Agenda Item H.3
Attachment 10 (Full Assessment; Electronic Only)
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DRAFT

The Status of Widow Rockfish (*Sebastes entomelas*) Along the U.S. West Coast in 2015

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Executive Summary

Stock

This is an assessment of Widow Rockfish (*Sebastes entomelas*) that reside in the waters off California, Oregon, and Washington from the U.S.-Canadian border in the north to the U.S.-Mexico border in the south. Widow Rockfish inhabit water depths of 25–370 m from northern Baja California, Mexico to Southeastern Alaska. Although catches north of the U.S.-Canada border and south of the U.S.-Mexico border were not included in this assessment, it is not certain if those populations contribute to the biomass of Widow Rockfish off of the U.S. West Coast, possibly through adult migration and/or larval dispersion.

There is little evidence of genetically separate stocks along the U.S. coast and past assessments have used a single area, coastwide model with multiple fisheries (He et al. 2011). In 2011, a two-area assessment model was brought forward for review, and was found to be similar to a coastwide model (He et al. 2011). There is some evidence of biological differences between areas. For example, Widow Rockfish collected off California tend to mature at a smaller length than Widow Rockfish collected off of Oregon (Barss and Echeverria 1987). This may be due to environmental or anthropogenic effects rather than genetic differences. It was decided to continue with a single area model for this assessment instead of potentially lose prediction power by splitting the data into two separate areas.

Landings

The historical reconstruction of landings for Widow Rockfish suggests that hook-and-line and bottom trawl fisheries have caught Widow Rockfish since the turn of the 20th century. Landings in the trawl fishery are estimated to have increased into the 1940s and remained relatively constant throughout the 1950s and into the 1960s before the foreign trawl fleet increased catches into the 1970s, peaking at almost 5,000 mt in 1967. In the late 1970s a midwater trawl fishery developed for Widow Rockfish and catches increased rapidly with the discovery of large aggregations that form at night.

Total landings of Widow Rockfish peaked in the early 1980s, increasing from approximately 1,000 metric tons (mt) in 1978 to a peak in landings exceeding 25,000 mt in 1981. After this sudden increase in catch, Widow Rockfish were given their own market category and often specifically identified in the landings. However, species composition sampling of market categories occurred before the mid-1980s when Widow Rockfish was not specifically identified. The uncertainty in species composition is greater in past years, thus landings of Widow Rockfish are not well known further back in history.

The large landings in the early 1980s were curtailed with trip limits beginning in 1982, which resulted in a decline in landings throughout the 1980s and 1990s following sequential reductions in the trip limits. From 2000 to 2003, landings of Widow Rockfish dropped from over 4,000 mt to about 40 mt and have been slowly increasing since, with a more rapid relative increase in 2013 and 2014 to above 700t. Bottom trawl and midwater trawl gears in groundfish and Pacific Whiting fisheries make up the majority of the catch.

Widow Rockfish are a desirable market species and it is believed that discarding was low historically. However, management restrictions (e.g., trip limits) resulted in a substantial amount of discarding beginning in 1982. Trawl rationalization was introduced in 2011, and since then very little discarding of Widow Rockfish has occurred. Discards were estimated in the model with the assistance of data from the West Coast Observer Program (WCGOP), and total catches (discards plus landings) are reported in addition to landings.

Table a: Recent landings for the bottom trawl, midwater trawl, at-sea hake, net, and hook-and-line fisheries and the total landings across fisheries and the total estimated catch (discards + landings) (mt).

Year	Trawl	Midwater Trawl	At-Sea Hake	Net	Hook-and-line	Total Commercial Landings	Estimated Total Catch
2005	3.13	32.82	157.99	0.13	1.22	195.29	203.57
2006	6.01	12.86	193.19	0.00	0.88	212.94	220.68
2007	4.81	1.55	228.39	2.91	1.93	239.59	244.72
2008	2.15	42.15	217.96	0.00	1.25	263.51	272.37
2009	4.19	36.45	135.35	0.21	0.41	176.61	186.28
2010	4.73	54.67	106.35	0.00	0.15	165.90	178.87
2011	18.34	43.88	149.65	0.00	0.12	211.99	212.65
2012	41.23	47.36	181.43	0.00	0.33	270.35	271.34
2013	51.27	241.09	176.41	0.00	0.98	469.75	472.96
2014	71.28	306.62	342.16	0.03	1.84	721.93	726.17

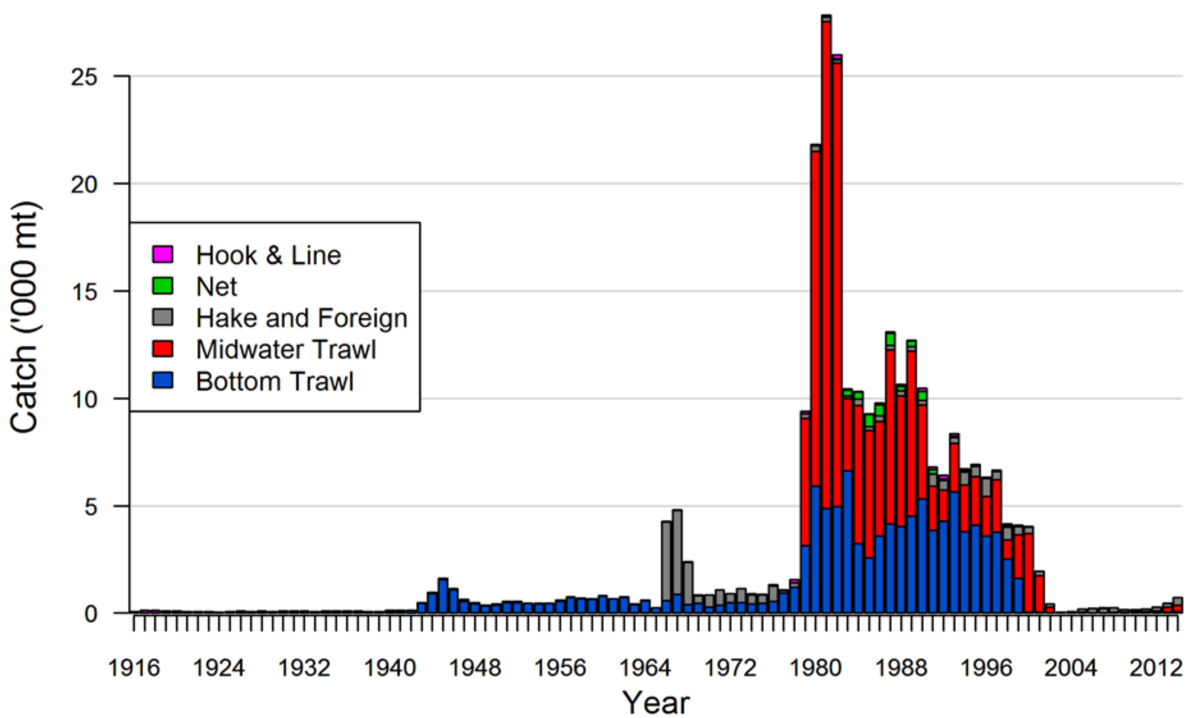

Figure a: Landings of Widow Rockfish from 1916 to 2014 for bottom trawl, midwater trawl, net, and hook-and-line fisheries, and catches of Widow Rockfish for the foreign (1966–1976), and Pacific Whiting (hake) fisheries.

Data and assessment

This is a new full assessment for Widow Rockfish which was last assessed in 2011. In this assessment, all aspects of the model including catches, data, and modelling assumptions were re-evaluated as much as possible. The assessment was conducted using the length- and age-structured modeling software Stock Synthesis (version 3.24U, pers. comm. Richard Methot, NMFS). The coastwide population was modeled assuming separate growth and mortality parameters for each sex (a two-sex model) from 1916 to 2015, and forecasted beyond 2015.

The definitions of fishing fleets have been changed from those in the 2011 assessment separating fisheries by strategy rather than space. Five fishing fleets were specified within the model: 1) a shorebased bottom trawl fleet with coastwide catches from 1916–2014, 2) a shorebased midwater trawl fleet with coastwide catches from 1979–2014, 3) a mostly midwater trawl fleet that targets Pacific Hake/Whiting (*Merluccius productus*) and includes a foreign and at-sea fleet with catches from 1975–2014, a domestic shorebased fleet that targeted Pacific Hake with catches from 1991–2014, and foreign vessels that targeted Pacific Hake and rockfish between 1966–1976, 4) a net fishery consisting of catches mostly from California from 1981–2014, and 5) a hook-and-line fishery (predominantly longline) with coastwide catches from 1916–2014.

Data from three fishery-independent surveys were also included in the model: 1) the National Marine Fisheries Service (NMFS) Southwest Fisheries Science Center (SWFSC) and Northwest Fisheries Science Center (NWFSC)/Pacific Whiting Conservation Cooperative (PWCC) Midwater Trawl Survey that provides pre-recruit indices of abundance, 2) the triennial survey which was conducted from 1977–2004 in depths less than 500 meters, and 3) the NWFSC shelf/slope survey which has been surveying the entire U.S. West Coast in depths between 55 and 1,280 meters since 2003.

The data used in the assessment model consisted of survey abundance indices, length compositions, discard data, and age compositions. Model-based biomass indices and length compositions were determined for the triennial and NWFSC surveys. Length and age compositions were also available from the five fisheries. Age data for all years of the NWFSC shelf/slope survey were input as age-at-length. Discard data for the bottom trawl, midwater trawl, and hook-and-line fisheries were available in various years in the form of discarded biomass and length compositions. A small amount of data was available to inform discarding practices of Widow Rockfish prior to 2002. The variances and sample sizes on all of the data were tuned to the expected variability in the model predictions.

The base model estimated parameters for length-based selectivity for all fleets and surveys, retention curves based on length for the bottom trawl, midwater trawl, and hook-and-line fishing fleets, a length-at-age relationship, natural mortality, and recruitment deviations starting in 1900. A Beverton-Holt stock-recruitment function was used to model productivity and the steepness parameter was fixed at 0.798 based on a steepness meta-analysis for west coast rockfishes (pers. comm. Jim Thorson, NWFSC).

Uncertainty for the parameter estimates and derived quantities was determined in three ways. First, estimation uncertainty in the base model was determined using approximate asymptotic 95% confidence intervals based on maximum likelihood theory. Second, model uncertainty was investigated with various sensitivity runs where alternative model structures were implemented. Finally, the major axis of uncertainty was determined to define a range of states of nature and results are presented in a decision table.

Although there are many types of data available for Widow Rockfish since the late 1970s, which were used in this assessment, there is little information about steepness and natural mortality, and recent recruitment. Estimates of steepness are uncertain partly because of variable recruitment. Uncertainty in natural mortality is common in many fish stock assessments even when length and age data are available. Finally, there is little information about the strength of recent recruitment because the young fish are seen with a lower probability in the fisheries and surveys. These uncertainties were characterized as best as possible in the predictions and projections from this assessment.

Stock biomass

The predicted spawning biomass from the base model generally showed a slight decline over the time series until 1966 when the foreign fleet began. A short, but sharp decline occurred, followed by a steep increase due to strong recruitment. The spawning biomass declined rapidly with the developing domestic midwater fishery in the late 1970s and early 1980s. The stock continued to decline until 2000 when a combination of strong recruitment and low catches resulted in a quick increase. The 2015 spawning biomass relative to unfished equilibrium spawning biomass is above the target of 40% of unfished spawning biomass (75.1%), with a low of 37.3% in 1998.

Approximate confidence intervals based on the asymptotic variance estimates show that the uncertainty in the estimated spawning biomass is high, especially in the early years. The standard deviation of the log of the spawning biomass in 2015 is 0.18.

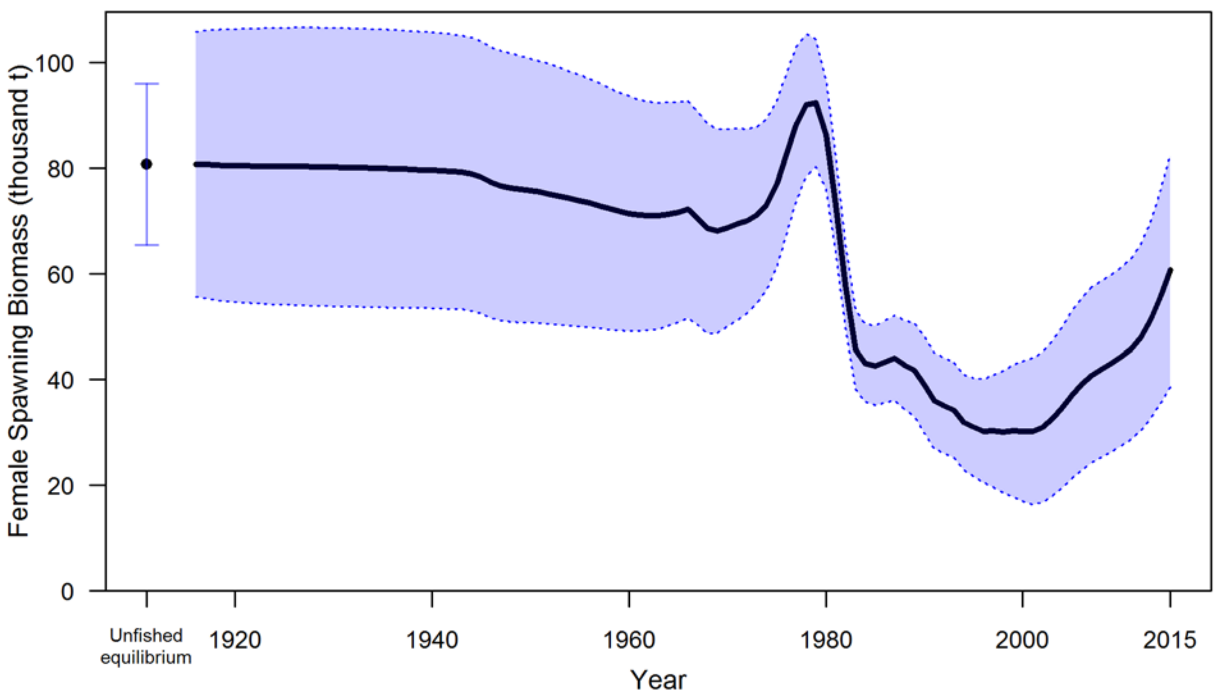

Figure b: Estimated female spawning biomass time-series from the base model (solid line) with an approximate asymptotic 95% confidence interval (shaded area).

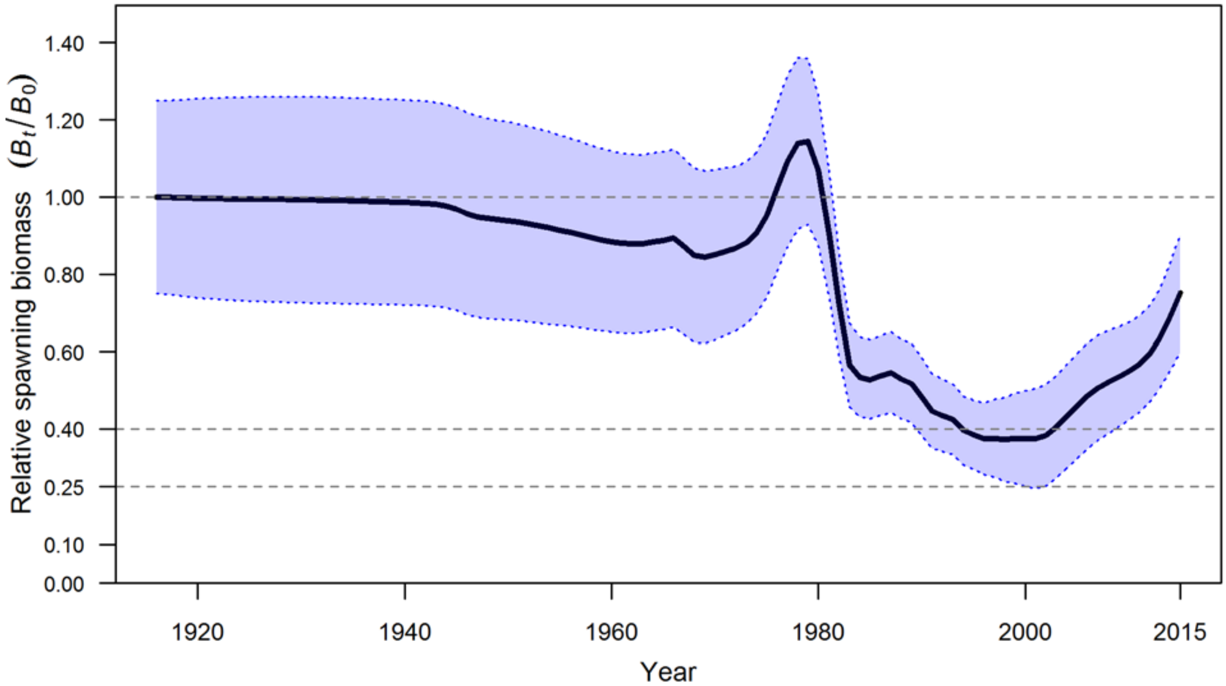

Figure c. Estimated relative spawning biomass (depletion) with approximate 95% asymptotic confidence intervals (filled area) for the base case assessment model.

Table b: Recent trend in estimated female spawning biomass (mt) and relative spawning biomass (depletion).

Year	Spawning Biomass	~95% Confidence Interval	Estimated Depletion (%)	~95% Confidence Interval
2006	39,164	22,905–55,422	48.5	34.8–62.2
2007	40,825	24,272–57,377	50.6	37.0–64.2
2008	42,031	25,372–58,689	52.1	38.8–65.4
2009	43,110	26,388–59,832	53.4	40.5–66.4
2010	44,280	27,467–61,093	54.9	42.2–67.5
2011	45,813	28,751–62,874	56.8	44.3–69.2
2012	47,912	30,355–65,470	59.4	47.0–71.8
2013	51,215	32,650–69,779	63.5	50.6–76.3
2014	55,669	35,553–75,785	69.0	55.1–82.8
2015	60,608	38,622–82,594	75.1	59.8–90.4

Recruitment

Recruitment deviations were estimated for the entire time series modeled. There is little information regarding recruitment prior to 1965, and the uncertainty in these estimates is expressed in the model. There are very large, but uncertain, estimates of recruitment in 2008, 1970, and 1971. Other large recruitment events (in descending order of magnitude) occurred in 1978, 2010, 1981, 1991, and 1977. The five lowest recruitments (in ascending order) occurred in 1976, 2005, 1973, 1996, and 1972. Estimates of recruitment appear to be episodic and characterized by periods of low recruitment. Two of the five largest estimated recruitments happened in the last decade.

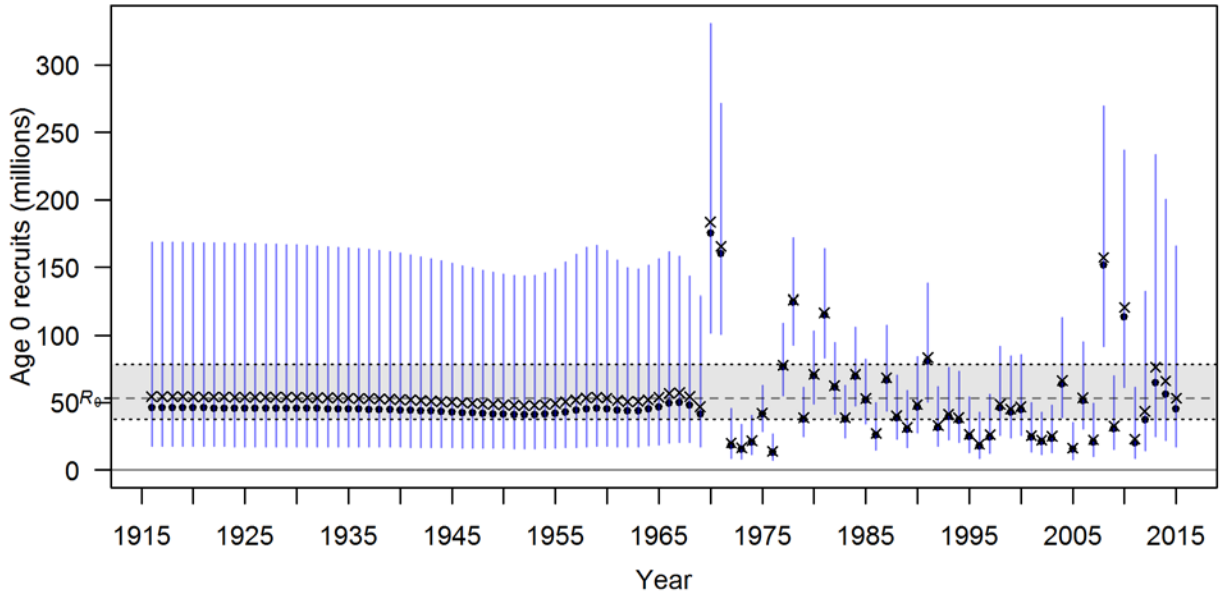

Figure d: Time-series of estimated recruitments (medians as solid circles and mean as an 'x') for the base case model with approximate asymptotic 95% confidence interval (vertical bars). Estimated mean unfished equilibrium recruitment (R_0) is shown as the horizontal dashed line with a 95% confidence interval shaded between the dotted lines.

Table c: Recent estimated trend in Widow Rockfish recruitment with approximate 95% confidence intervals determined from the base model.

Year	Estimated Recruitment (number in thousands)	~95% Confidence Interval	Estimated Recruitment Deviation	~95% Confidence Interval
2006	53,702	30,309–95,149	0.212	-0.181–0.606
2007	22,470	10,225–49,378	-0.664	-1.352–0.025
2008	157,219	91,670–269,639	1.278	0.921–1.635
2009	32,713	15,331–69,803	-0.295	-0.950–0.361
2010	120,622	61,356–237,136	1.007	0.453–1.561
2011	22,961	8,562–61,575	-0.709	-1.683–0.265
2012	43,443	14,268–132,274	-0.130	-1.276–1.015
2013	76,349	24,956–233,579	0.373	-0.780–1.526
2014	66,109	21,826–200,234	0.221	-0.918–1.361
2015	53,370	17,161–165,975	0.0	NA

Exploitation status

The spawning biomass of Widow Rockfish reached a low in 2001 before increasing due to low catches. The estimated depletion was possibly below the overfished level in the early 2000s, but has likely remained above that level otherwise, and currently is significantly greater than the 40% unfished spawning biomass target. Throughout the 1980s and 1990s the exploitation rate and (1-*SPR*) were mostly above target levels. Recent exploitation rates on Widow Rockfish were predicted to be significantly below target levels.

Table d. Recent trend in spawning potential ratio (entered as 1-SPR) and summary exploitation rate.

Year	Estimated 1-SPR (%)	~95% confidence interval	Harvest rate (proportion)	~95% confidence interval
2005	5.03	2.49–7.57	0.0026	0.0015–0.0037
2006	5.13	2.61–7.65	0.0027	0.0016–0.0039
2007	5.39	2.81–7.98	0.0030	0.0018–0.0042
2008	5.78	3.09–8.48	0.0032	0.0019–0.0044
2009	3.92	2.12–5.71	0.0021	0.0013–0.0030
2010	3.67	2.03–5.31	0.0020	0.0012–0.0027
2011	4.19	2.37–6.01	0.0023	0.0015–0.0032
2012	5.19	3.00–7.39	0.0026	0.0016–0.0035
2013	8.22	4.88–11.57	0.0042	0.0026–0.0058
2014	11.44	6.90–15.98	0.0057	0.0036–0.0079

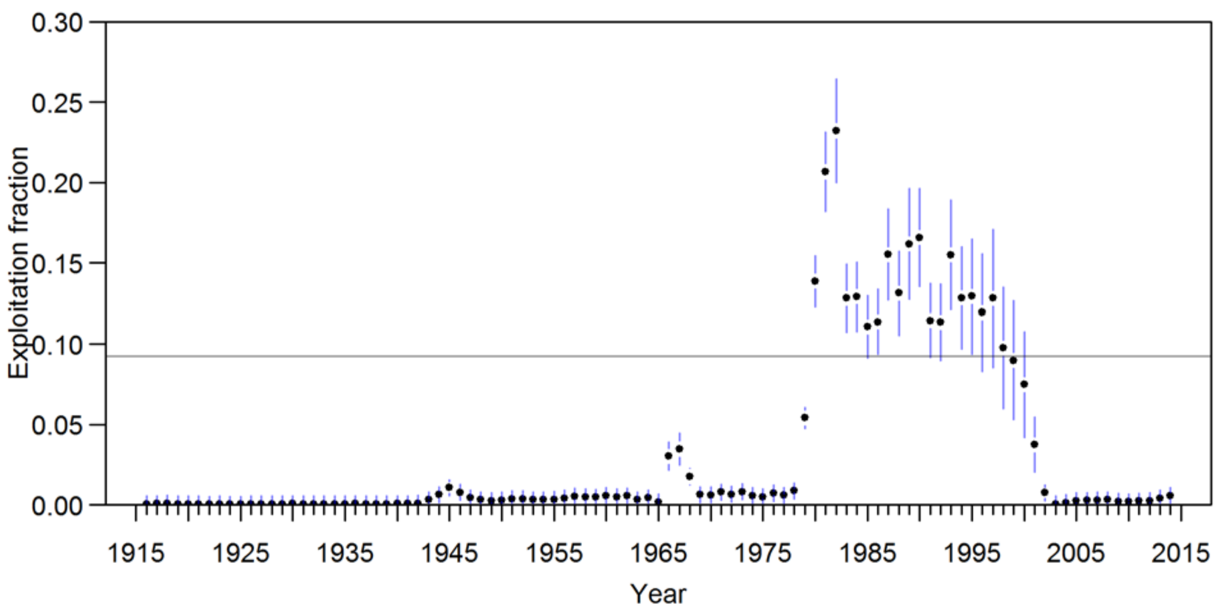

Figure e. Time-series of estimated summary harvest rate (catch divided by age 4+ biomass) for the base case model (round points) with approximate 95% asymptotic confidence intervals (gray lines). The horizontal line is the harvest rate at the overfishing F_{MSY} harvest rate proxy of $SPR_{50\%}$.

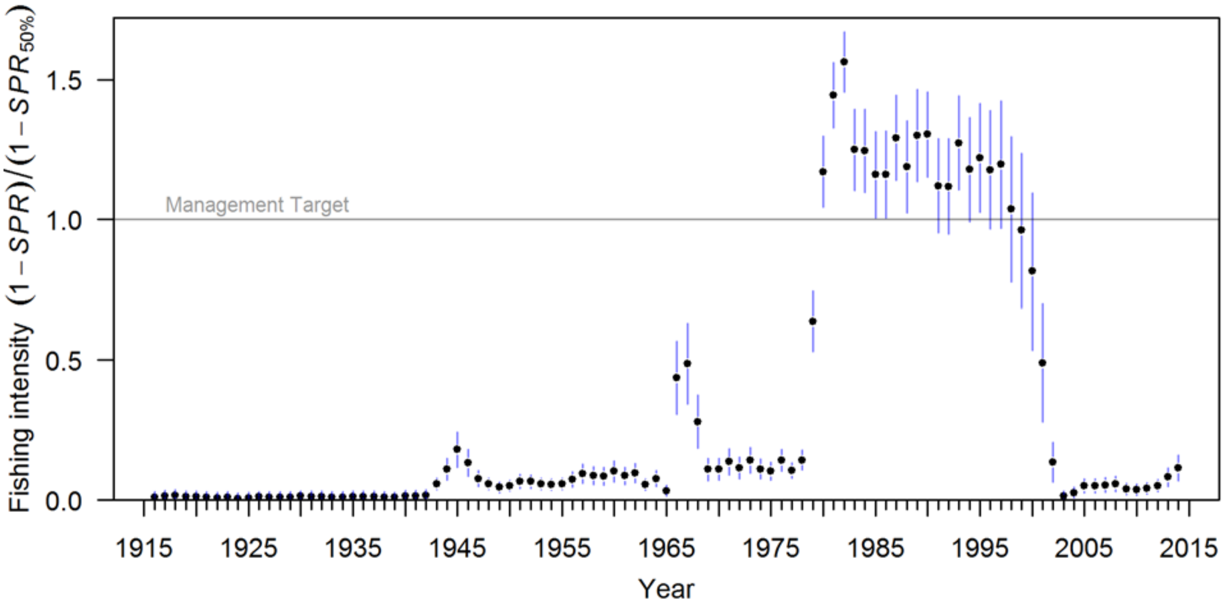

Figure f. Trend in estimated fishing intensity (relative to the SPR management target) through 2014 with 95% asymptotic confidence intervals. One minus SPR is used so that higher exploitation rates occur on the upper portion of the y-axis. The relative management target is plotted as a horizontal line and values above this reflect harvests in excess of the overfishing proxy based on $SPR_{50\%}$.

