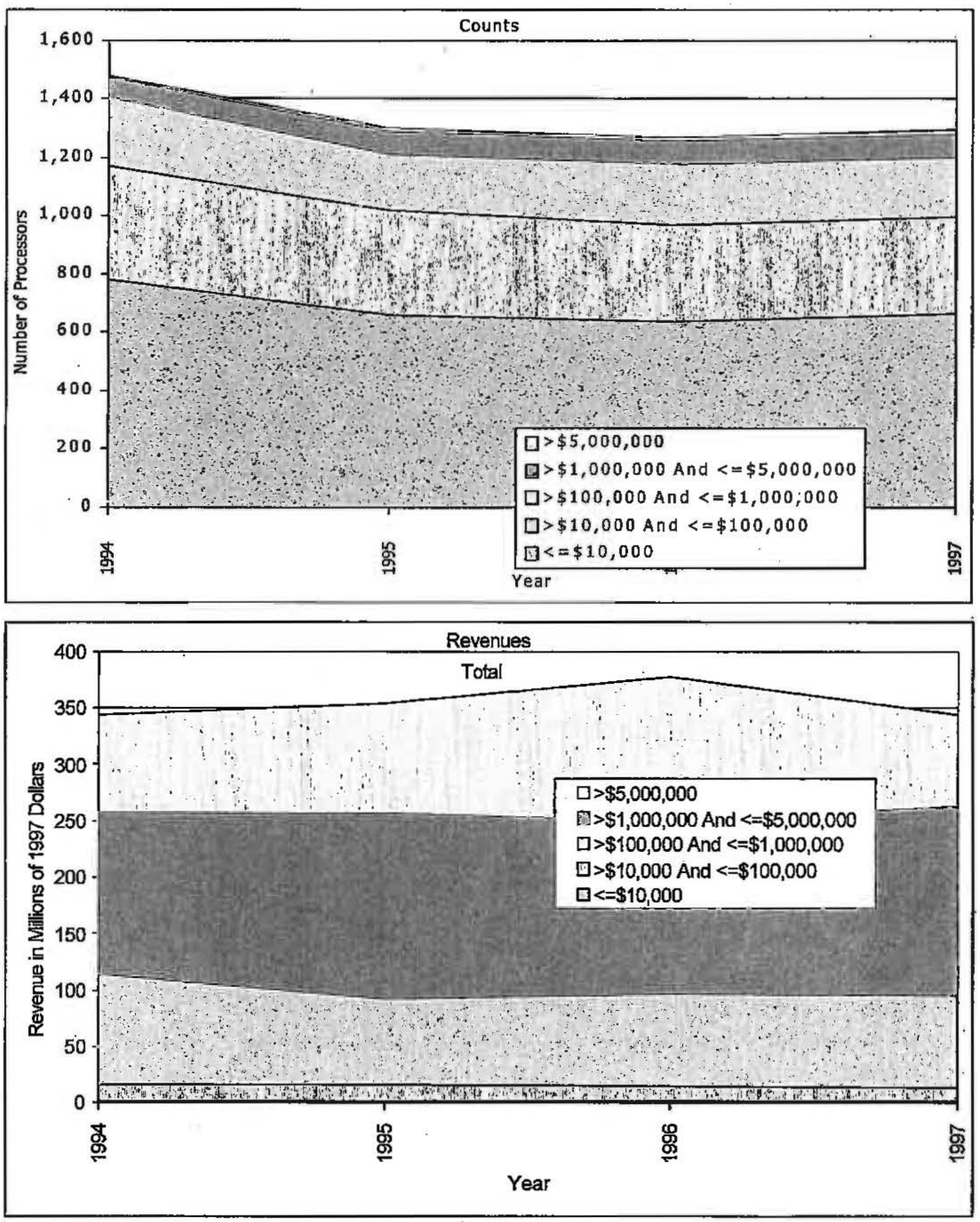
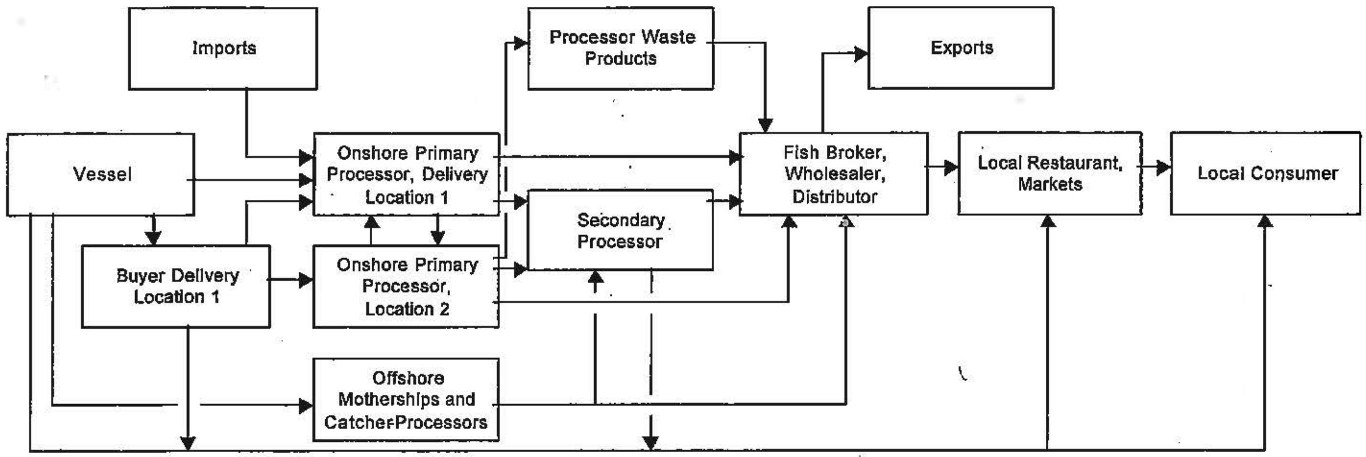
Figure E8
Processor or Buyer Counts and Revenues by Revenue Categories in 1994-1997



Notes: 1. Revenue adjusted for inflation using the GDP Implicit Price Deflator, 1997=100.
Source: Annual vessel summary information extracted from PacFIN in March 1999.

Figure E9
Seafood Product Distribution Chain



Processor Classifications

Finding categories of processors is analogous to determining a vessel classification scheme. Processors making the higher volume purchases are a generalized category for using many species and manufacturing many product forms. The rules adopted for a classification scheme adopted the threshold purchase levels as shown in the first column on Table E9. The ex-vessel values by purchased species for these categories are shown in the other columns on Table E9.

Processed Product Value

The value of primary seafood products produced in the U.S. West Coast can be calculated using sales price of product forms and the landed species group finished product poundage. Radtke and Davis (1998b) used an analysis of final product form to estimate ex-processor pricing. The ex-processor price was determined using financial information about five components of product cost or published sales price for product forms.

- Raw product purchase = Average price ÷ Product form yield
- Labor = Cost for labor associated with product form processing
- Tax/fee = Costs for ad valorem and poundage taxes and fees paid on deliveries of raw product by the processor. For Oregon, taxes are 0.0109 of ex-vessel value for all fish except salmon. Salmon taxes are 0.0315 of value, plus $0.05 per round pound for salmon habitat restoration programs.
- Other = Fixed plant costs, etc.
- Contribution = Profit, etc.

Using previous project results by the authors (Radtke and Davis 1998b), the estimated ex-processor value from processing the U.S. West Coast landings in 1996 was about double the ex-

Table E8
Counts and Revenue Distribution of Processors or Buyers Purchasing Within Species Groups in 1997

	Count	Processor Counts Within Revenue Categories					Counts Within Revenue Specialization Categories		
Species	Total	<=$10K	<=$100K	<=$1,000K	<=$5,000K	>$5,000K	>90%	>50%	>33%
Groundfish	528	37%	29%	21%	12%	2%	18%	35%	44%
Pacific whiting	30	3%	7%	27%	43%	20%	13%	17%	20%
Salmon	483	48%	25%	16%	9%	2%	34%	50%	57%
Crab/lobster	485	29%	32%	26%	11%	2%	29%	49%	60%
Shrimp	266	30%	28%	24%	15%	3%	27%	37%	44%
Coastal pelagic	163	20%	25%	30%	21%	5%	14%	23%	26%
Other pelagic	124	10%	25%	36%	23%	5%	18%	21%	23%
Highly migratory	375	37%	28%	19%	13%	3%	25%	34%	40%
Halibut	89	17%	26%	28%	20%	9%	7%	18%	21%
Sea urchins	85	25%	29%	33%	12%	1%	55%	62%	66%
Other	593	35%	29%	23%	11%	2%	19%	29%	35%
Total	1,290	52%	26%	16%	6%	1%			

Species	Sum of Revenue (thousands)	Revenue Distribution (thousands) 90th Percentile	50th Percentile	Mean
Groundfish	$77,956	$270	$2	$148
Pacific whiting	8,356	786	20	279
Salmon	23,854	85	3	49
Crab/lobster	73,338	464	11	151
Shrimp	24,053	330	6	90
Coastal pelagic	29,849	479	1	183
Other pelagic	15,787	186	0	127
Highly migratory	39,672	118	4	106
Halibut	10,679	250	4	120
Sea urchins	16,722	868	11	197
Other	24,256	61	2	41
Total	$344,521	$674	$9	$267

Notes: 1. Table shows counts of unique processors or buyers for >50% specialization, but counts are repeated in species groups for <=50% specialization.
2. One processor is identified as making a purchase, but the value is zero. This processor is excluded from this table.

Source: PacFIN March 1999 extraction.

Table E9
Sources of Revenue by Processor Volume in 1997

	U.S. West Coast Onshore											
Volume Category	Ground-fish	Pacific Whiting	Salmon	Crab/ Lobster	Shrimp	Coastal Pelagic	Other Pelagic	Highly Migratory	Halibut	Sea Urchins	Other	Total Onshore
<=$10K	203 11%	0 0%	413 23%	272 15%	200 11%	56 3%	7 0%	318 17%	17 1%	45 2%	304 17%	1,837 100%
	0%	0%	2%	0%	1%	0%	0%	1%	0%	0%	1%	1%
<=$100K	1,659 15%	25 0%	1,630 15%	2,747 25%	1,039 9%	265 2%	274 2%	862 8%	124 1%	554 5%	1,841 17%	11,021 100%
	2%	0%	7%	4%	4%	1%	2%	2%	1%	3%	8%	3%
<=$1,000K	11,374 14%	1,257 2%	8,327 10%	23,165 28%	5,033 6%	4,408 5%	3,553 4%	4,984 6%	2,964 4%	9,075 11%	7,176 9%	81,319 100%
	15%	15%	35%	32%	21%	15%	23%	13%	28%	54%	30%	24%
<=$5,000K	40,111 24%	3,881 2%	10,219 6%	29,474 18%	12,885 8%	16,062 10%	11,744 7%	15,016 9%	6,829 4%	6,962 4%	14,701 9%	167,886 100%
	51%	46%	43%	40%	54%	54%	74%	38%	64%	42%	61%	49%
>$5,000K	24,608 30%	3,192 4%	3,264 4%	17,679 21%	4,895 6%	9,056 11%	209 0%	18,491 22%	744 1%	86 0%	234 0%	82,459 100%
	32%	38%	14%	24%	20%	30%	1%	47%	7%	1%	1%	24%
Total revenue	77,956 23%	8,356 2%	23,854 7%	73,338 21%	24,053 7%	29,849 9%	15,787 5%	39,672 12%	10,679 3%	16,722 5%	24,256 7%	344,521 100%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Processor count	528	30	483	485	266	161	120	373	89	85	589	1,290

Notes: 1. Revenue is ex-vessel value in thousands of 1997 dollars. Percents are column \ row total revenue shares.
2. Processor counts across species group categories are not unique but the column total is for unique vessels.
3. Excludes one processor where $0 revenue was reported.

Source: PacFIN March 1999 extraction.

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vessel value of the landings. Using the same relationship between ex-vessel price and ex-processor price in 1996, the 1997 ex-processor sales, including non-edible products, such as fish meal, are estimated to be $689.0 million.

Major Processor Companies and Facilities in the U.S. West Coast

There are numerous processing and fish buyers licenses in all three states. About 80 of these may be identified as individual or business groups. Several groups (about 50) have business operations in more than one area. Thirteen processing groups have plants in more than one U.S. West Coast state. One processing group has processing plants in the states of California, Oregon, Washington, and Alaska.[1]

The major processor groups can be categorized by ex-processor sales in four classifications: largest (greater than $10 million), medium ($5 million to $10 million), small ($1 million to $5 million), or very small (less than $1 million) (Table E10). The largest classification is composed of 15 companies (parent groups) and processed 65 percent of the fish by volume and 46 percent of the total fish by value in 1997. These processors average about $10.6 million in landed value and about $22 million in ex-processor value annually.[2] The medium sized processor category process 12 percent of the landed volume and 16 percent of the landed value. This group averages about $3.4 million in purchases per year. The large and medium processors purchase 77 percent of the landed volume and 62 percent of the landed value along the U.S. West Coast. The other smaller processors purchase an additional 22 percent of the total volume. The rest are either individual vessels that also act as dealers and other very small buyers found along the U.S. West Coast.

Seafood Markets

While many processing plants are located in many locations along the U.S. West Coast, only some of these processing plants serve to hold inventories and distribute products in the U.S. and to the rest of the world. U.S. West Coast seafood production and distribution is primarily to serve the closest major regional markets. The San Francisco and Los Angeles market areas dominate the absorption of seafood products. Strong markets for some groundfish have also developed in Japan. This includes products from sablefish, Pacific whiting, and relatively modest amounts of salmon and shrimp. Most of the Pacific whiting processing capability being developed by U.S. West Coast firms is for surimi production. Surimi markets are mostly in Japan and Korea. Some domestic and European markets for Pacific whiting headed and gutted, fillet and other product forms are also developing. A study of groundfish markets by Oregon State University (Shriver 1996) concluded that Pacific whiting surimi markets and sablefish markets were mostly destined for the Asian markets, while other groundfish and Pacific whiting (headed and gutted) markets were mostly in the U.S. These markets for groundfish were evenly divided between the U.S. northwest, California, and the rest of the U.S.

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1. For a more complete description of seafood processing on the West Coast, see Radtke and Davis (1997).
2. These estimates are based on fish ticket information, so it does not necessarily include purchases from small buyers that take delivery from harvesters and sell their products to the larger processors.

Table E10
Ranking of U.S. West Coast Processor Groups in 1997

	Count	Percent of Volume	Percent of Value	Average Annual Ex-Vessel Value	Annual Estimated Ex-Processor Sales
Largest	15	64.8%	46.0%	$10.6 million	> $10 million
Medium	16	11.9%	15.6%	$3.4 million	$5 million to $10 million
Small	96	18.9%	27.5%	$990,400	$1 million to $5 million
Very small	97	2.9%	6.7%	$238,400	$100,000 to $1 million
All others	1,067	1.5%	4.2%	NA	NA
Total	1,291				

Source: PacFIN November 1998 extraction and anecdotal information.

The Oregon seafood processing sector ownership is most concentrated of the states. The three largest seafood processing groups in Oregon purchase 79 percent of seafood landed (64 percent by value) in Oregon. In Washington, the four largest processing groups purchase 38 percent (24 percent by value) in Washington. California is similarly diversified, with the four largest processing groups purchasing 29 percent of seafood landed (21 percent by value). Part of the reason may be that, in Washington and California, most of the marine products are landed close to the metropolitan centers of Seattle, San Francisco, and Los Angeles.

Challenges Facing the Seafood Processing Industry

There are five major issues in the 1990's that have changed and are changing the fish processing industry in the U.S. West Coast. These are:

- Collapse of the salmon industry
- Expansion of the Pacific whiting industry
- Consolidation of seafood processing industry
- Reductions in groundfish resources and efforts to improve utilization
- Infrastructure problems

The U.S. West Coast salmon landings, because of a host of reasons, declined from an average of 14 million pounds in the late 1980's to about 1.2 million pounds in 1994. Coho, except for some special seasons, has been eliminated as a commercial species. At the same time, largely because of the expansion of the farmed salmon industry, real prices for troll caught chinook salmon have dropped to an average of $1.60 per landed pound. This compares to inflation adjusted prices in the 1970's and 1980's of $4.00 to $5.00 per pound.

There has been a major expansion of the onshore whiting processing industry since 1992. At the present time, five surimi plants have the capacity to process up to 20 million pounds per week. In 1997, the whiting industry in the U.S. West Coast processed a total of 162 million pounds of whiting. With greater utilization and added value development, this industry has the potential to generate up to $100 million annually to the national economy.

The consolidation of processing groups that are located in the U.S. West Coast has followed an earlier expansion in the processing industry, based on exploitation of available resources. One company has led in the consolidation. The Pacific Group expansion has been based on its regional distribution network. This company has utilized local resources to fill regional markets, while at the same time developing export markets.

The new Magnuson-Stevens Fishery Conservation and Management Act requires the Pacific Fishery Management Council to use the most recent stock assessments from the National Marine Fisheries Service and cautionary principles to determine harvest guidelines. The new stock assessments and conservative management measures indicate immediate and substantial groundfish harvest reductions are needed in order to prevent further stock declines in many of the rockfish species. The results are fewer available resources, smaller trip limits, and increasing bycatch and discards. As discards increase, there is a growing interest in utilization of the unintended bycatch and resulting discards. Full utilization of these resources may result in an increase of up to $39 million of personal income to the U.S. West Coast economy (Radtke and Davis 1998). The challenge for the U.S. West Coast seafood processing industry is to develop markets for products that may be developed from these resources.

Part of the challenge of full utilization will also be to develop the infrastructure (utilities, docks and unloading facilities, cold storage, navigation channels, and product shipping ground and air transportation routes) required for processing. The greatest concern is whether water and byproduct use will overwhelm existing infrastructure. Increased demands for potable water from growth and fixed supply sources will probably increase water costs as an overall share of production costs in the future. Seafood processors would benefit from water conservation measures, as well as improved controls for waste utilization and disposal methods. With industry participation, seafood processing wastes can be put to further use by existing plants. Creative options for waste disposal exist, but additional research and product development needs to make sure these options are cost effective. Further study of the composition of seafood wastes may show that they are a benefit rather than a hindrance for improved utilization of marine resources.

H. CHALLENGES FACING THE SEAFOOD PROCESSING INDUSTRY

There are five major issues in the 1990's that have or are changing the fish processing industry along the U.S. West Coast. These are:

- Collapse of the salmon industry
- Expansion of the Pacific whiting industry
- Consolidation of seafood processing industry
- Reductions in groundfish resources and efforts to improve utilization
- Infrastructure problems

This section of the report provides a short overview discussion of each of these events.

1. <u>Collapse of the Salmon Industry</u>

The U.S. West Coast states salmon landings, because of a host of reasons, declined from an average of 45 million pounds in the late 1980's to about 13 million pounds in 1996. Coho, except for some special seasons, has been eliminated as a commercial species. At the same time, largely because of the expansion of the farmed salmon industry, real prices for troll caught chinook salmon have dropped to an average of $1.60 per landed pound. This compares to inflation adjusted prices in the 1970's and 1980's of $4.00 to $5.00 per pound.

2. <u>Expansion of the Pacific Whiting Industry</u>

There has been a major expansion of the onshore whiting processing industry since 1992. At the present time, five surimi plants have the capacity to process up to 20 million pounds per week. In 1997, the whiting industry processed a total of 197 million pounds of whiting. With greater utilization and added value development, this industry has the potential to generate up to $100 million annually to the U.S. West Coast economies.

3. <u>Consolidation of Seafood Processing Industry</u>

The consolidation of processing groups that are located along the U.S. West Coast has followed an earlier expansion in the processing industry, based on exploitation of available resources. As some major processing groups expand, many other existing processing groups have either closed, sold out, or reduced their operations.

4. <u>Reductions in Groundfish Resources and Efforts to Improve Utilization</u>

The new Magnuson-Stevens Fishery Conservation and Management Act of 1996 requires the Pacific Fishery Management Council (PFMC) to use the most recent stock assessments from the NMFS and cautionary principles to determine harvest guidelines. The new stock assessments and conservative management measures indicate immediate and substantial groundfish harvest reductions are needed in order to prevent further stock declines in many of the rockfish species. The results are fewer available resources, smaller trip limits, and increasing bycatch and discards. As discards increase, there is a growing interest in utilization of the unintended

National Marine Fisheries Service
Fisheries Statistics and Economics Division

You asked for the following

Trade Type:	EXPORTS
From:	1994
Through:	2012
Product:	GROUNDFISH HAKE
Countries:	ALL COUNTRIES INDIVIDUALLY

Note: If a month is not listed, then we do not have data for that month. Current data through February, 2012.

Country	Product Name	Kilos	Dollars
1994			
AUSTRALIA	GROUNDFISH HAKE,WHITING FROZEN	55,288	133,056
Subtotal: AUSTRALIA		**55,288**	**133,056**
BRAZIL	GROUNDFISH HAKE,WHITING FROZEN	18,071	22,962
Subtotal: BRAZIL		**18,071**	**22,962**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	12,396	18,878
Subtotal: CANADA		**12,396**	**18,878**
INDONESIA	GROUNDFISH HAKE,WHITING FROZEN	19,194	40,000
Subtotal: INDONESIA		**19,194**	**40,000**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	777,742	1,452,685
Subtotal: JAPAN		**777,742**	**1,452,685**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	2,268	5,350
Subtotal: MEXICO		**2,268**	**5,350**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	2,257,480	4,239,033
Subtotal: SOUTH KOREA		**2,257,480**	**4,239,033**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	28,924	31,246
Subtotal: SPAIN		**28,924**	**31,246**
Grand Total: 1994		**3,171,363**	**5,943,210**
1995			
CANADA	GROUNDFISH HAKE,WHITING FROZEN	7,579	11,904
Subtotal: CANADA		**7,579**	**11,904**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	3,697	6,080
Subtotal: FRANCE		**3,697**	**6,080**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	11,420	6,875
Subtotal: ITALY		**11,420**	**6,875**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	1,230,453	3,555,531
Subtotal: JAPAN		**1,230,453**	**3,555,531**

MEXICO	GROUNDFISH HAKE,WHITING FROZEN	13,612	25,400
Subtotal: MEXICO		**13,612**	**25,400**
MOROCCO	GROUNDFISH HAKE,WHITING FROZEN	24,660	15,000
Subtotal: MOROCCO		**24,660**	**15,000**
PORTUGAL	GROUNDFISH HAKE,WHITING FROZEN	19,217	20,934
Subtotal: PORTUGAL		**19,217**	**20,934**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	160,994	313,379
Subtotal: SOUTH KOREA		**160,994**	**313,379**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	18,935	57,193
Subtotal: SPAIN		**18,935**	**57,193**
Grand Total: 1995		**1,490,567**	**4,012,296**
1996			
CANADA	GROUNDFISH HAKE,WHITING FROZEN	4,191	9,817
Subtotal: CANADA		**4,191**	**9,817**
CHINA - HONG KONG	GROUNDFISH HAKE,WHITING FROZEN	11,492	10,100
Subtotal: CHINA - HONG KONG		**11,492**	**10,100**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	17,920	30,025
Subtotal: FRANCE		**17,920**	**30,025**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	317,676	323,933
Subtotal: GERMANY		**317,676**	**323,933**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	74,612	84,370
Subtotal: ISRAEL		**74,612**	**84,370**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	1,176,448	1,770,500
Subtotal: JAPAN		**1,176,448**	**1,770,500**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	5,492	11,622
Subtotal: MEXICO		**5,492**	**11,622**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	216,440	170,796
Subtotal: RUSSIAN FEDERATION		**216,440**	**170,796**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	187,440	372,612
Subtotal: SOUTH KOREA		**187,440**	**372,612**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	260,246	744,025
Subtotal: SPAIN		**260,246**	**744,025**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	2,838,520	2,857,513
Subtotal: UKRAINE		**2,838,520**	**2,857,513**
UNITED KINGDOM	GROUNDFISH HAKE,WHITING FROZEN	71,718	113,383
Subtotal: UNITED KINGDOM		**71,718**	**113,383**
Grand Total: 1996		**5,182,195**	**6,498,696**
1997			

	GROUNDFISH HAKE,WHITING FROZEN	414,740	269,393
Subtotal: AUSTRIA		**414,740**	**269,393**
BERMUDA	GROUNDFISH HAKE,WHITING FROZEN	2,285	3,276
Subtotal: BERMUDA		**2,285**	**3,276**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	236,656	373,724
Subtotal: CANADA		**236,656**	**373,724**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	1,162,884	1,309,501
Subtotal: CHINA		**1,162,884**	**1,309,501**
CHINA - HONG KONG	GROUNDFISH HAKE,WHITING FROZEN	78,368	186,529
Subtotal: CHINA - HONG KONG		**78,368**	**186,529**
CHINA - TAIPEI	GROUNDFISH HAKE,WHITING FROZEN	7,983	7,920
Subtotal: CHINA - TAIPEI		**7,983**	**7,920**
CROATIA	GROUNDFISH HAKE,WHITING FROZEN	44,698	43,720
Subtotal: CROATIA		**44,698**	**43,720**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	1,790	4,342
Subtotal: FRANCE		**1,790**	**4,342**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	611,777	682,755
Subtotal: ISRAEL		**611,777**	**682,755**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	177,659	191,020
Subtotal: JAPAN		**177,659**	**191,020**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	91,936	75,020
Subtotal: JORDAN		**91,936**	**75,020**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	200,257	259,119
Subtotal: LEBANON		**200,257**	**259,119**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	110,265	164,360
Subtotal: MEXICO		**110,265**	**164,360**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	139,323	95,550
Subtotal: NETHERLANDS		**139,323**	**95,550**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	18,000	45,000
Subtotal: RUSSIAN FEDERATION		**18,000**	**45,000**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	427,242	1,078,835
Subtotal: SOUTH KOREA		**427,242**	**1,078,835**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	193,542	559,829
Subtotal: SPAIN		**193,542**	**559,829**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	2,358,434	1,975,773
Subtotal: UKRAINE		**2,358,434**	**1,975,773**
VIET NAM	GROUNDFISH HAKE,WHITING FROZEN	68,297	81,770
Subtotal: VIET NAM		**68,297**	**81,770**

		6,346,136	**7,407,436**
1998			
CANADA	GROUNDFISH HAKE,WHITING FROZEN	31,142	55,845
Subtotal: CANADA		**31,142**	**55,845**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	137,778	149,512
Subtotal: CHINA		**137,778**	**149,512**
CHINA - HONG KONG	GROUNDFISH HAKE,WHITING FROZEN	43,846	156,210
Subtotal: CHINA - HONG KONG		**43,846**	**156,210**
CHINA - TAIPEI	GROUNDFISH HAKE,WHITING FROZEN	237,358	274,596
Subtotal: CHINA - TAIPEI		**237,358**	**274,596**
FINLAND	GROUNDFISH HAKE,WHITING FROZEN	1,350	7,860
Subtotal: FINLAND		**1,350**	**7,860**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	60,766	121,402
Subtotal: FRANCE		**60,766**	**121,402**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	24,269	8,981
Subtotal: GREECE		**24,269**	**8,981**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	533,505	540,042
Subtotal: ISRAEL		**533,505**	**540,042**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	253,019	508,485
Subtotal: JAPAN		**253,019**	**508,485**
LATVIA	GROUNDFISH HAKE,WHITING FROZEN	23,430	80,000
Subtotal: LATVIA		**23,430**	**80,000**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	455,802	321,887
Subtotal: LEBANON		**455,802**	**321,887**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	21,979	19,661
Subtotal: LITHUANIA		**21,979**	**19,661**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	95,112	111,413
Subtotal: MEXICO		**95,112**	**111,413**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	52,211	82,437
Subtotal: NETHERLANDS		**52,211**	**82,437**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	45,359	41,899
Subtotal: ROMANIA		**45,359**	**41,899**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	86,089	158,810
Subtotal: RUSSIAN FEDERATION		**86,089**	**158,810**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	21,000	21,700
Subtotal: SOUTH KOREA		**21,000**	**21,700**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	136,617	370,237
Subtotal: SPAIN		**136,617**	**370,237**

	GROUNDFISH HAKE,WHITING FROZEN	750	4,534
Subtotal: SWITZERLAND		**750**	**4,534**
UNITED KINGDOM	GROUNDFISH HAKE,WHITING FROZEN	69,184	146,420
Subtotal: UNITED KINGDOM		**69,184**	**146,420**
Grand Total: 1998		**2,330,566**	**3,181,931**
1999			
BELGIUM	GROUNDFISH HAKE,WHITING FROZEN	9,405	17,887
Subtotal: BELGIUM		**9,405**	**17,887**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	3,595	6,774
Subtotal: CANADA		**3,595**	**6,774**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	45,642	36,756
Subtotal: CHINA		**45,642**	**36,756**
CHINA - TAIPEI	GROUNDFISH HAKE,WHITING FROZEN	19,046	81,878
Subtotal: CHINA - TAIPEI		**19,046**	**81,878**
FINLAND	GROUNDFISH HAKE,WHITING FROZEN	24,004	33,420
Subtotal: FINLAND		**24,004**	**33,420**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	175,902	169,278
Subtotal: FRANCE		**175,902**	**169,278**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	34,365	73,840
Subtotal: GREECE		**34,365**	**73,840**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	1,227,867	1,158,711
Subtotal: ISRAEL		**1,227,867**	**1,158,711**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	64,141	58,505
Subtotal: JORDAN		**64,141**	**58,505**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	299,091	399,091
Subtotal: LEBANON		**299,091**	**399,091**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	258,779	444,359
Subtotal: LITHUANIA		**258,779**	**444,359**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	210,284	249,327
Subtotal: MEXICO		**210,284**	**249,327**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	47,174	35,859
Subtotal: NETHERLANDS		**47,174**	**35,859**
NORWAY	GROUNDFISH HAKE,WHITING FROZEN	72,012	101,926
Subtotal: NORWAY		**72,012**	**101,926**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	22,829	88,780
Subtotal: POLAND		**22,829**	**88,780**
PORTUGAL	GROUNDFISH HAKE,WHITING FROZEN	142,608	106,348
Subtotal: PORTUGAL		**142,608**	**106,348**

	GROUNDFISH HAKE,WHITING FROZEN	66,000	53,376
Subtotal: ROMANIA		**66,000**	**53,376**
SAUDI ARABIA	GROUNDFISH HAKE,WHITING FROZEN	92,630	65,811
Subtotal: SAUDI ARABIA		**92,630**	**65,811**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	320,679	218,520
Subtotal: SOUTH KOREA		**320,679**	**218,520**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	789,039	1,485,159
Subtotal: SPAIN		**789,039**	**1,485,159**
UNITED KINGDOM	GROUNDFISH HAKE,WHITING FROZEN	56,916	130,983
Subtotal: UNITED KINGDOM		**56,916**	**130,983**
Grand Total: 1999		**3,982,008**	**5,016,588**
	2000		
AUSTRALIA	GROUNDFISH HAKE,WHITING FROZEN	63,361	18,667
Subtotal: AUSTRALIA		**63,361**	**18,667**
BELGIUM	GROUNDFISH HAKE,WHITING FROZEN	244,438	403,461
Subtotal: BELGIUM		**244,438**	**403,461**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	298,531	137,409
Subtotal: CANADA		**298,531**	**137,409**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	242,498	160,469
Subtotal: CHINA		**242,498**	**160,469**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	105,272	207,037
Subtotal: FRANCE		**105,272**	**207,037**
ICELAND	GROUNDFISH HAKE,WHITING FROZEN	99,790	63,400
Subtotal: ICELAND		**99,790**	**63,400**
IRELAND	GROUNDFISH HAKE,WHITING FROZEN	6,600	23,287
Subtotal: IRELAND		**6,600**	**23,287**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	1,895,199	1,331,648
Subtotal: ISRAEL		**1,895,199**	**1,331,648**
JAMAICA	GROUNDFISH HAKE,WHITING FROZEN	11,237	8,919
Subtotal: JAMAICA		**11,237**	**8,919**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	61,200	102,000
Subtotal: JAPAN		**61,200**	**102,000**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	141,820	82,060
Subtotal: JORDAN		**141,820**	**82,060**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	438,832	255,360
Subtotal: LEBANON		**438,832**	**255,360**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	587,630	1,175,109
Subtotal: LITHUANIA		**587,630**	**1,175,109**

	GROUNDFISH HAKE,WHITING FROZEN	9,015	19,078
Subtotal: MEXICO		**9,015**	**19,078**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	348,239	385,858
Subtotal: NETHERLANDS		**348,239**	**385,858**
NORWAY	GROUNDFISH HAKE,WHITING FROZEN	37,186	78,700
Subtotal: NORWAY		**37,186**	**78,700**
PORTUGAL	GROUNDFISH HAKE,WHITING FROZEN	1,815	4,101
Subtotal: PORTUGAL		**1,815**	**4,101**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	22,000	23,000
Subtotal: ROMANIA		**22,000**	**23,000**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	114,000	214,650
Subtotal: RUSSIAN FEDERATION		**114,000**	**214,650**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	192,000	221,940
Subtotal: SOUTH KOREA		**192,000**	**221,940**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	1,616,871	3,208,540
Subtotal: SPAIN		**1,616,871**	**3,208,540**
Grand Total: 2000		**6,537,534**	**8,124,693**
2001			
BELGIUM	GROUNDFISH HAKE,WHITING FROZEN	225,466	360,043
Subtotal: BELGIUM		**225,466**	**360,043**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	341,550	378,000
Subtotal: BULGARIA		**341,550**	**378,000**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	1,361	3,036
Subtotal: CANADA		**1,361**	**3,036**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	395,859	473,360
Subtotal: CHINA		**395,859**	**473,360**
DOMINICA	GROUNDFISH HAKE,WHITING FROZEN	94,012	91,229
Subtotal: DOMINICA		**94,012**	**91,229**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	70,941	146,597
Subtotal: DOMINICAN REPUBLIC		**70,941**	**146,597**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	490,143	728,308
Subtotal: FRANCE		**490,143**	**728,308**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	5,676,665	7,492,837
Subtotal: GERMANY		**5,676,665**	**7,492,837**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	286,676	339,284
Subtotal: GREECE		**286,676**	**339,284**
ICELAND	GROUNDFISH HAKE,WHITING FROZEN	137,198	125,678
Subtotal: ICELAND		**137,198**	**125,678**

	GROUNDFISH HAKE,WHITING FROZEN	46,108	104,521
Subtotal: IRELAND		**46,108**	**104,521**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	2,126,493	1,108,829
Subtotal: ISRAEL		**2,126,493**	**1,108,829**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	40,000	72,000
Subtotal: JAPAN		**40,000**	**72,000**
LATVIA	GROUNDFISH HAKE,WHITING FROZEN	45,360	36,826
Subtotal: LATVIA		**45,360**	**36,826**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	324,524	293,326
Subtotal: LEBANON		**324,524**	**293,326**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	576,817	375,688
Subtotal: LITHUANIA		**576,817**	**375,688**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	25,039	45,518
Subtotal: MEXICO		**25,039**	**45,518**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	95,256	104,432
Subtotal: NETHERLANDS		**95,256**	**104,432**
NORWAY	GROUNDFISH HAKE,WHITING FROZEN	17.853	12,000
Subtotal: NORWAY		**17,853**	**12,000**
PALAU	GROUNDFISH HAKE,WHITING FROZEN	1,170	2,703
Subtotal: PALAU		**1,170**	**2,703**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	94,430	79,500
Subtotal: ROMANIA		**94,430**	**79,500**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	97,182	108,000
Subtotal: RUSSIAN FEDERATION		**97,182**	**108,000**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	1,048,940	1,158,722
Subtotal: SOUTH KOREA		**1,048,940**	**1,158,722**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	2,407,842	4,563,829
Subtotal: SPAIN		**2,407,842**	**4,563,829**
Grand Total: 2001		**14,666,885**	**18,204,266**
2002			
BELGIUM	GROUNDFISH HAKE,WHITING FROZEN	14,779	31,191
Subtotal: BELGIUM		**14,779**	**31,191**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	308,819	317,182
Subtotal: BULGARIA		**308,819**	**317,182**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	213,576	186,480
Subtotal: CHINA		**213,576**	**186,480**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	270,181	272,617
Subtotal: DOMINICAN REPUBLIC		**270,181**	**272,617**

	GROUNDFISH HAKE,WHITING FROZEN	499,470	476,000
Subtotal: ESTONIA		**499,470**	**476,000**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	221,815	473,524
Subtotal: FRANCE		**221,815**	**473,524**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	3,617,408	4,600,035
Subtotal: GERMANY		**3,617,408**	**4,600,035**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	97,738	88,520
Subtotal: GREECE		**97,738**	**88,520**
ICELAND	GROUNDFISH HAKE,WHITING FROZEN	165,458	124,880
Subtotal: ICELAND		**165,458**	**124,880**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	114,621	87,495
Subtotal: ISRAEL		**114,621**	**87,495**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	47,990	45,000
Subtotal: ITALY		**47,990**	**45,000**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	16,224	71,487
Subtotal: JAPAN		**16,224**	**71,487**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	453,566	406,750
Subtotal: LEBANON		**453,566**	**406,750**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	696,551	525,230
Subtotal: LITHUANIA		**696,551**	**525,230**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	30,667	64,900
Subtotal: MEXICO		**30,667**	**64,900**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	264,192	383,078
Subtotal: NETHERLANDS		**264,192**	**383,078**
NORWAY	GROUNDFISH HAKE,WHITING FROZEN	70,123	84,240
Subtotal: NORWAY		**70,123**	**84,240**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	46,400	40,861
Subtotal: ROMANIA		**46,400**	**40,861**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	243,596	230,144
Subtotal: RUSSIAN FEDERATION		**243,596**	**230,144**
SAN MARINO	GROUNDFISH HAKE,WHITING FROZEN	24,900	26,000
Subtotal: SAN MARINO		**24,900**	**26,000**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	1,463,091	3,253,417
Subtotal: SPAIN		**1,463,091**	**3,253,417**
Grand Total: 2002		**8,881,165**	**11,789,031**
2003			
BELGIUM	GROUNDFISH HAKE,WHITING FROZEN	120,557	134,310
Subtotal: BELGIUM		**120,557**	**134,310**

	GROUNDFISH HAKE,WHITING FROZEN	92,800	92,840
Subtotal: BULGARIA		**92,800**	**92,840**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	17,110	27,374
Subtotal: CANADA		**17,110**	**27,374**
CHINA - TAIPEI	GROUNDFISH HAKE,WHITING FROZEN	24,000	45,480
Subtotal: CHINA - TAIPEI		**24,000**	**45,480**
COLOMBIA	GROUNDFISH HAKE,WHITING FROZEN	7,035	16,325
Subtotal: COLOMBIA		**7,035**	**16,325**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	921,777	1,469,494
Subtotal: GERMANY		**921,777**	**1,469,494**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	46,000	41,580
Subtotal: ISRAEL		**46,000**	**41,580**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	259,310	471,070
Subtotal: JAPAN		**259,310**	**471,070**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	483,076	464,678
Subtotal: LEBANON		**483,076**	**464,678**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	6,560,197	6,995,146
Subtotal: LITHUANIA		**6,560,197**	**6,995,146**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	12,606	26,679
Subtotal: MEXICO		**12,606**	**26,679**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	1,542,180	1,476,796
Subtotal: NETHERLANDS		**1,542,180**	**1,476,796**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	99,903	164,861
Subtotal: POLAND		**99,903**	**164,861**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	297,280	248,259
Subtotal: ROMANIA		**297,280**	**248,259**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	1,137,616	1,183,464
Subtotal: RUSSIAN FEDERATION		**1,137,616**	**1,183,464**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	1,956,640	3,245,032
Subtotal: SOUTH KOREA		**1,956,640**	**3,245,032**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	2,787,667	3,538,127
Subtotal: SPAIN		**2,787,667**	**3,538,127**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	69,399	53,326
Subtotal: UKRAINE		**69,399**	**53,326**
UNITED ARAB EMIRATES	GROUNDFISH HAKE,WHITING FROZEN	2,647	6,750
Subtotal: UNITED ARAB EMIRATES		**2,647**	**6,750**
UNITED KINGDOM	GROUNDFISH HAKE,WHITING FROZEN	32,945	70,064
Subtotal: UNITED KINGDOM		**32,945**	**70,064**

		16,470,745	**19,771,655**
2004			
BELARUS	GROUNDFISH HAKE,WHITING FROZEN	238,400	269,507
Subtotal: BELARUS		**238,400**	**269,507**
BELGIUM	GROUNDFISH HAKE,WHITING FROZEN	35,438	75,000
Subtotal: BELGIUM		**35,438**	**75,000**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	239,000	225,182
Subtotal: BULGARIA		**239,000**	**225,182**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	3,992	8,837
Subtotal: CANADA		**3,992**	**8,837**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	2,427,261	4,130,850
Subtotal: CHINA		**2,427,261**	**4,130,850**
DOMINICA	GROUNDFISH HAKE,WHITING FROZEN	45,644	42,378
Subtotal: DOMINICA		**45,644**	**42,378**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	72,676	39,457
Subtotal: DOMINICAN REPUBLIC		**72,676**	**39,457**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	80,820	105,066
Subtotal: FRANCE		**80,820**	**105,066**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	4,816,828	11,796,706
Subtotal: GERMANY		**4,816,828**	**11,796,706**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	262,020	273,477
Subtotal: GREECE		**262,020**	**273,477**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	1,369,493	1,269,496
Subtotal: ISRAEL		**1,369,493**	**1,269,496**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	208,085	214,400
Subtotal: JAPAN		**208,085**	**214,400**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	69,000	51,750
Subtotal: JORDAN		**69,000**	**51,750**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	1,048,022	983,548
Subtotal: LEBANON		**1,048,022**	**983,548**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	9,934,304	8,838,027
Subtotal: LITHUANIA		**9,934,304**	**8,838,027**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	2,092,118	2,708,230
Subtotal: NETHERLANDS		**2,092,118**	**2,708,230**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	374,315	474,534
Subtotal: POLAND		**374,315**	**474,534**
PORTUGAL	GROUNDFISH HAKE,WHITING FROZEN	9,072	25,000
Subtotal: PORTUGAL		**9,072**	**25,000**

	GROUNDFISH HAKE,WHITING FROZEN	317,989	265,095
Subtotal: ROMANIA		**317,989**	**265,095**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	12,170,704	11,374,919
Subtotal: RUSSIAN FEDERATION		**12,170,704**	**11,374,919**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	309,610	277,942
Subtotal: SOUTH KOREA		**309,610**	**277,942**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	3,029,251	6,069,741
Subtotal: SPAIN		**3,029,251**	**6,069,741**
THAILAND	GROUNDFISH HAKE,WHITING FROZEN	96,000	102,000
Subtotal: THAILAND		**96,000**	**102,000**
TRINIDAD & TOBAGO	GROUNDFISH HAKE,WHITING FROZEN	69,830	60,000
Subtotal: TRINIDAD & TOBAGO		**69,830**	**60,000**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	3,254,757	3,184,191
Subtotal: UKRAINE		**3,254,757**	**3,184,191**
Grand Total: 2004		**42,574,629**	**52,865,333**
2005			
ARMENIA	GROUNDFISH HAKE,WHITING FROZEN	45,470	59,424
Subtotal: ARMENIA		**45,470**	**59,424**
BELARUS	GROUNDFISH HAKE,WHITING FROZEN	23,000	26,450
Subtotal: BELARUS		**23,000**	**26,450**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	477,613	570,826
Subtotal: BULGARIA		**477,613**	**570,826**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	31,407	40,629
Subtotal: CANADA		**31,407**	**40,629**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	1,377,399	3,666,258
Subtotal: CHINA		**1,377,399**	**3,666,258**
DOMINICA	GROUNDFISH HAKE,WHITING FROZEN	139,380	143,820
Subtotal: DOMINICA		**139,380**	**143,820**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	136,708	173,765
Subtotal: DOMINICAN REPUBLIC		**136,708**	**173,765**
ESTONIA	GROUNDFISH HAKE,WHITING FROZEN	25,000	36,000
Subtotal: ESTONIA		**25,000**	**36,000**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	639,900	1,533,615
Subtotal: FRANCE		**639,900**	**1,533,615**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	304,885	365,393
Subtotal: GEORGIA		**304,885**	**365,393**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	3,841,613	8,456,122
Subtotal: GERMANY		**3,841,613**	**8,456,122**

	GROUNDFISH HAKE,WHITING FROZEN	70,450	187,859
Subtotal: GREECE		**70,450**	**187,859**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	813,886	978,295
Subtotal: ISRAEL		**813,886**	**978,295**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	23,800	39,032
Subtotal: ITALY		**23,800**	**39,032**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	788,723	1,496,182
Subtotal: JAPAN		**788,723**	**1,496,182**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	278,800	218,480
Subtotal: JORDAN		**278,800**	**218,480**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	1,224,776	1,347,099
Subtotal: LEBANON		**1,224,776**	**1,347,099**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	5,482,569	6,879,739
Subtotal: LITHUANIA		**5,482,569**	**6,879,739**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	20,258	42,875
Subtotal: MEXICO		**20,258**	**42,875**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	2,136,972	3,984,419
Subtotal: NETHERLANDS		**2,136,972**	**3,984,419**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	72,093	89,021
Subtotal: POLAND		**72,093**	**89,021**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	117,936	160,429
Subtotal: ROMANIA		**117,936**	**160,429**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	20,823,278	24,543,554
Subtotal: RUSSIAN FEDERATION		**20,823,278**	**24,543,554**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	4,293,430	9,743,668
Subtotal: SPAIN		**4,293,430**	**9,743,668**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	5,358,709	6,199,387
Subtotal: UKRAINE		**5,358,709**	**6,199,387**
Grand Total: 2005		**48,548,055**	**70,982,341**
	2006		
ARMENIA	GROUNDFISH HAKE,WHITING FROZEN	392,000	400,000
Subtotal: ARMENIA		**392,000**	**400,000**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	574,320	807,204
Subtotal: BULGARIA		**574,320**	**807,204**
CAMEROON	GROUNDFISH HAKE,WHITING FROZEN	52,000	51,900
Subtotal: CAMEROON		**52,000**	**51,900**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	187,606	270,107
Subtotal: CANADA		**187,606**	**270,107**

	GROUNDFISH HAKE,WHITING FROZEN	2,382,656	3,802,166
Subtotal: CHINA		**2,382,656**	**3,802,166**
COLOMBIA	GROUNDFISH HAKE,WHITING FROZEN	8,164	26,920
Subtotal: COLOMBIA		**8,164**	**26,920**
CROATIA	GROUNDFISH HAKE,WHITING FROZEN	444,485	633,205
Subtotal: CROATIA		**444,485**	**633,205**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	176,566	226,892
Subtotal: DOMINICAN REPUBLIC		**176,566**	**226,892**
ESTONIA	GROUNDFISH HAKE,WHITING FROZEN	89,797	152,660
Subtotal: ESTONIA		**89,797**	**152,660**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	352,207	609,590
Subtotal: FRANCE		**352,207**	**609,590**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	433,994	636,276
Subtotal: GEORGIA		**433,994**	**636,276**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	6,846,611	16,278,802
Subtotal: GERMANY		**6,846,611**	**16,278,802**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	468,867	706,322
Subtotal: GREECE		**468,867**	**706,322**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	422,420	633,788
Subtotal: ISRAEL		**422,420**	**633,788**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	672,720	1,345,440
Subtotal: JAPAN		**672,720**	**1,345,440**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	114,454	155,454
Subtotal: JORDAN		**114,454**	**155,454**
LATVIA	GROUNDFISH HAKE,WHITING FROZEN	48,600	63,302
Subtotal: LATVIA		**48,600**	**63,302**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	1,426,538	2,113,955
Subtotal: LEBANON		**1,426,538**	**2,113,955**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	868,555	1,232,449
Subtotal: LITHUANIA		**868,555**	**1,232,449**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	18,144	28,000
Subtotal: MEXICO		**18,144**	**28,000**
MOLDOVA	GROUNDFISH HAKE,WHITING FROZEN	24,030	41,452
Subtotal: MOLDOVA		**24,030**	**41,452**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	3,436,374	6,433,025
Subtotal: NETHERLANDS		**3,436,374**	**6,433,025**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	594,577	1,333,568
Subtotal: POLAND		**594,577**	**1,333,568**

	GROUNDFISH HAKE,WHITING FROZEN	530,151	866,474
Subtotal: ROMANIA		**530,151**	**866,474**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	18,532,068	27,214,447
Subtotal: RUSSIAN FEDERATION		**18,532,068**	**27,214,447**
SLOVENIA	GROUNDFISH HAKE,WHITING FROZEN	20,000	23,000
Subtotal: SLOVENIA		**20,000**	**23,000**
SOUTH AFRICA	GROUNDFISH HAKE,WHITING FROZEN	22,902	34,353
Subtotal: SOUTH AFRICA		**22,902**	**34,353**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	40,107	55,278
Subtotal: SOUTH KOREA		**40,107**	**55,278**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	3,132,509	5,638,468
Subtotal: SPAIN		**3,132,509**	**5,638,468**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	17,057,013	24,801,265
Subtotal: UKRAINE		**17,057,013**	**24,801,265**
UNITED KINGDOM	GROUNDFISH HAKE,WHITING FROZEN	45,798	83,582
Subtotal: UNITED KINGDOM		**45,798**	**83,582**
Grand Total: 2006		**59,416,233**	**96,699,344**
2007			
ARMENIA	GROUNDFISH HAKE,WHITING FROZEN	134,400	150,000
Subtotal: ARMENIA		**134,400**	**150,000**
BELARUS	GROUNDFISH HAKE,WHITING FROZEN	48,600	82,620
Subtotal: BELARUS		**48,600**	**82,620**
BOSNIA-HERCEGOVINA	GROUNDFISH HAKE,WHITING FROZEN	72,014	122,082
Subtotal: BOSNIA-HERCEGOVINA		**72,014**	**122,082**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	692,017	1,036,870
Subtotal: BULGARIA		**692,017**	**1,036,870**
CAMEROON	GROUNDFISH HAKE,WHITING FROZEN	189,388	197,323
Subtotal: CAMEROON		**189,388**	**197,323**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	45,703	81,897
Subtotal: CANADA		**45,703**	**81,897**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	3,626,940	5,501,989
Subtotal: CHINA		**3,626,940**	**5,501,989**
COLOMBIA	GROUNDFISH HAKE,WHITING FROZEN	5,298	17,465
Subtotal: COLOMBIA		**5,298**	**17,465**
CROATIA	GROUNDFISH HAKE,WHITING FROZEN	209,040	288,201
Subtotal: CROATIA		**209,040**	**288,201**
DENMARK	GROUNDFISH HAKE,WHITING FROZEN	966	11,978
Subtotal: DENMARK		**966**	**11,978**

	GROUNDFISH HAKE,WHITING FROZEN	45,798	68,697
Subtotal: ESTONIA		**45,798**	**68,697**
FINLAND	GROUNDFISH HAKE,WHITING FROZEN	22,450	55,070
Subtotal: FINLAND		**22,450**	**55,070**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	166,465	267,862
Subtotal: FRANCE		**166,465**	**267,862**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	1,016,565	1,491,980
Subtotal: GEORGIA		**1,016,565**	**1,491,980**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	6,183,047	14,249,243
Subtotal: GERMANY		**6,183,047**	**14,249,243**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	667,767	1,063,418
Subtotal: GREECE		**667,767**	**1,063,418**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	327,710	453,508
Subtotal: JAPAN		**327,710**	**453,508**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	139,620	216,411
Subtotal: JORDAN		**139,620**	**216,411**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	433,383	634,169
Subtotal: LEBANON		**433,383**	**634,169**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	799,052	1,258,365
Subtotal: LITHUANIA		**799,052**	**1,258,365**
MOLDOVA	GROUNDFISH HAKE,WHITING FROZEN	116,234	191,135
Subtotal: MOLDOVA		**116,234**	**191,135**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	3,015,080	4,824,128
Subtotal: NETHERLANDS		**3,015,080**	**4,824,128**
NEW ZEALAND	GROUNDFISH HAKE,WHITING FROZEN	79,686	279,832
Subtotal: NEW ZEALAND		**79,686**	**279,832**
NIGERIA	GROUNDFISH HAKE,WHITING FROZEN	61,753	70,785
Subtotal: NIGERIA		**61,753**	**70,785**
NORWAY	GROUNDFISH HAKE,WHITING FROZEN	22,000	55,000
Subtotal: NORWAY		**22,000**	**55,000**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	319,777	471,875
Subtotal: POLAND		**319,777**	**471,875**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	778,896	1,039,028
Subtotal: ROMANIA		**778,896**	**1,039,028**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	15,339,000	23,314,978
Subtotal: RUSSIAN FEDERATION		**15,339,000**	**23,314,978**
SERBIA & KOSOVO	GROUNDFISH HAKE,WHITING FROZEN	164,313	227,150
Subtotal: SERBIA & KOSOVO		**164,313**	**227,150**

	GROUNDFISH HAKE,WHITING FROZEN	343,058	516,104
Subtotal: SOUTH AFRICA		**343,058**	**516,104**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	76,786	104,431
Subtotal: SOUTH KOREA		**76,786**	**104,431**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	2,603,395	5,409,607
Subtotal: SPAIN		**2,603,395**	**5,409,607**
TOGO	GROUNDFISH HAKE,WHITING FROZEN	23,240	25,215
Subtotal: TOGO		**23,240**	**25,215**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	24,154,510	37,445,004
Subtotal: UKRAINE		**24,154,510**	**37,445,004**
UNITED ARAB EMIRATES	GROUNDFISH HAKE,WHITING FROZEN	185,600	287,680
Subtotal: UNITED ARAB EMIRATES		**185,600**	**287,680**
VENEZUELA	GROUNDFISH HAKE,WHITING FROZEN	17,010	25,515
Subtotal: VENEZUELA		**17,010**	**25,515**
Grand Total: 2007		**62,126,561**	**101,536,615**
2008			
ARUBA	GROUNDFISH HAKE,WHITING FROZEN	1,922	7,000
Subtotal: ARUBA		**1,922**	**7,000**
AUSTRALIA	GROUNDFISH HAKE,WHITING FROZEN	206,414	280,728
Subtotal: AUSTRALIA		**206,414**	**280,728**
BELARUS	GROUNDFISH HAKE,WHITING FROZEN	50,800	104,140
Subtotal: BELARUS		**50,800**	**104,140**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	293,460	552,472
Subtotal: BULGARIA		**293,460**	**552,472**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	36,159	65,242
Subtotal: CANADA		**36,159**	**65,242**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	5,124,946	11,053,847
Subtotal: CHINA		**5,124,946**	**11,053,847**
COLOMBIA	GROUNDFISH HAKE,WHITING FROZEN	1,897	2,580
Subtotal: COLOMBIA		**1,897**	**2,580**
CROATIA	GROUNDFISH HAKE,WHITING FROZEN	88,325	168,728
Subtotal: CROATIA		**88,325**	**168,728**
FINLAND	GROUNDFISH HAKE,WHITING FROZEN	87,554	199,312
Subtotal: FINLAND		**87,554**	**199,312**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	99,949	351,280
Subtotal: FRANCE		**99,949**	**351,280**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	769,534	1,491,198
Subtotal: GEORGIA		**769,534**	**1,491,198**

	GROUNDFISH HAKE,WHITING FROZEN	5,575,111	11,858,007
Subtotal: GERMANY		**5,575,111**	**11,858,007**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	603,216	1,488,098
Subtotal: GREECE		**603,216**	**1,488,098**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	220,515	306,984
Subtotal: ISRAEL		**220,515**	**306,984**
JAMAICA	GROUNDFISH HAKE,WHITING FROZEN	907	3,980
Subtotal: JAMAICA		**907**	**3,980**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	527,100	1,110,663
Subtotal: JAPAN		**527,100**	**1,110,663**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	48,000	100,800
Subtotal: JORDAN		**48,000**	**100,800**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	143,594	235,888
Subtotal: LEBANON		**143,594**	**235,888**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	2,403,049	4,616,965
Subtotal: LITHUANIA		**2,403,049**	**4,616,965**
MALAYSIA	GROUNDFISH HAKE,WHITING FROZEN	2,722	8,700
Subtotal: MALAYSIA		**2,722**	**8,700**
MEXICO	GROUNDFISH HAKE,WHITING FROZEN	16,360	30,756
Subtotal: MEXICO		**16,360**	**30,756**
MONTENEGRO	GROUNDFISH HAKE,WHITING FROZEN	102,960	210,000
Subtotal: MONTENEGRO		**102,960**	**210,000**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	188,580	517,660
Subtotal: NETHERLANDS		**188,580**	**517,660**
NEW ZEALAND	GROUNDFISH HAKE,WHITING FROZEN	68,706	287,793
Subtotal: NEW ZEALAND		**68,706**	**287,793**
OMAN	GROUNDFISH HAKE,WHITING FROZEN	367,314	598,315
Subtotal: OMAN		**367,314**	**598,315**
PHILIPPINES	GROUNDFISH HAKE,WHITING FROZEN	46,000	40,000
Subtotal: PHILIPPINES		**46,000**	**40,000**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	96,321	212,000
Subtotal: POLAND		**96,321**	**212,000**
PORTUGAL	GROUNDFISH HAKE,WHITING FROZEN	4,760	17,806
Subtotal: PORTUGAL		**4,760**	**17,806**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	235,644	455,317
Subtotal: ROMANIA		**235,644**	**455,317**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	5,586,091	11,416,917
Subtotal: RUSSIAN FEDERATION		**5,586,091**	**11,416,917**

	GROUNDFISH HAKE,WHITING FROZEN	398,574	678,077
Subtotal: SOUTH AFRICA		**398,574**	**678,077**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	79,640	141,900
Subtotal: SOUTH KOREA		**79,640**	**141,900**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	2,921,505	6,991,010
Subtotal: SPAIN		**2,921,505**	**6,991,010**
SWEDEN	GROUNDFISH HAKE,WHITING FROZEN	31,800	47,700
Subtotal: SWEDEN		**31,800**	**47,700**
SYRIA	GROUNDFISH HAKE,WHITING FROZEN	1,216,495	2,284,039
Subtotal: SYRIA		**1,216,495**	**2,284,039**
TANZANIA	GROUNDFISH HAKE,WHITING FROZEN	29,040	30,000
Subtotal: TANZANIA		**29,040**	**30,000**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	11,285,136	20,602,292
Subtotal: UKRAINE		**11,285,136**	**20,602,292**
VENEZUELA	GROUNDFISH HAKE,WHITING FROZEN	8,792	16,484
Subtotal: VENEZUELA		**8,792**	**16,484**
Grand Total: 2008		**38,968,892**	**78,584,678**
2009			
ARMENIA	GROUNDFISH HAKE,WHITING FROZEN	70,500	60,000
Subtotal: ARMENIA		**70,500**	**60,000**
ARUBA	GROUNDFISH HAKE,WHITING FROZEN	5,145	19,490
Subtotal: ARUBA		**5,145**	**19,490**
BARBADOS	GROUNDFISH HAKE,WHITING FROZEN	531	3,476
Subtotal: BARBADOS		**531**	**3,476**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	80,954	128,784
Subtotal: BULGARIA		**80,954**	**128,784**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	11,180	22,468
Subtotal: CANADA		**11,180**	**22,468**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	4,540,710	10,132,258
Subtotal: CHINA		**4,540,710**	**10,132,258**
COLOMBIA	GROUNDFISH HAKE,WHITING FROZEN	29,993	60,069
Subtotal: COLOMBIA		**29,993**	**60,069**
CROATIA	GROUNDFISH HAKE,WHITING FROZEN	39,251	75,426
Subtotal: CROATIA		**39,251**	**75,426**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	72,150	144,300
Subtotal: DOMINICAN REPUBLIC		**72,150**	**144,300**
EGYPT	GROUNDFISH HAKE,WHITING FROZEN	228,440	230,000
Subtotal: EGYPT		**228,440**	**230,000**

	GROUNDFISH HAKE,WHITING FROZEN	67,995	124,000
Subtotal: ESTONIA		**67,995**	**124,000**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	203,200	383,111
Subtotal: FRANCE		**203,200**	**383,111**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	342,307	550,794
Subtotal: GEORGIA		**342,307**	**550,794**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	4,083,700	12,154,349
Subtotal: GERMANY		**4,083,700**	**12,154,349**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	223,246	504,496
Subtotal: GREECE		**223,246**	**504,496**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	154,007	523,624
Subtotal: ITALY		**154,007**	**523,624**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	323,500	911,040
Subtotal: JAPAN		**323,500**	**911,040**
KAZAKHSTAN	GROUNDFISH HAKE,WHITING FROZEN	5,259	6,957
Subtotal: KAZAKHSTAN		**5,259**	**6,957**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	216,403	320,700
Subtotal: LEBANON		**216,403**	**320,700**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	1,553,964	2,505,720
Subtotal: LITHUANIA		**1,553,964**	**2,505,720**
MALTA	GROUNDFISH HAKE,WHITING FROZEN	126,500	110,000
Subtotal: MALTA		**126,500**	**110,000**
MONTENEGRO	GROUNDFISH HAKE,WHITING FROZEN	87,498	207,484
Subtotal: MONTENEGRO		**87,498**	**207,484**
NAMIBIA	GROUNDFISH HAKE,WHITING FROZEN	92,880	369,574
Subtotal: NAMIBIA		**92,880**	**369,574**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	5,000	8,000
Subtotal: NETHERLANDS		**5,000**	**8,000**
NEW ZEALAND	GROUNDFISH HAKE,WHITING FROZEN	91,608	353,430
Subtotal: NEW ZEALAND		**91,608**	**353,430**
PHILIPPINES	GROUNDFISH HAKE,WHITING FROZEN	46,012	46,012
Subtotal: PHILIPPINES		**46,012**	**46,012**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	95,520	150,000
Subtotal: POLAND		**95,520**	**150,000**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	189,502	432,453
Subtotal: ROMANIA		**189,502**	**432,453**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	6,804,559	11,690,841
Subtotal: RUSSIAN FEDERATION		**6,804,559**	**11,690,841**

	GROUNDFISH HAKE,WHITING FROZEN	284,828	520,710
Subtotal: SOUTH AFRICA		**284,828**	**520,710**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	755,430	1,017,816
Subtotal: SOUTH KOREA		**755,430**	**1,017,816**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	2,056,818	4,251,845
Subtotal: SPAIN		**2,056,818**	**4,251,845**
ST.KITTS-NEVIS	GROUNDFISH HAKE,WHITING FROZEN	30,992	44,643
Subtotal: ST.KITTS-NEVIS		**30,992**	**44,643**
SWEDEN	GROUNDFISH HAKE,WHITING FROZEN	31,800	116,600
Subtotal: SWEDEN		**31,800**	**116,600**
SYRIA	GROUNDFISH HAKE,WHITING FROZEN	1,302,461	2,271,685
Subtotal: SYRIA		**1,302,461**	**2,271,685**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	10,933,231	17,957,253
Subtotal: UKRAINE		**10,933,231**	**17,957,253**
UNITED KINGDOM	GROUNDFISH HAKE,WHITING FROZEN	526,483	856,361
Subtotal: UNITED KINGDOM		**526,483**	**856,361**
Grand Total: 2009		**35,713,557**	**69,265,769**
2010			
ALBANIA	GROUNDFISH HAKE,WHITING FROZEN	119,160	111,720
Subtotal: ALBANIA		**119,160**	**111,720**
ANDORRA	GROUNDFISH HAKE,WHITING FROZEN	2,044	2,780
Subtotal: ANDORRA		**2,044**	**2,780**
ARMENIA	GROUNDFISH HAKE,WHITING FROZEN	23,500	20,000
Subtotal: ARMENIA		**23,500**	**20,000**
CANADA	GROUNDFISH HAKE,WHITING FROZEN	13,098	22,685
Subtotal: CANADA		**13,098**	**22,685**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	2,902,330	6,310,622
Subtotal: CHINA		**2,902,330**	**6,310,622**
CHINA - HONG KONG	GROUNDFISH HAKE,WHITING FROZEN	212,271	288,694
Subtotal: CHINA - HONG KONG		**212,271**	**288,694**
CHINA - TAIPEI	GROUNDFISH HAKE,WHITING FROZEN	23,400	33,000
Subtotal: CHINA - TAIPEI		**23,400**	**33,000**
COLOMBIA	GROUNDFISH HAKE,WHITING FROZEN	1,088	5,040
Subtotal: COLOMBIA		**1,088**	**5,040**
CONGO (BRAZZAVILLE)	GROUNDFISH HAKE,WHITING FROZEN	10,765	14,640
Subtotal: CONGO (BRAZZAVILLE)		**10,765**	**14,640**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	46,000	88,320
Subtotal: DOMINICAN REPUBLIC		**46,000**	**88,320**

	GROUNDFISH HAKE,WHITING FROZEN	470,500	860,743
Subtotal: EGYPT		**470,500**	**860,743**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	1,162,164	2,614,013
Subtotal: FRANCE		**1,162,164**	**2,614,013**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	446,259	819,814
Subtotal: GEORGIA		**446,259**	**819,814**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	6,119,217	19,089,823
Subtotal: GERMANY		**6,119,217**	**19,089,823**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	140,059	406,815
Subtotal: GREECE		**140,059**	**406,815**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	216,000	329,280
Subtotal: ISRAEL		**216,000**	**329,280**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	1,106,251	3,733,347
Subtotal: ITALY		**1,106,251**	**3,733,347**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	4,485,880	6,134,272
Subtotal: JAPAN		**4,485,880**	**6,134,272**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	2,008,676	4,237,734
Subtotal: LITHUANIA		**2,008,676**	**4,237,734**
MONTENEGRO	GROUNDFISH HAKE,WHITING FROZEN	72,000	113,996
Subtotal: MONTENEGRO		**72,000**	**113,996**
NAURU	GROUNDFISH HAKE,WHITING FROZEN	72,500	100,000
Subtotal: NAURU		**72,500**	**100,000**
NETHERLANDS	GROUNDFISH HAKE,WHITING FROZEN	1,190,411	3,165,805
Subtotal: NETHERLANDS		**1,190,411**	**3,165,805**
NEW ZEALAND	GROUNDFISH HAKE,WHITING FROZEN	45,804	120,000
Subtotal: NEW ZEALAND		**45,804**	**120,000**
NIGERIA	GROUNDFISH HAKE,WHITING FROZEN	405,030	419,509
Subtotal: NIGERIA		**405,030**	**419,509**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	125,451	265,955
Subtotal: POLAND		**125,451**	**265,955**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	94,680	138,166
Subtotal: ROMANIA		**94,680**	**138,166**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	6,837,353	12,373,175
Subtotal: RUSSIAN FEDERATION		**6,837,353**	**12,373,175**
SINGAPORE	GROUNDFISH HAKE,WHITING FROZEN	129,410	176,000
Subtotal: SINGAPORE		**129,410**	**176,000**
SOUTH AFRICA	GROUNDFISH HAKE,WHITING FROZEN	850,444	1,260,370
Subtotal: SOUTH AFRICA		**850,444**	**1,260,370**

	GROUNDFISH HAKE,WHITING FROZEN	3,000	6,450
Subtotal: SOUTH KOREA		**3,000**	**6,450**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	604,739	1,139,239
Subtotal: SPAIN		**604,739**	**1,139,239**
ST.KITTS-NEVIS	GROUNDFISH HAKE,WHITING FROZEN	567	4,263
Subtotal: ST.KITTS-NEVIS		**567**	**4,263**
SYRIA	GROUNDFISH HAKE,WHITING FROZEN	1,067,500	1,539,609
Subtotal: SYRIA		**1,067,500**	**1,539,609**
THAILAND	GROUNDFISH HAKE,WHITING FROZEN	22,000	46,200
Subtotal: THAILAND		**22,000**	**46,200**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	9,631,243	17,155,035
Subtotal: UKRAINE		**9,631,243**	**17,155,035**
UNITED ARAB EMIRATES	GROUNDFISH HAKE,WHITING FROZEN	23,520	43,512
Subtotal: UNITED ARAB EMIRATES		**23,520**	**43,512**
VENEZUELA	GROUNDFISH HAKE,WHITING FROZEN	23,002	41,403
Subtotal: VENEZUELA		**23,002**	**41,403**
WESTERN SAMOA	GROUNDFISH HAKE,WHITING FROZEN	29,000	40,000
Subtotal: WESTERN SAMOA		**29,000**	**40,000**
Grand Total: 2010		**40,736,316**	**83,272,029**
	2011		
ALBANIA	GROUNDFISH HAKE,WHITING FROZEN	209,340	384,847
Subtotal: ALBANIA		**209,340**	**384,847**
ARMENIA	GROUNDFISH HAKE,WHITING FROZEN	51,450	80,850
Subtotal: ARMENIA		**51,450**	**80,850**
BENIN	GROUNDFISH HAKE,WHITING FROZEN	24,500	99,715
Subtotal: BENIN		**24,500**	**99,715**
BULGARIA	GROUNDFISH HAKE,WHITING FROZEN	50,400	102,500
Subtotal: BULGARIA		**50,400**	**102,500**
CAMEROON	GROUNDFISH HAKE,WHITING FROZEN	5,316,740	6,862,172
Subtotal: CAMEROON		**5,316,740**	**6,862,172**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	3,243,294	4,078,607
Subtotal: CHINA		**3,243,294**	**4,078,607**
DOMINICA	GROUNDFISH HAKE,WHITING FROZEN	24,000	48,000
Subtotal: DOMINICA		**24,000**	**48,000**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	24,500	45,325
Subtotal: DOMINICAN REPUBLIC		**24,500**	**45,325**
EGYPT	GROUNDFISH HAKE,WHITING FROZEN	3,692,593	5,599,540
Subtotal: EGYPT		**3,692,593**	**5,599,540**

	GROUNDFISH HAKE,WHITING FROZEN	71,000	111,200
Subtotal: ESTONIA		**71,000**	**111,200**
FRANCE	GROUNDFISH HAKE,WHITING FROZEN	941,598	1,909,585
Subtotal: FRANCE		**941,598**	**1,909,585**
GABON	GROUNDFISH HAKE,WHITING FROZEN	24,500	45,350
Subtotal: GABON		**24,500**	**45,350**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	718,210	1,071,925
Subtotal: GEORGIA		**718,210**	**1,071,925**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	6,082,302	16,807,266
Subtotal: GERMANY		**6,082,302**	**16,807,266**
GHANA	GROUNDFISH HAKE,WHITING FROZEN	248,500	372,320
Subtotal: GHANA		**248,500**	**372,320**
GREECE	GROUNDFISH HAKE,WHITING FROZEN	477,035	986,171
Subtotal: GREECE		**477,035**	**986,171**
HAITI	GROUNDFISH HAKE,WHITING FROZEN	13,412	18,240
Subtotal: HAITI		**13,412**	**18,240**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	482,612	974,132
Subtotal: ISRAEL		**482,612**	**974,132**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	1,539,630	4,602,471
Subtotal: ITALY		**1,539,630**	**4,602,471**
IVORY COAST	GROUNDFISH HAKE,WHITING FROZEN	147,000	350,350
Subtotal: IVORY COAST		**147,000**	**350,350**
JAPAN	GROUNDFISH HAKE,WHITING FROZEN	800,687	1,528,099
Subtotal: JAPAN		**800,687**	**1,528,099**
JORDAN	GROUNDFISH HAKE,WHITING FROZEN	284,220	594,778
Subtotal: JORDAN		**284,220**	**594,778**
LATVIA	GROUNDFISH HAKE,WHITING FROZEN	74,500	147,163
Subtotal: LATVIA		**74,500**	**147,163**
LEBANON	GROUNDFISH HAKE,WHITING FROZEN	676,727	1,358,687
Subtotal: LEBANON		**676,727**	**1,358,687**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	2,188,915	4,045,252
Subtotal: LITHUANIA		**2,188,915**	**4,045,252**
MACEDONIA	GROUNDFISH HAKE,WHITING FROZEN	73,976	114,750
Subtotal: MACEDONIA		**73,976**	**114,750**
MOLDOVA	GROUNDFISH HAKE,WHITING FROZEN	152,625	261,875
Subtotal: MOLDOVA		**152,625**	**261,875**
MONTENEGRO	GROUNDFISH HAKE,WHITING FROZEN	46,440	92,880
Subtotal: MONTENEGRO		**46,440**	**92,880**

	GROUNDFISH HAKE,WHITING FROZEN	1,646,447	4,460,984
Subtotal: NETHERLANDS		**1,646,447**	**4,460,984**
NIGERIA	GROUNDFISH HAKE,WHITING FROZEN	5,225,197	10,076,499
Subtotal: NIGERIA		**5,225,197**	**10,076,499**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	615,781	1,094,983
Subtotal: POLAND		**615,781**	**1,094,983**
ROMANIA	GROUNDFISH HAKE,WHITING FROZEN	143,512	247,675
Subtotal: ROMANIA		**143,512**	**247,675**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	6,771,847	14,182,978
Subtotal: RUSSIAN FEDERATION		**6,771,847**	**14,182,978**
SINGAPORE	GROUNDFISH HAKE,WHITING FROZEN	205,043	278,863
Subtotal: SINGAPORE		**205,043**	**278,863**
SOUTH AFRICA	GROUNDFISH HAKE,WHITING FROZEN	2,159,123	4,209,407
Subtotal: SOUTH AFRICA		**2,159,123**	**4,209,407**
SOUTH KOREA	GROUNDFISH HAKE,WHITING FROZEN	87,160	155,741
Subtotal: SOUTH KOREA		**87,160**	**155,741**
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	1,887,482	3,833,021
Subtotal: SPAIN		**1,887,482**	**3,833,021**
SYRIA	GROUNDFISH HAKE,WHITING FROZEN	47,600	88,060
Subtotal: SYRIA		**47,600**	**88,060**
THAILAND	GROUNDFISH HAKE,WHITING FROZEN	9,204	8,873
Subtotal: THAILAND		**9,204**	**8,873**
TOGO	GROUNDFISH HAKE,WHITING FROZEN	49,000	88,200
Subtotal: TOGO		**49,000**	**88,200**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	17,112,943	33,961,419
Subtotal: UKRAINE		**17,112,943**	**33,961,419**
UNITED ARAB EMIRATES	GROUNDFISH HAKE,WHITING FROZEN	175,000	290,000
Subtotal: UNITED ARAB EMIRATES		**175,000**	**290,000**
Grand Total: 2011		**63,816,045**	**125,670,753**
2012			
CAMEROON	GROUNDFISH HAKE,WHITING FROZEN	144,000	136,800
Subtotal: CAMEROON		**144,000**	**136,800**
CANADA	GROUNDFISH HAKE FILLET FROZEN	35,481	167,842
CANADA	GROUNDFISH HAKE FRESH	32,217	141,826
Subtotal: CANADA		**67,698**	**309,668**
CHINA	GROUNDFISH HAKE,WHITING FROZEN	69,851	143,651
Subtotal: CHINA		**69,851**	**143,651**
DOMINICAN REPUBLIC	GROUNDFISH HAKE,WHITING FROZEN	15,088	20,520

		15,088	**20,520**
ESTONIA	GROUNDFISH HAKE,WHITING FROZEN	47,587	72,760
Subtotal: ESTONIA		**47,587**	**72,760**
FRANCE	GROUNDFISH HAKE FILLET FROZEN	93,846	443,936
Subtotal: FRANCE		**93,846**	**443,936**
GEORGIA	GROUNDFISH HAKE,WHITING FROZEN	20,545	86,773
Subtotal: GEORGIA		**20,545**	**86,773**
GERMANY	GROUNDFISH HAKE,WHITING FROZEN	108,119	277,911
Subtotal: GERMANY		**108,119**	**277,911**
GREECE	GROUNDFISH HAKE FRESH	1,800	8,452
GREECE	GROUNDFISH HAKE,WHITING FROZEN	1,800	8,452
Subtotal: GREECE		**3,600**	**16,904**
HAITI	GROUNDFISH HAKE,WHITING FROZEN	29,058	39,520
Subtotal: HAITI		**29,058**	**39,520**
ISRAEL	GROUNDFISH HAKE,WHITING FROZEN	71,999	136,796
Subtotal: ISRAEL		**71,999**	**136,796**
ITALY	GROUNDFISH HAKE,WHITING FROZEN	508,268	1,450,862
Subtotal: ITALY		**508,268**	**1,450,862**
LITHUANIA	GROUNDFISH HAKE,WHITING FROZEN	99,467	147,758
Subtotal: LITHUANIA		**99,467**	**147,758**
POLAND	GROUNDFISH HAKE,WHITING FROZEN	132,006	244,211
Subtotal: POLAND		**132,006**	**244,211**
RUSSIAN FEDERATION	GROUNDFISH HAKE,WHITING FROZEN	334,357	724,089
Subtotal: RUSSIAN FEDERATION		**334,357**	**724,089**
SOUTH AFRICA	GROUNDFISH HAKE FILLET FROZEN	50,883	166,387
SOUTH AFRICA	GROUNDFISH HAKE,WHITING FROZEN	24,664	53,644
Subtotal: SOUTH AFRICA		**75,547**	**220,031**
SPAIN	GROUNDFISH HAKE FRESH	3,160	14,429
SPAIN	GROUNDFISH HAKE,WHITING FROZEN	208,150	372,219
Subtotal: SPAIN		**211,310**	**386,648**
UKRAINE	GROUNDFISH HAKE,WHITING FROZEN	724,551	1,831,860
Subtotal: UKRAINE		**724,551**	**1,831,860**
Grand Total: 2012		**2,756,897**	**6,690,698**

WHITE THOMPSON & CO., PS
CERTIFIED PUBLIC ACCOUNTANTS

PHONE: (206)286-8556
FAX: (206)284-4114

FACSIMILE TRANSMITTAL SHEET

TO: Chris Kayser	FROM: Greg White
COMPANY: Larkins Vacura	DATE: May 1, 2012
FAX NUMBER: 503.827-7600	TOTAL NO. OF PAGES INCLUDING COVER: 16
PHONE NUMBER: 503.222-4424	SENDER'S REFERENCE NUMBER:
RE: Work papers to support chart	YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Hi Chris,

Here are the work papers that support the chart. Just call if you have any questions.