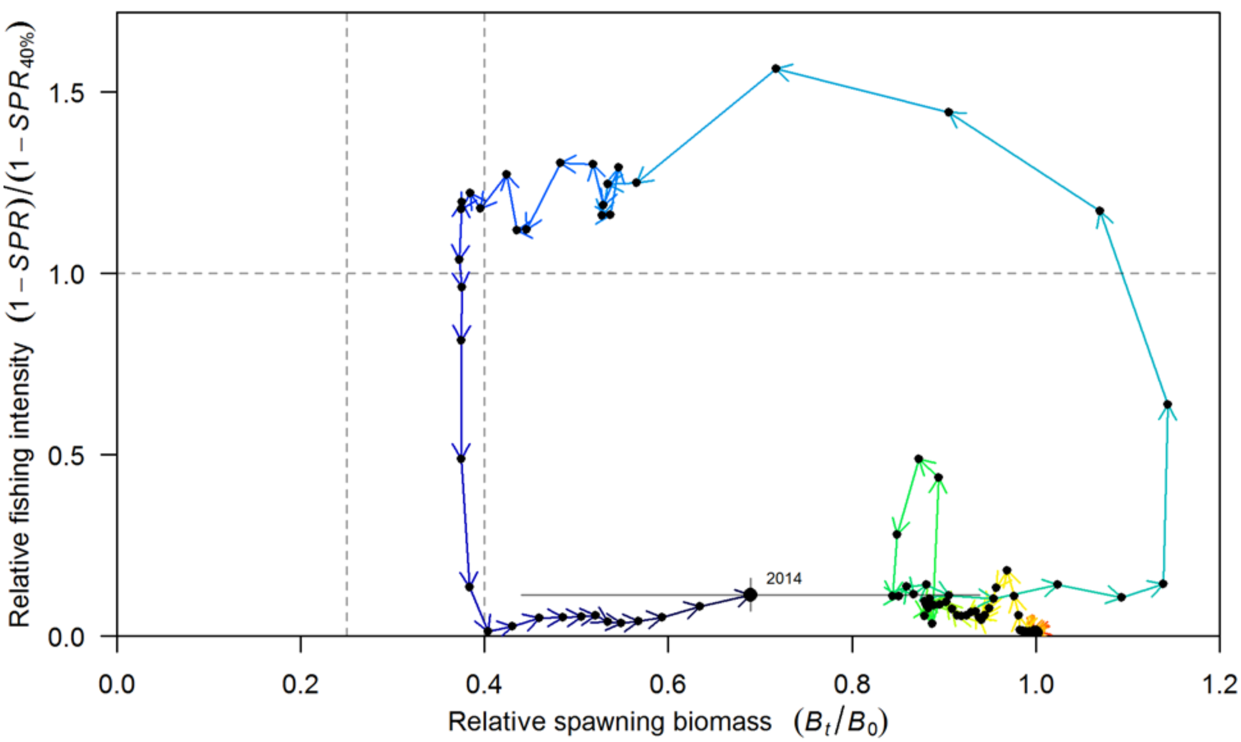

Figure g. Phase plot of estimated relative (1-SPR) vs. relative spawning biomass for the base case model. The relative (1-SPR) is (1-SPR) divided by 0.5 (one minus the SPR target). 2014 is noted with 95% asymptotic confidence intervals.

Ecosystem considerations

Rockfish are an important component of the California Current ecosystem along the U.S. West Coast, with its more than sixty five species filling various niches in both soft and hard bottom habitats from the nearshore to the continental slope, as well as near bottom and pelagic zones. Widow Rockfish frequently aggregate in the pelagic zone.

Recruitment is one mechanism by which the ecosystem may directly impact the population dynamics of Widow Rockfish. The 1999 cohort for many species of rockfish was large – sometimes significantly so – from these species' long-term averages suggesting that environmental conditions may influence the spawning success and survival of larvae and juvenile rockfish. Widow Rockfish showed an above average recruitment deviation in 1999, but absolute recruitment was not as large as other years. The specific pathways through which environmental conditions exert influence on Widow Rockfish dynamics are unclear; however, changes in water temperature and currents, distribution of prey and predators, and the amount and timing of upwelling are all possible linkages. Changes in the environment may also result in changes in age-at-maturity, fecundity, growth, and survival which can affect how the status of the stock and its susceptibility to fishing are determined. Unfortunately, there are few data available for Widow Rockfish that provide insights into these effects.

Fishing has effects on both the age structure of a population as well as the habitat with which the target species is associated. Fishing often targets larger, older fish, and years of fishing mortality results in a truncated age-structure when compared to unfished conditions. Rockfish are often associated with habitats containing living structure such as sponges and corals, and fishing may alter that habitat to a less desirable state. This assessment provides a look at the effects of fishing on age structure, and recent studies on essential fish habitat are beginning to characterize important locations for rockfish throughout their life history; however there is little current information available to evaluate the specific effects of fishing on the ecosystem issues specific to Widow Rockfish.

Reference points

Reference points were calculated using the estimated selectivities and catch distribution among fleets in the most recent year of the model (2014). Sustainable total yields (landings plus discards) were 7,776 mt when using an $SPR_{50\%}$ reference harvest rate and with a 95% confidence interval of 5,881 to 9,670 mt based on estimates of uncertainty. The spawning biomass equivalent to 40% of the unfished spawning output ($SB_{40\%}$) was 32,283 mt. The recent catches (landings plus discards) have been below the point estimate of potential long-term yields calculated using an $SPR_{50\%}$ reference point and the population has been increasing over the last decade.

Table e. Summary of reference points and management quantities for the base case model.

Quantity	Estimate	~95% Confidence Interval
Unfished Spawning Biomass (mt)	80,708	65,427–95,989
Unfished age 4+ biomass (mt)	156,990	127,085–186,895
Unfished recruitment (R0)	60,608	38,622–82,594
Spawning Biomass (2015)	54,490	34,342–74,638
Depletion (2015)	75.1	59.82–90.37
Reference points based on $SB_{40\%}$		
Spawning biomass ($SB_{40\%}$, mt)	32,283	26,171–38,396
SPR resulting in $B_{40\%}$ ($SPR_{B40\%}$)	0.438	0.438–0.438
Exploitation rate resulting in $B_{40\%}$	0.113	0.102–0.124
Yield with $SPR_{B40\%}$ at $B_{40\%}$ (mt)	8,468	6,397–10,540
Reference points based on SPR proxy for MSY		
Spawning Biomass ($SB_{SPR50\%}$, mt)	37,628	30,503–44,752
$SPR_{50\%}$	0.5	NA
Exploitation rate corresponding to $SPR_{50\%}$	0.092	0.083–0.101
Yield with $SPR_{50\%}$ at $SB_{SPR50\%}$ (mt)	7,776	5,881–9,670
Reference points based on estimated MSY values		
Spawning biomass at *MSY* (SB_{MSY}, mt)	18,247	14,812–21,681
SPR_{MSY}	0.275	0.269–0.281
Exploitation rate corresponding to SPR_{MSY}	0.197	0.175–0.218
MSY (mt)	9,464	7,111–11,817

Management performance

Exploitation rates on Widow Rockfish exceeded *MSY* proxy target harvest rates during the 1980s and 1990s and spawning biomass is predicted to have fallen below the proxy management target of 40%. Exploitation rates decreased in the late 1990s due to management restrictions, and have slightly increased in recent years. Predicted catches in the last decade have not exceeded the annual catch limit (ACL) set by management.

Table f. Recent trend in total catch and commercial landings (mt) relative to the management guidelines. Estimated total catch reflects the commercial landings plus the model estimated discarded biomass.

Year	OFL (mt) (termed ABC prior to 2011)	ABC (mt)	ACL (mt) (termed OY prior to 2011)	Commercial Landings (mt)	Estimated Total Catch (mt)
2004	3,460	NA	284	87	99
2005	3,218	NA	285	195	204
2006	3,059	NA	289	213	221
2007	5,334	NA	368	240	245
2008	5,144	NA	368	264	272
2009	7,728	NA	522	177	186
2010	6,937	NA	509	166	179
2011	5,097	4,872	600	212	213
2012	4,923	4,705	600	270	271
2013	4,841	4,598	1,500	470	473
2014	4,435	4,212	1,500	722	726
2015	4,137	3,929	2,000	NA	NA

Unresolved problems and major uncertainties

This is a reconfiguration of a long line of stock assessments for Widow Rockfish on the U.S. West Coast and although scientifically credible advice is provided by synthesizing many sources of data, there remain data and structural assumptions that contribute to uncertainty in the estimates. Major sources of uncertainty include landings, discards, natural mortality, and recruitment, which are discussed below.

Discards of Widow Rockfish are even more uncertain than landings, but because Widow Rockfish is a marketable species, historical discard rates were likely lower than less desirable or smaller species. In this assessment, we assumed that discarding was nearly negligible before management restrictions began in 1982. Once trip limits were introduced, discarding tended to be an all or none event, and detecting large, but rare, discard events with far less than 100% observer coverage has a low probability. For the years 2002–2010, the WCGOP has provided data on discards from vessels that were randomly selected for observer coverage, thus some uncertainty is present in the total amount discarded. The implementation of trawl rationalization in 2011 resulted in almost 100% observer coverage for the trawl fleet and very little incentive to discard Widow Rockfish. However, the open access fixed-gear fleet is not monitored by the full observer coverage required under trawl rationalization and data show that discarding of Widow Rockfish has occurred on fixed gear vessels in recent years (limited entry vessel fishing with fixed gear are subject to 100% observer coverage). Uncertainty in recent discards is greatly reduced because of observer coverage, but it is unknown what historical discarding may have been. The model assumes a discard rate of 1% pre-1982, which is arbitrary, but reasonable.

Widow Rockfish is a relatively long-lived fish, and natural mortality is likely to be lower than many species of fish, such as gadoids. Ages above 50 years have been observed and it is expected that natural mortality would be less than 0.10 yr^{-1}. However, even with length and age data available back to the late 1970s, natural mortality was estimated above 0.15 yr^{-1} with a small amount of uncertainty (7% coefficient of variation). This assessment attempts to capture that uncertainty by estimating natural mortality (M) and integrating that uncertainty into the derived biomass estimates, as well as additional uncertainty by including levels outside of the predicted interval in a decision table.

Model sensitivities and profiles over M showed that current stock status was highly sensitive to the assumption about natural mortality. The estimates of M varied slightly depending on the weight given to age and length data, or removing recent years of data, but M was always estimated above 0.15 yr^{-1}. Profiles over natural mortality provide support for values above 0.13 yr^{-1}.

Steepness was fixed at 0.798 in the base model, but a likelihood profile showed that it would be estimated at a value less than that. Estimates of M increased slightly with lower steepness, while unfished equilibrium spawning biomass increased and current spawning biomass decreased. Equilibrium yield ranged from approximately 4,000 to 8,000 mt depending on the value of steepness.

Decision table

Model uncertainty has been described by the estimated uncertainty within the base model and by the sensitivities to different model structure. The estimated parameter that resulted in the most variability of predicted status and yield advice was natural mortality (M), which was estimated with much more certainty than the prior distribution implied. In fact, the 95% confidence interval for estimated M was entirely greater than and did not include the point estimate from the prior distribution. There is the possibility that the base model and the approximate uncertainty intervals based on maximum likelihood theory may not entirely convey the actual uncertainty of this assessment. However, preliminary (and non-converged) MCMC tests suggest that the uncertainty is similar to the results presented here for natural mortality, spawning biomass, and depletion.

Three categories of parameters that greatly contribute to uncertainty in the results were natural mortality (an important estimated parameter), steepness (not estimated in the model), and the strength of recent year classes (influential on projections). A combination of these three factors was used as the axis of uncertainty to define low and high states of nature. The 12.5% and 87.5% quantiles for female and male natural mortality (independently) were chosen as low and high values (0.145 yr^{-1} and 0.170 yr^{-1} for females; 0.158 yr^{-1} and 0.183 yr^{-1} for males). The 12.5% and 87.5% quantile of t 2010 recruitment were also used (0.7340 and 1.3826). Steepness is probably the most important factor since it was fixed in the base model and is not incorporated in the estimation uncertainty. The 12.5% and 87.5% quantiles from the steepness prior (without Widow Rockfish data) were used to define the low and high values of steepness (0.682 and 1.333). The low combination of these three factors defined the low state of nature and the high combination of these three factors defined the high state of nature. The predictions of spawning biomass in 2015 from the low and high states of nature are close to the 12.5% and 87.5% lognormal quantiles from the base model.

This assessment synthesizes many sources of data and estimates recruitment variability, thus it is classified as a Category 1 stock assessment. Therefore, the sigma for P* to determine the catch reduction to account for scientific uncertainty is 0.36, since the estimated sigma in the assessment is less than this for current spawning biomass.

Table g. Projection of potential OFL, landings, and catch, summary biomass (age-4 and older), spawning biomass, and depletion for the base case model projected with total catch equal to the default ACL of 2,000 mt annually. The predicted OFL is the calculated total catch determined by $F_{SPR=50\%}$.

Year	Predicted OFL (mt)	Projected Total Catch (mt)	Age 4+ biomass (mt)	Spawning Biomass (mt)	Depletion (%)
2015	4,137*	2,000	132,031	60,608	75.1
2016	3,990*	2,000	135,187	64,599	80.0
2017	14,130	2,000	140,098	67,674	83.9
2018	14,511	2,000	144,029	69,856	86.6
2019	14,746	2,000	146,237	71,533	88.6
2020	14,966	2,000	147,574	72,892	90.3
2021	15,132	2,000	148,209	73,866	91.5
2022	15,200	2,000	148,328	74,413	92.2
2023	15,179	2,000	148,098	74,604	92.4
2024	15,108	2,000	147,654	74,556	92.4
2025	15,016	2,000	147,099	74,369	92.2
2026	14,924	2,000	146,502	74,110	91.8

*Value determined prior to the 2015 assessment as part of the harvest specifications

Table h. Summary table of 12-year projections beginning in 2017 for alternate states of nature based on the axis of uncertainty (a combination of *M*, *h*, and 2010 recruitment strength). Columns range over low, mid, and high state of nature, and rows range over different assumptions of total catch levels (discards + retained). Catches in 2015 and 2016 are determined from the percentage of landings for each fleet in 2014.

			State of nature					
			Low		Base case		High	
Relative probability of ln(SB_2013)			0.25		0.5		0.25	
Management decision	Year	Catch (mt)	Spawning biomass (mt)	Depletion (%)	Spawning biomass (mt)	Depletion (%)	Spawning biomass (mt)	Depletion (%)
1000K	2017	1,000	52,762	64%	67,674	84%	79,913	99%
	2018	1,000	54,446	66%	69,856	87%	83,026	102%
	2019	1,000	56,079	68%	71,533	89%	84,926	105%
	2020	1,000	57,729	70%	72,892	90%	85,972	106%
	2021	1,000	59,239	72%	73,866	92%	86,277	106%
	2022	1,000	60,490	73%	74,413	92%	85,944	106%
	2023	1,000	61,486	75%	74,604	92%	85,158	105%
	2024	1,000	62,287	76%	74,556	92%	84,116	104%
	2025	1,000	62,954	76%	74,369	92%	82,969	102%
	2026	1000	63,529	77%	74,110	92%	81,815	101%
Current ACL	2017	2,000	52,762	64%	67,674	84%	79,913	99%
	2018	2,000	54,446	66%	69,856	87%	83,026	102%
	2019	2,000	56,079	68%	71,533	89%	84,926	105%
	2020	2,000	57,729	70%	72,892	90%	85,972	106%
	2021	2,000	59,239	72%	73,866	92%	86,277	106%
	2022	2,000	60,490	73%	74,413	92%	85,944	106%
	2023	2,000	61,486	75%	74,604	92%	85,158	105%
	2024	2,000	62,287	76%	74,556	92%	84,116	104%
	2025	2,000	62,954	76%	74,369	92%	82,969	102%
	2026	2,000	63,529	77%	74,110	92%	81,815	101%
ACL (P* =0.45 and sigma=0.36)	2017	13,491	52,762	64%	67,674	84%	79,913	99%
	2018	12,641	48,317	59%	63,908	79%	77,179	95%
	2019	11,818	44,578	54%	60,327	75%	73,894	91%
	2020	11,188	41,738	51%	57,301	71%	70,629	87%
	2021	10,680	39,486	48%	54,680	68%	67,448	83%
	2022	10,212	37,565	46%	52,283	65%	64,331	79%
	2023	9,777	35,913	44%	50,105	62%	61,384	76%
	2024	9,395	34,519	42%	48,199	60%	58,730	72%
	2025	9,077	33,351	41%	46,588	58%	56,434	70%
	2026	8,820	32,363	39%	45,253	56%	54,498	67%

Research and data needs

There are many areas of research that could be improved to benefit the understanding and assessment of Widow Rockfish. Below, we specifically identify five topics that we believe are most important.

- **Historical landings and discards:** The historical landings and discards are uncertain for Widow Rockfish and improvements would increase the certainty that fishing removals are applied appropriately. Because landings are assumed to be known exactly in the assessment model, uncertainty in the predictions does not include uncertainty in the landings. A thorough look at historical landings, species compositions, and discarding practices would potentially account for and possibly reduce the uncertainty. More importantly, though, a measure of uncertainty on the estimated historical landings would allow for reasonable sensitivities to be investigated.

- **Natural mortality:** Uncertainty in natural mortality translates into uncertain estimates of status and sustainable fishing levels for Widow Rockfish. The collection of additional age data, re-reading of older age samples, reading old age samples that are unread, and improved understanding of the life-history of Widow Rockfish may reduce that uncertainty.

- **Maturity and fecundity:** There are few studies on the maturity of Widow Rockfish and even less recent information. There have been no studies that reported results of a histological analysis. Further research on the maturity and fecundity of Widow Rockfish, the potential differences between areas, the possibility of changes over time would greatly improve the assessment of these species.

- **Age data and error:** There is a considerable amount of error in the age data and potential for bias. Investigating the ageing error and bias would help to understand the influences that the age data have on this assessment.

- **Basin-wide understanding of stock structure, biology, connectivity, and distribution:** This is a stock assessment for Widow Rockfish off of the west coast of the U.S. and does not consider data from British Columbia or Alaska. Further investigating and comparing the data and predictions from British Columbia and Alaska to determine if there are similarities with the U.S. West Coast observations would help to define the connectivity between Widow Rockfish north of the U.S.-Canada border.

Table i. Summary table of results for the assessment of Widow Rockfish.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Commercial landings (mt)	213	240	264	177	166	212	270	470	722	NA
Total catch (mt)	221	245	272	186	179	213	271	473	726	NA
OFL (mt)	3059	5334	5144	7728	6937	5097	4923	4841	4435	4137
ACL (mt)	289	368	368	522	509	600	600	1500	1500	2000
1-SPR (%)	0.05	0.05	0.06	0.04	0.04	0.04	0.05	0.08	0.11	NA
Exploitation rate (catch/ age 4+ biomass)	0.0027	0.003	0.0032	0.0021	0.002	0.0023	0.0026	0.0042	0.0057	NA
Age 4+ biomass (mt)	80,300	81,347	86,157	86,889	90,515	91,387	106,032	112,532	126,652	132,031
Spawning Biomass	39,164	40,825	42,031	43,110	44,280	45,813	47,912	51,215	55,669	60,608
~95% Confidence Interval	22,905-55,422	24,272-57,377	25,372-58,689	26,388-59,832	27,467-61,093	28,751-62,874	30,355-65,470	32,650-69,779	35,553-75,785	38,622-82,594
Recruitment	53,702	22,470	157,219	32,713	120,622	22,961	43,443	76,349	66,109	53,370
~95% Confidence Interval	30,309-95,149	10,225-49,378	91,670-269,639	15,331-69,803	61,356-237,136	8,562-61,575	14,268-132,274	24,956-233,579	21,826-200,234	17,161-165,975
Depletion (%)	48.5	50.6	52.1	53.4	54.9	56.8	59.4	63.5	69	75.1
~95% Confidence Interval	34.8-62.2	37.0-64.2	38.8-65.4	40.5-66.4	42.2-67.5	44.3-69.2	47.0-71.8	50.6-76.3	55.1-82.8	59.8-90.4

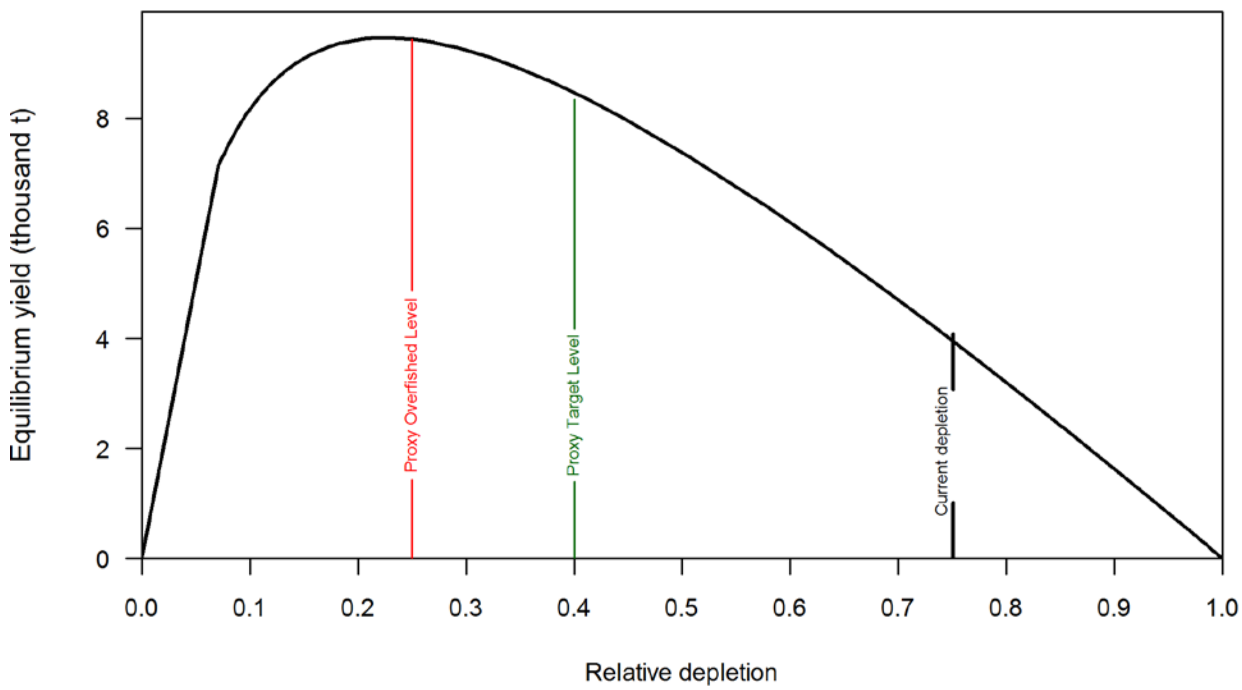

Figure h. Equilibrium yield curve (derived from reference point values reported in Table e) for the base case model. Values are based on 2015 fishery selectivity and distribution with steepness fixed at 0.798. The depletion is relative to unfished spawning biomass.

1 Introduction

Sebastes entomelas (Widow Rockfish) is named after its black-lined gut cavity (*ento* meaning within and *melas* meaning black). It has been referred to as buda, beccafico (Italian bird), and viuva (widow) prior to the 1930s. More recently, the Widow Rockfish is also called brownie, belinda bass, brown bomber, and soft brown.

This is an assessment of Widow Rockfish that inhabit the waters off California, Oregon, and Washington from the U.S.-Canadian border in the north to the U.S.-Mexico border in the south, and does not include Puget Sound waters (Figure 1). This assessment represents a thorough reconsideration of the data, data preparation, and model structure for assessing Widow Rockfish, including reinvestigations of recent and historical catches (including discards), length and age data, and fleet structure.

1.1 Distribution and stock structure

Widow Rockfish inhabit water depths of 25–370 m from northern Baja California, Mexico to Southeastern Alaska, and are most abundant from British Columbia to Northern California. Although catches north of the U.S.-Canada border or south of the U.S.-Mexico border were not included in this assessment, it is possible that these populations contribute to the biomass of Widow Rockfish off of the U.S. West Coast through adult migration and/or larval dispersion.

There is little evidence of genetically separate stocks along the U.S. coast and past assessments have used a single area, coastwide model with multiple fisheries (He et al. 2011). In 2011, a two-area assessment model was brought forward for review, and was found to be similar to a coastwide model (He et al. 2011). There is some evidence of biological differences between areas. For example, Widow Rockfish collected off California tend to mature at a smaller length than Widow Rockfish collected off of Oregon (Barss & Echevarria 1984). This may be due to environmental or anthropogenic effects rather than genetic differences. The connectivity of Widow Rockfish populations throughout its range is unknown and it was decided to continue with a single area model for this assessment instead of potentially lose prediction power by splitting the data into two separate areas.

1.2 Life History and ecosystem interactions

Widow Rockfish are atypical for West Coast rockfish species because they form dense midwater aggregations at night, which were largely undetected until the late 1970s. They are typically found over high relief strata and near cobblestone. The diet of Widow Rockfish is dominated by species that comprise the deep scattering layers, including salps, myctophids, *Sergestes similis* (a caridean shrimp), and euphausiids (Adams 1987).

Widow Rockfish are ovoviviparous with gestation lasting from 1 to 3 months. Parturition occurs earlier in southern latitudes (December-March off California) than in northern latitudes (April in British Columbia) and occur once a year (Barss & Echeverria, 1987). Estimates of fecundity of Widow Rockfish range from 95,375 oocytes at 33 cm to 1,113,000 oocytes at 52 cm (Boehlert et al, 1982).

There is little information regarding the movement of Widow Rockfish. Past assessments have assumed a two-area model because of differences in growth and maturity (see He et al. 2011). However, using recent observations from the NWFSC shelf/slope survey to follow two separate cohorts through time and space suggests that Widow Rockfish may recruit in the south and disperse northward as they age (Figure 2). Spatial recruitment and movement patterns of Widow Rockfish are uncertain and much more investigation and sampling is needed to fully understand them.

1.3 Historical and current fishery

Widow Rockfish were lightly exploited by bottom trawl and hook-and-line gears prior to the 1980s. After many attempts to start trawl fisheries off the west coast of the United States in the late 1800s, the availability of otter trawl nets and the diesel engine in the mid-1920s helped trawl fisheries expand (Douglas 1998). The trawl fisheries really became established during World War II when demand increased for shark livers and bottomfish. A mink food fishery also developed during World War II (Jones and Harry 1960). Foreign fleets began fishing for rockfish in the mid-1960s until the EEZ was implemented in 1977 (Rogers 2003). Longline catches of Widow Rockfish are present from the turn of the century and continue in recent years, mainly from fisheries targeting sablefish and halibut.

In the late 1960s and early 1970s, it is reported that foreign fishing vessels caught large numbers of Widow Rockfish (Rogers 2003). In the late 1970s a domestic midwater trawl fishery began developing off of Oregon when it was realized that Widow Rockfish form dense aggregations at night (Gunderson 1984). The fishery expanded very quickly, with landings from trawl, net, and hook-and-line gears increasing more than 20 times by the early 1980s (Table 1). As early as 1982, trip limits were imposed to keep catches below recommended annual levels (Table 3). Trip limits became more restrictive over the years until Widow Rockfish was declared overfished in 2001. In 2002, harvest guidelines were greatly reduced and over the last decade have been small, although increasing since 2004 (Table 4).

Historical discarding practices are not well known, but it is believed that little discarding occurred prior to management restrictions. With the introduction of trip limits, limited data from the mid-1980s show occasional very high discard rates of Widow Rockfish from tows that occurred near the end of a trip.

More detailed information of the fisheries in each state is given in Section 2.2.1 where the reconstructed landings are discussed.

1.4 Management history and performance

Widow Rockfish has been a small large component of groundfish fisheries since the late 1970s. The landings of Widow Rockfish have been historically governed by harvest guidelines and trip limits, while recently management is imposed with total catch harvest limits in the form of overfishing limits (OFLs), acceptable biological catches (ABCs), and annual catch limits (ACLs). A trawl rationalization program, consisting of an individual fishing quota (IFQ) or catch shares system was implemented in 2011 for the limited entry trawl fleet targeting non-whiting groundfish, including Widow Rockfish, and the trawl fleet targeting and delivering whiting to shore-based processors. The limited entry at-sea trawl sectors (motherships and catch-processors) that target whiting and process at sea are managed in a system of harvest cooperatives.

Limits on Widow Rockfish were first established in 1982 (Table 3). These were implemented as trip limits and cumulative landing limits that were first imposed by trip, then week, then every 2 weeks, month, 2 months, and eventually into periods. In many years, the trip limits on Widow Rockfish were significantly reduced at the end of the year to avoid exceeding the harvest recommendations. Some important years were 1985 when trip limits were reduced to 30,000 pounds once per week or 60,000 pounds once every 2 weeks, 1990 when trip limits were reduced to 15,000 or 25,000 pounds every one or two weeks, respectively, 1998 when a 25,000 pound cumulative limit per two-month period was implemented, and 2011 when catch shares was implemented.

A sorting requirement was implemented for Widow Rockfish in the early 1980s with California beginning in 1982, Oregon in 1984, and Washington in 1988. Some important events that could affect fishery selectivity are the gear restrictions implemented in 2000, implementation of Rockfish

Conservation Areas (RCA's) in 2002, seasonal changes to the RCA's in 2007, and the beginning of catch shares in 2011.

Table 4 shows that recent landings have been below recommended catch levels. Landings are a considerable amount below the ACL, and it is unlikely that total mortality has exceeded the ACL in the last 10 years.

1.5 Fisheries and assessments in Canada and Alaska

Widow Rockfish are distributed throughout Canada and Southeast Alaska and are commonly caught in trawl and hook-and-line fisheries. However, the landings from the fisheries in these areas are estimated to harvest Widow Rockfish at much smaller rate than has been observed off California, Oregon, and Washington mostly due to lower abundance of Widow Rockfish, but also partly due to precautionary behavior of Canadian managers after the large catches followed by management restrictions and concerns of the U.S. fishery in the early 1980s.

Alaska formed the "Other Rockfish" complex in 2012 from the combination of Other Slope Rockfish and the Widow and Yellowtail Rockfishes from the Pelagic Shelf Rockfish category. This new complex includes 18 species and Widow Rockfish are a small proportion of the catch (less than 5%). Total biomass estimates are provided by the Gulf of Alaska (GOA) triennial/biennial trawl survey. ABC's and OFL's were set for the Other Rockfish Complex and component species in 2013 with a recommended OFL in 2014 of 5,347 mt for the complex. Widow Rockfish comprise a small part of this complex in Alaska.

The fishery for Widow Rockfish in British Columbia, Canada started in 1986 although some very small landings occurred in the mid-1970s. Landings peaked at about 4,500 mt in 1990 and were around 2,000 mt throughout the 1990s (DFO 1999). Most landings occurred in a midwater trawl fishery, but there have also been reports of "nuisance catches in the salmon troll fishery". An assessment of Widow Rockfish in Canada was completed in 1998 (Stanley 1999) as part of a shelf rockfish complex. Additional research has since been done on the estimation of biomass of particular aggregations of Widow Rockfish (Stanley et al. 2000), but no formal assessment has been done since.

2 Data

Many sources of data were available for this assessment, including indices of abundance (Table 5), length observations, and age observations from fishery-dependent and fishery-independent sources.

2.1 Fishery-independent data

Data from three fishery-independent surveys were used in this assessment: 1) the SWFSC and NWFSC/PWCC Midwater Trawl Survey (hereafter, "juvenile survey"); 2) the Alaska Fisheries Science Center (AFSC)/NWFSC triennial Pacific Coast Bottom Trawl Survey (hereafter, "triennial survey"); and 3) the NWFSC Pacific Coast Groundfish Bottom Trawl Survey (hereafter, "NWFSC shelf/slope survey"). These surveys employed different designs and sampling methodologies, were conducted during different years and time periods within years, and included coverage over different areas of the coast. In some instances, the survey frequency, depths, and geographic areas covered were not internally consistent within surveys. A brief description of each survey is provided below.

Strata were defined by latitude and depth to analyze the catch-rates, length compositions, and age compositions using stratified random sampling theory. The latitude and depth breaks were chosen based on the design of the survey as well as by looking at biological patterns in relation to latitude and depth.

Indices of abundance for all of the surveys were derived using a Delta-generalized linear mixed model (GLMM) following the methods of Thorson and Ward (2013). The surveys were stratified by latitude and depth, and vessel-specific differences in catchability (via inclusion of random effects for the NWFSC and the Triennial surveys) were estimated for each survey time series. The Delta-GLMM approach explicitly models both the zero and non-zero catches and allows for skewness in the distribution of catch rates. Lognormal and gamma errors structures were considered for the positive tows, including the option to model extreme catch events (ECEs), defined as hauls with extraordinarily large catches, as a mixture distribution (Thorson et al. 2011). There were therefore four total positive tow error structures considered: gamma or lognormal with or without ECEs mixture distributions. Model convergence was evaluated using the effective sample size of all estimated parameters (typically >500 of more than 1000 kept samples would indicate convergence), while model goodness-of-fit was evaluated using Bayesian Q-Q plots and deviance. The resultant coefficient of variations (CVs) of each model were also considered when determining viable indices (i.e., CVs consistently >2 in each year were deemed uninformative and not used).

2.1.1 Juvenile survey

An update of the coastwide pre-recruit indices of abundance was obtained from John Field (SWFSC, pers. comm.). These indices of abundance were estimated using data from three separate midwater trawl surveys for young-of-the-year (YOY) pelagic juvenile rockfish. Identical gear was used by each survey, and combining the data provides the best opportunity to create coastwide indices. Only years that covered waters from 36°N latitude to the U.S./Canada border were used. Estimates, in numbers of age-0 fish, were bias corrected for the lognormal distribution to get a median value before fitting in the model.

The index shows a very large number of age-0 fish in 2013, followed by a large number in 2014, and a moderate value in 2004 (Table 8 and Figure 4). Coefficients of variation were all above 60%, and approaching 100% for the largest estimates.

2.1.2 AFSC/NWFSC triennial bottom trawl survey

The triennial survey was first conducted by the AFSC in 1977 and spanned the timeframe from 1977–2004. The survey's design and sampling methods are most recently described in Weinberg et al. (2002). Its basic design was a series of equally-spaced transects from which searches for tows in a specific depth range were initiated (Figure 5). The survey design changed slightly over time (Table 6 and Figure 6). In general, all of the surveys were conducted in the mid-summer through early fall: the 1977 survey was conducted from early July through late September; the surveys from 1980 through 1989 ran from mid-July to late September; the 1992 survey spanned from mid-July through early October; the 1995 survey was conducted from early June to late August; the 1998 survey ran from early June through early August; and the 2001 and 2004 surveys were conducted in May-July (Figure 6).

Haul depths ranged from 91–457 m during the 1977 survey with no hauls shallower than 91 m. The surveys in 1980, 1983, and 1986 covered the West Coast south to 36.8°N latitude and a depth range of 55–366 meters. The surveys in 1989 and 1992 covered the same depth range but extended the southern range to 34.5°N (near Point Conception). From 1995 through 2004, the surveys covered the depth range 55–500 meters and surveyed south to 34.5°N latitude. In the final year of the triennial series (2004), the NWFSC's Fishery Resource and Monitoring division (FRAM) conducted the survey and followed very similar protocols as the AFSC.

Given the different depths surveyed during 1977, the data from that year were not included in this assessment. Water hauls (Zimmermann et al. 2003) and tows located in Canadian waters were also excluded from the analysis of this survey. The survey was analyzed as an early series (1980–1992) and a late series (1995–2004), as has been done in other West Coast rockfish assessments.

The triennial index was estimated as a single time-series using a GLMM with the stratifications shown in Table 7. Boxplots of the deviance for triennial survey series are shown in Figure 7 and show that the gamma and the lognormal distributions with random strata-year effects including an extreme catch event mixture distribution (ECE) have the lowest median deviance values. Random or fixed strata-year effects without extreme catch events produced a similar deviance to each other, and the deviance was greatly reduced when ECEs were accounted for. Deviance Information Criterion (DIC) values were also compared among models. DIC values favored the gamma distribution with ECEs over the lognormal distribution with ECEs. The Q-Q plot for the gamma distribution with random strata-year effects and ECEs did not show a departure from the normality assumption (Figure 8). Therefore, based on the deviance and the DIC criteria the gamma distribution with random strata-year effects accounting for ECEs was used to estimate the indices given in Table 8. The time series suggests a possible slightly increasing trend in biomass from 1980 - 1983, although is relatively flat until the end of the period in 2001 and 2004 when the index declines significantly. The design-based estimates (average density expanded to the stratum area then summed over strata) are compared to the model-based estimates in Figure 9. The trends generally vary between the design-based and the Delta-GLMM based model, with the highest estimates based on the design-based occurring in 1989 and 1992. However, the design-based abundance estimates result in the lowest abundances in 2001 and 2004, similar to the Delta-GLMM model.

Length frequencies for each year were expanded using the same stratification as the GLMM, and weighted by strata estimated numbers from the GLMM when combining them into a coastwide length composition (Figure 10). Unsexed fish were apportioned to males and females according to the estimated sex ratio for lengths greater than 28 cm. The sex ratio of lengths less than 28 cm was assumed to be 0.5. There was considerable variability in length frequencies in the triennial survey data. Smaller fish (less than 15 cm) were observed in small proportions from 1992 onwards. There is no clear difference in length composition pre- and post-1995 that would support the split into early and late periods.

2.1.3 NWFSC shelf/slope survey

The NWFSC shelf/slope survey is based on a random-grid design, covering the coastal waters from a depth of 55 m to 1,280 m (Keller et al. 2007). This design uses four chartered industry vessels in most years, assigned to a roughly equal number of randomly selected grid cells. The survey, which has been conducted from late-May to early-October each year, is divided into two 2-vessel passes of the coast, which are executed from north to south. This design therefore incorporates both vessel-to-vessel differences in catchability as well as variance associated with selecting a relatively small number (~700) of cells from a very large population of possible cells (greater than 11,000) distributed from the Mexican to the Canadian border. Much effort has been expended on appropriate analysis methods for this type of data, culminating in the West Coast trawl survey workshop held in Seattle in November 2006.

Widow Rockfish are not commonly caught in the NWFSC shelf/slope survey. Higher catch rates occur north of 40° N latitude and catches are rare south of 36° N latitude (Figure 11). Few large fish are found shallower than 100 m and few small fish are found in the deeper water of the slope (Figure 12). There is no clear trend in length with latitude other than smaller fish tend to occur south of approximately 36° N latitude, and there appears to be some very small fish found near 39° N latitude.

The indices for this survey were developed using a GLMM with the stratification shown in Table 7. Boxplots of the deviance for this survey (Figure 7) show that the gamma distribution with random strata-year effects and ECE had the lowest median deviance and was chosen as the final model. The Q-Q plot does not show any departures from the assumed distribution (Figure 8).The Delta-GLMM can account for impact of survey timing by incorporating pass as a covariate. Explorations were done with and without the inclusion of the pass covariate that showed little to no improvement in model deviance or improved DIC values when pass was included as a covariate. Therefore, the gamma distribution with the ECE mixture distribution and random effects on the year-strata interaction without pass as a covariate was used to estimate the indices given in Table 8.

The indices for the NWFSC shelf/slope survey show a slight increasing trend over the time series (Figure 9). The design-based estimates also show a generally increasing trend but are more variable than the model-based estimates (Figure 9). Accounting for ECEs dampened the high peaks observed in the design-based time series in years with only a few large hauls.

Length, age, and conditional age-at-length compositions were created by expanding to the tow and summing to give a strata specific composition. The strata compositions were combined to a coastwide composition using the numbers in each strata estimated from the GLMM. Numbers in each strata were calculated by converting the numbers-at-length to weight-at-length to calculate a mean weight. The GLMM biomass estimate within each stratum was divided by the strata specific mean weight.

Expanded length frequencies from this survey show intermittent years of small fish (Figure 13). In 2003 and 2004, a high proportion of fish were seen around 35–40 cm, but in later years, it was uncommon to see fish in that range. Age compositions (Figure 14) show a high proportion of a single age in 2003 and 2004. Strong cohorts are not immediately apparent and it seems that ageing error may result in some variability between years. In 2012, there was a high proportion of 4 year old fish, which appears in successive years as a strong 2008 year class. Conditional age-at-length proportions (Figure 15) show relatively consistent length-at-age with few outliers.

2.1.4 Fishery-independent surveys not used in this analysis

2.1.4.1 AFSC slope survey

The AFSC slope survey operated during autumn (October-November) aboard the R/V *Miller Freeman*. Partial survey coverage of the U.S. west coast occurred during 1988–96 and complete coverage (north of 34° 30’ S latitude) during 1997, 1999, 2000, and 2001, which observed Widow Rockfish in 10, 17, 5 and 8 tows, respectively. Length data are available in each year, with 89 samples in 1999, but less than 20 combined between 2000 and 2001.

2.1.4.2 NWFSC slope survey

The NWFSC slope survey covered waters throughout the summer from 183 m to 1280 m north of 34° 30’ S latitude, which is near Point Conception. The survey took place from 1998–2002. In 1999, Widow Rockfish were caught in 18 hauls, the most seen for this survey. In 1998, rockfish were not recorded. This survey was not used because it occurred over a short time period, surveyed slope waters (>183 m) that exclude some of the Widow Rockfish habitat, observed few Widow Rockfish, and did not record an lengths of Widow Rockfish.

2.1.4.3 IPHC longline survey

The International Pacific Halibut Commission (IPHC) has conducted an annual longline survey for Pacific halibut off the coast of Oregon and Washington (IPHC area “2A”) since 1999 with a fixed station design. Approximately 1,800 hooks are deployed at 84 locations each year (Figure 16). Rockfish bycatch is routinely recorded during this survey, and originally estimates of rockfish bycatch in area 2A were based on subsampling the first 20 hooks of each 100-hook skate. Recently, all rockfish are tagged and recorded for later sampling by WDFW and ODFW biologists (see http://www.iphc.int/publications/rara/2012/rara2012503_ssa_survey.pdf). Some variability in exact sampling location is practically unavoidable, and leeway is given in the IPHC methods to center the set on the target coordinates but to allow wind and currents to dictate the actual direction in which the gear is deployed. This can result in different habitats accessed at each fixed location among years.

The IPHC longline survey fishes in suitable habitat for Widow Rockfish, but the majority of the rockfish catch is yelloweye rockfish (*S. ruberrimus*). From 2002 to 2012, only one observation of Widow Rockfish was recorded, which was at station 1064 off of Westport.

2.2 Fishery-dependent data

Widow Rockfish have been caught in trawl and hook-and-line fisheries since the early part of the 20th century. Widow Rockfish are a desirable rockfish and are not likely to be discarded for market reasons. However, smaller Widow Rockfish are found at shallower depths and discarding practices in the early 1900s are uncertain. Few Widow Rockfish have been observed (relative to other gear types) in recreational, commercial pot, and commercial shrimp fisheries, thus only trawl, net, and hook-and-line landings were used in this assessment.

In data from the early 1980s, Widow Rockfish have had their own landing category. California began in 1982, Oregon in 1984, and Washington in 1988. Estimates of historical landings of Widow Rockfish rely upon species-composition sampling data from each period. The uncertainty in species composition is greater in past years, with less systematic and extensive sampling occurring prior to 1980. Consequently, the precision with which landings of Widow Rockfish can be estimated likely decreases for earlier years. A description of the methods used to determine the historical and current landings is provided below.

2.2.1 Commercial catch reconstruction

PacFIN serves as a clearinghouse for commercial landings data since the early 1980s, and before that, landings for each state were reconstructed using the assumptions described below. The at-sea trawl fleet catches are calculated from observer data stored in the NORPAC database, maintained by the AFSC.

2.2.1.1 Washington

Historical commercial landings of three gear types, bottom trawl, midwater trawl, and longline, were reconstructed for Widow Rockfish landed in Washington. It was assumed that landings from other gears constitute a negligible amount of the total mortality.

Washington's trawl fishery

Washington's coastal trawl fishery began in the early 1930s off of Cape Flattery and landings increased substantially by the 1940s (Tagart and Kimura 1982). In 1946, rockfish landings experienced a sharp decline, presumably in response to weakened market demand following World War II. After a period of steady landings of around 5,000 metric tons (mt) annually, landings rapidly increased in the 1960s, followed by a decline in the mid-1970s and a further increase in the late 1970s. After World War II and before the mid-1970s a substantial proportion of the rockfish and Pacific Ocean Perch (POP, *S. alutus*) catch came from Canadian waters. The implementation of the EEZ brought higher landings in Washington from U.S. waters, which rose to over 10,000 mt up until 1983. After that time, rockfish landings declined to around 500 mt in the late 1990s.

Most of the rockfish landed in the Washington trawl fishery were historically assigned into two market categories: "Pacific Ocean Perch" (POP) or "other rockfish" (URCK). Widow Rockfish were specifically identified and sorted in 1988 in Washington. Figure 17 shows the amount landed in each category between 1930 and 1966 before proportioning out the species.

Theresa Tsou (pers comm., WDFW, *Pre80CommSpeciesCom.xlsx*) provided species composition data from landings for 1968–1980. From these data, the years 1968–1975 were used to calculate the average proportion of Widow Rockfish in the URCK market categories, and the years 1972 and 1974 were used to calculate the average proportion of Widow Rockfish in the UPOP market category. These proportions were then applied to historical landings of each category to determine historical Widow Rockfish landings. These years were chosen because landings in these two market categories were consistently sampled for species compositions and after 1975 was when the Widow Rockfish fishery appeared to be developing because the proportion of Widow Rockfish in the landings began increasing. UPOP had Widow Rockfish observations only in 1972 and 1974. The average proportion of Widow Rockfish in UPOP landings in 1972 and 1974 was 0.00049 and the average proportion of Widow Rockfish in URCK landings from 1968–1975 was 0.0095. The average proportion of Widow Rockfish in the sum of UPOP and URCK landings for 1972 and 1974 was 0.0054.

A database of historical Washington landings (Greg Lippert, WDFW, pers comm.) contained landings from Puget Sound and was used to calculate a proportion of the U.S. and Canadian rockfish landings (without POP) that were not from Puget Sound. POP was excluded because it was assumed all POP were caught outside of Puget Sound. From 1949 to 1969, the proportion of landings outside of Puget Sound were greater than 0.95. These estimates agreed closely with estimates calculated using data from research reports on the Washington trawl fishery (Holmberg et al. 1962, Holmberg et al. 1967). Prior to 1949, when POP and rockfish landings were not separated, it was assumed that 99% of the landings came from outside of Puget Sound.

Catches from U.S. waters were derived from Forrester (1967) and Tagart and Kimura (1982). Forrester (1967) reports the separate U.S. vessel and Canadian vessel catches of POP and rockfish for PSMFC areas near British Columbia in the years 1954–1965. Catches south of PSMFC area 3B were not reported, but it is likely that a large proportion of the catch south of 3B came from Oregon vessels. The proportion of Washington landings caught in US waters was calculated as the ratio between the US vessel catch in area 3B and the total catch by US vessels. It is unclear if area 3C as used by Forrester (1967) includes a portion of U.S. waters. Tagart and Kimura (1982) report catches by PSMFC area for the years 1966–1979 and there was little catch in the areas south of 3B. Additionally, an extraction of Washington fish tickets (supplied by Teresa Tsou, pers comm., WDFW, *FT_WithComps05222015.xlsx*) for 1939–1969 listed general areas of the catch, some of which were obviously US only while others were spanned US and Canadian waters. These data were mostly classified as US/Canadian waters, with more than 90% of the years showing more than 57% of the catch in this two-country category, and more than 55% of the years showing more than 90% of the catch in this two-country category. The years which had the smallest proportion of catch in this two-country category were the years with very small total catches. After 1954, more than 90% of the catch was reported in this two-country category, except for 1959, which had 86% reported.

In the data available, the first observation coded as midwater trawl was in 2000. From 1994, Pacific Fishery Information Network (PacFIN) database provides a category called Dahl_Sector which can identify shoreside hake, which is most likely midwater trawls. Using data from PacFIN (1994-2014), at most 8.7% of the GFT landings were reported as Dahl_Sector 3, although typically more than 20% of those landings had an unknown Dahl_Sector. Alternatively, I used the annual proportion of trawl catch reported in logbooks (downloaded from PacFIN on June 1, 2015) as midwater trawl gear and filled in missing years with the proportion of midwater trawl catches in Oregon (Figure 18)

Historical landings from trawl fisheries of Widow Rockfish were determined as follows for the periods shown.

< 1930: Assumed no catch of Widow Rockfish.

1930–1934: The Pacific Fisherman Yearbook rockfish landings were used and it was assumed that all landings were caught in U.S. waters. It was assumed that 1% of the total catch was from Puget Sound, thus was removed (1% was used because POP could have been aggregated with rockfish). The proportion of Widow Rockfish used was 0.00327.

1935–1942: Washington Department of Fisheries reported landings (1955 Commercial Fishing Statistics, Washington Dept Fisheries) were used instead of the Pacific Fisherman Yearbook. The sources are quite different, and the Pacific Fisherman Yearbook states it is reporting foodfish only (there was a substantial mink food fishery). We used 0.00543 as the proportion of Widow Rockfish in the landings since POP landings were not separated. For U.S. catches, we assumed a linear decrease from 100% of the catches in U.S. waters in 1934 to 17.65% catches from U.S. waters in 1946 (calculated from the average percentage of catch of rockfish+POP in U.S. waters between 1954-1974, see Forrester (1967) and Tagart and Kimura (1982). However, it is likely that fishing vessels stayed closer to home during the war years. Puget Sound catches were assumed to comprise 1% of the total landings and were removed.

1943–1966: A spreadsheet of Washington landings provided by Theresa Tsou (pers. comm., WDFW) and called *FT_WithComps05222015.xlsx/Pre1970_Data* was used for separated rockfish and POP landings. It was assumed that the proportion of Widow Rockfish caught with POP was 0.00049 because few Widow Rockfish were seen in POP species comps from 1972–1977 even though Tagart and Kimura (1982) report that prior to 1968, POP landings were invariably 100% Pacific Ocean Perch and species composition does not need to be applied (see the Hicks et al 2013 rougheye assessment for why this may not be entirely true). A value of 0.0095 was used as the proportion of Widow Rockfish in the other rockfish (URCK) category. The proportion of landings from U.S. waters were determined for the years 1954–1965 using data reported by Forrester (1967) and ranged from 9.9–46.4% for rockfish landings and from 3.1–40.1% for POP landings. The assumed proportions of rockfish and POP from US waters for the years prior to 1954 were 0.215 and 0.143, respectively. These were determined by calculating the average of the proportions from U.S. waters in the years 1954–1974 (before the proportion of landings caught in U.S. waters began steadily increasing). Tagart & Kimura (1982) reported proportions of rockfish and POP from US waters for 1966 as 0.21 and 0.19, respectively.

1967–1969 The spreadsheet of Washington landings provided by Theresa Tsou (pers. comm., WDFW) and called *FT_WithComps05222015.xlsx/Pre1970_Data* provided actual Widow Rockfish landings determined using species composition sampling.

1970–1980: The estimate of Widow Rockfish landings for this set of years was obtained from a spreadsheet supplied by Teresa Tsou (pers. comm., WDFW). This spreadsheet is called *FT_WithComps05222015.xlsx/1970-1980_Data*" and has the landings of Widow Rockfish specifically listed, based on species comps. Therefore, no proportions needed to be applied. Landings were greater than landings estimated using Tagart and Kimura (1982) UPOP and URCK landings and species proportions as described above. All of these observations were coded as groundfish trawl (GFT), and the annual ratios of midwater trawl landings to total groundfish trawl landings in Oregon were used to partition midwater and bottom trawl landings in 1979 and 1980 (87.7% and 95.4% from midwater trawls, respectively).

1981–2014: Widow Rockfish landings were obtained from PacFIN (retrieval dated June, 11 2015, Pacific States Marine Fisheries Commission, Portland, Oregon; www.psmfc.org). Puget Sound catches were removed and only non-shrimp trawl gear was used. When possible, the ratio of midwater trawl catch to total groundfish trawl catch reported in Washington logbooks was used to partition midwater and bottom trawl landings (1988–1991 & 1995–1998). The ratio of midwater trawl landings from Oregon groundfish trawl landings were used in the years 1981–1987, 1992–1994, and 1999 (Figure 18). The midwater trawl landings were specifically reported in PacFIN from 2000–2014.

The landings of Widow Rockfish in the Washington trawl fishery were low until the late 1970s when the EEZ was implemented and US vessels fished more often in US waters, and midwater trawling became more common (Figure 19). Midwater trawl landings peak at the start of the fishery in the early 1980s near 7,000 mt and has declined to landings less than 100 mt since 2002 (Figure 20).

Washington's hook-and-line fisheries

A longline fishery has operated since at least the middle of the 20th century in Washington. However, the few data sources available with species compositions of historical longline catches did not have any records of Widow Rockfish. In addition, estimates of hook-and-line catches of Widow Rockfish in Oregon were less than 1% of total landings since 1940. Therefore, without any additional information, we assumed that hook-and-line landings of Widow Rockfish in Washington were zero prior to 2000. From 2000 to 2014, PacFIN reports some very small hook-and-line catches.

Washington's net fisheries

Occasional observations of Widow Rockfish landings that were caught with net gears were present in the fish ticket database supplied by Theresa Tsou (pers. comm., WDFW, file *FT_WithComps05222015.xlsx*). Landings with net gear were very small prior to 1980, then peaked in 1985 at 40 mt before declining to just tens of kilograms in 1986 and onward. These landings are included in the Net fleet.

Comparison with previous assessment

Catches prior to 1981 in the 2011 assessment were calculated as 72% of Oregon catches, and are greater than the landings reconstructed for this assessment especially in the mid-1940s and after the late 1950s (Figure 21). Reasons for this difference is that the 2011 assessment catches included discards (a fixed rate applied to them), and included foreign at-sea catches from 1966–1976, which are accounted for in the At-Sea fleet of this assessment. Accounting for those explanations, the overall landings for the entire time series are very similar.

2.2.1.2 Oregon

Historical reconstructed trawl and hook-and-line landings of Widow Rockfish from Oregon for the years 1892–1986 were obtained from Vladlena Gertseva (NWFSC, NOAA). A description of the methods can be found in Karnowski et al. (2012). Hook-and-line catches of Widow Rockfish were present in a small amount since 1892, bottom trawl catches started in 1932 with landings similar to hook-and-line landings, but quickly surpassed them, and midwater trawl landings began in 1979 with very large catches (Figure 22).

Recent landings (1987–2014) of these three gear types were obtained from PacFIN (retrieval dated June 11, 2015, Pacific States Marine Fisheries Commission, Portland, Oregon; www.psmfc.org). Landings associated with the shoreside hake fleet were separated from other trawl landings following the methods described below.

Catches prior to 1981 in the 2011 assessment were very similar to the landings reconstructed for this assessment (Figure 22). Catches in the 2011 assessment after 1980 tended to be larger than the landings reconstructed here, which is likely due to the 2011 assessment catches including discards using a fixed rate. Accounting for those explanations, the overall landings for the entire time series are very similar.