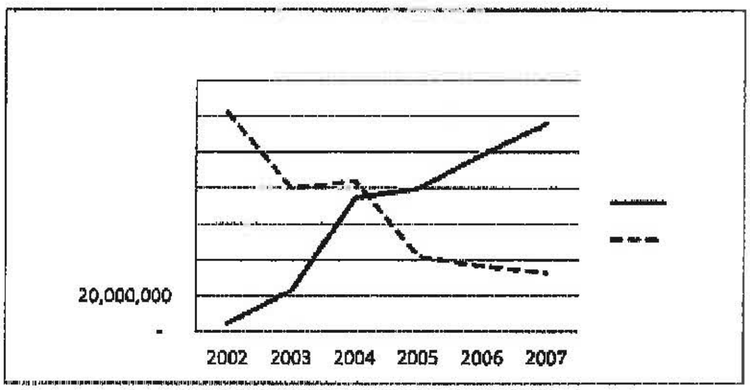
Thanks,
Greg

701 DEXTER AVENUE NORTH SUITE 701
SEATTLE, WA 98109

Hake H&G And Surimi Exports - Lbs 2002-2007

	Pacific District	
	H&G Exports	Surimi NSPF
2002	4,787,298	121,961,439
2003	23,105,418	80,067,201
2004	74,746,661	84,169,337
2005	79,985,218	42,149,432
2006	98,996,567	36,757,175
2007	116,126,253	32,916,406

SOURCE: http://www.st.nmfs.noaa.gov/st1/trade/annual_data/TradeDataAnnualDistrictAllProducts.html
H&G Filter: > 300,000 Pounds



[illegible]

CON' 'IAL

PACIFIC DISTRICT HAKE EXPORTS

		2002			2003			2004			2005			2006			2007	
CODE	COUNTRY	POUNDS	DOLLARS	$/LB	POUNDS	DOLLARS	$/LB	POUNDS	DOLLARS	$/LB	POUNDS	DOLLARS	$/LB	POUNDS	DOLLARS	$/LB	POUNDS	DOLLARS
F	FRANCE	463,277	447,045	0.965			#DIV/0!			#DIV/0!			#DIV/0!	721,361	584,390	0.810		
F	GERMANY	7,974,938	4,600,035	0.577	2,032,150	1,469,494	0.723	10,619,179	11,796,706	1.111	8,469,220	8,436,122	0.996	15,094,039	16,278,802	1.078	13,631,145	14,249,243
F	ITALY			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
F	NETHERLA	582,438	383,076	0.658			#DIV/0!			#DIV/0!	4,711,168	3,984,419	0.846	7,575,830	6,433,025	0.849		
F Total		9,020,652	5,430,158	0.602	2,032,150	1,469,494	0.723	10,619,179	11,796,706	1.111	13,180,388	12,440,541	0.944	23,391,229	23,296,217	0.996	13,631,145	14,249,243
H	ALBANIA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	ARMENIA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	864,203	400,000	0.463		
H	BELARUS			#DIV/0!			#DIV/0!	525,577	269,507	0.513			#DIV/0!			#DIV/0!		
H	BELGIUM			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	BULGARIA	680,822	317,182	0.466			#DIV/0!	526,899	225,162	0.427	1,052,946	570,826	0.542	1,266,146	807,204	0.638	1,525,621	1,036,870
H	CANADA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	362,961	231,736	0.638		
H	CHINA	470,850	186,480	0.396			#DIV/0!	5,351,140	4,130,850	0.772	3,036,614	3,666,258	1.207	5,252,805	3,802,166	0.724	7,595,952	5,501,989
H	CHINA - HONG KONG			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	CHINA - TAIPEI			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	CROATIA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	979,912	633,205	0.646	460,850	285,201
H	DOMINICA			#DIV/0!			#DIV/0!			#DIV/0!	307,277	143,820	0.468			#DIV/0!		
H	DOMINICAN REPUBLIC			#DIV/0!			#DIV/0!			#DIV/0!	301,386	173,765	0.577	389,257	226,892	0.583		
H	EGYPT			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	ESTONIA	1,101,132	476,000	0.432			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	FRANCE										428,171	178,712	0.417					
H	GEORGIA			#DIV/0!			#DIV/0!			#DIV/0!	618,798	345,393	0.558	956,763	636,276	0.665	2,241,119	1,491,980
H	GHANA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
F	GERMANY																	
H	GREECE			#DIV/0!			#DIV/0!	525,797	197,800	0.376			#DIV/0!	988,686	632,783	0.640	1,435,122	1,003,351
H	ICELAND	364,769	124,880	0.342			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	ISRAEL			#DIV/0!			#DIV/0!	3,019,184	1,269,496	0.420	1,794,293	978,295	0.545	931,267	633,788	0.681		
H	IVORY COAST			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	JORDAN			#DIV/0!			#DIV/0!			#DIV/0!	614,642	218,480	0.355			#DIV/0!	307,806	216,411
H	LEBANON	999,932	406,750	0.407	1,064,989	464,678	0.436	2,310,469	983,548	0.426	2,700,141	1,347,099	0.499	3,144,946	2,113,955	0.672	955,436	634,169
H	LITHUANIA	1,169,794	382,142	0.327	14,462,610	6,995,146	0.484	21,901,167	8,838,027	0.404	12,086,872	6,879,739	0.569	1,914,816	1,292,449	0.644	1,761,590	1,258,965
H	NETHERLANDS			#DIV/0!	3,399,898	1,476,796	0.434	4,612,283	2,708,230	0.587			#DIV/0!			#DIV/0!	6,647,045	4,824,126
H	NIGERIA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	OMAN			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	POLAND			#DIV/0!			#DIV/0!	825,215	474,534	0.575			#DIV/0!	1,310,804	1,333,568	1.017	704,980	471,875
H	ROMANIA			#DIV/0!	655,383	248,259	0.379	701,039	265,095	0.376			#DIV/0!	1,168,771	866,474	0.741	1,717,154	1,039,026
H	RUSSIAN FEDERATION			#DIV/0!	2,507,988	1,183,464	0.472	26,831,534	11,374,919	0.424	45,230,268	24,201,925	0.535	40,855,797	27,214,447	0.666	33,818,959	23,914,976
H	SERBIA & KOSOVO			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	362,244	227,150
H	SINGAPORE			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	SOUTH AFRICA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	756,306	516,104
H	SPAIN			#DIV/0!	1,014,557	541,240	0.533	440,920	194,000	0.440			#DIV/0!	1,005,522	727,977	0.724	1,778,462	1,553,302
H	SYRIA			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H	UKRAINE			#DIV/0!			#DIV/0!	7,175,427	3,184,191	0.444	11,813,810	6,199,367	0.525	37,603,891	24,801,265	0.660	53,251,039	37,445,004
H	UNITED ARAB EMIRATES			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	409,174	287,680
H	UNITED KINGDOM			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!		
H Total		4,787,298	1,693,534	0.396	23,105,418	10,909,583	0.472	74,746,668	34,115,379	0.456	79,985,210	44,903,693	0.561	98,996,567	66,294,185	0.670	116,126,259	81,107,585
R	CAMEROON			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!	417,525	197,323
R Total		-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	417,525	197,323
S	JAPAN			#DIV/0!	571,675	471,070	0.824	456,744	214,400	0.467	1,721,660	1,481,781	0.861	1,483,079	1,345,440	0.907	721,477	447,887
S	SOUTH KOREA			#DIV/0!	4,313,609	3,245,032	0.752	682,566	277,942	0.407			#DIV/0!			#DIV/0!		
S Total		-	-	#DIV/0!	4,885,283	3,716,102	0.761	1,141,310	492,342	0.431	1,721,660	1,481,781	0.861	1,483,079	1,345,440	0.907	721,477	447,887
Grand Total		13,807,950	7,329,692	0.530	30,022,851	16,095,179	0.536	86,507,150	46,404,427	0.536	94,887,267	58,826,021	0.620	122,870,874	90,935,842	0.734	130,896,431	96,002,038

National Marine Fisheries Service
Fisheries Statistics and Economics Division

You asked for the following

Trade Type:	EXPORTS
Product:	SURIMI
From:	2002
Through:	2007
U.S. Customs Districts:	PA 7 districts: ANCHORAGE, AK, HONOLULU, HI, LOS ANGELES, CA, PORTLAND, OR, SAN DIEGO, CA, SAN FRANCISCO, CA, SEATTLE, WA

Note: Current data through December, 2011.

Edible	Product Name	Country	Kilos	Dollars
		2002		
E	SURIMI ALASKA POLLOCK	AUSTRALIA	192,000	408,240
E	SURIMI ALASKA POLLOCK	BELGIUM	25,005	41,336
E	SURIMI ALASKA POLLOCK	CANADA	522,466	1,101,220
E	SURIMI ALASKA POLLOCK	CHINA	379,693	584,049
E	SURIMI ALASKA POLLOCK	CHINA - TAIPEI	2,581,905	4,359,863
E	SURIMI ALASKA POLLOCK	ESTONIA	595,200	1,357,088
E	SURIMI ALASKA POLLOCK	FRANCE	7,698,381	14,299,027
E	SURIMI ALASKA POLLOCK	GERMANY	509,493	1,028,631
E	SURIMI ALASKA POLLOCK	ITALY	414,000	899,300
E	SURIMI ALASKA POLLOCK	JAPAN	63,032,227	117,469,895
E	SURIMI ALASKA POLLOCK	LITHUANIA	4,105,476	8,191,864
E	SURIMI ALASKA POLLOCK	MALAYSIA	100,800	211,680
E	SURIMI ALASKA POLLOCK	MEXICO	4,776	15,264
E	SURIMI ALASKA POLLOCK	NETHERLANDS	719,755	1,655,052
E	SURIMI ALASKA POLLOCK	NORWAY	147,003	245,734
E	SURIMI ALASKA POLLOCK	RUSSIAN FEDERATION	40,000	68,000
E	SURIMI ALASKA POLLOCK	SOUTH KOREA	50,808,905	95,783,702
E	SURIMI ALASKA POLLOCK	SPAIN	1,379,940	2,399,040
E	SURIMI ALASKA POLLOCK	THAILAND	109,962	151,388
	Subtotal: SURIMI ALASKA POLLOCK		**133,366,987**	**250,270,373**
E	SURIMI NSPF	CHINA	138,063	187,773
E	SURIMI NSPF	CHINA - TAIPEI	49,100	96,000
E	SURIMI NSPF	DOMINICAN REPUBLIC	1,823	3,501
E	SURIMI NSPF	FRANCE	608,502	1,246,908
E	SURIMI NSPF	GERMANY	338,009	525,113
E	SURIMI NSPF	ITALY	145,580	203,342
E	SURIMI NSPF	JAPAN	42,166,350	87,001,182
E	SURIMI NSPF	LITHUANIA	125,000	272,906
E	SURIMI NSPF	MALAYSIA	204,160	368,406
E	SURIMI NSPF	NETHERLANDS	63,602	93,323
E	SURIMI NSPF	NORWAY	418,761	584,908

E	SURIMI NSPF	SOUTH KOREA	10,491,789	20,948,574
E	SURIMI NSPF	SPAIN	337,280	541,344
E	SURIMI NSPF	THAILAND	233,327	304,648
	Subtotal: SURIMI NSPF		**55,321,346**	**112,377,928**
Subtotal: E			**188,688,333**	**362,648,301**
Grand Total: 2002			**188,688,333**	**362,648,301**
		2003		
E	SURIMI ALASKA POLLOCK	AUSTRALIA	163,311	344,736
E	SURIMI ALASKA POLLOCK	CANADA	439,475	916,046
E	SURIMI ALASKA POLLOCK	CHINA	2,017,964	3,301,023
E	SURIMI ALASKA POLLOCK	CHINA - TAIPEI	2,307,453	3,792,378
E	SURIMI ALASKA POLLOCK	ESTONIA	323,120	648,456
E	SURIMI ALASKA POLLOCK	FRANCE	5,741,815	10,241,239
E	SURIMI ALASKA POLLOCK	GERMANY	306,983	694,759
E	SURIMI ALASKA POLLOCK	ISRAEL	40,004	81,328
E	SURIMI ALASKA POLLOCK	ITALY	363,000	552,752
E	SURIMI ALASKA POLLOCK	JAPAN	60,284,005	118,817,629
E	SURIMI ALASKA POLLOCK	JORDAN	20,040	28,657
E	SURIMI ALASKA POLLOCK	LITHUANIA	4,760,446	7,718,308
E	SURIMI ALASKA POLLOCK	MALAYSIA	185,074	318,111
E	SURIMI ALASKA POLLOCK	MEXICO	24,043	52,318
E	SURIMI ALASKA POLLOCK	NETHERLANDS	3,043,791	4,794,204
E	SURIMI ALASKA POLLOCK	SINGAPORE	20,000	34,000
E	SURIMI ALASKA POLLOCK	SOUTH KOREA	56,358,868	99,764,047
E	SURIMI ALASKA POLLOCK	SPAIN	1,730,605	3,151,526
	Subtotal: SURIMI ALASKA POLLOCK		**138,129,997**	**255,251,517**
E	SURIMI NSPF	CHINA	322,367	551,220
E	SURIMI NSPF	CHINA - TAIPEI	23,085	43,318
E	SURIMI NSPF	ESTONIA	115,200	208,147
E	SURIMI NSPF	FRANCE	1,648,556	2,605,734
E	SURIMI NSPF	ITALY	208,000	284,300
E	SURIMI NSPF	JAPAN	25,186,730	53,839,209
E	SURIMI NSPF	LITHUANIA	446,480	811,608
E	SURIMI NSPF	MALAYSIA	23,000	36,924
E	SURIMI NSPF	MEXICO	2,494	26,808
E	SURIMI NSPF	NETHERLANDS	137,698	230,490
E	SURIMI NSPF	NORWAY	155,317	200,328
E	SURIMI NSPF	SOUTH KOREA	7,384,724	14,832,263
E	SURIMI NSPF	SPAIN	614,773	864,808
E	SURIMI NSPF	SWEDEN	23,999	33,597
E	SURIMI NSPF	THAILAND	18,000	23,400
E	SURIMI NSPF	UNITED KINGDOM	7,821	25,000
	Subtotal: SURIMI NSPF		**36,318,244**	**74,617,154**
Subtotal: E			**174,448,241**	**329,868,671**
Grand Total: 2003			**174,448,241**	**329,868,671**
		2004		

E	SURIMI ALASKA POLLOCK	AUSTRALIA	145,577	307,440
E	SURIMI ALASKA POLLOCK	CANADA	453,761	934,399
E	SURIMI ALASKA POLLOCK	CHINA	2,423,728	3,627,080
E	SURIMI ALASKA POLLOCK	CHINA - TAIPEI	2,313,028	3,789,291
E	SURIMI ALASKA POLLOCK	ESTONIA	1,621,400	2,396,890
E	SURIMI ALASKA POLLOCK	FRANCE	8,665,917	13,035,665
E	SURIMI ALASKA POLLOCK	GERMANY	1,140,420	1,574,250
E	SURIMI ALASKA POLLOCK	ITALY	184,000	351,988
E	SURIMI ALASKA POLLOCK	JAPAN	79,620,949	126,576,936
E	SURIMI ALASKA POLLOCK	LITHUANIA	5,070,497	7,076,467
E	SURIMI ALASKA POLLOCK	MALAYSIA	93,120	190,560
E	SURIMI ALASKA POLLOCK	NETHERLANDS	2,308,267	3,462,368
E	SURIMI ALASKA POLLOCK	POLAND	20,865	68,998
E	SURIMI ALASKA POLLOCK	PORTUGAL	16,900	29,808
E	SURIMI ALASKA POLLOCK	RUSSIAN FEDERATION	75,220	92,573
E	SURIMI ALASKA POLLOCK	SOUTH KOREA	55,330,748	81,940,564
E	SURIMI ALASKA POLLOCK	SPAIN	2,161,610	3,616,145
E	SURIMI ALASKA POLLOCK	THAILAND	22,902	35,343
E	SURIMI ALASKA POLLOCK	UKRAINE	22,800	38,760
	Subtotal: SURIMI ALASKA POLLOCK		**161,691,709**	**249,145,525**
E	SURIMI NSPF	AUSTRALIA	24,000	50,400
E	SURIMI NSPF	BELARUS	22,400	47,040
E	SURIMI NSPF	CHINA	1,884,543	3,159,987
E	SURIMI NSPF	CHINA - TAIPEI	61,612	117,603
E	SURIMI NSPF	ESTONIA	33,790	108,013
E	SURIMI NSPF	FRANCE	2,078,340	3,537,296
E	SURIMI NSPF	GERMANY	849,036	1,374,280
E	SURIMI NSPF	ITALY	262,960	314,550
E	SURIMI NSPF	JAPAN	21,581,898	38,166,849
E	SURIMI NSPF	LITHUANIA	1,991,321	3,851,021
E	SURIMI NSPF	MALAYSIA	34,400	67,159
E	SURIMI NSPF	MEXICO	18,480	31,878
E	SURIMI NSPF	NETHERLANDS	243,960	365,346
E	SURIMI NSPF	NORWAY	156,004	226,410
E	SURIMI NSPF	PORTUGAL	65,161	152,118
E	SURIMI NSPF	RUSSIAN FEDERATION	855,534	987,586
E	SURIMI NSPF	SINGAPORE	20,000	34,000
E	SURIMI NSPF	SOUTH KOREA	5,663,624	9,127,763
E	SURIMI NSPF	SPAIN	1,893,040	2,824,129
E	SURIMI NSPF	THAILAND	261,600	273,717
E	SURIMI NSPF	UKRAINE	174,400	277,904
E	SURIMI NSPF	UNITED KINGDOM	2,858	3,780
	Subtotal: SURIMI NSPF		**38,178,961**	**65,098,829**
Subtotal: E			**199,870,670**	**314,244,354**
Grand Total: 2004			**199,870,670**	**314,244,354**
		2005		

E	SURIMI ALASKA POLLOCK	AUSTRALIA	351,426	1,050,280
E	SURIMI ALASKA POLLOCK	CANADA	425,331	999,381
E	SURIMI ALASKA POLLOCK	CHINA	2,508,523	4,942,444
E	SURIMI ALASKA POLLOCK	CHINA - TAIPEI	2,019,400	4,185,356
E	SURIMI ALASKA POLLOCK	FRANCE	5,086,362	9,758,278
E	SURIMI ALASKA POLLOCK	GERMANY	7,102,616	12,372,569
E	SURIMI ALASKA POLLOCK	ITALY	69,000	129,030
E	SURIMI ALASKA POLLOCK	JAPAN	87,996,159	182,667,287
E	SURIMI ALASKA POLLOCK	LITHUANIA	6,688,076	13,024,683
E	SURIMI ALASKA POLLOCK	MALAYSIA	155,244	300,510
E	SURIMI ALASKA POLLOCK	NETHERLANDS	8,394,274	14,854,408
E	SURIMI ALASKA POLLOCK	PORTUGAL	84,000	231,000
E	SURIMI ALASKA POLLOCK	RUSSIAN FEDERATION	352,460	792,157
E	SURIMI ALASKA POLLOCK	SINGAPORE	22,211	71,000
E	SURIMI ALASKA POLLOCK	SOUTH KOREA	61,312,473	132,188,655
E	SURIMI ALASKA POLLOCK	SPAIN	3,686,087	7,867,014
E	SURIMI ALASKA POLLOCK	THAILAND	63,000	115,500
E	SURIMI ALASKA POLLOCK	UKRAINE	175,600	311,520
E	SURIMI ALASKA POLLOCK	UNITED KINGDOM	28,658	58,682
	Subtotal: SURIMI ALASKA POLLOCK		**186,520,900**	**385,919,754**
E	SURIMI NSPF	CHINA	518,160	995,692
E	SURIMI NSPF	CHINA - TAIPEI	6,525	24,080
E	SURIMI NSPF	DENMARK	8,995	10,000
E	SURIMI NSPF	FRANCE	1,465,430	2,980,438
E	SURIMI NSPF	GERMANY	1,715,869	2,916,977
E	SURIMI NSPF	ITALY	70,200	154,764
E	SURIMI NSPF	JAPAN	9,482,092	18,647,865
E	SURIMI NSPF	LITHUANIA	1,318,800	2,699,897
E	SURIMI NSPF	MEXICO	42,536	59,584
E	SURIMI NSPF	NETHERLANDS	92,664	137,760
E	SURIMI NSPF	RUSSIAN FEDERATION	167,200	245,460
E	SURIMI NSPF	SOUTH KOREA	3,518,932	6,518,144
E	SURIMI NSPF	SPAIN	425,340	904,807
E	SURIMI NSPF	THAILAND	46,000	89,100
E	SURIMI NSPF	UKRAINE	231,278	336,401
E	SURIMI NSPF	UNITED KINGDOM	8,836	28,247
	Subtotal: SURIMI NSPF		**19,118,857**	**36,749,216**
Subtotal: E			**205,639,757**	**422,668,970**
Grand Total: 2005			**205,639,757**	**422,668,970**
		2006		
E	SURIMI ALASKA POLLOCK	AUSTRALIA	237,435	669,311
E	SURIMI ALASKA POLLOCK	CANADA	378,334	988,819
E	SURIMI ALASKA POLLOCK	CHINA	1,701,484	3,173,728
E	SURIMI ALASKA POLLOCK	CHINA - TAIPEI	1,331,422	2,699,378
E	SURIMI ALASKA POLLOCK	DENMARK	33,206	26,227
E	SURIMI ALASKA POLLOCK	FRANCE	2,752,600	5,555,131

E	SURIMI ALASKA POLLOCK	GERMANY	4,803,748	10,256,400
E	SURIMI ALASKA POLLOCK	ITALY	112,500	210,375
E	SURIMI ALASKA POLLOCK	JAPAN	83,591,758	171,737,421
E	SURIMI ALASKA POLLOCK	LITHUANIA	2,096,700	3,698,884
E	SURIMI ALASKA POLLOCK	MALAYSIA	21,554	33,264
E	SURIMI ALASKA POLLOCK	NETHERLANDS	5,478,241	10,700,040
E	SURIMI ALASKA POLLOCK	PORTUGAL	125,798	202,084
E	SURIMI ALASKA POLLOCK	RUSSIAN FEDERATION	444,040	685,466
E	SURIMI ALASKA POLLOCK	SOUTH AFRICA	44,900	76,330
E	SURIMI ALASKA POLLOCK	SOUTH KOREA	57,864,324	115,481,671
E	SURIMI ALASKA POLLOCK	SPAIN	2,119,603	4,444,881
E	SURIMI ALASKA POLLOCK	THAILAND	23,040	48,384
E	SURIMI ALASKA POLLOCK	UKRAINE	86,400	235,346
E	SURIMI ALASKA POLLOCK	UNITED KINGDOM	64,804	110,167
	Subtotal: SURIMI ALASKA POLLOCK		**163,311,891**	**331,033,307**
E	SURIMI NSPF	CHINA	522,360	1,441,232
E	SURIMI NSPF	FRANCE	1,410,702	2,802,806
E	SURIMI NSPF	GERMANY	712,672	1,297,316
E	SURIMI NSPF	JAPAN	2,230,229	5,579,052
E	SURIMI NSPF	LITHUANIA	1,127,400	2,200,303
E	SURIMI NSPF	MEXICO	535	4,588
E	SURIMI NSPF	NETHERLANDS	22,000	35,200
E	SURIMI NSPF	POLAND	2,245	2,880
E	SURIMI NSPF	PORTUGAL	157,439	276,000
E	SURIMI NSPF	RUSSIAN FEDERATION	529,326	1,046,997
E	SURIMI NSPF	SOUTH KOREA	9,679,737	19,146,387
E	SURIMI NSPF	SPAIN	278,300	596,532
	Subtotal: SURIMI NSPF		**16,672,945**	**34,429,293**
Subtotal: E			**179,984,836**	**365,462,600**
Grand Total: 2006			**179,984,836**	**365,462,600**
		2007		
E	SURIMI ALASKA POLLOCK	AUSTRALIA	158,820	333,522
E	SURIMI ALASKA POLLOCK	BELGIUM	45,000	84,150
E	SURIMI ALASKA POLLOCK	CHINA	1,282,968	2,321,223
E	SURIMI ALASKA POLLOCK	CHINA - TAIPEI	1,103,300	2,273,896
E	SURIMI ALASKA POLLOCK	DENMARK	143,076	289,020
E	SURIMI ALASKA POLLOCK	FRANCE	2,586,019	4,532,183
E	SURIMI ALASKA POLLOCK	GEORGIA	46,000	96,600
E	SURIMI ALASKA POLLOCK	GERMANY	2,454,531	4,072,025
E	SURIMI ALASKA POLLOCK	JAPAN	60,257,862	122,478,211
E	SURIMI ALASKA POLLOCK	LITHUANIA	4,346,527	7,188,276
E	SURIMI ALASKA POLLOCK	MALAYSIA	45,804	70,686
E	SURIMI ALASKA POLLOCK	NETHERLANDS	1,294,707	2,641,542
E	SURIMI ALASKA POLLOCK	NIGER	91,987	180,188
E	SURIMI ALASKA POLLOCK	RUSSIAN FEDERATION	1,108,040	2,356,349
E	SURIMI ALASKA POLLOCK	SOUTH KOREA	49,444,385	105,836,413

E	SURIMI ALASKA POLLOCK	SPAIN	1,228,520	2,712,857
E	SURIMI ALASKA POLLOCK	THAILAND	89,460	213,942
E	SURIMI ALASKA POLLOCK	UKRAINE	46,200	91,845
	Subtotal: SURIMI ALASKA POLLOCK		**125,773,206**	**257,772,928**
E	SURIMI NSPF	CANADA	397,527	1,051,623
E	SURIMI NSPF	CHINA	46,420	129,976
E	SURIMI NSPF	CHINA - HONG KONG	31,347	53,290
E	SURIMI NSPF	CHINA - TAIPEI	43,200	120,960
E	SURIMI NSPF	FRANCE	1,760,160	3,462,258
E	SURIMI NSPF	GERMANY	43,200	82,080
E	SURIMI NSPF	JAPAN	6,135,189	15,195,823
E	SURIMI NSPF	LITHUANIA	1,449,001	2,802,401
E	SURIMI NSPF	MEXICO	18,347	26,995
E	SURIMI NSPF	NETHERLANDS	182,729	238,640
E	SURIMI NSPF	POLAND	69,120	124,416
E	SURIMI NSPF	RUSSIAN FEDERATION	1,397,828	2,277,916
E	SURIMI NSPF	SOUTH KOREA	978,647	2,155,268
E	SURIMI NSPF	SPAIN	2,330,573	3,864,768
E	SURIMI NSPF	UKRAINE	45,360	92,256
E	SURIMI NSPF	UNITED KINGDOM	2,136	3,500
	Subtotal: SURIMI NSPF		**14,930,784**	**31,682,170**
Subtotal: E			**140,703,990**	**289,455,098**
Grand Total: 2007			**140,703,990**	**289,455,098**

National Marine Fisheries Service
Fisheries Statistics and Economics Division

You asked for the following

Trade Type:	EXPORTS
Product:	GROUNDFISH HAKE
From:	2002
Through:	2007
U.S. Customs Districts:	PA 7 districts: ANCHORAGE, AK, HONOLULU, HI, LOS ANGELES, CA, PORTLAND, OR, SAN DIEGO, CA, SAN FRANCISCO, CA, SEATTLE, WA

Note: Current data through December, 2011.

Edible	Product Name	Country	Kilos	Dollars
		2002		
E	GROUNDFISH HAKE,WHITING FROZEN	BULGARIA	308,819	317,182
E	GROUNDFISH HAKE,WHITING FROZEN	CHINA	213,576	186,480
E	GROUNDFISH HAKE,WHITING FROZEN	DOMINICAN REPUBLIC	35,833	25,704
E	GROUNDFISH HAKE,WHITING FROZEN	ESTONIA	499,470	476,000
E	GROUNDFISH HAKE,WHITING FROZEN	FRANCE	210,141	447,045
E	GROUNDFISH HAKE,WHITING FROZEN	GERMANY	3,617,408	4,600,035
E	GROUNDFISH HAKE,WHITING FROZEN	GREECE	97,738	88,520
E	GROUNDFISH HAKE,WHITING FROZEN	ICELAND	165,458	124,880
E	GROUNDFISH HAKE,WHITING FROZEN	ISRAEL	114,621	87,495
E	GROUNDFISH HAKE,WHITING FROZEN	ITALY	47,990	45,000
E	GROUNDFISH HAKE,WHITING FROZEN	JAPAN	16,224	71,487
E	GROUNDFISH HAKE,WHITING FROZEN	LEBANON	453,566	406,750
E	GROUNDFISH HAKE,WHITING FROZEN	LITHUANIA	530,615	382,242
E	GROUNDFISH HAKE,WHITING FROZEN	NETHERLANDS	264,192	383,078
E	GROUNDFISH HAKE,WHITING FROZEN	NORWAY	70,123	84,240
E	GROUNDFISH HAKE,WHITING FROZEN	ROMANIA	46,400	40,861
	GROUNDFISH HAKE,WHITING			

E	FROZEN	RUSSIAN FEDERATION	98,066	73,700
E	GROUNDFISH HAKE,WHITING FROZEN	SAN MARINO	24,900	26,000
	Subtotal: GROUNDFISH HAKE,WHITING FROZEN		**6,815,140**	**7,866,699**
Subtotal: E			**6,815,140**	**7,866,699**
Grand Total: 2002			**6,815,140**	**7,866,699**
		2003		
E	GROUNDFISH HAKE,WHITING FROZEN	BELGIUM	120,557	134,310
E	GROUNDFISH HAKE,WHITING FROZEN	BULGARIA	92,800	92,840
E	GROUNDFISH HAKE,WHITING FROZEN	CANADA	13,300	21,602
E	GROUNDFISH HAKE,WHITING FROZEN	CHINA - TAIPEI	24,000	45,480
E	GROUNDFISH HAKE,WHITING FROZEN	GERMANY	921,777	1,469,494
E	GROUNDFISH HAKE,WHITING FROZEN	ISRAEL	46,000	41,580
E	GROUNDFISH HAKE,WHITING FROZEN	JAPAN	259,310	471,070
E	GROUNDFISH HAKE,WHITING FROZEN	LEBANON	483,076	464,678
E	GROUNDFISH HAKE,WHITING FROZEN	LITHUANIA	6,560,197	6,995,146
E	GROUNDFISH HAKE,WHITING FROZEN	NETHERLANDS	1,542,180	1,476,796
E	GROUNDFISH HAKE,WHITING FROZEN	POLAND	99,903	164,861
E	GROUNDFISH HAKE,WHITING FROZEN	ROMANIA	297,280	248,259
E	GROUNDFISH HAKE,WHITING FROZEN	RUSSIAN FEDERATION	1,137,616	1,183,464
E	GROUNDFISH HAKE,WHITING FROZEN	SOUTH KOREA	1,956,640	3,245,032
E	GROUNDFISH HAKE,WHITING FROZEN	SPAIN	460,200	541,240
E	GROUNDFISH HAKE,WHITING FROZEN	UKRAINE	69,399	53,326
E	GROUNDFISH HAKE,WHITING FROZEN	UNITED KINGDOM	32,945	70,064
	Subtotal: GROUNDFISH HAKE,WHITING FROZEN		**14,117,180**	**16,719,242**
Subtotal: E			**14,117,180**	**16,719,242**
Grand Total: 2003			**14,117,180**	**16,719,242**
		2004		
E	GROUNDFISH HAKE,WHITING FROZEN	BELARUS	238,400	269,507
	GROUNDFISH HAKE,WHITING			

E	FROZEN	BELGIUM	35,438	75,000
E	GROUNDFISH HAKE,WHITING FROZEN	BULGARIA	239,000	225,182
E	GROUNDFISH HAKE,WHITING FROZEN	CANADA	3,992	8,837
E	GROUNDFISH HAKE,WHITING FROZEN	CHINA	2,427,261	4,130,850
E	GROUNDFISH HAKE,WHITING FROZEN	DOMINICA	45,644	42,378
E	GROUNDFISH HAKE,WHITING FROZEN	DOMINICAN REPUBLIC	72,676	39,457
E	GROUNDFISH HAKE,WHITING FROZEN	FRANCE	80,820	105,066
E	GROUNDFISH HAKE,WHITING FROZEN	GERMANY	4,816,828	11,796,706
E	GROUNDFISH HAKE,WHITING FROZEN	GREECE	238,500	197,800
E	GROUNDFISH HAKE,WHITING FROZEN	ISRAEL	1,369,493	1,269,496
E	GROUNDFISH HAKE,WHITING FROZEN	JAPAN	208,085	214,400
E	GROUNDFISH HAKE,WHITING FROZEN	JORDAN	69,000	51,750
E	GROUNDFISH HAKE,WHITING FROZEN	LEBANON	1,048,022	983,548
E	GROUNDFISH HAKE,WHITING FROZEN	LITHUANIA	9,934,304	8,838,027
E	GROUNDFISH HAKE,WHITING FROZEN	NETHERLANDS	2,092,118	2,708,230
E	GROUNDFISH HAKE,WHITING FROZEN	POLAND	374,315	474,534
E	GROUNDFISH HAKE,WHITING FROZEN	PORTUGAL	9,072	25,000
E	GROUNDFISH HAKE,WHITING FROZEN	ROMANIA	317,989	265,095
E	GROUNDFISH HAKE,WHITING FROZEN	RUSSIAN FEDERATION	12,170,704	11,374,919
E	GROUNDFISH HAKE,WHITING FROZEN	SOUTH KOREA	309,610	277,942
E	GROUNDFISH HAKE,WHITING FROZEN	SPAIN	200,000	194,000
E	GROUNDFISH HAKE,WHITING FROZEN	THAILAND	96,000	102,000
E	GROUNDFISH HAKE,WHITING FROZEN	UKRAINE	3,254,757	3,184,191
	Subtotal: GROUNDFISH HAKE,WHITING FROZEN		**39,652,028**	**46,853,915**
Subtotal: E			**39,652,028**	**46,853,915**
Grand Total: 2004			**39,652,028**	**46,853,915**

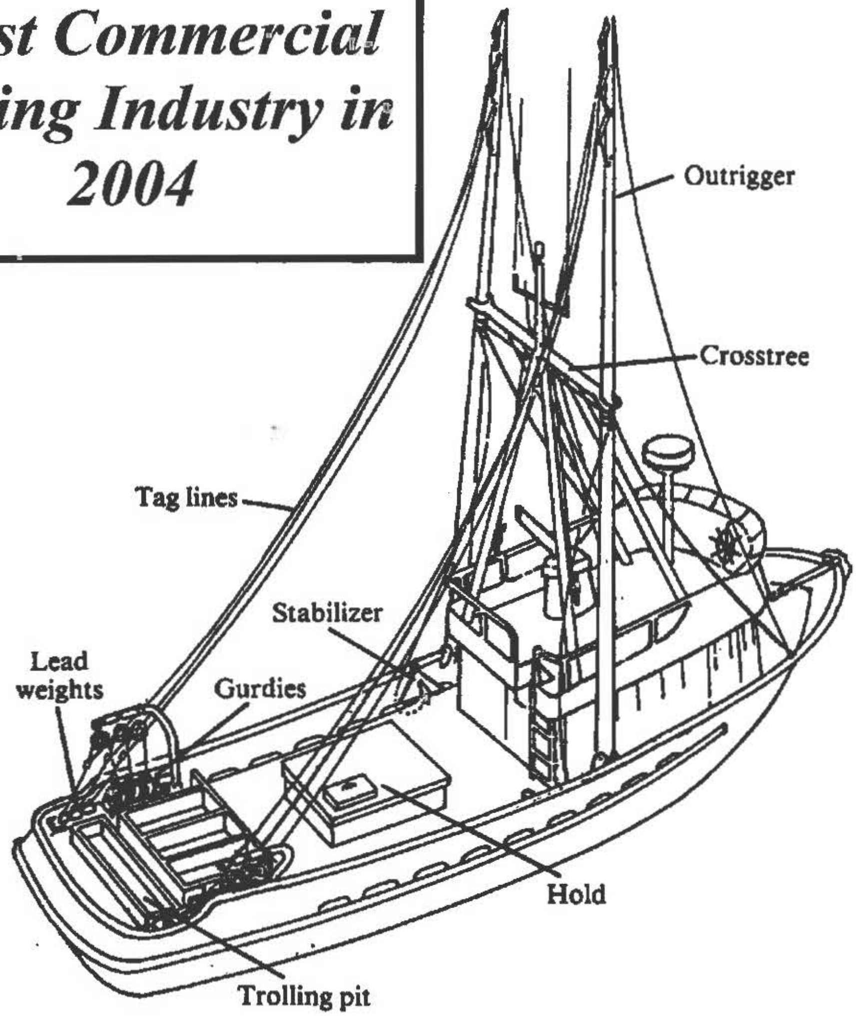
		2005		
E	GROUNDFISH HAKE,WHITING FROZEN	ARMENIA	45,470	59,424
E	GROUNDFISH HAKE,WHITING FROZEN	BELARUS	23,000	26,450
E	GROUNDFISH HAKE,WHITING FROZEN	BULGARIA	477,613	570,826
E	GROUNDFISH HAKE,WHITING FROZEN	CANADA	17,193	9,755
E	GROUNDFISH HAKE,WHITING FROZEN	CHINA	1,377,399	3,666,258
E	GROUNDFISH HAKE,WHITING FROZEN	DOMINICA	139,380	143,820
E	GROUNDFISH HAKE,WHITING FROZEN	DOMINICAN REPUBLIC	136,708	173,765
E	GROUNDFISH HAKE,WHITING FROZEN	ESTONIA	25,000	36,000
E	GROUNDFISH HAKE,WHITING FROZEN	FRANCE	194,217	178,712
E	GROUNDFISH HAKE,WHITING FROZEN	GEORGIA	280,685	345,393
E	GROUNDFISH HAKE,WHITING FROZEN	GERMANY	3,841,613	8,456,122
E	GROUNDFISH HAKE,WHITING FROZEN	GREECE	24,979	28,645
E	GROUNDFISH HAKE,WHITING FROZEN	ISRAEL	813,886	978,295
E	GROUNDFISH HAKE,WHITING FROZEN	ITALY	23,800	39,032
E	GROUNDFISH HAKE,WHITING FROZEN	JAPAN	780,940	1,481,781
E	GROUNDFISH HAKE,WHITING FROZEN	JORDAN	278,800	218,480
E	GROUNDFISH HAKE,WHITING FROZEN	LEBANON	1,224,776	1,347,099
E	GROUNDFISH HAKE,WHITING FROZEN	LITHUANIA	5,482,569	6,879,739
E	GROUNDFISH HAKE,WHITING FROZEN	NETHERLANDS	2,136,972	3,984,419
E	GROUNDFISH HAKE,WHITING FROZEN	POLAND	72,093	89,021
E	GROUNDFISH HAKE,WHITING FROZEN	ROMANIA	117,936	160,429
E	GROUNDFISH HAKE,WHITING FROZEN	RUSSIAN FEDERATION	20,516,315	24,201,925
E	GROUNDFISH HAKE,WHITING FROZEN	UKRAINE	5,358,709	6,199,387
	Subtotal: GROUNDFISH HAKE,WHITING FROZEN		**43,390,053**	**59,274,777**

Subtotal: E			**43,390,053**	**59,274,777**
Grand Total: 2005			**43,390,053**	**59,274,777**
		2006		
E	GROUNDFISH HAKE,WHITING FROZEN	ARMENIA	392,000	400,000
E	GROUNDFISH HAKE,WHITING FROZEN	BULGARIA	574,320	807,204
E	GROUNDFISH HAKE,WHITING FROZEN	CANADA	164,638	231,736
E	GROUNDFISH HAKE,WHITING FROZEN	CHINA	2,382,656	3,802,166
E	GROUNDFISH HAKE,WHITING FROZEN	CROATIA	444,485	633,205
E	GROUNDFISH HAKE,WHITING FROZEN	DOMINICAN REPUBLIC	176,566	226,892
E	GROUNDFISH HAKE,WHITING FROZEN	ESTONIA	89,797	152,660
E	GROUNDFISH HAKE,WHITING FROZEN	FRANCE	327,207	584,390
E	GROUNDFISH HAKE,WHITING FROZEN	GEORGIA	433,994	636,276
E	GROUNDFISH HAKE,WHITING FROZEN	GERMANY	6,846,611	16,278,802
E	GROUNDFISH HAKE,WHITING FROZEN	GREECE	448,465	632,783
E	GROUNDFISH HAKE,WHITING FROZEN	ISRAEL	422,420	633,788
E	GROUNDFISH HAKE,WHITING FROZEN	JAPAN	672,720	1,345,440
E	GROUNDFISH HAKE,WHITING FROZEN	JORDAN	93,816	125,760
E	GROUNDFISH HAKE,WHITING FROZEN	LATVIA	48,600	63,302
E	GROUNDFISH HAKE,WHITING FROZEN	LEBANON	1,426,538	2,113,955
E	GROUNDFISH HAKE,WHITING FROZEN	LITHUANIA	868,555	1,232,449
E	GROUNDFISH HAKE,WHITING FROZEN	MOLDOVA	24,030	41,452
E	GROUNDFISH HAKE,WHITING FROZEN	NETHERLANDS	3,436,374	6,433,025
E	GROUNDFISH HAKE,WHITING FROZEN	POLAND	594,577	1,333,568
E	GROUNDFISH HAKE,WHITING FROZEN	ROMANIA	530,151	866,474
E	GROUNDFISH HAKE,WHITING FROZEN	RUSSIAN FEDERATION	18,532,068	27,214,447
	GROUNDFISH HAKE,WHITING			

E	FROZEN	SLOVENIA	20,000	23,000
E	GROUNDFISH HAKE,WHITING FROZEN	SOUTH AFRICA	22,902	34,353
E	GROUNDFISH HAKE,WHITING FROZEN	SOUTH KOREA	40,107	55,278
E	GROUNDFISH HAKE,WHITING FROZEN	SPAIN	456,102	727,977
E	GROUNDFISH HAKE,WHITING FROZEN	UKRAINE	17,057,013	24,801,265
E	GROUNDFISH HAKE,WHITING FROZEN	UNITED KINGDOM	45,798	83,582
	Subtotal: GROUNDFISH HAKE,WHITING FROZEN		**56,572,510**	**91,515,229**
Subtotal: E			**56,572,510**	**91,515,229**
Grand Total: 2006			**56,572,510**	**91,515,229**
		2007		
E	GROUNDFISH HAKE,WHITING FROZEN	ARMENIA	134,400	150,000
E	GROUNDFISH HAKE,WHITING FROZEN	BELARUS	48,600	82,620
E	GROUNDFISH HAKE,WHITING FROZEN	BOSNIA-HERCEGOVINA	72,014	122,082
E	GROUNDFISH HAKE,WHITING FROZEN	BULGARIA	692,017	1,036,870
E	GROUNDFISH HAKE,WHITING FROZEN	CAMEROON	189,388	197,323
E	GROUNDFISH HAKE,WHITING FROZEN	CANADA	33,414	50,977
E	GROUNDFISH HAKE,WHITING FROZEN	CHINA	3,626,940	5,501,989
E	GROUNDFISH HAKE,WHITING FROZEN	CROATIA	209,040	288,201
E	GROUNDFISH HAKE,WHITING FROZEN	ESTONIA	45,798	68,697
E	GROUNDFISH HAKE,WHITING FROZEN	FINLAND	22,450	55,070
E	GROUNDFISH HAKE,WHITING FROZEN	FRANCE	133,110	193,857
E	GROUNDFISH HAKE,WHITING FROZEN	GEORGIA	1,016,565	1,491,980
E	GROUNDFISH HAKE,WHITING FROZEN	GERMANY	6,183,047	14,249,243
E	GROUNDFISH HAKE,WHITING FROZEN	GREECE	650,967	1,000,351
E	GROUNDFISH HAKE,WHITING FROZEN	JAPAN	327,260	447,887
E	GROUNDFISH HAKE,WHITING FROZEN	JORDAN	139,620	216,411
	GROUNDFISH HAKE,WHITING			

E	FROZEN	LEBANON	433,383	634,169
E	GROUNDFISH HAKE, WHITING FROZEN	LITHUANIA	799,052	1,258,365
E	GROUNDFISH HAKE, WHITING FROZEN	MOLDOVA	116,234	191,135
E	GROUNDFISH HAKE, WHITING FROZEN	NETHERLANDS	3,015,080	4,824,128
E	GROUNDFISH HAKE, WHITING FROZEN	NEW ZEALAND	79,686	279,832
E	GROUNDFISH HAKE, WHITING FROZEN	NIGERIA	61,753	70,785
E	GROUNDFISH HAKE, WHITING FROZEN	NORWAY	22,000	55,000
E	GROUNDFISH HAKE, WHITING FROZEN	POLAND	319,777	471,875
E	GROUNDFISH HAKE, WHITING FROZEN	ROMANIA	778,896	1,039,028
E	GROUNDFISH HAKE, WHITING FROZEN	RUSSIAN FEDERATION	15,339,000	23,314,978
E	GROUNDFISH HAKE, WHITING FROZEN	SERBIA & KOSOVO	164,313	227,150
E	GROUNDFISH HAKE, WHITING FROZEN	SOUTH AFRICA	343,058	516,104
E	GROUNDFISH HAKE, WHITING FROZEN	SOUTH KOREA	76,786	104,431
E	GROUNDFISH HAKE, WHITING FROZEN	SPAIN	806,705	1,553,302
E	GROUNDFISH HAKE, WHITING FROZEN	TOGO	23,240	25,215
E	GROUNDFISH HAKE, WHITING FROZEN	UKRAINE	24,154,510	37,445,004
E	GROUNDFISH HAKE, WHITING FROZEN	UNITED ARAB EMIRATES	185,600	287,680
	Subtotal: GROUNDFISH HAKE, WHITING FROZEN		**60,243,703**	**97,451,739**
Subtotal: E			**60,243,703**	**97,451,739**
Grand Total: 2007			**60,243,703**	**97,451,739**

Review of the West Coast Commercial Fishing Industry in 2004



Pacific States Marine Fisheries Commission

September 2006

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Review of the West Coast Commercial Fishing Industry in 2004

prepared by

The Research Group
Corvallis, Oregon

prepared for

Pacific States Marine Fisheries Commission
Portland, Oregon

September 2006

PREFACE

This study was sponsored by the Pacific States Marine Fisheries Commission (PSMFC). Dave Colpo, PSMFC directed the project and was very helpful guiding tasks to successful completion. The study was funded with a grant from the National Marine Fisheries Service (NMFS), Northwest Regional Office. Steve Freese was the NMFS funding administrator who did double duty in providing understanding and insight on the issues facing the U.S. West Coast fishing industry. The study consultant was The Research Group, Corvallis, Oregon. Shannon Davis and Hans Radtke were the principal authors. The authors were greatly assisted by Kari Olsen at The Research Group.

This study purpose is to prepare a report for lay readers interested in fishery management. The report is to have the same level and extent for Washington and California fishery descriptions that are in a serial publication describing Oregon commercial fisheries. (The Oregon report is written by this study's authors and the citation is in this report's bibliography section.) All three states would then have parallel descriptions in a single report. This study also provides updated information in a report published in February 2000 by the PSMFC. (Again, this study's author wrote the PSMFC report and the citation is contained in this report's bibliography section.) This new report liberally borrows excerpts from both the Oregon and previous PSMFC reports as applicable to new fisheries' situations.

Fish landing data is garnered from the Pacific Coast Fisheries Information Network database maintained by the PSMFC and the fish ticket and permit databases maintained by the states. Will Daspit at the PSMFC, Lee Hoines at the Washington Department of Fish and Wildlife (WDFW), John Seabourne at Oregon Department of Fish and Wildlife (ODFW), and Gerry Kobylinski at the California Department of Fish and Game (CDFG) assisted in providing the data.

This report was reviewed in draft form to provide candid and critical comments. This feedback helped make the findings of this report as sound as possible and ensures the report meets standards for objectivity, evidence, and responsiveness to the study charges. Although reviewers provided many useful comments and suggestions, they were not asked to endorse study findings and recommendations. This independent examination task was done in accordance with accustomed procedures and review comments were carefully considered.

The authors' interpretations and conclusions should prove valuable for this study's purpose. However, no absolute assurances can be given that the described results will be realized. Government legislation and policies, market circumstances, and other situations will affect the basis of assumptions in unpredictable ways and will lead to unanticipated changes. The information should not be used for investment or operational decision making. The authors and study sponsor do not assume any liability for the information and shall not be responsible for any direct, indirect, special, incidental, or consequential damages in connection with the use of the information.

Authorization is granted for the study report's contents to be quoted either orally or in written form without prior consent of the authors. Customary reference to authorship, however, is requested.

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Appendices

Table V.4e
Groundfish Product Price Conversion Model

Fishery: Groundfish	Groundfish Fillet to Japan Markets	
Product Form: Fillet	Cod/Rockfish	Flatfish
Ex-vessel price /2,3	0.60	0.42
Yield for primary product (percent)	0.29	0.24
Raw product cost of primary product	2.07	1.75
Variable costs:		
Direct labor	0.25	0.38
Packaging and material	0.05	0.05
Other costs (including taxes)	0.07	0.07
Total variable costs	0.37	0.50
Raw product and variable costs	2.44	2.25
Contribution margin to fixed costs /9	0.40	0.40
Primary ex-processor price of product	2.84	2.65
Marketing margins		
Brokerage (2%)	0.06	0.05
Distribution (10%)	0.29	0.27
Retailer (40%)	1.27	1.19
Customer price for primary product (primary ex-processor price plus marketing margins)	4.46	4.16

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2004.
2. Other notes from Table V.4a also apply to this table.
3. Groundfish is primarily sold as fresh fillets.

Source: Study.

Table V.4f
Pacific Whiting Headed and Gutted and Surimi Product Price Conversion Model

Fishery: Pacific Whiting Product Form: H/G and Surimi	Headed and Gutted	Surimi
Ex-vessel price /2,3	0.04	0.04
Yield for primary product (percent)	61%	22%
Raw product cost of primary product	0.07	0.18
Variable costs:		
Direct labor	0.10	0.12
Packaging and material	0.05	0.15
Other costs (including taxes)	0.06	0.15
Total variable costs	0.21	0.42
Raw product and variable costs		
Contribution margin to fixed costs /9	0.14	0.04
Primary ex-processor price of product	0.40	0.62
Marketing margins		
Brokerage (2%)	0.01	0.01
Distribution (10%)	0.04	0.06
Retailer (40%)	0.16	0.25
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	0.61	0.94

Notes: 1. Notes from Table V.4a also apply to this table.

Source: Study.

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Portfolio Analysis for Optimal Seafood Product Diversification and Resource Management

Sherry Larkin, Gil Sylvia, and Chris Tuininga

Future harvests from commercial fish stocks are unlikely to increase substantially due to biological and regulatory constraints. Developing alternative sets of processed seafood products is one strategy for increasing welfare while managing the risks inherent in a variable and renewable natural resource. To quantify the risk-benefit tradeoffs of alternative strategies, a portfolio decision framework is embedded into a multi-period bioeconomic model. The model is used to generate an efficient portfolio frontier to estimate possible rent dissipation from status quo management. Frontiers are also generated for seafood processors and brokers. Implications for the different industry agents are discussed.

Key words: bioeconomic analysis, dynamic optimization, Markowitz, Pacific whiting, portfolio analysis, resource management, seafood processing

Introduction

Risk-averse investors seek to reduce uncertainty in the expected returns from a portfolio of assets. Markowitz (1952, 1991) provided a means to quantitatively compare potential portfolios and select those with minimum risk given an expected level of return (i.e., the efficient portfolios). Following Markowitz's 1952 seminal article, a large body of literature on portfolio analysis has focused on the securities markets for which the theory was originally developed. Portfolio theory has also been extended to various types of assets including agricultural crops (Heady; Collins, and Barry; Stovall) and natural resources (Mills and Hoover). The most common agricultural applications evaluate risk-return tradeoffs associated with crop diversification practices (Hazell) and dynamic crop planting decisions (Burt and Johnson). The portfolio analysis approach, however, is also applicable to downstream market segments including the food processing sector. For example, processors must decide how to cut, clean, and package a fresh fruit or vegetable. Despite similarities in the decisions faced by investment managers and food processors,

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The authors thank two anonymous reviewers for comments that strengthened this paper. This research was partially funded by the Office of Sea Grant and Extramural Programs, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, under grant number NA36RG0451 (project number R/SF-5), and by appropriations made by the Oregon State Legislature. This grant was also supported by the Coastal Oregon Marine Experiment Station of Oregon State University and the Florida Agricultural Experiment Station of the University of Florida where it was approved for publication as Journal Series No. R-08058. The views expressed herein do not necessarily reflect those of any of the funding organizations.

Review coordinated by Gary D. Thompson.

to our knowledge portfolio theory has not been applied to food processing in general or fish processing specifically.

Increasing the economic stability of the seafood processing sector by reducing the risks associated with sales in output markets can indirectly reduce the financial risk in the harvest sector, thereby sustaining the success of a fishery. By producing a more diverse portfolio of products, processors can accomplish two objectives. First, they can maximize profits through a wider variety of production alternatives that can be matched with the intrinsic characteristics of the raw product. In effect, processors would be positioned to change the composition of output products—including fish paste (surimi), frozen individual fillets, or frozen fillet blocks—by altering the freezing method, portion type and size, and/or degree of processing. This production strategy can increase the profits or reduce the risks associated with seasonal variability in the biological characteristics of the raw input product. Second, seafood markets can be extremely volatile due to both supply and demand variability including seasonal and annual changes in resource stocks, harvests, and output market prices. Access to a larger number of production alternatives is one strategy producers can adopt to address these types of economic risks.

Aside from documenting the effects of diversification at the broker and processor levels, portfolio analysis also provides an analytical tool for policy makers and natural resource managers given their direct and indirect influence on private-sector business behavior (Jensson). For example, seafood processors often depend on uncertain supplies of commercially harvested wild species. Policy makers can control harvest levels and geographic, seasonal, or inter-annual allocations, factors which can directly influence processing costs and production yields as well as indirectly influence the choice of output products, output prices, and diversification strategies.

Understanding how seafood firms manage risks within the opportunities and constraints imposed by public policy is critical for developing management strategies designed to maximize public welfare. This is especially relevant for fisheries because current legislation requires that fisheries be managed to maximize national benefits while reducing risk, particularly in relation to conserving biological stocks.

To fully evaluate the risk-return tradeoffs from portfolio diversification in seafood processing, optimal portfolio frontiers are generated for the Pacific whiting (*Merluccious productus*) fishery using three alternative benefit functions representing the possible objectives of different interest groups. The first approach (the seafood broker scenario) is a direct application of portfolio theory from the finance literature in which diversification strategies are compared based on net returns per unit of output production. This approach is representative of seafood brokers who facilitate transactions between processors and wholesale distributors and bear no additional costs associated with possession or speculation. Unlike other market players, brokers are paid on a percentage of the value of each unit of production. And unlike the processor or resource manager, the "myopic" broker's decisions are based only on units of output, rather than the opportunities associated with raw input product, harvest, or stock of resource capital.[1]

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[1] Brokers provide a significant link between processors and retail distributors in the marketing chain for whitefish species (Sylvia). Most of these species are regulated using open-access management strategies. Open access tends to generate greater variability in resource stock and harvests, and is characterized by greater policy uncertainty than more flexible management systems such as individual transferable quotas. Such strategies are inconsistent with institutions that support efficient vertical integration or long-term contracting with downstream market sectors including retail or food service firms. Under more efficient institutional arrangements (e.g., property rights), "myopic" brokers would play a less important role.

In the case of unit returns, Markowitz (1952) argued that investors are concerned with both the expected return (R) and the variance of returns (V) for a given asset or portfolio of assets. Because V is an "economic bad" for risk-averse investors who require a higher return for investing in higher variance assets, a tradeoff between R and V results. This Markowitz or full-covariance model was developed to generate R-V combinations, among which investors could choose their R-V preferences (Markowitz 1952, 1991; Alexander and Francis).

The second approach (the fish processor scenario) compares diversification strategies based on total expected net income resulting from a specified input (catch) level. Under this scenario, it is assumed fish processors attempt to maximize net income, which is the expected return, given a predetermined quantity of fish. In doing so, they incorporate expected prices, processing costs, market risk, and production yields into their production decisions. The explicit inclusion of production yields is notable with seafood processing because yields can range from approximately 20% for surimi (a flavorless, odorless protein paste used to produce imitation seafood products) to nearly 90% for minimally processed whole fish (Jensson). In the Pacific whiting fishery, the processing sector incorporates the harvest sector as all operations are considered vertically integrated for quota allocation purposes (Pacific Fishery Management Council).[2] Thus, this scenario generates a frontier for seafood processors, representing the tradeoff between net income and risk for a given quota allocation.

The third approach (the resource manager scenario) links dynamic stock characteristics and resource management objectives with fish processing diversification strategies. By embedding a portfolio decision framework within a dynamic bioeconomic model, it is possible to determine both the efficient product mix and the optimal management plan in a single simultaneous framework. There are several notable features of this approach. First, fish characteristics vary intra-seasonally and affect production yields and final product price. Second, the model incorporates expected price and cost variability which is product specific. Third, the efficient portfolio frontier reflects the rent-maximizing tradeoffs of alternative processing strategies. These tradeoffs provide resource managers with the expected economic outcomes of alternative management plans. Although economic effects are not the sole or primary concern for managers of the Pacific whiting resource, predicted economic effects have affected, for example, design of fishing seasons and quota allocations (Larkin and Sylvia).

A comparison is then made of the optimal frontiers and portfolios generated from benefit functions representing each of the three interest groups described above—seafood brokers, fish processors, and resource managers. Comparisons with the current portfolio and resulting estimates of regulatory rent dissipation are also presented. The study concludes with a summary discussion, with specific remarks considering further potential use of portfolio theory for addressing a wide range of risks associated with marine resource management, including the integration of private and public decision making.

[2] For management purposes, the fishery is composed of two sectors: (*a*) factory trawlers that harvest and process at sea, and (*b*) shore-based processors that receive fish from numerous smaller trawl vessels.

Modeling Approaches

Seafood Broker Scenario

Given n assets (i product forms), the proportions invested in (i.e., the share directed toward the production of) each asset, X_i, must sum to one:

$$\sum_{i=1}^{n} X_i = 1. \tag{1}$$

Using the weighted sum of the expected returns of the individual assets, represented by the mean return $\bar{r}_i$, the expected rate of return for the portfolio is denoted by:

$$R = \sum_{i=1}^{n} X_i \bar{r}_i . \tag{2}$$

With the Markowitz model (Markowitz 1952, 1991), the variance of a given portfolio,

$$\sigma^2 = V = E\left(\left(\sum_{i=1}^{n} X_i r_i - R\right)^2\right) = \sum_{i=1}^{n}\sum_{j=1}^{n} X_i X_j \sigma_{ij}, \tag{3}$$

can also be determined with σ_{ij}, the variance-covariance of past returns between assets i and j ($i, j = 1, 2, ..., n$).

Covariances between assets play an important role in decreasing the variability in the return generated by all assets in the portfolio. Because V is a weighted average of the variances and covariances of the included assets, V declines as the correlation between assets decreases. Thus, a low-return product form might be an attractive alternative if its returns are inversely correlated with the returns of other potential product forms.

The R-V combinations reflecting the tradeoff between returns and risk are derived by minimizing the variance of the portfolio subject to a given level of expected unit return (covering the range of possible returns) and the adding-up constraint. In practice, unit return frontiers are constructed by using proportional returns. In this case, the unit return is calculated per pound of finished product,

$$r_i = p_i - c_i^T, \tag{4}$$

using the observed unit price (p_i) and total costs of production (c_i^T) including raw product costs (c^r), other variable processing costs (c^v), and fixed costs (c^f) for each product form. Efficient portfolios lie on the concave portion of the frontier and represent minimum risk for a given expected rate of return (or conversely, represent the highest expected return for a given level of risk). In summary, this frontier is generated by minimizing equation (3) subject to equations (1) and (2).

Fish Processor Scenario

Net income (I) in the short run—i.e., a single day, which is applicable to processors—is calculated by summing the total income from each product form:

$$I = \sum_{i=1}^{n} Q_i^F \left(p_i - c_i^v\right), \tag{5}$$

where Q_i^F represents the total quantity of product form i, and the term in parentheses represents the corresponding net unit return.

Because output quantities are the results of the efficiency of the production process and are not decision variables, the quantity of raw fish that is available and directed toward producing different products needs to be explicitly included. To that end, the quantity of raw fish available in weight (q) is a constraint in this scenario:

$$q = \sum_{i=1}^{n} Q_i^R. \tag{6}$$

This quantity is disaggregated for use by processors into the quantity of fish landed that is directed toward the production of product form i (Q_i^R). To account for the effect of production yields (also known as product recovery rates) on the selection of products to produce, Q_i^R is multiplied by the yield for product form i (γ_i), where $0 < \gamma_i < 1$, to determine the total quantity of product i available for sale:

$$Q_i^F = \gamma_i Q_i^R. \tag{7}$$

Two additional equations are needed to determine the portfolio distribution of products. The quantities of the final products must be summed to determine the total quantity of final products produced, Q^T:

$$Q^T = \sum_{i=1}^{n} Q_i^F. \tag{8}$$

The output portfolio enters the model through the following equation:

$$Q_i^F = X_i Q^T. \tag{9}$$

The net income frontier is generated by maximizing the expected net income (5) given a specified level of risk subject to equations (3) and (6)–(9). The model is solved over a range of possible risk levels to construct the maximum expected net income (I) portfolio frontier.

Resource Manager Scenario

An age-structured model predicts the number of fish harvested (N) in each time period. Fish age (a) ranges from 2 to 15 years. Time (t) is tracked monthly across years. Stock size is determined by the previous stock size and the total mortality rate (Z), which is composed of natural mortality (m) and fishing mortality (F). Fishing mortality is determined by the harvest rate, selectivity of each cohort to fishing pressure (sel), and a variable that allocates effort within each season. The harvest rate is determined by the size of the spawning biomass (SB) and an adjustment factor, which is the ratio of the ideal harvest rate (f^*) to the corresponding "ideal" spawning biomass (sb^*). The spawning biomass is the weight of the sexually mature females calculated by multiplying the stock size (N), fish weights (w), proportion of females by weight (pf), and the proportion of females that are sexually mature (pm). The explicit biological, harvest, and processing equations are presented in table 1.

Table 1. Glossary of the Model Components Used in the Resource Manager Scenario

Variable	Equation[a]
Biology and Harvest:	
Numbers of Whiting	$N_{t+1a+1} = N_{ta}\exp(-Z_{ta})$
Total Mortality	$Z_{ta} = m + F_{ta}$
Fishing Mortality	$F_{ta} = (f^*SB_t/sb^*)sel_a M_t$
Spawning Biomass	$SB_t = \Sigma_a N_{ta} w_{ta} pf_a pm_a$
Landings in Numbers	$H_{ta} = N_{ta}(1 - \exp(-Z_{ta}))(F_{ta}/Z_{ta})$
Processing:	
Production in Weight	$Q_{ti}^F = \Sigma_a H_{ta} w_{ta} X_{ti} \gamma_{ti}$
Annual Product Form Allocation	$\Sigma_i X_{ti} = 1$

[a] See text for description of the parameters, which are denoted by lower-case letters. Time, fish age, and product form are denoted by indices t, a, and i, respectively. For simplicity, time (month and years) is represented by a single index. Separate indices for month and year are used in the programming model to advance the age of each cohort, include a new cohort, and account for annual fixed costs in each year. (See Larkin and Sylvia for further detail.)

The harvest in numbers (H) is calculated using the total number of fish, the proportion that die during the period, and the proportion that die from fishing effort. The total quantity of final products produced in time t is determined by a number of factors including the total number of fish harvested during the period. Other dynamic factors also significantly affect the volume of final products, including the weight of each cohort at the time of harvest, the proportion of fish used to produce alternative product forms, and the production yields. A significant feature of the dynamic model is that it determines optimal production strategies (i.e., product form portfolios) in each time period, X_{ti}, which are averaged for comparison among scenarios. These portfolios change over time in order to account for the seasonal variation in the weight of individual fish within each cohort and other intrinsic characteristics such as protein and fat content which affect yields and prices.

In a dynamic framework, net income is standardized over time using a monthly discount rate (δ),

$$NPV = \sum_t \sum_i I_{ti}(1/(1+\delta))^t, \quad (10)$$

where net income (I) is redefined over time as: $I_{ti} = Q_{ti}^F r_{it} - fc$, such that total costs of production and all fixed costs (fc) are included. The objective of the resource manager model is to maximize net present value (NPV) subject to the stock dynamics, harvest equation, product form selection, and production equations. The frontier is generated by maximizing equation (10) subject to the biological, harvest, and processing equations in table 1 and different levels of risk associated with allocating the raw fish into the production of alternative product forms [equation (3)]. Due to a lack of sufficient data, the unit returns differ only by month (not year), and the covariance matrix is held constant across all months.

Data

Stock

Using the Pacific whiting fishery, the inter-year biological dynamics are modeled assuming a three-year time horizon in order to correspond with the stock assessments conducted by the National Marine Fisheries Service (NMFS). Total annual landings, however, are subject to an aggregate quota of 273,800 metric tons (mt) in order to be consistent with the triennial harvest plan and stock assessment schedule (Pacific Fishery Management Council). The specified biological equations and parameters were adapted (and in some instances simplified as described earlier) from Larkin and Sylvia, and from NMFS source documents described therein.

Product Forms and Prices

Prices for six whiting product forms were obtained from the *Fisheries Market News Report* (NMFS). Historical price data were not available for all products because domestic processing and marketing only began in the early 1990s. As there is high correlation between prices of identical product forms processed from similar species due to substitution possibilities at the processor level (Sylvia), the volatility in returns of a whiting product is assumed to equal the volatility experienced by an identical product made from walleye pollock (*Theragra chalcogramma*). Based on this assumption, published monthly prices for six additional non-whiting products were included (i.e., $i = 1, 2, ..., 12$). All prices were obtained for a five-year period ending September 1995.

Prices for the non-whiting products were obtained from various issues of the *Seafood Price Current* (Urner Barry). The monthly price data show a correlation coefficient of 0.873 for pollock and cod fillets over the five-year period, which is nearly identical to the 0.869 correlation between pollock and whiting blocks. Breaded products processed from pollock and whiting showed an even higher degree of correlation (0.952). These high correlation coefficients indicate the substitutability among product forms of different species and support the decision to use prices of similar species as a proxy for product forms not currently produced from whiting. Prices were adjusted to the average of market prices observed in September 1995 using the average price difference between species, provided by processors from an industry survey (Tuininga). Table 2 gives a summary of the product forms, their abbreviations used in this analysis, and related price information.

Costs

Costs were obtained through surveys with whiting processors (Tuininga). The reported average variable costs by product form are summarized in table 3. Because costs were not collected over time, producer price indices developed by the U.S. Department of Labor were used to estimate costs over time for labor, ingredients, packaging, and manufacturing overhead. For example, the producer price index for "folding sanitary containers" was used to derive a monthly time series of estimates to correspond with the price data for packaging costs.

At the time of the survey, fixed costs per pound of finished product ($c^f_{it=1}$) averaged \$0.114 and consisted of administrative salaries (\$0.042), interest and depreciation

Table 2. Product Forms for Portfolio Model Selection

Abbreviation	Product Description [a]	Lot Size	Species	Average Price ($/lb.)	Price Adjustment [b] ($/lb.)	Price Range ($/lb.)	Source [c]
H&G	Headed and Gutted	5.0 lbs.	Whiting	0.40	−0.03	0.37–0.49	NMFS
BLK	Blocks	16.5 × 4 lbs.	Whiting	0.80	−0.15	0.65–1.18	NMFS
MBL	Minced Blocks	16.5 × 4 lbs.	Pollock	0.43	−0.02	0.39–0.92	NMFS
SUR	Surimi	16.5 × 4 lbs.	Pollock	1.10	−0.23	0.60–2.03	NMFS
LF_A	Layerpack Fillets, skinless	10.0 lbs.	Whiting	0.95	0.00	0.83–1.08	NMFS
LF_B	Layerpack Fillets, skin-on	10.0 lbs.	Whiting	0.74	0.00	0.61–0.83	NMFS
SF2	Shatterpack Fillets, 2–4 oz.	3 × 15 lbs.	Pollock	0.95	−0.35	0.55–1.36	UB
SF4	Shatterpack Fillets, 4–6 oz.	3 × 15 lbs.	Pollock	1.00	−0.35	0.70–1.60	UB
IQF2	Individually Quick Frozen Fillets, 2–4 oz.	Bulk	Pollock	0.95	0.00	0.80–1.40	UB
IQF4	Individually Quick Frozen Fillets, 4–6 oz.	Bulk	Pollock	1.00	−0.10	0.95–1.62	UB
BP_C	Breaded Portions, 2–4 oz. cooked	6.0 lbs.	Whiting	1.10	−0.35	0.97–1.20	NMFS
BP_R	Breaded Portions, 2–4 oz. raw	6.0 lbs.	Whiting	1.05	−0.35	1.00–1.18	NMFS

[a] All products are frozen. All fillets are skinless unless specified otherwise.
[b] Prices were adjusted to match the average market price observed by Pacific whiting processors in September 1995 based on price relationship information provided during the surveys (Tuininga).
[c] NMFS = National Marine Fisheries Service and UB = Urner Barry, for the five-year period ending September 1995.

Table 3. Raw Product and Other Variable Costs per Finished Pound for Pacific Whiting

	Product Form i								
Cost Components	H&G	BLK	MBL	SUR	LF_A[a]	LF_B	IQF[b]	BP_C	BP_R
Raw Product ($\bar{c}_i^r$):									
Cost	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Fish tax (1.09%)	0.001	0.002	0.002	0.003	0.002	0.002	0.002	0.001	0.001
Total ($/lb. raw)	0.051	0.052	0.052	0.053	0.052	0.052	0.052	0.051	0.051
Processing ($\bar{c}_i^y$):									
PRR (lb. output/lb. raw)[c]	0.54	0.23	0.33	0.16	0.23	0.31	0.23	0.38	0.38
Total ($/lb. output)	0.09	0.23	0.16	0.33	0.23	0.17	0.23	0.13	0.13
Labor and Benefits	0.06	0.25	0.05	0.12	0.40	0.37	0.25	0.50	0.50
Ingredients[d]	0.00	0.00	0.02	0.09	0.00	0.00	0.00	0.14	0.11
Packaging	0.05	0.02	0.03	0.04	0.06	0.06	0.06	0.06	0.06
Manufacturing Overhead	0.05	0.10	0.05	0.13	0.12	0.12	0.12	0.12	0.12
Total[e]	0.25	0.59	0.30	0.69	0.80	0.72	0.65	0.96	0.93

[a] Also represents costs for shatterpack fillets (SF2 and SF4).
[b] Costs are the same for all fillet sizes.
[c] PRR is the "product recovery rate," which is the output quantity divided by the input quantity.
[d] Note, some product forms do not require the use of any ingredients and so have zero costs.
[e] Totals may not equal sum of individual components due to rounding.

($0.04), operating expenses ($0.015), insurance ($0.01), and technicians ($0.006). Because fixed costs were indistinguishable across species and product forms, they were allocated equally among all finished products. In the *NPV* scenario, fixed costs (fc) totaling $15 million were included as a lump sum based on findings reported by Radtke.

Yield and Cost Seasonality

Historically, the processing of whiting has not been equally distributed throughout the year due to seasonal migration and open-access harvesting. Harvest and processing have occurred primarily from April through October. Table 4 documents the monthly yields used in this analysis. As evident from table 4, yields vary significantly among the different products, and are expected to have an important impact on net income and *NPV*. For example, 1,000 mt of raw fish could be used to produce 1,186,000 pounds of headed and gutted product (H&G) or only 355,000 pounds of surimi. Table 4 also includes the monthly variable processing costs for each product form, which varied by less than 4% for any given product.

Results

Seafood Broker Scenario

A nonlinear programming model was developed to solve the full-covariance portfolio model [equations (1)–(4)]. This model and subsequent models were optimized using the GAMS software package with the MINOS solver (Brooke, Kendrick, and Meeraus). A nonnegativity constraint was imposed on the allocations to each product form in order

Table 4. Pacific Whiting Seasonal Processing Parameters

	Month						
Product Form	April	May	June	July	August	September	October
Processor Yields (γ_{it} lb. output/lb. raw):							
MBL	0.310	0.320	0.330	0.340	0.340	0.340	0.340
LF_A	0.210	0.220	0.230	0.240	0.240	0.240	0.240
LF_B	0.300	0.310	0.320	0.330	0.330	0.330	0.330
BP_C, BP_R	0.344	0.361	0.377	0.393	0.393	0.393	0.393
H&G	0.510	0.525	0.540	0.540	0.540	0.540	0.540
BLK	0.210	0.220	0.230	0.240	0.240	0.240	0.240
SUR	0.151	0.156	0.161	0.166	0.166	0.166	0.166
SF2, SF4	0.210	0.220	0.230	0.240	0.240	0.240	0.240
IQF2, IQF4	0.210	0.220	0.230	0.240	0.240	0.240	0.240
Variable Cost of Production (c_{it}^{v} $/lb. output):							
MBL	0.313	0.308	0.303	0.299	0.299	0.299	0.299
LF_A	0.821	0.810	0.800	0.791	0.791	0.791	0.791
LF_B	0.723	0.718	0.713	0.708	0.708	0.708	0.708
BP_R	0.942	0.935	0.929	0.923	0.923	0.923	0.923
BP_C	0.972	0.965	0.959	0.953	0.953	0.953	0.953
H&G	0.259	0.256	0.254	0.254	0.254	0.254	0.254
BLK	0.616	0.605	0.595	0.586	0.586	0.586	0.586
SUR	0.711	0.700	0.690	0.681	0.681	0.681	0.681
SF2, SF4	0.821	0.810	0.800	0.791	0.791	0.791	0.791
IQF2, IQF4	0.671	0.660	0.650	0.641	0.641	0.641	0.641

to preclude assets from being sold short. This assumption is reasonable for the whiting fishery, as processors have indicated forward contracting is rare (Tuininga). In addition, an upper-bound constraint of 30% was imposed on individually quick frozen (IQF) and shatterpack fillet shares for the 4–6 oz. product size in order to conform with the average size of this whiting species, which is relatively small.

Correlation coefficients of the proportional unit returns described in equation (4) for the 12 alternative product forms ranged from −0.51 to 0.90 (table 5). The return of the block product form (BLK) was negatively correlated with the returns of most other products. The H&G return was negatively correlated with the returns of surimi (SUR) and shatterpack fillets (SF2, SF4). Due to their negative correlation coefficients with different product forms, blocks and H&G are likely important products in reducing variation in the expected rate of return (assuming these relationships continue to hold).

Causal explanations for these weak to moderate negative correlations are difficult to determine given the complexity of global whitefish markets, which encompass generic white-flesh fish products such as those produced from Pacific whiting and walleye pollock. Possible reasons may stem from the inverse seasonal supply trends of alternative frozen whitefish products produced in the southern versus northern hemispheres. Other reasons may be related to the distinct markets for which these products are targeted. Spurious correlation is also possible, particularly given that the data cover only a five-year period.

Table 5. Product Form Correlation Coefficients of Unit Returns

	H&G	BLK	MBL	SUR	LF_A	LF_B	SF2	SF4	IQF2	IQF4	BP_C	BP_R
H&G	1.00											
BLK	−0.05	1.00										
MBL	0.40	−0.09	1.00						SYMMETRIC			
SUR	−0.05	−0.27	0.81	1.00								
LF_A	0.40	0.13	0.30	0.19	1.00							
LF_B	0.13	0.10	0.36	0.48	0.77	1.00						
SF2	−0.51	0.13	0.29	0.48	0.16	0.20	1.00					
SF4	−0.18	−0.13	0.26	0.36	0.35	0.22	0.78	1.00				
IQF2	0.34	−0.36	0.77	0.64	0.44	0.36	0.34	0.56	1.00			
IQF4	0.20	−0.45	0.52	0.44	0.30	0.15	0.41	0.72	0.90	1.00		
BP_C	0.26	−0.50	0.25	0.18	0.10	−0.07	0.18	0.59	0.60	0.80	1.00	
BP_R	0.66	−0.52	0.54	0.36	0.30	0.12	−0.04	0.38	0.75	0.76	0.80	1.00

Note: The correlations were based on monthly observations from October 1990 through September 1995 ($n = 60$).

The optimal portfolio and associated risk resulting from the variance-covariance matrix of unit returns were generated for unit returns ranging from zero to the highest observed unit return in 0.007 increments. The minimum variance portfolio frontier and associated product portfolios from selected points are depicted in figure 1. The constraint on the production of 4–6 oz. fillets prevented the model from increasing the proportion of these product forms above 30%, explaining in part why the slope decreased when moving to the higher risk and return portfolios.

In general, returns and prices were directly related as expected; low return product forms were associated with low risk and vice versa. High return/high risk portfolios for seafood brokers consist primarily of surimi and IQF fillets. Medium return/medium risk broker portfolios are primarily composed of IQF fillets, blocks, and H&G. Raw breaded portions (BP_R), H&G, and blocks are present in low return/low risk broker portfolios.

The model selected the production of blocks through a wide range of broker portfolios associated with various levels of risk. This occurred because blocks provide significant risk reduction due to their low or negative covariation with all other product forms, especially IQF fillets and breaded products. The model selects 4–6 oz. IQF fillets rather than shatterpack fillets because of their higher expected return. The model does not select minced blocks, skinless layerpack fillets, or cooked breaded portions because the returns and risk-reducing performance of these product forms are relatively low.

In 1998, whiting processors produced a product mix of 70% surimi, 15% IQF fillets, and 15% H&G (Pacific Fishery Management Council). For comparison, this portfolio is identified in figure 1 as "current." According to the broker frontier, this production strategy would be characterized as relatively high risk/high return. Risk could be reduced by approximately 10% without sacrificing expected return by changing the product mix to reflect portfolio 10 (i.e., reduce surimi production, discontinue producing H&G, increase the production of IQF fillets, and initiate production of blocks). Alternatively, changing the production mix to reflect portfolios 2 or 3 would increase returns by approximately $0.07/pound for the same risk. Portfolios on the negatively sloped portion of the frontier (albeit small) would never be selected because the same return could be achieved with less risk by selecting portfolios on the positively sloped segment of the frontier.

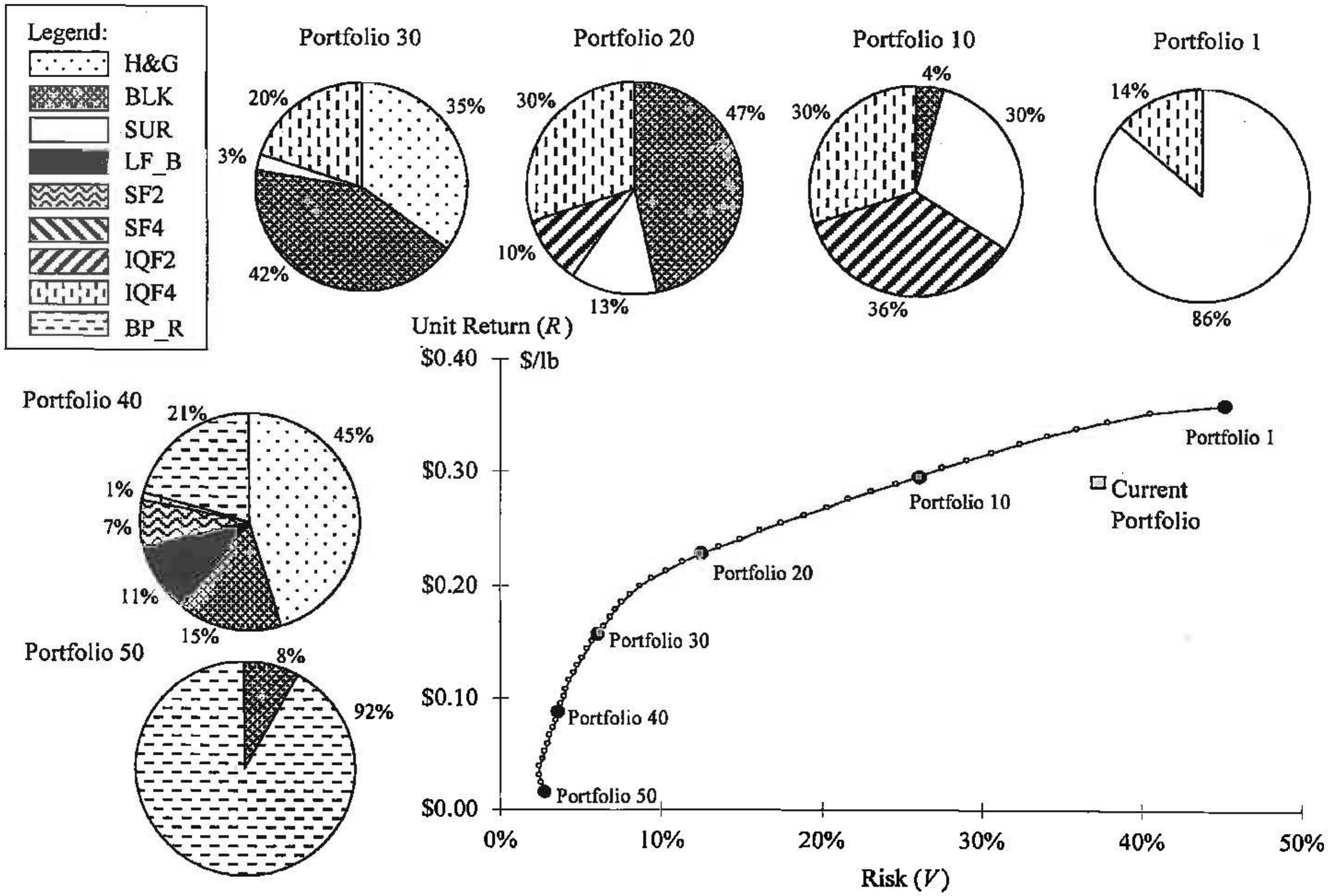

Figure 1. The efficient broker frontier and selected portfolios

Fish Processor Scenario

The efficient processor frontier is generated by maximizing the expected net income [equation (5)] subject to a specified level of risk [equation (3)], which is varied from zero to the maximum possible given the observed variances, and quantity of harvested fish (q). The harvest quantity of fish landed was fixed at 1,000 mt, representing approximately the quantity a single plant can process in a day (Libby). The empirical application also includes the nonnegativity constraint on the portfolio shares as used in the previous scenario. Model results are depicted in figure 2 based on a 7% discount rate, which was the official governmental rate at the time of the analyses.

Net income is highest in portfolio 44, which consists of 70% H&G, 27% 4–6 oz. IQF fillets, and 3% 4–6 oz. shatterpack fillets. The variance of this portfolio is 9%, which is below the average risk of all income-maximizing portfolios (25.3%). While the net unit return for H&G ($0.15/pound) is relatively low compared to 4–6 oz. IQF fillets ($0.35/pound) and surimi ($0.41/pound), the higher yield for H&G (54% versus 23%) offsets the lower net return per unit when the total quantity of landed fish is incorporated into the model. In addition, the relatively low covariation of H&G returns with the other product forms (table 5) makes this an important low-risk product form. Overall, the surimi, 4–6 oz. IQF fillets, and H&G product forms comprise some portion of the optimal processor portfolios at all risk levels, although the portfolios include shatterpack rather than IQF fillets at lower risk levels.

The current average portfolio of whiting processors is included in figure 2. The location of this point in risk and net income space indicates (given the prevailing prices, recovery rates, and processing costs) firms may be able to achieve higher profits ($152,184 versus $140,000) by shifting production away from surimi and into H&G. A move toward the lower risk portfolios (49 and 50) but with the same return would require shifting production from primarily surimi to H&G and raw breaded portions, and would reduce risk by approximately 36 percentage points. Such a shift would likely depend on the markets for the products in the low-risk portfolios.

When compared to the seafood broker frontier and associated optimal portfolios, the processor frontier also suggests less reliance on surimi but an increase in H&G instead of fillets. Because the harvesting sector is vertically integrated with the processing sector in this fishery, processor output is explicitly considered by resource managers when making quota allocation decisions (Pacific Fishery Management Council). Consequently, this scenario could be used to quantify industry incentives and provide managers with information on the likely outcomes of alternative management plans.

Resource Manager Scenario

The efficient resource manager portfolio frontier is determined by maximizing NPV subject to a specified level of risk ranging from zero to the maximum given the data. For simplicity, each harvest/processing firm is assumed capable of processing all product forms. As current processors have the equipment or can affordably modify their equipment to process each product form considered in this study (Tuininga),[3] this assumption is reasonable.

[3] To consider the case where firms do not currently process whiting or possess the required capacity, the programming model was modified to trigger the purchase of the necessary equipment. The quantity of equipment purchased was determined by the maximum quantity of fish processed in a month. However, because the equation that performed this function was not differentiable, the algorithm in the MINOS solver used by GAMS could not solve this model. Specifically, the discrete choice optimization algorithms were unable to handle the large number of nonlinearities generated by the bioeconomic model. Future development of more sophisticated programming models would allow for the accommodation of discrete and lumpy capital investment (see Tuininga for further detail).

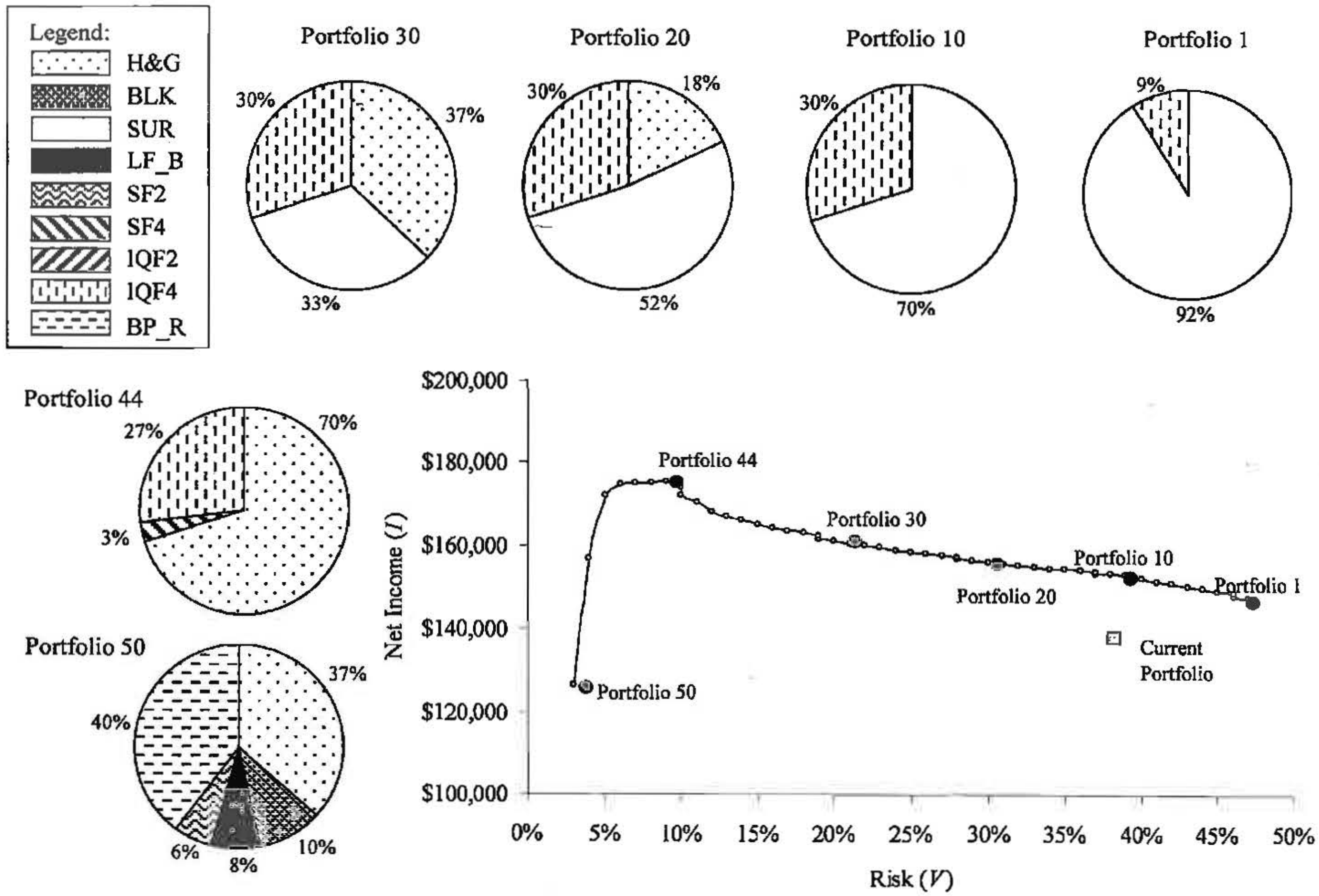

Figure 2. The efficient processor frontier and selected portfolios

The total annual landings quota constraint (273,800 mt) reflects the reality that harvest quantities are determined independently from the expected returns or risks faced by the industry. Additional equations ensure individual product form allocations are nonnegative (as in previous scenarios), the total allocation sums to one, and the existing monthly capacity of the onshore processing sector of 30,000 mt (Libby) is not exceeded. The efficient frontier generated under this scenario is depicted in figure 3, where the sample portfolios are averages over the three-year time horizon.

Low-risk portfolios for resource managers would consist primarily of H&G and 4–6 oz. IQF fillets. The product form with the lowest risk, raw breaded portions, is utilized in the lowest risk portfolio. However, this portfolio would produce the lowest *NPV* over the three-year period ($16.5 million). Due to the high tradeoff between *NPV* and risk at this low level of risk, processors would likely be inclined to increase *NPV* while only increasing their exposure to risk by a marginal amount. *NPV* is highest ($24.7 million) at a relatively low level of risk (9%), and is achieved through the production of 69% H&G and 30% 4–6 oz. IQF fillets (portfolio 42). Higher risk management portfolios consist of IQF fillets, decreasing quantities of H&G, and increasing proportions of surimi. Through the middle range of risk, management portfolios contain a maximum of 30% 4–6 oz. IQF fillets due to the production constraint. Where this constraint is binding, NPV is maximized by substitution of 2–4 oz. IQF fillets, generating proportionally higher returns due to the interactive effects of increasing product recovery and higher relative prices.

The model optimizes by selecting harvest and processing late in the season (i.e., July through October) given the monthly onshore processing capacity constraint. This optimal delay is due to higher processing yields, which occur later in the fishing season when fish are larger and in better condition. Higher yields generate larger quantities of finished product per unit of raw fish landed, which ultimately reduces the processing costs per finished pound. In addition, the model maximizes *NPV* by producing H&G and IQF fillets at the beginning and end of the processing season, respectively, in each of the three years. In high-risk management portfolios consisting of IQF fillets and surimi, *NPV* is maximized by first producing fillets and then switching to surimi later in the season. In moving along the management frontier from high to low risk, processing strategies make a transition from surimi to H&G production at risk levels above 22%. The processing of raw breaded portions typically accompanies the production of H&G in the lowest risk portfolios. Table 6 summarizes the average intra-season allocation of selected management portfolios.

The resource management frontier in figure 3 is similar to the frontier generated for seafood processors (industry) in figure 2. Despite the similarity, there are significant differences in portfolios between models. Most importantly, the management model incorporates intra- and inter-year stock dynamics, which result in the inclusion (increase) of 2–4 oz. IQF fillets at the expense of surimi and H&G production through the middle range of risky portfolios. The resource management results are particularly relevant given managers have the authority to alter the timing of fishing seasons, affect the speed at which processors operate, and control the allocation of harvests to fishing and processing sectors known to specialize in the production of different products (particularly surimi). When compared to the seafood broker and processor results, the resource manager scenarios predict a larger share of fillets would be optimal.

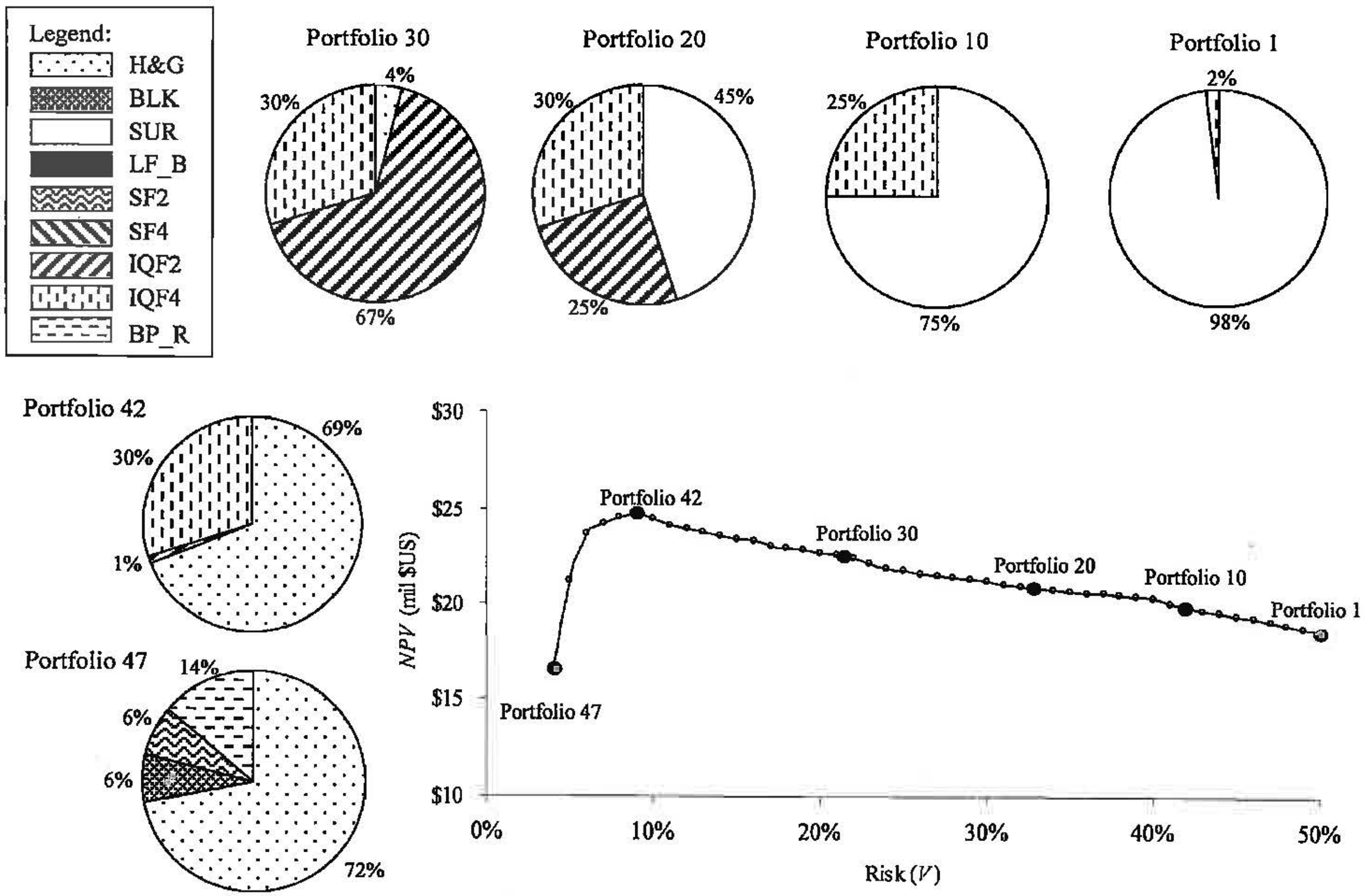

Figure 3. The efficient resource manager frontier and selected portfolios

Table 6. Selected Intra-Season Portfolios (%) from the Resource Manager Scenario

Product Form	Month: July	August	September	October	Average Annual Portfolio
Portfolio 22:					
SUR	0.0	3.5	49.8	46.8	37.6
IQF2	0.0	73.2	24.1	2.7	32.4
IQF4	45.8	3.9	18.9	31.3	30.0
Total	13.8	26.2	32.2	27.9	100.0
Portfolio 42:					
BP_R	0.0	65.9	34.1	0.0	29.3
H&G	49.8	31.2	19.0	0.0	25.0
BLK	31.6	18.2	31.2	19.0	10.3
IQF2	0.0	0.0	31.2	68.8	5.4
IQF4	0.0	0.0	42.7	57.3	30.0
Total	15.7	29.0	32.5	22.8	100.0
Portfolio 47:					
BP_R	0.0	13.3	66.2	20.5	44.3
H&G	49.8	31.2	19.0	0.0	25.0
BLK	12.3	37.5	18.5	31.8	21.0
IQF4	0.0	8.6	0.0	91.4	9.6
Total	15.0	22.4	38.0	24.6	100.0

Summary and Conclusions

This analysis has generated risk-return frontiers for interest groups with different benefit functions for the U.S. Pacific whiting fishery. The implications for processing strategies were derived by comparing the current portfolio, risk, and return with the optimal solutions predicted along each frontier. These comparisons quantify the trade-offs of changing product diversification strategies in response to the objectives of alternative interest groups. For resource managers in particular, the comparisons provide a measure of regulatory rent dissipation which is occurring under status quo management. For example, the current production mix of 70% surimi, 15% H&G, and 15% fillets falls below each frontier, indicating the status quo management is suboptimal and inefficient for all interest groups.[4] At the observed risk level, which is relatively high, returns could be increased as much as 16% to 24% depending on the interest group and potential for developing or expanding markets for these product forms.

For seafood brokers focused on product output and unit returns, the optimal portfolios differ markedly from those generated for processors and resource managers at all but

[4] The location of the frontier is affected by the underlying modeling assumptions. The extent to which the model may be misspecified or parameter values have changed (including the discount rate required by the Office of Management and Budget) will affect the level of estimated dissipated rents. Other factors that could affect the position of the frontier include significant processing scale economies, large research and development marketing costs, or aversion to risks associated with future but unknown fisheries management policies.

the highest risk levels. By comparison, broker portfolios would handle a larger number of product forms at all but the highest and lowest risk levels (e.g., portfolio 40 versus portfolios 1 or 50). While H&G is an important product form in low risk/low return portfolios of processors and resource managers, it was included only in the portfolios associated with a relatively small range of risk for brokers. These differences highlight the importance of selecting the market level upon which to base the economic analysis of the fishery.

The share of raw fish directed toward the production of surimi was robust to the alternative benefit functions; surimi dominated the optimal high-risk portfolios and was absent from the optimal low-risk portfolios of brokers, processors, and resource managers. Similarly, large (4–6 oz.) IQF fillets accounted for a stable share of each optimal portfolio at all but the lowest risk levels for each interest group. Two different product forms were included in the optimal portfolios of the lowest risk scenarios—raw breaded portions and, to a lesser extent, blocks. H&G was the only other product form found to be relatively robust to the alternative benefit function specification, although the H&G share was largest and most prevalent in lower risk scenarios for processors and resource managers.

When compared with the current industry portfolio at the processor level, the efficient frontiers reveal the same return can be achieved at lower risk levels by diverting raw fish from surimi to IQF fillets, H&G, and/or blocks. The specific substitute product form depends on the benefit function. Brokers would handle more blocks and IQF fillets, small and large. Processors would produce more large IQF fillets. Resource managers would allocate the annual quota among sectors and dictate the season opening in order to increase the production of IQF fillets. As the risk level is reduced, the H&G product form would enter the optimal portfolios.

Discussions with processors in 1998 revealed that market and product quality development efforts would need to increase in order for H&G and fillet products to realize the predicted profits of increased production (Tuininga). More recent discussions with seafood processors suggest a delayed season opening and cooperative agreements among members of the harvest and processing sectors have contributed to improving product quality and expanding market opportunities for H&G and fillet products. Specifically, they provided greater opportunities for the industry to develop Pareto-efficient risk-management strategies.

At this time, processors plan to decrease surimi production and increase IQF fillets and H&G by 20% to 30%, in part to reduce dependency on price-volatile surimi (Richardson; Libby). Thus, the tradeoffs predicted by the frontiers coincide with the more recent history of the fishery. However, capital stuffing and "race-for-the-resource" strategies by onshore processors induced by regulated open-access management continue to increase opportunity costs associated with more deliberate and balanced harvesting and processing strategies (Larkin and Sylvia).

This work illustrates how portfolio analysis can be used to evaluate the economic effects of product diversification. Although generation of efficient portfolio frontiers and dynamic bioeconomic analysis are well-known tools, their integration provides another approach for evaluating and incorporating the downstream economic effects of resource management policies. For example, the Sustainable Fisheries Act of 1996 requires policy makers to consider the effects of management decisions on fishing communities potentially dominated by fish processing plants, especially in smaller coastal ports.

The portfolio approach is particularly relevant for understanding and improving management of the U.S. Pacific whiting fishery, given the allocation of the annual quota among industry sectors specializing in the production of different product forms which will optimally vary throughout the season (Larkin and Sylvia). In addition, the increasing emphasis on addressing problems associated with industry stability, species substitutability, and implementing biologically related precautionary management suggests a range of opportunities in developing and applying additional risk-based approaches for fisheries managers.

Increasing the economic stability of the processing sector by reducing the risk associated with sales in the output markets can indirectly reduce market variability in the fishing sector and help sustain the development of the fishery. By producing a more diverse portfolio of products, processors can specifically accomplish two objectives. First, they can maximize expected profits through a wider variety of production alternatives that can be matched with the intrinsic characteristics of the raw product. In effect, processors would be positioned to change product forms to best address the risk and profitability associated with naturally occurring seasonal variability in fish attributes. Second, seafood markets can be extremely volatile due to both supply and demand variability. Producing a portfolio of products is one strategy for contending with market-related economic risks. However, because the development of markets for nontraditional and new products requires time and investment, it is important to consider all factors that may affect decisions to produce alternative product forms—including the investment-inhibiting effects of regulated open-access management strategies and policy uncertainty. A portfolio approach provides industry and resource managers with a potentially valuable framework to evaluate complex natural resource issues and develop management strategies best suited to balancing multiple objectives.

This analysis was conducted with data corresponding to a period during which the fishery was being developed. As such, the costs may not be representative of current production efficiencies. The alternative products included some that were not produced from Pacific whiting but were considered to have potential given markets from similar and competing whitefish species. A changing global whitefish market would likely change the specific product forms included if the analysis were repeated. Most importantly, from an economic perspective, availability of more seasonal price and cost data series would allow for the calculation of intra- and inter-season (monthly and annual) covariance matrices. Aside from economic parameters, the status of the stock (size and composition) would also affect results. A recent decline in total harvest quotas could, for example, allow the model to select optimal portfolio levels without the influence of demand constraints. In general, this study provides an illustration of how portfolio analysis can be applied to fisheries and fish processing, and how the results are important for different industry segments.

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PACIFIC HAKE

General Biology

Geographical distribution

Pacific hake, *Merluccius productus* (Ayres, 1855), of the offshore stock range from Sanak Island in the western Gulf of Alaska to Magdalena Bay, Baja California Sur. They are most abundant in the California Current System (Bailey 1982, Hart 1973, Love 1991, NOAA 1990). There are three much smaller stocks with much smaller ranges: a Puget Sound stock, a Strait of Georgia stock, and a dwarf stock limited to waters off Baja California (Bailey et al. 1982, Stauffer 1985). The offshore stock of Pacific hake is migratory and inhabits the continental slope and shelf within the California current system from Baja California to British Columbia (Quirollo 1992). All life stages are found in euhaline waters at 9-15°C (NOAA 1990).

Eggs and larvae of the offshore stock are pelagic in 40-140 m of water (Smith 1995), with eggs in the earlier stages being at the deeper depths (Moser et al. 1997). Pacific hake larvae tend to aggregate near the base of the thermocline or mixed layer (Stauffer 1985). This association with the thermocline or mixed layer may partially explain why Pacific hake in the Strait of Georgia and Puget Sound spawn near major sources of freshwater which would cause a stratified layer of low-salinity water on top of the well mixed marine waters common during the winter. Juveniles reside in shallow coastal waters, bays, and estuaries (Bailey 1981, Bailey et al. 1982, Dark 1975, Dark and Wilkins 1994, Dorn 1995, NOAA 1990, Sakuma and Ralston 1995, Smith 1995), and move to deeper water as they get older (NOAA 1990). Pacific hake school at depth during the day, then move to the surface and disband at night for feeding (McFarlane and Beamish 1986, Sumida and Moser 1980, Tanasich et al. 1991).

Adults are epi-mesopelagic (Bailey et al. 1982, NOAA 1990, Sumida and Moser 1980). Highest densities of Pacific hake are usually found between 50 and 500 m, but adults occur as deep as 920 m and as far offshore as 400 km (Bailey 1982, Bailey et al. 1982, Dark and Wilkins 1994, Dorn 1995, Hart 1973, NOAA 1990, Stauffer 1985). Spawning is greatest at depths between 130 and 500 m (Bailey et al. 1982, NOAA 1990, Smith 1995).

Smith (1995) recognized three habitats utilized by the offshore stock of Pacific hake: 1) a narrow 30,000 km^2 feeding habitat near the shelf break of British Columbia, Washington, Oregon, and California, populated 6-8 months per year, 2) a broad 300,000 km^2 open-sea area of California and Baja California populated by spawning adults in the winter and embryos and larvae for 4-6 months, and 3) a continental shelf juvenile rearing area of unknown size off California and Baja California.

Migrations

Offshore stocks spawn off Baja California in the winter, then mature adults begin moving northward and inshore, following the food supply and Davidson currents (Fig. 17) (NOAA 1990). Pacific hake reach as far north as southern British Columbia by fall. By early late fall, they begin the southern migration to southern spawning grounds and further offshore (Bailey et al. 1982, Dorn 1995, Smith 1995, Stauffer 1985) (see Fig. 17).

Stocks in the Strait of Georgia and Puget Sound undergo similar migration patterns, but on a greatly reduced scale (McFarlane and Beamish 1986, Shaw et al. 1990). In both areas, spawning occurs in locations proximate to major sources of freshwater inflow: near the Frazer River in the Strait of Georgia, and near the Skagit and Snohomish Rivers in Port Susan (McFarlane and Beamish 1985, Pedersen 1985). The Puget Sound and Strait of Georgia stocks spend their entire lives in these estuaries (McFarlane and Beamish 1986, Shaw et al. 1990).

Reproduction and development

Pacific hake may spawn more than once per season, so absolute fecundity is difficult to determine. Pacific hake are oviparous with external fertilization. Offshore stocks have 180-232 eggs/g body weight, but Puget Sound and

Strait of Georgia stocks have only 50-165 eggs/g body weight (Mason 1986). Bailey (1982) estimated that a 28-cm female had 39,000 eggs, while a 60-cm female had 496,000 eggs.

Eggs are spherical, 1.14 to 1.26 mm in diameter with a single oil droplet, and are neritic and float to neutral buoyancy (Bailey 1981, Bailey et al. 1982, NOAA 1990). The pelagic eggs of Pacific hake off California are found at depths between 50 and 75 m over a bottom depth of at least 300 m (Moser et al. 1997). Pelagic eggs of Puget Sound Pacific hake are found at approximately the same depth, but Pacific hake eggs in Puget Sound are in the bottom 25 m of the water column over a bottom depth of about 110 m (Bailey 1982, Moser et al. 1997).

Embryonic development is indirect and external (NOAA 1990). Hatching occurs in 5-6 days at 9-10°C and 4-5 days at 11-13°C (Bailey 1982, Hollowed 1992). Larvae hatch at 2-3 mm total length (Stauffer 1985, Sumida and Moser 1984) with a yolk sac that is gone in 5-7 days (Bailey 1982). Larvae metamorphose into juveniles at 35 mm, typically in 3-4 months (Hollowed 1992). Juveniles range from 35 mm to 40 cm depending on sex (Bailey et al. 1982, Beamish and McFarlane 1986, Hollowed 1992).

In Puget Sound and the Strait of Georgia, female Pacific hake mature at 37 cm and 4-5 years of age (McFarlane and Beamish 1986). Females of the offshore stock mature at 3-4 years and 34-40 cm, and nearly all males are mature by age 3 and as small as 28 cm. Females grow more rapidly than males after 4 years; growth ceases for both sexes at 10-13 years (Bailey et al. 1982).

By age 3, most Pacific hake become available to the mid-water trawl fishery, although Pacific hake between ages 6 and 11 are most commonly caught. The maximum age of Pacific hake is about 20 years, but Pacific hake over age 12 are rare (Methot and Dorn 1995). The size-at-age of offshore Pacific hake has been declining since the 1960s (Methot and Dorn 1995). By the early 1990s, age-10 males were 47 cm, and age-10 females were 48 cm. McFarlane and Beamish (1985) reported a more rapid growth rate in Pacific hake from the Strait of Georgia compared to Pacific hake from offshore up to age 4, after which time their growth rate levels off. Moreover, the Strait of Georgia Pacific hake reach maximum mean lengths (approximately 44 cm) that are approximately 10 cm shorter than the length at maximum age for offshore Pacific hake. In Puget Sound, male Pacific hake rarely exceed a length of 40 cm, whereas females tend to be about 4 cm longer than males (Pedersen 1985). MacGregor (1971) noted a marked cline in size at maturity with latitude for Pacific hake. According to MacGregor (1971) Pacific hake grow to a larger size and mature at a larger size in the northern part of their range, when comparing Pacific hake from southern Baja California to Puget Sound. MacGregor (1971) noted that this same growth pattern is apparent in European hake (*M. merluccius*) with larger hake occurring in the north and smaller hake in the south.

Trophic interactions

Pacific hake larvae eat calanoid copepod eggs, nauplii, and adults (McFarlane and Beamish 1986, Sumida and Moser 1984). Juveniles and small adults feed chiefly on euphausiids (NOAA 1990). Large adults also eat amphipods, squid, Pacific herring, smelt, crabs, shrimp, and sometimes juvenile Pacific hake (Bailey 1981, Dark and Wilkins 1994, McFarlane and Beamish 1986, NOAA 1990).

Eggs and larvae of Pacific hake are eaten by walleye pollock, herring, invertebrates, and sometimes Pacific hake. Juveniles are eaten by lingcod, Pacific cod, and rockfish species. Adults are preyed on by sablefish, albacore, walleye pollock, Pacific cod, soupfin sharks, and spiny dogfish (Fiscus 1979, McFarlane and Beamish 1986, NOAA 1990). Another important group on predators of adult Pacific hake are marine mammals, including the northern elephant seal (*Mirounga angustirostris*), northern fur seal (*Callorhinus ursinus*), California sea lion (*Zalophus californianus*), and several species of dolphins and whales (Methot and Dorn 1995).

Size and age distributions

As was mentioned above in the "Reproduction and development section," Pacific hake in the Strait of Georgia tend to be shorter at age than Pacific hake in the offshore populations; in some cases up to 10 cm (McFarlane and Beamish 1985). In addition, Pacific hake from central Puget Sound appear to be 2 to 4 cm shorter at age than

Pacific hake from the Strait of Georgia. Quinnell and Schmitt (1991) presented length/frequency data for Pacific hake from Puget Sound (Fig. 18) which demonstrated a trimodal length distribution, with most Pacific hake being 33 to 50 cm, and approximately similar numbers of Pacific hake being either 22 to 28 cm or 9 to 14 cm (see Table 2).

Table 2. Estimated body size of Pacific hake sampled during research trawling in major regions of Puget Sound in 1987 (from Quinnell and Schmitt 1991).

	No. of tows	No. of tows with catch	Mean length (cm)	No. of fish measured
Gulf of Bellingham	11	8	40	112
Strait of Juan de Fuca	30	5	52	102
Hood Canal	7	6	27	91
Central Puget Sound	28	19	34	876
South Puget Sound	17	6	28	54

Phenetic and Genetic Information Relating to the Species Question

Phenetic and genetic information examined for evidence of DPS delineations of Pacific hake included presence of geographically-discrete and temporally-persistent spawning aggregations, and variation in seasonal migration patterns, year-class strength, parasite incidence, growth rate, size- and age-at-maturity, length frequency, fecundity, meristics and morphometrics, and genetic population structure.

Life History Information

In addition to the abundant migratory population of Pacific hake, that spawns offshore from Cape Mendocino, California to southern Baja California, several other stocks of Pacific hake have been identified including at least two that spawn in Puget Sound, several in the Strait of Georgia, several in the west coast inlets of Vancouver Island, and a small-bodied ("dwarf hake") off the west coast of southern Baja California (Nelson 1969, Bailey et al. 1982, Ermakov 1982, Bailey and Yen 1983, Beamish and McFarlane 1985, Pedersen 1985, Bollens et al. 1992a, Alados et al. 1993, Methot and Dorn 1995, Fox 1997).

The Pacific hake stocks from offshore (Baja California to the west coast of Vancouver Island), Strait of Georgia, and Puget Sound have been considered discrete from one another on the basis of differences either in: 1) allozyme frequencies (Utter 1969a, b; Utter and Hodgins 1969, 1971; Utter et al. 1970), 2) spawning locality (Alverson and Larkins 1969), 3) size- and age-at-maturity (Goñi 1988), 4) growth (Nelson 1969, Beamish et al. 1982, McFarlane and Beamish 1985), 5) year-class strength (McFarlane and Beamish 1985, Goñi 1988), 6) effective fecundity (McFarlane and Saunders 1997), 7) otolith morphology and annuli formation (McFarlane and Beamish 1985), or 8) the degree of infestation with the protozoan parasite *Kudoa paniformis* Kabata and Whitaker, 1981 (Kabata and Whitaker 1981, 1985; McFarlane and Beamish 1985).

Pre-historical and historical persistence in Puget Sound

Tunnicliffe et al. (in press) examined fish remains in a complete Holocene sediment core sequence from Saanich Inlet, Vancouver Island, British Columbia. Pacific hake were one of the first fish species to occur in Saanich Inlet following glacial retreat from the region, after approximately 12,000 years before present (BP) (Tunnicliffe et al. in press). Fish abundance and species diversity peaked in Saanich Inlet between 7,500 and 6,000 BP, and the last 1,000 years have seen some of the lowest abundances of fishes in Saanich Inlet's marine history (Tunnicliffe et al. in press). The close proximity of Saanich Inlet to Puget Sound would suggest that Pacific hake were also likely established in Puget Sound by about 12,000 BP.

Pacific hake were identified in prehistoric fish skeletal remains from the Duwamish No. 1 archeological site (45-

KI-23), located 3.8 km upstream from Elliott Bay on the Duwamish River, utilized by aboriginal humans between A.D. 15 and A.D. 1654 (Butler 1987). Gadiforms were present throughout the occupational history of this site, and were third and fourth in rank order of taxonomic abundance in two separate studies of fish bones performed at this site (following Salmonidae, Pleuronectiformes, and in one case Squalidae) (Butler 1987). Conversely, archaeological investigations of the West Point site on the north side of Discovery Park in Seattle (utilized by hunter-fisher-gatherers between 4,250 and 200 BP) found few remains of gadiforms, although some Pacific cod bones were identified at this site (Wigen 1995). Wigen (1995) postulated that differences in the frequency of gadiform remains found between the Duwamish and West Point sites may be related to the possible use of fish traps at West Point versus hook and line methods at the Duwamish site, or perhaps to differences in the season of human occupation between the two sites. In historic times, Pacific hake were reported as abundant in Puget Sound by Jordan and Starks (1895).

Spawning location and spawn timing

Within Puget Sound (including Hood Canal) Pacific hake are known to spawn in Port Susan (Nelson 1969, Pedersen 1985, WDFHMD 1992) and in Dabob Bay (Bailey and Yen 1983, Bollens et al. 1992a, Fox 1997) and there may be other spawning aggregations of Pacific hake in Puget Sound (Fig. 19) but only the Port Susan-Saratoga Passage population has been commercially exploited (Thorne et al. 1971, Kimura and Millikan 1977, Pedersen 1985). Smith (1936) stated that spawning Pacific hake of both sexes were taken in Hale Passage near Carr Inlet in southern Puget Sound in March of 1936. WDFHMD (1992) also lists Carr Inlet as a known Pacific hake spawning location. According to Nelson (1969) large numbers of Pacific hake eggs and larvae have been found in Puget Sound only at Port Susan, with small numbers of eggs and larvae occurring in southern Puget Sound, Hood Canal, and near Possession Sound. Miller and Borton (1980) summarized distribution records of Pacific hake in Puget Sound as found in published records, museum collections, and various boat logs. Centers of collection of Pacific hake in Puget Sound were heavily influenced by fishing effort and ease of access, and centered around Port Susan, Saratoga Passage, Possession Sound, the central Sound from Shilshole Bay to Port Madison, Port Orchard, Carr Inlet, Penn Cove and Holmes Harbor on Whidbey Island, and Dabob Bay in Hood Canal (Miller and Borton 1980). Pedersen (1985) stated that small groups of Pacific hake occur in other areas of Puget Sound, in addition to Port Susan, but he did not identify the areas specifically. Historically, commercial fisheries for Pacific hake in Puget Sound centered around the Port Susan, Saratoga Passage, Port Gardner, and southern Carr Inlet areas (Fig. 20, Pedersen and DiDonato 1982).

Table A-1 summarizes available data on spawn timing in various locations for Pacific hake. In Puget Sound, spawning occurs primarily during February through April, peaking in March (W. Palsson[2]). Spawning aggregations begin to form up to a month before actual spawning. Within Puget Sound, peak spawning of Pacific hake occurs in mid-late-March in the Central Puget Sound population in Port Susan (Goñi 1988). Spawn timing of the Dabob Bay stock ranged from the beginning of February to the end of April in 1990 and from mid-January to the beginning of April in 1991 (Fox 1997). The mean back-calculated spawn date for Pacific hake in Dabob Bay was 14 March, in 1990, and February 20, in 1991 (Table A-1) (Fox 1997).

The main Pacific hake stock in the Strait of Georgia aggregates to spawn in the deep basins of the south-central Strait of Georgia (Fig. 19), with peak spawning occurring from March to May (Table A-1) (Goñi 1988, Shaw et al. 1990, Kieser et al. 1999). This area is bound by Halibut Bank and Gabriola Island, to the east and west, and Texada Island and Galiano Island to the north and south. Spawning aggregations of Pacific hake in south-central Strait of Georgia occur in two depth strata between 50-120 m and 150-330 m (Shaw et al. 1990). Beamish et al. (1976b) and McFarlane and Beamish (1985) stated that there is a second discrete stock of Pacific hake in the Strait of Georgia that has been found spawning northwest of Texada Island near Montgomery Bank (Fig. 19).

Foucher and Beamish (1980) reported that a third small stock of large Pacific hake has been observed spawning, 4-6 months prior to the main Strait of Georgia stock, in the Gulf Islands near Yellow Point in Stuart Channel (Fig. 19, Table A-1), suggesting this group is an additional discrete spawning stock (McFarlane and Beamish 1985). Likewise, Beamish et al. (1976a, c, 1978a) speculated that a stock of large Pacific hake may occur in Stuart Channel in the Gulf Islands that mature and spawn earlier than do Pacific hake in the open Strait of Georgia (Shaw et al. 1985a). Beamish et al. (1976c) stated that a small percentage of the presumed Stuart Channel stock appear to be in spawning condition year-round. An additional stock of Pacific hake was suggested to occur in

Saanich Inlet by Beamish et al. (1978b) based on apparent different rates of growth and presence of larger than normal Pacific hake in this area.

Palsson et al. (1997) stated that the South Puget Sound Pacific hake, which spawn in the Port Susan area are distinct from the offshore migratory stock and probably distinct from the resident transboundary stock shared with Canada that spawns in the Strait of Georgia. This resident transboundary population is also considered distinct from the offshore migratory stock (Palsson et al. 1997). Although spawning of the stocks occurs in well separated areas, it is not clear to what degree precise homing to the spawning grounds occurs in the Strait of Georgia and Puget Sound (Goñi 1988). Alverson (1969) stated that the migration pattern and distribution of eggs and larvae indicate that the offshore migratory Pacific hake population is homogeneous. Alverson (1969) also stated that the evidence is good that Pacific hake in inshore waters of Puget Sound, and perhaps the Strait of Georgia, are distinct from the offshore migratory population.

Various Canadian publications provide evidence that two types of Pacific hake occur off the southwest coast of Vancouver Island. These two types consist of: 1) small numbers of resident Pacific hake that remain in the region year round, spending the summer in coastal inlets along the west coast of Vancouver Island, and 2) the much larger stock of migratory offshore Pacific hake that spawn off southern California and migrate north to feed in the spring and summer (Beamish and McFarlane 1985, Shaw et al. 1985b, Ware and McFarlane 1995). Separate resident stocks of Pacific hake apparently occur in Nootka Sound, Barkley Sound (Trevor Channel), Sydney Inlet, and Tahsis Inlet on Vancouver Island (Beamish and McFarlane 1985; Shaw et al. 1985b, 1989a, b; Ware and McFarlane 1995). Shaw et al. (1985b) stated that "it appears that each inlet contains a "resident" stock of hake which may have different spawning times assuming similar growth rates." Beamish and McFarlane (1985) cited unpublished data indicating that eggs and larvae of Pacific hake have been found in samples from January to April in the vicinity of Barkley Sound and Sydney Inlet "clearly indicating the presence of resident spawning stocks." Beamish (1981a) and Beamish and McFarlane (1985) also stated that since few Pacific hake have been observed in this region in winter, the putative resident stocks of Pacific hake off the west coast of Vancouver Island are likely small in size. Smith et al. (1990) speculated that as resident west coast Vancouver Island inlet Pacific hake mature, they may eventually mix with the offshore migratory population during summer months off southwest Vancouver Island. In addition, McFarlane and Beamish (1985) reported that small distinct local stocks of Pacific hake are suspected to occur in mainland inlets of the British Columbia coast north of the Strait of Georgia.

The offshore stock spawns off southern California, primarily from December to April, with peak activity occurring in January and February (Bailey 1981, Smith 1995)-although sometimes heavy spawning occurs in March (Fig. 17, Table A-1) (Bailey et al. 1982). Woodbury et al. (1995) provided evidence, based on back-calculated spawn dates of young-of-the-year Pacific hake collected in central California, that spawning occurred in some years from September to March but that the majority of survivors were spawned in January-February. Hirschberger and Smith (1983) reported on an anomalous group of over 180 Pacific hake collected in spawning condition in August 1980 along the coast of Oregon; a time of year and region where spawning Pacific hake had not been previously, or subsequently, reported.

Doyle (1992) and Hollowed (1992) reported the presence of Pacific hake eggs and larvae in ichthyoplankton samples collected offshore of Northern California, Oregon, and Washington in the spring of 1983 and 1984, but not in the spring of 1980, 1981, 1982, or 1985. Hollowed (1992) speculated that the 1983-84 El Niño may have caused a shift in Pacific hake spawner distribution to the north in the winter of 1983 and 1984, accounting for the finding of most eggs in those years between 40° and 44° N.

A stock of Pacific hake off the west coast of southern Baja California was identified as distinct from the main offshore stock by Vrooman and Paloma (1976) based on morphometry, meristics, and general protein electrophoresis. Vrooman and Paloma (1976) called this population "dwarf hake" and suggested that it does not interbreed with *M. productus* and may therefore be a separate species. Ermakov (1982) also differentiated between an "oceanic" and a "dwarf" Pacific hake off southern California and Baja California based on morphometrics and disjunct spawning localities. Bailey et al. (1982) regarded the separation of the dwarf and offshore stocks to be controversial and suggested the differences between the two units may not be genetic, but "are not inconsistent with changes caused by environmental effects in the different habitats." Mathews (1985) described the "dwarf hake" of Vrooman and Paloma (1976) off Baja California as *M. hernandezi*; however, the taxonomic status of this species is still uncertain (Cohen et al. 1990).

Tagging and distribution

In general, species in the Genus *Merluccius* do not survive capture and release well and therefore no tagging studies exist to infer patterns of migration (Fritz 1959). This generality also holds for Pacific hake, which are difficult to tag externally due to their fragility (MacLellan and Saunders 1995). Despite the lack of tagging data, Mason et al. (1984) and Mason (1986) thought it unlikely that offshore and Strait of Georgia Pacific hake stocks intermingle to any large degree, based on their distributional patterns; although, according to Mason (1986), there may be some interchange between the Strait of Georgia and Puget Sound stocks due to surface transport of larvae produced in the central Strait of Georgia. However, WDFW (2000) pointed out that since water leaves the Strait of Georgia primarily "through and west of the San Juans into the northern Strait of Juan de Fuca," direct exchange of larvae between the Strait of Georgia and Puget Sound would not be expected.

Seasonal migrations

In autumn, the offshore stock of Pacific hake migrate from summertime feeding grounds (located between Queen Charlotte Sound in British Columbia and central California) to winter spawning areas (located between Cape Mendocino on the California coast and northern Baja California) (see Fig. 17). Spawning occurs from 60-1,655 km offshore at depths of from 120-400 m over bottom depths exceeding 1,000 m (Saunders and McFarlane 1997). Some Pacific hake may spawn as far south as off the southern tip of Baja California (Bailey 1982). The distribution of eggs and larvae and the migration pattern suggests that there is a single large offshore Pacific hake stock (Alverson and Larkins 1969). Adults migrate northward in the spring while juveniles remain off central and northern California (Bailey et al. 1982). The extent of northward migration is age-dependent, with older and larger fish migrating furthest north (Richards and Saunders 1990, Dark and Wilkins 1994, Saunders and McFarlane 1997). In warm years a greater proportion of the offshore Pacific hake stock moves into the Canadian fishery zone (Richards and Saunders 1990) and spawner distribution may shift further north as well (Hollowed 1992, Saunders and McFarlane 1997). Saunders and McFarlane (1997) summarized observations of latitudinal trends in biological characteristics such as age composition, sex ratio, mean size, and parasite prevalence for both summer-feeding and winter-spawning aggregations of offshore Pacific hake and propose processes that may explain these patterns.

Inshore Pacific hake that spawn in the Strait of Georgia, in Puget Sound at Port Susan and Dabob Bay, and in Nootka Sound, Barkley Sound, and Sydney Inlet on Vancouver Island are essentially resident stocks, although they may have relatively short spawning migrations (Ware and McFarlane 1995).

Year class strength

Strong year classes in offshore Pacific hake are not synchronous with those in Strait of Georgia Pacific hake (Beamish 1981a, McFarlane and Beamish 1985). According to Beamish et al. (1982), the dominant age-groups of Pacific hake in the Strait of Juan de Fuca and off the west coast of Vancouver Island were identical, and differed from Pacific hake in the Strait of Georgia. Analysis of age composition suggests that the differences between offshore Pacific hake and the inshore populations probably would be better characterized as differences in year-class variability rather than in year-class syncronicity (M. Dorn[3]).

Goñi (1988) found "strong inequalities" between indices of year-class strength (YCI, calculated by adding up percent contributions of each particular year class at ages 4, 5, and 6) for Port Susan (Puget Sound) and Strait of Georgia Pacific hake. Although discrepancies between ageing methods employed for these two populations may have confounded correlations between year classes in this study, Goñi (1988) stated that the differing relative importance and lack of correlation between strong year-class abundances in Port Susan and Strait of Georgia Pacific hake could be interpreted as evidence of their physical isolation. However, the fact that ageing procedures for Pacific hake differed by agency for these two groups of fish (Goñi 1988) and that the YCI used by Goñi (1988) was sensitive to the exploitation level, suggests that apparent differences in the YCI can't be used as reliable evidence of stock separation. At the time that Goñi (1988) did her study, the exploitation level for Puget Sound Pacific hake was high, whereas Strait of Georgia Pacific hake had a low exploitation rate. A high exploitation rate would accentuate the variability in the YCI even with the same variability in year class strength. The observation that recruitment (as evident by strong year classes) is more variable in Puget Sound Pacific hake relative to Strait of Georgia Pacific hake isn't supportable (M. Dorn[4]).

Parasite incidence

The softness and rapid deterioration of Pacific hake flesh following capture is generally considered to be due to two species of *Kudoa*, a genus of myxosporean protozoan parasites that infect the Pacific hake muscle fibers (Kabata and Whitaker 1981, 1985, 1986). The myxosporean parasite *Kudoa paniformis* was absent from Strait of Georgia Pacific hake (Kabata and Whitaker 1981, McFarlane and Beamish 1985) but was found in 57% of the large offshore migratory Pacific hake population (Kabata and Whitaker 1985). *Kudoa paniformis* was also absent in the putative resident Pacific hake stock in Tahsis Inlet on Vancouver Island, and was found in only one fish (11%) from the putative resident Pacific hake stock in Barkley Sound (Trevor Channel) (Shaw et al. 1989b).

Another less harmful but more widespread myxosporean parasite *K. thyrsitis* (Gilchrist, 1924) is found in Pacific hake from the Strait of Georgia, west coast Vancouver Island inlets, and offshore locations. This parasite is also prevalent in walleye pollock, some flatfish, and in several fish from Australia and South Africa (Kabata and Whitaker 1985). The presence of *K. paniformis* in the offshore stock but not in the Strait of Georgia or in Tahsis Inlet stocks indicates that this parasite likely infected the offshore Pacific hake stock subsequent to the separation of the inshore stocks (Kabata and Whitaker 1981, 1985). Distribution of parasites in the Genus *Kudoa* is further indication that resident Pacific hake stocks do not substantially intermingle with offshore migratory Pacific hake; *Kudoa* infection is spread either by release of spores from dead fish or via cannibalism.

Growth rate and body size

Due to the difficulty of visualizing scale annuli in Pacific hake, ageing of this species has typically occurred through analysis of the surface or internal annuli of otoliths (Etchevers 1971, Chilton and Beamish 1982). Due to difficulties in detecting growth zones in older, slower growing fish in the Strait of Georgia, Pacific hake in this area are aged by the "break and burn" method where the otolith is broken or sectioned through the nucleus and exposed to an alcohol flame, which enhances the contrast between the translucent and opaque zones (Chilton and Beamish 1982). Beamish (1979) stated that "age determinations using whole otoliths will not accurately determine the age of most older Pacific hake in some stocks." Puget Sound Pacific hake have routinely been aged by counting annuli on the surface of the otolith (Goñi 1988). Since growth zones on the otolith surface are difficult to identify in older, slower growing fish (Etchevers 1971), Beamish (1979) suggested that ages assigned to Pacific hake in the Puget Sound population by Kimura and Millikan (1977) may have underestimated the actual ages of older fish. Attempts to compare growth rates between stocks of Pacific hake are further compounded by apparent temporal changes in mean length-at-age and consequent interannual variations in mean growth rates within the offshore stock (Woodbury et al. 1995).

Hollowed et al. (1988) reported recent declines in mean length-at-age of offshore Pacific hake that may have been associated with the 1983 El Niño event or a density-dependent growth response to increased population abundance (Hollowed et al. 1988, Dorn 1992, Dark and Wilkins 1994). Despite differences in ageing methods applied to different stocks of Pacific hake, comparisons of growth parameters between stocks are routinely made.

Puget Sound Pacific hake have been reported to have a substantially slower growth rate than offshore Pacific hake (Alverson and Larkins 1969, Nelson and Larkins 1970). Likewise, Beamish et al. (1982) and McFarlane and Beamish (1985) noted that Pacific hake in the Strait of Georgia were considerably smaller than similar aged Pacific hake in the Strait of Juan de Fuca and off the west coast of Vancouver Island. Beamish et al. (1982) concluded that these differences supported the contention that Pacific hake in the Strait of Georgia are a separate stock from Pacific hake found in the western Strait of Juan de Fuca and offshore of Vancouver Island. The size of offshore and Strait of Georgia Pacific hake is reportedly similar up to the age at which they first mature, but offshore Pacific hake continue to increase in length, and reach larger sizes (Beamish 1979).

Goñi (1988) compared growth rate parameters from the literature for Puget Sound and Strait of Georgia Pacific hake and found between-stock differences in mean length-at-age that were significant for all cohorts examined. Comparison of growth plots of the two stocks revealed a consistent between-stock difference of about 5 cm in size-at-age. Puget Sound Pacific hake do not seem to grow as large overall as do Strait of Georgia Pacific hake (Goñi 1988).

Alverson et al. (1964) reported that mature Pacific hake taken off the Oregon-Washington coast averaged 52 cm in length with a range of from 22 to 71 cm. In the Strait of Georgia, the mean size of males was 52 cm and 54.5 cm for females between 1977 and 1981 (Beamish and McFarlane 1985). Between 1977 and 1981, the largest male and female Pacific hake reported from the Strait of Georgia were 77 and 84 cm, respectively, although very small percentages of either sex were greater than 60 cm in length (Beamish and McFarlane 1985). Most of the Pacific hake that occurred in the fishery in Port Susan in Puget Sound were from 32-45 cm in length (Pedersen 1985). Maximum lengths recorded by Pedersen (1985) for Puget Sound Pacific hake were 45 cm for males and 73 cm for females.

Nelson (1969) stated that for any given age, Pacific hake from inshore waters of Puget Sound and the Strait of Georgia are substantially smaller than the offshore migratory Pacific hake. For instance, the mean lengths of inshore Pacific hake at age 3 and 4 are 15 to 20 cm shorter than offshore Pacific hake of the same age (Nelson 1969). Pedersen (1985) stated that Puget Sound Pacific hake appear to be 2-4 cm larger at age 2 and 2-4 cm shorter at age 3 and older, than Strait of Georgia Pacific hake. Pedersen (1985) suggested that this relationship (and the fact that Puget Sound Pacific hake mature at a smaller size than do Strait of Georgia Pacific hake) may have been due to the intense commercial Pacific hake fishery in Puget Sound. The average sizes of Pacific hake in both Puget Sound and the Strait of Georgia are substantially smaller at the present time than they were in the 1980s. For example, very few Pacific hake larger than 30 cm are currently present in the Port Susan Pacific hake population (Figs. 21, 22).

Kautsky (1989) stated that "the coastal stock consistently attains larger sizes at age than the Puget Sound stock suggesting that the maximum attainable size for the Puget Sound stock is less than that for the coastal stock."

Shaw et al. (1989a) reported that mean length-at-age of Pacific hake in Trevor Channel in Barkley Sound on the west coast of Vancouver Island was significantly smaller than that for the migratory offshore Pacific hake from La Perouse Bank and Triangle Island off Vancouver Island.

Length and age at maturity

Table A-2 summarizes length at first maturity, at 50% maturity, and at 100% maturity for selected Pacific hake populations. Puget Sound and Strait of Georgia Pacific hake stocks appear to mature at a smaller size than the offshore migratory stock (McFarlane and Saunders 1997).

Historically, both male and female offshore Pacific hake matured at a length of about 40 cm (Best 1963), whereas male and female Pacific hake in the Port Susan population in Puget Sound matured at a length of about 30 cm (Kimura and Millikan 1977). Currently, length at 50% maturity for females in the Port Susan Pacific hake population is approximately 21.5 cm, compared to 29.8 cm in the 1980s (Fig. 23, Table A-2).

Length frequencies

Figures 21 and 22 illustrate the temporal decline in the size of survey-caught Pacific hake in the Port Susan spawning population from the late 1980s to the present. A large proportion of the Pacific hake in Puget Sound sampled in the 1987 research-trawl survey (Quinnell and Schmitt 1991) were greater than 30 cm length (Fig. 18), indicating that this decline in average length and shift to smaller size frequencies occurred after this period of time. In the latter half of the 1990s, few Pacific hake larger than 35 cm were caught in the Port Susan acoustic-trawl surveys and by 1999 the majority were less than 25 cm in length (Figs. 21, 22).

Fecundity

Like hake species elsewhere, the Strait of Georgia Pacific hake stock shows evidence of resorption of unreleased oocytes following spawning (Foucher and Beamish 1980, Mason 1986, McFarlane and Saunders 1997). MacGregor (1966, 1971) also noted that small-yoked oocytes were resorbed following spawning of larger eggs in a sample of female Pacific hake collected off California in March and April.

The presence of oocytes of different maturity stages in pre-spawning Pacific hake and the retention of small-sized yoked oocytes in spent or partially spent Pacific hake have been interpreted differently by various researchers. In the case of *Merluccius hubbsi*, *M. gayi*, *M. merluccius*, *M. capensis*, and *M. paradoxus* multiple size classes of oocytes in different maturity states and retention of yoked oocytes in post spawners have been interpreted as evidence for serial or batch spawning (Osborne et al. 1999, and references therein). Similarly, Ermakov (1974) interpreted multi-modal oocyte diameters in Pacific hake as evidence for multiple spawning events in a single year. However, other researchers (MacGregor 1966, 1971; Foucher and Beamish 1980; McFarlane and Saunders 1997) reported that smaller yoked oocytes that remain after spawning in *M. productus* were completely resorbed and that a second spawning did not occur. Although other species of *Merluccius* may be batch spawners, it is currently assumed that Pacific hake spawn only once per year. The retention of some oocytes after spawning in Pacific hake suggests that traditional methods of estimating fecundity are not applicable to Pacific hake. Therefore, McFarlane and Saunders (1997) have defined "effective fecundity" in Pacific hake "as the number of yoked oocytes that are actually released to be fertilized."

McFarlane and Saunders (1997) reported that although total fecundity does not differ among Pacific hake stocks, effective fecundity differs between the migratory offshore stock and the smaller discrete stocks of Pacific hake in Puget Sound and the Strait of Georgia. All three stocks of Pacific hake retained and resorbed a portion of their oocytes (10-12% for the offshore stock, 32-44% for the Puget Sound stock, and 38-58% for the Strait of Georgia stock), but the Strait of Georgia stock retained a considerably higher percentage of eggs than the other stocks, ranging from 38% for the largest fish to 58% for the smallest (McFarlane and Saunders 1997).

Morphological Differentiation

Morphometric discrimination

Ehrich and Rempe (1980) examined morphometric differences (diameter of bony orbit, head length, precaudal length, and distances from the tip of snout to end of the pectoral and 2nd dorsal fin) between four groups of Pacific hake found in the northern and southern regions of the Gulf of California, offshore of Baja California to Alaska, and in nearshore regions of the west coast of Baja California. The greatest differences were found between the offshore population and the southern Gulf of California population, while the offshore population was most similar to the southern nearshore population off the west coast of Baja California (Ehrich and Rempe 1980).

Shape and size of the otolith

McFarlane and Beamish (1985) reported that sagittal otoliths from offshore Pacific hake were more elongate and less concave in section than otoliths from Strait of Georgia Pacific hake, although no statistical analyses were published to test these observations. Anonymous (1968) also reported that otoliths from Puget Sound Pacific hake "vary" from offshore Pacific hake otoliths.

A number of studies have attempted to utilize interspecific and intraspecific size and shape variation in otoliths to identify species, populations and stocks of various hake species in the genus *Merluccius* (Lombarte and Castellón 1991, Torres et al. 2000, Bolles and Begg 2000). Lombarte and Castellón (1991) applied multivariate analysis to a numerical description of otolith outlines for four size classes of fish in six species of *Merluccius*. Analysis of otoliths from fish greater than 20 cm in length correctly classified individuals into a Euro-African group (*M. merluccius*, *M. capensis*, and *M. paradoxus*) and an American group (*M. bilinearis*, *M. productus*, and *M. gayi*). Lombarte and Castellón (1991) concluded that these morphological differences "are a reflection of genetic distance between species." Within Pacific hake (*M. productus)*, "otoliths taken from individuals from different geographical areas [presumably from off west coast Vancouver Island and California] had no influence on otolith shape." Lombarte and Castellón (1991) did not apparently make a comparison of otoliths in offshore Pacific hake with otoliths from inshore Pacific hake.

Torres et al. (2000) demonstrated clear geographical differentiation between two groups of *M. gayi* (from Chile and Peru) and between Atlantic and Mediterranean samples of *M. merluccius* in morphometric measurements of otoliths. In both species, all otoliths could be correctly assigned to the appropriate geographical sample based on otolith analysis. However, two groups of *M. hubbsi* from off the southeast coast of South America could not be differentiated on the basis of otolith morphometrics. Likewise, Bolles and Begg (2000) successfully used whole sagittal otolith morphometrics, specific to fish age, to differentiate silver hake (*M. bilinearis*) stocks from the east coast of North America into a northern stock from the Gulf of Maine to Georges Bank and a southern stock from southern Georges Bank to the Middle Atlantic.

Otolith morphometrics related to length and width can be expected to reflect localized environmental variables. Although variation in otolith morphometrics can be used to differentiate stocks or management units of fish, the usefulness of these differences in the delineation of a DPS in a marine fish species is dependent on the degree to which otolith variability reflects environmental or genetic differences between groups of fish.

Genetic Information

Genetic population structure of hake species

Inada (1981) recognized 12 species of hake in the Genus *Merluccius:* 1) European hake *M. merluccius*, 2) Senegalese hake *M. senegalensis*, 3) Bengualean hake *M. polli*, 4) shallow-water Cape hake *M. capensis*, 5) deep-water Cape hake *M. paradoxus*, 6) silver hake *M. bilinearis*, 7) offshore hake *M. albidus*, 8) Pacific hake *M. productus*, 9) Panamanian hake *M. angustimanus*, 10) Chilean hake *M. gayi*, 11) Argentinian hake *M. hubbsi*, and 12) New Zealand hake *M. australis*.

Interspecific allozymic variation of hake has been investigated by Stepien and Rosenblatt (1996), Roldan et al. (1999), and Galleguillos et al. (1999), while Becker et al. (1988) and Quinteiro et al. (2000) examined between-species genetic divergence using mtDNA RFLP variation and comparison of sequence divergence in the control region of mtDNA, respectively (see "Glossary" for definitions). Intraspecific relationships have been studied using allozyme electrophoresis in *M. merluccius* (Pla et al. 1991, Lo Brutto et al. 1998, Roldan et al. 1998), *M. capensis* and *M. paradoxus* (Grant et al. 1987b, and references therein), *M. hubbsi* (Roldan 1991), and *M. productus* (Anonymous 1968; Utter 1969a, b; Utter and Hodgins 1969, 1971; Utter et al. 1970). Lundy et al. (1999) have investigated population structure in European hake through variation at six microsatellite loci.

The European hake, *M. merluccius,* is distributed along the eastern Atlantic coast from Norway to Morocco and throughout the Mediterranean Sea. Early efforts at detecting genetic population structure in European hake with protein electrophoresis revealed no significant variation at three allozyme loci among twelve samples ranging from Norway to the Bay of Biscay (Mangaly and Jamieson 1978). More recent genetic studies, using up to 21 polymorphic allozyme loci, have indicated a clear genetic difference between European hake in the Atlantic Ocean and the Mediterranean Sea, with the Straits of Gibralter acting as a geographic barrier (Pla et al. 1991, Roldan et al. 1998). Lo Brutto et al. (1998) detected insignificant levels of allozyme variation at four polymorphic loci among populations of *M. merluccius* along the coasts of Italy and Sicily. Despite the reported genetic homogeneity among Italian populations, Roldan et al. (1998) found significant allozyme genetic evidence of population substructuring in both Atlantic and western Mediterranean *M. merluccius*. Similarly, Lundy et al. (1999) found significant population subdivisions between Mediterranean and Atlantic European hake, but no substructure within the Mediterranean, using six polymorphic microsatellite loci. However, Lundy et al. (1999) did find significant differentiation in the same microsatellite loci between Bay of Biscay and Portuguese populations, which are currently managed as one stock, but no differentiation between southern Bay of Biscay and Celtic Sea populations, which are managed as separate stocks.