2.2.1.3 California

Historical commercial fishery landings of Widow Rockfish were obtained from the California Cooperative Groundfish Survey, also known as CALCOM (http://calcomfish.ucsc.edu/) for the years

1916–1968. The majority of these landings was classified as "other" gear, and were a significant amount. Trawl landings were specifically reported and were consistent with the bottom trawl landings in the period following 1968; therefore, we chose to classify them as bottom trawl landings. Lenarz (1986) reports that prior to 1943, most rockfish in California were caught with hook-and-line gear. We decided to classify the "other" gear in this historical reconstruction as hook-and-line because of Lenarz (1986) and because they are consistent with hook-and-line catches reported immediately following 1968. Trawl landings increased over this time period while hook-and-line landings declined.

Landings in California for 1969–1980 were also obtained from CALCOM (http://calcomfish.ucsc.edu/) for bottom trawl, midwater trawl, hook-and-line, and net gears. Trawl landings made up the majority of the landings (Figure 23).

Recent landings (1981–2014) were obtained from PacFIN (retrieval dated June 11, 2015) for bottom trawl, hook-and-line, and net gear types. CALCOM landings were used for midwater trawl because there appeared to be significant landings in CALCOM that were not in PacFIN (up to 29.2 mt in 2008). No midwater trawl landings were reported by either source from 2011–2014. The early 1980s is the period with the largest landings of Widow Rockfish in California (Figure 23).

Catches in the 2011 assessment were similar to the landings reconstructed for this assessment except from the mid-1960s onward (Figure 23). Catches in the 2011 assessment after 1980 tended to be larger than the landings reconstructed here, which is likely due to the 2011 assessment catches including discards (a fixed rate applied to them).

2.2.1.4 Shoreside hake

The domestic shoreside Pacific Hake fishery has been operating since the early 1990s and encounters rockfish as bycatch, which includes Widow Rockfish. These bycatch events are often landed and accounted for because the fishery does not normally discard catch at sea. Instead, hauls are quickly dumped into the hold (with ice or refrigerated seawater) to cool the hake quickly. The non-hake species are then accounted for when off-loading. Therefore, discards were not investigated and the landings were assumed to include the entire catch of Widow Rockfish.

Catches of Widow Rockfish in the shoreside hake fishery were separated from general trawl catches reported in PacFIN using the following method. Fish ticket landings of Widow Rockfish and Pacific Hake were downloaded from the vdrfd in the PacFIN database. Fish tickets with Pacific hake catches were matched to fish tickets with Widow Rockfish to determine the amount of hake landed with the Widow Rockfish. The following criteria were used to classify a Widow Rockfish landing as shoreside hake.

- The catch was made with bottom trawl or midwater trawl gear.
- The landing occurred in the months May through November.
- The landing occurred in years 1991 and later.
- The catch of Pacific Hake was greater than 50 kg.
- All landings with a DAHL_SECTOR indicating shoreside hake (3 or 17).

DAHL_SECTOR is a field in the vdrfd table that indicates many different sectors for landings from 1994 onward. Two codes, 3 and 17, were used to indicate shoreside hake. The rules for classifying a landing in these codes are

> **Code 3 (Shoreside Whiting Sector):** Removal type is not research, Pacific Hake catch was greater than 50% of the total vessel-day-gear catch, PacFIN gear group was TWL, and the vessel had a valid trawl endorsement.

Code 17 (Treaty Shoreside Whiting Sector): Pacific Hake catch was greater than 50% of the total vessel-day-gear catch, and PacFIN gear group was TWL.

The reason that additional rules were created to classify shoreside hake catches of Widow Rockfish was that the DAHL_SECTOR's were not available for 1991–1993. The criteria were chosen because the shoreside hake fishery is conducted with trawl gear, the majority of the landings occur in the months of May through November, the domestic hake fishery started landing significant amounts of hake in 1991, and we wanted to make sure that the years 1994 and later matched the classification in DAHL_SECTOR.

To determine the cutoff for hake catch the classification errors at different cutoffs were investigated using all landings from 1994–2014 and comparing the classification routine to what was indicated by DAHL_SECTOR. There are two types of classification errors: 1) classify a non-shoreside hake catch as a shoreside hake catch, and 2) classify a shoreside hake catch as a non-shoreside hake catch. Using various cutoff weights of hake landed, and classifying all tows in months other than May–November, the best overall classification (lowest misclassification) occurred once a small (>20 kg) weight was used (Figure 24). Misclassification rates are low even with 0 kg of hake in the landing because there are many non-shoreside hake landings, which is the initial assumption. Numbers of landings with Widow Rockfish was more sensitive, but the weight of landed Widow Rockfish showed that larger cutoffs did not change the weight due to the trade-off of each type of misclassification. A cutoff of 50 kg was chosen to classify shoreside hake tows.

Landings of Widow Rockfish from the shoreside hake fishery were greatest in the mid-1990s, but have been increasing over the last few years (Figure 25). Oregon has typically landed the most Widow Rockfish in a year. California has occasionally landed Widow Rockfish in the shoreside hake fishery, but since catch shares, there have been very few hake landings in California because the incentive of an early fishery is gone.

2.2.1.5 At-sea

Catches of Widow Rockfish are determined aboard at-sea processsing vessels by observers in the At-Sea hake Observer program (ASHOP). Observers use a spatial sample design, based on weight, to randomly choose a portion of the haul to sample for species composition. For the last decade, this has typically been 30-50% of the total weight, with a target of 50%. The total weight of the sample is determined by all catch passing over a flow scale. All species other than hake are removed and weighed, by species, on a motion compensated flatbed scale. Observers record the weights of all non-hake species. Non-hake species total weights are expanded (in the database) by using the proportion of the haul sampled to the total weight of the haul. The catch of non-hake species in unsampled hauls is determined using annual bycatch rates observed in sampled hauls. Table 10 provides a summary of the total number of hauls, the total number of unsampled hauls, the total sampled weight of all of the hauls, and the median tow expansion factor used to expand from the sample to the haul. Since 2001, more than 97% of the hauls have been observed and sampled.

The at-sea fleet consists of catcher-processor vessels (CP) and mother-ship vessels (MS). These two fleets have caught similar amounts of Widow Rockfish in past years, with some variation (Figure 26). Since 2002, the catch of Widow Rockfish has general been less than before 2002.

2.2.2 Fishery catch-per-unit-effort

Changes in management during the years with the largest catches of Widow Rockfish and restrictive limits, including the cessation of the target fishery beginning in 2002 after the Widow Rockfish stock was declared overfished make it difficult to create a catch-per-unit-effort (index of abundance from fishery-dependent information that adequately reflect the population trend. In the 2011 assessment for Widow Rockfish, four fishery-dependent CPUE indices were used. These were derived from the following fisheries: 1) Oregon bottom trawl, 2) Pacific Whiting at-sea foreign fleet, 3) Pacific Whiting at-sea joint-venture fleet, and 4) Pacific Whiting at-sea domestic fleet.

Investigating the raw catch-per-effort data can be time consuming, and the decisions on what should be kept as data to input into the modelling of the CPUE index can often be subjective. In the limited time to complete this new assessment for Widow Rockfish, we decided to focus on catch reconstruction, length and age data, fishery-independent surveys, assessment model restructuring, and assessment model investigation. Therefore, we do not present new fishery CPUE indices, but use the same four series that were included in the 2011 assessment. These four indices are shown in Figure 4.

2.2.3 Fishery length and age data

Biological data from commercial fisheries that caught Widow Rockfish were extracted from PacFIN (PSMFC) on June 25, 2015, from CALCOM on June 17, 2015 and from the NORPAC database on June 29, 2015. Lengths taken during port sampling in California, Oregon, and Washington were used to calculate length and age compositions. The data were classified into bottom trawl, midwater trawl, hake trawl, net, and hook-and-line fleets

Table 11 shows the number of landings sampled and Table 12 shows the number of lengths taken for each year, gear, and fleet from the three states. Table 13 shows these numbers for the at-sea fleet.

Length and age samples from PacFIN and CALCOM were expanded up to the total landing then combined into state-specific frequencies. Expansion factors were calculated in a way such that large expansions would not occur and based on ideas first presented by Owen Hamel (pers. comm., NWFSC). First the expansion factor (E_k) was the total catch weight (W_k) divided by the sample weight (w_k), and raised to 0.9 to account for non-homogeneity within a trip. Then, expansion factors greater than 300 were capped (100 for net fisheries) to reduce the influence of small samples (i.e., a few fish representing a large catch). The predicted total numbers at length or age weighted by landings for each state were added to create a coast-wide length frequency. The effective sample sizes of the state combined length frequencies were determined from the following formula, which has been used in previous Widow Rockfish assessments as well as other west coast groundfish assessments.

Fishery Samples	Survey Samples
$N_{eff} = N_{sample} + 0.138N_{fish} \quad \frac{N_{fish}}{N_{sample}} < 44$	$N_{eff} = N_{sample} + 0.0707N_{fish} \quad \frac{N_{fish}}{N_{sample}} < 55$
$N_{eff} = 7.06N_{sample} \quad \frac{N_{fish}}{N_{sample}} \geq 44$	$N_{eff} = 4.89N_{sample} \quad \frac{N_{fish}}{N_{sample}} \geq 55$

This is slightly different than the sample size of 2.43 per haul for rockfish that Stewart & Hamel (2014) report.

Observed lengths were expanded to the tow from At-Sea Hake Observer Program samples (NORPAC). Tows are typically well sampled, thus expansion factors were not modified from what was calculated. Hake fishery length compositions were created by combining shoreside and at-sea length compositions, weighting by the catch from each sector. The effective sample sizes for hake fishery length and age comps were calculated using the above equations for the shoreside fleet and added to the number of tows sampled from the at-sea fleet.

Expanded length compositions for bottom trawl, midwater trawl, hake fisheries, net, and hook-and-line are shown in Figure 27 to Figure 31. It is quickly apparent that all of these fisheries rarely land fish less than 26 cm. All of the non-hake fleets show a strong cohort coming though in the late 1970s and early

1980s, and then another cohort coming through in the late 1980s. Sample sizes typically dropped off after 2000, except in the hake fishery where nearly every tow is sampled.

Age compositions for the five fleets are shown in Figure 32 to Figure 36. Occasional cohorts appear to move through the population, indicating that Widow Rockfish population dynamics may be characterized by episodic recruitment events.

2.2.4 Discards

Data on discards on Widow Rockfish are available from three different sources. The earliest source is called the Pikitch data and comes from a study organized by Ellen Pikitch that collected data on trawl discards from 1985–1987 (John Wallace, pers. comm and a manuscript in prep). The second source is called EDCP data, which stands for Enhanced groundfish Data Collection Project. These data were collected from late 1995 to early 1999 by at-sea observers on vessels that voluntarily participated in the project. These data were obtained from John Wallace (NWFSC, pers. comm.) and a report to the Oregon Trawl Commission written by David Sampson describes the data. The third data source is from the WCGOP. This program is part of the NWFSC and has been recording discard observations since 2003.

Results of the Pikitch data were obtained from John Wallace (NWFSC, pers. comm.) in the form of ratios of discard weight to retained weight of Widow Rockfish and sex-specific length frequencies. Although results were extended to additional years using data from a mesh study, it was decided to use only the results from the specific years of the study since there were many observations from those years (1985–1987). Discard estimates are shown in Table 17 and range from 523 to 1,134 mt. Length compositions for discards show a wide range of sizes being discarded, with a peak around 40 cm (Figure 37).

Observations of discards from the EDCP dataset were provided as total discards and total landings per trip (i.e., fish ticket). For each year, the discards were summed and divided by the total observed landings to provide a ratio of discarded to retained catch. This was then applied to the total landings of that fleet to estimate to total discards in that year (Table 17). Variability was estimated from individual trip discard ratios. Length data were not available.

The WCGOP has been collecting on-vessel data since 2002 to mainly record discard information, and are current through 2013. A proportion of the fleet for various gear types has been observed in each year and the data collected are used to estimate the total mortality for various species. Since 2011, under trawl rationalization, 100% observer coverage is required for the limited entry trawl sectors, which resulted in a large increase in data and ability to determine discard behavior. However, given the change in management, it is likely that there has been a change in discarding behavior.

Table 18 shows the number of vessels, trips, hauls with Widow Rockfish and the number of Widow Rockfish observed by the WCGOP in the years 2002–2013 for each fleet. One year of data from midwater trawl had to be removed due to confidentiality (at least three vessels need to be observed within a year, regardless of species caught, for the strata defined). Sample sizes are largest for bottom trawl and least for hook-and-line. Midwater trawl and shoreside hake were sampled in few years, mostly since 2011. Since 2011, when the trawl rationalization program was implemented, observer coverage rates increased to nearly 100% for all the limited entry trawl vessels in the program. Open access and non-sablefish fixed gear fisheries have continued with observer rates less than 13% of all groundfish landings (WCGOP report, http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/sector_products.cfm).

Table 17 shows discard totals in metric tons for each year since the WCGOP has been collecting data. Total discards by fleet were calculated by summarizing the observed discards (d) and observed retention (r) by fleet on a coastwide basis. Using the observed landings (R), the total discards were calculated as

$$D_{y,f} = \frac{d_{y,f}}{r_{y,f}} R_{y,f}$$

where *y* and *f* indicate year and fleet, respectively. The groundfish mortality reports written by WCGOP personnel were not used because they did not contain the exact fleet structure needed and did not have uncertainty associated with the estimates. Coefficients of variation (CV) were calculated by bootstrapping vessels within ports because the observer program randomly chooses vessels within ports to be observed in the non-catch shares sectors.

Total discards were estimated in many years for some fleets and few for others (Table 17). Discards in the bottom trawl fleet were estimated for all available years (2002–2013), and discard rates (d/[d+r])were typically greater than 50% prior to implementation of the trawl rationalization program in 2011, but less than 5% thereafter. The hook-and-line fleet had a paucity of data in 2002, 2003, and 2009 (see Table 18), but other years (2004–2008 and 2010–2013) produced estimates with discard rates ranging from 10.71% to 71.7%. Observations of the midwater trawl fleet were available in only one year prior to catch-shares (2002), and in two years post-catch shares (2012 & 2013). The discard ratio was 42.5% in 2002, and virtually zero after catch shares was implemented. The shoreside hake fleet was only observed post-trawl rationalization, and even though they do not typically sort the catch at-sea, 2011 showed a discard rate of 9.6%. This was mainly the result of a single very large discard event recorded in the observer database, and because it was not indicative of more recent years and the shoreside hake fishery is managed under a maximum retention regulation, discard estimates were simply added into landings and not modeled separately for this fleet. No observations of the net fleet were available even though a very small amount of Widow Rockfish was landed by this gear between 2002 and 2013. Overall, this period of time (2002–2013) is a period with highly regulated fisheries, and discarding could have been a result of trip limits being reached. Therefore, these numbers may not be indicative of previous years when the fishery was not as tightly regulated. Variability from bootstrapping the discard data often had a long tail or was characterized by small discards or large discards, indicating that tow-specific discard rates were sometimes zero and sometimes near 100% (Figure 38).

Length compositions of the discards for the bottom trawl and hook-and-line fleets were quite different from each other (Figure 39). The hook-and-line fleet was characterized by small fish, while the bottom trawl fleet consisted mainly of large fish until 2011.

These discards were fitted to in the model. Estimated total catches, the sum of estimated discards and fixed landings, are reported where necessary.

2.3 Biological data

2.3.1 Weight-length relationship

Weight-at-length data collected from fisheries sampling and by the Triennial and NWFSC shelf/slope trawl surveys were used to estimate a weight-length relationship for Widow Rockfish (Figure 40). Weight-at-length was similar between sources with the fishery samples showing a slightly smaller weight at large sizes when compared to the survey data (Figure 41). WCGOP data were not used because only small fish were sampled, the weight of these small fish were typically less than from other sources (Figure 40), and the curves fitted to only WCGOP data were unable to estimate the slope. There were only 81 observations from the WCGOP data, which is a small amount of data compared to everything available. However, these observations may be useful to understand discards.

The weight-length relationship used in the 2011 assessment was similar for males but predicted slightly heavier females at larger sizes (Figure 41). The following relationships between weight and length for females and males were estimated from all of the data combined:

Females	$\text{weight} = 1.7355 \times 10^{-5} \cdot \text{Length}^{2.9617}$
Males	$\text{weight} = 1.4824 \times 10^{-5} \cdot \text{Length}^{3.0047}$

where weight is measured in kilograms and length in cm. These relationships were used in the assessment as fixed relationships.

2.3.2 Maturity schedule

Estimates of maturity at length have been presented by Barss & Echeverria (1987), Echeverria (1987), and Love et al (1990). Barss & Echeverria (1987) supplied data collected from Oregon and California commercial and recreational samples, which allowed us to estimate the proportion mature-at-length and proportion mature-at-age for samples from each state (Figure 42). As noted by Barss & Echeverria (1987), the samples from Oregon matured at older age and larger length. Estimates of maturity-at-length from California reported by Barss & Echeverria (1987) are similar to estimates of length-at-50%-mature from samples collected in California reported by Echeverria (1987) and Love et al (1990), although Barss & Echeverria show the smallest length-at-50%-mature.

To maintain some consistency with the 2001 assessment and to avoid any potential growth issues by area, we decided to use maturity-at-age in this assessment, but used the data provided by Barss & Echeverria (1987) to estimate a new maturity curve following a logistic function with the data from California and Oregon equally weighted to avoid California dominating the estimated relationship. This maturity-at-age curve falls between the estimated California and Oregon maturity-at-age curves (Figure 42, right), with the age-at-50%-mature estimated at 5.47 and with a slope of -0.7747 (as specified in SS3). This logistic maturity-at-age curve was used in the assessment except that maturity-at-age for ages 2 and lower were set equal to zero (Table 19).

2.3.3 Fecundity

Fecundity in rockfish is often not a linear function of weight, but increases faster at larger weights (Dick 2009). Therefore, this relationship is often accounted for in rockfish assessments by using spawning output (numbers of eggs) to determine current status. Dick (2009) did not find a significant relationship between the number of eggs per gram of body weight and body weight for Widow Rockfish. Therefore, spawning output was assumed to be proportional to weight, which is the same as spawning biomass, and is reported here.

2.3.4 Natural mortality

Natural mortality (*M*) is a parameter that is often highly uncertain in fish stocks. Past assessments of Widow Rockfish assumed constant natural mortality of 0.125 yr^{-1} or 0.15 yr^{-1}. The 2011 assessment estimated *M* with a prior developed by Owen Hamel (NWFSC, pers. comm.) using methods described in Hamel (2014). This prior was based on a maximum age of 44 and 40 for females and males, respectively, a mean temperature of 8 degrees Celsius (about 150m deep off of Oregon), and a gonadosomatic index of 9.99% and 1.86% for females and males, respectively (Love et al 1990). The sex-specific lognormal priors for *M* have medians of 0.124 yr^{-1} and 0.129 yr^{-1} for females and males, respectively, and a coefficient of variation (CV) of 30.7% for each sex. Discussions with Owen Hamel (NWFSC) led to the development of a new prior based solely on maximum age to use when estimating *M*. Using all of the available age data, a maximum age of 54 was determined for both females and males, although it has been rare to observe Widow Rockfish older than about 45 years old (Figure 43). This resulted in a prior with a much smaller median (0.0810 or -2.513284 in log space) and a larger standard deviation in log space (0.523694). Figure 44 shows that these prior distributions are wide and not highly informative.

2.3.5 Length-at-age

Two different labs have aged the majority of processed otoliths for Widow Rockfish. The SWFSC has been aging Widow Rockfish otoliths for many years, including all of the fishery data prior to 2011 and otoliths collected from the NWFSC shelf/slope survey in 2009 and 2010. The Cooperative Ageing Project (CAP) in Newport, Oregon aged 1,100 otoliths from the NWFSC shelf/slope survey, 2,026 otoliths provided by ASHOP, and 3,467 otoliths collected by port samplers. All of the commercial fishery samples were collected in the years 2011–2014. In total, there are 105,814 paired age and length observations ranging from 1978 to 2014.

Figure 45 shows the lengths and ages for all years and all data as well as predicted von Bertalanffy fits to the data. Females grow larger than males and sex specific growth parameters were estimated at the following values:

Females	$L_\infty = 50.34,\ k = 0.15,\ t_0 = -2.22$
Males	$L_\infty = 44.19,\ k = 0.21,\ t_0 = -1.78$

The data from each source (ASHOP, port sampling/BDS, Triennial survey, and NWFSC survey) are shown in Figure 46 with fitted von Bertalanffy lines. All of these sources are quite similar, especially observations from ASHOP and the NWFSC survey.

The standard deviation (SD) and coefficient of variation (CV) of length-at-age are shown in Figure 47. Modelling the CV as a function of predicted length-at-age appears to be somewhat linear from a value just under 0.1 at small lengths and slightly less value at larger lengths.

2.3.6 Sex ratios

Females tend to grow larger than males and it is expected that the proportion of females approaches one at large lengths and is less than 0.5 at intermediate lengths. Figure 48 shows that the proportion of females at length from survey data is approximately 50% until approximately 34 cm, when the proportion of females drops below 50%. At lengths larger than 46 cm, the proportion of females increases rapidly to one, suggesting that few males grow larger than 50 cm. Using all available length data with sex recorded from fishery and survey samples produces a smoother curve with the proportion of females dripping below 50% around 30 cm and increasing above 50% at lengths greater than 43 cm (Figure 49).

2.3.7 Ageing bias and imprecision

Uncertainty surrounding the ageing-error process for widow rockfish was incorporated by estimating ageing error by age. Age-composition data used in the model were from break-and-burn and surface reads and were aged by the Cooperative Ageing Project (CAP) in Newport, Oregon and the SWFSC in Santa Cruz, California.

Break-and-burn double reads of 1788 otoliths were performed by both the CAP and the SWFSC lab combined. Additionally, 100 otoliths were read both by surface and break-and-burn methods. An ageing error estimate was made based on these double reads using a computational tool specifically developed for estimating ageing error (Punt et al. 2008), and using release 1.0.0 of the R package *nwfscAgeingError* (Thorson et al. 2012) for input and output diagnostics, publicly available at: https://github.com/nwfsc-assess/nwfscAgeingError. The maximum aged fished read by the surface reading method was 10 years and the cross otolith reads between the surface and break-and-burn ageing methods showed limited variation. Therefore, a unique ageing error was not created for surface read otoliths. A non-linear standard error was estimated by age where there is more variability in the estimated age of older fish was estimated for each reading lab (Table 20, Figure 50). The SWFSC labs were estimated to be biased relative to the CAP read otoliths with a constant CV across age.

2.4 History of modeling approaches used for this stock

Interest in assessing Widow Rockfish began with a workshop on Widow Rockfish that was held at the NMFS SWFSC lab on December 11–12, 1980 (Lenarz & Gunderson 1987). This workshop was in response to the increase in catches that began in 1979. Descriptions of the fisheries in different states were given along with the biological research that was being done.

A 1984 assessment of Widow Rockfish (Lenarz 1984) summarizes a 1983 report provided to the groundfish management team, and then reports the results of a full assessment. Changes included reducing *M* from 0.25 yr^{-1} to 0.15 yr^{-1}, modeling sexes combined, and making improvements to the cohort analysis. The assessment reported that the population had declined considerably since 1980 (more than 50%) and that 1977 and 1978 were potentially strong cohorts. Assessments though 1988 suggested an equilibrium yield around 10,000 mt and strong cohorts in the late 1970s or early 1980s.

In 1989 (Hightower & Lenarz1989), stock synthesis was introduced as an assessment tool and $F_{0.1}$ was used to determine sustainable yield for *M* values of 0.15 yr^{-1} and 0.2 yr^{-1}. Equilibrium yield estimates were slightly less than 10,000 mt. In 1990 (Hightower & Lenarz1990) $F_{SPR=35\%}$was used to determine and ABC, which was 11% less than the ABC from the previous assessment. This assessment also reported results of an area-stratified model where northern and southern areas were treated as separate fisheries, with different selectivities.

An assessment in 1993 (Rogers & Lenarz 1993) produced similar results as the 1990 assessment, but made some notable observations. They found that the 1980 and 1981 year classes were stronger than the 1978, 1979, and 1984 year classes. They also reported different selectivities between bottom trawl and midwater trawl gears and suggested separating the landings by gear type.

The 1997 assessment (Ralston & Pearson 1997) defined the fleet structure that would pretty much remain until 2011. They define a mixed gear fishery in Eureka and Conception INPFC areas, an Oregon bottom trawl fishery, an Oregon midwater trawl fishery, and a Vancouver-Columbia trawl fishery. They reported that the fishery had been supported by a small number of strong cohorts: 1977, 1978, 1980, 1981, and especially 1970. They cautioned against using a constant harvest rate policy of $F_{35\%}$ or $F_{40\%}$ because of the low stock size.

An age-based model similar to Stock Synthesis was coded in ADMB (Fournier et al. 2012) for the 2000 assessment (Williams et al. 2000). The differences between SS and the new ADMB model were minor. This assessment predicted that the Widow Rockfish stock was overfished, but that the population is likely to increase with reasonable catches. Natural mortality was fixed at 0.15 yr^{-1} in this model and a starting year of 1968 was chosen based on the assumption that the 1965 year class was the earliest recruitment that could be estimated given the available data. The assessment model remained the same through 2007 with the exception of starting in year 1958 and reducing the fixed value of *M* to 0.125 yr^{-1}. In 2009, a full assessment was completed with a two-area model for a coastwide stock that estimated the proportion of recruitment in each area and started with reconstructed landings back to 1916 (He et al. 2009).

The stock was not declared rebuilt until the 2011 assessment (He et al. 2011). This assessment was a one-area model with fisheries stratified by areas as in previous assessments. This was the result of an investigation that found little difference between a one-area model and a two-area model. The model used Stock Synthesis, started in 1916, estimated recruitment, estimated *M* with a prior distribution, used length-based selectivity, and assumed a time-varying, but constant discard rate for all fisheries before

2007. This 2011 single-area model was the starting point for this assessment, and a bridging was done to investigate the differences in assumptions and updated data.

3 Assessment

An age-structured stock assessment model was used to predict the biomass trajectory of Widow Rockfish with an approach of balancing parsimony with complexity. This allowed for the determination of general trends in the biomass over time without introducing extraneous data partitions that explain little additional variation.

This assessment was a fresh look at Widow Rockfish and started by reconfiguring the fleet structure based on fishing strategy rather than space. For example, states were combined, but gears were kept separate. We also separated fleets based on discarding practices. This was also an opportunity to compile all possible sources of data, and additional length and age data were used. Unfortunately, the limited time available for this assessment did not allow for the re-analysis of all data sources, in particular, the fishery-dependent indices of abundance.

3.1 General model specifications and assumptions

Stock Synthesis v3.24U was used to estimate the parameters in the model. R4SS, revision 1.23.4, along with R version 3.2.0 were used to investigate and plot model fits. A summary of the data sources used in the model (details discussed above) is shown in Figure 51.

Stock Synthesis has many options when setting up a model and the assessment model for Widow Rockfish was set up in the following manner.

3.1.1 Summary of fleets and areas

Widow Rockfish are observed along the entire U.S. West Coast in survey and fishery observations. Past assessments have attempted modelling Widow Rockfish in two separate areas split by latitude 43° N. However, in 2011, investigations found that a single area model produced similar results. A multi-area model was not attempted here for that reason plus others listed here. First, splitting the data into two areas reduces the amount of data in each area, and should be done only when there are obvious differences that may bias the results (as in stratified sampling). Second, there is little information to inform the life-history assumptions of each area, such as maturity and movement. For example, Barss & Echeverria (1987) reported differences in maturity for samples collected from California and Oregon, but they also explained that these differences could have been due to samples collected from shallow versus deep fisheries. Finally, following two cohorts that were seen by the NWFSC bottom trawl survey indicated that they may recruit to Central and Southern California and move north as they age (Figure 2). For the management of Widow Rockfish, a single area will suffice, but if understanding the life-history and movement of Widow Rockfish is desired, then a multi-area model may be necessary.

Multiple fisheries encounter Widow Rockfish. Bottom and midwater trawl fisheries account for the majority of the Widow Rockfish landings both historically and currently. Five fishing fleets were specified within the model: 1) a shorebased bottom trawl fleet with coastwide catches from 1916–2014, 2) a shorebased midwater trawl fleet with coastwide catches from 1979–2014, 3) a fleet that targets Pacific Hake/Whiting (*Merluccius productus*) and includes a foreign and at-sea fleet with catches from 1975–2014, a domestic shorebased fleet with catches from 1991–2014, and foreign vessels that targeted Pacific Hake and rockfish between 1966–1976, 4) a net fishery consisting of catches mostly from California from 1981–2014, and 5) a hook-and-line fishery (mostly longline) with coastwide catches from 1916–2014.

3.1.2 Other specifications

The specifications of the assessment are listed in Table 21. The model is a two-sex, age-structured model starting in 1916 with an accumulated age group at 40 years. Growth and natural mortality were estimated. The lengths in the population were tracked by 1 cm intervals and the length data were binned into 2 cm intervals. A curvilinear ageing imprecision relationship was estimated and used to model ageing error. Fecundity was assumed to be proportional to body weight, thus spawning biomass was used as the measure of spawning output.

The Triennial survey was kept as a single series. Assessment of other groundfish have split this survey into an early and a late series, based mostly on the shift to deeper depths and the timing of the survey (see section 2.1.2), by estimating different catchability parameters and selectivity parameters for each period. Age data were not available for the Triennial survey, but were available for the NWFSC shelf/slope survey and were entered into the model as conditional age-at-length. Length-frequencies were calculated for the Triennial and the NWFSC shelf/slope surveys within each stratum, and then combined across strata using the biomass in each stratum as the weighting factor. This reduced the influence of a few fish observed in a large area.

The specification of when to estimate recruitment deviations is an assumption that likely affects model uncertainty. It was decided to estimate recruitment deviations from 1900–2014 to appropriately quantify uncertainty. The earliest length-composition data occur in 1976 and the earliest age data were in 1978. The most informed years for estimating recruitment deviations were from about the mid-1970s to about 2011. The period from 1900-1974 was fit using an early series with little or no bias adjustment, the main period of recruitment deviates occurred from 1975–2010 with an upward and downward ramping of bias adjustment, and 2011 onward was fit using forecast recruitment deviates with little bias adjustment. Methot and Taylor (2011) summarize the reasoning behind varying levels of bias adjustment based on the information available to estimate the deviates. Recruitment deviation was assumed to be 0.60, based on iteratively tuning to a value slightly less than the observed variability of recruitment deviations in the period 1975–2010.

The recommended selectivity type in Stock Synthesis is the double normal and was used in this assessment for the fleets. The symmetric quality of the double normal appeared to affect the fits to survey data, so the survey selectivities were modeled with a 3-node cubic spline curve. Changes in selectivity and retention curves were estimated for the trawl and fixed gear fisheries.

Time blocks for the bottom trawl, midwater trawl, and hook-and-line fishery are provided in Table 21. Bottom trawl selectivity was shifted in 2002 based on the implementation of RCAs. The time block on the retention curves for the trawl fishery were set from 1982–1989 and 1990–2010 based on changes in trip limits that likely resulted in changes to discarding patterns of Widow Rockfish. The early period (1916-1981) of the model and the final years (2011–) were mirrored and assumed to a constant 1% discard rate. Time blocks for the midwater trawl fishery were set from 1916–1982, 1983–2001, 2002–2010, and 2011–2015. These blocks were based on trip limits and major changes in the observed landings. No length data were available for discards from the midwater trawl fishery, thus the asymptote was constant across all lengths and modified up or down to change the discard rate. Hook-and-line selectivity changed in 2003 based on the implementation of RCA's, and retention changed in 1983 with the introduction of trip limits.

The following distributions were assumed for data fitting. Survey indices were lognormal, total discards were lognormal.

3.1.3 Priors

A prior distribution was developed for the natural mortality parameter from an analysis of a maximum age of 54 years. The analysis was performed by Owen Hamel (pers comm, NWFSC, NOAA) and used data from Then et al. (2015) to provide a lognormal distribution for natural mortality. The median of the lognormal prior is 0.081 and has a standard deviation in log space of 0.52. The distribution is shown in Figure 44.

The prior for steepness (*h*) assumes a beta distribution with parameters based on an update of the Dorn rockfish prior (commonly used in past West Coast rockfish assessments) conducted by J. Thorson (pers. comm, NWFSC, NOAA) which was reviewed and endorsed by the SSC in 2015. During the stock assessment review, if was decided that the steepness prior should be developed without the past Widow Rockfish data, because that would be essentially using data twice if the 2011 assessment results were included in the prior. Without Widow Rockfish, the prior is a beta distribution with μ=0.798 and σ=0.132). The distribution is shown in Figure 44. It was also decided to fix steepness at the mean of the prior without Widow Rockfish included because using the prior with the 2011 Widow Rockfish results may be inconsistent with this new assessment of Widow Rockfish.

3.1.4 Sample weights

Initially, the base case assessment model was iteratively reweighted such that the various data sources were mostly consistent with each other in terms of the relationship between input and effective sample sizes. Length and age-at-length compositions from the NWFSC shelf/slope survey were fit along with length and marginal age compositions from the fishery fleets. Length data started with a sample size determined from the equation listed in Section 2.2.3. Age-at-length data assumed that each age was a random sample within the length bin and started with a sample size equal to the number of fish in that length bin . One extra variability parameter that was added to the input variance was estimated for each survey index series. Vessels present in the WCGOP data were bootstrapped to provide uncertainty of the total discards (Table 17).

An alternative method to determine weightings for the different data sources is called the Francis method, which was based on equation TA1.8 in Francis (2011). This formulation looks at the mean length or age and the variance of the mean to determine if across years, the variability is explained by the model. If the variability around the mean does not encompass the model predictions, then that data source should be down-weighted. This method does account for correlation in the data (i.e., the multinomial distribution) as opposed to the McAllister and Ianelli (1997) method of looking at the difference between individual observations and predictions. This weighting method is presented as a sensitivity.

The method to weight the compositions datasets in SS was to use the lambdas as the weighting factor. The fleet and data-type (length or age) factor was entered as lambdas until the harmonic mean of the effective sample sizes matched the mean of the adjusted input sample sizes. Once the weighting was determined, lambda factors for all fleets with both marginal length and marginal age compositions were down-weighted by 0.5 to account for the potential double use of data since length and age are observed from the same fish.

3.1.5 Estimated and fixed parameters

There were 202 estimated parameters in the base case model. These included one parameter for R_0, 10 parameters for growth, two sex-specific natural mortality parameters, 4 parameters for extra variability on the survey indices (survey indices were fixed at zero), 3 parameters for the catchability of the hake series and the Triennial survey (the catchabilities for other surveys were calculated analytically), 47 parameters for selectivity, retention, and time blocking of the fleets, 8 parameters for survey selectivity, 115 recruitment deviations, and 12 forecast recruitment deviations.

Fixed parameters in the model were as follows. Steepness was fixed at 0.798, which is the mean of the current rockfish prior. A sensitivity analysis and a likelihood profile were done for steepness. The standard deviation of recruitment deviates was fixed at 0.60. Maturity at age was fixed as described in

Section 2.3.2. Length-weight parameters were fixed at estimates using all length-weight observations (Figure 41 and Table 22).

Dome-shaped selectivity was explored for both the fishery and the surveys. Older Widow Rockfish are often found in deeper waters and may move into areas that limit their availability to fishing gear, especially trawl gear. Little evidence was found for domed shape selectivity in all but the midwater trawl fleet. The final base model assumed asymptotic selectivity for each fishery except for the midwater trawl fishery, and for both surveys.

3.2 Model selection and evaluation

The base case assessment model for Widow Rockfish was developed to balance parsimony and realism, and the goal was to estimate a biomass trajectory for the population of Widow Rockfish on the west coast of the United States. The model contains many assumptions to achieve parsimony and uses many different sources of data to estimate reality. A series of investigative model runs were done to achieve the final base case model.

3.2.1 Key assumptions and structural choices

The key assumptions in the model were that the assessed population is a single stock with biological parameters characterizing the entire coast, maturity at age has remained constant over the period modeled, weight-at-length has remained constant over the period modeled, the standard deviation in recruitment deviation is 0.60, and steepness is 0.798. These are simplifying assumptions that unfortunately cannot be verified or disproven. Sensitivity analyses were conducted for most of these assumptions to determine their effect on the results.

Structurally, the model assumed that the catches from each fleet were representative of the coastwide population, instead of specific areas, and fishing mortality prior to 1916 was negligible. It also assumed that discards were low prior to 1982 and after 2010.

3.2.2 Alternate models explored

The exploration of models began by bridging from the 2011 assessment to SS version 3.24U, which produced no discernable difference. The updated catch series with discards added per the 2011 assessment produced insignificant differences because the total catches with assumed discards added were similar. Updating the survey indices produced small differences, except with the NWFSC shelf/slope survey. When updating this survey to 2010, the biomass decreased. However, when adding the years 2011–2014, the spawning biomass was again similar to the 2011 assessment (Figure 52). Adding age and length data from the survey produced minor differences (triennial not shown, NWFSC shelf/slope survey shown in Figure 53).

This assessment attempted to estimate discards in the model, so time was spent investigating time blocks for changes in selectivity and retention to match the limited discard data as best as possible. Using major changes in management (mainly in trip limits, Table 3) and observed changes in landings, a set of blocks was found for the bottom trawl, midwater trawl, and hook-and-line fleets. In the spirit of parsimony, we used as few blocks as possible, allowed blocks only for time periods with data, and added new blocks when we felt they were justified by changes in management and they improved the fit to the data.

Natural mortality was also investigated and a new prior was developed assuming a maximum age of 54 years for females and males. The new prior showed a median natural mortality that was quite a bit less than the prior for natural mortality used in the 2011 assessment. Therefore, even though M was estimated using the new prior, sensitivities were done fixing M at the medians of the sex-specific priors from the 2011 assessment (He et al. 2011).

Age compositions show strong occasional cohorts (Figure 32 to Figure 36), thus it was assumed that the estimation of recruitment deviations would be necessary. A simple production type model was fit to the data during the initial explorations where recruitment was not estimated. This simple model captured the gross trends, but did not capture the intricacies of strong year classes and periods of low recruitment, and uncertainty was very small. We felt that these assumptions could be relaxed with a more complex model, and poor residual patterns were explained much better.

Finally, many data configurations and model assumptions were explored during the STAR panel review. Slight changes were made to the survey length and age-at-length compositions, the steepness prior without Widow Rockfish was used, and the data weighting method was slightly modified. The changes made during the STAR panel made very little difference to the model results.

3.2.3 Convergence status

Proper convergence was determined by starting the minimization process from dispersed values of the maximum likelihood estimates to determine if the model found a better minimum. This was repeated 100 times and a better minimum was not found. The model did not experience convergence issues when provided reasonable starting values. Through the jittering done as explained above and likelihood profiles, we are confident that the base case as presented represents the best fit to the data given the assumptions made. There were no difficulties in inverting the Hessian to obtain estimates of variability, although much of the early model investigation was done without attempting to estimate a Hessian.

3.3 Response to STAR panel review and recommendations

3.3.1 STAR panel in 2011

1. *A thorough review of model structure and available data should be conducted, including but not limited to evaluation of one-area vs two areas models, the use of age- or length-based selectivities, evaluation of fixed model parameters (i.e. natural mortality), the use of dome-shaped or asymptotic selectivity curves, and the spatial definition of fisheries. Some of these items are discussed in detail below.*

   Response: All data used in the assessment model presented here, except for the fisheries indices of abundance, were obtained from appropriate sources and completely re-analyzed. This includes discards, lengths, ages, maturity, and catches. A single area assessment model was thorough investigated. A two-area model is not presented because time was better spent investigating spatial differences in the data.

2. *Provide data and/or maps on spatial patterns of fishing harvest and/or effort, particularly as it relates to the split between the northern and southern areas, in order to assess whether the division at 43° N corresponds to a natural break in the fishery or whether it divides a continuous pattern.*

   Response: Specific spatial patterns have not been fully investigated, but it was assumed that specific fishery practices have more influence on the dynamics of the population that dividing fisheries by space. Catches in California have historically been large, and may have had an effect on local abundance. However, following two recent cohorts with the NWFSC shelf/slope bottom trawl survey data show that as the cohort ages, it appears farther north, suggesting potential coastwide movement of Widow Rockfish. Spatial differences in the fisheries, the distribution of Widow Rockfish recruitment, and movement of Widow Rockfish are concepts that should be investigated further.

3. *Consider the theoretical basis of selectivity with regard to whether the mechanistic process is age-based or size-based, and the types of data which would provide information on this topic.*

   Response: A thorough investigation of age and length data was done and all available data were compiled. A specific theoretical investigation of selectivity was not done, but all possible sources of data were included in this model to inform selectivity. Selectivity was modeled as length-based because it was obvious in the fishery data that larger fish were selected (Figure 27 to Figure 31). An upper dome-shape on age-based selectivity was not investigated.

4. *Obtain all length composition from the fisheries and surveys, and evaluate whether the inclusion of these data in the model improves model performance.*

   Response: A thorough investigation of available age and length data was done, and much more data were included in this model. It is difficult to say if model performance has improved since the authors of this assessment do not have a lot of experience with the 2011 assessment, but the model was stable and uncertainty was much smaller than for many groundfish assessments.

5. *Consider multiple model-independent estimates of natural mortality in order to assess potential variation, with the possibility of developing a prior distribution for M.*

   Response: A discussion with Owen Hamel (NWFSC) led to the development of a new prior distribution based on a maximum age of 54. This prior showed a lower median than previous prior distributions, and we feel that this is the lower range of natural mortality, although the assessment of Widow Rockfish in Alaska assumes a natural mortality of 0.05 (which would indicate that fish grow to 100 years old). Owen Hamel believes that accounting for other life-history components would increase M for Widow Rockfish. The prior for M is broad and covers a wide range of possibilities.

6. *Future estimates of steepness should be accompanied by comparisons to other west coast rockfish stocks, with proposed biological explanations for any large discrepancies from other rockfish stocks.*

   Response: A new prior distribution for steepness was developed for West Coast rockfish, but was not much different than previous prior distributions. This model does not seem to be as sensitive to steepness as previous models, but that may be because M was estimated. Sensitivities exploring different values of steepness in combination with M were done.

7. *Apply other assessment methodologies, potentially including catch curves, surplus production models, stock reduction analysis, etc., to evaluate whether the information obtained on stock status, vital rates, and productivity are consistent with the assessment model.*

   Response: A proxy to a surplus production model was done in SS by fixing recruitment deviations at zero. The general trend in spawning biomass was similar, except that spawning biomass started at a higher value. Estimates of natural mortality were nearly identical to the base model. The end of the time series increased faster than the base model to nearly unfished equilibrium levels.

3.3.2 SSC recommendations in 2011

The SSC recommends that the next assessment of this stock should be

1. *a full assessment to incorporate reconstructed historical landings data for Washington,*

   Response: This is a full assessment and although a formal reconstruction of Washington landings is not complete, the assessment authors worked closely with WDFW to reconstruct the landings of Widow Rockfish in Washington.

2. *resolve potential inconsistencies in the age-reading data,*

   Response: The ages have been historically read at the SWFSC, but with many different readers. A small number of ages were surface reads, and a comparison of surface to break-and-burn (100 double reds ranging in age from 4–10) showed little bias and similar standard error. In addition, 618 otoliths were re-read by CAP that were originally read by the SWFSC. The ageing error used in this assessment accounts for the bias and error of these two sources, although it has to assume that the CAP readings are unbiased. Further investigation, and possibly re-ageing, of older otoliths should be done.

3. *evaluate the strength of incoming year-classes,*

   Response: One of the main goals of this assessment was to enumerate past and recent recruitment in the best way possible. This included eliminating spurious trends in early recruitment, but also using up-to-date data to estimate recent recruitments. The main sources of information were the NWFSC shelf/slope survey and the juvenile survey. Strong 2008 and 2010 cohorts were predicted.

4. *explore the utility of several legacy data sets, such as the Oregon bottom trawl catch per unit of effort (CPUE) index, for which complete documentation is lacking.*

   Response: Initial investigations of logbook data were done before it was realized that a proper investigation would require more time than is available to complete this assessment. This would be a useful non-assessment year research topic.

3.3.3 STAR panel in 2015

The stock assessment review (STAR) panel for this assessment was held at the NWFSC satellite lab in Newport, OR from July 27–31, 2015. David Sampson was the chair, while Paul Medley, Neil Klaer, and Ian Stewart were invited reviewers. It was a productive and busy review that thoroughly reviewed many facets of the assessments. As mentioned above, slight changes were made to the survey length and age-at-length compositions, the steepness prior without Widow Rockfish was used, and the data weighting method was slightly modified. The changes made during the STAR panel made very little difference to the model results.

The STAR panel had many recommendations, of which a great proportion applied to stock assessments in general. Only the recommendations specific to Widow Rockfish are listed here with a specific response.

3.3.3.1 Specific recommendations for this assessment

1. Produce diagnostics (residual plots, sample size estimates) based on a model run with sample size multipliers used for length and age compositions, rather than the lambda adjustment. This will make diagnostics and residual plots more straightforward to interpret.

2. The description of the W-L relationship on page 16 of the draft document describes the relationship in grams to cm; this should be kilograms.
3. Include a sensitivity run using logistic selectivity for the NWFSC survey.
4. Include a retrospective over historical assessments.
5. Include the summary table of indices used in the assessment with relative rankings.

3.3.3.2 Specific recommendations for the next widow rockfish assessment

6. The next iteration of this assessment should be an update assessment.

   Response: We agree.

7. Minor anomalies in the weight-length data from the BDS system should be excluded or reconciled.

   Response: We agree, although these anomalies had minimal effect on the assessment results.

8. A reanalysis of the foreign at-sea index that best overlaps the period of largest stock decline could be conducted before the next assessment. Other fishery indices are unlikely to have an appreciable impact on the results and may not be worth reanalyzing. In particular, an analysis should consider effort measures that include search as well as towing time, given the schooling nature of this species.

   Response: This could potentially provide better information to the period of time when the population was declining fastest. The analysis done for previous assessments, and used here, is defensible and sound. A reanalysis of these data may provide minimal return for the time invested.

9. Widow rockfish should be considered in any future discussions about trans-national stocks. Although a joint assessment with Canada may be difficult to arrange, it should be explored. It is possible that lack of information from Canada affects estimates of productivity and, in particular, steepness. Until such time as a joint assessment can be conducted, evaluation of relative catches and trend information on abundance in Canadian waters would also be helpful. Potential exchange also clouds the clear interpretation of what represents steepness for this stock.

   Response: Data on the Widow Rockfish fishery in Canada are sparse. Recent catches are well determined, but there is little additional information. To fully understand the Widow Rockfish population in Canada and its connectivity to the west coast of the United States would likely require additional sampling. However, this would result in a more complete assessment.

10. Updated maturity data representing the current stock distribution should be collected and analyzed, preferably using histological methods.

    Response: We agree completely.

11. Since there was so little information in the data on steepness, the informative prior might be strong enough to allow for estimation in future assessments. This should be explored.

    Response: Sensitivities are provided that estimate steepness with the prior. However, we are concerned that using two independent priors for natural mortality and steepness is not completely correct, and a joint prior would be the correct method. In addition, the likelihood profiles for steepness show little information about steepness, thus it was fixed and included as a axis of uncertainty.

12. Based on the variability estimated for the juvenile index, it should be removed from future analyses unless it can be improved and validated. Specifically, the estimated variance is greater than the RMSE of the recruitments, so it will add more noise than signal at the end of the time-series when there are no other data to inform recruitment. This decreases the predictive ability of the model.

    Response: We feel that this should be investigated further.

13. The recreational catch is higher than might be expected for this species. Although recreational removals are still likely to be low in relation to other removals for this stock, these should at least be reported in a table for comparison in future documents.

    Response: We agree, and have not included those catches in this document because they are difficult to compile and subject to great uncertainty.

14. It may be improve the model if the H&L and NET fisheries are combined with other fleets, as these represent very little removals and noisy data. Removals of these data did not appreciably change the results for this assessment and their selectivity showed similar patterns to other fleets. Removing these as separate fleets would likely to make the modelling simpler with no loss of signal.

    Response: This assessment included a major overhaul of the fleet structure compared to previous assessments. It is likely that future assessments can improve the assessment by learning from this and past assessments about what the important fleet structure may be.

15. Select one or more fleets (as run-time allows) and create conditional age at length data in order to inform growth and selectivity from more than just the most recent years where survey data is available.

    Response: We agree that this will be a useful investigation. Based on the advice from reviewers for this assessment, the conditional age-at-length compositions should be expanded by sample (trip or tow). Doing this for this assessment was too time consuming during the review week, so the original structure of marginal age compositions for the fishing fleets was retained.

3.4 Base-model results

The base model parameter estimates along with approximate asymptotic standard errors are shown in Table 23 and the likelihood components are shown in Table 24. Estimates of key derived parameters and approximate 95% asymptotic confidence intervals are shown in Table 25.

3.4.1 Parameter estimates

The estimates of natural mortality (0.1572 yr^{-1} and 0.1705 yr^{-1} for females and males, respectively) were higher than suggested by the medians of the prior distributions used in this assessment and the 2011 assessment. Fixing *M* at lower values than those estimates resulted in a recruitment pattern immediately before the fishery started of reduced recruitment. This suggests that the model is doing what it can to reduce the number of observations of older fish in the data. The estimates of *M* fall within the 95% confidence interval of the prior distribution (0.029–0.225), and are shown in Figure 54. The prior medians from the 2011 assessment are lower than the lower value of the 95% estimated confidence interval of *M* from this assessment (0.1362–0.1782 yr^{-1} for females and 0.1485–0.1925 yr^{-1} for males).

Estimating *M* is difficult in stock assessments, and the parameters may represent model misspecification instead of the actual life-history trait. However, when investigating models leading up to the base case model, the estimates of M were rarely less than 0.12 yr^{-1}. Uncertainty in the estimated *M* was also much less than the range of the prior (Figure 54). The assumption that appeared to have the largest effect on *M* was introducing dome-shaped selectivity in the midwater trawl fleet made *M* smaller.

Selectivity curves were estimated for commercial and survey fleets. The estimated selectivity, retention, and keep (the product of selectivity and retention) curves for the trawl and hook-and-line fleets are shown in Figure 55. The selectivity curves showed a shift to larger fish in 2002 for the bottom trawl fishery and a shift to smaller fish in 2003 for the hook-and-line fishery. The bottom trawl shift is consistent with the introduction of the RCA and gear restrictions (shoreward of the RCA) that virtually eliminated fishing in shelf habitats where smaller Widow Rockfish would more likely be encountered. Around this same time, the fixed-gear RCA specifications began preventing fishing between 30 and 100 fm.

The retention curves showed a shift to retaining a lower percentage of fish since trip limits were introduced. The asymptote of the retention curve for the bottom trawl fishery sequentially decreased as more management restrictions were introduced to about 50% retention of larger fish in the 1998-2010 period. Midwater trawl and hook-and-line fisheries estimated an asymptote to retention just above 80% for the period 1983-2010.

Estimated selectivity for the hake fleet was nearly identical to the selectivity of the net fleet (Figure 56) and neither of these fleets supported dome-shaped selectivity. The estimated selectivity curves for the Triennial and NWFSC shelf/slope surveys were similar except that the triennial survey selected smaller fish and the NWFSC slope/shelf survey was minimally dome-shaped at large sizes (Figure 56). Adding a parameter to estimate a change in selectivity for the later years of the triennial survey (a sensitivity case not shown) produced a curve that was shifted to smaller fish and slightly dome-shaped. This is unexpected since the late triennial survey coincided with a move to include deeper water (Table 6).

Additional survey variability (process error added directly to each year's input variability) for the triennial and NWFSC shelf/slope surveys was not estimated in the model because when it was estimated the estimate was zero. To avoid bound issues in estimation of the Hessian, these parameters were fixed at zero. In other words, the GLMM model-based results provided reasonable estimates of variance. The additional standard deviation added to the fishery-dependent indices was quite large, ranging from 0.16 for the bottom trawl index and 0.59 for the foreign at-sea hake fleet. The additional variability on the juvenile survey was the highest, at 0.93, giving the index very little weight in the model.

The estimates of maximum size for both females and males (Table 23) were not unexpected given the data in Figure 45. Estimates of *k* were slightly different in the model, but that is expected when accounting for selectivity. Estimated growth curves are shown in (Figure 57).

Estimates of recruitment suggest that the Widow Rockfish population is characterized by variable recruitment with occasional strong recruitments and periods of low recruitment (Figure 58). There is little information regarding recruitment prior to 1965, and the uncertainty in these estimates is expressed in the model. There are very large, but uncertain, estimates of recruitment in 2008, 1970, and 1971. Other large recruitment events (in descending order of magnitude) occurred in 1978, 2010, 1981, 1991, and 1977. The five lowest recruitments (in ascending order) occurred in 1976, 2005, 1973, 1996, and 1972. Estimates of recruitment appear to be episodic and characterized by periods of low recruitment. Two of the five largest estimated recruitments happened in the last decade.

Patterns in estimated recruitment change considerably with different values of natural mortality. The base model showed the least pattern, but there is the appearance of a period of higher recruitment in the 1970s and 1980s, followed by lower recruitment in the 1990s and early 2000s. With lower values of natural mortality, the declining pattern from the 1970s to the early 2000s was more prominent. More concerning, the recruitment for a few decades before 1970 showed a prominent decline that indicated a misspecification was present in the model (Figure 59). For a base model, it was decided to estimate *M* and reduce the model-induced trends in recruitment that were not supported by data.

3.4.2 Fits to the data

There are numerous types of data for which the fits are discussed: survey abundance indices, discard data (biomass and length compositions), length composition data for the fisheries and surveys, marginal age compositions for the fisheries, and conditional age-at-length observations for the NWFSC shelf/slope survey.

The fits to the five survey series are shown in Figure 60. Extra standard error was estimated for all of the series except for the two survey series (Table 23). None of the series showed patterns in residuals, and with the large amount of error, none of the series showed serious lack of fit. The recent NWFC shelf/slope survey showed a general increase over the time period, which was also estimated in the base model (Figure 60, lower left), although the low estimate of abundance in 2014 was not fit very well.

Fitting the total observed discard amounts required time blocks (Figure 61). Fits to the trawl discards from the Pikitch data in 1985–1987 in the time block 1982–1989 were quite good. The EDCP data (1995–1999) were not fit as well. In the time block 1990–1997, the EDCP discard observations showed a high error, and the fits were within the confidence limits, but below the point estimate in two of the three years. A time block was introduce in 1998 because a serious reduction in trip limits occurred in that year (Table 3) and continued to 2010. The EDCP data showed a very small amount of discarding, which was consistent with the WCGOP data from that time period, but in 1998 and 1999, landings from the bottom trawl fleet were very large compared to 2000–2010. Therefore, a large amount of discards were predicted for 1998 and 1999, which do not match the observations. It is believed that the EDCP observations in 1998 and 1999 are not indicative of the actual discards because the sample sizes from the EDCP data were small in those years, and 1999 had a few samples from early in the year and at the beginning of the two-month trip limit period. The predicted discards for the years 2002–2010 were small (ranging from 1.98 to 15.82 mt), and the WCGOP points estimates showed more interannual variation than the predictions (ranging from 0.03 to 26.57 mt). There were not specific patterns in residuals other than when the observation was high, the prediction was less, and vice versa. Since catch shares was introduced in 2011, the predicted discards were 0.5 mt or less (with a fixed discard rate of 1%). Observed discards in 2013, with nearly 100% observer coverage, were 2.43 mt.

The midwater trawl fishery had four time blocks, two with estimated constant discard rates across length, and two with a fixed constant discard rate of 1% across length (see Figure 55). The first time block with discard data was 1983 to 2001. Predicted discards for all three years of the Pikitch data (1985–1987) were underfit, but within the confidence limits (Figure 61). The fits to the EDCP data in 1997 and 1998 were overfit. The second time block was 2002 to 2010, which contained only one observation in 2002 (and was fit exactly, as expected). The last time block (2011 onward) assumed a 1% discard rate (as did 1916–1982). The two observations were nearly zero, and the model predicted 2.4 mt of discards in 2013.