Grant et al. (1987b) detected only small amounts of genetic divergence by allozyme electrophoresis between stocks of both *M. capensis* and *M. paradoxus*off Namibia and South Africa. More than 98% of the total genetic diversity in these species was found to occur within sampling locations for both species. Nei's genetic distances (D) between samples were generally less than 0.001. Although three widely separated spawning grounds have been identified for *M. australis* in New Zealand waters (Colman 1995), Smith et al. (1979) were unable to detect significant differences in allele frequencies at two polymorphic allozyme loci among four New Zealand sampling locations. Roldan (1991) found a complex structure to occur among *M. hubbsi* populations on the Argentinian continental shelf upon analysis of 4 polymorphic allozyme loci sampled at 10 locations. However, genetic heterogeneity among samples was primarily due to variation at a single locus (*EST-1**) and sample sizes were relatively small (Roldan 1991). In general, species of *Merluccius* that have been investigated tend to show subdivided population structure around geographically complex coastlines (Roldan et al. 1998, Lundy et al. 1999), but not along linear coastlines (Smith et al. 1979, Grant et al. 1987b).

Pacific hake genetics

In a series of publications, Utter and coauthors (Utter 1969a, b; Utter and Hodgins 1969, 1971; Utter et al. 1970) compared protein electrophoretic variation in Pacific hake from various locations in Puget Sound, off the Oregon-Washington coast, and off southern California at four polymorphic loci (lactate dehydrogenase (LDH), transferrin, muscle protein, and esterase). Two alleles were detected at both the muscle protein and LDH loci, four at the transferrin locus, and five at the esterase locus (Utter and Hodgins 1971). No evidence of heterogeneity was found at LDH or esterase within or between the two sampling locales for offshore Pacific hake (off Oregon/Washington and southern California) (Utter and Hodgins 1969, 1971; Utter et al. 1970). Comparison between multiple samples of Pacific hake taken off the outer coasts of Oregon and Washington also revealed no heterogeneity at the transferrin or muscle protein loci (Utter 1969b, Utter and Hodgins 1971).

However, Utter and Hodgins (1971) stated that allelic frequencies of all four polymorphic loci differed significantly between offshore and Puget Sound Pacific hake and indicated that these populations were reproductively isolated. The average and range of frequencies of the most common allele for the four loci for the two regions were as follows: 1) esterase, 0.603 (range 0.577-0.655) in offshore samples (n=358) and 0.828 (range 0.733-0.904) in Puget Sound (n=903); 2) transferrin, 0.564 (range 0.536-0.583) in offshore (n=203) and 0.696 (range 0.672-0.750) in Puget Sound (n=115); 3) skeletal muscle protein, 0.982 (range 0.969-0.992) for offshore samples (n=225) and 0.730 (range 0.705-0.823) for Puget Sound (n=250); and 4) LDH, 0.980 in offshore samples (n=355) and 0.745 (range 0.695-0.794) in Puget Sound (n=762) (Utter 1969b; Utter and Hodgins 1969, 1971; Utter et al. 1970). Many of the Pacific hake samples used in the above allozyme studies of Utter and coauthors were collected in Puget Sound outside of the spawning season and distant from known spawning grounds; however, several collections (particularly for esterase and LDH) were made of fish in or near the spawning grounds (Port Susan) and during the spawning season and these samples did not differ significantly from any of the other Puget Sound samples (Utter 1969b; Utter and Hodgins 1969, 1971; Utter et al. 1970).

Utter et al. (1970) included analysis of esterase variation of one sample of 80 Pacific hake juveniles collected in Hood Canal (Dabob Bay in Hood Canal is a known Pacific hake spawning ground). The frequency of the most common allele in this sample (0.831) did not differ significantly from that of other samples taken in Puget Sound (average frequency of 0.828 for 12 samples) (Utter et al. 1970).

Prior to the recent decrease in body size of inshore Pacific hake (see "Length and age-at- maturity" section), Puget Sound fish averaged approximately 35 cm and offshore fish averaged about 50 cm. However, observations of large-sized (greater than 60 cm) Pacific hake have been made in both Puget Sound and the Strait of Georgia and speculation as to whether these large fish are from the offshore population has been made. Anonymous (1968) addressed this question and stated that: Hake of oceanic size have occasionally been caught in Puget Sound, which raised the question of whether the larger fish were migratory or indigenous. ... The gene frequencies of the large and normal fish in Puget Sound agreed with those of smaller fish from the same area. This indicated that the larger fish are indigenous to Puget Sound.

Goñi (1988) examined restriction fragment length polymorphism (RFLP) variation of mitochondrial DNA (mtDNA) in Pacific hake collected from California (four individuals pooled, collected off Cape Mendocino, California in August), Puget Sound (four individuals pooled, collected off West Point, Washington in August), and the Strait of Georgia (two separate individuals, collected in the central Strait of Georgia in November). Goñi

(1988) observed four composite mtDNA haplotypes amongst these samples and stated that "The geographical distribution of these genotypes seems to reveal a certain degree of mixture between populations." Goñi (1988) also stated that "The apparent absence of high diversity in the mtDNA molecules might indicate that the three stocks either intermingle to a certain extent, or are units that have recently formed." However, several factors make the interpretation of Goñi's (1988) mtDNA study difficult. Homogenization of both the California and Puget Sound samples was done by Goñi (1988) with the assumption that within-sample variation was nonexistent. However, within-sample variation was found in pooled California and separate Strait of Georgia samples, leading Goñi (1988) to conclude that homogenization was inappropriate and may have masked the true results. Another factor that complicates the interpretation of Goñi's (1988) results is that all samples were collected outside of the spawning season and a considerable distance away from known spawning grounds of Pacific hake. The small sample sizes used in this study would also indicate that Goñi's (1988) study should be considered inconclusive.

Information Relevant to the Pacific Hake DPS Question

As stated in the previous "Approaches to the Species Question and to Determining Risk" section, four broad types of information were analyzed by the BRT in its determinations of whether Pacific hake in Puget Sound represent a "discrete" and "significant" population and therefore qualifies as a DPS under the ESA. These are: habitat characteristics, phenotypic and life-history traits, mark-recapture studies, and analysis of neutral genetic markers. As such data can only be properly evaluated in relation to similar information for the biological species as a whole, Puget Sound Pacific hake data were compared with data from Pacific hake from throughout the species' range.

As detailed in the previous sections on "Environmental History and Features of Puget Sound" and "Phenetic and Genetic Information Relating to the Species Question," specific information in the following categories was available for Puget Sound Pacific hake: physical habitat, spawning time and location, year-class strength, growth rate and body size, size and age at maturity, length frequency, fecundity, and protein electrophoretic variation. Data on migration patterns, tagging, parasite incidence, meristics and morphometrics, and genetic population structure using contemporary techniques were largely unavailable for Pacific hake in Puget Sound. A similar assemblage of data was available for Pacific hake from the Strait of Georgia, although protein electrophoretic data were lacking and studies on the incidence of the parasite *Kudoa paniformis* were available. With the exception of tagging and a contemporary study of genetic population structure, all categories of information mentioned above were available for offshore Pacific hake. The previous section on "Approaches to the Species Question and to Determining Risk" should be consulted for a general discussion of the relative usefulness of the various categories of data for DPS delineation. Issues of biological data quality for Pacific hake are addressed for each category in the preceding section on "Phenetic and Genetic Information Relating to the Species Question."

Discussion and Conclusions for Pacific Hake DPS Determinations

The BRT considered several possible DPS configurations for populations of Pacific hake in the northeastern Pacific Ocean in its attempt to identify a "discrete" and "significant" segment of the biological species that incorporates Puget Sound Pacific hake. After careful consideration of the available information, the BRT concluded that inshore resident Pacific hake from Puget Sound and the Strait of Georgia are part of a separate DPS from offshore (coastal) migratory Pacific hake that are seasonally distributed from southern California to as far north as southeastern Alaska. These inshore Pacific hake will hereafter be identified as the Georgia Basin Pacific hake DPS (Figure 1). Pacific hake that spawn occasionally off the west coasts of Oregon, Washington and Vancouver Island were considered to be opportunistic spawners belonging to the offshore Pacific hake stock and not part of the Georgia Basin DPS. Lack of biological information precluded the BRT from drawing any firm conclusions about the affinities of Pacific hake from west coast Vancouver Island inlets. At the present time, Pacif hake from west coast Vancouver Island inlets are not considered to be part of the Georgia Basin DPS.

The BRT identified a variety of evidence to support their conclusion that Georgia Basin Pacific hake constitute a separate DPS relative to offshore Pacific hake: 1) Differences in annual migration behavior; 2) significant allozyme frequency differences between Puget Sound and offshore Pacific hake; 3) absence of the protozoan parasite *Kudoa paniformis* in inshore populations compared to its common occurrence in offshore Pacific hake; 4) differences in otolith morphology between Strait of Georgia and offshore Pacific hake; 5) distinctiveness of the habitats of inshore Pacific hake (they spawn in deep, inshore basins that receive large freshwater inputs and are the only populations of Pacific hake that inhabit fjord-like environments); 6) wide geographic separation of inshore and offshore spawning locales; and 7) demographic data showing inshore Pacific hake are generally smaller for a given age, mature at a smaller size, and reach a smaller maximum length than offshore fish.

The BRT expressed several concerns about the available data; for example: 1) it is not clear to what degree demographic differences between Georgia Basin and offshore Pacific hake are driven by environmental or genetic differences, 2) some of the allozyme loci that show differences between the Puget Sound and offshore Pacific hake have been shown to be under selection in other animals, and 3) there is no obvious physical barrier preventing mixing of offshore and Georgia Basin Pacific hake, especially during the June-August period when offshore Pacific hake may occur near the mouth of the Strait of Juan de Fuca.

The Georgia Basin DPS encompasses at least five geographically-discrete spawning aggregations in deep-water basins, including Dabob Bay and Port Susan in Puget Sound and south-central Strait of Georgia, Stuart Channel, and Montgomery Bank in the Strait of Georgia (Figs. 1, 19). Therefore, the BRT considered whether there is evidence for multiple populations or stocks of Pacific hake within this DPS and, perhaps, multiple DPSs within the Puget Sound/Strait of Georgia area. Such information is limited. The majority of the BRT felt that good evidence that stock structure may exist within the Georgia Basin DPS includes: 1) the presence of geographically-discrete and temporally-persistent spawning aggregations, and 2) demographic differences between Strait of Georgia and Puget Sound fish. Tagging and genetic data for within Georgia Basin comparisons are unavailable or incomplete. Data showing apparent asynchronous year class strength between Puget Sound and Strait of Georgia Pacific hake were viewed as technically flawed (see above "Year class strength" section). Although the BRT could not with any certainty identify multiple populations or DPSs of Pacific hake within the Georgia Basin, the majority of the BRT acknowledged the possibility that significant structuring may exist within the proposed DPS and that such structure might be revealed by new information in the future.

Offshore Pacific hake migrate annually between summer feeding areas in waters off Oregon, Washington, British Columbia, and occasionally as far north as south central Alaska to spawning areas off southern California. The BRT did not attempt to determine whether offshore Pacific hake are composed of more than one DPS.

Assessment of Extinction Risk

Introduction

The petition discussed decline in abundance (Palsson et al. 1997), decline in average size, and predation by marine mammals (Schmitt et al. 1995) in its proposal to list Pacific hake in South Puget Sound. South Puget Sound was defined in the petition as the Sound east of Deception Pass and to the south of and east of Admiralty Point and south of Point Wilson on the Quimper Peninsula. Although the petition only discussed the spawning population of Pacific hake in the Port Susan area, it is known that Pacific hake also spawn in Dabob Bay (Fox 1997). The BRT concluded that Puget Sound populations of Pacific hake are part of the Georgia Basin DPS.

This section presents results of review and analysis of available information on abundance, evaluation of risk of extinction of the Port Susan population, and evaluation of the risk of extinction of the DPS as a whole. Hydro-acoustic estimates of the Port Susan population were revised under assumptions that are more appropriate for the risk analysis than those originally used. Also, new target strength estimates based on recent developments in hydro-acoustic technology were used for the revision. Risk assessment of the Port Susan population used two models to analyze the impact of pinniped predation under a wide range of assumed levels of predation. There were insufficient data available to evaluate the status of the Dabob Bay population. There were also insufficient data to perform more than a semi-quantitative analysis of the risk of extinction of the Canada portion of the DPS or of the DPS as a whole.

Information on Abundance and Composition

Port Susan

Biomass estimates of Pacific hake in Port Susan were given by Palsson et al. (1997)(Table 3). The Washington Department of Fish and Wildlife (WDFW) produced the estimates from annual hydro-acoustic surveys (Lemberg et al. 1990). After examination of available data and consultations with Wayne Palsson (W. Palsson[5]) and Martin Dorn (M. Dorn[6]) it was decided that analysis of the data shown in Table 3 could be improved in several ways for the risk analysis.

WDFW designed the surveys to produce estimates of biomass available to the fishery in each year. Their information indicated that peak abundance usually occurs in March. Since the fishing season often began in the preceding fall, WDFW usually added catches up to the time of the survey to the survey results to obtain a biomass estimate at the beginning of the fishing season. The fishery ceased in 1991. WDFW used one to three surveys taken in late February through mid March. Also WDFW and the industry desired that immature fish not be harvested. Pacific hake matured at about 30 cm during the early years of the survey. In most years WDFW used catch compositions of trawl surveys to first convert acoustic biomass estimates to estimates of Pacific hake biomass and then to convert Pacific hake biomass estimates to estimates of biomass of greater than 29 cm. However, WDFW included smaller Pacific hake in estimates for the earlier years. WDFW did not conduct trawl surveys in 1994 or 1995, but made biomass estimates from hydro-acoustic surveys (biomass estimates not in Table 3).

Wayne Palsson (W. Palsson[7]) provided biomass estimates from 1982 through 1999 (data for the year 2000 were received subsequent to the analyses) and information about the quality of the surveys. It was decided not to use the 1994 and 1995 estimates, because WDFW did not conduct trawl surveys, and their1995 acoustic survey was in early February which is before the time of normal peak abundance. While WDFW's decision to add catch to the survey estimates and estimating biomass of Pacific hake greater than 29 cm were appropriate for fishery management, it was decided to use estimates of biomass of all Pacific hake in the Port Susan area at the time of surveys for risk assessment. The surveys occurred during the spawning season, which seemed the appropriate season for examination of productivity of the population. Catch was not added to the

Table 3. Hydro-acoustic estimates of biomass of Pacific hake in the Port Susan area, 1983-1994 (Palsson et al. 1997). Estimates were converted from million lbs to metric tons.

Year	Biomass (mt)
1983	20,457
1984	12,292
1985	7,258
1986	7,258
1987	5,398
1988	5,806
1989	5,489
1990	6,124
1991	5,307
1992	4,037
1993	499
1994	590

survey estimates. Examination of data provided by WDFW (W. Palsson[8]) revealed that size of maturity decreased since the early 1980s (Fig. 23). Recent surveys captured Pacific hake that were smaller than Pacific hake captured in earlier years, but mature fish comprised most of the biomass in both time periods. In addition, fish less than 30 cm comprise a significant proportion of Pacific hake consumed by pinnipeds (P. Gearin[9]).

Martin Dorn (M. Dorn[10]) reviewed the first draft of this document and noted that both NMFS (Traynor 1996) and Canada Department of Fisheries and Oceans (DFO) (Kieser et al. 1999) now use target strength relationships dependent on length for hydro-acoustic estimates of Pacific hake biomass rather than the constant target strength procedure used by WDFW. The length-dependent target strength method is considered more accurate and after consultation with WDFW (W. Palsson[11]), the biomass estimates for Port Susan were revised (M. Dorn[12]) Average weights and Pacific hake length frequency data needed for the revision were compiled from data supplied by WDFW. Length-frequency samples from trawls taken during the surveys (Fig. 21) were weighted equally in terms of weight rather than numbers of sampled fish to avoid bias towards larger fish. There were changes in trawls used for the surveys during the time span. These changes were assumed to not have significant impacts on the composition of the catch. Data from Kautsky (1989) were used to estimate that target strength = 20 log length - 73.5 (M. Dorn[13]). New estimates of Pacific hake biomass under both the constant and length-dependent target strength models are shown in Table 4. Estimates made under the length-dependent target strength model were used for the following analyses.

Biomass estimates (Table 4) made under the length-dependant target strength assumption were higher than estimates made under the constant target strength assumption until 1997. The 1999 biomass declined to 12% of the 1983 estimate under the length-dependent target strength assumption compared to 19% under the constant target strength assumption (Fig. 24). Although catches were not added to survey biomass estimates, the new estimates (Table 4) were similar to or higher than the old estimates during the 1983-1993 period (Table 3). Average weight decreased from 0.298 kg in 1982 to 0.072 kg in 1999. There does not appear to be a trend in numbers of Pacific hake in the survey area (Fig. 25).

Preliminary results from the March 7, 2000 WDFW Port Susan Pacific hake survey were received subsequent to the above analyses (W. Palsson[14]). Pacific hake biomass estimates were calculated using the length dependent target strength methodology described above (M. Dorn[15]). Results are shown in Table 4. Reliable acoustic data were not available for the Possession Sound portion of the 2000 survey, because of equipment problems, and WDFW estimates that 15-20% of the total stock may have been missed (M. Dorn[16]). The new estimates indicate that both biomass and numbers are at the lowest level since the surveys were started in 1982. If the survey missed 20% of the total biomass, the corrected biomass would be 1,240 mt, which would be the lowest on record, 52% of the 1999 biomass, 6% of the peak biomass in 1983, and represent an 85% decrease during the past 15 years. Average weight increased from 0.072 kg in 1999 to 0.091 kg in 2000. Compared to recent years there were relatively few fish smaller than 20 cm and relatively more fish larger than 30 cm.

Palsson et al. (1997) presented estimates of mid-water trawl catch per effort (Table 5) and Pacific hake biomass estimates from bottom trawl surveys (Table 6). Catch-per-effort data were not used in this analysis because of the difficulties in adjusting the data for undocumented changes in gear and fishing strategies. Bottom-trawl survey estimates were not used because there were not enough to serve as an index, and bottom-trawl surveys are not suitable for estimates of absolute abundance of Pacific hake because of the semi-pelagic behavior of Pacific hake.

Table 4. Estimates of total Pacific hake biomass, average weight, and numbers of fish in the Port Susan area during the spawning season. Data provided by Wayne Palsson (WDFW) and converted from million lbs to metric tons. Trawl surveys were not made in 1994 and 1995. Biomass estimates using length dependent target strength were made by Martin Dorn (NMFS, AFSC), these data are utilized in the remainder of the document, and are emphasized by being put in **bold**. Length frequencies were not available from 1991, therefore length data from adjacent years were used. Data for 2000 provided by Wayne Palsson (WDFW) after analysis was completed.

	Biomass (mt)	**Biomass (mt)**

Year	(target strength, constant)	(target strength, length dependent)	Average weight (kg)	Number ofPacific hake
1982	11,975	14,826	0.298	49,746,267
1983	14,946	19,612	0.288	68,129,922
1984	10,168	12,925	0.267	48,470,006
1985	5,690	7,066	0.255	27,725,137
1986	6,332	8,277	0.263	31,508,611
1987	5,638	7,501	0.215	34,893,521
1988	7,031	9,322	0.243	38,362,214
1989	6,683	8,483	0.256	33,127,174
1990	8,087	10,648	0.262	40,654,512
1991	5,262	6,701	0.235	28,575,429
1992	5,897	7,211	0.207	34,817,610
1993	4,218	4,506	0.149	30,226,033
1996	7,847	8,343	0.132	63,384,421
1997	4,264	3,636	0.104	35,026,849
1998	3,992	3,289	0.090	36,750,409
1999	2,858	2,365	0.072	32,930,666
2000	1,227	992	0.091	10,890,255

Table 5. Fishery trends for Pacific hake in Southern Puget Sound (modified from Palsson et al. 1997). Dashes indicate data were not available.

Year	Trawl catch rate (1000 kg/hr)
1970	2.7
1971	1.5
1972	1.4
1973	1.6
1974	2.9
1975	3.5
1976	7.7
1977	4.8
1978	8.2
1979	10.3
1980	9.9
1981	5.5
1982	4.4
1983	2.9
1984	2.1
1985	2.5
1986	1.5
1987	3.3
1988	4.2
1989	1.1
1990	0.1
1991	4.5
1992	----
1993	----
1994	----

Table 6. Area-swept-estimates of biomass, number and size of Pacific hake in the Puget Sound population from WDFW trawl surveys (source: W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to W. Lenarz.). Dashes indicate data were not available.

Biomass (mt)

Year	Gulf-Bellingham	Strait of Juan de Fuca	North Sound	Hood Canal	Central Sound	South Sound	Southern areas combined
1987	103.93	233.34	337.27	34.21	1,421.65	90.97	1,546.83
1989	182.46	0.00	182.46	172.58	397.19	27.46	597.23
1991	76.85	0.18	77.03	129.92	837.33	51.40	1,018.65
1994	424.47	--	--	--	--	--	--
1995	--	--	--	--	4713.78	--	--
1996	--	--	--	70.88	--	40.89	--
1995-1996	--	--	--	--	--	--	4,825.55
1997	355.87	--	--	--	--	--	--

Numbers (thousands of fish)

Year	Gulf-Bellingham	Strait of Juan de Fuca	North Sound	Hood Canal	Central Sound	South Sound	Southern areas combined
1987	240.90	243.74	484.64	227.03	3,887.18	311.40	4,425.61
1989	203.02	0.00	203.02	3,215.55	1,794.40	172.18	5,181.73
1991	142.08	12.42	154.50	3,471.12	18,997.54	348.85	22,817.51
1994	969.82	--	--	--	--	--	--
1995	--	--	--	--	85,220.29	--	--
1996	--	--	--	472.39	--	536.59	--
1995-1996	--	--	--	--	--	--	86,229.27
1997	883.38	--	--	--	--	--	--

Table 6. (Continued).

Size (kg/ fish)

Year	Gulf-Bellingham	Strait of Juan de Fuca	North Sound	Hood Canal	Central Sound	South Sound	Southern areas combined
1987	0.43	0.96	0.70	0.15	0.37	0.29	0.35
1989	0.90	--	0.90	0.05	0.22	0.16	0.12
1991	0.54	--	0.54	0.04	0.04	0.15	0.04
1994	0.44	--	--	--	--	--	--
1995	--	--	--	--	0.06	--	--
1996	--	--	--	0.15	--	0.08	--
1995-1996	--	--	--	--	--	--	0.06
1997	0.40	--	--	--	--	--	-

Canadian portion of the Strait of Georgia

The DFO conducts periodic hydro-acoustic estimates of biomass of Pacific hake in the Canadian portion of the Strait of Georgia using length-dependent target strength (Saunders and McFarlane 1999). Timing of the surveys has changed. There was concern that March-April estimates included signal from the spring plankton bloom, particularly in 1981 and 1993 (Saunders and McFarlane 1999, Kieser et al. 1999). Since 1993, the surveys have been conducted in February. There was concern that February surveys occurred before peak in spawning and may have underestimated the biomass (Saunders and McFarlane 1999, Kieser et al. 1999). The estimates are shown in Table 7. Saunders and McFarlane (1999) stated that "At the present time we do not have an adequate absolute or relative index of stock size and the recent biomass estimates should be considered a conservative minimum. Based on the information briefly stated above and reported in detail in Kieser er al. (1999) we believe the biomass of Pacific hake in the 1990's to be stable at approximately 50-60,000t."

Data in Saunders and McFarlane (1999) also revealed that, as in Puget Sound, average size of Pacific hake in the Strait of Georgia has decreased. Size-at-age data indicated that growth between ages 2 and 3 years considerably decreased between 1976 and 1999. Age-composition data indicated that the 1991-1992 year classes were strong and persisted in the samples through 1999. The 1995 and 1998 year classes were also strong compared to adjacent year classes, but do not appear to be as strong as the 1991-1992 year classes.

Risk Assessment

Port Susan

Introduction. The BRT concluded that the Port Susan Pacific hake population is a component of the Georgia Basin DPS, the interactions of the Port Susan population with other components of the DPS are not known. Two models were developed for evaluation of risk to the Port Susan population. The models are similar to models used by Mohn and Bowen (1996) to study grey seal predation on Atlantic cod. Both models include a variable, relative productivity or population growth rate, that includes the impact of migration to or from other components of the DPS. Otherwise, it is assumed that the dynamics of the Port Susan population are independent of the other components. Hollowed et al. (2000) and Livingston and Methot (1998) developed age-based models of fish population dynamics that incorporated predation mortality. Insufficient data were available for use of their models in this study.

Table 7. Hydro-acoustic estimates of Pacific hake biomass in the Canadian portion of the Strait of Georgia. (Saunders and McFarlane 1999).

Year	Date of survey	Biomass (mt)
1981	Jan 12-23	53,387
1981	Feb 09-20	80,525
1981	April 13-24	126,240
1981	April 13-24 (adjusted)	71,542
1988	March 18-28	66,174
1993	March 8-25	105,008
1996	Feb 20-March 5	60,266
1997	Feb 17-28	46,524
1998	Feb 16-26	33,681

Pacific hake removals by humans and pinnipeds--Pacific hake commercial catch and pinniped predation were used in the models. Commercial catches were compiled from monthly catch data (W. Palsson[17]) (Table 8). Fishing year was defined as March through February of the following year to correspond with Pacific hake biomass estimates assumed to be for March 1. Catches were different than shown in Palsson et al. (1997), because they defined the fishing year to begin in the fall of the preceding year and include recreational catches. Recreational landings of Pacific hake were minor.

It was more difficult to estimate Pacific hake exploitation by pinnipeds than by humans. California sea lions and harbor seals are known to consume Pacific hake (Olesiuk 1993, Schmitt et al. 1995). Schmitt et al. (1995) estimated Pacific hake consumption by California sea lions in Puget Sound for the 1986-1994 period. However consultation with knowledgeable marine mammal experts, including the two junior authors of Schmitt et al. (1995) (S. Jeffries[18] and P. Gearin[19]), revealed that these estimates were not acceptable to the marine mammal research community. In addition, researchers have not estimated Pacific hake consumption by harbor seals in Puget Sound. Also, researchers have not attempted to understand functional relationships between Pacific hake consumption by pinnipeds and the abundance of Pacific hake and other potential prey.

Because of the uncertainty, Pacific hake consumption by pinnipeds in Puget Sound was treated as hypothetical values in what-if risk assessments of the Port Susan Pacific hake population. After consultation with experts at the NMFS's National Marine Mammal Laboratory (NMML), ranges of values were used that were consistent with published and unpublished information in the sense that the ranges were likely to include the real levels of consumption. There was insufficient knowledge to conclude that the actual levels were likely to be close to the center of the ranges.

Patrick Gearin (P. Gearin[20]) indicated that estimates of consumption of all food items in Puget Sound by California sea lions and harbor seals given in NMFS (1997) are consensus estimates by the marine mammal research community and thus acceptable to them as the best available. They estimated that California sea lions on the average consumed 830 mt per year between 1986 and 1994, which is close to the lower estimate of Schmitt et al. (1995). They did not use the upper estimate of Schmitt et al.(1995), because they believed that it was not justified by research information. NMFS (1997) estimated that in 1993 harbor seals consumed 3,209 mt in Eastern Bays and 1,649 mt in Puget Sound proper (Fig. 26). They also provided an estimate for Hood Canal, but it was assumed that harbor seals in Hood Canal prey on the Dabob Bay rather than the Port Susan population. The peak count of sea lions in Puget Sound was 444. Population abundances of harbor seals were 3,479 in Eastern Bays, and 1,787 in Puget Sound proper.

Jeff Laake (J. Laake[21]) provided estimates of predicted annual monthly counts of sea lions at Everett, Washington for 1986-1998. Year was defined in the same manner as for fishing year, which is March through February of the following year. Actual counts were available for about half of the possible year-month combinations. He used a generalized additive model containing spline-smoothed functions for year, season, and year-season to predict the average monthly counts. A Poisson error structure with over dispersion was assumed. Patrick Gearin (P. Gearin[22]) provided peak count data for 1982-1999. Peak counts usually occurred in about March. A regression between peak count and average monthly count was used to estimate average monthly count for 1982-1985 and 1999. Average counts were then doubled because Schmitt et al. (1995) indicated that counts probably represented about 50% of the total Puget Sound population as was done for consumption estimates in NMFS(1997). Sea lion counts increased from 1982 to 1986, decreased from 1986 to 1989, increased from 1989 to 1995, and decreased from 1995 to 1999 (Table 9).

The literature details difficulties in estimation of pinniped diet composition (see Olesiuk 1990). These difficulties center around questions concerning prey specific digestion and retention rates. Variation in digestion and retention rates are also a source of uncertainty in studies of diet composition of fish, but compositions of stomach contents are usually used for fish studies, while compositions of scat contents are the predominant data source for pinniped studies. Different rates of digestion and retention are likely to produce less severe problems for stomach contents than for scat contents.

Schmitt et al. (1995) estimated that Pacific hake comprised 32% of the diet of California sea lions in Puget Sound during the 1986-1994 period. Their estimates were based on the estimated mass of individual prey items.

Estimates in Schmitt et al. (1995) seem consistent with a more recent unpublished summary (Gearin et al. 1999), which showed that about 82% of sea lion scats contained Pacific hake parts, while the next two important items were dogfish parts, at about 22%, and salmon parts, at about 15%. Pacific hake parts are more likely to resist destruction by digestion than either spiny dogfish parts or salmon parts. However, since the major concentration of sea lions in Puget Sound overlaps both spatially and temporally with the major Pacific hake spawning activity, it would seem likely that Pacific hake comprise a significant portion of sea lion diets. Olesiuk et al. (1990) estimated boundaries on their point estimates of diet composition of harbor seals in the Canadian portion of the Strait of Georgia. Their gadiform contribution to the diet was 45.1%. Their lower limit was 28.0% (62% of point estimate) and upper limit was 60.9% (135% of point estimate). Schmitt et al. (1995) did not provide boundaries and used different methodologies in their study of California sea lions. It seemed reasonable to use a range that is broader than that used by Olesiuk et al. (1990) and to set the bounds at 50% and 200% of the Schmitt et al. (1995) estimates in an attempt to include the true value. The hypothetical range of consumption of Pacific hake by California sea lions in Puget Sound was calculated by multiplying total consumption by 0.16 (0.5 x 0.32) and 0.64 (2 x 0.32). Hypothetical estimates of Pacific hake consumption by California sea lions are shown for 10 levels within the above range in Table 9. The hypothetical estimates assume that consumption per sea lion was independent of Pacific hake abundance, and constant during the 1982-1999 time period.

Robert DeLong (R. DeLong[23]) provided information on annual rates of change of populations of harbor seals based on WDFW/NMML data. Harbor seals were estimated to have increased by 3.3% annually in Puget Sound between 1985 and 1997. They were estimated to have increased by 2.7% annually in Eastern Bays between 1983 and 1998. It was assumed that the expansion rates applied to the entire 1982-1999 period for estimation of consumption of Pacific hake rates. The estimates of harbor seal abundance in 1993 by NMFS (1997) were used for the baseline population.

Researchers have developed less information on composition of the diet of harbor seals in Puget Sound than in the Canadian portion of Strait of Georgia or for California sea lions in Puget Sound. Pacific hake parts frequently occur in harbor seal scat samples (79%-Skokomish River, 84% - Hamma Hamma River, 100% - Duckabush River, 85% - Dosewallips River and 88% - Quilcene Bay) (S. Jeffries[24]). These estimates are for the Hood Canal area and are shown here only to illustrate that Pacific hake apparently can comprise a significant portion of harbor seals in the general Puget Sound area. Pacific hake parts were estimated to occur in 32% of scat samples and Pacific hake comprised 5% of the diet by weight of harbor seals at Gertrude Island (South Puget Sound) from June 24, 1994 to October 23, 1995 (P. Gearin[25]). Pacific hake also occurred in 80% of scat samples and comprised 83% of the diet by weight of harbor seals at Everett from January-April, 1989 and October-November, 1995. Olesiuk et al. (1990) estimated that Pacific hake comprised 42.6% of the diet of harbor seals in the Strait of Georgia. Since harbor seals are not as concentrated in the Port Susan area as sea lions are, it seems reasonable to set the bounds of Pacific hake contribution to harbor seal diet lower than used for sea lions. In the Eastern Bays, which includes Port Susan, it was set at 10-40%, a four-fold change from low to high as for sea lions. The low bound seemed reasonable, although it is two times higher than the estimate for Gertrude Island, which appears to be an extreme location. The high bound is about half of the Everett estimate, which also probably is an extreme location. At the suggestion of Robert DeLong (R. DeLong[26]), the hypothetical Pacific hake contribution in the diet of harbor seals in Puget Sound was set at 5%, which is the estimate for Gertrude Island. The estimates are shown in Table 10. The hypothetical estimates assume that consumption per harbor seal was independent of Pacific hake abundance and constant during the 1982-1999 time period.

Population productivity--Two models were used to estimate the productivity of the Pacific hake population during the 1982-1999 period. The first model assumes that the annual consumption of Pacific hake by an individual pinniped is independent of Pacific hake abundance. The second model assumes that annual consumption of Pacific hake by an individual pinniped is described by the catch equation usually used to describe fish population dynamics, (i.e. it is dependent on abundance of Pacific hake, rate of natural mortality for Pacific hake, human generated fishing mortality, and number of pinnipeds). Both models assume that all estimated human and pinniped consumption is from the Port Susan population. While the commercial fishery and most observed sea lions occur in the Port Susan area, there are substantial occurrences of harbor seals in other areas of Puget Sound. The portion of Pacific hake from other populations consumed by pinnipeds is unknown. It is also not known if Hood Canal harbor seals or harbor seals west and/or north of Eastern Bays consume Pacific hake from the Port Susan population.

Under the first model, productivity in year i is
$Prod(i) = (Bio(i+1) - Bio(i) + C_h(i) + C_{sl}(i) + C_{hs}(i))/Bio(i)$ (1)
Where,
Bio(i) = Biomass of Pacific hake in year i,
$C_h(i)$
= Catch by humans in year i, $C_{sl}(i)$ = Consumption by California sea lions in year i, and
$C_{hs}(i)$ = Consumption by harbor seals in year i.

Pacific hake biomass was estimated to increase considerably between 1993 and 1996 (Table 4). However missing biomass estimates for 1994 and 1995 preclude estimation of annual productivity estimates for 1993, 1994, and 1995. The missing data were approximated by assuming that productivity was constant for those three years and using iteration to estimate Prod(1993), Prod(1994), Prod(1995), Bio(1994), and Bio(1995).

Estimates of average annual productivity during the 1982-1998 period increased with pinniped consumption and ranged from 0.13 to 0.38 (Table 11). There was no obvious temporal trend in productivity at the higher assumed levels of predation, but productivity tended to decline over time (nonsignificant, r = -0.33) when pinniped predation was assumed to be low (Fig. 27). The lowest estimated annual value was -0.46 in 1996 under the hypothetical minimum pinniped predation. The highest value was 1.03 in 1982 under the hypothetical maximum pinniped predation. Estimates of productivity include impacts of migration to and from other populations of the DPS. It is not known what proportion of the estimated productivity is the result of migrations.

Under the second model biomass in year i+1 is

$Bio(i+1) = Bio(i)e^{-Z(i)}$(2)
Where,
$Z(i) = M + F(i) - G(i)$,
M = Constant instantaneous rate of natural mortality,
F(i) = Instantaneous rate of exploitation mortality from all causes in year i,
$F(i) = F_h(i) + F_{sl}(i) + F_{hs}(i)$,
$F_h(i)$ = Instantaneous rate of mortality caused by exploitation by humans in year i,
$F_{sl}(i)$ = Instantaneous rate of mortality caused by exploitation by sea lions in year i,
$F_{hs}(i)$ = Instantaneous rate of mortality caused by exploitation by harbor seals in year i, and
G(i) = Instantaneous rate of productivity in year i. It includes migration to and from other populations.

M was assumed to be 0.23, which is the value used in Dorn et al. (1999a) to assess the offshore stock of Pacific hake. The offshore stock estimate included impacts of predation by pinnipeds, which are probably of minor importance compared to the Port Susan population, and was used to describe changes in numbers rather than biomass. The Port Susan population appears to be shorter lived than the offshore stock and thus probably has a higher value of M. However, M as used in the model does not include the impact of predation by pinnipeds.

The following constraints and relationships were used to solve iteratively for G(t). It was assumed that G(t) was approximately constant between 1993 and 1995 for middle levels of pinniped predation.

Total consumption in year i is
$C(i) = Bio(i)F(i)(1-e^{-z(i)})/Z(i)$ and
$C(i) = C_h(i) + C_{sl}(i) + C_{hs}(i)$.
Where
$C_h(i)$ = human consumption in year i,
$C_{sl}(i)$ = sea lion consumption in year i, and

$C_{hs}(i)$ = harbor seal consumption in year i.
It follows from (2) that
$Z(i) = -\ln(Bio(i+1)/(Bio(i))$.
Catchability coefficients q were estimated for sea lions and harbor seals where,
$F_{sl}(i) = q_{sl}N_{sl}(i)$,
$N_{sl(}(i)$ = number of sea lions in year i,
$F_{hs}(i) = q_{hs}N_{hs}(i)$, and
$N_{hs}(i)$ = number of harbor seals in year i.

The productivity estimates (Table 12) are similar to the results obtained using Model 1. Average productivity was greater than natural mortality, increased with increased hypothetical level of predation by pinnipeds, and ranged from 0.30 to 0.51. There was no obvious temporal trend in productivity at the higher assumed levels of predation, but productivity tended to decline over time (nonsignificant, r = -0.42) when pinniped predation was assumed to be low (Fig. 28). The lowest estimated annual value was -0.49 in 1996 under the hypothetical minimum pinniped predation. The highest value was 1.23 in 1982 under the hypothetical maximum pinniped predation.

Results of both models suggest that the Port Susan Pacific hake population would have increased between 1982 and 1999, if there had been no commercial exploitation and no pinniped predation, and either model held. It is likely that productivity would be lower if the population were approaching the carrying capacity of its habitat. Since the results did not indicate a positive trend in productivity as the population decreased, we are not able to estimate the carrying capacity. Population dynamics theory predicts that productivity would increase as biomass decreases. The lack of such a response for Port Susan Pacific hake suggests that productivity may have been impacted by natural or human related factors. One possible factor is the relatively warm climate conditions experienced since 1976. Average weight of Pacific hake decreased from 0.298 kg in 1982 to 0.072 kg in 1999. The decrease may have been partially caused by decreased growth as occurred for Pacific hake in the Canadian portion of the Georgia Basin (Saunders and McFarlane 1999). The possible decrease in growth may have been related to the relatively warm conditions or smaller size-at-maturity (Fig. 23) and may have had a negative impact on productivity. It is possible that the theoretically expected negative relationship between biomass and productivity would have been strong enough to significantly reduce the observed decline in Pacific hake biomass, if unknown factors had not affected the ability of the population to respond to decreased levels.

Both models have theoretical deficiencies in the description of predation by pinnipeds. For example, under the first model the consumption of Pacific hake per pinniped is constant until extinction of the Pacific hake population, and under the second model Pacific hake consumption per pinniped increases without bounds as the Pacific hake population increases. Both models ignore the effect of varying abundances of other prey.

There was a non-significant (r = -0.03) negative relationship between Pacific hake abundance and average sea lion count between 1986 and 1999, not including 1994 and 1995. Since California sea lion aggregations did not regularly occur in Puget Sound until 1979 (Schmitt et al. 1995), and sea lion abundance tended to increase until 1986, the year 1986 was chosen as the first year to examine the sea lion-Pacific hake relationship. There is no apparent trend in sea lion abundance in Puget Sound since 1986, although the coast-wide stock has continued to increase (NMFS 1997).

d) Projections-

Hypothetical projections (see Appendix B) indicated that uncertainty about rates of predation of Pacific hake by pinnipeds and the form of the relationships between Pacific hake predation by pinnipeds and commercial fishing precludes definitive conclusions concerning the risk of extinction of the Port Susan Pacific hake population.

Table 8. Commercial catches of Pacific hake in the Port Susan area. Fishing year defined as March to February of the following year. Data were converted from million lbs to metric tons. Data provided by Wayne Palsson (W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill

Creek, WA 98012-1296. Pers. commun. to W. Lenarz.).

Year	Commercial catch (mt)
1982	8,986
1983	4,749
1984	4,232
1985	1,538
1986	880
1987	268
1988	231
1989	64
1990	41
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	0
1998	0
1999	0
2000	0

Table 9. California sea lion counts and hypothetical consumption of Pacific hake in Puget Sound. California sea lion count data for 1986-1998 and estimates of ten levels of consumption of Pacific hake by California sea lions based on information provided by Jeff Laake (NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.). California sea lion count data for 1982-1985 and 1999 data estimated from regression of mean counts and peak counts. Peak count data provided by Patrick Gearin (NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.).

Year **Mean sea lion count** **Ten levels of Pacific hake consumption (mt) by California sea lions**

1982	135	110	147	184	221	257	294	331	368	404	441
1983	164	134	179	224	269	313	358	403	448	493	537
1984	207	170	226	283	339	396	452	509	565	622	679
1985	290	237	316	395	474	554	633	712	791	870	949
1986	378	309	412	515	618	721	824	927	1,030	1,133	1,236
1987	218	178	237	297	356	415	474	534	593	652	712
1988	168	137	183	229	274	320	366	411	457	503	548
1989	138	113	151	188	226	264	301	339	377	414	452
1990	168	138	184	230	276	323	369	415	461	507	553
1991	258	212	283	353	424	495	565	636	707	777	848
1992	282	231	308	385	461	538	615	692	769	846	923
1993	352	288	384	481	577	673	769	865	961	1057	1153
1994	546	448	598	747	897	1046	1196	1345	1494	1644	1793

1995	664	545	726	908	1089	1271	1452	1634	1815	1997	2179
1996	488	399	532	665	798	931	1065	1198	1331	1464	1597
1997	304	249	333	416	499	582	665	748	831	915	998
1998	222	182	242	303	364	424	485	545	606	666	727
1999	210	172	230	287	345	402	459	517	574	632	689

Table 10. Hypothetical estimates of consumption of Pacific hake in Puget Sound and Eastern Bays by harbor seals. The base line year is 1993. Consumption in other years is based on estimate that abundance of harbor seals increased 3.3% per year in Puget Sound, and 2.7% per year in Eastern Bays. Estimates based on information provided by Robert DeLong (NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.). One level estimated for Puget Sound and ten levels estimated for Eastern Bays. Methodology is detailed in text.

	Pacific hake consumption by harbor seals (mt)										
Year	**Puget Sound**					**Eastern Bays**					
1982	57	237	317	396	475	554	633	712	792	871	950
1983	59	244	325	407	488	569	651	732	814	895	976
1984	61	251	334	418	502	585	669	753	836	920	1,003
1985	63	258	344	430	516	602	687	773	859	945	1,031
1986	65	265	353	442	530	618	707	795	883	971	1,060
1987	67	272	363	454	545	635	726	817	908	998	1,089
1988	70	280	373	466	560	653	746	840	933	1,026	1,119
1989	72	288	383	479	575	671	767	863	959	1,055	1,150
1990	75	296	394	493	591	690	788	887	985	1,084	1,182
1991	77	304	405	506	608	709	810	911	1,013	1,114	1,215
1992	80	312	416	520	624	729	833	937	1,041	1,145	1,249
1993	82	321	428	535	642	749	856	963	1,070	1,177	1,284
1994	85	330	439	549	659	769	879	989	1,099	1,208	1,318
1995	88	338	451	564	677	790	903	1,015	1,128	1,241	1,354
1996	91	348	463	579	695	811	927	1,043	1,159	1,275	1,390
1997	94	357	476	595	714	833	952	1,071	1,190	1,309	1,428
1998	97	367	489	611	733	855	978	1,100	1,222	1,344	1,466
1999	100	377	502	628	753	879	1,004	1,130	1,255	1,381	1,506

Table 11. Estimates of productivity (G) of the Port Susan population of Pacific hake at 10 levels of pinniped consumption using equation 1.

Year	**Productivity**									
1982	0.96	0.96	0.97	0.98	0.99	1.00	1.00	1.01	1.02	1.03
1983	-0.08	-0.07	-0.06	-0.06	-0.05	-0.04	-0.04	-0.03	-0.03	-0.02
1984	-0.09	-0.08	-0.07	-0.06	-0.05	-0.03	-0.02	-0.01	0.00	0.01
1985	0.47	0.49	0.51	0.54	0.56	0.58	0.61	0.63	0.65	0.68
1986	0.09	0.11	0.14	0.16	0.18	0.21	0.23	0.25	0.27	0.30
1987	0.35	0.37	0.39	0.41	0.43	0.45	0.47	0.49	0.51	0.53
1988	-0.01	0.00	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12
1989	0.32	0.33	0.35	0.37	0.38	0.40	0.41	0.43	0.44	0.46

1990	-0.32	-0.31	-0.29	-0.28	-0.26	-0.25	-0.24	-0.22	-0.21	-0.20
1991	0.16	0.19	0.22	0.24	0.27	0.29	0.32	0.34	0.37	0.40
1992	-0.29	-0.26	-0.24	-0.21	-0.19	-0.16	-0.14	-0.11	-0.09	-0.06
1993	0.38	0.42	0.47	0.52	0.56	0.61	0.65	0.70	0.74	0.79
1994	0.38	0.42	0.47	0.52	0.56	0.61	0.65	0.70	0.74	0.79
1995	0.38	0.42	0.47	0.52	0.56	0.61	0.65	0.70	0.74	0.79
1996	-0.46	-0.43	-0.40	-0.37	-0.34	-0.31	-0.28	-0.25	-0.23	-0.20
1997	0.10	0.15	0.21	0.26	0.32	0.38	0.43	0.49	0. 54	0.60
1998	-0.08	-0.03	0.03	0.08	0.14	0.19	0.25	0.30	0.36	0.42
Mean	0.13	0.16	0.19	0.21	0.24	0.27	0.30	0.32	0.35	0.38

Table 12. Estimates of productivity (G) of the Port Susan population of Pacific hake at 10 levels of pinniped consumption using equation 2.

Year	Productivity (G)									
1982	1.09	1.10	1.12	1.13	1.15	1.17	1.18	1.19	1.21	1.23
1983	0.17	0.18	0.20	0.22	0.23	0.25	0.27	0.28	0.30	0.32
1984	0.13	0.14	0.16	0.18	0.20	0.22	0.24	0.25	0.27	0.29
1985	0.66	0.68	0.71	0.73	0.75	0.77	0.79	0.81	0.83	0.86
1986	0.33	0.35	0.38	0.40	0.43	0.46	0.48	0.50	0.52	0.56
1987	0.55	0.56	0.59	0.61	0.62	0.65	0.67	0.68	0.70	0.73
1988	0.23	0.24	0.26	0.28	0.30	0.32	0.34	0.35	0.37	0.39
1989	0.53	0.54	0.56	0.58	0.60	0.62	0.63	0.65	0.66	0.69
1990	-0.16	-0.14	-0.12	-0.10	-0.09	-0.06	-0.05	-0.03	-0.01	0.01
1991	0.38	0.40	0.43	0.45	0.47	0.50	0.52	0.54	0.56	0.59
1992	-0.16	-0.14	-0.11	-0.09	-0.07	-0.03	-0.01	0.01	0.03	0.06
1993	0.55	0.58	0.62	0.65	0.68	0.72	0.75	0.78	0.81	0.85
1994	0.55	0.58	0.62	0.65	0.68	0.72	0.75	0.78	0.81	0.85
1995	0.55	0.58	0.62	0.65	0.68	0.72	0.75	0.78	0.81	0.85
1996	-0.49	-0.46	-0.42	-0.39	-0.36	-0.32	-0.29	-0.26	-0.23	-0.19
1997	0.22	0.24	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.46
1998	-0.02	0.01	0.04	0.06	0.08	0.11	0.13	0.15	0.17	0.20
Mean	0.30	0.32	0.35	0.37	0.39	0.42	0.44	0.46	0.48	0.51

Georgia Basin DPS

Saunders and McFarlane (1999) indicated that a conservative estimate of the biomass of Pacific hake in the Canadian portion of the Strait of Georgia during the 1990's was about 50,000 to 60,000 mt and that biomass was stable during this time. Biomass estimates for the Port Susan population ranged from 10,648 mt in 1990 to 2,365 mt in 1999 (Table 4). Using these estimates, the Port Susan Pacific hake population comprised from 3.8-17.6% of the combined Port Susan-Strait of Georgia population during the 1990's. If the Canadian portion of the Strait of Georgia population is maintained, extinction of the Port Susan population does not appear to pose a serious risk of extinction for the entire Georgia Basin DPS. However, the Canadian portion of the DPS has shown some signs of decline in the late 1990s so the situation warrants continued close monitoring.

Saunders and McFarlane (1999) did not recommend formal changes in the range of yield recommended for the Canadian population. However, because of concern about factors such as decreasing size-at-age and increasing predation by pinnipeds they suggested "that managers choose from the lower half of the yield range," which was 7,554 to 14,687 mt. Saunders and McFarlane (1999) also estimated that harbor seals consumed 11,000 mt of Pacific hake in the Strait of Georgia in 1996, ranging from 4,400 to 21,000 mt. They qualified the consumption estimate by observing that age composition and distribution of harbor seals had changed considerably since composition of the diet estimates were made in the 1980's. Thus the estimate and ranges may not be accurate.

If harbor seals consumed 11,000 mt and commercial catch was 7,554 mt of Pacific hake and the biomass was 60,000 mt, then the total rate of exploitation would have been 0.31. Average estimated total rate of predation of the Port Susan Pacific hake population was lower under low hypothetical values of predation by pinnipeds during the time that the population declined from 14,826 mt in 1982 to 2,365 mt in 1999 (Table 13).

Environmental risks to the Georgia Basin Pacific hake DPS

The above analyses examined the possible effects of human and pinniped predation on the population of Pacific hake in the Georgia Basin DPS. As previously mentioned, environmental factors could have been very important factors in the observed decreases in biomass and size.

Changes in migratory behavior and location specific size at age of the offshore population of Pacific hake appear to be related to environmental factors (Dorn 1995). In the discussion that follows, temperature is referred to with the understanding that temperature is just one parameter of what is probably a complex suite of environmental factors that fish encounter. During warm years, a greater portion of the offshore Pacific hake population is found off Canada during the summer feeding season (Dorn 1995), and during the very warm period of the late 1990's some Pacific hake apparently spawned off Washington and Canada, which is much further north than the typical spawning area off California and Mexico (Dorn et al. 1999a). The Port Susan population apparently has changed more than the Canadian portion of the DPS. It is possible that warm environmental conditions have caused the Port Susan area to be relatively less favorable for Pacific hake spawning than the Canadian portion of the Strait of Georgia. Some of the Port Susan population may have migrated to Canadian waters, or perhaps there has been less movement from Canadian waters than before. The warm period may be part of global warming that has occurred during the last century. There is evidence that anthropogenic increases in atmospheric CO_2 may cause global warming. However there is still considerable scientific debate on whether or not the observed increases have natural or anthropogenic causes. Continuation or perhaps even enhancement of the warm conditions observed in the Pacific Northwest could preclude improvement in the condition of the Port Susan population of Pacific hake unless the fish eventually adapt to these conditions.

Table 13. Estimates of total rate of exploitation of Port Susan Pacific hake by humans and pinnipeds under 10 hypothetical levels of pinniped predation.

Year	Rate of total exploitation under 10 hypothetical levels of pinniped predation									
1982	0.63	0.64	0.65	0.66	0.66	0.67	0.68	0.69	0.70	0.70
1983	0.26	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.32	0.32
1984	0.36	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46
1985	0.30	0.32	0.34	0.37	0.39	0.41	0.44	0.46	0.48	0.51
1986	0.18	0.21	0.23	0.25	0.28	0.30	0.32	0.35	0.37	0.39
1987	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28
1988	0.08	0.09	0.11	0.12	0.14	0.15	0.17	0.18	0.20	0.21
1989	0.06	0.08	0.09	0.11	0.13	0.14	0.16	0.17	0.19	0.20
1990	0.05	0.07	0.08	0.09	0.11	0.12	0.1 3	0.15	0.16	0.17
1991	0.09	0.11	0.14	0.17	0.19	0.22	0.24	0.27	0.29	0.32
1992	0.09	0.11	0.14	0.16	0.19	0.21	0.24	0.26	0.29	0.31
1993	0.15	0.20	0.24	0.29	0.33	0.38	0.42	0.47	0.51	0.56
1994	0.16	0.20	0.25	0.30	0.34	0.39	0.44	0.48	0.53	0.58
1995	0.14	0.19	0.23	0.27	0.32	0.36	0.40	0.45	0.49	0.53
1996	0.10	0.13	0.16	0.19	0.22	0.25	0.28	0.31	0.34	0.37
1997	0.19	0.25	0.30	0.36	0.41	0.47	0.53	0.58	0.64	0.69
1998	0.20	0.25	0.31	0.36	0.42	0.47	0.53	0.59	0.64	0.70
Mean	0.19	0.21	0.24	0.27	0.29	0.32	0.35	0.38	0.40	0.43

There may be other anthropogenic changes in the environment that have adversely affected Pacific hake. As previously noted (see "Environmental History and Features of Puget Sound" section) there have been changes in kelp and eel grass beds. While kelp and eel grass beds are not an important habitat for Pacific hake, it is possible that reduced beds result in reduced detritus for detrital feeders which may be important sources of food for Pacific hake in Puget Sound. Anthropogenic changes in river flow patterns and increased turbidity could possibly cause changes in the ecosystem that are adverse to Pacific hake. There have been insufficient studies to determine if there have been impacts from anthropogenic sources of toxic chemicals.

Summary and Conclusions of Georgia Basin Pacific Hake Risk Assessment

In its deliberations concerning ESA risk assessment for Pacific hake in the Georgia Basin DPS, the BRT considered the status of the Port Susan and Strait of Georgia stocks, the relationships among stocks, and effects of potential risk factors.

The BRT identified several concerns about the status of the Port Susan stock. Biomass and numbers of fish surveyed during the spawning period in Port Susan are the lowest since the surveys began in 1992. Estimated biomass in 2000 was 992 mt, about half the biomass in 1999 and represents an 85% decrease in the past 15 years. The size composition of the stock also showed a marked shift to smaller fish. Consequently, recruitment appeared to be maintained through 1999 despite declines in spawning biomass. Numbers of Pacific hake fluctuated around 30 million fish between 1985 and 1999, except in 1996 when estimated numbers exceeded 60 million fish. However in 2000, estimated numbers fell below 11 million. The size, and presumably age, at maturity has also dropped substantially. Nearly all female Pacific hake over 20 cm sampled during the 1990s were mature, whereas in the early 1980s, none were mature until 24 cm and about half of the sampled females were mature by 30 cm.

In addition to concerns about the status of the Port Susan stock, the BRT identified several areas of uncertainty. The extent of any mixing of spawners or spawning products among stocks within Puget Sound or between Puget Sound and Strait of Georgia stocks is not known. Unlike in Port Susan, the abundance of Pacific hake in the Strait of Georgia has not markedly declined over the past 15 years, and recruitment of young fish to the Port Susan stock may be the result of migration from the Strait of Georgia and other areas. If so, the Port Susan stock measured during the spawning period may be a variable portion of a larger stock and its size may not be indicative of the size of the larger stock. Under this hypothesis, the BRT's concerns about the low abundance of Pacific hake observed in Port Susan may be considerably reduced, but the BRT did not reach a consensus on the likelihood or extent of potential mixing among stocks.

The effects of potential risk factors, such as pinniped predation, habitat alteration or loss, and environmental changes, are also poorly known. Environmental changes could contribute to the observed changes in the status of Port Susan stocks, such as decreased growth, size at maturity, and reduced survival. The effect of pinniped predation or other risk factors that may be contributing to the decline in Port Susan Pacific hake abundance is also inconclusive. For two hypothetical models of pinniped predation that were considered, uncertainties about predation rates and behaviors precluded definitive conclusions about the risk of extinction of the Port Susan stock. Predation by other fish on Pacific hake or reductions in prey abundance have not been evaluated. The potential effects of habitat loss or degradation are not known, although West (1997) speculated that juvenile survival could be reduced through loss or degradation of nearshore nursery habitats.

In contrast to Port Susan, Pacific hake abundance in the Canadian portion of the Strait of Georgia apparently has been stable during the 1990s. Estimated biomass ranged between 50,000-60,000 mt, much larger than the Port Susan stock. The status of the Pacific hake in Dabob Bay, its relation to stocks in other areas, or the potential existence of undetected stocks are all unknown. Similarly, it is not known if the factors contributing to the decline in Port Susan could similarly affect the Strait of Georgia stocks in the near future.

These uncertainties and the differences in stock status between Strait of Georgia and Port Susan Pacific hake made evaluation of the status of the DPS difficult. The BRT concluded that the Georgia Basin Pacific hake DPS was not presently in danger of extinction, but could with nearly equal likelihood fall into either of two categories: 1) not in danger of extinction, nor likely to become so in the foreseeable future, or 2) not presently in danger of extinction, but likely to become so in the foreseeable future. As a whole, the BRT gave slightly higher support to the first category. Over the next year much new information is expected to become available that will likely resolve many of the uncertainties about the status and relationship of stocks of Pacific hake within the Georgia Basin DPS. When it is available, the BRT urges that this new information be considered and extinction risk be reevaluated.

[2] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to B. McCain.

[3] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to R. Gustafson.

[4] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to R. Gustafson

[5] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to W. Lenarz.

[6] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[7] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to W. Lenarz.

[8] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to W. Lenarz.

[9] P. Gearin, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[10] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[11] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to W. Lenarz.

[12] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[13] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[14] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to BRT, July 26, 2000.

[15] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz

[16] M. Dorn, NMFS, F/AKC3, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[17] W. Palsson, WDFW, 16018 Mill Creek Blvd., Mill Creek, WA 98012-1296. Pers. commun. to W. Lenarz.

[18] S. Jeffries, WDFW, 600 Capitol Way N., Olympia, WA 98501-1091. Pers. commun. to W. Lenarz.

[19] P. Gearin, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[20] P. Gearin, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[21] J. Laake, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[22] P. Gearin, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[23] R. DeLong, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz

[24] S. Jeffries, WDFW, 600 Capitol Way N., Olympia, WA 98501-1091. Pers. commun. to T. Builder. September 17, 1999.

[25] P. Gearin, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

[26] R. DeLong, NMFS, F/AKC4, National Marine Mammal Laboratory, 7600 Sandpoint Way NE, Seattle, WA 98115-6349. Pers. commun. to W. Lenarz.

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DOES SEAFOOD SCIENCE HAVE A ROLE IN FISHERIES MANAGEMENT: A CASE STUDY OF THE PACIFIC WHITING FISHERY

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INTRODUCTION

Optimum utilization of fishery resources is a critical issue for the industry and seafood researchers. There is a general consensus that wild-caught marine fishery harvests have peaked and the majority of the commercially important fisheries are at their maximum sustainable yields (de Wilde and Kamstra 1995). Maximum utilization and increased economic benefits to the industry can still occur through reduction of postharvest fishery losses, increased recovery of food grade raw material from fish, and harvesting when fish are in their optimal physiological state in terms of seafood quality and potential processing yield. Most commercial marine species undergo physiological changes that affect the potential quality and processing yield. The European sardine undergo tremendous seasonal changes in lipid content varying from 1.6% to 22.4% lipid content on a whole body basis (Ackman 1995). Salmon rapidly deteriorate during spawning migration which greatly affects flesh quality and potential markets. Several species undergo specific spawning periods after which the muscle becomes noticeable soft and has a high moisture content. Love (1988) has described several physiological changes that occur during spawning and their effects on the "eating quality" of fish. There has been little effort to incorporate these changes in physiological conditions into fisheries management schemes. This paper will discuss the need for using intrinsic fish quality characteristics as a management tool. The Pacific whiting fishery is used as an example of how fisheries management plans can incorporate seafood science data to increase economic benefits and help conserve the resource.

Pacific whiting (*Merluccius productus*) is the largest fishery resource off the Pacific Northwest Coast (excluding Alaska). Since 1990 through 1996 the harvests have averaged approximately 207,000 metric tons (mt) with lows of 142,000 mt (1993) and highs of 260,000 mt (1994) (Radtke, 1995). The fishery has evolved from one dominated by foreign and joint venture (JV) operations in the 1980s, to a split at-sea and shoreside operations during the 1990s. In 1996, 40% of the fishery was taken by shoreside interests while 60% was harvested by an at-sea component which consists of large factory trawlers and motherships that act as processors. Shoreside processing of Pacific whiting has grown from 8,115 mt in 1990 to a present harvest of 85,000 mt. This ten-fold increase is the result of utilization of Pacific whiting for surimi production. There are four surimi plants in Oregon that use from 200,000 to 500,000 lbs of Pacific whiting per day as raw material. Although several products, such as frozen H&G, IQF fillets and minced blocks, are made from whiting, more than 80% goes into surimi production. The main stock of Pacific whiting spawns off the Baja California coast in the winter and slowly migrates up the California coast in the Spring (Wilkins 1992). By March, the fish can be found in large schools in near-shore waters from Northern California to south of Vancouver Island, Canada. The larger factory trawlers that enter the fishery will harvest their quota within a two-three week period. The onshore fishery, depending on the size of the quota and the number of vessels fishing, will last 60 to 100 days.

The Pacific Fisheries Management Council (PFMC) develops the management plan for the Pacific whiting resource in the U.S. This involves a variety of regulatory options including setting the opening dates of the season as well as allocating the annual allowable domestic harvest among competing fishing and processing sectors. The opening dates for the U.S. fishery have traditionally been April 15 which accommodates the needs of the offshore fleet to operate between the Alaska A and B seasons. The allocation decision (between onshore and offshore interests) usually involves a choice among alternatives based on economic and social benefits (e.g. employment) that each sector would generate. These decisions are made to satisfy three broadly defined goals of the Pacific Coast Groundfish Fishery Management Plan. These are: 1) conservation of the resource, 2) maximum economic value, and 3) efficient utilization. In conducting their analysis, policy makers have largely ignored the intraseason variation in the characteristics of the raw product. This variation can have a significant impact on product quality and ultimately, socioeconomic benefits of the fishery.

There is much anecdotal and research information concerning Pacific whiting quality. It is primarily known as a soft-flesh whitefish that can have severe texture problems if not handled properly (Peters et al. 1995). There have been anecdotal reports that during the JV operations, European buyers would not accept fish harvested before June due to quality problems. The quality issue is centered on two concerns, one biochemical and the other physiological. Pacific whiting is known for having high levels of protease enzymes in their muscle tissue. These proteases are associated with myxosporidean parasites that infect the flesh. Although the parasites are not a human health problem their presence and that of the protease can effect the final product quality. Onshore harvests of Pacific whiting, prior to 1990, were carried out by bottom trawlers that primarily captured other groundfish species (i.e. rock fish) and often fished over a 3-4 day period. Due to texture problems, efforts were made to capture whiting on the last days of the trip and on-board handling of whiting was less than optimal.

With the advent of the surimi industry, Pacific whiting became a target fishery and the industry began to make changes. Most boats altered their hulls and had refrigerated sea water (RSW) systems or champaign ice (seawater, ice and bubbled air) systems installed. Research at the OSU Seafood lab showed that time and temperature were critical factors for production of high quality surimi (Morrissey et al. 1992). Researchers recommended that the fish be brought down to <4°C and be processed within a 24 hr period. Trips were often accomplished within 12 hrs and fish were stored either in the vessels in refrigerated systems or on shore based tanks that were refrigerated. Research with different protease inhibitors showed the correct combinations that could be used for inhibiting the proteases that remained in the flesh (Morrissey et al. 1993). Additional research identified the protease enzymes responsible for tissue softening (Seymour et al. 1994; An et al. 1994), loss of protein in surimi processing (Lin and Park, 1996a) and the effects of in-line washing on surimi yield and quality (Morrissey et al. 1995; Lin and Park 1996b). The OSU Seafood Laboratory worked closely with the industry in determining the factors in the Pacific whiting fishery that affect final surimi quality. Work with new "expert systems" such as neural networks and M-5 induction gave insights to researchers and the industry about biological, harvesting and processing factors that effect final product quality (Peters et al. 1996).

On-board handling and processing factors can be changed to optimize quality if the fishermen and processors agree that the costs of the changes are economically worthwhile. The intrinsic biological factors, as they relate to seasonality, can only be changed through fishery management decisions that reflect harvests dates, allocations, etc. The purpose of this study was to determine the changes in intrinsic quality parameters that take place during the Pacific whiting season and determine how they effect critical factors such as yield and product quality. If these factors are important for the economic health of the industry, then suggestions can be made to the fishery management council that would reflect a maximization of profits to the industry without compromising the biological health of the fishery.

METHODOLOGY

Development of Pacific Whiting Model

The fishery is modeled using non-linear mathematical programming. The type of model involves choosing the time of harvest which maximizes social benefits subject to biological dynamics and economic conditions (Clark 1990; Onal et al. 1991). One of the main objectives of the model is to maximize the Net Present Value (NPV) to the industry by incorporating biological, economic and intraseason product quality variation. Relationships between product characteristics and prices, costs, recovery rates, and production practices are determined using intraseasonal data. For the Pacific whiting fishery, the model is based on the final product form - surimi, which is a graded product and one of only a few fisheries-based products which have an established structure for quality determination. The quality characteristics of surimi determine its price and the production formulas for several hundred surimi-based final products. The other product forms (fillets, H&G, etc.) are not marketed using a consistent set of quality parameters nor have they experienced significant inseason price variation.

Surimi quality is typically identified by quantifiable levels of certain quality parameters. Together these characteristics are used to define its grade, and ultimately the price of the product. These include gel strength, whiteness, and moisture content. Seasonality is typically incorporated into a model using a dummy variable, however, in our analysis, seasonality is implicitly incorporated through changes in the properties of surimi which result from variation in intrinsic quality (i.e., flesh composition). The equations specifying this relationship were estimated as an SUR modeling system (i.e., the surimi characteristics were regressed against raw product characteristics in order to relate intrinsic quality to surimi quality)(Larkin and Sylvia 1996a). Only gel strength was found to be significant at the 5% level. Using the coefficient, a reasonable 25% seasonal increase in gel strength would produce a $0.10 per pound, or 16%, price increase. The data utilized was obtained during a period of relatively stable supply and demand conditions. Obviously supply and demand cannot be expected to remain constant in the long-run, however, our goal for this analysis is only to incorporate price variation to the extent that it is affected by the collective changes in raw quality (Larkin and Sylvia 1996b).

Data Collection

Several data sources were used for this model. Weight and length data by age were obtained from 1986-1988 (PFMC 1992). The Oregon State University Seafood Laboratory (OSU-SL) provided information on weights, lengths, and proximal content for 1992-1994 seasons. Pacific whiting fish samples were taken each week over a three year period. For each analysis 20 fish were chosen at random and transported on ice to the OSU-SL. Proximate composition (protein, moisture, lipid and ash) were done on Pacific whiting fillets by standard AOAC methods (AOAC 1990). Data sources for earlier years (mid 1960s) and similar species (cod, pollock) confirm the stability and absolute values of our data (Nelson et al. 1985; Alaska Fisheries Development Foundation 1991). Annual average product recovery rates were obtained from NMFS and inseason rates were provided by two private firms on a confidential basis. Data for the determining the relationship of price to surimi characteristics were received from four distinct, but confidential, sources which enabled model validation. Remaining price and cost data was obtained from NMFS and correspond to the estimates used by the resource managers (PFMC 1993).

Biological Information

The biological component of the data uses an estimate of the initial population, and incorporates annual recruitment, migration, natural mortality, and fishing selectivities to determine the annual population, spawning biomass, fishing mortality, and sustainable harvest levels. The annual allowable U.S. harvest is allocated into monthly catch. The data for the biological model was obtained from the National Marine Fisheries Service (NMFS) which develops the stock assessments for management of the Pacific whiting fishery (Dorn et al. 1993).

Economics

In our model, each sector realizes different product recovery rates, costs, and in some cases, prices. In addition, each sector specializes in the production of different products; the offshore sector concentrating in surimi production while the onshore sector produces surimi and some fillets and H&G products. Each sector differs in its maximum daily capacity and utilization of waste. The shoreside industry has spawned several by-product industries such as the production of fishmeal, protein hydrolysates, and fertilizers. Product recovery rates vary by product form (surimi, H&G, fillets and fishmeal) and are multiplied by the gross weight of the fish used to arrive at final production quantities. These rates are also used as indicators of the efficiency of the industry or comparison of the efficiency of competing harvest sectors.

Seafood Science

The general form of the intraseason product recovery rates (a.k.a. production, *yld*),

$$yld_{m,s,f} = f(X_1, X_2) = f(cf, wl, pro, moi, fat)$$

assumes that yields are determined by both fish size (X_1) and flesh composition (X_2), where fish size is described by either the condition factor (*cf*) or the weight-length ratio (*wl*) and flesh composition consists of the percentage of weight accounted for by protein, moisture, or fat (*pro*, *moi*, and *fat*, respectively). In particular, a larger fish (e.g., heavier or "plumper") can either increase the recovery rate (processing equipment is generally able to extract more from larger size fish) or decrease it (if size is a result of increased gonadal tissue). Similarly, improvements in the composition of the flesh can either increase recovery rates (as protein content and quality are positively related) or decrease rates (as moisture content and quality are inversely related). Partial correlation analysis identified which variables describe the most variation in each of the production yields. This system of linear equations was estimated using SUR (Larkin and Sylvia 1996a).

RESULTS

Protein content in Pacific whiting fillets increased and moisture content decreased as the season progressed (Fig. 1). The normal whiting season begins April 15 and ends once the quota is captured. At the beginning of the season the moisture content is usually close to 84% as the fish are recovering from their post-spawning migration. This gradually decreases to 81% by the end of July. The protein content in the fillets increased as the season progressed from a low of 15% to 18% by August. This indicates improved condition of the fish and better overall quality as well. The surimi process requires washing the minced flesh to concentrate myofibrillar protein. Optimum surimi production would take place during the period when there is maximum protein in the flesh. The weight-length ratios as tracked over time. This data also shows that the condition of the fish improves as the season progresses and the fish put on weight.

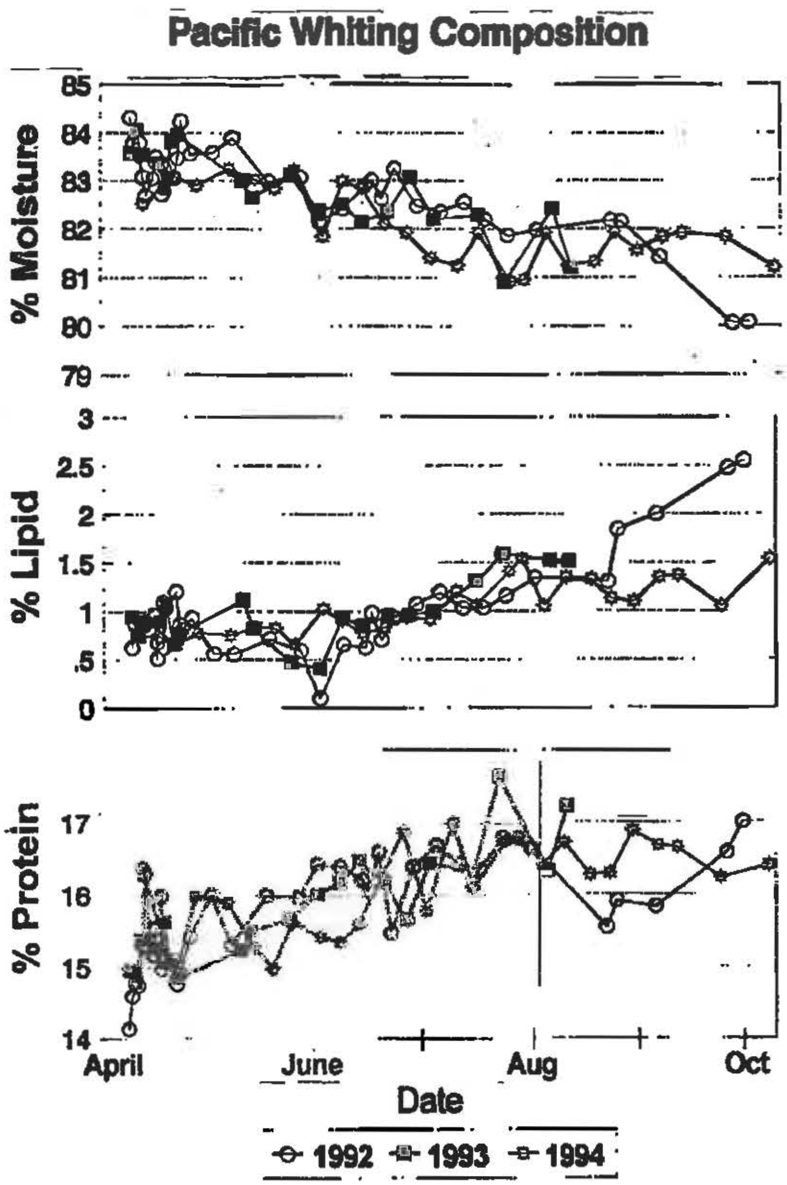

Figure 1. Moisture, lipid and protein content of Pacific whiting over the 1992-1994 harvest seasons

The optimized model described in the methodology section maximizes the value of the fishery over time by determining when, where, by whom, and how much is harvested. The optimal management plan (i.e., the "proposed" plan) is compared with the current management practice which ignores seasonality (i.e., the "standard" plan). More importantly, the model describes the differences between plans and quantifies the individual effects of changes in weight, product recovery rates (via intrinsic quality changes, i.e., changes in size and flesh composition), and market prices for the final goods.