The hook-and-line fleet had one period when retention was estimated (1983 onward). Fits to the discard data were variable, but reasonable (Figure 61).

Fits to the length-composition data are displayed in two different ways: the Pearson residuals-at-length are shown for each year for all types of length compositions, and also compared across fleets. More detailed plots of fitted lines drawn over the plotted proportions at length are shown in Appendix A. Pearson residuals for the fisheries (Figure 62 to Figure 63) do not show consistent patterns, but they do show that some fleets are not fitting some cohorts. Each fleet also shows that there are periods where older fish are underfit, and periods when older fish are overfit. With a peaked length frequency distribution, it is common for these patterns to appear given shifts in the expected distribution due to sampling error, and time-varying parameters that are assumed time-invariant. The net fishery observed some very large fish in the first two years of data, but did not observe those fish in later years. This pattern was not seen in any other fishery. There were also years where females showed positive residuals (filled circle, observed > expected) and males showed negative residuals (e.g., Figure 62, early years of bottom trawl and midwater trawl). It is uncertain if this pattern is related to growth, sexing error, or to sex-specific selectivity (e.g., when Widow Rockfish aggregate, sexes possibly may be aggregating separately). Overall, the fits to commercial fishery length compositions showed some patterns that would require complicated modelling assumptions to alleviate. However, the residuals were mostly less than 2 in absolute value, especially for fleets with a lot of sampling and catch.

Looking at the fits to length compositions aggregated for all years shows that the general shape of the length distributions are captured (Figure 64). The net and hook-and-line fisheries commonly overpredicted the catch of larger males.

The discard length frequencies for the bottom trawl and hook-and-line fleets showed a few patterns and some large residuals in a few years (Figure 65). The fits to bottom trawl discard length frequencies were generally good except in the years since catch shares began. These recent years observed small fish, which the estimated selectivity of the trawl fleet did not allow for. There were no other years that showed small fish being caught by the trawl fleet. Attempting to explain these small fish with additional time blocks on selectivity and retention did not help because explaining the small fish in the discards worsened the fits to the landed and larger fish. Discards are extremely small in this time period, so it is unlikely that a misfit here will have a lot of effect on the model. Combining the discard length frequencies over years may not be appropriate for the bottom trawl fishery due to the likely changes in discarding practices, but Figure 66 shows the prediction of discarding smaller females than observed and a more peaked observed distribution of discarded males than predicted.

Hook-and-line discard length frequencies showed a pattern of observed small fish unable to be explained by the model. These residuals were small and likely have a small effect on the model results. Combining the discard length frequencies over years showed that to capture the pattern of many small fish and a few large fish in the hook-and-line fleet would require observations of fish of sizes in the 30-40 cm range (Figure 66). Modeling discards with a simple retention function may not capture the actual discarding pattern of all or none observed in the Widow Rockfish fishery.

The triennial and NWFSC shelf/slope surveys length frequencies showed underfitting of older fish in some years and underfitting of younger fish in others (Figure 67). The combined length frequencies across years were bimodal with a valley around 37 cm, and the model showed an indication of a bimodal distribution but was unable to adequately capture both peaks (Figure 68). The nonparametric selectivity pattern helped to reduce this pattern, but selectivity may be even more complicated for the surveys. It is interesting that the fishery fleets, especially the midwater trawl fleet, typically caught fish in the 35–45 cm range, which is where some of the valley in the survey selectivities is.

Age data were fitted to as marginal age compositions for the fishing fleets and as conditional age-at-length for the NWFSC shelf/slope survey, which was expanded by tow and then by strata. Raw observations of age-at-length, which assumes that within each length bin the observed ages are a random sample of fish, were not used because they are inconsistent with the length compositions which are expanded. Using expanded age-at-length ensures that as the length bin size is increased, it approaches the expanded marginal age composition. Pearson residuals for the commercial fleets are shown in Figure 62 and Figure 63. For the trawl fisheries in Figure 62, there are diagonal patterns that mostly correspond to cohorts ageing through the years. However, there are instances where the diagonal seems to shift, such as the filled circles of the midwater trawl fishery on the lower left of the plot (years 1981–1991). The patterns match the length compositions residuals in some cases. The hake fishery shows the largest residuals in the most recent years, which could indicate a change in selectivity due to changes in how the industry responds to bycatch of Widow Rockfish. The net and hook-and-line fits to age compositions (Figure 63) showed larger residuals than the trawl fisheries. As with the fits to the length compositions, the net fishery showed the inability to match the large number of older fish observed in the early years. There appear to be a strong shift in residuals in 1988 when a lack of fit to potentially a cohort appears. The residuals were typically less than 2 for fits to the age data. However, the female age compositions occasionally produced some large residuals that were not consistently seen in the male age compositions. Aggregating across years shows that the fit to age comps was good to the trawl fleets and less so for the net and hook-and-line fleets, which had smaller sample sizes (Figure 69). The aggregated data also showed that the predictions were often unable to fit the peak in the data.

The observed and expected age-at-length are shown in Figure 70 for the twelve years of the NWFSC shelf/slope survey observations. The fits generally match the observations with some misfit at larger lengths. The standard deviation of age-at-length was variable and often the expectation was higher than the observations at larger lengths. Plots with the residuals for individual observations showed reasonably good fits to the conditional age-at-length data from the NWFSC shelf/combo survey (Figure 71). Some outliers are apparent, with large residuals mostly at smaller lengths for a given age.

3.4.3 Population trajectory

The predicted spawning biomass (in metric tons) is given in Table 26 and plotted in Figure 72. The predicted spawning biomass from the base model generally showed a slight decline over the time series until 1966 when the foreign fleet began. A short, but sharp decline occurred, followed by a steep increase due to strong recruitment. The spawning biomass declined rapidly with the developing domestic midwater fishery in the late 1970s and early 1980s. The stock continued to decline until 2000 when a combination of strong recruitment and low catches resulted in a quick increase at the end of the time series. The recent increase is even faster for summary biomass (Figure 73) because not all age 4 fish are mature (Figure 42). The 2015 spawning biomass relative to unfished equilibrium spawning biomass is above the target of 40% of unfished spawning biomass (75.1%), with a low of 37.3% in 2001 (Figure 74). Approximate confidence intervals based on the asymptotic variance estimates show that the uncertainty in the estimated spawning biomass is high, especially in the early years. The standard deviation of the log of the spawning biomass in 2015 is 0.18.

Recruitment deviations were estimated for the entire time series that was modeled (Figure 58 and discussed in Section 3.4.1) and provide a more realistic portrayal of uncertainty. Recruitment predictions from 1992 to 2007 were mostly below average (11 out of 16), with the 1998, 2004, and 2006 cohorts being the strongest in this time period, although these are weaker than the 1991 and 2008 cohorts. Many other stock assessments of rockfish along the west coast of the U.S. have estimated a large recruitment event in 1999 (e.g., greenstriped rockfish (Hicks et al. 2009), chilipepper rockfish (Field 2007), darkblotched rockfish (Gertseva and Thorson 2013)), and the 1999 cohort is predicted to be slightly above average for Widow Rockfish. The 2008 and 2010 year classes were estimated as 2 of the 4 strongest year classes. These are also very strong year classes for Pacific Hake (Taylor et al. 2015). It may be worthwhile to investigate the periods of strong and weak year classes further to see if it is an artifact of the data, a consistent autocorrelation, or a result of the environment.

The stock-recruit curve resulting from a fixed value of steepness is shown in Figure 75 with estimated recruitments also shown. The stock is predicted to have never fallen to low enough levels that the steepness is obvious. However, the lowest levels of predicted spawning biomass showed some of the smallest recruitments and very few above average recruitments. Steepness was not estimated in this model, but sensitivities to alternative values of steepness are discussed below.

The population numbers-at-age for each year are shown in Appendix B.

3.5 Uncertainty and sensitivity analyses

Three types of uncertainty are presented for the assessment of Widow Rockfish. First, uncertainty in the parameter estimates was determined using approximate asymptotic estimates of the standard error. These estimates were based on the maximum likelihood theory that the inverse of the Hessian matrix (the second derivative of the log-likelihood function with respect to the parameter vector) approaches the true uncertainty of the parameter estimates as the sample size approaches infinity. This approach takes into account the uncertainty in the data and supplies correlation estimates between parameters, but does not capture possible skewness in the error distribution of the parameters and may not accurately estimate the standard error in some cases (see Stewart et al. 2013).

The second type of uncertainty that is presented is related to modeling and structural error. This uncertainty cannot be captured in the base model as it is related to errors in the assumptions used in specifying the base model. Therefore, sensitivity analyses were conducted where assumptions were modified to reveal the effect they have on the model results.

Lastly, a major axis of uncertainty was determined from a parameter or structural assumption that results in the greatest change in stock status and advice, and projections were made for different states of nature based upon that parameter or structural assumption.

3.5.1 Parameter uncertainty

Parameter estimates are shown in Table 23 along with approximate asymptotic standard errors. The only parameters with an absolute value of correlation greater than 0.95 were the female and male natural mortality parameters, which is expected. Estimates of key derived parameters are given in Table 25 along with approximate 95% asymptotic confidence intervals. There is a reasonable amount of uncertainty in the estimates of biomass and the coefficient of variation (CV) of the spawning biomass in 2015 is 0.18, much below the default value (0.36) used to calculate P* for a Category 1 stock (Ralston et al. 2011). The CV of the 2015 estimate of depletion is 10.4%, and 99.9% of the approximate normal distribution describing uncertainty around depletion is above the management target of 40% of the unfished spawning biomass.

3.5.2 Sensitivity analysis

Sensitivity analysis was performed to determine the model behavior under different assumptions than those of the base case model. Seven sensitivity analyses were conducted to explore the potential differences in model structure and assumptions, including

1. Steepness fixed at 0.40.
2. Steepness fixed at 0.60.
3. Fixed natural mortality at 0.081 for both sexes.
4. Fixed natural mortality at 0.124 yr^{-1} for females and 0.129 yr^{-1} for males.
5. Removing the 2012–2014 survey length and age compositions.
6. Forcing asymptotic selectivity on the midwater trawl fleet.
7. Weighting the composition data using the Francis method.
8. Fitting logistic curves for survey selectivities.

Likelihood values and estimates of key parameters are shown in Table 27. Predicted spawning biomass trajectories and estimated recruitments are shown in in Figure 76. The estimates of current stock status ranged from 23.2–76.5% across the sensitivity runs, with fixing M at 0.081 resulting in the lowest estimate and Francis Weighting resulting in the highest estimate.

The value of steepness had a small effect on the end of the time series with smaller values of steepness resulting in a more depleted stock in 2015. The estimates of *M* increased slightly with smaller steepness. Equilibrium yield also decreased significantly, as expected, to a low of 3,878 mt with a steepness of 0.40.

Fixing *M* at values lower than the estimate resulted in the largest changes to spawning biomass (Figure 76) and changes to equilibrium yield that were comparable to the steepness sensitivity. Due to the changes in spawning biomass, the relative spawning biomass in 2015 changed from 75.1% in the base model to 57.3% with an *M* of 0.124 yr^{-1} and 0.129 yr^{-1} for females and males, respectively, and then to 23.2% with an *M* of 0.081 yr^{-1}. The total likelihood for both of these sensitivities were beyond the significance level for a two-parameter likelihood profile (the significance level is 3.0).

Sensitivities to the recent survey compositions, dome-shaped selectivity, the Francis weighting method, and logistic selectivities for the surveys did not show the large differences that changes in *M* showed. Estimates of *M* showed little change for all of these sensitivities. Estimating dome-shaped selectivity for the midwater fleet did not result in a significant improvement to the likelihood, but remained in the base model due to a lack of time to fully investigate these sensitivities during the STAR panel. Equilibrium unfished spawning biomass changed little for these four sensitivities.

The results were the most sensitive to natural mortality and higher mortality resulted in a higher relative spawning biomass in 2015 (i.e., less depleted), higher equilibrium yield, and less pattern in estimated recruitment deviations before the data were influential (Figure 58 and Figure 59). Fixing *M* at the prior median of 0.081 would suggest that the stock is currently overfished, which is not supported by the data.

3.5.3 Retrospective analysis

A 5-year retrospective analysis was conducted by running the model using data only through 2009, 2010, 2011, 2012, and 2013, progressively (Table 28 and Figure 77). The initial scale of the spawning population was basically unchanged for all of these retrospectives. The size of the population for the last 15 years generally increased as data were removed, although slightly. The estimate of natural mortality decreased slightly when 2 to 4 years of data were removed. No alarming trends were present in the retrospective analysis.

A look at past assessments shows that the prediction of spawning biomass has generally increased with each assessment (Figure 78). This assessment (2015) predicts the largest spawning biomass. All assessments show similar trends.

3.5.4 Likelihood profiles over key parameters

Likelihood profiles were conducted for R_0, steepness (even though it was not estimated in the base case) and over male and female natural mortality values simultaneously. These likelihood profiles were conducted by fixing the parameter at specific values and removing the prior on the parameter being profiled. Without the original prior distribution the MLE estimates from the base case will likely be different than the MLE in the likelihood profile, but this displays what information the data have.

As R_0 increased, natural mortality also increased and the relative spawning biomass in 2015 was less depleted (Table 29). The total likelihood strongly supported the estimated value (Figure 79). All length compositions except for those from the net and hook-and-line fisheries and the NWFSC shelf/slope survey supported low values of R_0. The age composition data from the midwater trawl fleet and the NWFSC shelf/slope survey also supported low values while the age compositions from the bottom trawl fleet supported a value near the estimated value. The abundance index data also supported a value near the estimated R_0 with the bottom trawl fleet, hake fleet, and NWFSC shelf/slope survey keeping R_0 from going to low values, and the two surveys along with the hake fleet and bottom trawl fleet keeping from higher values. The index data had the most influence to keeping R_0 high, while the age and length data had the most influence of keeping R_0 low.

For steepness, the negative log-likelihood was minimized at a steepness of 0.4605, but the 95% confidence interval extends over the entire range of possible steepness values (Table 30 and Figure 80). Likelihood components by data source show that the net, hook& line, and hake (slightly) length compositions support values of steepness above 0.5. For the age data, the hake and bottom trawl data supported high values of steepness. The abundance index data supported high values of steepness overall, mostly because of the bottom trawl index. The hake indices also supported high steepness while the triennial and juvenile surveys supported low values. No single data source were the most influential on the estimate of steepness, but compositions supported low values while the indices of abundance supported high values, generally.

Bivariate likelihood profiles for female and male natural mortality are shown in Figure 81 and Figure 82. The bivariate profile (Figure 81) shows a strong diagonal pattern indicating that the difference between female and male natural mortality is well defined, but the value is not as well defined. *M* values less than 0.14 yr^{-1} are not strongly supported. As *M* increases, the stock status in 2015 also increases. The length and age data contained all of the information about the difference between female and male *M* (Figure 82). Small values of *M* were not supported mostly because of the recruitment penalty. As mentioned early, smaller *M* values resulted in patterns in recruitment deviations that depart from zero and add to the overall penalty. The only data to strongly support values less than 0.12 yr^{-1} were the length compositions. Fleet-specific components of the bivariate likelihood profile show that the bottom trawl data have the most influence on keeping *M* high (Figure 83). The NWFSC survey length data contradict the NWFSC survey age data.

3.5.5 Overall assessment uncertainty

Model uncertainty has been described by the estimated uncertainty within the base model and by the sensitivities to different model structure. The parameters that resulted in the most variability of predicted status and yield advice were natural mortality (*M*) and steepness (*h*). The 95% confidence interval for *M* was greater than and did not include the median of the prior distribution with a maximum age of 54, nor did it include the medians of the prior distributions used in the 2011 assessment (which were higher than the estimates from that assessment). There is the possibility that the base model and its approximate uncertainty intervals based on maximum likelihood theory may not entirely convey the actual uncertainty of this assessment. However, preliminary (and non-converged) MCMC tests suggest that the uncertainty is similar to the results presented here for natural mortality, spawning biomass, and depletion.

The estimates of natural mortality in this assessment are higher than the values estimated in the 2011 assessment. This assessment included much more length and age data, but the same index data with updates to the juvenile survey and the NWFSC shelf/slope survey. It is likely that the additional length and age data suggest that fewer fish are reaching old ages and large lengths than suggested by assumed smaller values of natural mortality. In addition, this assessment does not show as strong of a pattern in the estimated recruitment deviations immediately before fishing began (Figure 58 and Figure 59). The pattern of below average recruitment deviations before data were available is a way for the model to explain fewer old and fewer large fish in the years when data were available.

Recent recruitment is estimated with low precision because there are few observations to inform those year classes. However, the cohorts are very important to projections because they will be an important component of the fishery in future years. The 2008 and 2010 cohorts are estimated to be above average, but looking at retrospective estimates of year class strength (Figure 84), the year class strength is not often well know until age 5 or 6, and for some year classes until age 10.

Three major sources of uncertainty were natural mortality, steepness, and the strength of recent year classes. Therefore, the axis of uncertainty to define low and high states of nature was a combination of these three factors. The 12.5% and 87.5% quantiles for female and male natural mortality (independently) were chosen as low and high values (0.145 yr^{-1} and 0.170 yr^{-1} for females; 0.158 yr^{-1} and 0.183 yr^{-1} for males). The 12.5% and 87.5% quantile of t 2010 recruitment were also used (0.7340 and 1.3826). Steepness is probably the most important factor since it was fixed in the base model and is not incorporated in the estimation uncertainty. The 12.5% and 87.5% quantiles from the steepness prior (without Widow Rockfish data) were used to define the low and high values of steepness (0.682 and 1.333). The low combination of these three factors defined the low state of nature and the high combination of these three factors defined the high state of nature. The prediction of spawning biomass in 2015 from the low and high states of nature are close to the 12.5% and 87.5% lognormal quantiles from the base model.

4 Reference points

Reference points were calculated using the estimated selectivities and catch distribution among fleets in the most recent year of the model (2014). Sustainable total yields (landings plus discards) were 7,776 mt when using an $SPR_{50\%}$ reference harvest rate and with a 95% confidence interval of 5,881 to 9,670 mt based on estimates of uncertainty. The spawning biomass equivalent to 40% of the unfished spawning output ($SB_{40\%}$) was 32,283 mt. The recent catches (landings plus discards) have been below the point estimate of potential long-term yields calculated using an $SPR_{50\%}$ reference point and the population has been increasing over the last decade.

The predicted spawning biomass from the base model generally showed a slight decline until the late 1970s, steep increase above unfished equilibrium levels, then a steep decline until the mid-1980s followed by less of a decline until 2001 (Figure 72). Since 2001, the spawning biomass has been increasing due to small catches, and recently, above average recruitment. The 2015 spawning biomass relative to unfished equilibrium spawning biomass is above the target of 40% of unfished spawning biomass (Figure 74). The fishing intensity (relative 1-*SPR*) exceeded the current estimates of the harvest rate limit ($SPR_{50\%}$) throughout the 1980s and early 1990s, as seen in Figure 86. Recent exploitation rates on Widow Rockfish were predicted to be much less than target levels. In recent years, the stock has experienced exploitation rates that have been below the target level while the biomass level has remained above the target level (Figure 87).

The equilibrium yield plot is shown in Figure 88, based on a steepness value fixed at 0.798. The predicted maximum sustainable yield under the assumptions of this assessment occurs near 25% of equilibrium unfished spawning biomass.

5 Harvest projections and decision tables

A twelve year projection of the base model with catches equal to the current ACL (2,000 mt) for all years and a catch allocation equal to the percentages for each fleet in 2014 predicts an increase in the spawning biomass to levels just below unfished equilibrium spawning biomass, with a slight downturn beginning in 2023 (Table 31). This increase is due to the recent large estimated recruitments (2008 and 2010) and because 2,000 mt is less than the equilibrium yield. Projections with the current ACL using the low and high states of nature an increase in stock size and the stock remaining above 40% of unfished equilibrium spawning biomass (Table 32).

Projections were also down with an annual catch of 1,000 mt, which may be more reasonable since the largest catch in the last decade was in 2014 with total landings of 722 mt. Projections are slightly more optimistic than the 2000 mt series.

Projections with catches based on the predicted annual catch limit (ACL) using the SPR rate of 50%, the 40:10 control rule, and a 0.45 P* adjustment using a sigma of 0.36 from 2017 onward suggest that the spawning biomass will decrease over the projection period for all states of nature (Table 32). Predicted ACL catches range from 13,514 mt in 2017 to 8,832 mt in 2026.

6 Regional management considerations

Widow Rockfish have shown latitudinal differences in life-history parameters, which has led past assessment authors to pursue a two-area model. Modelling a stock with two areas is difficult because it requires many assumptions about recruitment distribution, movement, and connectivity, while also splitting data into two areas that reduces it sample size compared to a coastwide model. The upside is that it can result in a better model that more accurately predicts regional status. This assessment is a coastwide model because not enough is known about the assumptions that would have to be made for a two-area model.

It is still important to consider regional differences when making management decisions. Following recent cohorts through time with survey data showed that older fish showed up in the north after younger fish were observed in the south (Figure 2). This may indicate connectivity between the north and the south and that this is truly one stock. However, more investigation is needed.

Widow Rockfish are managed on a coastwide basis and observed more often in the NWFSC shelf/slope bottom trawl survey north of latitude 40° 10′ N. Bottom trawl catches in California have historically been as large as in Oregon and larger than in Washington, but recently catches in California have been small. Rockfish Conservation Areas (RCAs) cover a significant proportion of Widow Rockfish habitat, but a midwater trawl fishery is begin to re-develop that can fish in these areas. Future assessments and management of Widow Rockfish may want to monitor where catches are being taken to make sure that specific areas are not being overexploited. In addition, research on the connectivity along the coast as well as regional differences would help to inform the potential for overfishing specific areas.

7 Research and data needs

There are many areas of research that could be improved to benefit the understanding and assessment of Widow Rockfish. Below, we specifically identify five topics that we believe are most important.

- **Historical landings and discards:** The historical landings and discards are uncertain for Widow Rockfish and improvements would increase the certainty that fishing removals are applied appropriately. Because landings are assumed to be known exactly in the assessment model, uncertainty in the predictions does not include uncertainty in the landings. A thorough look at historical landings, species compositions, and discarding practices would reduce the potential uncertainty that is not entirely accounted for.

- **Natural mortality:** Uncertainty in natural mortality translates into uncertain estimates of status and sustainable fishing levels for Widow Rockfish. The collection of additional age data, re-reading of older age samples, reading old age samples that are unread, and improved understanding of the life-history of Widow Rockfish may reduce that uncertainty.

- **Maturity and fecundity:** There are few studies on the maturity of Widow Rockfish and even less recent information. There have been no studies that reported results of a histological analysis. Further research on the maturity and fecundity of Widow Rockfish, the potential differences between areas, the possibility of changes over time would greatly improve the assessment of these species.

- **Age data and error:** There is a considerable amount of error in the age data and potential for bias. Investigating the ageing error and bias would help to understand the influences that the age data have on this assessment.

- **Basin-wide understanding of stock structure, biology, connectivity, and distribution:** This is a stock assessment for Widow Rockfish off of the west coast of the U.S. and does not consider data from British Columbia or Alaska. Further investigating and comparing the data and predictions from British Columbia and Alaska to determine if there are similarities with the U.S. West Coast observations would help to define the connectivity between Widow Rockfish north of the U.S.-Canada border.

8 Acknowledgments

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10 Tables

Table 1: Landings for bottom trawl, midwater trawl, net, and hook-and-line (mt) fisheries from Washington, Oregon, and California.

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	CA	OR	WA	CA	OR	WA	CA	WA	CA	OR	WA
1916	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.8	0.3	0.0
1917	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.9	0.3	0.0
1918	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	128.5	0.3	0.0
1919	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.6	0.3	0.0
1920	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.7	0.4	0.0
1921	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.1	0.4	0.0
1922	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.2	0.4	0.0
1923	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.7	0.4	0.0
1924	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.2	0.4	0.0
1925	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.7	0.4	0.0
1926	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.5	0.4	0.0
1927	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.4	0.5	0.0
1928	16.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.0	0.8	0.0
1929	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.1	1.3	0.0
1930	20.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.4	1.2	0.0
1931	20.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.6	0.9	0.0
1932	21.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	77.7	0.3	0.0
1933	34.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	50.9	0.5	0.0
1934	30.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.7	0.5	0.0
1935	28.9	0.2	0.7	0.0	0.0	0.0	0.0	0.0	67.9	0.5	0.0
1936	23.4	0.7	1.1	0.0	0.0	0.0	0.0	0.0	84.3	1.2	0.0
1937	33.6	1.3	0.9	0.0	0.0	0.0	0.0	0.0	66.3	1.3	0.0
1938	32.2	0.0	1.1	0.0	0.0	0.0	0.0	0.0	49.6	1.0	0.0
1939	38.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	34.2	0.7	0.0
1940	30.6	43.7	1.0	0.0	0.0	0.0	0.0	0.0	43.9	1.5	0.0
1941	24.8	67.3	1.4	0.0	0.0	0.0	0.0	0.0	34.1	1.9	0.0
1942	5.4	126.1	1.8	0.0	0.0	0.0	0.0	0.0	10.2	3.1	0.0
1943	28.3	439.2	1.2	0.0	0.0	0.0	0.0	0.0	18.0	3.9	0.0
1944	148.6	770.7	2.0	0.0	0.0	0.0	0.0	0.0	38.0	1.4	0.0
1945	353.4	1,196.6	3.4	0.0	0.0	0.0	0.0	0.0	66.8	1.1	0.0
1946	353.2	735.0	0.8	0.0	0.0	0.0	0.0	0.0	69.7	1.3	0.0
1947	98.1	452.8	0.2	0.0	0.0	0.0	0.0	0.0	91.3	0.7	0.0
1948	139.4	297.3	0.1	0.0	0.0	0.0	0.0	0.0	39.6	1.2	0.0
1949	75.1	254.7	0.0	0.0	0.0	0.0	0.0	0.0	43.9	0.6	0.0
1950	70.9	286.8	1.8	0.0	0.0	0.0	0.0	0.0	63.4	0.8	0.0
1951	249.4	252.9	2.0	0.0	0.0	0.0	0.0	0.0	49.1	0.6	0.0