Results show that the inseason timing of harvests are significantly affected by having the model include seasonality. Incorporating inseason changes shows that delaying the harvest to coincide when the fish are at optimum quality increases Net Present Value (NPV) 117%. These results are summarized in Fig. 2. Under standard management, the offshore sector extracts its quota in April (usually in 2-3 weeks) and, on average, the season closes in July for the onshore component. Under the new proposed management plan the onshore season would not open until July and the offshore sector would harvest in October.

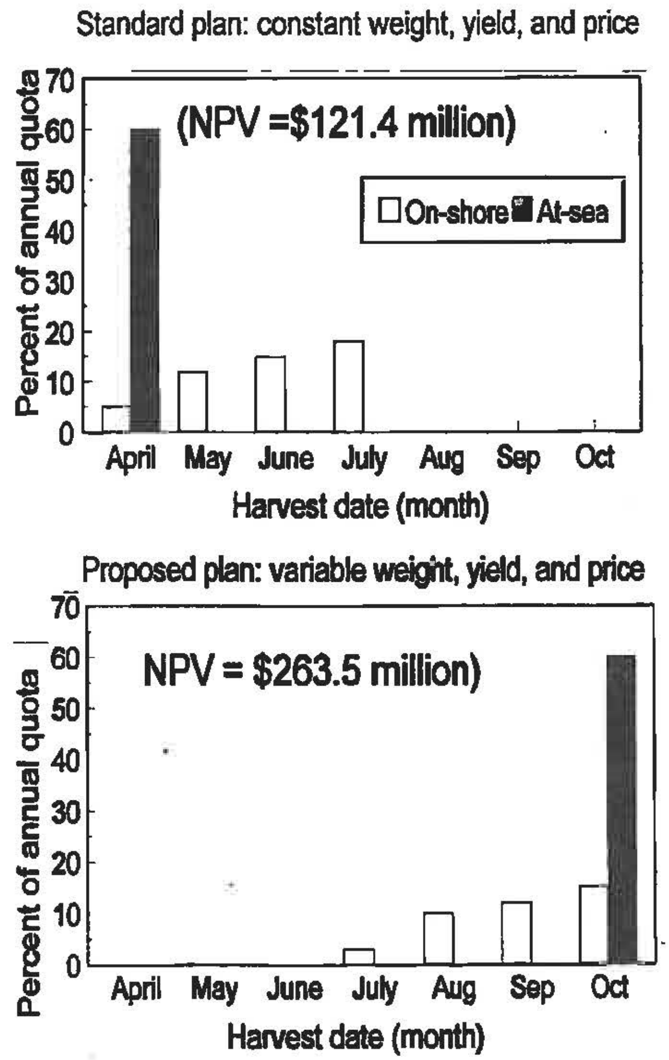

Figure 2. Harvest schedules for Pacific whiting as described in the existing standard plan and the proposed plan. (NPV = Net Present Value.)

The individual monetary effects that would result from the new fishing schedules are shown in Fig. 3. This figure describes the increase in NPV, that is, the difference between the standard and the proposed plan. The recovery rate (yield) effect dominates by accounting for 38% of the increased NPV. Inseason price and weight changes contribute 25% and 6%, respectively. These individual effects were determined by systematically allowing each component to vary while holding the remainder constant and recording the change in NPV (Sylvia et al. 1996).

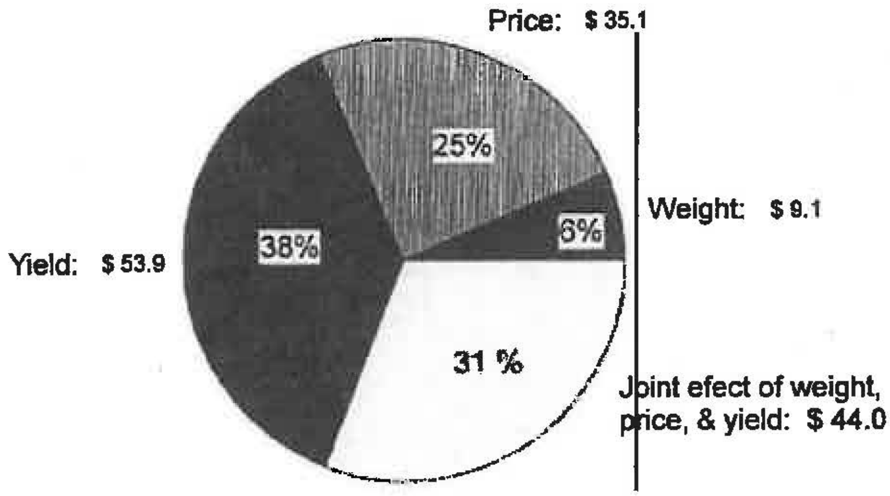

Figure 3. Relative percent contribution of weight, price, and production yields to increased NPV ($ million) resulting from introduction of seasonal variability.

It is possible to separate yield and price effects even further by examining the changes in the condition of the fish at the time of capture, i.e. fish size and flesh composition. For example, as the moisture content of the fish declines throughout the season (from approximately 84% to 81%), both production yields (of surimi and fillets) and surimi characteristics (including water content, whiteness, and gel strength) are affected. This is also true for protein and fat content. Seasonal changes in the intrinsic characteristics provide the critical link, in terms of effective management, between biological and economic components.

IMPLICATIONS ON FISHERIES MANAGEMENT

Clearly, the economic goals of the Pacific whiting fishery plan are best met if the season opening is delayed until June-July. It is important to consider the implications of this delayed opening on other factors such as conservation of the resource. The standard management plan is compared with the proposed plan on the basis of the stated goals of the PFMC Groundfish Management plan: 1) conservation of the resource, 2) economic value, and 3) efficient utilization. Results are summarized in Table 1.

Table 1. Comparison of management goals under the standard and proposed plans.[a]

U.S. management goals	Management plans		
	Standard	Proposed	Relative change
(1) Conservation			
1a) number of fish harvested	513.7 million	461.7 million	
1b) weight of fish harvested	225,100 t	253,000 t	
1c) size of spawning business (year 10)	1015 million	1028 million	+ 1%
1d) relative size of harvest (harvest/spawning biomass)	46.6%	41.5%	- 11%
(2) Economic value			
2a) net present value (NPV)	US $121.4	US$263.5	+ 117%
2b) property rights allocation			
onshore	46%	37%	- 19%
offshore	54%	63%	+ 16%
(3) Utilization			
3a) product recovery rates (yld)			
surimi	14%	17.4%	+ 24%
headed and gutted	56.4%	61.4%	+ 9%
fillets	23.5%	27.2%	+ 16%
meal and oil	9.8%	11.0%	+ 12%
3b) output quantities			
surimi	28,400 t	39,100 t	+ 37%
headed and gutted	8,000 t	8,000 t	0%
fillets	5,000 t	5,000 t	0%
meal and oil	27,900 t	24,100 t	- 16%

Values represent the average of annual statistics unless otherwise noted. If there is a seasonal component, the annual measure is the seasonal average based on when the harvest occurred.

No single measure can adequately represent the conservation of a resource. We use four separate measures to understand the possible implications to the ecosystem of the proposed management plan. The new proposed plan offers greater conservation since both the absolute and relative number of fish harvested declines (1a and 1d, respectively). In addition, the total annual harvest quota increases, that is, fewer but heavier fish are harvested. Perhaps more importantly, the size of the spawning biomass remaining at the end of the planning period is not compromised (1c). For the second goal, NPV increases under the proposed plan (NPV is our interpretation of the economic management goal). Alternatively, one could compare changes in employment or other measures of economic value to society (e.g., the relative change in property rights, 2b). In terms of utilization of the resource, average recovery rates increase under the proposed plan (3a). Output of surimi increases as property rights are shifted to the offshore sector (which specializes in surimi production), while production of meal declines. In addition, the onshore production of surimi also increases under the proposed plan (resulting form the seasonal price effect). The quantity of fillet and headed and gutted product does not change since both current production capabilities and market opportunities are limited.

SUMMARY

Seafood science can play an important role in management of a fisheries. There has been ample documentation of compositional changes in many commercially harvested species. These changes in moisture, protein, lipid content will affect final product quality, yields, and economic returns to the industry. This paper showed how variations on intraseason intrinsic quality can be an important key for successful development and management of many wild-stock fisheries. An interdisciplinary model for the Pacific whiting fishery demonstrated how seasonal changes in the raw product quality (i.e., fish weight at harvest and relative size and composition of the flesh) influence the economics of the fishery and its management. In particular, variations in weight directly affect the harvest quantities and variations in the relative size and proximate content impact production yields, product quality and product price.

For many species, management has disregarded the inseason timing of harvest in order to focus on the issues including allocating the annual quota among the competing harvest sectors. Failure to consider inseason intrinsic variability, however, results in sub optimal management of fast-growing or rapidly changing stocks. The result is decreased benefits to society and potentially the ecosystem. More importantly, management goals may not be mutually exclusive if harvest policies are dictated by the characteristics of the individual fish; that is, goals such as conservation, efficiency, and utilization may often by complementary.

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May 30, 2012

Via Electronic Mail and Overnight Delivery

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Re: Comments for Advance Briefing Book for June 20-26, 2012 Meeting

Dear Sir or Madam:

We are submitting the enclosed materials to be included in the Advance Briefing Book for the Pacific Fishery Management Council's ("Council's") June 20-26, 2012 meeting on behalf of our clients, Pacific Dawn LLC, Chellisa LLC, James and Sandra Schones, Da Yang Seafood Inc., and Jessie's Ilwaco Fish Company. These organizations and individuals are plaintiffs (the "Pacific Dawn Plaintiffs") in a case titled *Pacific Dawn LLC, et. al v. Bryson, et, al,* Case No. CV10-4829, filed in the Northern District of California, challenging the 2011 allocation of individual fishing quotas ("IFQs") for the Pacific whiting fishery.

On December 22, 2011, the Court in *Pacific Dawn* found that the National Marine Fisheries Service's and National Oceanic and Atmospheric Administration's failure to consider fishing history beyond 2003 for harvesters and 2004 for processors in implementing 2011 IFQs for the Pacific whiting fishery was arbitrary and capricious and therefore a violation of the Magnuson-Stevens Act. Because of the impact of the Court's ruling on the IFQ allocations for Pacific whiting, we request that the accompanying materials, which contain declarations filed in the above-reference case illustrating the impact of the old history dates on fishery participants, be reviewed by the Council in its consideration and plan for the upcoming Pacific whiting fishing season.

Enclosed, please find the following declarations filed in connection with Pacific Dawn Plaintiffs' Motion for Summary Judgment in the *Pacific Dawn* case:

- **Exhibit 1**: Declaration of Joseph Ham in Support of Plaintiffs' Motion for Summary Judgment, *Pacific Dawn LLC, et. al v. Bryson, et, al,* Case No. CV10-4829, Northern District of California (Docket No. 32, filed 7/27/11);

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- **Exhibit 2**: Declaration of Pierre Marchand Jr. in Support of Plaintiffs' Motion for Summary Judgment, *Pacific Dawn LLC, et. al v. Bryson, et, al,* Case No. CV10-4829, Northern District of California (Docket No. 33, filed 7/27/11);

- **Exhibit 3**: Declaration of Burt Parker in Support of Plaintiffs' Motion for Summary Judgment, *Pacific Dawn LLC, et. al v. Bryson, et, al,* Case No. CV10-4829, Northern District of California (Docket No. 34, filed 7/27/11);

- **Exhibit 4**: Declaration of James Schones in Support of Plaintiffs' Motion for Summary Judgment, *Pacific Dawn LLC, et. al v. Bryson, et, al,* Case No. CV10-4829, Northern District of California (Docket No. 35, filed 7/27/11); and

- **Exhibit 5**: Declaration of Chih Yuan Wang in Support of Plaintiffs' Motion for Summary Judgment, *Pacific Dawn LLC, et. al v. Bryson, et, al,* Case No. CV10-4829, Northern District of California (Docket No. 38, filed 8/1/11).

Thank you for your consideration. Please let me know if you have any questions or would like additional information.

Very truly yours,

Davis Wright Tremaine LLP

James Walsh

James P. Walsh

Exhibit 1

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Gwen Fanger (CA State bar No. 191161)
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DAVIS WRIGHT TREMAINE LLP

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

PACIFIC DAWN LLC, CHELLISSA LLC, JAMES AND SANDRA SCHONES, DA YANG SEAFOOD INC., and JESSIE'S ILWACO FISH COMPANY, Plaintiffs, v. GARY LOCKE, Secretary of Commerce, in his official capacity as Secretary of the United States, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, and NATIONAL MARINE FISHERIES SERVICE, Defendants.	Case No. CV 10 4829 TEH **DECLARATION OF JOSEPH HAM IN SUPPORT OF PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT** Date: November 14, 2011 Time: 10 a.m. Dept.: 12 (Hon. Thelton Henderson) First Amended Complaint filed: January 14, 2011

I, Joseph Ham, declare as follows:

1. I am the owner and operator of the F/V CHELLISSA, a trawl vessel licensed to fish in the Pacific whiting fishery off the West Coast. My home is 3897 Oceanview Drive, Florence, Oregon. I have been part of the commercial fishing industry since1980. I make this Declaration

based on my personal knowledge in support of Plaintiffs' Motion for Summary Judgment in this proceeding. If called as a witness, I could testify to the facts set forth in this Declaration truthfully and competently.

2. The F/V CHELLISSA has been fishing in the Pacific whiting fishery since 1996 through 2010. During this period of time, I have spent millions of dollars in upgrades to keep the vessel competitive.

3. I personally have caught every single pound of whiting on the vessel, which prevented me from spending the considerable amount of time attending meetings held by the Pacific Fishery Management Council held over many years to discuss the IFQ Program that was started this year. Others who are not that active in the fishery, particularly after 2003, did spend their time lobbying the Council for regulations that benefit a few vessels, whose owners simply want to trade their IFQ and sit on the beach with their passive earnings.

4. After all these years of active participation in the Pacific whiting fishery, our quota is at about 40 percent of the vessel's average yearly catch. The Magnuson-Stevens Act provisions regarding "recent" participation should have meant that vessels such as mine were given an initial IFQ allocation that reflected our investment and recent, as well as historic, participation in the fishery.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 23rd day of July 2011 in Florence, Oregon

/s/
Joseph Ham

Exhibit 2

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PACIFIC DAWN LLC, CHELLISSA LLC, JAMES and SANDRA SCHONES, DA YANG SEAFOOD INC. and JESSIE'S ILWACO FISH COMPANY

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

PACIFIC DAWN LLC, CHELLISSA LLC, JAMES AND SANDRA SCHONES, DA YANG SEAFOOD INC., and JESSIE'S ILWACO FISH COMPANY, Plaintiffs, v. GARY LOCKE, Secretary of Commerce, in his official capacity as Secretary of the United States, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, and NATIONAL MARINE FISHERIES SERVICE, Defendants.	Case No. CV 10 4829 TEH **DECLARATION OF PIERRE MARCHAND, JR. IN SUPPORT OF PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT** Date: November 14, 2011 Time: 10 a.m. Dept.: 12 (Hon. Thelton Henderson) First Amended Complaint filed: January 14, 2011

I, PIERRE MARCHAND, JR., declare as follows:

1. I am the President and owner of Jessie's Ilwaco Fish Company located at 117B Howerton Way SE, Ilwaco, Washington. I have been part of the Company since 1964. I make this Declaration based on my personal knowledge in support of Plaintiffs' Motion for Summary

Judgment in this proceeding. If called as a witness, I could testify to the facts set forth in this Declaration truthfully and competently.

2. Ilwaco, Washington is a small community located just inside the entrance to the Columbia River at the southwestern tip of Washington State, population 950. The median income for a household in the town, based on the 2000 census, is just under $30,000 per year. Because of its proximity to the Pacific Ocean, the town has long been the site for the harvesting and processing of fish, including salmon, shrimp, groundfish, crab and sardines. The first canning operation began in 1927.

3. Over the last ten years, between 70 (average daily employment) and 500 (peak work period) people have been employed by the Ilwaco Fish Company. The Magnuson-Stevens Fishery Management Act ("Magnuson-Stevens Act") recognizes fishing communities that are especially dependent on fishing, fish processing, or fishery-dependent support businesses. Ilwaco has a long tradition in the fish processing business and is unquestionably the kind of coastal community Congress had in mind to assist when it enacted the Magnuson-Stevens Act. Our company has long been the flagship fishery business for the Ilwaco community and surrounding area.

4. The Ilwaco Fish Company dates from the early 1920s, starting as a razor clam cannery, and has primarily processed salmon and crab but expanded in the 1960s and early 1970s to handle groundfish and shrimp. In 1985, our company expanded into the processing of Pacific whiting, a particular type of finfish that was not fully exploited in the United States until special handling techniques were developed to cope with the problem of quick deterioration of the fish once it is caught. The fishing industry on the West Coast has exploited the offshore stock of

Pacific whiting since around that time. Pacific whiting is the most abundant groundfish population in the California current system off the West Coast.

5. Because of its unique biological characteristics, Pacific whiting has always been separately managed by the Pacific Fishery Management Council ("Pacific Council") and the National Oceanic and Atmospheric Administration ("NOAA"). First of all, the offshore stock of Pacific whiting migrates extensively along the West Coast from its spawning grounds off Southern California to feeding grounds in the area from Oregon to British Columbia. Secondly, the stock must be shared with fishermen in Canada and treaty right fishermen in Washington State, on an equitable basis. Third, Pacific whiting are caught by mid-water trawling, unlike most of the other groundfish covered by the Pacific Council's Pacific Coast Groundfish Fishery Management Plan ("Groundfish FMP"). Fourth, the Pacific whiting fishery is managed under a "primary" season program where vessels may harvest the fish until the volumetric allocation in a particular sector is reached, and then all fishing in that sector must end. Fishing for other groundfish was controlled on the basis of "trip limits" prior to implementation of the IFQ Program in 2011. Finally, fishing vessels that engage in the Pacific whiting fishery are required to meet separate licensing requirements that are different from those for other Pacific groundfish fisheries (comprising 90 or more species) because of Amendment 15 to the Groundfish FMP.

6. In 2008, NOAA approved Amendment 15 to the Groundfish FMP placing new license restrictions on vessels that participate in the Pacific whiting fishery, in addition to the underlying license limitation program that has applied to all fishing vessels that engage in the groundfisheries since 1994. Under that Amendment, in addition to having a groundfish limited entry permit, vessels in the non-tribal Pacific whiting fishery beginning after May 11, 2009 had to provide evidence that it qualified to operate in a particular sector of the Pacific whiting fishery.

For processor vessels that catch their own fish, a vessel owner had to provide evidence that the vessel has a history of operating as such during the period January 1, 1997 through January 1, 2007. For catcher vessels that deliver at sea to a processor vessel, evidence of a history of operation in the Pacific whiting fishery for the same period is required. And for vessels that delivered Pacific whiting to shore-side processing plants, such as Ilwaco Fish Company, the same qualification period applies. The purpose of these new licensing restrictions was to further limit, for conservation purposes, the number of vessels that could qualify for the Pacific whiting fishery, including under the Individual Fishing Quota ("IFQ") program being implemented by the Amendments 20 and 21 to the Groundfish FMP, which are the subject of this lawsuit.

7. For reasons that I do not fully understand because of the lack of any real explanation in the Administrative Record, when making the initial allocations of IFQ pursuant to Amendment 20 and 21 to the Groundfish FMP, NOAA calculated the amount to be issued to Ilwaco Fish Company on the basis of the company's relative Pacific whiting processing history from 1998 through 2004 compared to the total amount of all Pacific whiting processing history for that same period. NOAA did not include any processing history for any period after 2004, either in the numerator or the denominator of the calculation. However, the Magnuson-Stevens Act, as I understand it, requires the Pacific Council and NOAA to consider <u>current and historical</u> harvests; employment in the harvesting and processing sectors; investments in, and dependence upon, the fishery; and the current and historical participation of fishing communities. Under Amendments 20 and 21, twenty percent of the overall allocation of Pacific whiting under the IFQ program would go to processors like Ilwaco Fish Company and in fact the company has been given an initial allocation, as part of the shore-side sector of the Pacific whiting fishery. Thus, the initial

allocation of ITQ to Ilwaco Fish Company ignored, without any basis whatsoever, the company's recent Pacific whiting processing history from 2005 through 2008, and later.

8. Ilwaco Fish Company would have had a higher initial allocation of IFQ if the history of processing after 2004 were taken into account. For example, our company processed over 14 million pounds of Pacific whiting in 2005, nearly 18 million pounds in 2006, nearly 9 million pounds in 2007, and just over 6 million pounds in 2008. Generally what happened in these years after 2003-2004 was the Pacific whiting industry in Washington State was more successful in harvesting and processing Pacific whiting. Processing companies such as Ilwaco Fish Company and Ocean Gold Seafoods., based in Westport, Washington, have a stronger recent history in processing Pacific whiting after 2004. For reasons I have yet to understand, the Pacific Council and NOAA chose to completely ignore this recent history, contrary to my understanding of the "recency" requirements of the Magnuson-Stevens Act.

9. I have been told that the Pacific Council and NOAA published, but did not adopt as a regulation, a control date with respect to entry of vessels into the fishery which was intended to reduce "speculators" in the Pacific whiting fishery after 2003. However, no such control date applied in any way to processing plants that are eligible for the initial IFQ allocations. Ilwaco Fish Company is not, by any measure, a late-comer to the business of processing Pacific whiting and has a very strong overall history in the business. Consequently, the "control" date rationale for a 2003 cutoff date for the fishing history of fishing vessels cannot logically be applied to processing plants, and does not make sense even for fishing vessels operating in the highly restrictive Pacific whiting fishery, given Amendment 15.

10. As a consequence of Amendments 20 and 21, Ilwaco Fish Company will only be able to process about 3 million pounds of Pacific whiting this year, even though the total allowable

catch in 2011 doubled from 2010, under the IFQ Program rather than the 11.8 million annual average the company processed in the period 2005 to 2008.

11. I believe that the allocation of Pacific whiting IFQ under Amendments 20 and 21, as adopted by NOAA, arbitrarily ignored the significant recent processing history of the Ilwaco Fish Company without any rational basis. As a result, NOAA's regulations unfairly harmed our company's processing business and will lead to layoffs of our workers and less economic activity for the small Ilwaco community.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 23rd day of July 2011 in Ilwaco, Washington

/s/

Pierre Marchand, Jr.

DAVIS WRIGHT TREMAINE LLP

Exhibit 3

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

PACIFIC DAWN LLC, CHELLISSA LLC, JAMES AND SANDRA SCHONES, DA YANG SEAFOOD INC., and JESSIE'S ILWACO FISH COMPANY, Plaintiffs, v. GARY LOCKE, Secretary of Commerce, in his official capacity as Secretary of the United States, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, and NATIONAL MARINE FISHERIES SERVICE, Defendants.	Case No. CV 10 4829 TEH **DECLARATION OF BURT PARKER IN SUPPORT OF PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT** Date: November 14, 2011 Time: 10 a.m. Dept.: 12 (Hon. Thelton Henderson) First Amended Complaint filed: January 14, 2011

I, Burt Parker, declare as follows:

1. I am one of the managing owners of Pacific Dawn, LLC with business offices at 2324 N.W. 90th Street, Seattle, Washington. Pacific Dawn, LLC owns and operates the 104 foot trawl vessel PACIFIC CHALLENGER and possesses all the necessary permits for the vessel to operate in the Pacific whiting fishery. I make this Declaration based on my personal knowledge in

support of Plaintiffs' Motion for Summary Judgment in this proceeding. If called as a witness, I could testify to the facts set forth in this Declaration truthfully and competently.

2. Pacific Dawn, LLC was formed in 2004 as a result of the merger of Amber Dawn Fisheries, LLC, which I owned, and Pacific Challenger, LLC, owned by the Petersen Family of Seattle, Washington. Amber Dawn Fisheries, LLC was the owner of the trawl vessel AMBER DAWN which had a long history in the Pacific whiting fishery before it sank in 2001. Pacific Challenger, LLC owned the PACIFIC CHALLENGER, which also had a long history of operating in the Pacific whiting fishery.

3. Under the limited license program for Pacific Groundfish first implemented in 1994 and still in effect today, both the AMBER DAWN and the PACIFIC CHALLENGER operated in the Pacific whiting fishery with all required permits during the years 1994, 1995, and 1996. The AMBER DAWN had a "B" permit and the PACIFIC CHALLENGER had an "A" permit. Both were valid permits during that period under which both vessels made landings of Pacific whiting, entitling them to "history" with respect to those landings. After 1996, "B" permits were either converted to "A" permits or were rescinded. However, the history of landings using either type of permit was never rescinded by Federal regulation, or otherwise.

4. When the two vessel entities were merged into Pacific Dawn, LLC in 2004, the agreements forming the LLC documented the transfer to the new LLC of all catch-history held by both Amber Dawn, LLC and Pacific Challenger, LLC for all prior years during which the vessels had fished, including for Pacific whiting.

5. Accordingly, the 1994-1996 catch history of Pacific whiting of the AMBER DAWN was "associated" with the permit held by Pacific Dawn, LLC well prior to final consideration of Amendments 20 and 21 and the final regulations implementing the new IFQ Program for Pacific Groundfish that went into effect on January 1, 2011.

6. The Pacific Fishery Management Council, to the best of my knowledge, never discussed in any of materials relating to the development of Amendments 20 and 21 the issue of

how to treat the fishing history relating to fishing under either an "A" or a "B" permit. Therefore we brought the issue to the Council's attention by asking our consultant, Mr. Steve Hughes, to submit documentation relating to the issue to the Council and to testify in public about our concerns as to how this history should be treated. These materials are referenced in Plaintiffs' Points and Authorities in Support of their Motion for Summary Judgment. Our testimony stated that all Pacific whiting landings had to be considered in allocating IFQ, given that "history" is simply factual information about landings, regardless of the type of permit used.

7. Based on information and belief, Mr. Jim Segar, a member of the Pacific Council's staff, confirmed at a Council public meeting that the development of the history of landings for allocation of IFQ included all permitted landings, including the so-called "B" permit landings. We believe that this remains true after the final Amendment 20 and 21 deliberations were concluded, but could find no written documentation to confirm this fact.

8. For Pacific Dawn, LLC, the inclusion of all the fishing history possessed by our company is important to our business, particularly given that the PACIFIC CHALLENGER has long participated in the Pacific whiting fishery and supports many families working in the both the offshore mothership sector and the shoreside sector of the fishery. Inclusion of this history as part of the initial IFQ allocation to Pacific Dawn, LLC would increase its overall history by nearly 4,000 metric tons in the shoreside sector (for the years 1994-1996) and just over 4,000 metric tons in the mothership sector. If these amounts were included, it would have increased Pacific Dawn, LLC's initial IFQ allocations in each sector by about 30 percent, which is worth about $150,000 a year in additional revenues to the company. However, it was not included by the National Oceanic and Atmospheric Administration, for what we believe was arbitrary reasons.

9. It is also important to understand why including more recent fishing history (after 2003) is "fair" overall in this fishery, particularly to those entities that have long participated in harvesting Pacific whiting. In the early years (1996 to 2000), the vast majority of Pacific whiting landings (perhaps 80-87 percent) occurred at ports in the State of Oregon. In 2001, an expansion

of processing capacity onshore farther north in Oregon (Astoria) and in Washington State began to occur, not as speculation but in the normal course of market competition in the fishery. As a consequence, during the period 2004-2008, Washington State landings of Pacific whiting increased to 50 percent of the total coast-wide landings, with Oregon declining to 42 percent and California at eight percent. These activities represent "investments in, and dependence upon, the fishery" set forth in the Magnuson-Stevens Act and as well as "current" harvests. Including these later year harvests would have significantly enlarged the initial IFQ allocation to Pacific Dawn, LLC as well.

10. We most strongly believe that the formulas adopted by the National Oceanic and Atmospheric Administration for initial allocations of IFQ in the Pacific whiting fishery are arbitrary and capricious and injure those of us who have long participated in the fishery for our livelihoods.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 27th day of July 2011 in Seattle, Washington

/s/

Burt Parker

Exhibit 4

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

PACIFIC DAWN LLC, CHELLISSA LLC, JAMES AND SANDRA SCHONES, DA YANG SEAFOOD INC., and JESSIE'S ILWACO FISH COMPANY, Plaintiffs, v. GARY LOCKE, Secretary of Commerce, in his official capacity as Secretary of the United States, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, and NATIONAL MARINE FISHERIES SERVICE, Defendants.	Case No. CV 10 4829 TEH **DECLARATION OF JAMES SCHONES IN SUPPORT OF PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT** Date: November 14, 2011 Time: 10 a.m. Dept.: 12 (Hon. Thelton Henderson) First Amended Complaint filed: January 14, 2011

I, James Schones, declare as follows:

1. My wife Sandra and I are the owners of the trawl fishing vessel COLLIER BROTHERS, home-ported in Portland Oregon. We live at 9589 S. E. Birch in South Beach, Oregon. I have been in the fishing industry since 1960 and have long participated in the Pacific

whiting fishery. I make this Declaration based on my personal knowledge in support of Plaintiffs' Motion for Summary Judgment in this proceeding. If called as a witness, I could testify to the facts set forth in this Declaration truthfully and competently.

2. I began in the Pacific whiting fishery in 1992 and continued in the fishery through 2003, except for about three years. Our fishing vessel possesses all the necessary permits and endorsements to continue in the Pacific whiting fishery and we were issued an initial IFQ for the fishery this year. However, our vessel has a strong history of fishing Pacific whiting after 2003 and, between 2004 and 2010, we averaged between 3.5 and 7 million pounds of landings.

3. As a result of the "history" requirements contained in Amendments 20 and 21, we receive no credit for our landings after 2003. If those landings were considered in making initial IFQ allocations, our allocation would have most certainly been higher. We think the agency's formula for initial allocations do not reflect the changes in the fishery after 2003 or our continued investments in keeping our vessel highly productive after that date. We are not "speculators" in this fishery.

4. We strongly believe that the initial allocation of IFQ in the Pacific whiting fishery was not fair to our company and should be increased based on our most recent fishing history.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 24th day of July 2011 in South Beach, Oregon

/s/
James Schones

DAVIS WRIGHT TREMAINE LLP

Exhibit 5

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

PACIFIC DAWN LLC, CHELLISSA LLC, JAMES AND SANDRA SCHONES, DA YANG SEAFOOD INC., and JESSIE'S ILWACO FISH COMPANY, Plaintiffs, v. GARY LOCKE, Secretary of Commerce, in his official capacity as Secretary of the United States, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, and NATIONAL MARINE FISHERIES SERVICE, Defendants.	Case No. CV 10 4829 TEH **DECLARATION OF CHIH YUAN WANG IN SUPPORT OF PLAINTIFFS' MOTION FOR SUMMARY JUDGMENT** Date: November 14, 2011 Time: 10 a.m. Dept.: 12 (Hon. Thelton Henderson) First Amended Complaint filed: January 14, 2011

I, Chih Yuan Wang, declare as follows:

1. I am the owner of Da Yang Seafood, which operates a small fish processing plant located at 45 Portway, Pier No. 2, Astoria, Oregon. I make this Declaration based on my personal

knowledge in support of Plaintiffs' Motion for Summary Judgment in this proceeding. If called as a witness, I could testify to the facts set forth in this Declaration truthfully and competently.

2. In 2006, our company began to buy Pacific whiting from fisherman, thereby providing them another market. The addition of Pacific whiting extended our plant operations from three to four months a year. We employ over a hundred workers in our facility. Our processed fish products are exported and sold to China, Europe and Russia. In 2007, we invested additional funds to expand our plant capacity to handle the additional demand for fish products from the West Coast, including Pacific whiting.

3. As a result of the "history" requirements contained in Amendments 20 and 21, our company received none of the Individual Fishing Quota ("IFQ") shares assigned to the shore-side sector of the Pacific whiting fishery. However, our recent Pacific whiting processing history is the following: 2 million pounds (2006), 9 million pounds (2007), 8 million pounds (2008), 9 million pounds (2009), and 12 million pounds (2010).

4. We believe that the negative impact of the loss of our ability to process Pacific whiting on the small community of Astoria, Oregon has been ignored. Cutting our company out of the business of processing Pacific whiting is not fair to our company, which simply tried to help local fisherman with new markets and competitive pricing.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 25th day of July 2011 in Seattle, Washington.

/s/
Chih Yuan Wang

DAVIS WRIGHT TREMAINE LLP

Agenda Item D.7.c
Supplemental Public Comment 4
June 2012

Analysis of the Use of Processing and Harvesting History in the Allocation of Pacific Whiting Quota

June 21, 2012

By
(Alphabetical by first name)

Ana Kujundzic
Christopher C. Riley
Joseph T. Plesha
Levis A. Kochin

Abstract

The purpose of this paper was to define the economic context of the decision facing the Pacific Council and the Secretary of Commerce concerning the re-examination of the dates that define the period of history that were used for the allocation of quota in the Pacific whiting fishery. We begin with a contrast between the performance of derby fisheries and rational fisheries; it is shown that the theoretical economic predictions and empirical observations in actual fisheries are in substantial agreement. The evidence shows that the problems associated with derby fishing are real and the solutions promised by catch share programs have been effective in addressing those problems.

We then move to the central problem of the evolution between derby and rational fishery operations. The problem is how to affect a rational allocation that is fair and equitable to both those receiving quota privileges, and the society that is the owner of such privileges, when the first move towards rationalization potentially causes the "race-to-fish" of a derby fishery to accelerate into a much more intensive and fundamentally more dangerous race-to-fish for quota. We demonstrate how such a race destroys wealth in much the same process that causes derby fisheries to consume the economic potential of a fishery. This example also demonstrates the fact that Pacific whiting is particularly vulnerable in both a biological and an economic sense to a race-to-fish for quota. We include a discussion of control dates the impact they have on expectations of those making investments in the industry.

We examine the fundamental rationale for allocations of quota to the owners of fishing vessels and processing plants as opposed to the general public and describe why, in capital intensive fisheries like Pacific whiting, allocations to such private entities is necessary to compensate them for the loss of value their capital investment suffer when a fishery is rationalized.

Given the rationale for allocations to private entities, criteria are developed to describe the quality of the investments made by the industry for purposes of determining those investments which most warrant allocations of quota. The criteria focus on the investment's benefits to society and the reasonable expectations of those making the investments. Using these criteria, we examine investments made in the Pacific whiting fishery.

I. Rational, Derby and License Limitation Fishery Management

Rational, derby and license limitation management systems are distinguished by the method by which the resource is allocated among its users. In rationalized,[1] or catch share management, the available fish are allocated between the users, usually in units of a percentage of the Total Allowable Catch (TAC). In derby fisheries the users compete for a share of a common pool of fish during a fishing season that begins on a certain date and ends when the biologically optimal amount of fish (TAC in the case of Pacific whiting) has been taken. License limitation fisheries are a hybrid between these two systems where the number of vessels participating in the derby is limited by a fixed number of permits in an attempt to prevent the overcapitalization that occurs in derby fisheries. License limitation was once thought to be a complete solution to the entry-driven dissipation of rents. However license limitation does not address the overcapitalization that has already occurred when the program is initiated, nor can it prevent the entry that occurs through "capital stuffing," i.e., increase in fishing vessels' capacity when the total number of vessels is fixed through such techniques as better fishing gear, increasing engine power, better electronics, expanding the width and depth of a vessel, etc. Groundfish trawl fisheries managed under license limitation have operated essentially as derby fisheries.[2] They are of interest here due to the fact that the Pacific Whiting fishery was managed under a license limitation system since 1994 through 2012.

It is now widely believed that derby fisheries substantially under-perform rationalized fisheries in every relevant criterion by which performance can be measured. These include: conservation of the resource, gross value extracted from the resource, cost of harvesting and processing the resource, managing bycatch, difficulty in controlling effort and safety at sea. Derby fisheries systematically destroy the ability of society to collect net benefit (rent) from the fisheries it owns and manages.

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[1] We define "rationalization" as "privatizing the privilege to utilize fishery resources." We also used the terms "rationalization" and "catch share" interchangeably in this paper.

[2] Wilen, James, *Limited Entry Licensing: A Retrospective Assessment*, Marine Resource Economics 5(4), 313-324 (1988).

The root cause of these shortcomings is the fact that no one is providing, for the resource itself, the services that are provided normally provided by an owner. There is no price paid for the fish. This results in a dissipation of rent from fisheries managed under a derby.

The theory that overcapitalization and the tendency toward overfishing could be cured through sole ownership of the fishery and privately owned fishing vessels was first proposed by Anthony Scott in 1955.[3]

Dissipation of Rent: The Problem with Derby and License Limitation Management

There are three economically driven mechanisms involved in the dissipation of rent. These are:

- Overcapitalization
- Intensive operation
- Underinvestment in conservation

1. Overcapitalization.

Overcapitalization is a process that is first outlined in Gordon 1954[4] and succinctly described by Crutchfield and Pontecorvo in 1969.

> The economic analysis follows directly from the traditional exposition of the firm. …[F]or any resource which is not owned and there are no barriers to entry, average cost rather than marginal cost will be equated with price; infra marginal rents will be dissipated by the creation of excess capacity.[5]

A simple example of overcapitalization is as follows: Imagine a fishery that is fished at the maximum sustainable yield, and produces one million dollars worth of fish per year with the services of five boats, at a total cost per boat of one hundred thousand dollars per year per boat. This results in a private and societal profit of five hundred thousand dollars per year. In this case each boat is earning one hundred thousand dollars of revenue above its total cost which includes a return on invested capital. These excess profits (rent) induce entry into the fishery despite the fact that the new capital investments do not add anything to the total catch. Entry continues until all the rent is dissipated. This occurs when the fishery contains ten boats for a total cost that exactly equals the value of the catch. If the price of fish doubled this would attract ten additional boats. The derby fishery squanders whatever societal benefits a fishery is otherwise biologically and technically capable of providing. If the cost of managing the fishery is not totally borne by the industry, the fishery managed by a derby becomes a net cost to society.

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[3] Scott, Anthony, *The Fishery: The Objectives of Sole Ownership*, Journal of Political Economy 63, 2, 116-124 (April 1955).

[4] Gordon, H.S., *The Economic Theory of a Common-Property Resource: The Fishery*, Journal of Political Economy 62, 124-142 (April 1954).

[5] Crutchfield, J. A., and Pontecorvo G., *The Pacific Salmon Fisheries: A Study of Irrational Conservation*, 32 (1969).

In order to limit the entry of capital into a fishery, a license limitation program is frequently the first step managers take in attempting to organize the industry in such a way so as to limit the flow of resources into the fishery, thus creating conditions that allow the fishery to produce some benefit to society. To the extent that the marginal cost of adding capacity by capital stuffing exceeds the marginal cost of doing so through the entry of additional vessels under the license limitation program, less than all of the potential rent is dissipated through investments in capital equipment. This will be reflected through a positive permit price, an increase in fishing intensity and hence cost of fishing, or both.

2. Intensive Operation.

When the primary method of capital infusion into a fishery (i.e., entry of vessels) is cut-off, and profitable opportunities for capital stuffing have already been exploited, the primary competitive tactic of fishermen becomes the operational aspects of fishing (or processing). When the capital portion of the production function is constrained, the marginal product, or the amount of additional fish that will be caught for an additional dollar of investment in capital is low, which is another way of saying the cost of increasing harvest by one ton per day using additional capital is very high.

This is referred to as the "race-to-fish," which differs from vessel entry and capital stuffing in that it does not involve any capital investment. This lack of capital investment is not in and of itself of much significance; however, it does affect the reliability of any estimate of stranded capital that uses changes in harvest rates as a proxy for capital investment. The race dissipates rent in two ways: (1) It can increase the cost of operation both on a per day and a per ton basis; and, (2) decreases the value and quality of the products produced, as suboptimal schools of fish are targeted and a suboptimal product mix is produced with less than the optimal amount of time dedicated to production. Raw fish itself is used as s substitute for other factors of production, leading to lower finished product recovery (or yield). Safety is also necessarily sacrificed to some extent. Nobel Prize winning economist George Stigler describes this as "[t]he least cost combination of inputs is achieved when a dollar's worth of any input adds as much value as any other input."[6]

When capacity enhancement is very expensive using capital and raw fish are free the result is the substitution of raw fish for capital in the production function and a waste of the resource.

The amount of capacity enhancement, as reflected in daily catch rates that can be traced to purely operational decisions in harvesting and processing, as well as some concept of the magnitude of the societal loss these operational methods is provided by Wilen and Richardson, who documented the operational changes, and the effect on output of finished products during the first year of rationalization in the Alaska pollock factory trawler fleet. This article documents the changes that occurred between the last year of derby fishing and the first year of operation under the American Fisheries Act.

> New rents were generated by tuning the fishing operations and coordinating harvesting operation with the onboard processing plants. In the initial year of cooperative fishing,

[6] George Stigler, *The Theory of Price*, 14 (1969).

> daily catch rates were only 40 percent of those recorded by the same vessels over the 1995-1998 seasons. Catch per haul was 27 percent lower and the number of hauls per day dropped by 45 percent. The length of the 1999 A-season was doubled compared with the 1998 season because of these substantial reductions in daily catch.
>
> [In the last year] before cooperative fishing, total product recovery rates averaged 19.5 percent. In the first year of cooperative fishing, total product recovery shot up to 24.6 percent, exceeding the increases anticipated by most knowledgeable factory managers.[7]

Silvia *et al.* conducted a similar study of the Pacific Whiting catcher processor fleet documenting the rapid transition that occurs from a race-to-fish regime to a rationalized fishery.

> The PWCC agreement also resulted in significant improvements in product recovery or yield, producing more food from each pound of fish landed. Product recovery rate or yield is the ratio (expressed as a percentage) of the weight of raw processed product relative to landed product. Prior to the formation of the cooperative, catcher-processors achieved on average a 17.2 percent yield in surimi operations. In 1998, the first full year under the harvest cooperative, catcher-processors were achieving an average yield of 24 percent. Based on 1998 landings, this equated to over 10 million more pounds of food from the same number of fish (APA, 2003). While engaged in the "race for fish," vessels had prosecuted the fishery at the highest possible speed without taking the time to consider product quality or output quantity. Inferior quality and low product recovery rates were simply necessary trade-offs given the time constraints of a race for-the-resource management system. Rationalizing the fishery allowed the vessels to prosecute the fishery at slower speeds and choose the time and location of fishing that would optimize returns. It allowed fishers to search for schools of larger and higher quality fish that generated higher yields than smaller fish (APA, 2003). It also motivated vessel owners to invest in equipment that would improve product yield and quality rather than simply maximize capacity for rapid throughput.[8]

The differences here are not trivial. The differences in yield indicate that the race-to fish induced the industry to waste 1.7 pounds of raw fish per pound finished product. The ten million pounds of additional product produced by the cooperative would have a value $10,580,000 per year at current Pacific whiting surimi prices.

3. Under-investment in conservation.

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[7] Wilen, James, and Richardson, Ed, *Rent Generation in the Alaskan Pollock Conservation Cooperative,* FAO Technical Paper, 504 Case Studies in Fishery Self-Management (2000).

[8] Silvia, G., Munro Muin, H., and Pugmire, C., *Achievements of the Pacific whiting conservation cooperative: rational collaboration in a sea of irrational competition,* FAO technical paper 504, Case Studies in Fishery Self-Management.

The third, and potentially most damaging, mechanism through which a derby fishery destroys wealth is that it provides economic incentives that can, and do, lead to the destruction of the resource upon which the fishery is based. This is consistent with both microeconomic theory and numerous empirical studies.

Derby fisheries provide insufficient incentives for conservation on the part of the industry.[9] In a situation where it is desirable to temporarily reduce the catch in order to facilitate a large increase in the annual harvest at some time in the future, existing fishermen often resist the conservation programs on perfectly rational grounds. While they must bear the entire cost of the reduced landings, they are forced to share the benefits of such a conservation program with the owners of however much additional capital that enters the fishery to share in the increased quota made possible by the investment in conservation.

Imagine a shrimp fishery that had 100 boats in an open access equilibrium harvesting ten million pounds of shrimp per year. Suppose the fishery managers proposed a two-year closure after which, when the fishery re-opened, the TAC would double. Even if the fishermen had 100% confidence the TAC would double after the two-year closure, they would likely oppose this proposal because they would know that the additional ten million pounds of shrimp would attract 100 additional boats. They would pay all the costs of the conservation effort, yet the benefits of that effort would be shared with the new boats, leaving them no better off than they were before they "invested" in the conservation effort. In fact, they would be worse off if you account for the cost of conservation. Two of the authors here used the term "Rational Myopia" to describe and explain the apparent paradox of the fishing industry opposing fishery conservation in a 1994 presentation to the Western Economic Association.[10] The industry's rational hostility toward conservation promoting regulation is translated through a process well documented by Stigler,[11] Buchannan and others. It is referred to as "regulatory capture,"[12] where the political process delivers a regulatory policy that is tailored to the economic interests of the regulated. When these interests are the necessarily short-term concerns of an industry regulated under a derby fishery, the results can be catastrophic for the resource.

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[9] http://www.economist.com/node/21548240, http://www.economist.com/node/21548212, The Economist, Feb 2012. See also, Costello, Christopher, *et al.*, *Can Catch Shares Prevent Fisheries Collapse?,* Science 321, 1678 (2008).

[10] Kochin, Levis A. & Riley, Christopher C., *The Changing Political Economy of Fishing: Efficient and Expedient regulation under ITQ and Open Access,* Western Economic Association Annual Meeting (July 1994).

[11] Stigler, George J., *The Theory of Economic Regulation*, The Bell Journal of Economics and Management Science Vol. 2, Issue 2, (1971).

[12] Dal Bo, Ernesto, *Regulatory Capture: A Review*, Oxford Review of Economic Policy, Vol. 22 Issue 2. http://faculty.haas.berkeley.edu/dalbo/Regulatory_Capture_Published.pdf

Once the resource has collapsed, these perverse incentives tend to hold fisheries in an economic, political and biological trap, from which there is seemingly no escape. This process is referred to as "Ludwig's ratchet."[13]

The Social Benefits of a Rationalized Fishery

The term rationalization, when used with respect to fisheries, is used to mean conversion to some sort of a catch share program. The theory that overcapitalization and the tendency toward overfishing could be cured through sole ownership of the fishery and privately owned fishing vessels was first proposed by Anthony Scott in 1955.[14] Catch share programs mimic the prescription of Scott with the exception that the rational sole owner is replaced by a group of quota holders with a financial interest in the health of the stock. This reverses the negative effects of Stigler's "regulatory capture" in that the quota owners will support increased conservation instead of excessive harvests. The combination of the rational interest of the quota holders and the final decision making power of the government satisfies Scott's requirement of "sole ownership."

In a catch share program, the TAC is allocated largely among fishery participants on a percentage basis. This quota share gives its owners the right to harvest a certain share of the TAC, eliminating the problems with derby operations at their source. Quota owners have every incentive to squeeze the maximum amount of value from each ton of round fish, which is the behavior of demanded by efficiency. Those same firms operating under a derby structure had an incentive to derive the maximum financial benefit out of every hour available during the fishing season, which is the behavior described by the term expediency. Fishery managers now generally understand that rationalization of fishery resources is essential to maximize efficiency.

This is not to say that any program bearing the label “rationalization” or “catch share” automatically provides all the economic efficiency that would be provided by a sole owner of a fishery resource. In some rationalized fisheries, there are additional constraints on quota ownership and transferability with goals other than economic efficiency in mind. These additional constraints weaken property rights and do not come without a cost.[15] Grainger and Costello, for example, have shown that the strength of the property right granted in a catch share program is positively correlated with a biological health of the fishery involved.[16]

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[13] Hennessey, T., and Healey, M., *Ludwig's Ratchet and the collapse of the New England Groundfish Stocks* Coastal Management 28:187-213.

[14] Scott, Anthony, *The Fishery: The Objectives of Sole Ownership* Journal of Political Economy Vol. 63, Issue 2 116-124 (April 1955).

[15] Environmental Defense Fund, *Catch Share Design Manual*, 2010.

[16] Grainger, Corbett A., and Costello, Christopher, *The Value of Secure Property Rights: Evidence from Global Fisheries,* NBER working paper, 1709 (May 2011).

II. Catch Share Programs: The Initial Allocation Problem

As Hannesson[17] has lamented, the typical progression of fisheries here and throughout the world is that we tend to wait until a fishery is overcapitalized through the uncontrolled entry process inherent in a derby fishery, before attempting to impose a catch share system. The fact that we tend to wait until a fishery is overcapitalized complicates the initial allocation process enormously. Because a conversion to catch share management has usually involved allocation of quota to those with investment in the fishery, any perception that a quota allocation is imminent causes firms the industry to "invest" in an effort to maximize their catch history that will be used for determining allocations of quota. The first impact of a move toward rationalization, therefore, is to make the existing overcapitalization problem worse.

Control dates

A control date announcement is an Advanced Notice of Proposed Rulemaking that must be voted on by a council, approved by NOAA and published in the Federal Register. Control dates are not legally binding.[18]

The control date announcement has two components: (1) Notice that a council is considering developing a catch share program; and, (2) a date, after which fishery participation may not be considered when a final decision is made to define the limits of the program. With respect to their influence on investment decisions, these two components work at cross purposes with one another. The announcement that the council is considering a catch share program stimulates the very problem, investment and behavior that increases industry capacity, that rationalization programs are intended to prevent. The specification of the date, which is usually essentially coincident with a council's action to begin development of a catch share program, is meant to ensure that the industry understands that the time for expansion of capacity for the purpose of capturing fishing rights may have ended, and so discourages further investment in capacity.[19] [20] The control date serves to provide the industry with information useful in the formation of reasonable expectations.

If the industry believed universally that date in the announcement was in fact a perfect predictor of the last day of fishery participation that would be considered for the allocation, investment and operating strategies, for the purpose of maximizing fishing history would cease immediately. If the Industry believed that the date itself was completely irrelevant to the final decision on qualifying dates, the race to fish for quota would be exacerbated. Under the Magnuson-Stevens Act (MSA) a regional fishery management council is able to select years of history for purposes of allocating

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[17] Rognvaldur Hannesson, *The Privatization of the Ocean*, p. 172.

[18] http://www.pcouncil.org/resources/archives/control-dates/

[19] Pacific Dawn, LLC. v. John Bryson, Summary Judgment, Dec 22, 2011.

[20] http://www.pcouncil.org/resources/archives/control-dates/

quota under a catch share plan that are later to, *or previous to*, the control date. We however are unaware of any instances where the end of the qualifying period was set prior to the date announced in the control date announcement.

Even if there were zero capacity enhancements after a control date was published, there would still be differences in the distribution of harvests in the period from the control date announcement to implementation of a catch-share program. Randomness alone will always produce variation in relative catch shares between two distinct time periods. For example, the biomass could move closer to a particular port. This would affect the distribution of the catch history, but would not affect in any way the distribution of invested capital that the proxy of catch history is attempting to measure.

If these differences between the distribution of harvesting and processing participation are treated as a legitimate reason to move the years used for allocation of quota to a time after the control date, a dangerous feedback loop will exist. Some firms will realize that investing in additional capacity after the control date would cause the years used for determination of quota allocation to move forward. These firms would speculatively invest in capacity enhancement, or increase the intensity of their operations. Other firms will realize that respecting the control date would result in a loss of quota they would otherwise have received, and they would also invest in capacity enhancement, or increase the intensity of their operation in order to protect their initial allocation position. Firms that chose to ignore the control date could be expected to exert political pressure and take legal action to have the years used to determine initial allocation of quota to include a period after the control date in order to "better reflect the pattern of current harvests." Instead of providing notice to the industry that increases in relative harvest after the publication of a control date may not result in the allocation of quota, a control date would instead become the starting gun on an intensive "race-to-fish" not for fish, but for something far more valuable; quota.

The rationale behind the initial allocation of quota in a catch share program system

A central problem in rationalizing a fishery is the initial allocation of quota, yet very little thought or analysis has been given to the rationale behind the initial allocation of quota when an overcapitalized fishery is rationalized. In industrial, capital intensive fisheries, historically allocations have been given to owners of capital in the fishery; typically vessel owners and, since the American Fisheries Act was enacted in 1998, processing plant owners have also received rights when the fishery is rationalized. In resolving the problem caused by the initial allocation of quota, it is important to understand the rationale behind the allocation of quota to owners of capital in the fisheries.

1. Why not hold an auction?

The MSA allows for an auction the fishing rights.[21] At first blush an auction seems sensible. Our Nation's fishery resources belong to the general public.[22] So why allocate fishing rights to private

[21] Riley, Christopher C., and Plesha, Joseph T., *Allocations of Harvesting Quota in the Shorebased Whiting Fishery*, p. 4 (Nov. 2008). http://www.pcouncil.org/bb/2007/1107/D7h_PC.pdf

entities at all when the fish actually belong to the general public? An auction, it turns out, would be financially devastating to the industry participating in a fishery, when that industry is both capital intensive and as grossly overcapitalized as was the Pacific whiting industry. An auction would in fact be an expropriation of the value of investments made in the fishery without compensation.[23]

In order to understand the economics of this, it is useful to imagine the situation where the quota holder has no investment in the capital involved in the fishery. This allows for a clear analysis of the financial consequences of rationalization on the recipients of the quota, and the owners of the non-malleable physical capital dedicated to the fishery. If the rationalization occurs in a fishery operating under a license limitation system in economic equilibrium, with a level of capitalization twice what is optimum for the fishery, a fishing vessel owning firm would be earning on average, the market return on investment on its vessel. The same can be said for the owners of processing facilities. Immediately upon the beginning of operations under the catch-share program, however, these owners of fishery-related capital will see the return on their investment fall to zero. This cannot be avoided and is, in fact, absolutely necessary in order to de-capitalize an overcapitalized industry. The owners of the physical capital cannot expect to realize any return on their investment until the excess capital stock is depreciated to the point where it is at the optimal level for the recently rationalized fishery.[24] Another part of this loss is actually a transfer of wealth from owners of vessels and processing facilities *to* quota holders.[25]

The mechanism at work here is that, by definition, the overcapitalized fishery has much more capital and hence daily harvesting and processing capacity than is necessary to prosecute the fishery when it is rationalized. A quota holder would not need to own a boat or a processing plant in order to participate in a fishery. If a quota holder decides to participate in the fishery, it could simply hold a reverse auction[26] among fishing vessel owners. The vessel owners would bid the price of "fishing services"[27] down to the point where the "winning" boat just covered its variable

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[22] The United States claims sovereign rights over all fish within the United States exclusive economic zone. 16 U.S.C. §1853a.

[23] Plesha, Joseph T., and Riley, Christopher C., *The Allocation of Individual Transferable Quotas to Investors in the Seafood Industry of the North Pacific*, (Jan. 1992). See also, Matulich, S.C., Mittelhammer, and Reberte, *Toward More Complete Model of Individual Transferrable Fishing Quotas*: *Implications of Incorporating the Processing Sector,* Journal of Environmental Economics and Management Vol. 31(1) 112-28 (1996).

[24] Id.

[25] Id.

[26] In a reverse auction, the sellers compete to obtain business from the buyer and prices will typically decrease as the sellers undercut each other.

[27] "Fishing services" as defined here refers to a fishing transaction wherein the contract is made on a services rendered basis rather than the traditional price per pound basis. In other words, "fishing services" includes locating, capturing, and delivering fish to a specified location.

costs. The quota holders would then proceed to secure processing services with the same result. The "winning" bid for processing services would cover only the variable costs of production. The quota owners will temporarily own not only the fish in the fishery but also usafructuary rights to the physical capital used to harvest and process those fish. This situation, where the quota holders enjoy free-of-charge use of physical capital, continues until the capital stock wears out to the point where only the appropriate amount remains (i.e., when a fishery is no longer overcapitalized). One model produced that was loosely based on the Pacific whiting fishery estimated that the direct impact of the allocation would result in the loss of over 90% in the value of non-malleable capital assets in both the harvesting and processing sectors.[28]

This explains the fact that owners of the physical capital in a fishery that will be devalued by rationalization are among the fiercest opponents of any attempt to rationalize a fishery where the owners' loss is not expected to be compensated with an initial allocation of quota. In short, no one with capital investments in vessels or processing plants would support a simple auction of the resource to rationalize a fishery because they understand that much of value of their boats or plants would be expropriated without compensation.

Fishery managers in the U.S. and elsewhere have solved this problem by allocating the fishing rights to those firms that can reasonably be expected to suffer the loss in capital value that results from rationalization.

There is no question that the U.S. treasury, in the short run, and neglecting consequential effects, would be better served by an auction than it would be by a direct allocation to private entities. This is not to say that such a decision would be socially optimal. The first reason to choose a direct allocation to those private entities that would otherwise be the losers in the process relies on the same regulatory capture mechanism described by Stigler,[29] which is to say that regulations often reflect the economic interest of the regulated. It is therefore more probable a fishery will be rationalized if the impacted industry is supporting the process instead of opposing it.

A second, and perhaps more compelling reason that in most catch share programs the quota is allocated nearly exclusively to the owners of capital is that an auction of the rights presents what is known as a "time inconsistency" problem. The essence of a time inconsistency problem is that what may seem to be an optimal decision based on a simple calculation of costs and benefits may not yield the optimum choice because such calculations do not take into account of the effect of the decision on future behavior. The existence of such problems has been reflected in decision-making conventions for centuries. The legal principle of *Stare Decisis* is an example.

> All Courts rule ex-post, after most economic decisions are sunk. This might generate a time-inconsistency problem. From an ex-ante perspective, Courts will have the

[28] Riley and Plesha, *supra*, p. 13.

[29] Stigler, George J., *The theory of Economic Regulation*, The Bell Journal of Economics and Management Science, Vol. 2, Issue 2, 3-21 (1971).

> (ex-post) temptation to be excessively lenient. This observation is at the root of the principle of stare decisis.[30]

Finn E. Kydland and Edward E. Prescott published an article in 1977[31] *Rules rather than Discretion: the Inconsistency of Optimal Plans,* which formalized this concept and reduced to it a series of mathematical proofs. This article was a major part of the work for which they were awarded the 2004 Nobel Prize in Economics. In this article they provide an example of the "time inconsistency" problem from patent law.

> A second example is patent policy. Given that resources have been allocated to inventive activity which resulted in a new product or process, the efficient policy is not to permit patent protection. For this example, few would seriously consider this optimal-control-theory solution as being reasonable. Rather, the question would be posed in terms of the optimal patent life (see, e.g., Nordhaus 1969), which takes into consideration both the incentive for inventive activity provided by patent protection and the loss in consumer surplus that results when someone realizes monopoly rents. In other words, economic theory is used to predict the effects of alternative policy rules, and one with good operating characteristics is selected.

A proposed alteration of existing patent law, which is analogous to distributing the fishing rights of the whiting industry, would be as follows: Congress passes legislation that cancels all existing patents and pending applications, however, the law does not affect any way future patent applications. Future developers of new technology, however, would remain fearful that Congress would again cancel all new patents at some future date, thereby greatly decreasing the incentive to make investments necessary for future invention.

If the government auctioned the resource, the entire net present value of the resource would be transferred to the government, as would the net present value of the excess malleable capital. In an allocation to private entities the U.S. Treasury would still receive tax revenue in perpetuity from the resource, which would be roughly equal to 35% of the net present value of that resource. Far more importantly, while an auction of fishing rights is legal under the MSA any benefit to the Treasury would be offset as a consequence of the increase political risk attached to, and premium demanded for, any investment in the United States.

2. Criteria for initial allocations to private entities.

Assuming the allocation will be made primarily to the industry itself, the first question is what entities within the industry should get quota, and why should these entities receive quota? What

[30] Felli, Leonardo, Anderlini, Luca and Riboni, Alessandro, *Why Stare Decisis?,* CEPR Discussion papers, 8266. Centre for Economic Policy Research, London, UK (2011).

[31] Kydland, Finn E., and Prescott, Edward E., *Rules rather than Discretion: the Inconsistency of Optimal Plans,* (1977).

public service have these entities provided, or what damage would these entities suffer as a result of rationalization?

The MSA applies to every federally managed fishery. It provides managers with a wide range of alternatives in the allocation decision. It requires that a council formally consider a large number of parameters across the history of the fishery before making a recommendation as to the rules that define the actual allocation. These include ecological, economic and sociological considerations. In small scale, artisanal, labor-intensive fisheries, sociological concerns — and therefore the personal participation of crew members — may trump those of economic efficiency. In large scale, industrial, capital intensive fisheries such as Alaska pollock, the allocation is received by those with investments in the fishery. In some fisheries the allocation is split between the investors in capital and labor. In all these allocations, however, landing history has been used as the proxy for estimating relative amounts of participation or investment. *"Often, allocation is based on catch history as many in the fishing industry view their history as a* *quantifiable* *and* *verifiable* *proxy for participation and investment."*[32]

The quality of investments

The purpose of initial allocations of quota to the investors of harvesting and processing capital in a fishery is to compensate those investors for the loss of value their investments will suffer when a fishery is rationalized. Otherwise, why allocate quota to the private entities (typically corporations) that own the processing plants or harvesting vessels? The corporate entities that own fishing vessels, for example, have never harvested a pound of fish. We define quality of investment, therefore, to mean a particular investment's relative fitness for qualification in a program that compensates for the expected loss in value that is a necessary byproduct of the rationalization process.

We propose here a two dimensional method for evaluating the quality of investments, these being (1) the contribution made to society by the investor at the time the investment was made; and, (2) the consideration due a particular investor as a result of reasonable expectations that investor had as a result of its decision to make, or not make, an investment at a particular time.

1. Societal impact.

We classify investments into two categories socially positive and socially negative. We make this evaluation on the basis of the conditions at the time the investment was made. Those that were made prior to the point where the industry was capable of harvesting and processing the resulted in an increase in final production from the fishery had a positive societal impact. The initial private returns on these investments must have been at least high enough to justify the risk as the fishery was full capitalized relatively rapidly. Because these capacity investments resulted in the utilization of additional fish and did not simply redistribute the utilization from the already existing industry to the investor in new capacity. Those capacity investments that occurred after the full U.S. utilization have a negative economic impact on society as the landings attributable to the new

[32] Establishing Criteria for IFQ programs Managing Fisheries, 2005, (Emphasis added.) http://www.managingfisheries.org/2005/backgrounders/establishing.pdf

investment come 100% from the landings attributable to previous investments. The first component of societal loss is the value of resources that were diverted away from productive uses to a use that produces zero or less than zero additional product. Additional loss results from the shortening of the fishing season and the fact that additional negative value investment in capacity causes an equal amount, in capacity terms, of negative value investment in the processing sector. Of course this also works in reverse. New investment in processing capacity also causes additional investment in harvesting capacity.

2. Basis for reasonable expectations.

Reasonable Expectations are *"those spoken and unspoken understandings on which the founders of a venture rely when commencing the venture."*[33] We restrict this to relative level of expectations that the harvest processing history would be excluded from the calculation that determines a future distribution of quota. The basis we use for these expectations is limited to official actions a council or the agency. These range from a *tacit* indication that the management authorities believed that additional capacity would be harmful, such as the imposition of the license limitation, to the *expressed,* a publication of a control date, to the *unequivocal,* in the form of final council action. Using this definition, relevant expectations began in 1994 with the adoption of the license limitation program in the Pacific whiting fishery.

Reasonable expectations are symmetrical. When a firm pursues a strategy of increasing its relative participation it has done so with some level of expectation that the increase in relative participation will be rewarded with a grant of fishing rights with a value that exceeds its private financial cost of that strategy.

When a firm pursues a strategy of not increasing, or actually decreasing its participation, it has done so with some level of a level of expectation that the decrease in relative participation will not be punished with a loss of fishing rights with a value that exceeds its private financial savings of that strategy.

For investments made (or not made) at a given time, the strength of the basis for these expectations is a fixed sum. This is to say that the stronger the basis for believing that the potential stranded capital loss that results from an investment will eventually be compensated for by means of a quota allocation, the weaker is the basis for expectations that the decision to not invest will not be elicit punishment via a reduction in the allocated quota. Therefore a "tacit discouragement of additional investment" also means "tacit encouragement of a decision to not invest."

A council typically takes no actions that would affect expectations regarding quota allocation until after the fishery was fully utilized. So actions that tacitly discourage additional investments take place during the time period when additional investments produce a negative societal contribution. It is therefore possible to construct a rank ordered grading of investment quality.

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[33] Kaplan v. First Hartford Corp., 484 F. Supp. 2d 131, 147 (D. Me. 2007).

So, as an example of ranking the quality of investments, if a private firm develops and invests in new technology to harvest and process a completely unutilized stock of fish, and this initial investor is successful so that the fishery soon has additional capital utilizing the resource, it may be that a council would announce a control date and consider developing a catch share program. Then, after the announcement of the control date, a separate private firm were to invest just as much money into harvesting and processing the resource as the initial investing firm, it could be argued that the newly investing firm will have as much stranded capital as the initial investor in the fishery. But the initial investor provided a substantial benefit to society by allowing for the utilization of fishery resources, while the investor whom added capacity after the fishery was fully utilized and a control date was published did so while reducing the net benefits (rents) society receives from the resource and with no reasonable expectations that its capital investments would receive allocations of quota.

3. Investments that are not "devalued" by rationalization.

As stated earlier, after a council has determined the broad definition of the class of potential grantees and the algorithm to be used to divide the allocation among the class of investors, it must decide the limits that define the history that will be used in the final allocation calculation. This must be done in consideration of the National Standards and other relevant factors in the MSA. Compensation for what would otherwise be a regulatory expropriation provides the rationale for choosing a direct allocation to private investors in the industry over an auction. It would seem necessary to first try to exclude from this quality evaluation those investments that will not be stranded, i.e., significantly devalued as a result of the rationalization process.

We have heard it argued that a shorebased plant may be more dependent upon the receipt of quota because the Pacific whiting fishery has moved closer to it while the Pacific Council was making its final allocation decision and the Secretary was reviewing and approving the Council's recommendation.

A superior location for a shorebased plant would translate into a relatively lower cost of fishing services as a vessel would spend less time and burn less fuel in delivering fish to such a plant. A superior location does not get "stranded" when a fishery is rationalized and an award of quota based upon such a fortuitous development is therefore inappropriate. If the distribution of a stock of fish moves toward a plant, an award of quota to such a plant for suddenly having fish nearby is actually perverse, as the lucky plant would merely be a reward for its good fortune, which reward is paid for by those who had bad luck.

Similarly, we have heard it argued that a processor invested in new technology that made it more efficient and therefore it needs to be rewarded with allocations of quota even if those investments were made well after the fishery was fully utilized and a control date published. The claim of new technology is debatable given the well-known methods of processing groundfish such as Pacific whiting, but let us assume the claim is true. If a processing plant developed a machine that resulted in 20% more revenue from each pound of raw whiting delivered to it (or a vessel invested in a net that increased efficiency in harvesting by 20% over other vessels) the investment in new technology would *not* be stranded when the fishery is rationalized because that processor would only have to pay what other processors pay for the rationalized whiting delivered to its plant would still achieve a 20% more revenue from each pound delivered. The investment in this new technology would receive a return equal to that which it earned in the derby fishery and therefore does not require compensation through the allocation of quota.

Capacity Investment "Grades"

We have graded the capital investments in the fishery in order of their impact on benefits to society and reasonable expectations of those making the investments. Those grades are as follows:

Grade: A — Net-beneficial to society. Investments in a vessel or processing plant that result in additional harvest. These investments also produce a variety of un-quantified positive externalities not captured in accounting measures, including non-proprietary technical development and furtherance of a national goal. For example, a vessel will try four different trawl nets before finding the one that is most efficient and then the net supplier will sell the efficient net to other vessels who invested nothing in the costly experimentation that lead to the identification of the most efficient net.

Grade: B — Net-harmful to society. Investments made in a vessel or a processing plant that does not result in additional harvest, but only a redistribution of the harvesting or processing that already existed in the fishery, but where there is an absence of any *tacit* or *explicit* discouragement by the management authority to make investments in the fishery.

Grade: C — Net-harmful to society. Investments in the fishery made in the presence of *tacit* discouragement (i.e. license limitation program) by the management authorities.

Grade: D — Net-harmful to society, made subsequent to *expressed* discouragement (i.e., publication of a control date) from the management authorities.

Grade: E — Net-harmful to society. Investments in the fishery made subsequent to *unequivocal* discouragement from the management authorities (i.e., publication of final council action). These investments must be of the type that will likely be stranded due to rationalization.

Fishing and Processing History as a Proxy for Capital Investments

To say the least, it would be extremely difficult to objectively measure the amount of capital value that each entity in a fishery would lose in rationalization. Therefore, fishery managers have settled on using "fishing and processing history" as a proxy for the stranded capital losses expected by current participants in the derby fishery.[34] This proxy should work well so long as the term "history" is properly defined and taken seriously by all participants. If the Industry were to believe that "history" might at least in part occur in the future, after the announced control date, the current derby participants would have the incentive to race-to-fish for quota. This behavior would dissipate much of the societal gain that can be expected from fishery rationalization. The race-to-fish-for quota is not necessarily a race involving capital stuffing and new processing plants. The

[34] Stranded capital is physical capital that has been substantially reduced in value due to a new regulation, policy or statue.

participants in this race have the incentive to create fishing history in the least expensive manner, which includes the use of intensive fishing and processing.

Stale control dates

One concept that has received some credence in this debate is that if, after to the setting of a control date, an "unreasonable" amount of time elapses before final action, this will allegedly cause damage to some firms. A remedy that has been suggested is that a "stale" control date must be abandoned to avoid causing some unspecified form of damage. We have been unable to find the logic behind the concept of staleness. How is net social utility negatively affected by the aging of a control date? We assert that the aging of a control date does not and cannot cause economic damage. We discuss the simple and most extreme case where a control date is published and, for whatever reason, a council never reaches final action.

Control dates are not legally binding, but they do impact reasonable expectations of the industry that has invested in the fishery, or is considering investing in the future. For at least the past twenty years, industry has always been aware that there was some possibility that it was operating in a time period that could possibly be part of "history" that would one day be converted into allocations of quota. The sort of conditions that prompt a council to take such action would have been obvious to the industry years before, and it is certain that this would have had some simulative effect on capital investment and operating behavior. It is, therefore, safe to say that on the day a control date is published, a fishery is more overcapitalized than it would have been if the concept of catch share management had never been invented, simply because essentially all control dates are announced during a low-grade race-to-fish for quota.

On the day a control date is announced, additional investment in socially harmful capital investments for the purpose of capacity enhancement is at least partially suppressed. Socially harmful and human-life endangering operational "investments" for the purpose of capturing a greater share of the eventual allocation are also suppressed. Overcapitalization and risky operational behavior are the problems we are trying to address with a catch share program. Society begins collecting partial returns in the form of reductions in potential overcapitalization as soon as the control date announcement is made.

If the industry is certain that the allocation will not be made on the basis of any landings after the control date, the suppressive effect of the control date is immediate and complete. The race-to-fish for quota ends. As long as the industry continues to believe with 100% certainty that no allocation will ever be made using history after the control date, the fishery would de-capitalize through depreciation (wearing out) of the physical capital. Capacity would decline by attrition, as major maintenance projects on capital that will soon be surplus are curtailed. Disinvestment will continue until total capitalization is equal to what it would have been in an ordinary race-to -fish derby. As long as the control date is perfectly durable, the time it is expected to take for final action, or the length of time it actually takes (even if this is literally forever) does not reduce this suppressive effect one iota.

The existence of the concept that the rationalization process may take so long that the old control date *must* be abandoned (i.e., a council cannot consider qualifying years for quota to end on a date at or before the published control date) increases the expected probability that actions and investments with an effect of increasing the relative share of landings by a firm will be rewarded with an increase in the amount of quota allocated. Any credence given to the concept of perishable control dates is harmful to society, in that it encourages and causes more anti-social behavior (and discourages and causes less pro-social behavior) than would otherwise be the case on the part of the industry, and so exacerbates the very problem that catch share management is designed to suppress.

We believe that, given the time needed to complete the Fishery Management Plan procedure as required in the MSA, realization of the full benefits of rationalization and the existence of perishable control dates are mutually exclusive. Any attempt to rationalize a fishery that eventually fails, where a control date existed that was believed to be perishable, will certainly leave the fishery even more overcapitalized than it would otherwise have been if the managers had simply allowed a continuation of a derby fishery.

III. Fishery Development in the United States EEZ and Ranking of Investments in the Pacific Whiting Fishery

In order to illustrate the economic evolution inherent in the fishery development process and the regulatory responses to that evolution, we have divided this process into five phases. In Phase I, we present the initial exploitation phase as it occurred in Pacific whiting specifically, as the initial exploitation of whiting occurred in a way for which there is no precedent, or general case. In Phases II-V, we first discuss the general fishery development case, which is followed by comment on the specific case of the Pacific whiting fishery.

Phase I: Initial Exploitation and Development (1976-1992)
The development domestic utilization of the Pacific whiting fishery began with passage of the MSA (then called Fishery Conservation and Management Act) in 1976. This law asserted the United State's right to manage the fisheries within 200 miles of shore. At the time of this law's passage, the Pacific whiting fishery was exploited by factory trawlers from the Soviet Union and Japan. A stated goal of the MSA was to encourage the domestic fishing and processing Industry to develop the skills and invest the capital necessary to convert these fisheries from foreign into domestic operations. This was goal soon developed the moniker "Americanization." The MSA established preference for U.S. fishermen, meaning that the amount of the TAC that was available for foreign fishing fleets was the remainder of the TAC, after that which the U.S. fleet was able to harvest was subtracted. Congress, with passage of the MSA, had made the Americanization of the fisheries a national goal.

In 1976 the U.S. seafood industry had neither the equipment nor the expertise to exploit these newly available resources. The Pacific whiting industry, and most of the other trawl-caught groundfish industries that were opened up by the MSA, grew by taking over the harvesting, then the processing and then the marketing of the target species. The first step was a joint venture fishery with the USSR that began in 1978. In this operation, U.S catcher boats caught the fish and then transferred them while they were still in the cod-end to the Soviet ships for processing and freezing.

The financial returns were sufficient to attract vessels into the fishery quickly. Within four years, the U.S. fishing fleet catch grew from 856 MT in 1978 to 72,100 MT in 1983, the first year when 100% of the harvest was caught by U.S. vessels.[35]

The development of processing capability proceeded at a much slower pace than the harvesting sector. Some of the difficulty was due to the fact that the conversion of existing processing assets was much more complicated than the conversion of crab boats and bottom-trawlers to mid-water trawlers.

In 1978, Congress, after "reaching an understanding that mere assertion of jurisdiction was not enough to "Americanize" the fishery,"[36] passed the Processor Preference Amendment that gave preferential claim to the TAC to operations where both the harvesting and the processing were accomplished by U.S.-controlled firms.

In I980, Congress passed the American Fisheries Promotion Act, that provided for research and development of new products and processes, a vessel loan guarantee program and established Fishery Trade Officers within the State Department.

In 1988, Congress passed the Anti-Reflagging Act, which prohibited the reflagging of existing foreign process ships and tightened ownership and manning restriction for ships operating in U.S. fisheries. The following quote from the Federal Register documents the contribution of this statute to the overall goal of "Americanization."

> Eleven years later another step was taken to further Americanize U.S. fisheries. The Commercial Fishing Industry Vessel Anti-Reflagging Act of 1987 required U.S. citizens to own and control more than 50 percent of any U.S.-flag fishing vessel. As the last of the foreign-flag fishing vessels in U.S. fisheries were being replaced by U.S.-flag vessels in 1986, federal law did not require U.S. fishing vessels to carry U.S. crew members.[37]

Investments made during phase I would all qualify as grade “A” under our criteria. The following evidence justifies this assertion:

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35 Nelson, R.E., Marine Fisheries Review Vol. 47(2) 39-41 (1985).

36 Greenberg, Eldon, Presentation at the Eighth Marine Law Symposium Roger Williams University School of Law Bristol, Rhode Island (Nov. 4, 2010).

37 https://www.federalregister.gov/articles/2000/07/27/00-18941/citizenship-standards-for-vessel-ownership-and-financing-American-fisheries-act

- New entry resulted in additional fish utilized so that the private return to investors was not simply a transfer of income from the pre-existing industry where the return on investment is automatically and completely offset by a reduction in the returns to the pre-existing fleet. The rapid pace of development is consistent only with a high return on investment, substantially above market rates of return. The fact that entry continued at a rapid pace after 1992 is further indication that return on investments were above the market rate of return, a condition which defines an investment with a net national benefit.

- Firms investing in the whiting industry were furthering a national goal.[38] This was clearly expressed in five separate pieces of legislation. Furtherance of a national goal is a societal benefit.

- The firms that first entered and developed this industry, as is the case in nearly all manufacturing, developed the necessary non-propriety technology and human capital. This resulted in a positive externality.

Phase II: **Rent Dissipation through Entry of Additional Capacity 1993-1994**
So long as *above* market *average* returns still exist at the time when the fishery is fully developed, entry will continue despite the fact that the *marginal* rate of social return will be negative when the fishery is limited by a TAC rather than a lack of capacity.[39] Entry will continue until average returns fall to the market rate, or until the fishery is otherwise limited through some sort of effective limited entry program. It should be noted that "return on investment" includes, in addition to the receipts for raw fish or fishery products, the perceived value of fishing history in any future limited entry or catch share program. The negative marginal rate of social return on capacity investments when the fishery is fully developed means that such investments impose a net cost on society because the capital so used produces nothing whilst it could have produced goods and services with value equal to the market rate of return if deployed elsewhere in the economy. However, this is not the only source of the societal loss. Another component of loss is the fact that increased capacity shortens the season, which in and of itself increases costs throughout the industry without adding anything, and likely reduces the total value of finished products.

Entry of catcher vessels into the Pacific whiting fishery ended in 1994 with the imposition of the license limitation program, though entry continued through capital stuffing. There was no limited entry in processing capacity. This is important because when a new processor enters the fishery, it tends to increase the demand for raw fish and thus push the ex-vessel prices up thereby fueling the

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[38] Handbook of marine fisheries conservation and management R Quinton Grafton ed. Governance of Fisheries in the United States chapter 29 Daniel S. Holland. Oxford University Press (2010).

[39] The negative marginal rate of social return is primarily due to the fact that private returns of a new entrant completely and exactly cancel out returns earned by the fleet that existed prior to the entry of a new vessel, or a capacity added to an existing vessel. This is significantly exacerbated by shortened fishing seasons and an increase in cost in both harvesting and processing sectors, along with a reduction in finished product value.

demand for additional harvesting capacity, which in turn causes further capital stuffing and more intense fishing activity.

We consider investments made in this period to be grade "B" in that they did not result in an increased harvest or utilization of Pacific whiting, but where there is an absence of any *tacit* discouragement by the management authority to make investments in the fishery.

Phase III: From License Limitation to Catch-Share Management: Before Final Control Date (1994-2003)

As mentioned earlier, new license limitation programs are now generally seen as an interim step between open access and a catch share fishery management program. The fact that imposition of a license limitation program is now seen as a signal that a fishery will be converted to a catch share system provides an additional incentive for new, and at the margin, socially harmful increases in capacity. There can be no dispute that a low intensity race to fish for quota was occurring at least as far back in time as the 1994 start of the license limitation program.

Capital stuffing in pursuit of increased daily capacity under a license limitation program has a negative societal value whether the motivation for such investment is maximization of current income or the capture of future fishing rights. Socially harmful investments in fishing power can be augmented with operational investments such as fishing for immature lower priced fish if the Catch per Unit Effort on the immature, lower, or even zero priced fish is high enough so that the perceived value of the history earned offsets the lower price of fish.

Although it is not legally binding, a control date draws a bright line in time beyond which the industry can have no reasonable expectation that increases in their relative harvest or processing history will be reflected in increases in their share of quota under any future allocation. The first control date announced by the Pacific Council was 1998. This was published during that year in the Federal Register. The verbatim announcement follows:

> The Pacific Fishery Management Council (Council) is considering whether there is a need to impose additional management measures to further limit harvest capacity or to allocate between or within the limited entry commercial and the recreational groundfish fisheries in the U.S. exclusive economic zone off the States of Washington, Oregon, and California. If the Council determines that additional management measures are needed, the Council will recommend a rulemaking to implement those measures. Possible measures include allocating harvest of particular groundfish species (rockfish and lingcod) between limited entry gear groups and between commercial and recreational fisheries and further limiting access to certain species within the Pacific Coast groundfish complex. The Council may proceed with some or all of these measures. In order to discourage fishers from intensifying their fishing efforts for the purpose of amassing catch history for any allocation or additional limited access program developed by the Council, the Council announced on April 9, 1998, that any program proposed would not include consideration of catch landed after that date. At present, the Council is planning to

> consider catch history through the 1997 fishing season. Persons interested in the Pacific Coast groundfish fishery should contact the Council to stay up to date on the management of the fishery.[40]

Though the 1998 control date was obviously superseded by the 2003 date, this action by the Pacific Council remains relevant because it served to provide notification to the industry that it wanted to discourage additional capacity enhancing investments or behavior. By implication, it also serves to encourage those contemplating a decision to cease investing in additional capacity, that such a decision would not likely affect their eventual limited entry or catch share allocation. It should also be noted that any capacity investments made between 1998 and 2003 were made despite the expressed discouragement of the Council.

The Pacific whiting fishery operated under a license limitation program from 1994 through the fall of 2003, when the Council developed a control date of November 6, 2003. In the years immediately preceding the announcement of the control date, a significant investment in a new shorebased processing facility was made. This investment was socially harmful in that it provided a significant increase in capacity at a significant cost, at a time when the marginal societal value of capacity was negative. It has been argued that this new factory made a marginal contribution to the public good due to its superior location. If this is true, this part of the capital investment would not be stranded due to the catch share system because the entire benefit of the location would be reflected in a lower cost of the fishing services needed to supply the plant. Thus, it would be inappropriate to compensate the owners of this plant for this investment, even if, in the unlikely case that some sort of investment was what caused the fish to move. This is another demonstration of the weakness of catch history as a proxy for stranded capital loss.

We would consider investments during this period to be grade “C” using our grading scale, as they were made after at least a tacit discouragement by the Council.

Phase IV: **From License Limitation to a Catch Share Management After the (most recent) Control Date (2003-2008)**

This phase begins with the announcement of the control date and ends with the final Council action. The setting of a control date that is taken seriously by the industry causes the benefits of rationalization to begin immediately. In a perfect world, it ends the race-to-fish for quota.

The behavior of the industry during this phase will be entirely determined by expectations regarding two things: the probability and timing of the conversion to the catch share program and the conditional probability that, given a conversion to a catch share program indeed occurs, the control date will be the same date used to determine harvesting and processing history.

The Pacific Council took final action on the catch share program in November of 2008. The quota was allocated based on vessels’ and processors’ relative history within the time period set by the Council. This is shown in Table 1 below.

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[40] http://www.pcouncil.org/resources/archives/control-dates/

Initial Allocation Group	History Years for Initial Allocation
Shoreside Harvesters	1994 through 2003
Shoreside Whiting Processors	1998 through 2004
Mothership Catcher Vessels	1994 through 2003

Table 1.

There were a few notable investments in capacity in the Pacific whiting fishery where the quantity of fish processed by some processors steadily increased after the announcement of the control date. Further, there was one Pacific whiting processor who first began its operations after publication of the control date. We would consider investments after the publication of the control date to be grade “D” under our grading system as they were made after being explicitly discouraged.

Phase V: Implementation and Operation 2008-????
The implementation phase begins immediately after the final Council action and continues until the time when both the fishery is operating under the catch share system and all disputes regarding the initial quota allocation are settled. In the years between the final Council action and the beginning of catch share operations, the fishery continues to operate under the license limitation program. During this period, the industry accelerates its evolution from throughput maximizers to value-per-ton maximizers.

When the catch share plan becomes operational, the ex-vessel price of fish will reflect both the costs of harvesting the fish and a quota value. The return on assets that are intended simply to maximize capacity will normally be close to zero. Excess capacity-related assets begin either leaving the fishery for other employment, are retired or are used up and not replaced while socially beneficial value enhancements (e.g. increased product quality, increased recovery rate, etc.) increase.

This was clearly the case in Alaska pollock fishery. Pacific whiting is a close relative of pollock. It is harvested with very similar gear, processed on similar or identical equipment, and processed into the same sorts of products (surimi, mince, fillet block, H&G) as pollock.

The fishery slows down and the season length increases. Recovery of finished product increases while discards decrease. The harvesting of small immature fish should drop immediately as harvesting small fish carries a strong financial penalty in the form of wasted quota. Another benefit expected from the catch share program is that fishing intensity decreases, reducing costs, and substantially reducing the physical hazards associated with commercial fishing.

The final rule that implemented the catch share program for Pacific whiting was published in the Federal register on October 1, 2010.

The catch share management of the Pacific whiting fishery started in January 2011. The catch share program is delivering the benefits that were promised. This is evidenced in specific comments from the industry prior to the discussion of this issue at the April Pacific Council meeting. The season has been extended, discards and fish processed directly into fishmeal have fallen, and new investments are now being directed toward extracting more value from a ton of fish rather than utilizing a ton of fish as quickly as possible.

Investments made by the industry to increase harvesting or processing capacity after the date of final Council action to rationalize the Pacific whiting fishery would earn a grade "E" under our grading system.

IV. Current Status of Pacific Whiting Allocation

On October 25, 2010, a complaint was filed in U.S. District Court for the Northern District of California on behalf of plaintiffs including the Pacific Dawn LLC. The complaint alleged, among other things, that the Pacific whiting allocation was illegal under the MSA on grounds of equity. They contended that the Secretary of Commerce failed in its obligation to consider current harvests as required by the MSA and that quota shares should have been allocated to firms who entered, or increased their landings after the control date.[41]

The court issued a judgment partially in favor of the plaintiffs on December 22, 2011. The primary basis of this judgment was that harvests after 2003 were considered for some purposes, but not in for the decision of how quota should be allocated, and use of a 2004 date as the last year processors' participation earned allocations of quota was a result of a political compromise rather than the considerations required under the MSA.[42] On February 21, 2012, the court ordered that the regulations regarding the Pacific whiting be remanded to the Council for reconsideration.

At its April 2012 meeting in Seattle, the Pacific Council chose a suite of five alternatives of fishing history for the shorebased processors for analysis in preparation for the process of choosing a preliminary preferred alternative at the June council meeting.

The MSA requires, among other things, that allocations of Pacific whiting be fair and equitable and that the Council consider current and historical harvests; and investments in and dependence upon the Pacific whiting fishery when making those allocations.[43] Regardless of any published control date, therefore, the Council must carefully consider current (as well as historical) harvest.

Taken in the context of the purpose of rationalizing the Pacific whiting fishery and the reason that the private entities that own capital in harvesting and processing capacity receive allocations (as

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41 Pacific Dawn v. Locke, Plaintiffs' Motion for Summary Judgment, p. 12 (Nov. 14, 2011).

42 Pacific Dawn V. Locke, Order, p.10 and 11 (Dec. 22, 2011).

43 18 U.S.C. §1853a.

opposed to the general public) consideration of current and historical harvest and investments indicate that the Council's initial choice of qualifying years was fair and equitable.

1. Prior to 1993 investments made in harvesting and processing capacity resulted in additional harvest and production of food from the fishery. These investments also produced a variety of un-quantified positive externalities not captured in accounting measures, including non-proprietary technical development and furtherance of a national goal of Americanizing the utilization of domestic fishery resources.

2. During 1993 and 1994 investments made in vessels or a processing plant capacity that did not result in additional harvest or production of food, but there is an absence of even a *tacit* discouragement by the management authority to make investments in the fishery.

3. From 1994 through 2003 investments made in the fishery were done so with at least tacit discouragement from the management authority. These investments resulted in negative societal consequences consistent with a derby fishery.

4. After 2003 any investments in the fishery resulted in no additional harvest and were made with formal public notice that such activities may not result in the awarding of quota. These investments not only resulted in negative societal consequences of a derby fishery, they could have been made in a race-to-fish, not for fish but for future allocations of quota, exacerbating these negative impacts. Because increases in relative production could be a result of "intense operation," or of other participants reducing their own "intensity" from a race to fish for quota level, in response to the publication of the control date. Therefore relative landings are not a plausible proxy for capital investment after the publication of the control date.

5. After final action by the Pacific Council in 2008 investments in additional harvesting and processing capacity (as opposed to investments in efficiency) would be extremely unlikely as capital must leave an overcapitalized fishery after it is rationalized.

It is important when considering of current and historical harvests, and investments in and dependence upon the fishery, to recognize the quality of the investments in terms of societal goals. The purpose of rationalizing a fishery is to allow more efficient utilization of the resource through de-capitalization of an overcapitalized industry. In determining a fair and equitable allocation, considerations of an investor's reasonable expectations are also relevant. Given that investments made after 2003 to increase capacity had a net-negative impact on society, may have been undertaken in a race-to-fish for quota exacerbating the overcapitalization problem, and were undertaken with clear public notice that they may not result in the allocation of quota it seems rational that the Council would, after consideration of these recent investment's impacts, chose dates for catch history that end at 2003. In addition, given that catch history is a proxy for capital investments in the fishery, participation after 2003 may not be a good proxy for actual investment in the fishery as vessel and processing plant owners will have a strong incentive to increase their production through intensive operation rather than additional capital investment. Moreover, it would irrational in a program designed to de-capitalize the fishery, to reward with quota those who added additional capital during the period when the Council was developing its catch share program.

For these reasons, we believe that after consideration of current and historical harvests, and investments and dependence upon the fishery, the Pacific Council's choice of years to determine history, as originally developed in 2008, were fair and equitable.

We believe that a decision to re-allocate from those who ended their participation in the race-to-fish for quota, in response to Council actions, to a group that continued in that race despite those Council announcements, is irrational and inequitable given that the purpose of developing a catch share program is to reduce overcapitalization.

As irrational as it would be to reward with allocations of quota those who exacerbated an already overcapitalized fishery while the Pacific Council was deciding how best to rationalize that fishery, it is likely that only a fraction of the total damage to the national interest that would result by such a decision, would be felt in the Pacific whiting industry. Many of our Nation's fisheries are currently operating below their potential. The science of fishery management has demonstrated a method of managing fisheries that provides for both a healthy stock and a healthy industry. As catch share programs are developed around the country, the reward of quota allocation to those firms who increase their relative participation during development of the catch share program in the Pacific whiting fishery, could have the precedential impact of causing intensive races-to-fish for quota in these other fisheries, beyond what has been seen in the past.

Mr. Dan Wolford, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
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Agenda Item D.7

RE: **Item D.7. Reconsideration of Initial Catch Shares for SS &MS sectors of the whiting fishery.**

Support of Status Quo as PPA

Chairman Wolford, members of the Council, my name is Donna Parker. I was a member of the TIQ Committee and attended all the GAC and Council meetings relevant to the development of Amendment 20. I am testifying in support of the Status Quo alternative on behalf of the Arctic Storm Management Group.

Arctic Storm is a long time participant in the whiting fishery. We operate two motherships and two catcher vessels that have permits in both the Mothership and Shoreside whiting fisheries. We believe the Council acted properly when it selected catch history year in 2008. However, if the Council believes it cannot provide an adequate record to justify departure from the Control Date in choosing landing years for shorebased processors, it should select Alternative 1 which keeps the Control Date intact for all participants.

Additions to the Analysis before it is released for Public Review

Before I provide rationale for support of SQ, I would like to request some additions to the analysis which I think will assist members of the public and the Council who were not here during the development of Amendment 20 to better understand why some catch history years were chosen for further analysis and some were not. I request that the following documents be included as an addendum to the EA:

- Transcripts of public comment and Council deliberations on the PPA and Final Action for A. 15 and A. 20 and in establishing the Control Date.
- T IQC and GAC Committee recommendations on A. 20 catch history years.
- Final EIS sections that describe 1) rationale for catch history years chosen and 2) catch history years considered but not included as alternatives.

The Status Quo alternative is most fair and equitable, best meets requirements of MSA, the National Standards and supports the integrity of the Control Date and the Council process.

My testimony will focus on rationale in support of selecting SQ as your Preferred Preliminary Alternative, especially why this alternative is the most fair and equitable choice and best protects the integrity of the Council process and use of Control Dates.

I would also like to address the written comments submitted by Ocean Gold which attempt to make a case for why markets, products, prices and fish location justify a reallocation of quota to that processing plant.

The SQ alternative is most Fair and Equitable.

Status Quo: *The catch history years of 1994-2003 for vessels in the shoreside, mothership and catcher processor whiting sectors and for the non-whiting trawl sector. The catch history years awarded to shoreside processors of 1998-2004.*

This is the most fair and equitable alternative because:

- **The SQ alternative is most fair and equitable because it does not discriminate among participants in the trawl fisheries by using different catch history years.** If Alternative 2, 3, or 4 is implemented MS and SS whiting participants will receive allocations based on more recent years than participants in the CP and non-whiting participants. Rationalization of the Pacific Coast trawl fisheries was designed as a single program. The Council was purposeful in keeping this a single action knowing that it would take much longer to implement, be more complex yet more balanced. Choosing separate catch history years for the MS and SS whiting participants than the years chosen for the CP sector and non –whiting participants is discriminatory and upsets the balance this action sought to establish. In choosing SQ, all vessel permits are treated equally.

- **The SQ alternative conforms with the Control Date of 2003 and so does not do harm to those who acted in good faith in choosing not to increase catch history after 2003.** The Control Date was chosen so that participants would not aggravate the race for fish by increasing participation in a race for catch history. The Council warned participants throughout development of A. 15 and A 20, not to expect that catch history after 2003 would accumulate toward catch shares. Participants made business decisions based on these admonitions. Those that acted in good faith in choosing not to increase participation after 2003 would be harmed by alternatives that, instead, use catch history years beyond 2003. *Fishermen unable to find markets during those later years after 2003 will also be harmed by Alternative 2, 3 and 4.*

- **The SQ Alternative is the most fair and equitable treatment of non-AFA participants in the whiting fishery.** Congress passed the American Fisheries Act which rationalized the Bering Sea pollock fishery when it was implemented in 1999 and 2000. It allowed pollock participants to lease quota or modify their fishing plans and increase participation in other fisheries, including whiting. For this reason Congress required the Pacific Council to take action that would protect non-AFA participants from increased participation by AFA vessels in the whiting fishery. The PFMC took protective action when it passed A 15 which closed entry to new participants in the whiting sectors in 2006. This action was described as an *interim* measure until A. 20 was passed. During public testimony and in deliberations on A

15, the Council warned the public not to expect catch history to accrue after the 2003 Control Date under A 20 knowing that every year after 2003 would give additional advantage to AFA vessels. Unlike AFA vessels, non-AFA vessels did not have an opportunity to lease quota or modify participation in other fisheries, giving AFA participants who chose to ignore the Control date, unfair advantage. Catch history years used in making vessel permit allocations that extend beyond 2003 provide advantage to AFA vessels and so are not fair and equitable to non-AFA vessel participants.

- **The SQ alternative is most fair and equitable to those hoping to rationalize other fisheries on the Pacific Coast and elsewhere in the Country**. Use of a Control Date is a critical management tool in allowing the fisheries under consideration for catch share programs to operate in a manner that does not destabilize the fishery or threaten to undermine conservation efforts such as bycatch reduction or rebuilding overfished species. An accelerated race for "catch history" destabilizes a fishery and threaten the incomes of those current fishery participants who may be displaced by the increased activity of those seeking catch share history. This race for catch history can potentially cause premature closure of the fishery by triggering bycatch caps such as happened in the shoreside whiting fishery.

- **SQ was supported as the most fair and equitable when final action taken in November 2008.** These catch history years were selected in a transparent, public process that received strong support from the vast majority of participants, including some of the plaintiffs and Ocean Gold. (See attachments)

- **The SQ Alternative was responsive to communities when it exceeded the Control Date in awarding shorebased processor quota.** In awarding a catch history year that extended beyond 2003 to shorebased whiting processors, the Council sought to provide increased stability to the communities where the processors were located. The communities could not engage in a race for fish and so were not the target of a Control Date. The 20% allocation to processors was intended to provide an added incentive for CV permits to land whiting in those communities and to protect processor investment in those communities. The additional year was added when participants were asked to meet and come to agreement on a set of years. Far from being a private deal for the benefit for of a single participant, these very public negotiations were initiated to build consensus around a fair and equitable solution. This effort was successful in winning broad public support in public testimony and so was approved by the Council. (See attachment) However, Judge Henderson found that departure from the Control Date to accommodate the needs of a single processor was "arbitrary and capricious." This benefit to a single processor was described by the judge as "a quintessential case of arbitrariness" and a "political solution." Those of us at the Council meeting during deliberations know that this decision was not arbitrary. It was instead, an effort to bring consensus to an important decision. Based on his comments, the judge seemed to think that awarding quota to processors and quota to harvesters was similar in intent and impact. When properly viewed in the context of impact to communities where processors are located both the intent and impact are quite different and different treatment in this context may be the most fair and equitable approach. *However, if the record cannot satisfactorily support use of 2004 in its award to SS processors because it undermines use of the Control Date or is arbitrary or capricious in its different treatment for processors, we support Alternative 1 as the PPA. Alternative would apply the 2003 Control Date to all participants.*

The issue of " Recency."

- **In the Judge's Summary Judgment he discussed the use of current participation years on pages 8 & 9 of that order.** He does not seem to agree with the plaintiffs interpretation of "present" history (which they continue to argue in this forum) to extend up to the year when the regulations were promulgated in 2010 even when that data would not have been available to the Council when it made its determination in 2008. Judge Henderson specifically sited a Ninth Circuit decision which addressed "recency." It appears on the bottom of page 8 where he quotes from the Ninth Circuit Court:

" 'Present' cannot therefore prudently be contemporaneous with promulgation of final regulations".

And he embellishes on it in the footnote at the bottom of the page:

"Plaintiffs assert that Congress intended the word 'current' to refer to more recent events than 'present' but they cite no authority for that position."

- The judge was clearly concerned by the amount of years between use of 2003 as the ending catch history year and promulgation of the regulations in 2010 and ruled that use of the 2003 cutoff date *may* be arbitrary and capricious.

" Alliance Against IFQs would clearly support upholding the regulations at issue in this case had they been promulgated in 2006 rather than 2010. The same 'good reason' that supported the cutoff date in that case applies equally here: the desire to curb speculation while regulations are under review..... However, if three years between the end of the qualifying period and promulgation of a regulation 'pushes the limits of reasonableness' then the six- and seven-year periods in this case arguably fall beyond those limits. While 'current' cannot 'prudently be contemporaneous with the promulgation of final regulation,' it may be that a 2003 cutoff date is 'so far' from 'current' harvests when the regulation was promulgated in 2010 as to be arbitrary and capricious."

- The Judge did not find in the plaintiffs favor when they asked that the Control Date of 2003 be struck and superseded by the Amendment 15 date of 2006.

" The same good reason that supported the cutoff date in this case (Alliance Against IFQs) applies equally here: the desire to curb speculation while regulations are under review. ....In light of all of the above, the

Court finds the control date was procedurally valid and was not subsequently invalidated by Amendment 15."

- While the judge thought that the number of years between the Control date and the date A 20 regulations were implemented may be arbitrary and capricious, it was the disparity in application of the Control Date that caused him to rule that the A. 20 final action was arbitrary and capricious and remand it for reconsideration. It is the reason we are reconsidering this action today.

"Most problematic is the Defendants explanation of why the qualifying period for processors was extended to 2004. Defendants did not rely on the 2003 control date for processors 'because keeping the date at 2003 was viewed to disadvantage a processor that was present as a participant during the window period but had increased its share of the processing substantially since the close of the original allocation period (2003).' Thus, the extension was made to benefit a single processor, which begs the question of why that particular processor should benefit – notwithstanding an earlier control date – when others should not. This appears to be a quintessential case of arbitrariness. ... While defendants correctly argue that they have broad discretion to make decisions, and that no particular outcome is required by the MSA, they have failed to present a reasonable explanation for relying on the 2003 control date for some purposes but not others. Consequently, the Court finds that the Defendants failure to consider fishing history beyond 2003 for harvesters and 2004 for processors was arbitrary and capricious."

- **Should the Council select SQ it must build a record that will pass muster with agency and potential court review.** Based on the Judge's order, the Council's task is to help the agency better explain the discrepancy in treatment of harvester and processors shares, better explain why there was a long gap in years between initiation of the analysis when the control date was identified and promulgation of regulations occurred in 2010, and why this choice is a fair and equitable decision.

- **Many of those arguments are embedded in public testimony and Council deliberations on A.15 and A. 20 and in the section of the EIS** that explained the rationale for use of those catch history years as well as the section that identified alternative catch history years that were considered by not included as alternatives. We strongly urge that those items in the record be included in an addendum to this EA.

Ocean Gold argues that changes in markets, products, prices and fish location require an increased allocation to its plant.

- **Ocean Gold takes credit for development of a new product which it calls HGT**, or head, gut and tail removal. It claims to have increased markets, prices and recovery rates with this product.

- **It's increased recovery rate occurs because it has not been processed further**. Eventually, the skin, bones and inedible trim will have to be removed. Surimi, fillet blocks and minced products are produced by high tech machinery, the employees who operate the production lines and inspect and package the final products.

- **While it is true that the surimi market declined for a period, prices have been increasing in recent years**. And the fillet and minced markets have expanded significantly in Europe and the U.S.

- **HGT doesn't work well for offshore fleets.** Because the HGT product has not been significantly processed it takes up hold space in the offshore processing vessels. Producing HGT would require our operations to return to town and unload more often using more fuel at sea and in shipping. For the most part, surimi , fillet and minced remain the primary products produced by the offshore sectors.

- **Ocean Gold claims that the new HGT product they invented is the reason prices paid to fishermen have increased since 2003. This view looks at shoreside whiting production in isolation.** Not only does it not include other west coast whiting sectors, but importantly, it does not include the global production trends of other whitefish that affect supply and demand. For instance, Peruvian, hake which is often used to produce an H&G product, collapsed in 2003. At that time, Thai itiyori, which competes with whiting surimi, also declined significantly. The Bering Sea pollock stocks also decreased for a few years. All these factors contribute to changing trends in whiting prices. In this case, the decreased supply put upward pressure on whiting prices.

- **Ocean Gold also points to the shift in whiting stocks to the north as another reason to increase the whiting allocation to its plant.** However, the analysis shows that allocation to plants may enhance deliveries to a plant and community, the location of the fish when harvested probably have more influence on the location of deliveries than processor allocation. See Figure 4-10, page 39 that compares landings made in '94-'03, the years used to allocate whiting to harvesters, with landings made in 2011 based on those allocations. The deliveries to Westport, where the Ocean Gold plant is located, doubled despite allocations made to the plant based on earlier years when the fish aggregations were generally located further south.

- **But even if all the claims made by Ocean Gold are valid, why should the Council consider reallocating quota every time a new product is developed, the ex-vessel price changes or fish stocks favor a different region? That seems destabilizing and contrary to the goals of A. 20 and the FMP.**

Thank you. That concludes my testimony.

Attachments

September 24, 2008

Mr. Phil Anderson
Washington Dept. of Fish & Wildlife
600 Capitol Way North
Olympia, WA 98501

RE: Whiting co-op mothership/catcher vessel management

Dear Phil:

The suite of preferred alternatives that you presented to the PFMC on the whiting co-op proposal for the mothership/catcher vessel (MS/CV) sector overall captures industry intent and is well developed. Given further reflection, there is, however, one component of the program that has been, and continues to be, of concern and we believe deserving of an additional alternative.

You may recall that the original proposal developed by UCB and presented to PFMC by Steve Hughes and Brent Paine, reported industry agreement on the package with the stipulation that individuals could offer additional alternatives to PFMC for consideration. The following deals with the aligning of catcher boats with motherships in 2009 and the movement of CV's between motherships in general. The below-signed would like to add an alternative that would provide more flexibility to catcher boats and to avoid CV's going through open access to change MS markets. Specifically, the added alternative that we request be added would provide that in the first year of co-op formation, catcher boats are free to deliver to any processor or processors which they choose, and that this procedure would be followed each year, which eliminates the one year open access requirement for CV's to change MS markets between years.

We thank you for your consideration of this additional alternative and we understand that it would be appropriate to discuss its inclusion in the co-op proposal during the October 8 and 9, 2008 Allocation Committee Meeting.

Sincerely,

[signature] (F/V Pacific Challenger)
[signature] (F/V Aleutian Challenger)
[signature] M/V Golden Alaska
Dyla D Patrick F/V Ocean Leader + F/V American Beauty
Dave Fraser FV Muir Milach
Neal Cooper F/V Perseverance

Attachment

Use of 2004 And Year Allocation Period For Processors

Transcript covering the Council rationale for moving the processor qualifying and allocation window and year from 2003 to 2004.

November 2008 Minutes

F.3.h Public Comment (11/05/08; 3:28 p.m.)

Mr. David Jincks, Midwater Trawlers Cooperative, Newport, OR
Mr. Richard Carroll, Ocean Gold Seafoods, Westport, WA
Mr. Dennis Rydman, Ocean Gold Seafoods, Westport, WA
Mr. Joe Plesha, Trident Seafoods, Newport, OR

[The above individuals testified as a group with many additional representative standing behind them. After their testimony was completed, regarding their agreement that 20% of the whiting quota share should be allocated to processors, Council members directed a number of questions to the group.]

Transcript of Council questions directed to this group of testifiers regarding the 2004 date and their response (11-06-08pm2.mp3):

Rod Moore (1:43:05) – very briefly either Joe or Rich, there's a difference in the harvesting history years and the processing history years could you explain, I understand from Dave how we got the harvesting history years, could you explain how we got the processing years please.

Richard Carroll - That was really a function of the spirit of compromise, the processing years on which we based our processing history is essentially a year range that we had agreed to at the start of this process five years ago. And, we feel it's an equitable distribution along the coast that recognizes the recent history that we've experienced in Westport.

Rod Moore - I could just follow up very quickly Mr. vice chair. So Rich, these years have appeared previously before the Council in various documents because they're not in the decision document right now?

Richard Carroll - I'm not sure that they've appeared before the Council before but they are a function of an earlier agreement.

Joe Plesha - I think it's important that we recognize that part of the goal of changing the years is to make sure that people who had recent investments, and one company in particular who made substantial investments, doesn't have the value of those investments stranded. And that's a real threat that people have because of the enormous capital that has been put into this fishery. And if they are not included that is a possibility. So I think that was important that the years be modified so that there is less stranded capital possibilities for the processing sector as a whole.

. . .

Phil Anderson (1:56:45) – I'll be quick but what I have to say is important. First, and that is thanks very much to all of you and everybody that worked on bringing this proposal forward I know you guys worked real hard on it and I know there were probably a lot of hard discussions and while Dave mentioned that you have worked together and talked a lot in the past, maybe not so much lately. On the years on the processor piece, and I understand that it was a compromise, I guess that you called it, and in at least in partial recognition of capital investments that have been made in recent years but is it fair to say that it doesn't capture the - by going to 04 the picture would've looked a lot different had you gone to 06 or 07, this indeed was a compromise to recognize, in part, recent capital investment is that a fair statement.

Rich Carroll - Yes I'd say that's a fair statement and one of the things I've tried to stress in my testimony is that everybody has had to give something here. This is genuinely a compromise but I think it that all of this here at the table recognize that the long-term benefits are going to outweigh the short-term compromises that we make. And that this is truly in the betterment of the industry.

NRC
NATURAL RESOURCES CONSULTANTS, INC.

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May 31, 2010

Mr. Dan Wolford, Chairman
Pacific Fishery Management Council
7700NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Re: Reconsideration of Initial Catch Shares in the Mothership and Shoreside Pacific Whiting Fishery

Dear Chairman Wolford:

Regarding the above matter, Richard Carroll with Ocean Gold Seafoods, Inc., has provided a statement to the Pacific Fishery Management Council that documents major changes that have occurred in the Pacific whiting fishery during the past decade. The focus of the changes described and documented in that statement address development of new whiting product forms since 2004 which have largely replaced the troubled surimi product, diversified marketing of the new product forms both domestically and internationally and the resulting stability and much improved economics that have occurred in the whiting fishery along the Pacific West Coast. Another chapter of parallel change has occurred with the catcher vessels since the early 2000's.

The development of the whiting HGT (headed, gutted, tail off), minced and fillet markets and the diversified marketing of these whiting products was not only favorable to much of the whiting processing industry but also to the catcher vessel fleet. Faster and more efficient processing of whiting resulted in more and better markets for catcher vessels. The diversified marketing of HGT product into Eastern European countries in particular beginning in about 2004 and continuing at present has played a positive role in stronger demand for whiting, higher product prices and higher ex-vessel prices for the catcher vessel fleet. During the years of the domestic whiting fishery prior to 2004, ex-vessel prices for whiting were typically 5-6 cents per pound at the best. By 2007, the fishery was moving more to the north off the Washington coast, the fishery was extending well into the fall season with the northerly whiting migration and the ex-vessel prices had increased to 8-8.5 cents per pound. The 2008 fishery saw stronger market demand for whiting and ex-vessel prices further increased to a range of 12-14 cents per pound shoreside and remained in the 11-14 cent per pound range through the 2010 season. Ex-vessel whiting prices to mothership markets saw similar price increases during the past 10-15 years as their production also moved away from surimi and into HGT, fillets and minced product forms, and benefited from the more diverse international markets.

The Richard Carroll document addressed the building of the Ocean Gold Seafoods, Inc., processing plant in Westport, Washington, with a focus on high volume and efficient whiting processing. In 2003, their plant provided markets to five commercial whiting trawlers and to one Makah Tribal whiting trawler. Catcher trawler market opportunities further increased to nine vessels during the 2004-2005 seasons, 14 catcher trawlers in the 2006-2007 seasons and a peak of 16 catcher trawlers during the 2010 season (Exhibit 1).

The very substantial changes that have occurred in the West Coast whiting fishery since 2003 have all been a reasonable progression in the building of a more mature fishery—more efficient processing plants able to handle large volumes of whiting, more diverse products tailored to world whitefish demands and a mid-water trawl catcher vessel fleet fishing further north, deeper and later in the fall season with less salmon and rockfish by-catch.

We all await the PFMC/NMFS analysis which we expect will document the timetable of changes that have occurred in the harvesting, processing, marketing and community dependence on the whiting fishery through 2010. We expect the analysis to report the number of active participants in the fishery over time through the recent years and West Coast community dependence on the fishery over the same time period.

Specific to the June 24 and 25, 2012, PFMC agenda item D.7, "Reconsideration of Initial Catch Shares in the Mothership and Shoreside Pacific Whiting Fisheries", plaintiff's support the inclusion of the recent years through 2010. After having had a chance to review the PFMC/NMFS analysis, plaintiffs will provide more specific comments at the public comment session regarding the preliminary preferred alternative.

Thank you for receiving these comments.

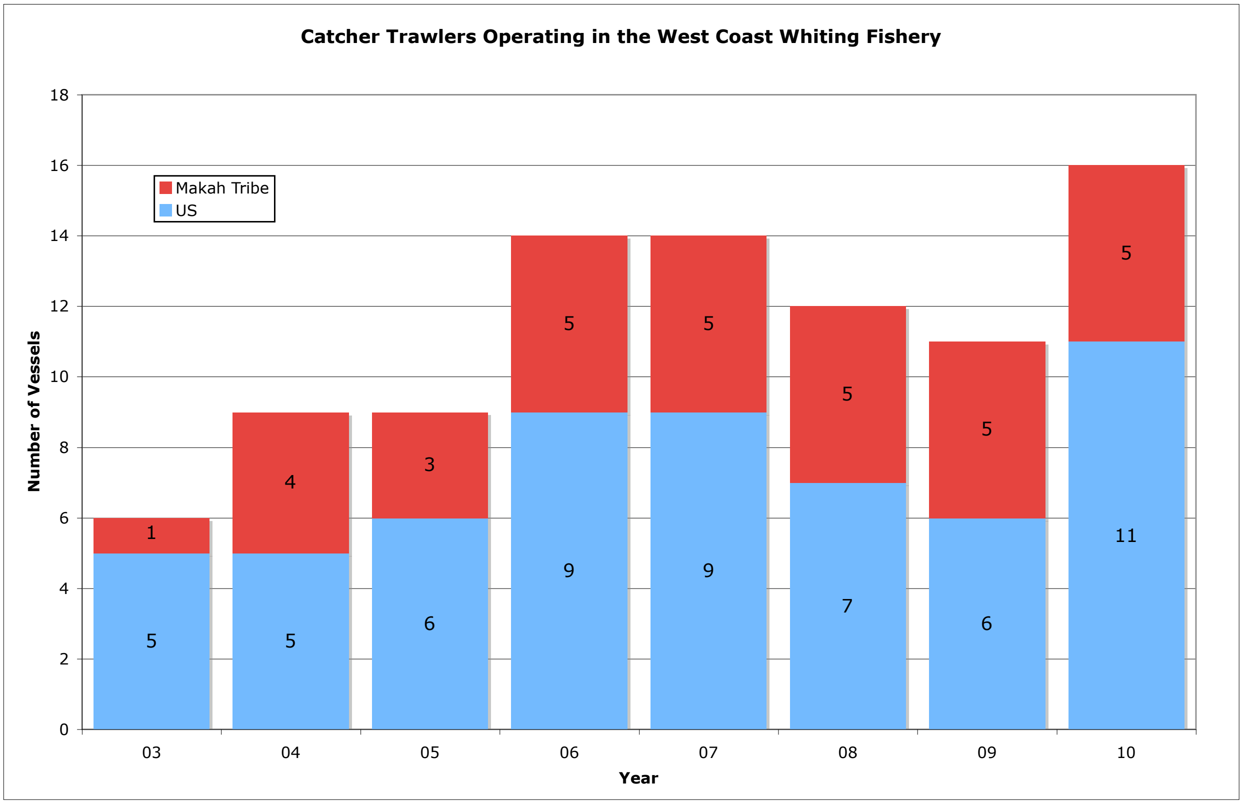
Sincerely,

NATURAL RESOURCES CONSULTANTS, INC.

Steve Hughes

Steve Hughes
President

Exhibit 1. Number of U.S. commercial catcher boats (blue) and Makah Tribal catcher boats (red) that delivered Pacific whiting to the Ocean Gold Seafoods, Inc., processing plant in Westport, Washington, 2003-2010.



SEADAWN FISHERIES, INC.
P. O. Box 352
Newport, Oregon 97365

June 8, 2012

Mr. Dan Wolford, Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RE: Agenda Item D.7 Reconsideration of the Initial Catch Share Allocations in the Whiting Fishery

Dear Chairman Wolford and Council Members:

I am the managing owner of the trawler SEADAWN which is a long term participant in the Whiting fishery. Further, we are long term participants in the Council process and support the Council's efforts to rationalize this fishery which has long been overcapitalized.

The court is now requiring the Council and NMFS to reconsider the dates it used to allocate Whiting in the IQ and Mothership Whiting fishery. While the history dates must be reconsidered so as to more carefully consider recent history, there is no requirement that the Council change the allocation dates if the Council is satisfied after full reconsideration that its original decision is the most fair and equitable.

As a long term and continuous participant in the Whiting fishery (since 1982) it is my belief that the Council's original decision is sound and that therefore the "no action" alternative should be adopted. The "no action" alternative uses the control date in the final allocation criteria for harvesters, which is very important so as to maintain the credibility of the allocation in this program and to confirm the precedent of the validity of control dates for future programs.

After the control date was adopted the majority of Industry relied on that date and worked in good faith within the Council process to formulate a comprehensive trawl rationalization program which is now Amendment 20. Without the control date the race for fish would have drastically increased across the board. However, most believed in the control date and therefore did not expand their participation in the Whiting fishery. Now those who followed the rules, relied in good faith on the control date and did not increase the level of their participation in the fishery should not be adversely impacted by now giving credit to those who ignored the control date. In summary, the "no action" alternative is the best alternative and is legally sound provided the justifications therefore are adequately explained so it is clear that the conclusion is not arbitrary and capricious.

Alternative 1 is also a legitimate option for the Council to consider. It relies on the control date for both harvesters and processors and therefore addresses one of the chief concerns of the Court. The justification for the different date for the processors was based on political compromise which is reasonable if adequately explained. However, in this case it is my understanding the primary beneficiary was not satisfied with the political compromise made for its benefit so there is no reason to continue forward with a different date for the processors if the program would be more supportable by having a single date.

Alternatives 2, 3 and 4 must be considered by this Council because that is the appropriate procedure, however, from the Council's analysis it is clear that those alternatives are clearly unfair to the long term participants in the fishery and must be rejected. Alternative 3 and 4 are the most draconian and, in fact, are so extreme in the manner in which they would create a large windfall to those who ignored the Council's control date and at the same time take away from those who followed the rules. This is simply not a reasonable result and in fact would, by its nature, be arbitrary and capricious to now benefit recent participants disproportionately to those who followed the rules and did not increase their participation after the control date.

It must be remembered in this process that when the plaintiffs claim their history (recent history) is somehow better than the history of long term participants, that this fishery has long been overcapitalized. It was overcapitalized before 2003 so why should so called "recent participants" be rewarded for adding to this overcapitalization? To do so would be arbitrary and capricious.

Thank you for considering our comments.

Sincerely,

Fred A. Yeck
President

June 9, 2012

Agenda Item D.7
Supplemental Public Comment

Mr. Dan Wolford, Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RE: Agenda Item D.7 Reconsideration of the Initial Catch Share Allocations in the Whiting Fishery

Dear Chairman Wolford and Council Members:

I am the captain of the F/V Blue Fox, I share this duty with long time Captain Hank Kentta. Hank Kentta has been catching whiting in the mothership whiting fishery since 1982 and in the shoreside whiting fishery since 1989. I have been a commercial fisherman for eleven years, seven years as engineer and going on my 4th year in the wheelhouse. The Blue Fox's main fisheries are Bering Sea P. Cod, Bering Sea Pollock, and Pacific Whiting both at-sea mothership and shoreside whiting.

In my short fishing career I have participated in two derby fisheries, Pacific Whiting and Bering Sea P. Cod. The West Coast whiting fishery was a derby disaster, it was by far the worst managed fishery under the Pacific Councils jurisdiction. From the day the control date was set for the Catch Share Program (2003) to the day it was implemented was chaos. What was already an overcapitalized fishery became much worse, whiting was the target of latent permitted vessels with little or no history. The whiting fishery was unstable and took tremendous effort by a few industry representatives to keep this fishery operating until Catch Shares could be implemented.

The lawsuit that now has the Catch Share Program back before the Council has far worse consequences than the derby fishery we rationalized. Reallocation is a disaster, there is no analysis that can demonstrate how this is possible when there was a control date in place. Most fishermen respected this date, while others speculated, this leads to inconclusive analysis, only thing you can do is speculate. The ability to use control dates is extremely important in fisheries management, even with my lack of experience I can recognize what a disaster it would be not having this available. There're fisheries in the Bering Sea, and the Gulf of Alaska that are considering going to some form of Catch Share Program, what message are we sending if a Council flops on a control date. What type of industry buyoff do you think you can get for Fisheries Management Plans if control dates are unusable and easily overturned in court?

There are only two options before the Pacific Council that would not alter the program or impact other Regional Councils. The status quo option has been supported by industry, Pacific Council, and the Secretary of Commerce. Alternative one is also valid, besides status quo, alternative one would be the least disruptive and leave the control date intact protecting future FMP's. Your decision is extremely important to longtime captain Hank Kentta and I, any changes in the harvesters control date will have serious impacts on us. Keep the excess capacity out, focus on the goals of the program, capacity reduction being the most important.

We sincerely appreciate the ability to participate in the whiting Catch Share Program, thank you.

Larry Jincks, Captain F/V Blue Fox
Hank Kentta, Captain F/V Blue Fox

MIDWATER TRAWLERS COOPERATIVE
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MTC

June 8, 2012

Mr. Dan Wolford, Chairman
Pacific Fisheries Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RE: Agenda Item D.7 Reconsideration of the Initial Catch Share Allocations in the Whiting Fishery

Dear Chairman Wolford and Council Members:

Midwater Trawlers Cooperative (MTC) represents 18 vessels that participate in the at-sea mothership whiting fishery, and 18 vessels that also participate in the shoreside whiting fishery. MTC has participated in the Council process since incorporation (1982), with many members serving on Council advisory bodies and committees. MTC representatives have focused on ending the destructive tolls that overcapitalization has taken on the west coast whiting fisheries (1992 Science and Statistical Committee discusses ITQ's to solve overcapitalization in the whiting fishery).

The Pacific Fisheries Management Council has worked diligently over the years to address capacity issues in the west coast trawl fisheries. Amendment 6 capped the harvesters in 1996, in 2000 the Strategic Plan said to develop and implement a program to reduce capacity by 50%.

March 16, 2000, Science and Statistical Committee report on overcapitalization in the west coast groundfish fishery (overcapitalization is the single most serious problem facing the West Coast groundfish fishery) (The Council should take immediate actions to develop stringent capacity reduction programs)

In 2003 an industry funded buyback was implemented reducing trawl permits to 172 (35%) not reaching the 50% target. In the same year the non-whiting and whiting trawl industry came to the Council asking for the development of a trawl Individual Quota, 2003 was set as the control date.

The Pacific Council and Industry worked for 7 years to implement the West Coast Catch Share program with capacity reduction being one of the intended goals. The whiting fishery had struggled for years with capacity issues beginning in 1992 and growing worse as speculation spurred entrance into the fishery during Catch Shares development. 2003-2010 became the toughest management years for the whiting fishery. Industry representatives had to step in to self manage a fishery that had gone out of control due to increased number of vessels, and limited numbers of constraining species.

The Pacific Council now has the opportunity to go back and review the intentions of the Catch Share Program, the goals and objectives this program was built on will demonstrate that status quo no action alternative, or alternative 1 will maintain the integrity of this program.

The information supplied in the Draft EA submitted in the Briefing Book describes the impacts that will result from any delineation from the first seven words of the problem statement that was relied on to develop this program.

Create and implement a capacity rationalization plan

To add capital to a fishery that has struggled with overcapitalization for 17 years, and reallocate resource from dependent communities and harvesters would be arbitrary and capricious.

David Jincks, President
880 SE Bay Blvd * Newport, OR 97365 * Phone: (541) 265-9317 * Email: bluefox@q.com

The Council and NMFS defended the programs position on history years and allocation in ***Federal Register /Vol. 75, No. 190 / Friday, October 1, 2010 /Rules and Regulations***

b. Allocation Formula

Comment 29.

Several commenter's addressed the qualifying history period selected by the Council for both whiting and nonwhiting non-overfished species.

One commenter criticized the period as ''arbitrary.'' Others expressed a belief that MSA ''recency'' requirements are not being met because the qualifying period of 1994–2003 is too out of date. One commenter suggested increasing emphasis on recent years by moving the start of the allocation period from 1994 to 1997 and the end from 2003 to 2006 and using 2003 through 2006 for the allocation period for overfished species), recognizing a new control date of January 1, 2007.

Response.

Similar comments were received during the public comment period on the draft EIS ''Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery.'' Parts of the detailed response to those comments bears repeating as directly relevant and responsive to the comments received recently. In recommending initial allocations, the Council is required to consider several factors including current harvests and historic harvests. *See* 16 U.S.C. 1853a(c)(5)(A); see also 16 U.S.C. 1853(b)(6). Appendix A to the Amendment 20 EIS includes a review of the Council's consideration of all of these factors, including a discussion of the rationale for considering a variety of dates for the allocation period, including start dates of 1994 and each year from 1997 through 2001.

The allocation dates selected represent a balance between emphasis on more recent history and considering the historic fishing opportunities which may have had a determining effect on the levels of capital investment by individual firms. The start date of 1994 was selected because 1994 was the first year of the license limitation program. The decision to utilize a long allocation period was deliberate; it is likely that capital investment is based on longer term opportunity and that capital persists after contractions in the fishery such as that reflected by the disaster declaration in 2000. On this basis it is appropriate to give some weight to landings from the 1990s. Because more fish was taken during that time period, the relative pounds approach measuring catch history as a vessel's share of total catch) reduces the emphasis on a pound of fish caught in the 1990s as compared to a pound of fish caught after 2000. While some argue that fishermen who caught fish in themid-1990s caused the disaster and should not receive QS for that fish, the catch taken in the mid-1990s was in line with what was allowed under the regulations and believed to be sustainable at the time. The Council selected the ending year of 2003 because that year corresponds to the previously announced control date for the fishery. The Council adopted and published the control date of November 6, 2003 (see 69 FR 1563 (January 9, 2004); 70 FR 29713 (May 24, 2005). The Council believes it is very important that the 2003 control date be used in order to prevent future fishery disruptions.

The purpose of announcing a control date in advance of developing a LAPP is to discourage entry into a fishery and increased harvest while the Council goes through the process of developing the program details, which can be a lengthy exercise. If the Council develops a pattern of announcing and abandoning control dates, then the announcement of control dates will become a signal to harvesters to intensify their efforts to catch fish in order to increase their odds of qualifying for greater initial allocations. Such a response would be disruptive to fisheries and exacerbate the challenges of meeting conservation objectives. Additionally, abandoning the original control date would reduce the perceived fairness of the program by rewarding those who fished speculatively after the control date (fishing primarily on the chance that the control date would be abandoned and they would acquire more quota as a result of their post control date fishing) at the expense of those who heeded the control date. In balancing the importance of the reliable control date, and the importance of considering historic participation, against the potential for some disruption of using a time period ending several years prior to the start of the program, the Council found that it was preferable to use the 2003 control date. The public was given significant notice of the use of November 6, 2003, as a potential control date. The notice was originally published in the Federal Register on January 9, 2004, and an additional notice was published on May 24, 2005. Both notices were posted on the Council's Web site, with an explanation of the possible consequences of the control date. In addition, starting in October 2003, The Council and its Trawl Individual Quota Committee held numerous public meetings and discussions at Council meetings on the trawl rationalization program including the use of the control date and the alternate qualifying periods.

David Jincks, President
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The Council disagrees with the commenter's assertion that Amendment 15 to the Groundfish management plan created a new control date of January 1, 2007, that should be controlling here. Nowhere does Amendment 15 address the 2003 control date or purport to change the qualifying period for the groundfish trawl program. Amendment 15 was a limited interim action for the non-Tribal whiting fishery issued in anticipation of the trawl rationalization that in no way attempted to address matters beyond its limited scope. Moreover, the Council has explicitly stated that vessels that qualified for Pacific whiting fishery participation under Amendment 15 were not guaranteed future participation or inclusion in the Pacific whiting fishery under the provisions of Amendment 20. *Seehttp://www.pcouncil.org/ groundfish/fishery-management-plan/ fmp-amendment-15.*

With regards to "recency" The Council does take into account recent participation patterns in the fishery by allocating QS to current permit holders rather than to individuals or vessels that originally caught the fish. In this way, during the extensive period required to develop a program of this kind, entry and exit can occur and QS can be allocated in a less disruptive manner than would occur if the allocations went to the individuals who caught the fish historically.

While the overfished species allocation formula includes logbooks for 2003–2006, these records are used to determine the fishing pattern, not the overall level of harvest activity. The Council's methodology for allocating overfished species is significantly different than the methodology for allocating target catch. The 1994–2003 periods is still used to determine the target species allocation, and the harvest patterns from the 2003–2006 logbooks are used to determine the amount of overfished species an entity would need to take its target species. In this fashion, more recent information for the fishery is used without rewarding post control date increases in effort. The 1994–2003 harvest patterns were not used to determine a target species QS recipient's need for overfished species QS. This is because of the substantial changes in fishing patterns which were induced by the determination that some species were overfished and the implementation of the rockfish conservation areas (RCAs) and because the RCAs will remain in place after the trawl rationalization system is put into place. Therefore the Council considered that an estimate of likely patterns of activity should be based on a period of time when the RCAs were in place. The RCAs were not in place for most of the 1994–2003 periods but were in place for 2003–2006.

One commenter made the point that the initial allocation, because it is different from the current distribution of harvest, may reward inefficiencies and reverse recent conservation gains, including reductions in bycatch.

While it is possible that the initial allocations may not go to the most efficient and innovative harvesters, because of the need to draw a balance between a reliable control date and disruption, fairness and equity, recent participation and historic participation issues, it is expected that society will benefit over the long haul as the quota is transferred to use by the most efficient harvesters as the program progresses. Independent of the initial allocation, the QS system is expected to provide substantial incentive for vessels to avoid bycatch. One hundred percent observer coverage will ensure full individual vessel accountability. These individual vessel incentives are expected to preserve gains made in bycatch avoidance in recent years.

The same commenter also made the point that the discard and catch composition data quality from those years is poor and will skew the picture of the true state of nature.

Response
The allocation formula does not use discard data from the mid-1990s. With respect to catch composition data, it has been accepted that these data may skew the mix of species any particular permit would receive away from its actual catch, simply because the catch composition data was designed to estimate catch at the fleet level rather than the individual vessel level. Catch composition data has the same problem whether it is from the mid-1990s or early 2000s. While the catch composition data might be of
better quality in more recent years, the Council felt that it was more important that the control date and longer allocation period be maintained and worth the tradeoff entailed in relying on older catch composition data.

Comment 30.
A comment was submitted on behalf of owners and operators of a harvesting vessel, **in support generally of Amendments 20 and 21 for improving management of groundfish** but noting that the program improperly excludes valid "B" Permit

groundfish fishing history in the initial allocation process. The commenter submitted multiple exhibits in support of their comments.

Response.

NMFS has reviewed the comments and the supporting exhibits. The commenter's position is that the prior permit owner's assignment in 2004 of all fishing history to the current vessel/permit owner included the groundfish ''B'' Permit fishing history from 1994, 1995 and 1996, and therefore the program improperly excludes valid ''B'' Permit groundfish fishing history in the initial allocation process. Further, the comment notes that nothing in Amendment 20 or 21 precludes inclusion of that ''B'' Permit history in the total catch history owned by the current permit owner.

NMFS disagrees, for the following reasons.

Amendment 20 specifies that the initial allocation will be made to the current owner of groundfish limited entry permits. These permits have been in place since 1994, as part of the implementation of Amendment 6, the groundfish limited entry program. Limited entry permits with ''A'' and ''B'' endorsements were implemented as part of the groundfish limited entry program (57 FR 54001–01, November 16, 1992). The program established permits with ''A'' endorsements, which were transferable, for trawl vessels that met specific minimum landing requirements. It also established permits with ''B'' endorsements, which were not transferable, and which expired upon transfer to a different owner, or at the end of 1996 (whichever occurred first). These ''B'' endorsements were intended for vessels that had some low level of activity in the fishery prior to August 1, 1988, and under the current owner, but did not meet the landing requirements for vessels receiving ''A'' endorsements. The ''B'' endorsements provided a three year adjustment period during which the vessel owners could either make arrangements to stay in the fishery through the purchase of an existing ''A 'endorsed permit or stop participating in the limited entry fishery. NMFS accordingly removed the ''B'' endorsement provisions from the regulation after the ''B'' endorsements had expired; in addition to the ''A 'endorsement, the only endorsements on limited entry permits are now gear endorsements (trawl, longline, pot or trap) and size endorsements (*see* 66 FR 29729, June 1, 2001, and 50 CFR 660.333).

Consistent with this background, the current limited entry permits are ''A'' endorsed only and have no relationship to ''B'' endorsed permits, which expired at the end of 1996. The current limited entry permits in the trawl fishery with trawl endorsements originally, under Amendment 6, were called limited entry permits with ''A'' endorsements. When the ''B'' permits expired, NMFS revised the regulations to refer to limited entry permits with trawl endorsements. These are the limited entry permits referred to in the trawl rationalization program and they and their landings history, are distinct from the permits with ''B'' endorsements that are no longer inexistence. NMFS recognizes that the supporting exhibits submitted by the commenter show that for purposes of the American Fisheries Act (AFA), the NMFS, Alaska Region, approved the request that the F/V Pacific Challenger be named as a
replacement vessel for the F/V Amber Dawn. However, this decision for the AFA fisheries is separate from and has no effect on the relation to the Pacific Coast Groundfish permits and the trawl rationalization fishery.

Midwater Trawlers Cooperative supports the Catch Share Program as implemented; it's achieving the goals and objectives that the program was developed on.

Sincerely,

David Jincks
President

David Jincks, President
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Agenda Item D.7.c
Supplemental Public Comment 5
June 2012

Ocean Gold Seafood's Public Comments Before Pacific Fishery Management Council On Reconsideration of IFQ Allocation for Pacific Whiting

June 20-26, 2012

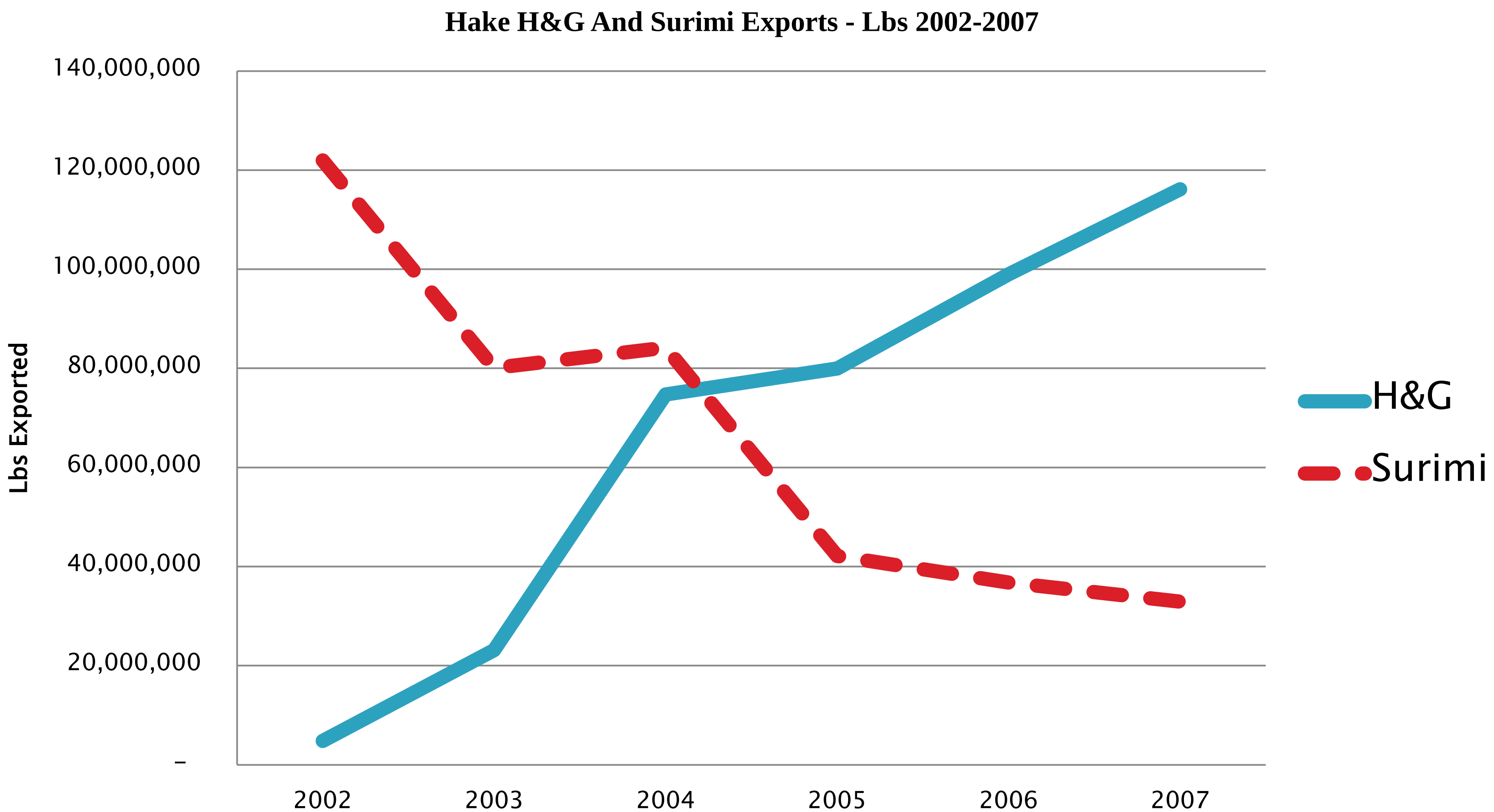
Recency Requirements

- MSA 303(c)(5)(A)(i) re LAPPs states that such programs must consider "current and historical harvests"
- MSA 303(a)(6) Contents of FMPs: a limited access system must take into account "present participation in the fishery."
- MSA 303(c)(5)(E) states that the allocation must be made to "persons who substantially participate in the fishery."
- NOAA LAPP Guidelines: current histories need to be considered to minimize "disruption of the current distribution of recipients."

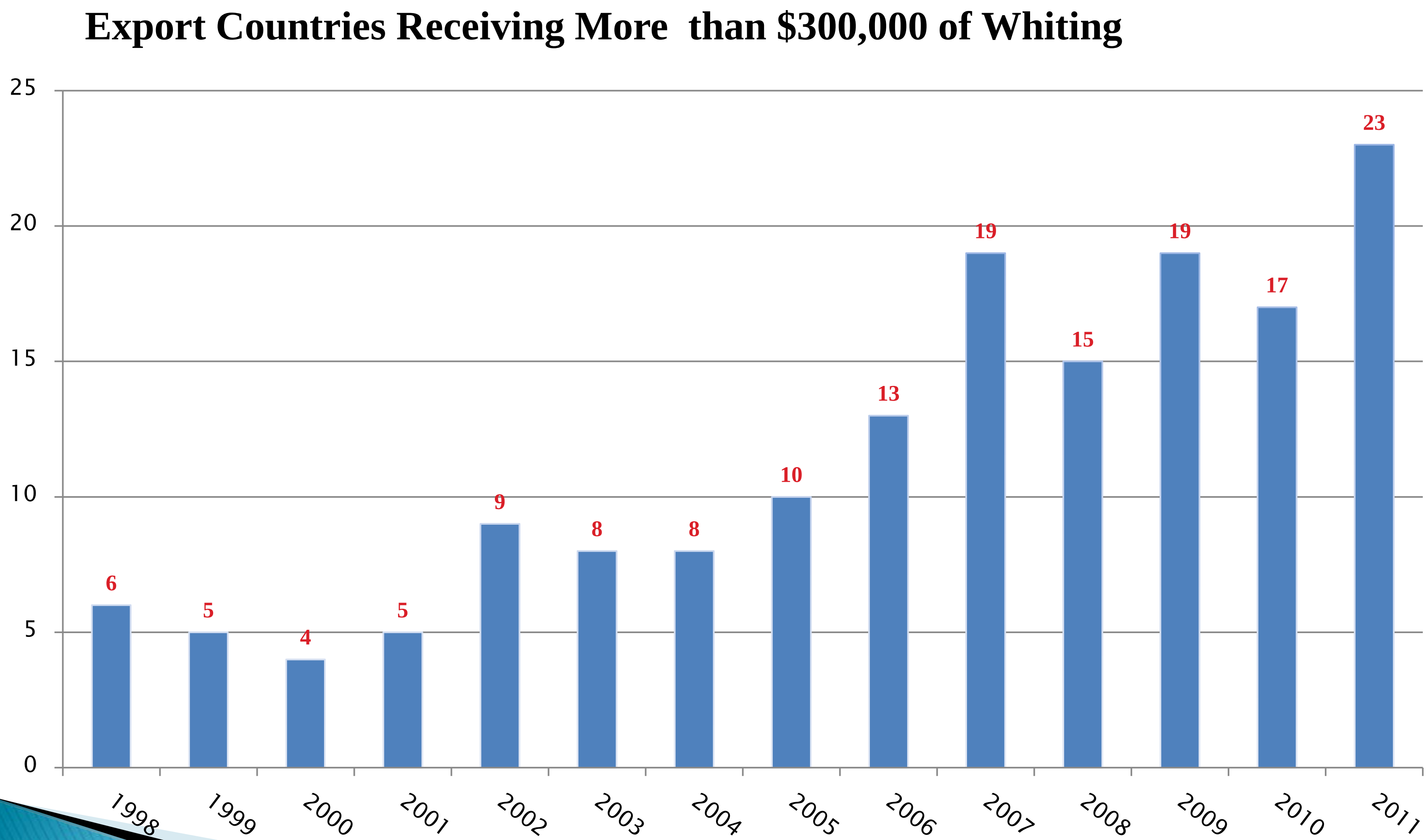
No Action and Alternative 1

- Of the 9 processors that qualify for IFQ, 3 have not processed whiting in for the last decade.
- Excludes allocation to 7 processors who have processed whiting between 2000-2010.
  - Judge Henderson: “Defendants make no argument why it was rational for them to exclude these new entrants, particularly the ones that had significant amounts of landings that will not receive an initial allocation of whiting QS under the IFQ program.”
- Allocates IFQ to 22 permits that have not fished whiting since 2003.
- For 2011, 39 permits that received quota didn’t fish it.

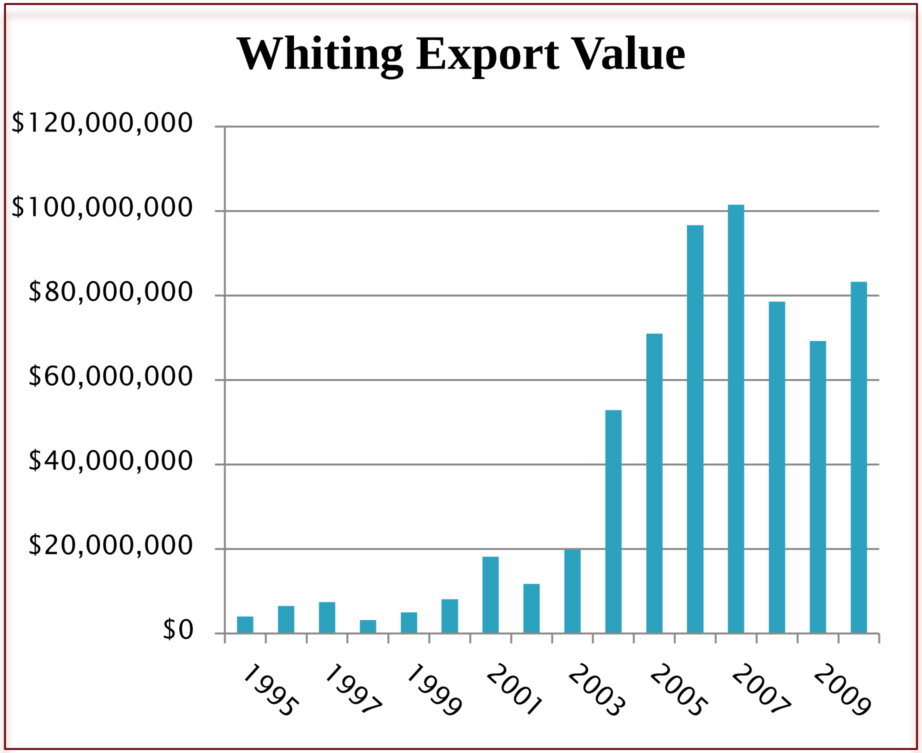
Whiting Product Market Changes: From Surimi to H&G, Fillets.

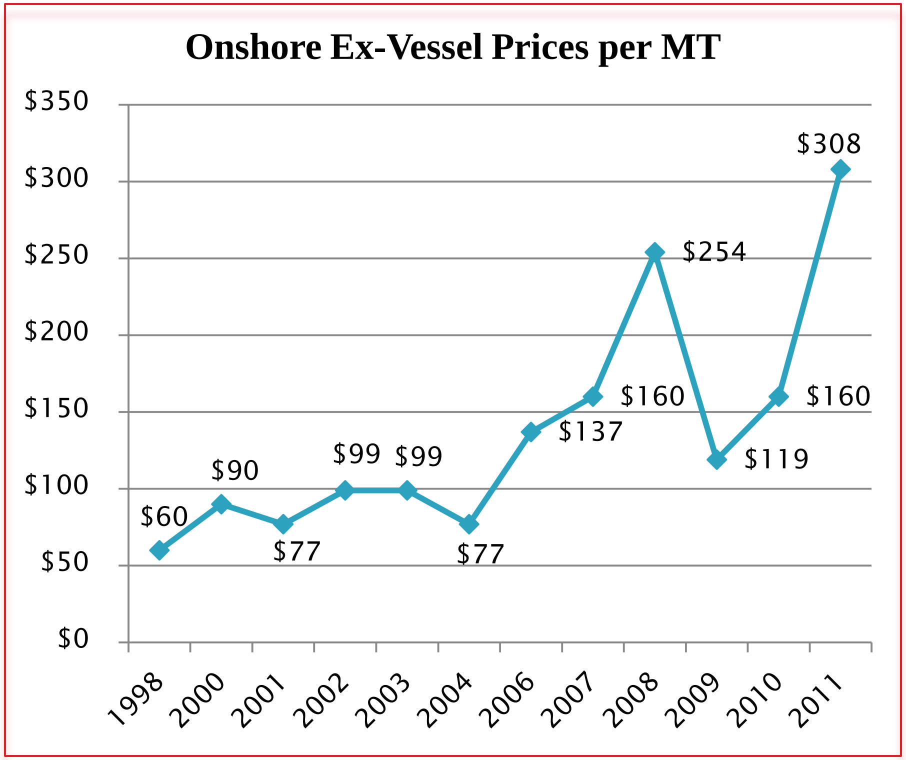


Whiting Export Market Diversifies



Economic Impacts of Export Markets





Key Findings From Draft Environmental Assessment Chapter 3

- "Ex-vessel revenues began increasing trend in 2003" p. 3
- "Ex-vessel prices show similar trends as revenues." p. 4
- "Export market growth starts in 2001 but increases significantly after 2003." p. 6.
- Catcher vessel revenues "generally increasing after 2003."

Economic Impacts

- MSA "Optimum Yield": means "the greatest overall benefit to the Nation, particularly with respect to food production."
- Groundfish FMP 6.3.1: Resource allocation should "increase economic yield."
- Amendment 20 Goal: implement plan that "increases net economic benefits, creates economic stability . . .."
- Amendment 20 Objective: "Provide for a viable, profitable, and efficient fishery. Promote measurable economic and employment benefits through seafood catching, processing distribution elements

Investments and Dependence

- MSA 303A(c)(5)(iii) requires consideration of "investments in, and dependence upon the fishery"
- NOAA LAPP Guidelines: "Comparing the financial investments shows . . . relative commitments to a fishery . . . and . .relative differences in amounts that will have to be earned to support the capital equipment."
- Draft EA p. 53: "the more recent the years of harvest included in the allocation formula, the more likely it is that allocations will reflect dependence on the fishery."