Table 1 continued

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	**CA**	**OR**	**WA**	**CA**	**OR**	**WA**	**CA**	**WA**	**CA**	**OR**	**WA**
1952	236.6	264.2	0.2	0.0	0.0	0.0	0.0	0.0	39.9	0.6	0.0
1953	242.6	211.5	1.2	0.0	0.0	0.0	0.0	0.0	13.7	0.3	0.0
1954	155.8	267.3	3.1	0.0	0.0	0.0	0.0	0.0	21.3	0.4	0.0
1955	166.3	277.5	2.5	0.0	0.0	0.0	0.0	0.0	18.2	0.4	0.0
1956	196.8	361.3	0.7	0.0	0.0	0.0	0.0	0.0	41.8	0.3	0.0
1957	233.1	489.5	0.1	0.0	0.0	0.0	0.0	0.0	37.4	0.6	0.0
1958	284.3	380.4	0.2	0.0	0.0	0.0	0.0	0.0	36.6	0.1	0.0
1959	229.9	412.8	0.1	0.0	0.0	0.0	0.0	0.0	28.6	0.2	0.0
1960	180.0	608.6	0.2	0.0	0.0	0.0	0.0	0.0	21.9	0.2	0.0
1961	118.4	543.1	0.2	0.0	0.0	0.0	0.0	0.0	15.0	0.5	0.0
1962	115.9	623.8	2.0	0.0	0.0	0.0	0.0	0.0	15.4	0.4	0.0
1963	221.2	190.2	2.1	0.0	0.0	0.0	0.0	0.0	19.6	0.4	0.0
1964	104.1	480.9	3.2	0.0	0.0	0.0	0.0	0.0	13.0	0.1	0.0
1965	155.9	80.6	2.2	0.0	0.0	0.0	0.0	0.0	20.2	0.6	0.0
1966	123.0	455.8	0.6	0.0	0.0	0.0	0.0	0.0	37.4	0.4	0.0
1967	141.9	743.9	0.6	0.0	0.0	0.0	0.0	0.0	31.9	1.1	0.0
1968	155.0	240.6	16.7	0.0	0.0	0.0	0.0	0.0	19.0	1.0	0.0
1969	223.5	229.3	16.7	0.0	0.0	0.0	0.0	0.0	17.6	2.3	0.0
1970	257.3	27.7	3.0	0.0	0.0	0.0	0.0	0.0	9.0	0.9	0.0
1971	316.2	50.6	11.7	0.0	0.0	0.0	0.0	0.0	10.2	1.8	0.0
1972	411.9	51.8	14.1	0.0	0.0	0.0	0.0	0.0	17.8	2.3	0.0
1973	428.1	20.9	32.4	0.0	0.0	0.0	0.0	0.0	15.8	2.5	0.0
1974	426.4	7.3	6.5	0.0	0.0	0.0	0.0	0.0	41.3	3.1	0.0
1975	429.9	9.0	12.0	0.0	0.0	0.0	0.0	0.0	28.4	1.6	0.0
1976	467.3	56.0	36.2	0.0	0.0	0.0	0.0	0.0	39.5	2.2	0.0
1977	459.0	340.0	125.8	0.0	0.0	0.0	0.0	0.0	38.1	2.6	0.0
1978	538.9	340.1	336.7	0.0	0.0	0.0	0.0	0.0	157.4	3.8	0.0
1979	2,315.4	519.4	305.0	0.0	3,746.0	2,199.8	0.0	0.0	97.1	6.4	0.0
1980	5,175.6	410.8	338.4	150.8	8,460.7	6,969.4	0.0	3.4	55.9	3.7	0.0
1981	2,660.2	1,527.1	681.2	2,627.4	13,861.9	6,183.5	15.5	3.2	67.5	4.0	0.0
1982	3,656.7	782.8	522.0	7,008.1	8,184.4	5,458.0	38.1	37.1	180.6	5.9	0.0
1983	3,667.1	1,403.6	1,554.6	205.1	1,495.6	1,656.5	280.0	14.5	23.5	10.2	0.0
1984	1,434.6	1,428.5	381.8	1,378.6	3,982.8	1,064.6	324.8	26.6	22.8	3.8	0.0
1985	1,363.0	895.1	317.6	1,281.6	3,423.4	1,214.6	585.8	40.2	26.1	1.1	0.0
1986	1,640.4	1,230.1	716.1	362.2	3,150.5	1,834.1	500.8	0.0	81.5	1.9	0.0
1987	2,261.1	1,185.5	698.4	0.0	5,114.5	3,013.1	584.6	0.0	52.4	2.7	0.0
1988	1,585.3	1,152.8	1,290.3	0.0	4,305.6	1,785.0	220.7	0.0	72.3	1.0	0.2
1989	1,838.3	2,027.5	647.7	0.0	4,957.7	2,726.9	253.6	0.1	44.7	0.4	0.0
1990	1,812.7	2,289.3	1,210.4	0.0	3,352.8	1,021.1	411.2	0.0	126.9	7.3	0.2

Table 1 continued

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	**CA**	**OR**	**WA**	**CA**	**OR**	**WA**	**CA**	**WA**	**CA**	**OR**	**WA**
1991	996.4	1,989.2	878.9	0.0	1,779.9	260.2	234.8	0.0	89.7	5.2	0.3
1992	917.4	2,709.5	646.5	0.0	1,183.8	282.5	45.4	0.0	165.8	9.2	0.5
1993	1,088.3	3,457.0	1,109.8	1.2	1,706.8	547.9	51.6	0.0	63.7	44.7	0.5
1994	557.9	2,600.7	644.1	210.0	1,564.4	387.5	58.4	0.0	71.7	9.6	0.4
1995	1,361.1	2,386.7	339.0	292.7	1,283.4	700.7	57.6	0.0	19.0	7.2	0.1
1996	1,056.8	2,292.1	237.9	238.8	998.2	609.4	16.1	0.0	21.6	11.0	0.1
1997	1,032.5	2,502.8	241.7	253.6	1,453.1	735.8	16.4	0.0	22.4	15.6	0.0
1998	686.2	1,641.1	188.4	81.6	493.4	307.8	48.7	0.0	62.4	24.1	0.0
1999	485.0	945.0	182.7	100.1	1,634.2	315.9	10.0	0.0	29.0	14.7	0.1
2000	34.2	19.6	2.9	680.8	2,604.8	379.4	6.8	0.0	11.9	2.5	0.0
2001	9.3	28.8	1.0	310.3	1,092.4	287.1	7.0	0.0	6.4	0.7	0.0
2002	8.7	6.0	2.4	40.0	151.7	59.8	0.0	0.0	0.4	0.1	0.0
2003	3.1	0.3	0.2	0.4	0.0	9.3	0.4	0.0	0.3	0.6	0.0
2004	5.9	2.4	0.1	7.5	0.0	21.3	0.0	0.0	0.2	0.1	0.0
2005	2.7	0.2	0.2	5.2	0.0	27.6	0.1	0.0	0.4	0.8	0.1
2006	3.8	2.0	0.3	3.6	0.0	9.3	0.0	0.0	0.8	0.0	0.0
2007	2.7	1.8	0.3	1.0	0.0	0.5	2.9	0.0	1.6	0.3	0.0
2008	0.2	1.7	0.2	29.2	0.0	12.9	0.0	0.0	1.2	0.0	0.0
2009	1.9	2.1	0.2	2.3	0.0	34.1	0.2	0.0	0.4	0.0	0.0
2010	1.2	2.9	0.7	9.0	0.0	45.7	0.0	0.0	0.0	0.1	0.0
2011	1.1	10.0	7.2	0.0	12.4	31.5	0.0	0.0	0.0	0.0	0.0
2012	2.3	27.0	12.0	0.0	5.9	41.5	0.0	0.0	0.2	0.1	0.0
2013	4.8	44.0	2.4	0.0	204.5	36.6	0.0	0.0	0.9	0.1	0.0
2014	2.7	46.1	22.5	0.0	259.7	46.9	0.0	0.0	1.7	0.1	0.0

Table 2: Landings (mt) from the foreign & domestic at-sea fleet and the domestic shoreside hake fleet. Catches (mt) from the Pacific whiting at-sea fishery as determined by onboard observers.

Year	Foreign & Domestic At-sea	Shoreside hake CA	Shoreside hake OR	Shoreside hake WA	Year	Foreign & Domestic At-sea	Shoreside hake CA	Shoreside hake OR	Shoreside hake WA
1966	3,670.0	0.0	0.0	0.0	1991	471.3	42.7	39.0	9.3
1967	3,902.0	0.0	0.0	0.0	1992	389.6	13.5	42.1	6.2
1968	1,956.0	0.0	0.0	0.0	1993	173.2	0.4	91.2	11.0
1969	358.0	0.0	0.0	0.0	1994	370.7	2.1	210.8	28.6
1970	554.0	0.0	0.0	0.0	1995	228.6	7.2	192.1	36.8
1971	701.0	0.0	0.0	0.0	1996	252.2	5.7	475.1	104.7
1972	421.0	0.0	0.0	0.0	1997	215.5	7.2	133.9	22.1
1973	656.0	0.0	0.0	0.0	1998	268.5	40.4	278.0	28.1
1974	418.0	0.0	0.0	0.0	1999	191.8	12.7	166.4	15.2
1975	391.2	0.0	0.0	0.0	2000	205.4	7.7	70.9	4.7
1976	718.5	0.0	0.0	0.0	2001	174.0	9.2	26.4	9.0
1977	119.3	0.0	0.0	0.0	2002	154.9	1.2	2.6	1.4
1978	191.9	0.0	0.0	0.0	2003	14.5	0.4	7.6	4.6
1979	197.9	0.0	0.0	0.0	2004	21.2	7.4	12.4	8.5
1980	272.0	0.0	0.0	0.0	2005	80.1	5.2	59.1	13.6
1981	227.9	0.0	0.0	0.0	2006	143.0	3.6	11.3	35.3
1982	157.5	0.0	0.0	0.0	2007	146.0	1.0	46.1	35.3
1983	131.5	0.0	0.0	0.0	2008	115.2	29.2	36.1	37.5
1984	294.7	0.0	0.0	0.0	2009	26.6	2.3	46.6	59.8
1985	182.6	0.0	0.0	0.0	2010	44.6	9.0	35.3	17.5
1986	256.8	0.0	0.0	0.0	2011	38.4	0.0	79.9	19.5
1987	181.3	0.0	0.0	0.0	2012	79.2	0.0	85.1	17.1
1988	231.6	0.0	0.0	0.0	2013	31.2	0.0	115.1	29.2
1989	212.0	0.0	0.0	0.0	2014	56.2	0.0	250.1	35.9
1990	230.2	0.0	0.0	0.0					

Table 3: A subset of management actions of importance to fisheries that caught Widow Rockfish.

Year	Management action
1982	Establishment of a 75,000 pound trip limit on Widow Rockfish in October
1983	Per-trip and per-week limits implemented for *Sebastes* complex coastwide (north and south of 40° N) 30,000 pound Widow Rockfish trip limit at the start of the year adjusted to 1,000 pound trip limit in September
1984	50,000 pound Widow Rockfish trip limit limited to once per week Trip limit lowered to 40,000 pounds once per week in May Directed fishery for Widow Rockfish closed in August and a full fishery closure in November
1985	30,000 pound trip limit once per week, or 60,000 pounds once every 2 weeks. Every 2 week option was rescinded in April Landings of *Sebastes* complex and Widow Rockfish smaller than 3,000 pounds unrestricted Widow Rockfish trip limit reduced to 3,000 pounds per trip without a trip frequency in July
1986	30,000 pound coastwide Widow Rockfish trip limit with no biweekly option Landings of *Sebastes* complex and Widow Rockfish smaller than 3,000 pounds unrestricted 3,000 pound coastwide trip limited implemented in September when Widow Rockfish ABC reached
1987	30,000 pound coastwide Widow Rockfish trip limit with no biweekly option. Only one landing per week above 3,000 pounds. Reduced Widow Rockfish trip limit to 5,000 pounds in October Closed the Widow Rockfish fishery in November
1988	30,000 pound coastwide Widow Rockfish trip limit with no biweekly option. Only one landing per week above 3,000 pounds. Reduced Widow Rockfish trip limit to 3,000 pounds in October
1989	30,000 pound coastwide Widow Rockfish trip limit with no biweekly option. Only one landing per week above 3,000 pounds. Reduced Widow Rockfish trip limit to 10,000 pounds in April Reduced Widow Rockfish trip limit to 3,000 pounds in October
1990	15,000 pound trip limit once per week, or 25,000 pounds once every 2 weeks. Only one landing per week above 3,000 pounds. Closed the Widow Rockfish fishery in December
1991	10,000 pound trip limit once per week, or 20,000 pounds once every 2 weeks. Only one landing per period above 3,000 pounds. Reduced Widow Rockfish trip limit to 3,000 pounds on my birthday in September
1992	30,000 pound coastwide Widow Rockfish trip limit per 4-week period. All landings apply to the 30,000 pounds. Reduced Widow Rockfish trip limit to 3,000 pounds in August Re-established the 30,000 pound cumulative landing limit for December
1993	30,000 pound coastwide Widow Rockfish trip limit per 4-week period. All landings apply to the 30,000 pounds. Reduced Widow Rockfish trip limit to 3,000 pounds in December
1994	Divided the commercial groundfish fishery in limited entry and open access fisheries. 30,000 pound cumulative Widow Rockfish limit per calendar month. Reduced Widow Rockfish trip limit to 3,000 pounds in December Rockfish limit of 10,000 per vessel per trip in open access fisheries, not to exceed 30,000 pounds of Widow Rockfish (as in limited entry fisheries) cumulative per month.
1995	30,000 pound cumulative Widow Rockfish limit per calendar month. Monthly cumulative trip limit increased to 45,000 pounds for Widow Rockfish
1996	70,000 pound cumulative Widow Rockfish limit per two-month period. Reduced cumulative two-month period Widow Rockfish limit to 50,000 pounds in September. 25,000 pound monthly cumulative limit implemented in November.
1997	70,000 pound cumulative Widow Rockfish limit per two-month period. Reduced cumulative two-month period Widow Rockfish limit to 60,000 pounds in May.

Table 3 continued

1998	25,000 pound cumulative Widow Rockfish limit per two-month period. Increased cumulative two-month period Widow Rockfish limit to 30,000 pounds in May. Open access monthly cumulative trip limits reduced to 3,000 pounds in July. Limited entry monthly trip limits for Widow Rockfish increased to 19,000 pounds. Prohibited landings of Widow Rockfish in open access fisheries.
1999	Dividing line between north and south management areas moved to 40º 10' N. Three-phase cumulative limit period system introduced. Phase 1: 70,000 pounds cumulative limit from January through March for Widow Rockfish. Phase 2: 16,000 pounds per 2-month period April through September for Widow Rockfish. Phase 3: 30,000 pounds per month October through December for Widow Rockfish. Open access limit to 2,000 pounds per month of Widow Rockfish. Phase 2 two-month limits reduced to 11,000 pounds for Widow Rockfish starting in June. Open access month cumulative trip limit increased to 8,000 pounds of Widow Rockfish. WA and OR restrict landings applied to 30,000 monthly limit to have midwater gear. State imposed cumulative trip limits per month applied otherwise.
2000	Sorting of Widow Rockfish required before weighing in limited entry and open access fisheries. New limited entry trawl gear restrictions implemented for large footrope trawl gear, small footrope trawl gear, and midwater trawl gear. Cumulative trip limits allowed for Widow Rockfish only if small footrope or midwater trawl gear were used. Higher cumulative trip limits available to midwater gear. 30,000 pound two-month cumulative trip limit for Widow Rockfish caught with mid-water gear. 1,000 pound monthly trip limit allowed for small footrope trawl. 3,000 pound monthly trip limits for Widow Rockfish caught with limited entry fixed gear, open access gear, and exempted trawl gear. Some closures south of 40°10' N latitude in January through April.
2001	Similar actions as in 2000 with the following changes: 20,000 pound two-month cumulative trip limit for Widow Rockfish caught with mid-water gear in January through April and September through October. 10,000 pound two-month cumulative trip limit in other periods. Widow Rockfish limits reduced to 1,000 pounds per month in July-September unless landed with Pacific Whiting, which is 2,000 pounds per month with a 500 pound trip limit. Retention of Widow Rockfish prohibited beginning in October. For gears other than midwater trawl.
2002	Rockfish Conservation Areas (RCA) established. Large footrope gear prohibited inside 275 m. Widow fishery closed most of the year except for a small amount of bycatch and small monthly limits in some months.
2003	Widow fishery closed most of the year except for a small amount of bycatch and small monthly limits in some months.
2004	Widow fishery closed most of the year except for a small amount of bycatch and small monthly limits in some months.
2005	Widow fishery closed most of the year except for a small amount of bycatch and small monthly limits in some months.
2006	Amendment 19 established essential fish habitat (EFH) boundaries and conservation areas. Widow bycatch cap in the non-tribal limited entry whiting trawl fishery increased from 200 mt to 220 mt in October
2007	Seasonal changes of trawl RCA boundaries and periodic closures within certain latitude boundaries (e.g., north of Cape Alava at 48°10' N. latitude to the U.S. - Canada border) started in 2007. Small monthly limits for Widow Rockfish (less than 1,500 pounds per month) Widow bycatch cap in the non-tribal limited entry whiting trawl fishery increased from 200 mt to 220 mt in May. Limited entry whiting trawl fishery closed due to attainment of 220 mt widow bycatch in July Limited entry whiting trawl fishery re-opened with 275 mt widow bycatch cap in October
2008	Widow bycatch cap of 275 mt adopted for limited entry whiting trawl fishery. Limited entry whiting trawl fishery closed due to attainment of canary bycatch in August Limited entry whiting trawl fishery re-opened with 284 mt widow bycatch cap in October

	Small monthly limits for Widow Rockfish (less than 1,500 pounds per month)

Table 3 (continued)

2009	Sector specific bycatch caps for Widow Rockfish in the limited entry whiting trawl fishery: 105 mt for shoreside fleet, 85 mt to catcher-processors, 60 mt to motherships Small monthly limits for Widow Rockfish (less than 1,500 pounds per month)
2010	
2011	Trawl rationalization began, establishing the IFQ fishery.

Table 4: Management guidelines for Widow Rockfish from 2004 to 2015. Total landings (mt) are also shown.

Year	OFL (mt) (termed ABC prior to 2011)	ABC (mt)	ACL (mt) (termed OY prior to 2011)	Commercial Landings (mt)	Estimated Total Catch (mt)
2004	3460	NA	284	87	99
2005	3218	NA	285	195	204
2006	3059	NA	289	213	221
2007	5334	NA	368	240	245
2008	5144	NA	368	264	272
2009	7728	NA	522	177	186
2010	6937	NA	509	166	179
2011	5097	4872	600	212	213
2012	4923	4705	600	270	271
2013	4841	4598	1500	470	473
2014	4435	4212	1500	722	726
2015	4137	3929	2000	NA	NA

Table 5: Description of indices of abundance with a ranking of the author's belief of the usefulness of each index.

Name	Region	Years	Fishery independent	Filtering	Method	Rank	Method endorsed
NWFSC shelf/slope survey	Coastwide	2003–2014	No	South of 34.5 removed	Delta-GLMM, ECEs	1	SSC
Oregon Bottom Trawl	OR	1984–1999	No	Jan–Mar 42.5–46.5 & 124.6-124.9 >1000 lbs	Delta-GLM	2	Past assessments
Domestic at-sea	OR/WA	1991–1998	No		Delta-GLM	3	Past assessments
Triennial trawl survey	Coastwide	1980–2004 (triennially)	Yes	None	GLMM, Gaussian, ECEs	4	SSC
JV at-sea bycatch	OR/WA	1983, 1985–1990	No		Delta-GLM	5	Past assessments
Foreign at-sea bycatch	Coastwide	1977-82, 1984-88	No		Delta-GLM	6	Past assessments
Juvenile Survey	Coastwide	2004, 2005–09, 2011 2013-14	No	Included years with coastwide coverage	ANOVA	7	Past assessments

Table 6: Depth ranges and limits of the southern latitude in the Triennial survey for the different years.

Years	Depth range (m)	Southern latitude
1977	91–457	34.05
1980–1986	55–366	36.8
1989–1992	55–366	34.5
1995–2004	55–500	34.5

Table 7. Stratifications used for the two surveys.

Triennial					
Strata	**Area (km2)**	**Depth1**	**Depth2**	**Latitude1**	**Latitude2**
A	33,730.25	55	183	34.5	49
B	11,062.63	183	400	34.5	49
NWFSC shelf/slope					
Strata	**Area (km2)**	**Depth1**	**Depth2**	**Latitude1**	**Latitude2**
A	10,687.86	55	183	34.5	40.5
B	3,394.82	183	400	34.5	40.5
C	23,042.39	55	183	40.5	49
D	7,667.81	183	400	40.5	49

Table 8: Survey indices of abundance used in the base case model.

	Juvenile		Triennial		NWFSC shelf/slope	
Year	Estimate (N)	SE(logN)	Estimate (B)	SE(logB)	Estimate (B)	SE(logB)
1980			7255.87	0.732		
1981						
1982						
1983			10838.68	0.690		
1984						
1985						
1986			5847.21	0.774		
1987						
1988						
1989			3884.95	0.702		
1990						
1991						
1992			7441.37	0.707		
1993						
1994						
1995			5885.03	0.712		
1996						
1997						
1998			9717.84	0.696		
1999						
2000						
2001			1980.62	0.742		
2002						
2003					2779.54	0.364
2004	73.6998	0.6013	1069.11	0.853	1182.17	0.485
2005	14.1540	0.6089			1760.56	0.423
2006	3.2871	0.6013			2656.90	0.362
2007	2.8577	0.5936			3035.76	0.370
2008	7.5383	0.6089			1668.12	0.428
2009	5.8124	0.6013			2836.50	0.370
2010					3720.15	0.353
2011	7.3891	0.6240			3613.07	0.327
2012					2814.30	0.369
2013	1032.7702	0.9800			4121.93	0.534
2014	204.3839	0.9340			2224.45	0.344

Table 9: Number of positive tows, lengths, and ages in each year from the Triennial survey (Tri) and the NWFSC shelf/slope survey (NW).

	Number of positive tows		Number of tows with lengths		Number of lengths		Number of tows with ages		Number of ages	
Year	Tri	NW	Tri	NW	Tri	NW	Tri	NW	Tri	NW
1980	38		3		166		1		22	
1981										
1982										
1983	70		5		385		0		0	
1984										
1985										
1986	46		8		317		0		0	
1987										
1988										
1989	38		20		713		0		0	
1990										
1991										
1992	50		10		708		0		0	
1993										
1994										
1995	43		43		500		0		0	
1996										
1997										
1998	59		58		738		0		0	
1999										
2000										
2001	28		28		130		0		0	
2002										
2003		20		18		216		6		10
2004	36	12	33	12	219	84	0	12	0	43
2005		20		20		78		18		65
2006		26		26		172		26		89
2007		27		27		92		27		83
2008		17		17		26		15		20
2009		32		32		142		32		124
2010		28		28		240		28		116
2011		31		31		313		31		152
2012		32		32		181		32		91
2013		18		18		364		18		246
2014		29		28		349		28		264

Table 10: Summary of the data from the at-sea hake observer program used to determine the catches of Widow Rockfish.

Year	Total Hauls	Unsampled	% Unsampled	Number of sampled hauls with Widow Rockfish	Median within tow expansion factor
1991	5167	2713	52.51%	1121	1.00
1992	3568	1407	39.43%	699	1.00
1993	1802	796	44.17%	546	1.84
1994	3743	1919	51.27%	1338	1.93
1995	2229	1046	46.93%	651	1.00
1996	2617	1077	41.15%	1034	2.09
1997	2861	835	29.19%	1172	2.37
1998	2969	573	19.30%	1297	3.12
1999	3012	736	24.44%	1246	2.71
2000	2431	250	10.28%	1068	2.99
2001	2212	56	2.53%	723	2.81
2002	1764	10	0.57%	626	2.82
2003	1843	18	0.98%	325	2.90
2004	2699	6	0.22%	539	2.90
2005	3006	4	0.13%	1389	2.11
2006	2933	48	1.64%	1532	2.00
2007	2872	15	0.52%	1786	1.96
2008	3613	23	0.64%	1706	2.03
2009	1908	4	0.21%	497	2.00
2010	2493	1	0.04%	1149	2.03
2011	3010	6	0.20%	1048	1.99
2012	2055	21	1.02%	1122	2.00
2013	2699	11	0.41%	1012	2.01
2014	2990	19	0.64%	918	2.01

Table 11: Number of landings sampled for length data by gear and state for non-whiting fisheries.

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	**CA**	**OR**	**WA**	**CA**	**OR**	**WA**	**CA**	**WA**	**CA**	**OR**	**WA**
1976	0	2	0	0	0	0	0	0	0	0	0
1977	22	0	0	0	0	0	0	0	0	0	0
1978	50	0	0	0	0	0	10	0	0	0	0
1979	32	9	0	0	8	0	8	0	3	0	0
1980	106	3	0	1	32	19	0	0	1	0	1
1981	76	13	0	56	40	31	0	0	7	0	0
1982	96	16	0	81	53	40	1	0	11	0	0
1983	157	22	0	46	20	25	27	0	9	0	0
1984	146	28	0	29	34	22	40	0	4	0	0
1985	149	25	0	25	58	16	81	0	5	0	0
1986	108	21	0	25	58	27	59	0	16	0	0
1987	88	34	0	49	69	36	37	0	3	0	0
1988	79	32	7	37	41	14	43	0	2	0	0
1989	81	49	14	30	68	16	79	0	7	0	0
1990	80	57	11	39	63	30	74	0	8	0	0
1991	74	76	19	13	59	15	23	0	12	0	0
1992	55	96	22	5	44	9	31	0	53	1	0
1993	60	70	28	5	46	8	19	0	40	0	0
1994	54	67	13	2	21	16	34	0	38	0	0
1995	53	47	17	11	14	16	14	0	7	0	0
1996	48	33	17	11	12	13	4	0	10	0	0
1997	54	49	16	10	21	18	2	0	20	0	0
1998	41	43	26	3	11	8	5	0	15	0	0
1999	37	29	21	5	17	11	1	0	3	1	0
2000	14	0	3	16	44	19	0	0	8	1	0
2001	12	6	2	10	38	11	0	0	2	3	0
2002	22	8	7	1	15	10	1	0	2	0	0
2003	7	0	1	0	0	5	0	0	0	0	0
2004	5	1	1	0	0	9	0	0	0	0	0
2005	4	2	0	0	0	7	0	0	1	0	0
2006	7	3	2	0	0	5	0	0	4	1	0
2007	7	16	4	0	0	1	0	0	4	1	0
2008	5	18	5	0	0	10	0	0	2	0	0
2009	19	28	0	0	1	13	0	0	0	0	0
2010	18	23	1	0	0	9	0	0	0	3	0
2011	6	14	9	0	1	6	0	0	1	0	0
2012	14	18	3	0	4	7	0	0	3	2	0
2013	20	21	1	0	6	6	0	0	9	4	0
2014	18	20	3	0	5	7	0	0	12	8	0

Table 12: Number of lengths of Widow Rockfish by gear and state for non-whiting fisheries.

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	CA	OR	WA	CA	OR	WA	CA	WA	CA	OR	WA
1976	0	150	0	0	0	0	0	0	0	0	0
1977	66	0	0	0	0	0	0	0	0	0	0
1978	303	0	0	0	0	0	66	0	0	0	0
1979	436	452	0	0	230	0	68	0	7	0	0
1980	736	302	0	3	1,021	1,900	0	0	1	0	2
1981	474	1,122	0	1,320	3,392	3,100	0	0	23	0	0
1982	988	1,819	0	3,088	6,187	4,000	1	0	84	0	0
1983	1,346	658	0	1,406	640	2,500	138	0	31	0	0
1984	1,722	3,247	0	1,278	4,334	2,199	167	0	11	0	0
1985	1,853	2,716	0	1,176	6,954	1,600	557	0	8	0	0
1986	1,740	1,886	0	1,032	6,245	2,650	321	0	120	0	0
1987	997	1,015	0	1,744	2,048	1,942	262	0	11	0	0
1988	763	976	350	1,230	1,209	700	334	0	3	0	0
1989	1,005	1,099	700	1,325	1,842	799	432	0	20	0	0
1990	1,202	1,294	550	1,510	1,479	1,500	612	0	37	0	0
1991	1,596	1,569	947	566	1,357	750	268	0	75	0	0
1992	1,470	1,947	1,100	222	1,778	450	231	0	689	2	0
1993	1,682	1,436	1,400	231	1,091	400	275	0	274	0	0
1994	1,359	1,464	650	112	557	842	410	0	554	0	0
1995	1,539	1,066	850	519	296	800	175	0	22	0	0
1996	1,329	845	704	437	316	650	132	0	80	0	0
1997	2,063	1,231	557	382	620	900	80	0	212	0	0
1998	1,368	1,013	865	125	291	400	179	0	318	0	0
1999	1,385	752	952	240	459	550	1	0	104	20	0
2000	263	0	101	641	1,147	950	0	0	64	1	0
2001	139	98	2	349	960	550	0	0	4	20	0
2002	318	185	136	39	319	500	2	0	74	0	0
2003	234	0	46	0	0	208	0	0	0	0	0
2004	26	18	3	0	0	477	0	0	0	0	0
2005	27	48	0	0	0	313	0	0	4	0	0
2006	79	58	7	0	0	337	0	0	36	1	0
2007	12	302	104	0	0	100	0	0	64	1	0
2008	8	274	76	0	0	986	0	0	27	0	0
2009	170	304	0	0	6	1,029	0	0	0	0	0
2010	204	238	100	0	0	753	0	0	0	16	0
2011	32	246	93	0	30	550	0	0	17	0	0
2012	136	352	91	0	95	688	0	0	9	8	0
2013	153	365	39	0	215	486	0	0	102	6	0
2014	134	324	106	0	150	700	0	0	242	16	0

Table 13: Number of landings and number of lengths sampled from the at-sea hake and shoreside hake fisheries.