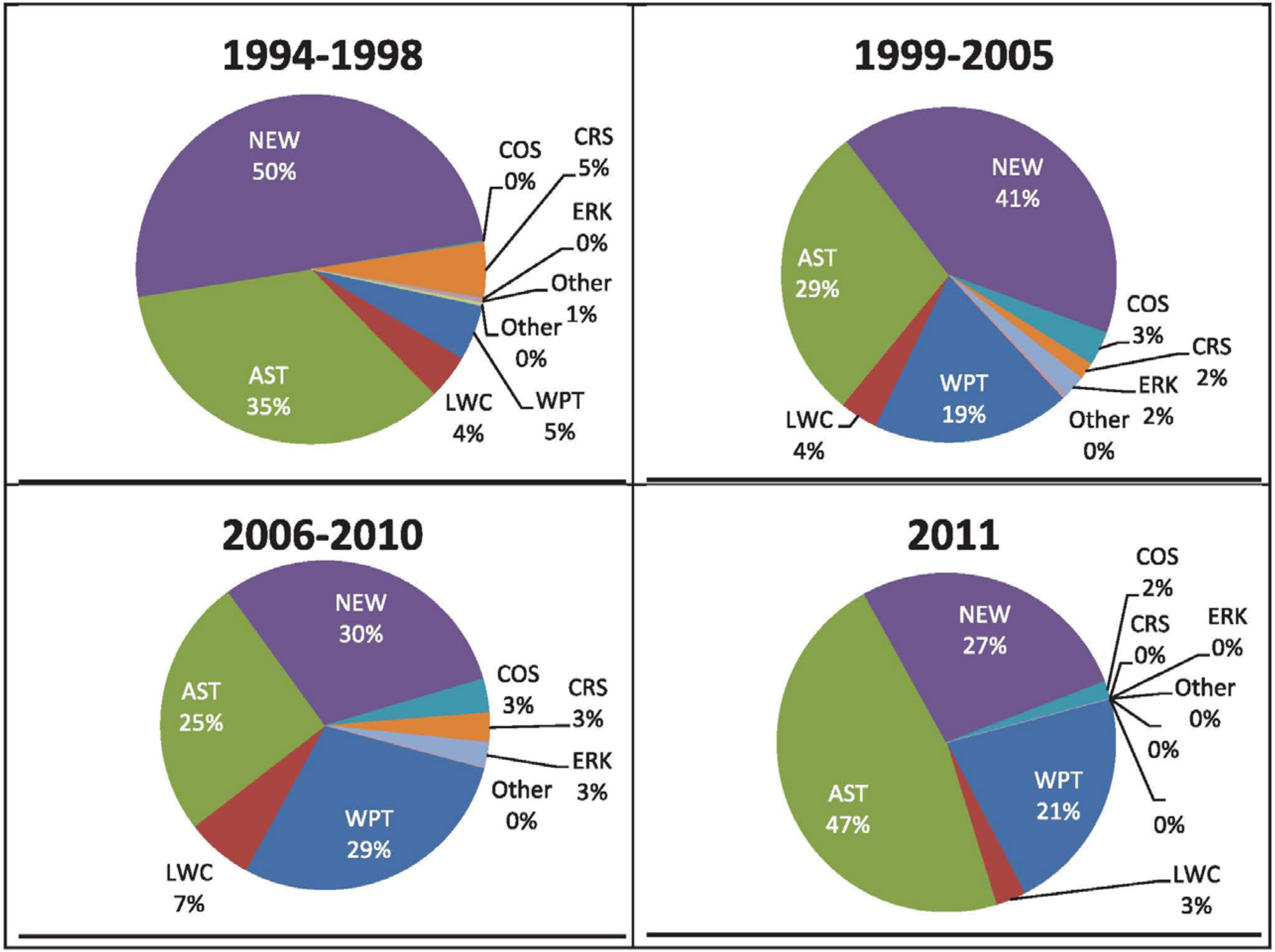
Ocean Gold Invests More than $25 Million Between 1997-2008

➢ 1997 First H&G Plant Built:	$1.2 Million
➢ 2000 Improvements to Ice house:	$1.0 Million
➢ 2004-2008 Meal Plant Built:	$10 Million
➢ 2004-2007 Dock Improvements:	$1.7 Million
➢ 2008 Cold Storage Built:	$10 Million
➢ 2003-2009 Wastewater System:	$1.3 Million
Total:	**$25.2 Million**

Reasons Why Alternative 4 Should Be Selected

- Accounts for recent history, current participation, and allocates to substantial participants in fishery.
- Snapshot best captures fishery when it is at its most efficient, economically stable, and valuable.
- Takes account for the most significant processor investments over the last decade.
- Excludes greatest number of years in which the fishery was inefficient, unstable, and on verge of collapse.

9. Community Shares of Whiting Harvests-Trends



No Evidence of Speculation

- Prevent consideration of 8 years of current history
- Intended purpose was to prevent speculation
- No evidence of any speculation after 2003. Environmental Assessment Chap. 3, p. 20:
  - "4 permits entered the West Coast whiting fishery for the first time after the 2003 control date."
  - "Of the four entering the fishery after the control date, only two participated in more than two years."
  - "Despite higher ex-vessel prices and new buyers, there was apparently little movement into or out of the whiting fishery after the 2003 control date."

COUNCIL DECISION TEMPLATE

Following is a detailed list of action items for potential use in motion making.

	Council Action
1. Select preliminary preferred alternative	
a. Catcher Vessel Permits – Shoreside History	
b. Whiting Processors - Shoreside History	
c. Catcher Vessel Permits –Mothership History	
2. Corresponding regulatory adjustments to consider (confirm changes or specify modifications)	
a. Recent participation period for processors	
b. Qualifying period for MS/CV Endorsements	
c. Buyback permit share determination	
d. Entity qualifying for initial allocation.	
3. Provide guidance on analysis, as needed.	
4. Provide comments on RAW 1 (due June 29, 2012)	
a. Trading Moratorium	
b. Divestiture Period	
c. MS/CV Endorsement Severability	
d. Start of Year QP Issuance	

PFMC
06/04/12

CONSIDERATION OF INSEASON ADJUSTMENTS

Management measures for groundfish are set by the Council with the general understanding these measures will likely need to be adjusted within the biennium to attain, but not exceed, the annual catch limits. This agenda item will consider inseason adjustments to ongoing 2012 fisheries. Potential routine inseason adjustments include adjustments to rockfish conservation area boundaries and adjustments to commercial and recreational fishery catch limits. Adjustments are, in part, based on catch estimate updates and the latest information from the West Coast Groundfish Observer Program. Also, under this agenda item, the National Marine Fisheries Service will report on the issuance of the 2011 surplus carry-over quota pounds to the 2012 shorebased individual fishing quota fishery (Agenda Item D.8.b, NMFS Report).

Council Action:

1. **Consider information on the status of 2012 fisheries and adopt final inseason adjustments.**
2. **Provide guidance on surplus carry-over, as necessary.**

Reference Materials:

1. Agenda Item D.8.b, NMFS Report: 2011 Surplus Carry-Over.

Agenda Order:

a. Agenda Item Overview — Kelly Ames
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Adopt Final Recommendations for Adjustments to 2012 Groundfish Fisheries, Including the Carry-Over Issue

PFMC
05/22/12

2011 Surplus Carryover

On May 14, 2012, the National Marine Fisheries Service (NMFS) announced surplus carryover from 2011 would be credited in to vessel accounts for individual fishing quota (IFQ) species except whiting and sablefish (NMFS public notice, NMFS-SEA-12-09). NMFS did not issue carryover for these two species because we concluded that, if surplus carryover were issued, the risk of catches exceeding the harvest limits (annual catch limits (ACLs) or, for whiting, total allowable catch (TAC)) was too high. In addition, for whiting, there are potential interactions between the carryover provisions under the Shorebased IFQ Program and the carryover provisions under the bilateral agreement with Canada (Agreement)[1] that have not yet been fully explored. Further discussions with the appropriate entities are required to determine how and if carryover under the Shorebased IFQ Program can be implemented in a manner consistent with the total allowable catch requirements of the Agreement.

This memorandum provides background and a summary of NMFS considerations for this action; it also describes potential management responses to keep catches within harvest limits.

Background

The Shorebased IFQ Program contains a carryover provision as specified in the Pacific Coast Groundfish Fishery Management Plan (FMP) at Appendix E, A-2.2.2.b and in the U.S. Codified Federal Regulations (CFR) for groundfish at 50 CFR part 660.140(e)(5). The provision allows up to 10 percent of the quota pounds that were not used in one year to be carried over into the following year -- called a surplus carryover. As required by the FMP and the regulations, each year NMFS must determine whether surplus carryover can be issued to individual vessel accounts for each species consistent with the conservation requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

> *Excerpt from 660.140(e)(5)(i)*
> *"…<u>To the extent allowed by the conservation requirements of the Magnuson-Stevens Act</u>, NMFS will credit the carryover amount to the vessel account in the immediately following year once NMFS has completed its end-of-the-year account reconciliation. …"*

NMFS highlighted this issue of carryover relative to the conservation requirements of the Magnuson-Stevens Act at the September 2011 Council meeting (Agenda Item G.1.a, Supplemental Attachment 7) and noted that the necessary analysis of the issue was missing from Amendments 20 and 23 and from the 2011-2012 harvest specifications analyses. NMFS has provided updates on progress of working toward resolution of this issue at every Council meeting since September 2011. NMFS also noted that the relationship between surplus carryover and ACL is being considered on a national level. At the April 2012 Council meeting, NMFS noted that it would be consistent with the conservation requirements of the Magnuson-Stevens Act to allocate above the ACL as long as projected catches were not expected to exceed the ACL.

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[1] Article II.5(b) and Article II.6 of the Agreement between the Government of the United States of America and the Government of Canada on Pacific Hake/Whiting.

NMFS considerations

For this decision, NMFS reviewed the requirements of the Magnuson-Stevens Act and the relevant language from the regulations and the FMP. NMFS has interpreted the phrase "*to the extent allowed by the conservation requirements of the Magnuson-Stevens Act*" to mean that issuance of surplus carryover from the previous year is not expected to result in the 2012 mortality (landings and discards) of that species from all sectors to exceed the 2012 ACL. NMFS reviewed the data from 2011 Shorebased IFQ Program vessel accounts that was available as of May 2012. NMFS also looked at projected impacts for 2012 of all sectors (including issuance of surplus carryover) compared to the 2012 ACL. This projected impacts analysis included a proportional reduction to the surplus carryover for IFQ species whose ACL declined between 2011 and 2012, consistent with §660.140(e)(5). NMFS only issued surplus carryover for species where there was a low risk of exceeding the ACL if we were to issue surplus carryover. For most species, NMFS determined there was a very low risk of exceeding the ACL because species were projected to be well below 80 percent of the 2012 ACL even with issuing surplus carryover.

For the species that were above 80 percent of the 2011 shorebased trawl allocation (whiting, sablefish (north and south of 36° N. lat.), and petrale), there is a higher likelihood of those species also reaching the 2012 shorebased trawl allocation even without surplus carryover. NMFS has provided further details below on our decision for these species.

Pacific whiting

Attainment of Pacific whiting in the 2011 IFQ fishery was 98.17% of the shorebased trawl allocation. Historical percent attainment of the OY between 2008-2010 from all fishing mortality is 93%, 90%, and 85%, respectively. In the analysis, NMFS used projected impacts for the IFQ fishery (multiplied percent attainment in 2011 by 2012 shorebased trawl allocation) and added the potential surplus carryover amount. For some sectors (set asides for incidental open access, EFPs, and research), NMFS used values in the 2011/2012 harvest specifications EIS (February 2011), Table 4-33, for the projected impacts. Where projected impacts were not available, NMFS used 2012 allocations (at-sea whiting and tribal whiting set-aside). While for many species this would likely be an overestimate, it is not for whiting because it is a fully allocated target species that is less likely to have allocations going unused, as evidenced in the historical attainment of the OY. Whiting is a high volume, trawl-caught, target fishery. The allocation to the IFQ fishery decreased between 2011 (92,817.90 mt) and 2012 (56,902 mt). In 2012, NMFS implemented reapportionment provisions from tribal to non-tribal whiting fisheries. This means that the whiting allocation is more likely to be attained in 2012. In addition, the U.S./Canada Agreement includes a 15% adjustment provision (Article II.5(b)) which allows up to 15% of the unused TAC from the previous year to be carried over and added to the following year's TAC. This was done in 2012, increasing the TAC from 142,401 mt to 186,037 mt. Thus, the whiting fishery has already gotten a carryover at the TAC level, which does not occur in the other groundfish species. The interaction between the IFQ fishery carryover and the carryover at the TAC level through the Agreement has not been fully explored. Article II.6 of the Agreement states that the fishery will be managed consistent with the approved recommendations of the Joint Management Committee (JMC). In developing their recommendation to the US and Canada, the JMC did not consider surplus carryover in the IFQ fishery. Further discussions with the appropriate entities are required to determine how and if carryover under the Shorebased IFQ Program can be implemented in a manner consistent with the TAC requirements of the Agreement. Therefore, because it is a target species that is likely to be close to full attainment in 2012, and there are potential impacts to the just concluded Agreement with Canada, NMFS did NOT issue surplus carryover from 2011 in 2012 for Pacific whiting based on the information available at this time.

Sablefish (north and south of 36° N. lat.)

Attainment of sablefish north in the 2011 IFQ fishery was 94.20% of the shorebased trawl allocation, while sablefish south was 86.24%. Historical percent attainment of the OY between 2008-2010 from all fishing mortality is 102% (coastwide) for 2008, 94% (north) and 57% (south) for 2009, and 95% (north) and 83% (south) for 2010. In the analysis, NMFS used projected impacts for the IFQ fishery (multiplied percent attainment in 2011 by 2012 shorebased trawl allocation) and added the potential surplus carryover amount. Projected impacts for sectors other than IFQ broken down by area were not available in the 2011/2012 harvest specifications EIS (February 2011), Table 4-33, so 2012 allocations were used from Tables 2a-d in federal regulations at 50 CFR part 660, subpart C. While for many species this would likely be an overestimate, it is not for sablefish, especially sablefish north. Sablefish is a high value groundfish species that is targeted in all sectors of the fishery (limited entry trawl (shorebased), limited entry fixed gear, open access, and tribal). In the Shorebased IFQ Program, gear switching, the ability to use fixed gear to harvest IFQ allocations, has increased participation of fixed gear vessels in the trawl fishery; increasing the likelihood of attainment of the IFQ allocation (north and south of 36° N. latitude). As such, it is fully allocated among the sectors and less likely to have allocations going unused, as evidenced in the historical attainment of the OY, especially in the north. Inseason management measures, such as adjustments to the trawl RCA, are not an effective tool for limiting access to sablefish. In addition, the coastwide sablefish stock has shown a declining trend in recent years. North of 36° N. lat., the allocation to the IFQ fishery decreased between 2011 (2,546.34 mt) and 2012 (2,467 mt). South of 36° N. lat., the allocation to the IFQ fishery decreased between 2011 (530.88 mt) and 2012 (514.08 mt). Therefore, because it is a target species in many groundfish sectors and is likely to be close to full attainment in 2012, because there are limited inseason management measures effective at controlling catch in the trawl fishery (such as RCA adjustments), and because there is a declining stock trend, NMFS concluded that the risk of exceeding the ACL is too high based on the information available at this time. Therefore, NMFS did NOT issue surplus carryover from 2011 in 2012 for sablefish north or south of 36° N. latitude.

Petrale sole

Attainment of Petrale sole in the 2011 IFQ fishery was 93.20% of the shorebased trawl allocation. Historical percent attainment of the OY between 2008-2010 from all fishing mortality is 90%, 81%, and 78%, respectively. In the analysis, NMFS used projected impacts for the IFQ fishery (multiplied percent attainment in 2011 by 2012 shorebased trawl allocation) and added the potential surplus carryover amount. Projected impacts for sectors other than IFQ were available for some sectors (set asides for incidental open access, EFPs, research, and tribal) in the 2011/2012 harvest specifications EIS (February 2011), Table 4-33, but not for others (at-sea whiting, limited entry fixed gear, sablefish open access, nearshore open access, and recreational). For the sectors that didn't have projected impacts, 2012 allocations were used and are likely an overestimate. Petrale is an overfished species managed under a rebuilding plan. However, petrale is also a productive stock and the 2011 stock assessment forecasts the biomass to continue to increase. Petrale is expected to move above the target stock size of $SB_{25\%}$ in 2013, the first time since 1956. Petrale is predominately a trawl-caught species and is a target species in the IFQ fishery. The allocation to the IFQ fishery increased between 2011 (871 mt) and 2012 (1,054.6 mt). Although the projected 2012 impacts are less than 100%, they are fairly high at 96%. However, if surplus carryover were issued for petrale, management measures effective at controlling catch of petrale inseason are available to managers, namely changes to the trawl RCA, should there be a conservation concern. NMFS believes that the sum of these factors allows us to conclude there is an acceptably low risk of exceeding the ACL and we will issue surplus carryover from 2011 in 2012 for Petrale sole.

Potential Management Responses to keep catches below the 2012 ACLs

The Council and NMFS monitor catch in the Shorebased IFQ Program against the shorebased trawl allocation specified in regulation (not including the surplus carryover) throughout the year. If there is a conservation concern, there are several management actions that the Council and NMFS can take to either mitigate for the concern or to close the fishery. To remain consistent with the allocation scheme adopted by the Council and NMFS, it is important for the management action to affect the Shorebased IFQ Program as a first priority and, ideally, not affect other sectors. However, the Council and NMFS may not necessarily take action if the 2012 shorebased trawl allocation is exceeded, if there is little to no risk of exceeding the ACL when all fishery impacts are combined. The actual management response would be specific to the characteristics of each particular situation. In the event that adjustments to the Shorebased IFQ Program are not sufficient, the Council and NMFS may also need to consider management action on multiple sectors or the entire groundfish fishery as a second priority action to keep catches within the ACL for the year.

GROUNDFISH ADVISORY SUBPANEL REPORT ON CONSIDERATION OF INSEASON ADJUSTMENTS

The Groundfish Advisory Subpanel (GAP) met with the Groundfish Management Team (GMT) to discuss progress of this year's fishery and possible inseason adjustments. The GAP offers the following recommendations and comments on proposed inseason adjustments to ongoing groundfish fisheries.

Limited Entry Fixed Gear Sablefish Fishery North of 36º N. Latitude

The GAP understands there is an accelerated pace to this year's limited entry fixed gear daily-trip-limit fishery that risks early attainment of the sector allocation and possible early closure of the fishery. The GAP understands the consideration of the very restrictive limits proposed by the GMT. While this will cause economic stress to the sector, these restrictive limits are better than an early fishery closure, which will cause greater harm to the sector and affected fishing communities. The GAP therefore supports the GMT option of reducing the current trip limits of 1,000 lbs/week, not to exceed 4,000 lbs/2 months to **800 lbs/week, not to exceed 1,600 lbs/2 months beginning on September 1, 2012 through the end of the year.**

Limited Entry Fixed Gear South of 34º27' N. Latitude

Minor Shelf Rockfish South: The GAP recommends an increase in the Minor Shelf Rockfish South cumulative landing limit from 3,000 lbs/2 months to **4,000 lbs/2 months beginning as soon as possible through the end of the year**. The GAP notes that there are no conservation issues with shelf rockfish and this will reduce regulatory discards and provide some economic relief to the few fishermen in this sector who fish in the southern California Bight.

Bocaccio: The GAP recommends an increase in the bocaccio cumulative landing limit from 300 lbs/2 months to **500 lbs/2 months beginning as soon as possible through the end of the year**. The GAP notes that there is an adequate buffer in the scorecard and this will reduce regulatory discards. This limit increase will not significantly increase bocaccio impacts since there are only a few fishermen in this sector who fish in the southern California Bight.

Implementation of the Surplus Carry-Over Provision from 2011 to 2012 in the Limited Entry Trawl Individual Fishing Quota (IFQ) Fishery

The GAP discussed the NMFS decision on the issuance of surplus carry-over quota from the 2011 IFQ fishery to the 2012 fishery. The GAP is concerned that surplus carry-over quota for Pacific whiting and sablefish were not issued this year. Many fishermen intentionally left quota unharvested last year expecting that this quota would be added to accounts this year. To not issue this surplus quota this year was a costly surprise to many IFQ fishermen.

The GAP understands the reasons for the decision to not issue surplus carry-over quota for Pacific whiting is tied to the new international forum for Pacific whiting. If a remedy is developed then, the GAP requests input through the Council process on this remedy at a time when such input is expedient.

The GAP also understands that the NMFS decision keeps open the possibility of issuing some or all of the surplus carry-over sablefish quota later this year if analysis of projected impacts indicates less risk of exceeding the annual catch limit (ACL). The GAP has heard that the sablefish carry-over amounts are 85 mt north of 36º N. latitude and 20 mt in the south. With these understandings, the GAP recommends further analysis of the risk of exceeding 2012 sablefish ACLs in time for reconsideration at the September Council meeting.

PFMC
06/24/12

THE GROUNDFISH MANAGEMENT TEAM REPORT ON CONSIDERATION OF INSEASON ADJUSTMENTS

CONTENTS

The Groundfish Management Team (GMT) considered the most recent information on the status of ongoing fisheries, research, and requests from industry and provides the following recommendations for 2012 inseason adjustments.

The GMT also received guidance from the National Marine Fisheries Service (NMFS) Northwest Region (NWR) regarding timing of implementation of inseason recommendations from this meeting. NMFS anticipates implementing routine inseason adjustments to fishery management measures by September 1, 2012.

1. ACTION ITEMS

1.1. *Commercial Fisheries*

1.1.1. Limited Entry and Open Access Nearshore Rockfish Trip Limits Between 40°10' N. latitude and 34°27' N. latitude

The GMT received a request in March 2012 (Agenda Item F.6.c Public Comment) to increase the trip limits for the shallow and deeper nearshore rockfish complexes for the area between 40°10' N. latitude and 34°27' N. latitude. The industry requested trip limits would vary by period and are outlined in Table 1. State fish ticket data (Jun 19, 2012) indicate that landings have been lower than normal compared to previous years.

Table 1. Limited entry and open access shallow and deeper nearshore rockfish complex trip limits (current and proposed, in pounds) for the area between 40°10' N. latitude and 34°27' N. latitude.

<table>
<tr><th></th><th></th><th>Jul/Aug</th><th>Sep/Oct</th><th>Nov/Dec</th></tr>
<tr><td rowspan="2">Shallow Nearshore Rockfish</td><td>Current</td><td>900</td><td>800</td><td>1,000</td></tr>
<tr><td>Proposed</td><td>1,200</td><td colspan="2">1,600</td></tr>
<tr><td rowspan="2">Deeper Nearshore Rockfish</td><td>Current</td><td colspan="3">900</td></tr>
<tr><td>Proposed</td><td>1,200</td><td colspan="2">1,600</td></tr>
</table>

The proposed trip limits are expected to keep target species well within harvest specifications. However, these trip limits would increase catch of bocaccio and canary rockfish estimated in the nearshore bycatch model (Table 2).

Table 2. Scorecard changes as a result of implementing the proposed nearshore rockfish trip limits (in mt).

Species	**Nearshore Scorecard Allocation**	**Model Estimates with Updated Observer Data**	**Industry Proposal Estimates**
Bocaccio	0.7	0.4	**0.5**
Canary	4.0	4.8	**6.0**

The GMT understands that approximately 5 percent of the nearshore permitees between 40°10' N. latitude and 34°27' N. latitude took greater than 75 percent of the maximum allowable landings during 2009 and 2011, and occurred in central California based on state fish ticket data. The proposed trip limit options (and catch estimates) assume similar fleet behavior under the higher trip limits. If fleet behavior changes such that the landings of shallow and deeper nearshore rockfish exceed those currently accounted for within the nearshore model, as a result of this proposed change, there could be an increase in overfished species impacts.

- **Consider the request to increase the shallow and deeper nearshore trip limits between 40°10' N. latitude and 34°27' N. latitude, taking into account the estimated change overfished species catches. If adopted, regulations should go into effect as soon as possible, through the end of the year.**

1.1.2. Limited Entry Fixed Gear Shelf Rockfish Trip Limits South of 34°27' N latitude

The GMT received a request to increase the limited entry fixed gear trip limits for the shelf rockfish complex south of 34°27' N. latitude from "3,000 lb./2 mo" to "4,000 lb./2 mo" through the end of the year, intended to reduce discarding of speckled rockfish while targeting other shelf rockfish, and to turn discards into landed catch.

The shelf rockfish complex south of 40°10' N. latitude has been under-harvested in recent years (Table 3). Starting in 2011 under Amendment 21 (intersector allocation), the minor shelf rockfish complex annual catch limit (ACL) of 701 mt is divided between the non-trawl (87.8 percent; 615 mt) and trawl (12.2 percent; 86 mt) sectors. If the newly implemented trawl/non-trawl allocation had been in place from 2006-2010, only 29-52 percent of the non-trawl allocation would have been taken (Table 4). On average, recreational catches comprise 94 percent of estimated mortality of shelf rockfish complex species from the non-trawl fishery

Table 3. Estimates of total mortality (TM) in the open access (OA) fishery south of 40° 10' N. latitude from West Coast Groundfish Observer Program (WCGOP) reports compared to Optimum Yield/Annual Catch Limits (OY/ACL) (2006-2010).

	TM (mt)	OY/ACL (mt)	% OY/ACL
2006	334	714	46.8 %
2007	365	714	51.1 %
2008	212	714	29.7 %
2009	273	714	38.2 %
2010	251	714	35.2 %

Table 4. Estimated mortality by sector (2006-2010) compared to 2012 non-trawl allocation south of 40° 10' N. latitude

	Trawl (mt)	Non-trawl (mt)	Non-trawl Allocation (mt)	% Non-trawl Allocation
2006	22	310	615	50.4 %
2007	3	319	615	51.8 %
2008	24	180	615	29.2 %
2009	15	254	615	41.3 %
2010	21	226	615	36.8 %

Although there is no formal bycatch projection model for the non-nearshore fishery south of 34°27' N. latitude, WGCOP data indicate very few encounters with overfished species (see 2011-12 FEIS). Although the current trip limit for shelf rockfish is “3,000 lb./2 months,” state fish ticket data indicate that very few vessels actually attained the full trip limit between 2008 and 2010, with average fleet landings of approximately 720 lb./ 2 months.

Based on these data, the GMT estimates landings would increase by approximately 0.2 mt, to a total of 2.2 mt. This does not anticipate any increased catches of overfished species as a result of this industry request. Additionally, the GMT does not anticipate that this modest increase in trip limits will result in an overharvest of any species’ contribution to the complex as a result of this request.

- **Therefore the GMT recommends increasing the limited entry shelf rockfish trip limit south of 34° 27' N. latitude from “3,000 lb./2 months” to “4,000 lb./2 months” as soon as possible, through the end of the year.**

1.1.3. Limited Entry Fixed Gear Bocaccio Trip Limits South of 34°27' N. latitude

The GMT received a request to increase the limited entry fixed gear trip limits for bocaccio south of 34°27' N latitude from “300 lb./2 mo” to “500 lb./2 mo” intended to reduce discarding as a result of increased encounters from a year-class recruiting into the fishery.

Similar to the shelf rockfish industry request above, had the newly implemented trawl/non-trawl allocation been in place from 2006-2010, only 19-32 percent of the non-trawl allocation would have been taken (Table 5). On average, recreational catches comprise 95 percent of estimated mortality of shelf rockfish complex species from the non-trawl fishery.

The estimated 2012 take would increase to 0.7 mt from the annual average of 0.4 mt, which is well within the non-trawl bocaccio allocation south of 40°10' N. latitude.

Table 5. Estimated total mortality of bocaccio in the non-trawl sector (2006-2010) compared to 2012 non-trawl allocation south of 40° 10' N. latitude.

Year	Non-trawl (mt)	Non-trawl Allocation (mt)	% Non-trawl Allocation
2006	42	189.6	22.1
2007	60	189.6	31.6
2008	36	189.6	19.0
2009	49	189.6	25.8
2010	58.7	189.6	31.0

This request is expected to only result in small increase in catches, which can be easily accommodated within the current non-trawl allocation.

- **Therefore, the GMT recommends increasing the limited entry fixed gear trip limits for bocaccio south of 34°27' N. latitude from "300 lb./2 mo" to "500 lb./2 mo" as soon as possible, through the end of the year.**

1.1.3. Fixed Gear Sablefish Daily-Trip-Limit (DTL) fisheries

This section discusses 2012 inseason considerations for the four fixed gear daily trip limit (DTL) fisheries, including both limited entry (LE) and open access (OA), north and south of 36° N. latitude for 2012. Hereafter, they will be referred to as follows: LE North, LE South, OA North, and OA South.

1.1.3.1. Current status

Current projections under No Action, for the sablefish DTL fisheries are shown in Table 6 and Figure 1. The GMT is recommending action only for the LE North fishery.

Table 6. Current projections of landings, corresponding attainment, targets and trip limits for the fixed gear, DTL fisheries under No Action, in 2012.

	LE N	OA N	LE S	OA S	South sum
Projection (mt)	373	390	422	134	556
Target (LT)	265	419	339	309	648
Difference	108	-29	71	-175	-92
Projected attainment	141%	93%	124%	43%	86%
Bimonthly TL	4000	1800	-	-	-
Weekly TL	1000	900	1800	1350	-
Daily TL	-	-	-	300	-

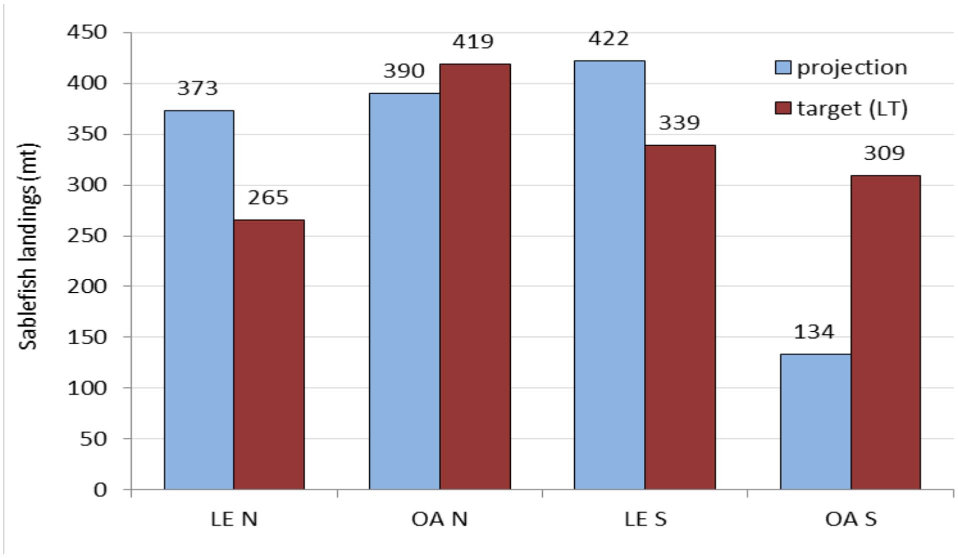

Figure 1. Current landings projections and targets for the fixed gear, DTL fisheries under No Action, in 2012.

The current projection for the OA North is 93 percent of the landing target (390 mt vs. 419 mt target, Table 3), and the sum of the projections for the LE South and OA South is 87 percent of the sum of those two landing targets (566 mt sum of predictions vs. 648 mt sum of targets). Although the LE South is projected to take 124 percent of its landing target (422 mt vs. 339 mt), and the OA South is currently predicted to take 43 percent of its landing target (134 mt vs. 309 mt). The Council has recently managed the two southern DTL fisheries under a sharing that was weighted to the LE, and the magnitude of predicted overage of the LE South is largely the result of a correction factor based on 2012 QSM catch estimates. The GMT believes there is time left this year to monitor catch and revisit it in September.

The current 2012 projection for the LE North fishery, assuming 2011 price structure, is for 141 percent (373 mt, vs. 265 mt target, Table 6) of the landing target (landing target = harvest guideline reduced for discard mortality).

1.1.3.2. Background and rationale

The GMT has been working to bring catch of the LE DTL North fishery to within its harvest guideline (which is estimated to have exceeded by a wide margin the last two years), since the correction of the PacFIN DTL landings estimation software last June presented us with accurate landings data for this fishery for the first time since 2004. Recent increases in effort, high sablefish prices, and lack of a daily limit have all likely contributed to recent high landings in this fishery and discrepancies with predictions, as current status of these factors is outside of the range of the historical data which inform predictions. As an example, the year 2011 saw 14 additional vessels in the fishery since 2010 (103 vs. 89 respectively); this is the highest ever, from 2004 to present. Prices in 2011 were also the highest ever for this fishery.

Current estimates of 2012 effort, landings and price indicate continued high catch in the LE North fishery this year. Effort in Period 1 of 2012 was the highest ever, compared with 2004 to present (e.g. 153 vessel days in Period 1 of 2012 versus 133 in 2011, and 89 in 2010). Landings so far in 2012, as reported in the Quota Species Monitoring, Best Estimate Report (QSM), match closely under the current model specification (QSM is 6 percent higher than projections for periods 1 and 2 of 2012 under the current specification, versus 57 percent higher than projections under the previous specification of the model).

At the April meeting, the GMT discussed that price would likely be added to the projection model for this fishery, in an effort to improve accuracy, given significant under-prediction for 2011. Sablefish ex-vessel price has been used in other DTL models in the past, was found to be a strong predictor of landings by period in the LE North fishery (R^2 as high as 0.95), and including it substantially improved overall model fit, especially during June-December of 2011.

The GMT assumed 2011 prices in the current projection for the LE North. Assuming a price schedule of $0.50 higher would result in a prediction of 406 mt or 153 percent of the landing target, while assuming prices of $0.50 lower would result in a prediction of 357 mt, or 135 percent of the landing target. The currently available data indicate that average ex-vessel price per pound in this fishery was higher in Period 1 of 2012 than 2011 ($3.05 vs. $2.54), but then decreased in Period 2 of 2012, to a similar level as 2011 ($2.94 vs. $2.91, respectively).

1.1.4. Alternative management measures for the LE North fishery

According to the best available information, trip limits would need to be reduced to 800 pounds per week, and 1,600 pounds per bimonthly period, with fishery closure on November 1 (Table 7), to result in 99.4 percent attainment of the landing target (263.5 mt vs. 265 mt). However, the Council could make the recommended reduction in Alternative 1 for Period 5, then revisit the issue in September, when more landings and effort data are available for this fishery, rather than decide on a Period 6 closure now. In a meeting with the GMT, the GAP indicated that Alternative 1 was preferable over setting trip limits to approximately half these levels for periods 5 and 6, thus providing a more viable fishery during the typical peak fishing months, rather than extremely small trip limits for a longer period of time. Action recommended in the September meeting could be implemented into regulation by November 1, 2012.

Table 7. Alternative management measures for Council consideration regarding the LE North sablefish DTL fishery in 2012.

<table>
<tr><th>Area</th><th>Fishery</th><th>Alternative</th><th>Jan-Feb</th><th>Mar-Apr</th><th>May-June</th><th>July-Aug</th><th>Sept-Oct</th><th>Nov-Dec</th></tr>
<tr><td rowspan="2">North of 36° N. lat. (U.S./Canada Border to 36° N. lat.)</td><td rowspan="2">LE North</td><td>No Action</td><td colspan="2">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td><td colspan="4">1,000 lb. per week, not to exceed 4,000 lb. per 2 mo.</td></tr>
<tr><td>Alt. 1</td><td colspan="2">1,300 lb. per week, not to exceed 5,000 lb. per 2 mo.</td><td colspan="2">1,000 lb. per week, not to exceed 4,000 lb. per 2 mo.</td><td colspan="2">800 lb. per week, not to exceed 1,600 lb. per 2 mo.</td></tr>
</table>

- **The GMT recommends reducing trip limits in the LE sablefish DTL fishery, north of 36° N. latitude from 1,000 pounds per week, not to exceed 4,000 pounds per two months, to 800 pounds per week, not to exceed 1,600 pounds per two months, beginning September 1, 2012, according to Alternative 1, in Table 2, though the end of the year.**

2. INFORMATIONAL ITEMS

2.1. 2011 update

The GMT received some update information on fisheries and impacts for 2011. This information is normally examined in March, however due to other workload items it was delayed. For petrale sole, Tribal impacts increased from the set-aside of 45.4 mt to 127 mt, however research, shorebased trawl, and at sea trawl sectors were below their allocations by 5.4, 59.2, and 1.1 mt, respectively. With these changes, the total projected impacts are still below (21.6 mt) the ACL. For bocaccio and cowcod, the California recreational impacts were higher than projected, however still within the allocation. The projected impacts for canary rockfish from the California recreational fishery exceeded the allocation by 1.3 mt, however the total impacts from all sectors are still projected to be 22.9 mt below the ACL. For yelloweye rockfish, the recreational fisheries in all three states had lower projected impacts than estimated in November. The impacts to yelloweye rockfish from all sectors are projected to be 3.8 mt below the ACL. While there were updates to some projected impacts in the overfished species scorecard, it appears that no ACLs were exceeded. Final information will be available via the WCGOP Groundfish Mortality Report this fall.

2.2. *Scorecard Update*

The scorecard has been updated to reflect changes to the WCGOP program bycatch rates (2003-2010) used in the nearshore model, updated research information, an update from the Makah tribe on their Petrale sole catch, and an update to the Oregon recreational canary rockfish impacts. Changes to the scorecard are indicated in **bold.**

2.3. Research

The GMT has received updates on research ongoing research projects, however no estimates of final projected impacts in research activities are available at this time, no changes to the overfished species research set-aside are being proposed at this time.

The GMT received an update from NMFS on several projects being conducted in 2012 by the Northwest Fisheries Science Center that had previously not been accounted for. For most species the additional projected impacts are within the current set-asides. Pacific Ocean perch (POP) is the only overfished species for which the projected impacts are greater than the current set-aside (1.8 mt vs. 5.2 mt). With the increase, the total POP impacts are still projected to be within the annual catch target (ACT; Attachment 1)

2.4. New Makah tribal set-aside attainment projection

The GMT has received an update from the Makah Tribe that they are experiencing higher than anticipated catches of petrale sole in 2011 and 2012. The GMT and Council updated their projections of petrale interactions in the tribal fishery for 2012 in April (Agenda Item I.3.b, Supplemental Tribal Report, April 2012); however, we have recently been made aware that the Makah bottom trawl fishery is encountering more petrale than previously projected. This increased encounter rate coupled with reduced midwater yellowtail opportunities, have resulted in higher than previously anticipated petrale sole catches. The scorecard has been updated with the new projection of 80 mt (Attachment 1). The GMT understands that, while the petrale catch within the Makah usual and accustomed (U&A) fishing grounds is higher than previously projected, the fleet is on a per-vessel limit for the remainder of the year. Catches in excess of the vessel limits will be confiscated by the Tribe and will count against the projected impact in the scorecard.

2.5. At-sea whiting set-asides

Unlike set-asides that are taken as off-the-top deductions after setting the ACL, set-asides for some species are taken from the trawl allocation to accommodate bycatch in the at-sea whiting fisheries (catcher-processor and mothership). Like other set-asides, these catches are not typically managed inseason. Therefore the Council has generally established set-aside amounts high enough to accommodate the historical maximum or any increased catch that is anticipated. Inseason action may be taken if there is a risk of a harvest specification being exceeded, unforeseen impact on another fisheries, or conservation concerns.[1] Potential inseason action for

[1] See 660.150(c)(2)(i)(B)(2)

the at-sea sectors include implementing bycatch reduction areas (BRA) which would prohibit vessels from fishing shoreward of a boundary line approximating the 75-fm, 100-fm or 150-fm depth contours and would be expected to reduce catches of some species.

At this meeting, the National Marine Fisheries Service (NMFS) submitted a letter detailing the catch estimates from the 2011 at-sea fishery (Agenda Item D.5.b, NMFS Letter). Catches in 2011 of arrowtooth flounder, minor slope rockfish north of 40°10 N. latitude, and Other Fish were higher than the 2012 set-aside (Table 8).

The GMT reviewed available data and has not identified concern for exceeding the harvest specifications for these species in 2011 or in 2012, should similar impacts occur again. The GMT will continue to track catches of these species and report back in September.

Table 8. Catches of Other Fish, arrowtooth flounder, and minor slope rockfish north from the at-sea sector in 2011, compared to the 2012 set-asides currently established in regulation (mt).

Species	2012 Set-Aside (mt)	2011 Total (mt)	Difference (mt)	2011 MS (mt)	2011 CP (mt)
Other Fish a/	520	725.8	205.8	85.13	640.71
Arrowtooth Flounder	10	45.2	35.2	7.23	37.98
Minor Slope Rockfish	55	78.8	23.8	4.08	74.73

a/ predominantly dogfish

2.6. California Recreational

The California Department of Fish and Game (CDFG) reported a slight harvest guideline (HG) overage for canary rockfish in 2011. The GMT understands that CDFG is not proposing inseason action at this time for 2012. The management areas north of Point Conception, where canary rockfish are more prevalent, just recently opened. It is also possible that a strong salmon season may reduce effort in the groundfish fishery.

The GMT received a briefing from Russell Porter from Pacific States Marine Fisheries Commission indicating that CDFG data for 2012 is not yet in RecFIN. The GMT understands that estimates should be forthcoming prior to September as CDFG continues to work with RecFIN to resolve data format issues.

2.7. Oregon Recreational

Based on final data through the end of April, the Oregon recreational fishery end of the year projected impacts to canary rockfish for 2012 have increased (Attachment 1), however it is still within the sector specific allocation. Therefore no inseason adjustments to fishery management measures are recommended at this time. The scorecard has been updated with the most current projected impacts.

2.8. Washington Recreational

Washington has examined recreational catch estimates through April 2012 and reports that catch is tracking according to projections and no updates to the overfished species scorecard are proposed for Washington recreational fisheries.

2.9. IFQ carryover inseason considerations

The IFQ carryover provision and the decisions that NMFS has made on it this year involve a mix of legal (authoritative), policy (discretionary), and analytical questions:

1. Are projected overages of an ACL consistent with the Magnuson-Stevens Act? (legal question)
2. Does the annual issuance of surplus carryover, along with projections from other fisheries, create a risk of exceeding an ACL? (analytical)
3. Are the certainty, magnitude, and probability of exceeding the ACL an acceptable risk? (policy choice made within legal parameters based on analytical projections of catch)
4. If an ACL is exceeded, what is the probability that overfishing of the stock would occur? (analytical)
5. Does exceeding an ACL cause a concern from a biological perspective? (analytical)

As a technical advisory body, we are focused on analytical questions. Sometimes, however, it is difficult to focus our analysis when policy objectives and legal parameters are unclear.

The GMT reviewed the analysis conducted on NMFS' decision to issue surplus carryover quota pounds and offers the following comments (Agenda Item D.8.b, NMFS Report).

NMFS decided not to issue carryover for sablefish and whiting. The GMT is concerned that disallowing carryover, while allowing participants to borrow against the following year's quota, could increase the risk of exceeding the ACL.

To elaborate on the increased risk of exceeding the ACL from disallowing the carryover, many fishermen in 2011 assumed that up to 10 percent of their QP could be carried over into 2012. It is therefore likely that some may have adopted fishing strategies that were aimed at attaining 100 percent of their allocation while being less concerned if they did not. That is, they may have been comfortable attaining between 90-100 percent of their allocation under their assumption that carryover pounds would be issued for what they were unable to catch. If so, fishing strategies in 2012 may change because carryover pounds in 2012 will not be issued for these species.

To explain, fishermen may reverse their thinking in some regard and plan to catch *at least* 100 percent of their allocation. They might do so because there is no incentive to catch less than this amount in the absence of the carryover allowance. At the same time, the program would allow them to catch up to 110 percent of their 2012 allocation with any catch over 100 percent of their 2012 allocation deducted from their 2013 allocation (participants can draw from the following year's quota if they go into deficit). It is not clear to us if the analysis NMFS used in deciding to not issue carryover took this factor into account.

If the risk of exceeding an ACL for each species must be taken into account each year before issuing carryover, the GMT recommends that the Council consider the current state of the fishery.

We would note that the uncertainty relative to the annual issuance of carryover might reduce the benefit that the carryover was meant to serve (i.e. uncertainty as to whether annual carryover will be issued). Fishery participants may therefore discount the carryover due to this uncertainty (i.e., the outcome of the review), and if so, will aim to use their full quota each year, as described above.

The GMT reminds the Council that the risk of exceeding an ACL in any year due to issuing carryover would not necessarily constitute overfishing. The overfishing level (OFL) is reduced due to scientific uncertainty to set the acceptable biological catch (ABC) and further reduced based on management uncertainty to set the ACL. This is the ". . . mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery. . ." required under the Magnuson Stevens Act (§303 (15)). We hope to expand on this point somewhat under Agenda Item G.3.

Further, the GMT notes that the SSC has weighed the biological impacts related to the surplus carryover program. Below is an excerpt from the SSC statement (Agenda Item I.3.b, Supplemental SSC Report):

> In the event annual catch limits are inadvertently exceeded, the SSC does not view relatively modest interannual departures from annual ACLs as cause for concern from a biological perspective. Once the trawl rationalization system stabilizes, rollovers to the following year may act to balance rollovers from the previous year. Ensuring that OFLs are not exceeded is an adequate additional constraint to ensure that the annual departures from ACL do not have biological impacts.

2.10. *IFQ fishery catch update*

The following is a "snapshot" of catch, effort, and retention in the shorebased IFQ fishery for the months of January through May of 2011 and 2012. IFQ catch data are available from https://www.webapps.nwfsc.noaa.gov/ifq/ . Total catch and attainment by species category through May 31 of 2011 and 2012 are shown in Table 10. Total catch and attainment are up for most species, compared with the same time in 2011, most notably for petrale sole, whose catch through May increased by 417,936 pounds from 554, 358 pounds in 2011 to 972,294 pounds in 2012, with attainment up 13 percent, from 29 percent in 2011 to 42 percent in 2012. Attainment of Pacific cod and darkblotched rockfish are also slightly higher than the same time last year (up by seven and six percent, respectively). Attainment of longspine thornyheads, north of 40°10' N. latitude and yelloweye rockfish are down slightly.

Total effort, as vessel-days, is up by approximately nine percent overall compared to the same time last year (Table 9), influenced by a 49 percent increase in California. Effort in Washington and Oregon is down slightly, by eight and five percent, respectively.

Retention rates are up for many species categories, including minor shelf rockfish south of 40°10' N. latitude (up 49 percent, from 3 to 52 percent), minor shelf rockfish north of 40°10' N. latitude (up by 37 percent, from 46 to 83 percent), splitnose rockfish, (up 10 percent, from 32 to 42 percent), and ten others by smaller amounts. Five species show decreases in retention, including lingcod (down five percent), minor slope rockfish, north of 40°10' N. latitude (down two percent), longspine thornyheads, north of 34°27' N. latitude, and Pacific ocean perch (both down by one percent), and Pacific whiting (down by 11 percent for this time of year), although that number is not very meaningful, on the cusp of the shoreside whiting season, as the rates cited here are for total IFQ).

Table 9. Shorebased IFQ groundfish effort as vessel days, as of June 1, for 2011 and 2012.

	CA	OR	WA	Total
2011	106	267	55	428
2012	158	262	47	467
Difference	52	-5	-8	39
Percent	149%	98%	85%	109%

Recommendations:

- **Consider increasing the shallow and deeper nearshore trip limits between 40°10' N. latitude and 34°27' N latitude, taking into account the potential increases in overfished species catches. If adopted, regulations should go into effect as soon as possible, through the end of the year.**

- **The GMT recommends increasing the limited entry shelf rockfish trip limit south of 34° 27' N. latitude from “3,000 lb./2 months” to “4,000 lb./2 months” as soon as possible, through the end of the year.**
- **The GMT recommends increasing the limited entry fixed gear trip limits for bocaccio south of 34°27' N latitude from “300 lb./2 mo” to “500 lb./2 mo” as soon as possible, through the end of the year.**

- **The GMT recommends reducing trip limits in the LE sablefish DTL fishery, north of 36° N. latitude from 1,000 pounds per week, not to exceed 4,000 pounds per two months, to 800 pounds per week, not to exceed 1,600 pounds per two months, beginning September 1, 2012, according to Alternative 1, in Table 2, though the end of the year.**

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Table 10. Shorebased IFQ groundfish total catch (lbs.) and attainment (%) by species category, as of June 1, for 2011 and 2012. Catch by the shorebased non-whiting fleet is designated as “NW”, and by the whiting fleet as “W”.

Species Category	2011 NW	2011 W	2011 Total	2011 Allocation	2011 Attain	2012 NW	2012 W	2012 Total	2012 Allocation	2012 Attain	Annual dif.	Attain dif.
Arrowtooth flounder	2,527,990		2,527,990	27,406,105	9%	2,816,716		2,816,716	20,861,131	14%	288,726	4%
Bocaccio rockfish South of 40°10' N.				132,277	0%	4,341		4,341	132,277	3%	4,341	3%
Canary rockfish	244		244	57,100	0%	1,245	4	1,249	57,761	2%	1,005	2%
Chilipepper rockfish South of 40°10' N.	2,122		2,122	3,252,370	0%	131,373		131,373	2,934,904	4%	129,251	4%
Cowcod South of 40°10' N.	8		8	3,968	0%	8		8	3,968	0%	0	0%
Darkblotched rockfish	57,807		57,807	552,997	10%	92,259		92,259	548,808	17%	34,452	6%
Dover sole	7,768,094		7,768,094	49,018,682	16%	7,953,207		7,953,207	49,018,682	16%	185,113	0%
English sole	50,834		50,834	41,166,808	0%	56,195		56,195	21,037,611	0%	5,361	0%
Lingcod	192,815		192,815	4,107,873	5%	220,450	11	220,461	3,991,800	6%	27,646	1%
Longspine thornyheads North of 34°27' N.	868,198		868,198	4,334,839	20%	667,855		667,855	4,219,648	16%	-200,343	-4%
Minor shelf rockfish North of 40°10' N.	4,123		4,123	1,150,813	0%	13,553	19	13,572	1,150,813	1%	9,449	1%
Minor shelf rockfish South of 40°10' N.	410		410	189,598	0%	1,578		1,578	189,598	1%	1,168	1%
Minor slope rockfish North of 40°10' N.	108,130		108,130	1,828,779	6%	147,071		147,071	1,828,779	8%	38,941	2%
Minor slope rockfish South of 40°10' N.	5,605		5,605	831,958	1%	42,770		42,770	831,958	5%	37,165	4%
Other flatfish	317,683		317,683	9,253,683	3%	335,305		335,305	9,253,683	4%	17,622	0%
Pacific cod	84,714		84,714	2,502,247	3%	251,898		251,898	2,502,247	10%	167,184	7%
Pacific halibut (IBQ) North of 40°10' N.	26,125		26,125	257,524	10%	33,902		33,902	232,856	15%	7,777	4%
Pacific ocean perch North of 40°10' N.	29,118		29,118	263,148	11%	47,250		47,250	263,441	18%	18,132	7%
Pacific whiting	107,417		107,417	204,628,442	0%	155,648	137,584	293,232	125,447,480	0%	185,815	0%
Petrale sole	554,358		554,358	1,920,226	29%	972,294		972,294	2,324,995	42%	417,936	13%
Sablefish North of 36° N.	1,497,684		1,497,684	5,613,719	27%	1,442,968		1,442,968	5,438,797	27%	-54,716	0%
Sablefish South of 36° N.	13,555		13,555	1,170,390	1%	33,225		33,225	1,133,352	3%	19,670	2%
Shortspine thornyheads North of 34°27' N.	607,956		607,956	3,156,138	19%	664,363		664,363	3,120,533	21%	56,407	2%
Shortspine thornyheads South of 34Ã‚°27' N.				110,231	0%				110,231	0%	0	0%
Splitnose rockfish South of 40°10' N.	6,006		6,006	3,045,245	0%	25,932		25,932	3,206,513	1%	19,926	1%
Starry flounder	5,463		5,463	1,471,586	0%	6,460		6,460	1,480,404	0%	997	0%
Widow rockfish	1,747		1,747	755,348	0%	14,896	100	14,996	755,352	2%	13,249	2%
Yelloweye rockfish	42		42	1,323	3%	7		7	1,323	1%	-35	-3%
Yellowtail rockfish North of 40°10' N.	36,595		36,595	6,821,455	1%	346,967	2,065	349,032	6,850,556	5%	312,437	5%
Grand Total	14,874,843	0	14,874,843	375,004,872	4%	16,479,736	139,783	16,619,519	268,929,501	6%	1,744,676	2%

Table 11. Total, landed, and discarded catch, with retention rates, for non-whiting trips, in the shorebased IFQ fishery, through June 1 of 2011 and of 2012.

Species category	2011 Total catch	2011 Landed	2011 Discarded	2011 Retention	2012 Total catch	2012 Landed	2012 Discarded	2012 Retention	Retention dif.
Arrowtooth flounder	2,527,990	2,366,271	161,719	94%	2,816,716	2,701,829	114,887	96%	2%
Bocaccio rockfish South of 40°10' N.	0	0	0	NA	4,341	4,341	0	NA	NA
Canary rockfish	244	240	4	98%	1,245	1,239	6	100%	1%
Chilipepper rockfish South of 40°10' N.	2,122	2,037	85	96%	131,373	127,901	3,472	97%	1%
Cowcod South of 40°10' N.	8	8	0	100%	8	8	0	100%	0%
Darkblotched rockfish	57,807	57,043	764	99%	92,259	91,546	713	99%	1%
Dover sole	7,768,094	7,663,019	105,075	99%	7,953,207	7,929,076	24,131	100%	1%
English sole	50,834	44,009	6,825	87%	56,195	51,690	4,505	92%	5%
Lingcod	192,815	190,407	2,408	99%	220,450	206,082	14,368	93%	-5%
Longspine thornyheads North of 34°27' N.	868,198	823,570	44,628	95%	667,855	629,166	38,689	94%	-1%
Minor shelf rockfish North of 40°10' N.	4,123	1,889	2,234	46%	13,553	11,269	2,284	83%	37%
Minor shelf rockfish South of 40°10' N.	410	13	397	3%	1,578	827	751	52%	49%
Minor slope rockfish North of 40°10' N.	108,130	103,190	4,940	95%	147,071	137,281	9,790	93%	-2%
Minor slope rockfish South of 40°10' N.	5,605	5,478	127	98%	42,770	41,917	853	98%	0%
Other flatfish	317,683	292,072	25,611	92%	335,305	327,451	7,854	98%	6%
Pacific cod	84,714	84,698	16	100%	251,898	251,898	0	100%	0%
Pacific halibut (IBQ) North of 40°10' N.	26,125	30	26,095	0%	33,902	120	33,782	0%	0%
Pacific ocean perch North of 40°10' N.	29,118	29,033	85	100%	47,250	46,542	708	99%	-1%
Pacific whiting	107,417	21,455	85,962	20%	155,648	14,037	141,611	9%	-11%
Petrale sole	554,358	552,285	2,073	100%	972,294	971,008	1,286	100%	0%
Sablefish North of 36° N.	1,497,684	1,488,602	9,082	99%	1,442,968	1,434,718	8,250	99%	0%
Sablefish South of 36° N.	13,555	13,208	347	97%	33,225	33,067	158	100%	2%
Shortspine thornyheads North of 34°27' N.	607,956	602,546	5,410	99%	664,363	659,241	5,122	99%	0%
Splitnose rockfish South of 40°10' N.	6,006	1,935	4,071	32%	25,932	10,941	14,991	42%	10%
Starry flounder	5,463	5,175	288	95%	6,460	6,396	64	99%	4%
Widow rockfish	1,747	1,712	35	98%	14,896	14,881	15	100%	2%
Yelloweye rockfish	42	42	0	100%	7	7	0	100%	0%
Yellowtail rockfish North of 40°10' N.	36,595	36,595	0	100%	346,967	346,967	0	100%	0%
Grand Total	14,874,843	14,386,562	488,281	97%	16,479,736	16,051,446	428,290	97%	1%

Attachment 1. Scorecard for June of 2012. Allocations[a] and projected mortality impacts (mt) of overfished groundfish species for 2012.

Fishery	Bocaccio b/		Canary		Cowcod b/		Dkbl		Petrale		POP		Widow		Yelloweye	
***Date*: 24 June 2012**	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts	Allocation a/	Projected Impacts
Off the Top Deductions	13.4	2.4	20.0	18.7	0.3	0.1	18.7	17.2	65.4	97.1	12.8	12.8	61.0	64.9	5.9	5.8
EFPc/	11.0	0.0	1.3	0.0	0.2	0.0	1.5	0.0	2.0	0.0	0.1	0.0	11.0	0.0	0.1	0.0
Research d/	1.7	1.7	7.2	7.2	0.1	0.1	2.1	2.1	17.0	17.0	1.8	1.8	1.6	1.6	3.3	3.3
Incidental OA e/	0.7	0.7	2.0	2.0	--	--	15.0	15.0	1.0	0.1	0.0	0.1	3.3	3.3	0.2	0.2
Tribal f/			9.5	9.5			0.1	0.1	45.4	**80.0**	10.9	10.9	45.0	60.0	2.3	2.3
Trawl Allocations	60.0	60.0	34.8	34.8	1.8	1.8	263.0	263.0	1,060.0	1,060.0	137.0	137.0	491.0	491.0	0.6	0.6
---SB Trawl	60.0	60.0	26.2	26.2	1.8	1.8	248.9	248.9	1,054.6	1,054.6	119.6	119.6	342.1	342.1	0.6	0.6
---At-Sea Trawl			8.6	8.6			14.5	14.5	5.0	5.0	17.4	17.4	147.9	147.9		
a) At-sea whiting MS			3.6	3.4			6.0	6.0			7.2	7.2	61.2	61.2		
b) At-sea whiting CP			5.0	4.8			8.5	8.5			10.2	10.2	86.7	86.7		
Non-Trawl Allocation	189.6	**55.8**	29.8	**21.4**	0.9	0.2	14.0	4.3	35.0	0.0	7.0	0.3	49.0	10.0	10.5	**9.6**
Non-Nearshore	57.9		2.3												1.3	
LE FG				1.5				3.6				0.3		0.1		0.6
OA FG				0.2				0.5				0.0		0.0		0.1
Directed OA: Nearshore	0.7	**0.4**	4.0	**4.8**		0.0		0.2						0.2	1.1	**1.0**
Recreational Groundfish																
WA			2.0	1.0				--		--		--		--	2.6	2.5
OR			7.0	**4.6**				--		--		--		1.0	2.4	2.3
CA	131.0	55.4	14.5	9.3		0.2		--		--		--		8.7	3.1	3.1
TOTAL	263.0	**118.2**	84.6	**74.9**	3.0	2.1	295.7	284.5	1,160.4	**1,157.1**	156.8	150.1	601.0	565.9	17.0	**16.0**
2012 Harvest Specification g/	**274**	**274**	**107**	**107**	**3.0**	**3.0**	**296**	**296**	**1,160**	**1,160**	**157**	**157**	**600**	**600**	**17**	**17**
Difference	11.0	155.8	22.4	32.1	0.0	0.9	0.3	11.5	-0.4	2.9	0.2	6.9	-1.0	34.1	0.0	1.0
Percent of OY	96.0%	43.1%	79.1%	70.0%	100.0%	70.0%	99.9%	96.1%	100.0%	99.8%	99.9%	95.6%	100.2%	94.3%	100.0%	94.1%

Key		
		= not applicable
	--	= trace, less than 0.1 mt
		= Fixed Values
		= off the top deductions

a/ Formal allocations are represented in the black shaded cells and are specified in regulation in Tables 1b and 1e. The other values in the allocation columns are 1) off the top deductions, 2) set asides from the trawl allocation (at-sea petrale only) 3) ad-hoc allocations recommended in the 2011-12 EIS process, 4) HG for the recreational fisheries for canary and YE.

b/ South of 40°10' N. lat.

c/ EFPs are amounts set aside to accommodate anticipated applications. Values in this table represent the estimates from the 11-12 biennial cycle, which are currently specified in regulation.

d/ Includes NMFS trawl shelf-slope surveys, the IPHC halibut survey, and expected impacts from SRPs and LOAs.

e/ The GMT's best estimate of impacts as analyzed in the 2011-2012 Environmental Impact Statement (Appendix B), which are currently specified in regulation.

f/ Tribal values in the allocation column represent the the values in regulation. Projected impacts are the tribes best estimate of catch.

g/ The POP ACL is 183 mt, while the HG is 157 mt

OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT ON THE INDIVIDUAL FISHING QUOTA (IFQ) PROGRAM OFF OREGON

The Oregon Department of Fish and Wildlife (ODFW) examined components of the Individual Fishing Quota (IFQ) Program in Oregon during 2011. Changes in fishing behavior were expected as the west coast groundfish trawl fishery made the transition from a fishery managed using bimonthly trip limits to one managed using IFQ. Changes in fishing behavior and landing statistics were analyzed since the inception of the Shorebased IFQ Program. Some of the potential impacts analyzed include: geographic consolidation of fleets, changes in landings and infrastructure, effort shifts to other fisheries, and changes in gear types used. The purpose of this report is to compare the IFQ fishery off Oregon during 2011 with the limited entry shorebased-trawl fisheries off Oregon during 2006 to 2010 (i.e., pre-IFQ). Note that the 2011 IFQ fishery began January 11th.

This report is intended to supplement IFQ updates that have recently been provided by the National Marine Fisheries Service (NMFS) and the Groundfish Management Team (e.g. Agenda Item F.6.b, Supplemental NMFS Report, March 2012; Agenda Item G.7.b, Supplemental ODFW Report, September 2011). Data was obtained from the Pacific Fisheries Information Network (PacFIN) and from Oregon commercial landing receipts (see Data Sources section). Only data associated with Oregon landings are presented herein. This analysis is limited to limited entry groundfish trawlers and their past and present activities within the limited entry shorebased groundfish trawl fishery, and within other federal and state managed fisheries. It should be noted that trends described in this report for Oregon may differ from patterns observed for Washington and California. Additionally, patterns observed during 2011 may change during subsequent years, as the IFQ fishery evolves, regulations change, Annual Catch Limits (ACLs) change, and as catches in alternative fisheries (e.g., crab and shrimp) fluctuate.

LIMITED ENTRY NON-WHITING IFQ FISHERY

The limited entry non-whiting IFQ fishery is defined as vessels taking part in the IFQ fishery, fishing with a limited entry trawl permit and using either trawl or fixed gear. In 2011, the total non-whiting IFQ groundfish landings, total volume, and the number of processors receiving non-whiting groundfish landings exhibited a decline relative to the previous five years (2006 through 2010) by the limited entry non-whiting "trawl" fleet (LET; 2006-2010; Table 1). The most dramatic changes that occurred during 2011 relative to the historical average were the number of vessels making groundfish landings (28% decline), the number of groundfish landings delivered (47% decline), and the number of processors receiving non-whiting groundfish landings (51% decline), all of which were at the lowest levels recorded over the five year period (Table 1; Figure 1). In contrast, the volume of the average non-whiting IFQ landing per trip increased by 45%, and the average annual vessel revenue increased 39% relative to the 2006-2010 LET average. Interestingly, although the total statewide landing volume decreased by 25% from 2010 to 2011, the total Oregon non-whiting groundfish revenue remained approximately the same (<1%change); suggesting overall increased product value between the two years. Even though fewer vessels made fewer landings during the 2011 IFQ fishery, the average landing size and revenue per trip increased relative to the previous five years (Table 1; Figure 1).

Table 1. Oregon landings statistics, by year, of the non-whiting groundfish trawl fishery (2006-2010) and the non-whiting IFQ fishery (2011). For each landing statistic, percent change (% Δ) represents the percentage increase or decrease in 2011, relative to the 2006 to 2010 historical average. Source: Data were obtained from PacFIN.

	2006	2007	2008	2009	2010	2011	% Δ
Vessels (No.)	73	76	75	79	71	54	-28%
Trips (No.)	1,114	1,131	1,272	1,514	1,212	668	-47%
Avg Trip Size (lbs)	21,755	24,870	27,502	24,776	27,285	36,631	45%
se	402	492	506	441	544	918	--
Avg Vessel Revenue ($)	188,095	197,181	265,983	240,028	232,036	312,209	39%
se	13,819	13,923	17,474	16,527	19,215	30,954	--
Processors (No.)	12	11	12	13	13	6	-51%
Total Volume (lbs)	24,235,145	28,127,776	34,982,347	37,511,575	33,069,924	24,469,544	-22.5%
Total Revenue ($)	13,730,931	14,985,729	19,948,777	18,962,235	16,474,552	16,859,299	0.2%

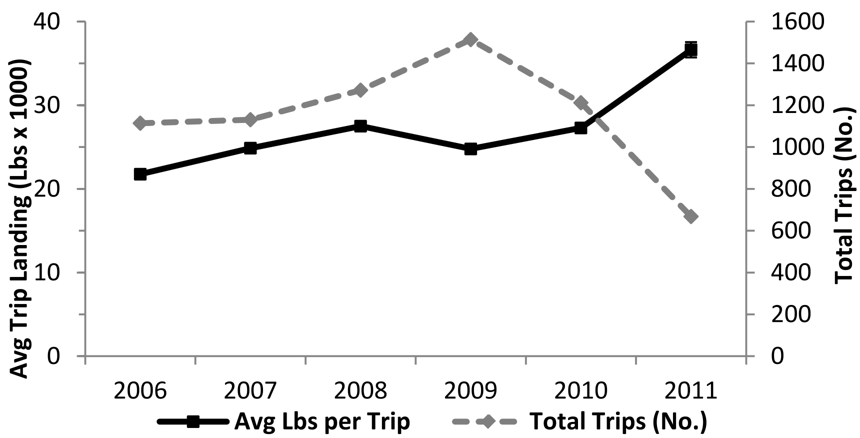


Figure 1. Average (±SE) non-whiting landing volume per trip (pounds) and total number of non-whiting trips per year, in the non-whiting groundfish trawl fishery (2006-2010) and the non-whiting IFQ fishery (2011) off Oregon. Source: Data were obtained from PacFIN.

Species Composition of Catches:

As noted in previous reports, the composition of landed species has changed in 2011 (Agenda Item F.6.b, Supplemental NMFS Report, March 2012), relative to the historical 2006 to 2010 average. Eight of the top ten non-whiting species landed showed decreases in 2011 landings (pounds), compared with the historical average (2006-2010; Table 2). Yellowtail landings increased by 2,392% in 2011, while Pacific cod increased by 289%, making up the largest changes in landing volume in the non-whiting fishery (Table 3). Four other species that increased 2011 landings over 100% greater than historical numbers: widow rockfish (173%), spiny dogfish (171 %), greenstriped rockfish (163 %), and lingcod (130 %).

Table 2. The top ten species landings (pounds) in 2011, for the non-whiting IFQ fishery (2011), along with average total landing volume in the non-whiting trawl fishery (2006-2010) off Oregon. For each species, percent change (% Δ) represents the percentage increase or decrease in 2011, relative to the 2006 to 2010 historical average. Source: Data were obtained from PacFIN.

Rank	Species	06-10AVG Lbs	2011 Lbs	%Δ
1	Dover sole	13,519,845	10,374,825	-23.3%
2	Arrowtooth flounder	4,512,321	3,558,295	-21.1%
3	Sablefish	3,852,276	2,766,192	-28.2%
4	Skate (Unspecified)	1,945,234	1,689,107	-13.2%
5	Petrale sole	2,359,722	1,131,812	-52.0%
6	Shortspine thronyheads	1,524,452	840,454	-44.9%
7	Longspine thornyheads	1,095,687	754,905	-31.1%
8	Yellowtail RF	25,484	634,965	2391.6%
9	Rex sole	797,366	587,120	-26.4%
10	Pacific cod	136,961	532,636	288.9%

Table 3. The top ten species with the greatest percent increase (%Δ) in 2011 landings (pounds), relative to the 2006 to 2010 historical average, in the Oregon non-whiting trawl fishery (2006-2010) and the non-whiting IFQ fishery (2011). Only landings greater than, or equal to, 1000 pounds were reported. Source: Data were obtained from PacFIN.

Rank	Species	06-10 AVG (Lbs)	2011 (Lbs)	%Δ
1	Yellowtail RF	25,484	634,965	2391.6%
2	Pacific cod	136,961	532,636	288.9%
3	Widow RF	8,267	22,544	172.7%
4	Spiny dogfish	62,064	168,422	171.4%
5	Greenstriped RF	5,926	15,572	162.8%
6	Lingcod	133,473	307,490	130.4%
7	Sand sole	75,287	142,915	89.8%
8	Canary RF	2,526	4,548	80.1%
9	Aurora RF	14,410	25,424	76.4%
10	Redbanded RF	4,610	6,995	51.7%

Ports

Oregon ports were categorized into four port groups: Astoria (Astoria, Cannon Beach, Gearhart/Seaside, Tillamook/Garibaldi, Pacific City, Nehalem Bay, Netarts, and Salmon River), Newport (Depoe Bay, Newport, Siletz Bay, Waldport, and Yachats), Coos Bay (Bandon, Charleston, Coos Bay, Florence, and Winchester Bay), and Brookings (Brookings, Gold Beach, and Port Orford). Port groupings match those used in the Environmental Impact Statement for Amendment 20 (http://www.pcouncil.org/wp-content/uploads/TRatFEIS_chapter_three_June2010.pdf) to the Groundfish Fishery Management Plan. Not all ports listed have trawl or fixed gear activity. The four Oregon port groups differ markedly in terms of their commercial fisheries overall, and in their trawl and fixed gear activity from 2006 through 2011. In 2011, the most dramatic change occurred in Newport, which saw a 57 % decrease in the total non-whiting groundfish pounds landed, relative to the historical average, but only saw a slight decline in ex-vessel revenues (-3.1 %; Figure 2; Table 4). Coos Bay had the largest revenue decline (-21 %), relative to the historical average, and had a 36 % decline in total volume landed. Astoria and Brookings had the least dramatic changes in landing volume and revenue during 2011 (Table 4).

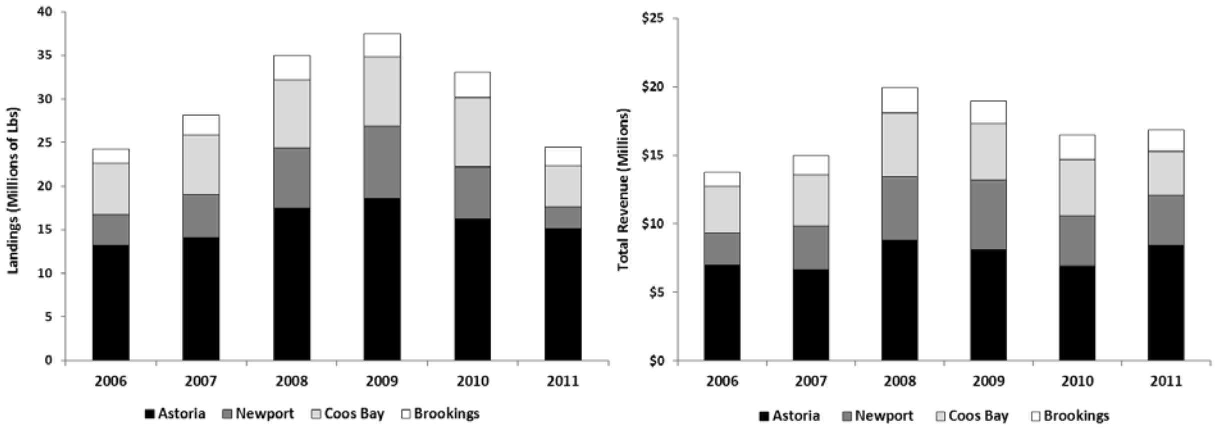


Figure 2. Distribution of landings (pounds) and revenue (dollars), by port group and year, for the non-whiting trawl fishery (2006-2010) and the non-whiting IFQ fishery (2011) off Oregon. Source: Data were obtained from PacFIN.

Table 4. Distribution of landings (pounds; top) and revenue (dollars; bottom), by port group and year, for the non-whiting trawl fishery (2006-2010) and the non-whiting IFQ fishery (2011) off Oregon. For each landing statistic, percent change (% Δ) represents the percentage increase or decrease in 2011, relative to the 2006 to 2010 historical average. Source: Data were obtained from PacFIN.

Landings (Lbs)

Port	2006	2007	2008	2009	2010	2011	% Δ
Astoria	13,224,114	14,079,818	17,456,961	18,575,470	16,180,179	15,140,046	-4.8%
Newport	3,521,190	4,950,653	6,913,831	8,317,743	6,002,899	2,535,895	-57.3%
Coos Bay	5,894,310	6,778,081	7,794,861	7,976,112	7,973,905	4,661,903	-36.0%
Brookings	1,595,531	2,319,224	2,816,694	2,642,250	2,912,941	2,131,700	-13.3%

Revenue ($)

Port	2006	2007	2008	2009	2010	2011	% Δ
Astoria	$6,958,858	$6,673,146	$8,797,883	$8,078,028	$6,929,717	$8,429,872	12.6%
Newport	$2,332,956	$3,151,896	$4,641,912	$5,104,188	$3,662,963	$3,661,220	-3.1%
Coos Bay	$3,415,723	$3,756,518	$4,635,452	$4,164,098	$4,085,658	$3,175,949	-20.8%
Brookings	$1,023,380	$1,404,169	$1,873,503	$1,615,927	$1,796,214	$1,592,258	3.2%

Gear Switching

In the West Coast Groundfish IFQ Program, the ability to utilize fixed gear to harvest quota pounds, also known as gear switching, has increased participation of IFQ vessels using fixed gear (i.e., both trawl vessels switching to fixed gear for certain trips and traditional fixed gear vessels purchasing “trawl” permits and entering the IFQ fishery). Of the 54 vessels participating in the IFQ fishery in Oregon during 2011, 43 solely used trawl gear to make non-whiting groundfish landings, 9 vessels used only fixed gear to make IFQ landings, and two vessels made IFQ landings using both fixed gear and trawl gear (Table 5). Interestingly, fixed gear landings accounted for 20% of the non-whiting IFQ revenues, but only 3% of the total pounds landed. Furthermore, fixed gear harvested 33% of the total Oregon IFQ sablefish landings and earned 55% of IFQ sablefish revenues. In contrast, trawlers harvested 67% of the Oregon IFQ sablefish volume, but earned 45% of the revenues (Table 6). High sablefish prices were the driving factor in the large percentage of revenue earned by the IFQ-fixed gear fishermen (Figure 3). Sablefish is a high value species and prices have increased substantially over the past five years (Figure 3). Furthermore, gear type influences the sablefish ex-vessel value. In 2011, fixed gear vessels earned a higher price per pound than did trawl vessels (Figure 3). Sablefish landed by fixed gear are generally larger than those landed by trawlers (Figure 3), and price per pound increases as grade increases (Table 5). Differences in size selectivity between trawl-caught and longline or pot-caught sablefish is described in the sablefish stock assessment (www.pcouncil.org/wp-content/uploads/G4a_ATT9_STATUS_SABLEFISH_SEPT2011BB.pdf).

Table 5. Average price per pound by gear type and sablefish grade, in the limited entry fixed gear and 2011 non-whiting IFQ fishery. Fixed gear includes hook and line and pots. Source: Data were obtained from PacFIN.

Grade	Fixed	Trawl
Extra small	$1.94	$1.29
Small	$2.38	$1.82
Medium	$2.73	$2.13
Large	$3.06	$2.53

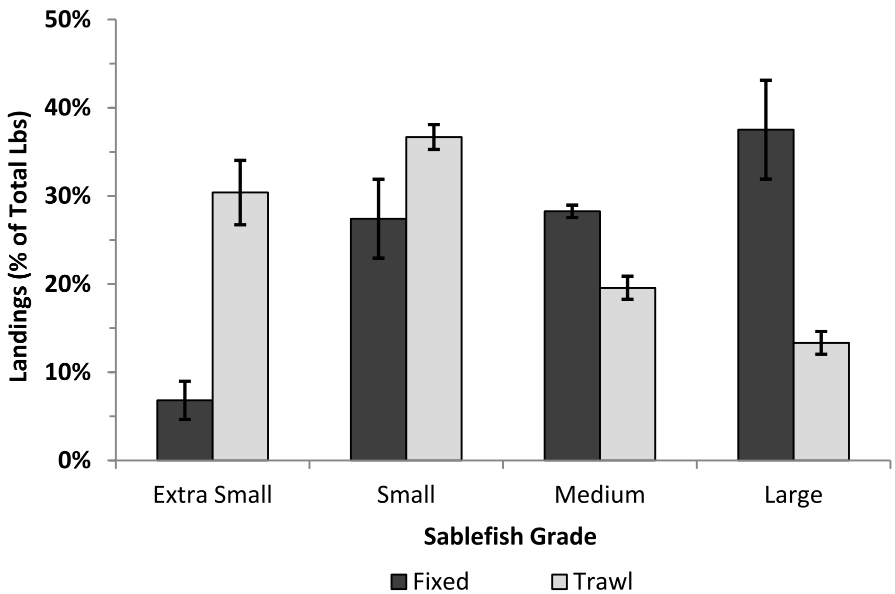


Figure 3. Average (2006-2011) proportion (±SE) of total sablefish landings by gear type and sablefish grade, in the limited entry fixed gear and non-whiting IFQ fishery. Fixed gear includes hook and line and pots. Source: Data were obtained from PacFIN.

The number of IFQ vessels gear switching varies by port group, with Newport having a substantially higher IFQ fixed gear sablefish landing volume, relative to all other Oregon port groups (Figure 4). It should be noted that this is a large shift from historical landing patterns in Newport. From 2006 to 2010, Newport trawlers made roughly half of sablefish landings, while limited entry fixed gear vessels comprised the other 50%. In 2011, vessels using fixed gear (IFQ and non-IFQ) landed 85% of the Newport sablefish, whereas trawlers landed only 15%.

Table 6. Groundfish landings, revenue, and number of IFQ trips and vessels, by gear type, in the 2011 non-whiting IFQ fishery. Fixed gear includes hook and line and pots. Note that two vessels used both fixed and trawl gear during 2011. Source: Data were obtained from PacFIN.

Gear Type	Vessels (No.)	Total Volume(Lbs)	Total Revenue($)	Total Trips (No.)	Avg Trip Revenue ($)
Fixed	11	714,692	2,762,955	62	44,564
Trawl	45	23,754,852	14,096,344	606	23,135

Table 7. Sablefish landings, revenue, and number of IFQ trips and vessels, by gear type, in the 2011 non-whiting IFQ fishery. Fixed gear includes hook and line and pots. Note that two vessels used both fixed and trawl gear during 2011. Source: Data were obtained from PacFIN.

Gear Type	Vessels (No.)	Total Volume (Lbs)	Total Revenue($)	Total Trips (No.)	Avg Trip Revenue ($)
Fixed Gear	11	688,497	2,746,884	62	$44,305
Trawl Gear	45	2,078,065	4,959,453	565	$8,778

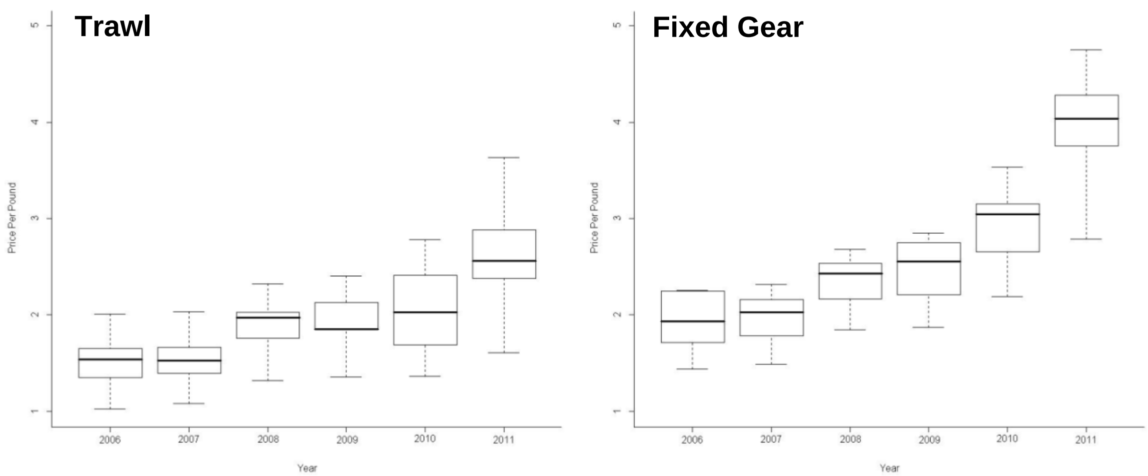


Figure 4. Average price per pound of sablefish, by year, during the limited entry trawl and fixed gear fisheries (2006-2010) and the IFQ fishery (2011) off Oregon. Note that in 2011, the fixed gear fishery includes sablefish from the limited entry fixed gear fishery and from the IFQ fishery. Source: Data were obtained from PacFIN.

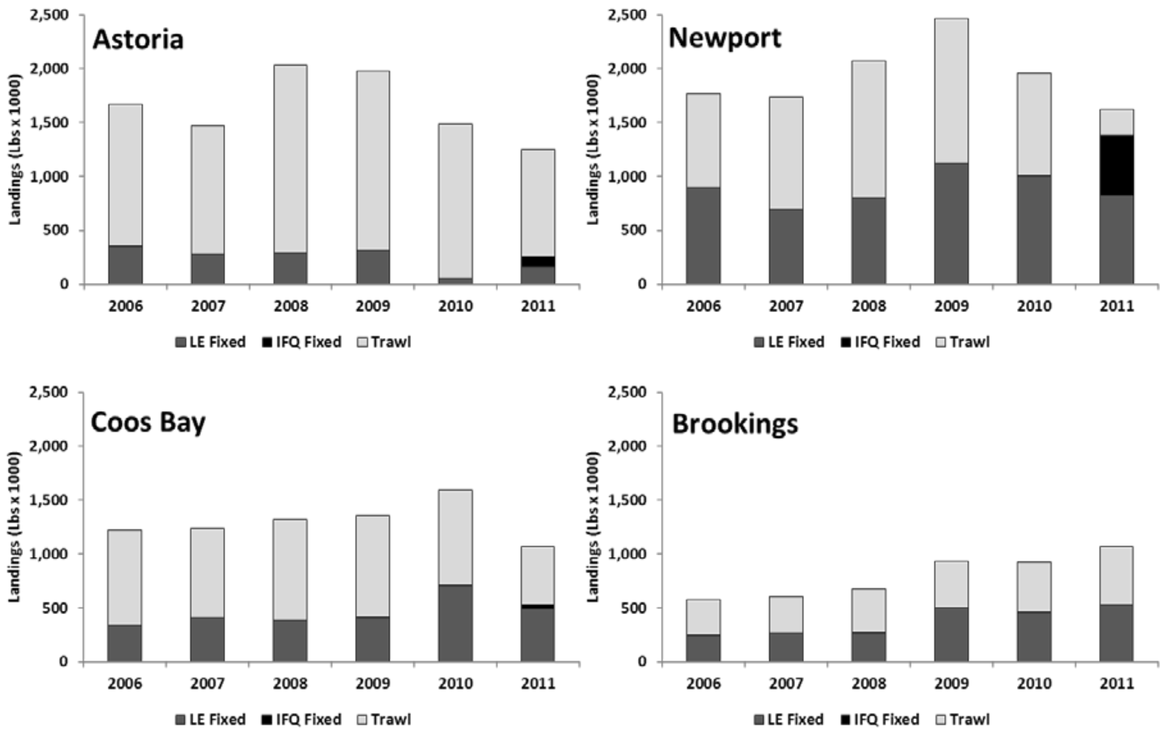


Figure 5. Sablefish landings (pounds), by port and gear type in the limited entry trawl and limited entry fixed gear fisheries from 2006 to 2011, in addition to the IFQ fishery. Note that 2011 includes IFQ landings for trawl and fixed gear, in addition to non-IFQ LE fixed gear landings. Fixed gear includes longline and pot gear. Source: Data were obtained from PacFIN.

LIMITED ENTRY SHORESIDE WHITING (IFQ)

The number of limited entry shoreside whiting vessels making landings in Oregon declined from 26 in 2010 to 22 in 2011 (Table 8). The average number of vessels from 2006 to 2010 was also 26. Shoreside IFQ whiting vessels made more numerous, larger volume trips during 2011 than shoreside whiting vessels did during 2006-2011 (Table 8). The result is substantially higher revenues per trip in 2011 than during the previous five years (Figure 7). Overall, prices were higher in 2011 ($0.11/pound) relative to the historical average ($0.07/pound). Interestingly, the 2011 trends may mirror patterns observed during 2008, when the whiting price was also high ($0.11/pound), which is correlated with high average trip revenues. Landing volumes per trip remained relatively consistent from 2006 to 2010 (mean = 174,000±2,000 pounds/trip), but spiked in 2011 (mean = 205,000±3,000 pounds/trip). Average trip revenue nearly doubled in 2011 ($22,000±300), relative to the 2006-2010 average ($12,600±150). In conjunction with vessel declines, the number of participants in the processing sector decreased from 10 (2006-2010 average) to seven (2011; Table 8). At the community level, Astoria, Newport, and Coos Bay all had fewer processors in 2011.

The whiting fleet exhibited lower landing volumes at the beginning of the season, but by July 2011, landing volumes had surpassed the five year average (2006-2010; Figure 8). The delayed start is most likely attributed to the new management program. In other words, under the West Coast Groundfish IFQ Program, participants may catch their quota at any time during the year, rather than race for fish in the derby-style fishery that had occurred for this fleet prior to IFQ.

The flexibility of the IFQ program allows fishermen the opportunity to fish during more optimal weather conditions, to fish in other fisheries during early summer, and/or delay their whiting season until later in the season when larger fish will be caught. In addition, it allows these fishermen to work with processors, and deliver catches over a longer period of time without saturating the markets. This flexibility may impact the price paid for the product. Only 12% was harvested during the second quarter of 2011, compared with 32% ± 11 on average, from 2006-2010. Nearly 80 % of total volume was landed from July through September (Q3) 2011, compared with 59 % ± 8 during Q3 of 2006-2010 (average; Figure 9). Additionally, 2011 had the most active fishing days in the past 17 years.

Table 8. Number of participating vessels, trips, average landing, and revenue per trip, in the directed shoreside whiting fishery (2006-2010) and the IFQ whiting fishery (2011). Source: Data were obtained from PacFIN.

Year	Vessels	# trips	avg lbs/trip	se	revenue/trip	se	Processors
2006	24	757	178,932	3,118	10,649	186	10
2007	25	561	169,040	3,929	11,774	288	9
2008	27	344	181,010	4,622	19,993	521	9
2009	26	345	183,385	4,416	11,157	355	11
2010	26	445	157,975	3,640	12,615	361	10
2011	22	736	204,791	2,718	22,922	332	7

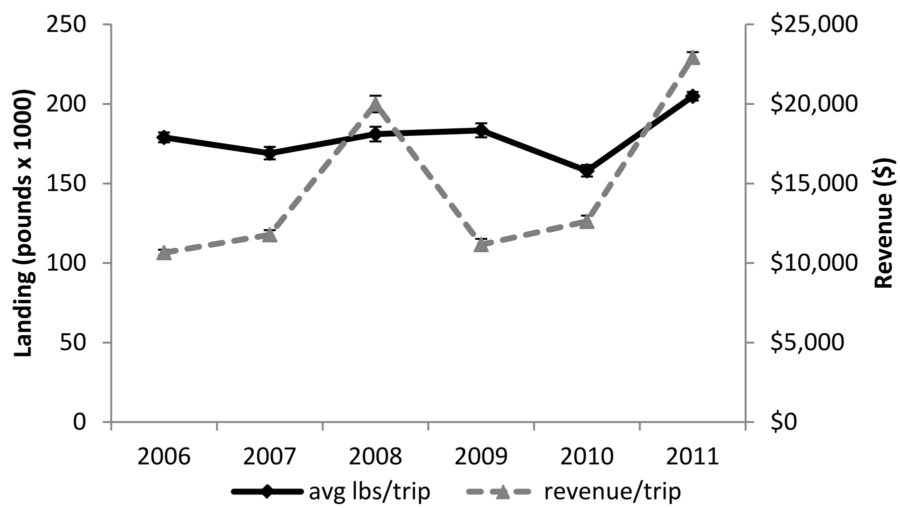


Figure 6. Average landing volume (±SE) and revenue per trip (±SE) of the directed shoreside whiting fleet (2006-2010), and the IFQ whiting fishery (2011). Source: Data were obtained from PacFIN.

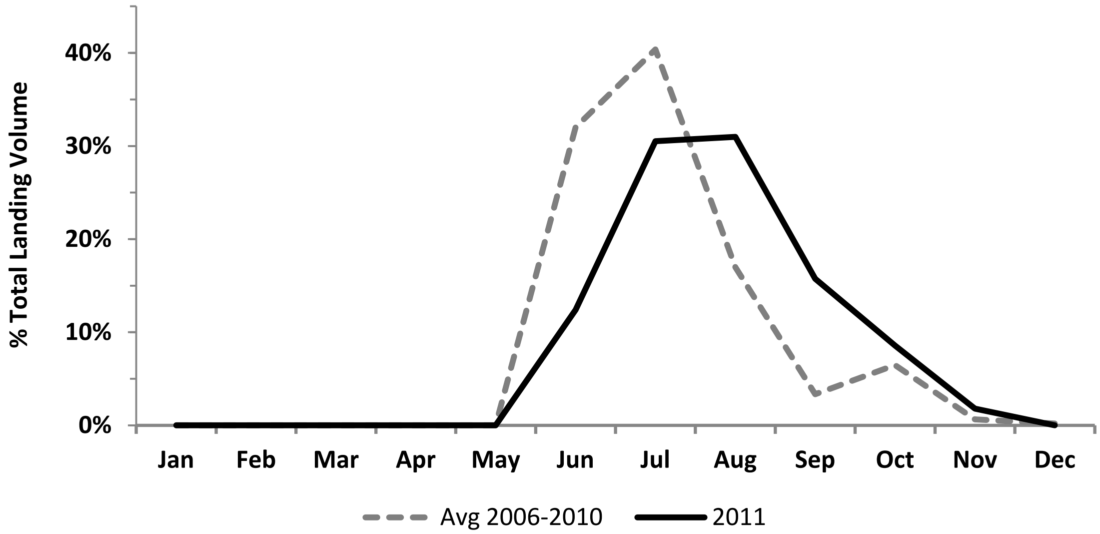


Figure 7. Monthly landings (% of total) by the shoreside, directed whiting fishery, for 2006-2010 and 2011. Source: Data were obtained from PacFIN.

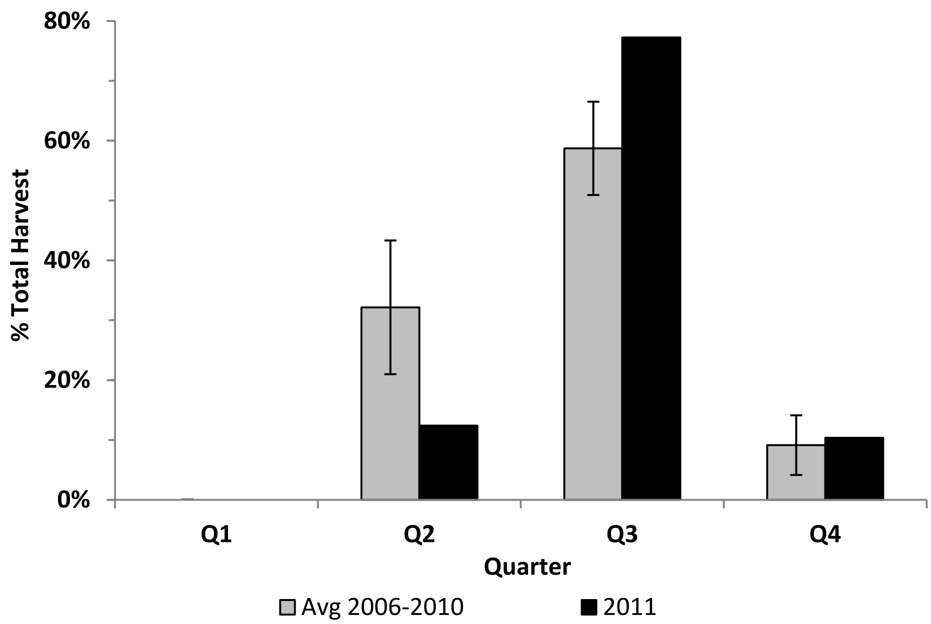


Figure 8. Quarterly landings as a percentage of total annual harvest by the shoreside, directed whiting fleet in the West Coast Groundfish IFQ Fishery in 2011, compared with the historical average (±SE) of the Limited Entry Trawl fleet in 2006-2010. Source: Data were obtained from PacFIN.

Overall, there has not been a huge shift in whiting delivery patterns among Oregon ports. However, note that smaller ports will be differentially impacted by slight delivery pattern shifts, than will larger ports. In 2011, Astoria and Newport showed an increased in number of vessels making directed whiting landings, relative to the historical mean (mean=13 vessels for both) while Coos Bay saw a decline (average = 3; Table 9). Astoria saw increased revenues in 2011, while Newport saw a decline (Figure 10).

Table 9. Vessel participation, by year and port, for the shoreside, directed whiting fleet during 2006-2011. Note that vessels may have landed in multiple ports. Source: Data were obtained from PacFIN.

Year	Astoria	Newport	Coos Bay
2006	11	10	3
2007	10	14	3
2008	15	15	3
2009	12	11	3
2010	15	14	4
2011	17	15	2

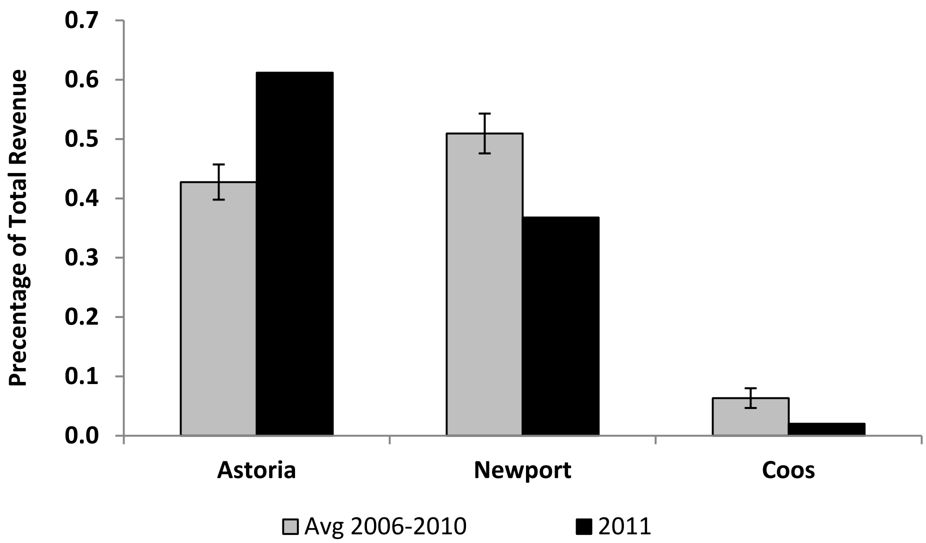


Figure 9. Port landings as a percentage of total annual Oregon harvest by the shoreside, directed whiting fleet in the West Coast Groundfish IFQ Fishery in 2011, compared with the historical average (±SE) of the Limited Entry Trawl fleet in 2006-2010. Source: Data were obtained from PacFIN.

SPILLOVER FROM IFQ TO STATE FISHERIES

One key component of the IFQ fishery is the added flexibility that allows participants to fish during optimal conditions (e.g. ideal weather or high market prices), no longer constraining them to bimonthly trip limits; ultimately ending what was once a derby style fishery. When constrained by trip limits, participants were required to fish during specific management windows, otherwise the catch was forgone. This limited the amount of effort that could be put towards harvesting in other fisheries. The IFQ program allows more flexibility for participants to fish in other fisheries, which may result in an effort shift, or spillover.

One specific example is the spillover of vessels holding limited entry trawl permits into state managed fisheries, specifically pink shrimp and Dungeness crab. Historically, many limited entry trawl permit holders participated in a combination of groundfish, pink shrimp, and/or crab fisheries, although groundfish trip limits limited the amount of time that these trawlers could spend to change gear and participate in state managed fisheries. With the inception of the IFQ program, participants are no longer as constrained by the opportunity costs associated with switching from one fishery to another. For example, IFQ participants are able to operate in the Dungeness crab fishery when crab season peaks during the first quarter, without forgoing any groundfish landings. In the same respect, IFQ participants are able to shrimp during the peak season (second and third quarter) and wait to harvest IFQ quota pounds until after shrimping subsides. Additionally, if it is more economically beneficial to harvest groundfish, IFQ fishermen can leave state fisheries and return to harvesting IFQ quota pounds. There is also the opportunity to sell quota pounds of groundfish to other IFQ permit holders, and choose not to fish groundfish at all, but rather participate in other fisheries or ventures (e.g., state fisheries, Alaska fisheries, research, etc.).

Pink Shrimp

In 2011, the Oregon pink shrimp fishery had the highest landing volume (48.3 million pounds) since 1989 (http://www.dfw.state.or.us/MRP/publications/docs/shrimp_newsletter2012.pdf), which coincided with the increase in shrimp volume landed by IFQ participants (Figure 6). The total number of participants in the shrimp fishery increased from 54 (2010) to 62 vessels (2011), although the number of IFQ/LET vessels that participated in the pink shrimp fishery decreased from 29 (2010) to 24(2011), while the number of non-IFQ/LET vessels increased by 13 vessels between 2010 and 2011 (Table 10). Furthermore, even though 2011 was an exceptional pink shrimp year, LET/IFQ participants landed the lowest proportion of total shrimp volume since 2007, which comprised 54% of the landing volume. This spillover behavior contrasts with what was anticipated at the inception of the IFQ program. Because of the exceptional 2011 shrimp harvest, it was expected that the number of LET/IFQ participants in the shrimp fishery would show a proportional increase, relative to the number of non-LET/IFQ participants. Even though this result is surprising, it must be pointed out that this analysis is based on one shrimp season and patterns that have emerged during 2011 may change in future seasons.

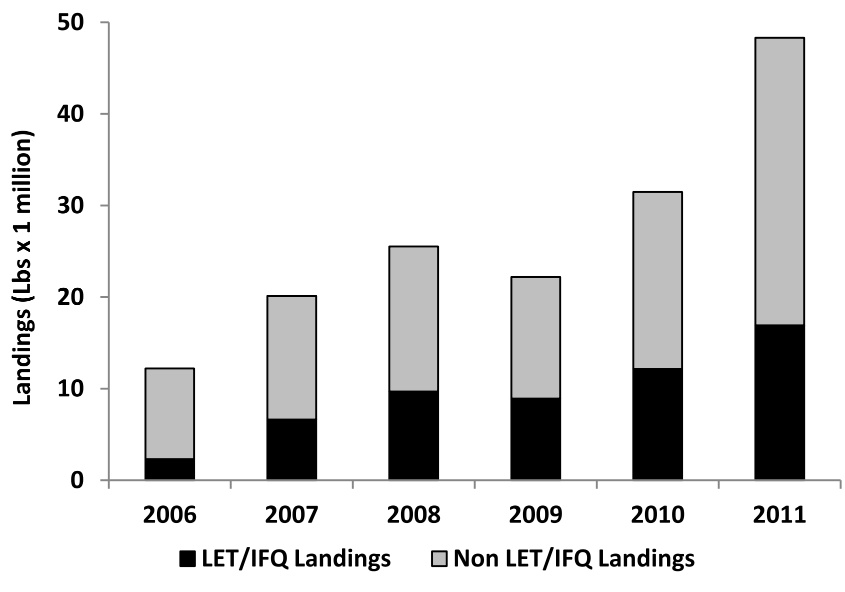


Figure 10. Shrimp landings (pounds) by participants in the Oregon Pink Shrimp fishery with and without limited entry trawl (2006-2010) and IFQ (2011) permits. Source: Data were obtained from PacFIN and from Oregon state commercial landing receipts (ODFW).

Table 10. Oregon pink shrimp landings statistics, by year, of the non-whiting groundfish trawl fishery (2006-2010) and the non-whiting shoreside IFQ fishery (2011). Source: Data were obtained from PacFIN and from Oregon state commercial landing receipts (ODFW).

Year	LET/IFQ Vessels	Non LET/IFQ Vessels	LET/IFQ Trips (No.)	Non LET/IFQ Trips (No.)	LET/IFQ Landings	Non LET/IFQ Landings	% LET/IFQ of Non LET/IFQ Landings
2006	12	25	92	384	2,313,501	9,881,954	23%
2007	22	23	244	471	6,620,229	13,504,720	49%
2008	29	29	312	508	9,678,734	15,841,872	61%
2009	23	27	214	372	8,919,990	13,258,365	67%
2010	29	25	288	446	12,174,336	19,288,570	63%
2011	24	38	349	681	16,904,719	31,409,316	54%

Dungeness Crab

IFQ participants in the Dungeness crab fishery exhibited a similar pattern to shrimp. The 2011-2012 crab season (December to May 31) had the fewest LET/IFQ participants and the lowest landing volumes in the past six seasons. Furthermore, among IFQ/LET participants there was a 34% decline in the number of vessels and the number of landings, along with a 57% decline in revenues from the 2010-11 season to the 2011-12 season (Table 11). However, the overall Dungeness crab fishery price per pound increased from \$2.30 to \$2.93 per pound during the same time period. The non-IFQ crab fleet participation decreased by 6%, landings decreased by 29%, and revenues by 7%. This is a stark contrast to the behavior exhibited during the 2010-2011 season, which had the most IFQ participants in the Dungeness crab fishery and the largest landing volumes since the 2005-2006 season. The increased effort during the 2010-2011 season may be attributed to the unfamiliarity with the new IFQ program and the delayed start (January 11th, 2011), combined with an exceptional Dungeness crab season. The patterns observed during the most recent season (2011-12) suggest an economic threshold for when to fish in the Dungeness crab fishery, or when to catch IFQ groundfish.

Table 11. Oregon Dungeness Crab landings statistics, by year, of the non-whiting groundfish trawl fishery (2005-2010) and the non-whiting shoreside IFQ fishery (2011-2012). Source: Data were obtained from PacFIN and from Oregon state commercial landing receipts (ODFW). Note that the crab seasons in this report run from December to May 31).

Crab Season	IFQ/LET Vessels (No)	Non IFQ/LET (No)	IFQ/LET Landings (Lbs)	Non IFQ/LET Landings (Lbs)	%IFQ/LET of Non-IFQ/LET Landings	Total IFQ/LET Crab Revenue ($)	Avg Price/ Pound ($)
2005-06	32	285	4,082,576	22,832,639	18%	$6,136,001	$1.57
2006-07	32	300	2,132,564	12,789,448	17%	$4,249,637	$2.18
2007-08	30	282	1,847,183	10,288,589	18%	$4,093,118	$2.39
2008-09	30	278	1,564,438	11,170,965	14%	$2,699,109	$2.01
2009-10	37	284	3,491,930	19,521,607	18%	$6,272,121	$1.93

2010-11	38	303	3,304,457	17,641,649	19%	$6,906,049	$2.30
2011-12	25	284	1,164,044	12,613,230	9%	$2,964,461	$2.93

DISCUSSION AND POTENTIAL MANAGEMENT IMPLICATIONS

In 2011, both the non-whiting and directed whiting West Coast Groundfish IFQ fleets exhibited declines in vessel participation and processing sector participation. Whiting vessels made more frequent, larger volume trips while the non-whiting IFQ fleet made less frequent, albeit larger landing trips. In 2011, the non-whiting sector had the highest average ex-vessel revenues in the past five years, although statewide groundfish revenues are approximately the same as the historical average (2006-2010). One possible reason for high average ex-vessel revenues is the increased value of some IFQ species, such as sablefish. High sablefish prices may be a function of increased international demand, combined with curtailed production in Japan, due to tsunami effects. One key component of the IFQ program is the use of fixed gear to fish IFQ species quota, also referred to as gear switching. Sablefish caught with fixed gear earns a higher price per size category for fixed gear, relative to trawl caught sablefish. In 2011, there were 11 vessels in Oregon that solely utilized fixed gear to fish IFQ quota pounds. Ports were differentially impacted by this influx in fixed gear fish with the most dramatic change occurring in Newport. Newport was historically a trawl dominated port, and has now shifted to a fixed gear dominated port. In addition to the opportunity for fixed gear use, IFQ participants may also choose to participate, or spillover, into other fisheries, as they are no longer constrained by trip limits and thus, the opportunity costs associated with switching from one fishery to another.

One specific example is the spillover into state managed fisheries, specifically pink shrimp and Dungeness crab. Interestingly, even though 2011 was an exceptional pink shrimp year, LET/IFQ participants landed the lowest proportion of total shrimp volume since 2007. This spillover behavior contrasts with what was anticipated at the inception of the IFQ program. IFQ participants in the Dungeness crab fishery exhibited a similar pattern to shrimp. The 2011-2012 crab season had the fewest LET/IFQ participants and the lowest landing volumes in the past six seasons. This is a stark contrast to the behavior exhibited during the 2010-2011 season, which had the most participants and the largest landing volumes since the 2005-2006 season. The increased effort during the 2010-2011 may be attributed to the unfamiliarity with the new IFQ program and the delayed start (January 11th, 2011), combined with an exceptional Dungeness crab season. The drop in IFQ participants in both the shrimp and crab fisheries indicate that there is an economic threshold for when to fish in the state managed fisheries, or when to fish IFQ groundfish.

DATA SOURCES

Data in this report were derived from multiple sources: groundfish landings data for 2011 through March 2012 were obtained from the Pacific Fisheries Information Network (PacFIN) data base. Data from 2006 through 2010. State managed fisheries data, which includes Dungeness crab and pink shrimp, were obtained from Oregon commercial paper landing receipts. The revenue described in this report refers to ex-vessel revenue and is not adjusted for inflation. Shoreside whiting and non-whiting IFQ trips were delineated by two factors: gear type and proportion of Pacific whiting catch on a given landing. In other words, if trawl gear was used to catch greater than 50 percent Pacific whiting, then that trip was designated as a shoreside whiting trip and that data is summarized in the Pacific whiting section of this report. All other landings by vessels using trawl gear with a limited entry permit were considered part of the shoreside non-whiting fleet from 2006 to 2010. In 2011 and 2012, shoreside whiting and non-whiting IFQ landings were identified via electronic landing receipts a. It should be noted that 2011 IFQ landings were made using trawl gear and fixed gear (which includes longline and pot gear). Fixed gear landings were delineated as either limited entry, non-nearshore fixed gear landings or as IFQ fixed gear landings for this analysis. Analysis based on the limited entry, non-nearshore fixed gear fishery (e.g. non-IFQ fixed gear landings) are specified herein, and all other fixed gear landings were made under the IFQ program. Commercial Oregon fish tickets were used to obtain state managed fisheries data (Dungeness crab and pink shrimp). Because the 2011 and 2012 information is recent this data may change slightly as updates are made.

Mr. Dan Wolford, Chairman

Pacific Fisheries Management Council

I am writing concerning surplus Carry-Overs for Whiting, Northern Sable fish and Southern Sablefish.

NMFS disallowed the carry over for Whiting, Northern Sablefish and Southern Sablefish. Their reasons were that the IFQ trawl fleet would exceed the ACL s in the following year if they made these carry overs and we would violate our whiting treaty .

Looking at the harvest for whiting in the year 2011, 18% of the total ACL was left in the water. The IFQ trawl sector is the only sector which is allowed to roll fish over from one year to the next. The Whiting shore side sector left .017% of the sectors fish in the water. There was 5% of the northern sable fish and 8% of the southern sable fish left in the water. IFQ share holders are allowed to roll over 10% of what they caught and what is left in there IQ accounts. A lot of what is left over is in accounts that were never used so it is only ten percent. The point I am trying to make is that what wasn't caught won't all be carried over. So we are talking less than it appears.

What makes this so upsetting is that I made business plans based on the carry-over provisions in the IFQ fishery. If I would have been told last year that NMFS was not going to allow carry-overs for whiting and Northern Sable fish I would not have left any fish in my accounts, but we had been told that this was a provision of this program. I feel that NMFS is sending the wrong message to the fleet,from now on I am going to fish my accounts in to a deficit. I believe this will lead us to exceed our ACLs not carry overs.

I believe that the council also believes that carry-overs are an important part of the IQ program and I am requesting the council to ask NMFS to reconsider their decision on carry overs.

Mark Cooper, President

Cooper Fishing, Inc

Agenda Item D.9
Situation Summary
June 2012

FINAL 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

This is the final step at this meeting in the process to adopt final harvest specifications and management measures, including allocations, for 2013-2014 groundfish fisheries. Under Agenda Item D.5, the Council is scheduled to adopt tentative harvest specifications, including rebuilding plans and management measures. The Council task under this agenda item is to confirm or modify action taken under Agenda Item D.5 for implementation in 2013-2014.

Council Action:

1. **Adopt final harvest specifications, including rebuilding plans.**
2. **Adopt final management measures, including allocations.**

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — John DeVore and Kelly Ames
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Adopt Final 2013-2014 Biennial Harvest Specifications and Management Measures

PFMC
05/22/12

GROUNDFISH ADVISORY SUBPANEL REPORT ON FINAL 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The Groundfish Advisory Panel (GAP) heard presentations from Mr. John DeVore regarding further action on harvest specifications and management measures for 2013-14 and we reference the specific items from Agenda Item D.5.a, Attachment 1, "Anticipated Council Actions and References Relevant to Decision-Making." At this time, we offer comments only on:

- 4a. Shoreside individual fishing quota (IFQ) fishery, trawl Rockfish Conservation Area (RCA) line modifications;
- 5f. Modifications to the shorebased IFQ accumulation limits; and
- 5h. Remove or reduce to 20 inches the minimum length limit for lingcod in the shorebased IFQ fisheries (all gears).

4a. Shoreside IFQ fishery, trawl RCA line modifications

The trawl fishery currently is working under inseason changes made to the RCA lines for 2012 and requests the Council reconsider its decision from earlier this week to maintain the preferred alternative identified in the DEIS, i.e., the RCA configurations that were in place on January 1, 2012. Instead, we request, at the Groundfish Management Team's (GMT) suggestion, that the existing RCA lines, as modified during inseason action this year and provided in the table below, be those under the final preferred alternative for 2013-14.

This alternative will keep in place current trawl RCA lines in the north. Inseason action is available should this need arise to modify the lines due to unforeseen circumstances.

Trawl RCA boundaries as of June 21, 2012 (published in inseason action, 76 FR 22679 on April 17, 2012, effective May 1, 2012).

<table>
<tr><th></th><th>JAN-FEB</th><th>MAR-APR</th><th>MAY-JUN</th><th>JUL-AUG</th><th>SEP-OCT</th><th>NOV-DEC</th></tr>
<tr><td>North of 48°10' N. lat.</td><td>shore - modified[2/] 200 fm line[1/]</td><td>shore - 200 fm line[1/]</td><td colspan="2">shore - 150 fm line[1/]</td><td>shore - 200 fm line[1/]</td><td>shore - modified[2/] 200 fm line[1/]</td></tr>
<tr><td>48°10' N. lat. - 45°46' N. lat.</td><td rowspan="2">75 fm line[1/] - modified[2/] 200 fm line[1/]</td><td>75 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>100 fm line[1/] - 150 fm line[1/]</td><td>75 fm line[1/] - 150 fm line[1/]</td></tr>
<tr><td>45°46' N. lat. - 40°10' N. lat.</td><td>75 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>100 fm line[1/] - 200 fm line[1/]</td><td>75 fm line[1/] - modified[2/] 200 fm line[1/]</td></tr>
<tr><td>South of 40°10' N. lat.</td><td colspan="6">100 fm line[1/] - 150 fm line [1/ 2/]</td></tr>
</table>

5f. Modifications to the shorebased IFQ accumulation limits

The GAP notes that "accumulation limits" is an umbrella term for the control caps and vessel use caps/vessel use limits but in this case, the GAP is referring to *vessel use limits*.

The GAP suggests the following changes to the vessel use limits, to better reflect the nature of the fishery under trawl rationalization:

Species	Existing cap	Proposed cap	Percent harvested, 2011
Chilipepper	15%	20%	21%
Minor slope rock North	7.5%	15%	17.5%
Minor slope rock South	9%	20%	13.6%
Sablefish north	4.5%	3%	94%
Lingcod north	3.8% coastwide	5.3%	15% coastwide
Lingcod south		13.3%	

It is important to note the GAP performed a comprehensive review of all the trawl-managed species and these are the only species that rise to the top as being restrictive. GAP representatives polled many members of the fleet to determine the priority species. The GAP realizes that since we have mentioned only lingcod previously, lingcod may be the only one that can move forward at this time in the specifications package. However, we request the Council take note of the others so they can move forward by any other means that may arise in the future.

Our comments regarding chilipepper, minor slope rockfish and sablefish can be found in our statement from earlier this week, Agenda Item D.5.b, Supplemental GAP report, at: http://www.pcouncil.org/wp-content/uploads/D5b_SUP_GAP_JUN2012BB.pdf.

For lingcod, the changes in vessel use caps will produce the equivalent of equal sharing that was in place prior to the change to a management line from coastwide to a division north and south. This was first brought up in November 2011 (reference our GAP statement under E.4: http://www.pcouncil.org/wp-content/uploads/E9b_SUP_GAP_NOV2011BB.pdf), at which time we introduced a formula that would provide the equivalent vessel use cap percentages.

From our November statement:

> "When the quota allocation is reduced from a coastwide one to area-specific quotas, then a fisherman who is holding quota pounds at the cap will also be at the cap at the lower sub-area ACL. Trading lingcod quota pounds with someone in the other area will not improve the fisherman's portfolio if he is held to the same vessel use cap implemented when there was a coastwide allocation of quota. Therefore, the caps will need to be adjusted upward to allow fishermen to use an amount equal to what they had held prior to stratifying the coastwide quota to the two areas corresponding to the two areas for which lingcod ACLs are specified.
>
> "The GAP proposes the current vessel use cap of 3.8% be adjusted upward to account for the loss of quota pounds within each of the two management areas."

The formula to arrive at the equivalent vessel use caps for northern and southern management areas is:

Old vessel cap / (sub-area annual catch limit (ACL)/ (north ACL + south ACL))

To following formulae illustrate the calculation of an equivalent vessel cap, using a northern ACL of 1,244 mt and a southern ACL of 496 mt:

<u>North</u>
3.8 / (1,244 / 1,244+496)) = 5.3 (5.3 percent)

<u>South</u>
3.8 / (496 / (1,244 + 496)) = 13.3 (13.3 percent)

For comparison, the following table depicts the difference between the use of the coastwide vessel use cap of 3.8 percent overall, if it were divided north and south, and the proposed vessel use caps of 5.3 percent in the north and 13.3 percent in the south:

Management area	2013 IFQ fishery allocation	Vessel use cap	Equivalent Vessel use quota (mt)	Equivalent vessel quota pounds
Coastwide (not split)	1,740 mt	3.8% (existing)	66.12	145,769
North	1,244 mt	3.8% (existing)	47.272	104,216
North	***1,244 mt***	***5.3% (proposed)***	***65.932***	***145,354***
South	496 mt	3.8% (existing)	18.848	41,552
South	***496 mt***	***13.3% (proposed)***	***65.968***	***145,433***

It is easy to see that the resulting individual vessel quota pounds, as proposed with the revised vessel use caps, would more closely resemble the individual vessel quota pounds *before* the management split – roughly 145,400 pounds per vessel. In other words, changing the vessel use caps essentially returns to each vessel account the quota pounds equivalent to what it had been prior to the management line shift.

5h. Remove or reduce to 20 inches the minimum length limit for lingcod in the shorebased IFQ fisheries (all legal gears)

In November, the GAP requested a lingcod survival credit and a minimum size limit of 20 inches coastwide for the trawl IFQ fishery.

The GAP reiterates that currently, all lingcod caught are counted against a vessel's quota pounds, which is overly punitive and does not provide any incentive to release smaller, unmarketable lingcod. The current lingcod minimum size limit is 24 inches south of 42° N latitude and 22 inches north of 42° N latitude. Some of the smaller lingcod, down to a range between 18 and 20 inches, may have some market value.

There has been some discussion as to the elimination of any minimum size limit and whether that should hold true for all sectors, not just the trawl IFQ fishery. During GAP discussion, a polling of all sectors resulted in the recreational sectors affirming it would rather keep its minimum size limits, and other sectors also preferred the minimum size limit of lingcod specified for their sectors be maintained as well.

We leave it to the Council to determine whether the minimum size limit should be eliminated for all sectors or whether it should be adjusted to an 18- to 20-inch range solely for the trawl IFQ fishery. Trawlers would prefer a survivability credit for lingcod, which is included in trawl rationalization trailing actions, but until that is in place, a lower minimum size limit that applies coastwide would be beneficial.

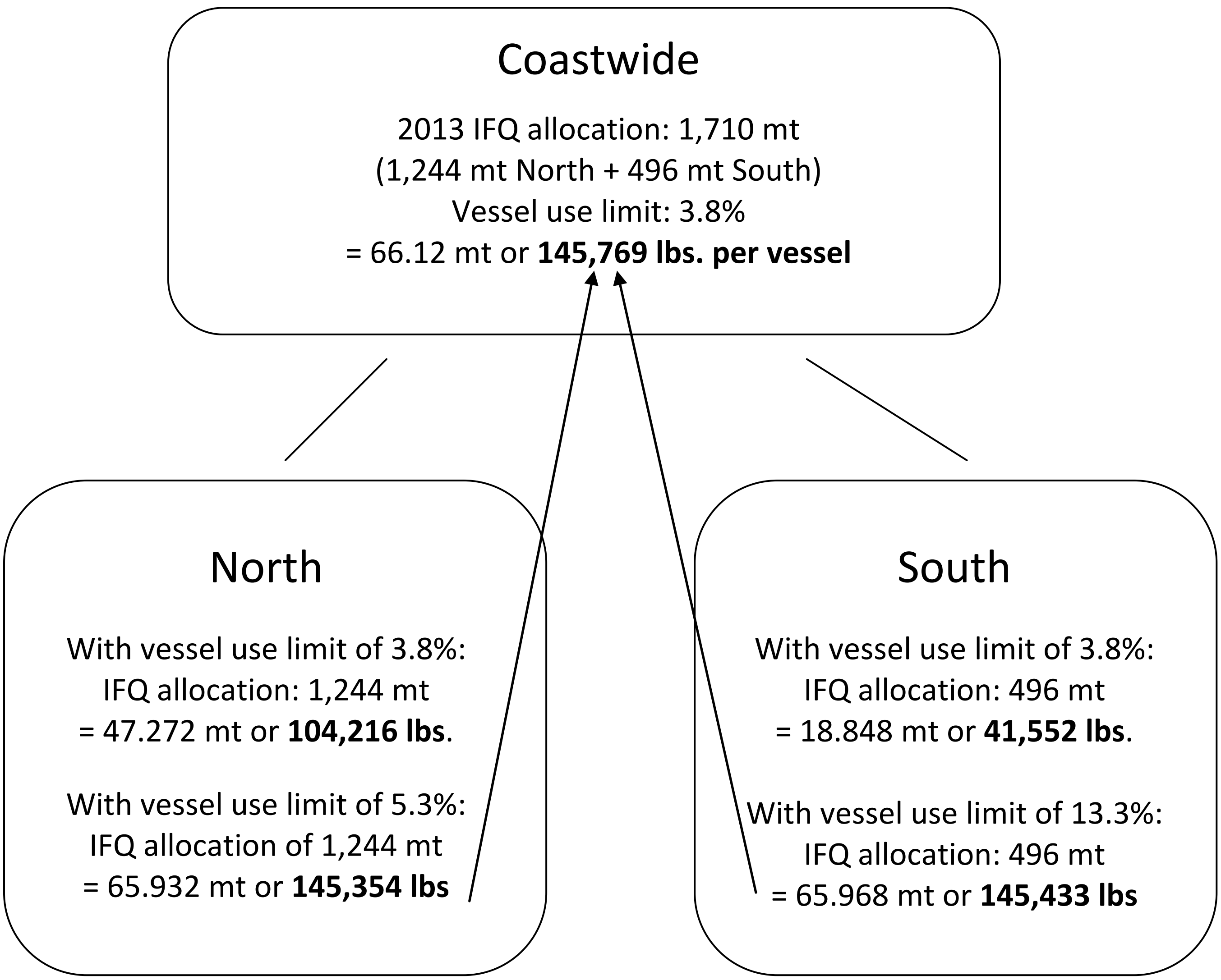
The GAP notes that, with regard to the Supplemental Enforcement Consultants Report under Agenda Item D.5, the concern over comingling of lingcod at the dock or during transportation is unnecessary, as it is unlikely that fish would sit on a dock for any length of time and transport of the fish away from a processing facility is most often in filet form, at which time there would be no way to determine round length. Furthermore, fish are offloaded one vessel at a time and every first receiver of trawl IFQ groundfish has a catch monitor to verify landings.

Lingcod vessel use limits comparison

The following flow chart illustrates the vessel quota pound adjustment according to modified vessel use limits that result in quota pounds equivalent to what a vessel would have prior to the management split.

PFMC

06/24/12



GROUNDFISH MANAGEMENT TEAM REPORT ON FINAL 2013-2014 BIENNIAL HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES

The Groundfish Management Team (GMT) received guidance from the Council under Agenda Item D.5 to further consider additional items concerning the 2013-2014 biennial harvest specifications and management measures and offers the following comments.

1. Updated set-asides for 2013-2014

The GMT updated the set-aside tables from the draft Environmental Impact Statement (EIS), based on the final preferred exempted fishing permit (EFP) set asides, and updated tribal and research catches. See Attachment 1, changes are indicated in **bold**. The GMT requests that the Council and NMFS staff have the ability to make corrections consistent with the Council's intent, to the values in these tables when completing the final EIS and proposed rule.

Updated fishery harvest guidelines and resulting sector-specific allocation tables
The GMT updated the fishery harvest guideline and resulting sector-specific allocation tables with the updated set-aside information. See Attachment 2, changes are indicated in **bold**. The GMT requests that the Council and NMFS staff have the ability to make corrections consistent with the Council's intent, to the values in these tables when completing the final EIS and proposed rule.

2. Final Management Measures for 2013-2014

The GMT compared the updated sector-specific allocations to the projected impacts modeled for the DEIS analysis. It appears that none of the updates change the sector-specific allocations and would not result in changes to the previously analyzed management measures.

2.1 Lingcod Length Limits

The Council requested input on expanding the existing DEIS analysis for the shorebased Individual Fishing Quota (IFQ) fishery to include an 18 inch minimum lingcod length limit. The current analysis explores removing or reducing to 20 inches the minimum length limit for lingcod in the shorebased IFQ fisheries (all legal gears).

Further, the Council requested input on expanding the existing DEIS analysis for the recreational and commercial limited entry and open access fixed gear fisheries to include the option for removing or reducing to 18 inches. The current analysis includes the no action length limits outlined in regulation.

The harvest specifications and management measures Project Team informed the GMT that they believe that with additional analysis, the modifications to the proposed lingcod size limit changes could be accommodated.

2.1.a Current Regulations

Commercial

The shorebased (IFQ), fishery limited entry and open access fixed gear fisheries (except pink shrimp) have limits that vary north and south of 42° N. latitude of 22 and 24 inches, respectively.

Recreational

- Washington
  - Marine Area 4: 24 inches (this size limit is consistent with state managed fisheries in adjacent Puget Sound management areas)
  - Marine Areas 1-3: 22 inches
- Oregon: 22 inches
- California: 22 inches

Changes to lingcod size limit for both commercial and recreational fisheries are designated as a routine action in the current regulations. Should concerns arise, the limits could be adjusted inseason. However, to reduce confusion the GMT recommends that such modifications occur at the beginning of the year (vs. mid-year).

2.1.b Biological Considerations

Lingcod mortality from 2007-2010 has been well below the annual catch limit (ACL)/optimum yield (OY; Table 1). The latest stock assessment indicates that the stock is in a healthy state both north and south of 40°10 N. latitude.

Table 1. Percent attainment of the OY/ACL from 2007-2010 for lingcod.

Year	Percent of OY/ACL
2007	11
2008	4
2009	11
2010	9

A 7 percent discard mortality rate is applied to lingcod discarded with the hook and line gears while 50 percent mortality is applied to trawl caught lingcod that are discarded. Elimination or reduction of the length restriction in the IFQ trawl fishery would convert regulatory discard mortality into retained catch, while the vast majority of lingcod caught with fixed gear would survive if discarded.

Gear selectivity curves for the commercial fishery from the 2009 lingcod stock assessment indicate that lingcod greater than approximately 18 inches are vulnerable to trawl gear. Thus there is the potential for increased mortality and harvest if length restrictions were reduced to this length. Female lingcod mature between 22 and 24 inches in length. Setting length restrictions near these lengths allows fish to spawn at least once prior to harvest increasing spawning biomass.

2.1.c Sector Considerations

Quantitative estimates of increased mortality as a result of removing or reducing the lingcod length for some sectors has not been attempted since no models exist to do so. However, given that historical mortality was well below the OY/ACL, it is unlikely that concern for exceeding the proposed ACL for 2013-2014 would be anticipated as a result of changes to the lingcod length limit.

Shorebased IFQ

Removing the lingcod length limit would reduce regulatory discards. Reducing the limit to either 20 or 18 inches would maintain regulatory discards but would allow smaller fish to be retained compared to No Action.

The shorebased IFQ fishery is rationalized and individual accountability is anticipated to resolve any overfished species implications related to removing or reducing the limit. Should increased catches of overfished species occur and become problematic, adjustments to the trawl rockfish conservation area (RCA) could be made to reduce catches.

Limited Entry and Open Access Fixed Gears

It is uncertain how removing or reducing the lingcod length limit could change effort in the nearshore commercial fisheries, especially the open access component. Projected catches of overfished species in the nearshore fishery are based on target species landing limits. If an increase in participation is realized such that the target species landings exceed those currently in the nearshore model, overfished species projections will increase. Inseason action to reduce trip limits could be taken if landings are tracking higher than projected. Adjustments to the non-trawl RCA could also be used to reduce overfished species interactions. In some areas, however, the shoreward area of the non-trawl RCA is already at 20 fathoms therefore, complete area closures would be necessary in this area depending on the magnitude.

Seaward adjustments to the non-trawl RCA or reductions to the lingcod trip limits may be necessary if removing or reducing the lingcod length limit results in increased overfished species interactions.

In Oregon, the commercial nearshore fishery has regulations that are more restrictive than the federal regulations. Therefore, if the Council adopts changes to the limit that are undesired then the No Action limits could be maintained. This is not an option in California where the state automatically takes conforming action to Federal regulations.

Recreational

It is possible that removing or reducing the lingcod size would allow fishermen to attain their bag limit quicker, which could reduce catches of overfished species. However, anglers may continue to fish for larger fish which would offset any potential reductions to overfished species catches.

If the Council adopts changes to lingcod size limits that the states are not prepared to implement, Washington and Oregon could maintain more conservative regulations through their state regulatory processes. This option is not available in California (due to the state regulatory process) so changes adopted at this meeting would automatically be implemented.

2.1.d Public Process

Relative to the public process, some on the GMT are concerned that a significant amount of stakeholder input has been gathered both at Council meetings and at the state level on reduction of the lingcod size limit in the IFQ fishery. Prior to the June Council meeting, discussions had not occurred relative to the limited entry and open access commercial or recreational fisheries. The public comment period on the DEIS is currently open and an additional opportunity for public comment will be available this fall when the proposed rule to implement the 2013-2014 harvest specifications and management measures is published.

When reductions to lingcod length restriction in the California recreational fishery were discussed in the past, several stakeholders expressed a preference for length restrictions no less than 22 inches, preferring to let fish grow to greater size before harvest even though mortality from a lower length restriction could be accommodated.

When reduction of the California recreational length restrictions were discussed in the past, several stakeholders expressed a preference for length restrictions no less than 22 inches, preferring to let fish grow to greater size before harvest, though mortality from a lower length restriction could be accommodated.

3. Accumulation Limits - Lingcod Vessel Use Limits (QP)

The term accumulation limits applies to the maximum number of quota shares (QS) an entity can control and the maximum number of quota pounds (QP) assigned to a vessel account in the shorebased IFQ fishery (defined in regulation at 50 CFR 660.111). These limits vary according to the management unit for each stock or stock complex. Objectives for the accumulation limits include preventing the consolidation of large blocks of quota holdings by a small number of controlling entities and encouraging the distribution of quota among communities.

The 2013-2014 DEIS analysis and this section are largely focused on changes to the lingcod QP limits due to changes in the IFQ management unit proposed for 2013-2014:

- **No Action:** The lingcod ACL is apportioned north and south of 42° N. latitude. The lingcod IFQ management unit is coastwide. The lingcod vessel QP limit is 3.8 percent.
- **Preferred**: The lingcod ACL and IFQ management units are proposed north and south of 40°10’ N. latitude. The lingcod vessel QP limit is 3.8 percent.
- **Option**: Modify the lingcod accumulation limits.

The GMT supports re-evaluating current vessel control limits in light of the proposed IFQ management unit changes but does not have a specific recommendation for the values. The GMT has reviewed the proposal offered by the GAP and do not have any issues with their approach. We note that these control limits can be evaluated again in a two meeting process or in the next biennial cycle, if in the future a change is necessary.

Attachment 1.1. 2013 updated set-aside table, changes indicated in **bold.**

Species	Area	ACL	Tribal	EFP	Research	OA	Set-aside Total	Fishery HG
Arrowtooth flounder	Coastwide	6,157	2,041	0	**16.39**	30	2087.39	4,069.6
Black	N of 46º16' N. lat.	411	14	0	0	0	14	397.0
Black	S of 46º16' N. lat.	1,000	0	**0**	0	0	0	1,000.0
Bocaccio	S of 40º10' N. lat.	320	0	**6**	1.7	0.7	8.4	311.6
Cabezon	46º16' to 42º N.	47	0	0	0	0	0	47.0
Cabezon	S of 42º N. lat.	163	0	0	0	0	0	163.0
California scorpionfish	S of 34°27' N. lat.	120	0	0	0	2	2	118.0
Canary rockfish	Coastwide	116	9.5	**1.5**	4.5	2	17.5	98.5
Chilipepper	S of 40º10' N. lat.	1,690	0	**210**	9	5	224	1,466.0
Cowcod	S of 40º10' N. lat.	3	0	**0**	0.1	0	0.1	2.9
Darkblotched rockfish	Coastwide	317	0.1	0.2	**2.1**	**18.4**	20.8	296.2
Dover sole	Coastwide	25,000	1,497	0	38	55	1590	23,410.0
English sole	Coastwide	6,815	91	0	5	7	103	6,712.0
Lingcod	N of 40'10º N. lat.	3,036	250	0	**11.67**	16	277.67	2,758.3
Lingcod	S of 40'10º N. lat.	1,111	0	**2**	0	7	9	1,102.0
Longnose skate	Coastwide	2,000	56	0	**13.18**	3	72.18	1,927.8
Longspine thornyhead	N of 34º27' N. lat.	2,009	30	0	13	3	46	1,963.0
Longspine thornyhead	S of 34º27' N. lat.	356	0	0	1	2	3	353.0
Minor nearshore rockfish north	N of 40º10' N. lat.	94	0	0	0	0	0	94.0
Minor nearshore rockfish south	S of 40º10' N. lat.	990	0	0	0	0	0	990.0
Minor shelf rockfish north	N of 40º10' N. lat.	968	**30**	**3**	**6.24**	26	65.24	902.8
Minor shelf rockfish south	S of 40º10' N. lat.	714	0	**31**	6	9	46	668.0
Minor slope rockfish north	N of 40º10' N. lat.	1,160	36	**1**	6	19	62	1,098.0
Minor slope rockfish south	S of 40º10' N. lat.	618	0	**2**	2	17	21	597.0
Other fish	Coastwide	2,286	**111.8**	**3**	**12.5**	**49.53**	**176.83**	2,109.2
Other flatfish	Coastwide	4,884	60	0	17	125	202	4,682.0
Pacific cod	Coastwide	1,600	400	0	**7.04**	2	409.04	1,191.0
Pacific whiting	Coastwide		**TBD**	**2**	133	2,000	2135	
Petrale sole	Coastwide	2,592	**220**	0	**11.6**	**2.4**	234	2,358.0
POP	Coastwide	**150**	10.9	0	**5.2**	0.4	16.5	133.5
Sablefish	N of 36º N. lat.	4,012	401	**4**	26	35		see
Sablefish	S of 36º N. lat.	1,439	0	0	3	2	5	1,434.0
Shortbelly	Coastwide	50	0	0	2	0	2	48.0
Shortspine thornyhead	N of 34º27' N. lat.	1,540	**50**	0	**7.22**	2	59.22	1,480.8
Shortspine thornyhead	S of 34º27' N. lat.	397	0	0	1	41	42	355.0
Splitnose	S of 40º10' N. lat.	1,610	0	**3**	9	0	12	1,598.0
Starry flounder	Coastwide	1,520	2	0	0	5	7	1,513.0
Widow	Coastwide	1,500	**60**	18	**7.9**	3.3	89.2	1,410.8
Yelloweye rockfish	Coastwide	18	2.3	**0.02**	3.3	0.2	5.82	12.2
Yellowtail	N of 40º10' N. lat.	4,378	**490**	**10**	11.49	3	514.49	3,863.5

Attachment 1.2. 2013 Trawl and non-trawl allocations, changes indicated in **bold**.

Species	Area	Fishery HG	Trawl		Non-trawl	
			%	Mt	%	Mt
Arrowtooth flounder	Coastwide	4,069.6	95%	3,866	5%	203
Black	N of 46º16' N. lat.	397.0				
Black	S of 46º16' N. lat.	1,000.0				
Bocaccio	S of 40º10' N. lat.	311.6	N/A	**74.9**	N/A	**236.7**
Cabezon	46º16' to 42º N. lat.	47.0				
Cabezon	S of 42º N. lat.	163.0				
California scorpionfish	S of 34º27' N. lat.	118.0				
Canary rockfish	Coastwide	98.5	N/A	**52.5**	N/A	**46.0**
Chilipepper	S of 40º10' N. lat.	1,466.0	75%	1,100	25%	367
Cowcod	S of 40º10' N. lat.	2.9	N/A	**1.0**	N/A	**1.9**
Darkblotched rockfish	Coastwide	296.2	95%	281	5%	15
Dover sole	Coastwide	23,410.0	95%	22,240	5%	1,171
English sole	Coastwide	6,712.0	95%	6,376	5%	336
Lingcod	N of 40'10º N. lat.	2,758.3	45%	1,241	55%	1,517
Lingcod	S of 40'10º N. lat.	1,102.0	45%	496	55%	606
Longnose skate	Coastwide	1,927.8	90%	1,735	10%	193
Longspine thornyhead	N of 34º27' N. lat.	1,963.0	95%	1,865	5%	98
Longspine thornyhead	S of 34º27' N. lat.	353.0				
Minor nearshore rockfish north	N of 40º10' N. lat.	94.0				
Minor nearshore rockfish south	S of 40º10' N. lat.	990.0				
Minor shelf rockfish north	N of 40º10' N. lat.	902.8	60.2%	543	39.8%	359
Minor shelf rockfish south	S of 40º10' N. lat.	668.0	12.2%	81	87.8%	587
Minor slope rockfish north	N of 40º10' N. lat.	1,098.0	81%	889	19%	209
Minor slope rockfish south	S of 40º10' N. lat.	597.0	63%	376	37%	221
Other fish	Coastwide	2,109.2				
Other flatfish	Coastwide	4,682.0	90%	4,214	10%	468
Pacific cod	Coastwide	1,191.0	95%	1,131	5%	60
Pacific whiting	Coastwide	0.0	100%	0	0%	0
Petrale sole	Coastwide	2,358.0	N/A	**2,323**	N/A	35
POP	Coastwide	133.5	95%	127	5%	7
Sablefish	N of 36º N. lat.	see attachment 2.3				
Sablefish	S of 36º N. lat.	1,434.0	42%	602	58%	832
Shortbelly	Coastwide	48.0		48		0
Shortspine thornyhead	N of 34º27' N. lat.	1,480.8	95%	1,407	5%	74
Shortspine thornyhead	S of 34º27' N. lat.	355.0	NA	50	NA	305
Splitnose	S of 40º10' N. lat.	1,598.0	95%	1,518	5%	80
Starry flounder	Coastwide	1,513.0	50%	757	50%	757
Widow	Coastwide	1,410.8	91%	**1,284**	9%	**127**
Yelloweye rockfish	Coastwide	12.2	N/A	1	N/A	11.2
Yellowtail	N of 40º10' N. lat.	3,863.5	88%	3,400	12%	464

Attachment 1.3. 2014 updated set-aside table, changes indicated in **bold.**

Species	Area	ACL	Tribal	EFP	Research	OA	Set-Aside	Fishery HG
Arrowtooth flounder	Coastwide	5,758	2,041	0	**16.39**	30	**2,087.4**	3,670.6
Black	N of 46º16' N. lat.	409	14	0	0	0	14.0	395.0
Black	S of 46º16' N. lat.	1,000	0	**0**	0	0	0.0	1,000.0
Bocaccio	S of 40º10' N. lat.	337	0	**6**	1.7	0.7	**8.4**	328.6
Cabezon	46º16' to 42º N. lat.	47	0	0	0	0	0.0	47.0
Cabezon	S of 42º N. lat.	158	0	0	0	0	0.0	158.0
California scorpionfish	S of 34º27' N. lat.	117	0	0	0	2	2.0	115.0
Canary rockfish	Coastwide	119	9.5	**1.5**	4.5	2	**17.5**	101.5
Chilipepper	S of 40º10' N. lat.	1,647	0	**210**	9	5	**224.0**	1,423.0
Cowcod	S of 40º10' N. lat.	3	0	**0**	0.1	0	0.1	2.9
Darkblotched rockfish	Coastwide	330	0.1	0.2	**2.1**	**18.4**	**20.8**	309.2
Dover sole	Coastwide	25,000	1,497	0	38	55	1,590.0	23,410.0
English sole	Coastwide	5,646	91	0	5	7	103.0	5,543.0
Lingcod	N of 40'10º N. lat.	2,878	250	0	**11.67**	16	**277.7**	2,600.3
Lingcod	S of 40'10º N. lat.	1,063	0	**2**	0	7	**9.0**	1,054.0
Longnose skate	Coastwide	2,000	56	0	**13.18**	3	**72.2**	1,927.8
Longspine thornyhead	N of 34º27' N. lat.	1,958	30	0	13	3	46.0	1,912.0
Longspine thornyhead	S of 34º27' N. lat.	347	0	0	1	2	3.0	344.0
Minor nearshore rockfish north	N of 40º10' N. lat.	94	0	0	0	0	0.0	94.0
Minor nearshore rockfish south	S of 40º10' N. lat.	990	0	0	0	0	0.0	990.0
Minor shelf rockfish north	N of 40º10' N. lat.	968	**30**	**3**	**6.24**	26	**65.2**	902.8
Minor shelf rockfish south	S of 40º10' N. lat.	714	0	**31**	6	9	**46.0**	668.0
Minor slope rockfish north	N of 40º10' N. lat.	1,160	36	**1**	6	19	**62.0**	1,098.0
Minor slope rockfish south	S of 40º10' N. lat.	622	0	**2**	2	17	**21.0**	601.0
Other fish	Coastwide	2,286	**111.8**	**3**	**12.5**	**49.53**	**176.8**	2,109.2
Other flatfish	Coastwide	4,884	60	0	17	125	202.0	4,682.0
Pacific cod	Coastwide	1,600	400	0	**7.04**	2	**409.0**	1,191.0
Pacific whiting	Coastwide	TBD	TBD	**2**	133	2,000	2,135.0	TBD
Petrale sole	Coastwide	2,652	**220**	0	**11.6**	**2.4**	**234.0**	2,418.0
POP	Coastwide	153	10.9	0	**5.2**	0.4	**16.5**	136.5
Sablefish	N of 36º N. lat.	4,349	435	**4**	26	35		
Sablefish	S of 36º N. lat.	1,560	0	0	3	2	5.0	1,555.0
Shortbelly	Coastwide	50	0	0	2	0	2.0	48.0
Shortspine thornyhead	N of 34º27' N. lat.	1,525	**50**	0	**7.22**	2	**59.2**	1,465.8
Shortspine thornyhead	S of 34º27' N. lat.	393	0	0	1	41	42.0	351.0
Splitnose	S of 40º10' N. lat.	1,670	0	**3**	9	0	**12.0**	1,658.0
Starry flounder	Coastwide	1,528	2	0	0	5	7.0	1,521.0
Widow	Coastwide	1,500	**60**	18	**7.9**	3.3	**89.2**	1,410.8
Yelloweye rockfish	Coastwide	18	2.3	**0.02**	3.3	0.2	**5.82**	12.2
Yellowtail	N of 40º10' N. lat.	4,382	**490**	**10**	**11.49**	3	**514.5**	3,867.5

Attachment 1.4. 2014 Trawl and non-trawl allocations, changes indicated in **bold**.

Species	**Area**	**Fishery HG**	**Trawl**		**Non-trawl**	
			%	**Mt**	**%**	**Mt**
Arrowtooth flounder	Coastwide	3,670.6	95%	3,487	5%	184
Black	N of 46º16' N. lat.	395.0				
Black	S of 46º16' N. lat.	1,000.0				
Bocaccio	S of 40º10' N. lat.	328.6	N/A	**79**	N/A	**249.6**
Cabezon	46º16' to 42º N. lat.	47.0				
Cabezon	S of 42º N. lat.	158.0				
California scorpionfish	S of 34º27' N. lat.	115.0				
Canary rockfish	Coastwide	101.5	N/A	**54.1**	N/A	**47.4**
Chilipepper	S of 40º10' N. lat.	1,423.0	75%	1,067	25%	356
Cowcod	S of 40º10' N. lat.	2.9	N/A	**1**	N/A	**1.9**
Darkblotched rockfish	Coastwide	309.2	95%	293.7	5%	15
Dover sole	Coastwide	23,410.0	95%	22,239.5	5%	1,171
English sole	Coastwide	5,543.0	95%	5,265.9	5%	277
Lingcod	N of 40'10º N. lat.	2,600.3	45%	1,170.1	55%	1,430
Lingcod	S of 40'10º N. lat.	1,054.0	45%	474.3	55%	580
Longnose skate	Coastwide	1,927.8	90%	1,735	10%	193
Longspine thornyhead	N of 34º27' N. lat.	1,912.0	95%	1,816	5%	96
Longspine thornyhead	S of 34º27' N. lat.	344.0				
Minor nearshore rockfish north	N of 40º10' N. lat.	94.0				
Minor nearshore rockfish south	S of 40º10' N. lat.	990.0				
Minor shelf rockfish north	N of 40º10' N. lat.	902.8	60.2%	560	39.8%	370
Minor shelf rockfish south	S of 40º10' N. lat.	668.0	12.2%	81	87.8%	587
Minor slope rockfish north	N of 40º10' N. lat.	1,098.0	81%	889	19%	209
Minor slope rockfish south	S of 40º10' N. lat.	601.0	63%	379	37%	222
Other fish	Coastwide	2,109.2				
Other flatfish	Coastwide	4,682.0	90%	4,214	10%	468
Pacific cod	Coastwide	1,191.0	95%	1,131	5%	60
Pacific whiting	Coastwide	TBD	100%	TBA	0%	TBA
Petrale sole	Coastwide	2,418.0	N/A	**2,383**	N/A	**35**
POP	Coastwide	136.5	95%	**129.675**	5%	7
Sablefish	N of 36º N. lat.	0.0	See Attachement 2.3			
Sablefish	S of 36º N. lat.	1,555.0	42%	653	58%	902
Shortbelly	Coastwide	48.0				
Shortspine thornyhead	N of 34º27' N. lat.	1,465.8	95%	1,392	5%	73
Shortspine thornyhead	S of 34º27' N. lat.	351.0	N/A	50	N/A	301
Splitnose	S of 40º10' N. lat.	1,658.0	95%	1,575	5%	83
Starry flounder	Coastwide	1,521.0	50%	761	50%	761
Widow	Coastwide	1,410.8	91%	**1,284**	9%	**127**
Yelloweye rockfish	Coastwide	12.2	N/A	1	N/A	11.2
Yellowtail	N of 40º10' N. lat.	3,867.5	88%	3,403	12%	464

Attachment 2.1. 2013 Sector-specific allocations under the Council's preferred ACL and allocation alternatives specified in Agenda Item D.5. at this meeting. Changes indicated in **bold**.

Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	320	116	3	317	150	2,592	18
Total Set-Asides	**8.4**	**17.5**	0.1	**20.8**	**16.5**	**234**	5.82
Tribal		9.5		0.1	10.9	**220**	2.3
EFP	**6**	**1.5**	0.0	0.2	0	0	0.02
Research	1.7	4.5	0.1	2.1	**5.2**	**11.6**	3.3
Open Access	0.7	2	-	18.4	0.4	2.4	0.2
Fishery Harvest Guideline	**311.6**	98.5	2.9	296.2	**133.5**	2,358.0	12.2
Trawl Allocation - Sum	**74.9**	**52.5**	**1.0**	**281**	**127.0**	**2,323**	1
Shorebased IFQ	**74.9**	**39.9**	**1.0**	**266.3**	**109.6**	**2,318**	1
At-Sea Whiting	N/A	**12.6**	N/A	14.7	17.4	5	--
Catcher Processor	N/A	7.4	N/A	8.6	10.2		--
Mothership	N/A	5.2	N/A	6.1	7.2		--
Non-Trawl Allocations - Sum	236.7	**46.0**	**1.9**	15.0	**7.0**	35.0	11.2
Non-Nearshore	**72.3**	**3.5**					1.1
Nearshore Fixed Gear	0.9	**6.2**					1.2
Washington Recreational [a/]	N/A	**3.1**					2.9
Oregon Recreational [a/]	N/A	**10.8**					2.6
California Recreational	**163.5**	**22.4**					3.4

a/ Values represent HGs which may be adjusted within the non-trawl allocation.

Attachment 2.2. 2014 Sector-specific allocations under the Council's preferred ACL and allocation alternatives specified in Agenda Item D.5. at this meeting. Changes indicated in **bold**.

Sector	**Bocaccio**	**Canary**	**Cowcod**	**DKB**	**POP**	**Petrale**	**Yelloweye**
ACL	337	119	3	330	153	2,652	18
Total Set-Asides	8.4	**17.5**	0.1	**20.8**	**16.5**	**234**	5.82
Tribal		9.5		0.1	10.9	**220**	2.3
EFP	**6**	**1.5**	0.0	0.2	0	0	**0.02**
Research	1.7	4.5	0.1	2.1	**5.2**	**11.6**	3.3
Open Access	0.7	2	-	18.4	0.4	2.4	0.2
Fishery Harvest Guideline	328.6	**101.5**	2.9	309.2	**136.5**	2,418.0	12.2
Trawl Allocation - here	79.0	**54.10**	1.0	**293.7**	129.7	**2383**	1
Shorebased IFQ	79.0	**41.1**	1.0	278.3	**112.3**	**2,378**	1
At-Sea Whiting	N/A	**13**	N/A	15.4	17.4		--
Catcher Processor	N/A	7.6	N/A	9	10.2	5	--
Mothership	N/A	5.4	N/A	6.4	7.2		--
Non-Trawl Allocations - here	249.6	**47.4**	1.9	**15**	7	35	11.2
Non-Nearshore	76.2	**3.7**					1.1
Nearshore Fixed Gear	0.9	**6.4**					1.2
Washington Recreational [a/]	N/A	**3.2**					2.9
Oregon Recreational [a/]	N/A	**11.1**					2.6
California Recreational	172.5	**23**					3.4

a/ Values represent HGs which may be adjusted within the non-trawl allocation.

Attachment 2.3 Updated Sablefish North of 36° N. lat. Allocations, 2013 and 2014

Year	ACL	Set-asides		Recreational Estimate	EFP	Commercial HG	Limited Entry HG		Open Access HG	
		Tribal	Research				%	Mt	%	Mt b/
2013	4,012	401	26	6.1	4	**3,575**	90.6%	**3,239**	9.4%	**336**
2014	4,349	435	26	6.1	4	**3,878**	90.6%	**3,513**	9.4%	**365**

Year	LE All	Limited Entry Trawl c/						
		ALL Trawl	At-sea Whiting	Shorebased IFQ		ALL FG	Primary	DTL
2013	**3,239**	**1,878**	50	**1,828**		**1,360**	**1,156**	**204**
2014	**3,513**	**2,038**	50	**1,988**		**1,476**	**1,254**	**221**

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