	Number of landings				Number of lengths			
	Domestic	Shoreside Hake			Domestic	Shoreside Hake		
Year	At-sea	CA	OR	WA	At-sea	CA	OR	WA
1991	0	4	4	0	0	195	85	0
1992	161	0	1	0	1,962	0	17	0
1993	220	0	2	0	2,124	0	39	0
1994	315	0	3	0	4,566	0	78	0
1995	297	0	20	0	2,936	0	600	0
1996	312	1	18	0	3,444	35	540	0
1997	371	1	29	0	3,994	47	822	0
1998	461	2	32	0	3,142	79	955	0
1999	593	1	53	0	3,822	35	1,581	0
2000	570	2	32	0	3,541	75	959	0
2001	522	1	0	0	2,185	36	0	0
2002	365	1	0	0	1,452	16	0	0
2003	290	1	0	1	805	20	0	6
2004	507	7	0	0	2,223	89	0	0
2005	1,226	0	0	0	7,175	0	0	0
2006	1,290	0	0	0	7,733	0	0	0
2007	1,491	1	0	0	14,367	30	0	0
2008	1,135	8	0	0	9,988	161	0	0
2009	398	6	16	0	2,506	174	615	0
2010	979	3	41	0	7,188	107	1,127	0
2011	980	0	42	0	4,539	0	1,236	0
2012	911	0	41	0	6,432	0	1,058	0
2013	900	0	36	0	4,726	0	960	0
2014	771	0	44	0	5,496	0	1,152	0

Table 14: Number of landings sampled for ages by gear and state for non-whiting fisheries.

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	**CA**	**OR**	**WA**	**CA**	**OR**	**WA**	**CA**	**WA**	**CA**	**OR**	**WA**
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	7	0	0	0	0	0	0	0	0	0	0
1979	11	8	0	0	8	0	0	0	0	0	0
1980	27	3	0	0	31	0	0	0	0	0	0
1981	14	13	0	30	39	0	0	0	0	0	0
1982	87	15	0	71	53	0	1	0	4	0	0
1983	150	21	0	45	20	0	5	0	2	0	0
1984	144	28	0	29	34	0	11	0	2	0	0
1985	137	25	0	24	56	0	40	0	2	0	0
1986	106	21	0	22	58	0	53	0	3	0	0
1987	84	27	0	49	62	0	27	0	0	0	0
1988	67	31	0	34	40	0	39	0	2	0	0
1989	75	49	0	30	67	0	75	0	3	0	0
1990	70	57	0	32	63	0	65	0	2	0	0
1991	65	76	0	13	59	0	19	0	9	0	0
1992	45	91	0	4	27	0	21	0	15	0	0
1993	28	68	0	0	46	0	6	0	3	0	0
1994	28	67	0	2	21	0	7	0	1	0	0
1995	8	45	0	3	13	0	0	0	0	0	0
1996	35	32	0	6	11	0	2	0	1	0	0
1997	42	46	0	10	20	0	0	0	9	0	0
1998	27	42	0	2	11	0	2	0	3	0	0
1999	28	28	0	3	16	0	0	0	0	0	0
2000	8	0	2	9	42	19	0	0	3	0	0
2001	2	6	0	4	35	10	0	0	0	0	0
2002	17	8	2	1	15	10	1	0	0	0	0
2003	3	0	0	0	0	5	0	0	0	0	0
2004	3	0	1	0	0	9	0	0	0	0	0
2005	0	2	0	0	0	7	0	0	0	0	0
2006	6	3	1	0	0	5	0	0	2	1	0
2007	6	16	4	0	0	1	0	0	3	1	0
2008	5	18	5	0	0	10	0	0	0	0	0
2009	8	27	0	0	1	12	0	0	0	0	0
2010	7	21	1	0	0	9	0	0	0	3	0
2011	0	5	7	0	1	5	0	0	0	0	0
2012	0	7	3	0	0	7	0	0	0	2	0
2013	0	7	1	0	3	5	0	0	0	0	0
2014	0	4	2	0	1	7	0	0	0	0	0

Table 15: Number of ages of Widow Rockfish by gear and state for non-whiting fisheries.

	Bottom Trawl			Midwater Trawl			Net		Hook-and-line		
Year	**CA**	**OR**	**WA**	**CA**	**OR**	**WA**	**CA**	**WA**	**CA**	**OR**	**WA**
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	107	0	0	0	0	0	0	0	0	0	0
1979	269	363	0	0	230	0	0	0	0	0	0
1980	404	302	0	0	986	0	0	0	0	0	0
1981	205	407	0	598	1,258	0	0	0	0	0	0
1982	834	510	0	2,382	1,620	0	1	0	18	0	0
1983	1,277	624	0	1,360	640	0	55	0	3	0	0
1984	1,678	839	0	1,278	1,019	0	94	0	5	0	0
1985	1,762	735	0	1,174	1,628	0	415	0	2	0	0
1986	1,704	798	0	913	2,033	0	188	0	5	0	0
1987	967	805	0	1,742	1,837	0	186	0	0	0	0
1988	692	946	0	1,132	1,179	0	290	0	3	0	0
1989	919	1,099	0	1,323	1,793	0	403	0	6	0	0
1990	1,051	1,284	0	1,309	1,472	0	533	0	8	0	0
1991	1,308	1,566	0	566	1,328	0	164	0	23	0	0
1992	676	1,854	0	82	592	0	87	0	91	0	0
1993	472	1,387	0	0	1,090	0	57	0	3	0	0
1994	516	1,463	0	54	556	0	58	0	1	0	0
1995	167	1,027	0	68	276	0	0	0	0	0	0
1996	838	827	0	158	292	0	88	0	7	0	0
1997	892	1,164	0	187	593	0	0	0	55	0	0
1998	1,019	987	0	82	291	0	84	0	46	0	0
1999	1,008	731	0	133	424	0	0	0	0	0	0
2000	157	0	100	353	1,067	948	0	0	12	0	0
2001	43	98	0	132	858	485	0	0	0	0	0
2002	294	179	99	21	319	488	2	0	0	0	0
2003	87	0	0	0	0	208	0	0	0	0	0
2004	7	0	3	0	0	475	0	0	0	0	0
2005	0	48	0	0	0	313	0	0	0	0	0
2006	74	58	6	0	0	237	0	0	5	1	0
2007	11	302	54	0	0	50	0	0	23	1	0
2008	8	274	75	0	0	500	0	0	0	0	0
2009	81	303	0	0	6	639	0	0	0	0	0
2010	54	231	50	0	0	439	0	0	0	15	0
2011	0	63	84	0	30	250	0	0	0	0	0
2012	0	79	41	0	0	163	0	0	0	8	0
2013	0	190	26	0	90	153	0	0	0	0	0
2014	0	91	25	0	30	178	0	0	0	0	0

Table 16: Number of landings and number of ages sampled from the at-sea hake and shoreside hake fisheries.

	Number of landings				Number of ages			
	Domestic	Shoreside Hake			Domestic	Shoreside Hake		
Year	At-sea	CA	OR	WA	At-sea	CA	OR	WA
1991	0	4	4	0	0	195	85	0
1992	0	0	1	0	0	0	17	0
1993	0	0	2	0	0	0	39	0
1994	0	0	3	0	0	0	78	0
1995	0	0	20	0	0	0	600	0
1996	0	1	18	0	0	35	538	0
1997	0	1	24	0	0	23	703	0
1998	0	2	32	0	0	79	954	0
1999	0	1	48	0	0	18	1,427	0
2000	0	1	28	0	0	40	830	0
2001	0	1	0	0	0	36	0	0
2002	0	1	0	0	0	16	0	0
2003	0	0	0	0	0	0	0	0
2004	0	7	0	0	0	89	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0
2007	0	1	0	0	0	29	0	0
2008	617	8	0	0	1,215	161	0	0
2009	377	5	15	0	643	113	549	0
2010	218	1	38	0	380	36	1,013	0
2011	467	0	22	0	510	0	614	0
2012	412	0	14	0	501	0	320	0
2013	455	0	10	0	509	0	240	0
2014	443	0	15	0	502	0	388	0

Table 17: Discard totals (mt) for four fleets derived from Pikitch data, EDCP data, and WCGOP data. Other quantities are described in Section 2.2.4. Italics indicate years that were not fitted to because they were simply added to the landings (Shoreside hake) or omitted because they were outside of the main study period.

	Year	Source	Discards	Rate (d/[d+r])	Ratio (d/r)	Median	CV
Bottom Trawl	*1981*	*Pikitch*	*900.19*	*0.16*	*0.18*	*791.21*	*54.26%*
	1982	*Pikitch*	*1450.74*	*0.23*	*0.29*	*1327.32*	*44.12%*
	1983	*Pikitch*	*1847.15*	*0.22*	*0.28*	*1691.31*	*43.91%*
	1984	*Pikitch*	*586.36*	*0.15*	*0.18*	*512.07*	*55.78%*
	1985	Pikitch	523.36	0.17	0.20	462.94	52.73%
	1986	Pikitch	615.81	0.15	0.17	534.79	57.09%
	1987	Pikitch	1133.69	0.21	0.27	1035.49	44.57%
	1988	*Pikitch*	*1177.09*	*0.23*	*0.29*	*1079.86*	*43.38%*
	1989	*Pikitch*	*1217.74*	*0.21*	*0.27*	*1111.73*	*44.70%*
	1990	*Pikitch*	*1010.95*	*0.16*	*0.19*	*898.64*	*51.53%*
	1991	*Pikitch*	*1219.25*	*0.24*	*0.32*	*1123.33*	*42.20%*
	1992	*Pikitch*	*1217.51*	*0.22*	*0.28*	*1111.86*	*44.62%*
	1993	*Pikitch*	*1430.18*	*0.20*	*0.25*	*1296.47*	*46.57%*
	1994	*Pikitch*	*1177.71*	*0.24*	*0.31*	*1081.50*	*43.11%*
	1995	EDCP	1307.10	0.24	0.32	924.8	83.18%
	1996	EDCP	3862.40	0.52	1.08	3084.5	67.07%
	1997	EDCP	4444.30	0.54	1.18	3353.3	75.06%
	1998	EDCP	48.00	0.02	0.02	42.6	48.80%
	1999	EDCP	6.10	0.00	0.00	4.8	68.78%
	2002	WCGOP	14.64	0.46	0.85	14.55	45.15%
	2003	WCGOP	5.08	0.59	1.42	5.37	97.86%
	2004	WCGOP	17.55	0.68	2.11	18.99	88.24%
	2005	WCGOP	23.49	0.88	7.50	23.11	46.92%
	2006	WCGOP	0.46	0.07	0.08	0.49	229.82%
	2007	WCGOP	17.45	0.78	3.63	16.12	67.89%
	2008	WCGOP	4.36	0.67	2.03	4.39	46.84%
	2009	WCGOP	28.65	0.87	6.83	27.92	34.76%
	2010	WCGOP	30.84	0.87	6.52	28.35	58.59%
	2011	WCGOP	0.08	0.00	0.01	0.08	0.00%
	2012	WCGOP	0.01	0.00	0.00	0.01	0.00%
	2013	WCGOP	2.43	0.00	0.05	2.43	0.00%
Shoreside Hake	2011	WCGOP	11.80	0.00	0.10	11.80	0.00%
	2012	WCGOP	0.05	0.00	0.00	0.05	0.00%
	2013	WCGOP	0.91	0.00	0.00	0.91	0.00%

Table 17 continued.

	Year	Source	Discards	Rate (d/[d+r])	Ratio (d/r)	Median	CV
Midwater Trawl	*1981*	*Pikitch*	*6479.88*	*0.22*	*0.29*	*6311.68*	*23.24%*
	1982	*Pikitch*	*5722.25*	*0.22*	*0.28*	*5578.55*	*22.84%*
	1984	*Pikitch*	*1737.57*	*0.21*	*0.27*	*1692.13*	*23.33%*
	1985	Pikitch	1546.20	0.21	0.26	1501.96	24.45%
	1986	Pikitch	1358.62	0.20	0.25	1321.18	23.97%
	1987	Pikitch	1861.22	0.19	0.23	1798.43	26.66%
	1988	*Pikitch*	*1615.83*	*0.21*	*0.27*	*1568.26*	*24.82%*
	1989	*Pikitch*	*1981.86*	*0.21*	*0.26*	*1921.51*	*25.26%*
	1990	*Pikitch*	*1205.44*	*0.22*	*0.28*	*1170.77*	*24.51%*
	1991	*Pikitch*	*565.94*	*0.22*	*0.28*	*549.90*	*24.33%*
	1992	*Pikitch*	*356.00*	*0.20*	*0.24*	*345.37*	*25.00%*
	1993	*Pikitch*	*569.86*	*0.20*	*0.25*	*552.39*	*25.34%*
	1994	*Pikitch*	*536.80*	*0.20*	*0.25*	*520.24*	*25.43%*
	1995	*Pikitch*	*663.24*	*0.23*	*0.29*	*645.20*	*23.81%*
	1996	*Pikitch*	*465.66*	*0.20*	*0.25*	*451.93*	*24.84%*
	1997	*Pikitch*	*663.14*	*0.21*	*0.27*	*644.69*	*24.10%*
	1998	*Pikitch*	*217.15*	*0.20*	*0.25*	*210.40*	*25.53%*
	1997	EDCP	1.40	0.00	0.00	1.00	83.26%
	1998	EDCP	18.70	0.02	0.02	18.70	80.00%
	2002	WCGOP	40.02	0.14	0.16	39.37	42.46%
	2012	WCGOP	0.00	0.00	0.00	0.00	0.00%
	2013	WCGOP	0.00	0.00	0.00	0.00	0.00%
Hook-and-line	2004	WCGOP	0.04	0.11	0.12	0.04	163.13%
	2005	WCGOP	0.25	0.17	0.21	0.25	66.60%
	2006	WCGOP	0.94	0.52	1.07	0.94	77.99%
	2007	WCGOP	1.07	0.36	0.56	1.11	144.59%
	2008	WCGOP	0.97	0.44	0.78	0.93	113.41%
	2010	WCGOP	0.38	0.72	2.54	0.38	87.87%
	2011	WCGOP	0.04	0.23	0.30	0.03	102.83%
	2012	WCGOP	0.06	0.16	0.19	0.06	144.71%
	2013	WCGOP	0.12	0.11	0.12	0.12	42.74%

Table 18: Number of observed vessels, trips, and hauls in the WCGOP with Widow Rockfish for the years 2002–2013 and four fleets: Bottom Trawl, Hook-and-line, Midwater Trawl, and Shoreside Hake. Italics indicate that those observations were not used. The letter "C" indicates that the data are confidential, due to less than 3 vessels observed, and were not used.

	Bottom Trawl			Hook-and-line		
Year	**Vessels**	**Trips**	**Hauls**	**Vessels**	**Trips**	**Hauls**
2002	41	68	173	*1*	*1*	*1*
2003	12	15	36	*1*	*1*	*1*
2004	27	34	82	5	7	7
2005	25	40	122	3	6	6
2006	18	32	163	4	8	8
2007	31	53	189	9	17	18
2008	33	54	243	6	6	6
2009	52	97	387	*2*	*2*	*2*
2010	37	58	297	5	5	6
2011	43	193	924	6	8	9
2012	45	238	1154	5	11	11
2013	44	235	1867	4	6	6

	Midwater Trawl			Shoreside Hake		
Year	**Vessels**	**Trips**	**Hauls**	**Vessels**	**Trips**	**Hauls**
2002	8	8	18	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	0	0	0	0	0	0
2008	0	0	0	0	0	0
2009	0	0	0	0	0	0
2010	0	0	0	0	0	0
2011	*C*	*C*	*C*	26	673	1257
2012	4	8	23	24	680	1474
2013	4	10	28	25	861	1566

Table 19: Estimated logistic maturity-at-age using data from Barss & Echeverria (1987) for data collected in California and Oregon. The estimated maturity-at-age using data from both states equally weighted is in the column called "All", and was used in the assessment model with maturity-at-age at ages 2 and lower set equal to zero. The logistic parameter estimates (as would be input into SS3) are shown at the top.

	CA	**OR**	**All**
$A_{50\%}$	4.25	6.68	5.47
Slope	-0.6647	-1.1173	-0.7747

Age	**CA**	**OR**	**All**
0	0.0560	0.0006	*0*
1	0.1034	0.0017	*0*
2	0.1830	0.0053	*0*
3	0.3034	0.0161	0.1283
4	0.4585	0.0476	0.2420
5	0.6220	0.1326	0.4093
6	0.7618	0.3184	0.6006
7	0.8615	0.5881	0.7654
8	0.9236	0.8136	0.8763
9	0.9592	0.9303	0.9389
10	0.9786	0.9761	0.9709
11	0.9889	0.9920	0.9864
12	0.9942	0.9974	0.9937
13	0.9970	0.9991	0.9971
14	0.9985	0.9997	0.9986
15	0.9992	0.9999	0.9994
16	0.9996	1.0000	0.9997
17	0.9998	1.0000	0.9999
18	0.9999	1.0000	0.9999
19	0.9999	1.0000	1.0000
20	1.0000	1.0000	1.0000

Table 20: Ageing error for two labs that was used in the assessment model.

True Age	Standard Deviation CAP	Standard Deviation SWFSC
0.5	0.145	0.111
1.5	0.145	0.111
2.5	0.187	0.147
3.5	0.233	0.187
4.5	0.283	0.233
5.5	0.338	0.284
6.5	0.398	0.341
7.5	0.463	0.406
8.5	0.534	0.478
9.5	0.612	0.560
10.5	0.697	0.651
11.5	0.790	0.755
12.5	0.892	0.871
13.5	1.003	1.001
14.5	1.124	1.148
15.5	1.256	1.313
16.5	1.401	1.499
17.5	1.558	1.708
18.5	1.731	1.943
19.5	1.919	2.207
20.5	2.124	2.504
21.5	2.349	2.839
22.5	2.594	3.215
23.5	2.861	3.638
24.5	3.154	4.113
25.5	3.473	4.649
26.5	3.821	5.250
27.5	4.202	5.927
28.5	4.618	6.689
29.5	5.072	7.545
30.5	5.568	8.508
31.5	6.109	9.592
32.5	6.700	10.810
33.5	7.346	12.181
34.5	8.052	13.723
35.5	8.822	15.456
36.5	9.663	17.407
37.5	10.582	19.600
38.5	11.585	22.067
39.5	12.680	24.842
40.5	13.877	27.964

Table 21: Specifications of the base assessment model for Widow Rockfish.

Starting year	1916
Population characteristics	
Maximum age	40
Genders	2
Population lengths	6-60 cm by 1 cm bins
Summary biomass (mt)	Age 4+
Data characteristics	
Data lengths	8-56 cm by 2 cm bins
Data ages	1-40
Minimum age for growth calcs	3
Maximum age for growth calcs	40
First mature age	3
Starting year of estimated recruitment	1900
Fishery characteristics	
Fishery timing	0.5
Triennial survey timing	0.55
NWFSC shelf/slope survey timing	0.65
Fishing mortality method	Discrete
Maximum F	0.9
Catchability	Analytical estimate
Fishery Selectivity (not midwater trawl)	Asymptotic Double Normal
Midwater Trawl Fishery Selectivity	Dome-shaped Double Normal
Triennial Survey Selectivity	Double Normal
Triennial Survey Selectivity	Cubic spline with 3 nodes
NWFSC Shelf/Slope Survey Selectivity	Cubic spline with 3 nodes
Fishery time blocks	
Bottom Trawl Selectivity	1916–2001, 2002-
Bottom Trawl Retention	1916–1981 and 2011 onward, 1982–1989, 1990–2010
Midwater Trawl Selectivity	1916–1982, 1983–2001, 2002–2010, 2011–
Midwater Trawl retention	1916–1982, 1983–2001, 2002–2010, 2011–
Hook-and-line Selectivity	1916–2002, 2003–
Hook-and-line Retention	1916–1982, 1983–

Table 22: Description of biological parameters in the base case assessment model. The lognormal (LN) prior distribution is specified with the median of the parameter and the standard deviation of the log of the parameter.

Parameter	Initial value	Number estimated	Bounds (low, high)	Prior distribution
Biological				
Females:				
Natural mortality (*M*) yr^{-1}	0.081	1	(0.01–0.30)	LN(0.081, 0.52)
Length at age 3	27.5	1	(10-40)	
Length at age 40	50	1	(35-60)	
von Bertalanffy K	0.15	1	(0.01-0.40)	
ln(SD) of length at age 3	0.07	1	(0.01-0.40)	
ln(SD) of length at age 40	0.04	1	(0.01-0.40)	
Maturity-at-age inflection	5.47	0	—	
Maturity-at-age slope	-0.7747	0	—	
Fecundity intercept	1	0	—	
Fecundity slope	0	0	—	
Length-weight intercept	1.736E-5	0	—	
Length-weight slope	2.962	0	—	
Males:				
Natural mortality (*M*) yr^{-1}	0.081	1	(0.01-0.30)	LN(0.081, 0.52)
Length at age 3	26	1	(10-40)	
Length at age 40	44	1	(35–60)	
von Bertalanffy K	0.21	1	(0.01-0.40)	
ln(SD) of length at age 3	0.07	1	(0.01-0.40)	
ln(SD) of length at age 40	0.04	1	(0.01-0.40)	
Fecundity intercept	1	0	—	
Fecundity slope	0	0	—	
Length-weight intercept	1.484E-5	0	—	
Length-weight slope	3.005	0	—	

Table 23: Parameter estimates and approximate asymptotic standard deviations for the base case model (from the final year for the commercial selectivity).

Parameter	Estimate	SD	Estimate	SD
Stock and recruitment				
Ln(R0)	10.91	0.189		
Surveys	*Catchability (q)*		Extra SE	
Bottom trawl	2.67E-3		0.1637	0.0608
JV at-sea hake	1.54E-5		0.3732	0.0868
Domestic at-sea hake	2.35E-5			
Juvenile	3.97E-4		0.9286	0.4160
Foreign at-sea hake	1.02E-5		0.5894	0.1541
Triennial	0.1165		0	
NWFSCshelf/slope	0.0489		0	

	Females		Males	
Biological	**Estimate**	**SD**	**Estimate**	**SD**
Natural mortality (M)	0.1572	0.0107	0.1705	0.0112
Length at age 3	16.37	0.8095	19.36	0.5451
Length at age 40	50.36	0.3194	44.89	0.3036
Von Bertalanffy K	0.1987	0.0079	0.2414	0.0103
SD (log) at age 3	0.1768	0.0188	0.1027	0.0091
SD (log) at age 40	0.0366	0.0036	0.0476	0.0036

Table 24: Likelihood components and other quantities related to the minimization of the base case model.

Description	Values
Nparameters	202
Negative log-likelihoods	
Total	14046.9
Indices	-8.59
Length-frequency data	635.67
Age-frequency data	863.34
Discard biomass	12548.90
Recruitment	4.78
Priors	1.82
Parameter Softbound	0.01

Table 25: Estimates of key derived parameters and reference points with approximate 95% asymptotic confidence intervals.

Quantity	Estimate	~95% Confidence Interval
Unfished Spawning Biomass (mt)	80,708	65,427–95,989
Unfished age 4+ biomass (mt)	156,990	127,085–186,895
Unfished recruitment (R0)	60,608	38,622–82,594
Spawning Biomass (2015)	54,490	34,342–74,638
Depletion (2015)	75.1	59.82–90.37
Reference points based on SB40%		
Spawning biomass ($SB_{40\%}$, mt)	32,283	26,171–38,396
SPR resulting in $B_{40\%}$ ($SPR_{B40\%}$)	0.438	0.438–0.438
Exploitation rate resulting in $B_{40\%}$	0.113	0.102–0.124
Yield with $SPR_{B40\%}$ at $B_{40\%}$ (mt)	8,468	6,397–10,540
Reference points based on SPR proxy for MSY		
Spawning Biomass ($SB_{SPR50\%}$, mt)	37,628	30,503–44,752
$SPR_{50\%}$	0.5	NA
Exploitation rate corresponding to $SPR_{50\%}$	0.092	0.083–0.101
Yield with $SPR_{50\%}$ at $SB_{SPR50\%}$ (mt)	7,776	5,881–9,670
Reference points based on estimated MSY values		
Spawning biomass at *MSY* (SB_{MSY}, mt)	18,247	14,812–21,681
SPR_{MSY}	0.275	0.269–0.281
Exploitation rate corresponding to SPR_{MSY}	0.197	0.175–0.218
MSY (mt)	9,464	7,111–11,817

Table 26: Time series of population estimates from the base case model.

Year	Total biomass (mt)	Spawning Biomass (mt)	Age 4+ biomass (mt)	Spawning Depletion (%)	Age-0 recruits	Estimated Total Catch (mt)	1- SPR (%)	Relative exploitation rate (%)
1916	162,766	80,680	156,923	100	54,389	79.1	0.93	0.05
1917	162,679	80,633	156,837	100	54,373	123.1	1.45	0.08
1918	162,555	80,565	156,715	100	54,355	141.5	1.67	0.09
1919	162,423	80,491	156,584	100	54,334	97.7	1.15	0.06
1920	162,341	80,445	156,504	100	54,312	100.0	1.18	0.06
1921	162,263	80,402	156,428	100	54,288	82.9	0.98	0.05
1922	162,205	80,371	156,372	100	54,260	72.0	0.85	0.05
1923	162,160	80,347	156,330	100	54,230	79.0	0.94	0.05
1924	162,108	80,322	156,281	100	54,195	50.8	0.60	0.03
1925	162,082	80,311	156,258	100	54,157	62.9	0.75	0.04
1926	162,041	80,294	156,220	100	54,113	95.6	1.13	0.06
1927	161,965	80,257	156,148	99	54,062	79.3	0.94	0.05
1928	161,902	80,229	156,090	99	54,005	90.3	1.07	0.06
1929	161,824	80,193	156,017	99	53,940	87.6	1.03	0.06
1930	161,744	80,158	155,943	99	53,867	113.5	1.34	0.07
1931	161,634	80,107	155,840	99	53,783	100.9	1.19	0.06
1932	161,530	80,061	155,744	99	53,689	101.1	1.20	0.06
1933	161,419	80,012	155,641	99	53,582	86.7	1.02	0.06
1934	161,312	79,968	155,544	99	53,461	91.8	1.09	0.06
1935	161,188	79,917	155,431	99	53,325	99.1	1.17	0.06
1936	161,043	79,857	155,298	99	53,170	111.8	1.33	0.07
1937	160,870	79,785	155,140	99	52,993	104.6	1.24	0.07
1938	160,687	79,710	154,973	99	52,791	84.7	1.00	0.05
1939	160,502	79,638	154,806	99	52,560	77.4	0.91	0.05
1940	160,298	79,560	154,624	99	52,295	121.9	1.43	0.08
1941	160,024	79,447	154,373	98	51,994	130.8	1.54	0.08
1942	159,710	79,317	154,087	98	51,653	148.1	1.73	0.10
1943	159,346	79,166	153,754	98	51,278	495.6	5.70	0.32
1944	158,620	78,813	153,063	98	50,873	970.4	10.94	0.63
1945	157,437	78,201	151,918	97	50,434	1,637.7	18.00	1.08
1946	155,652	77,245	150,176	96	49,964	1,171.8	13.34	0.78
1947	154,377	76,581	148,947	95	49,511	649.7	7.67	0.44
1948	153,616	76,222	148,234	94	49,074	482.5	5.76	0.33
1949	152,981	75,949	147,649	94	48,663	378.1	4.56	0.26
1950	152,391	75,714	147,106	94	48,308	427.9	5.17	0.29
1951	151,688	75,424	146,447	94	48,052	559.5	6.73	0.38
1952	150,803	75,029	145,600	93	47,950	546.9	6.61	0.38
1953	149,891	74,614	144,718	92	48,080	474.0	5.78	0.33
1954	149,026	74,211	143,867	92	48,521	452.5	5.55	0.31
1955	148,179	73,797	143,011	91	49,349	469.7	5.79	0.33
1956	147,348	73,358	142,142	91	50,591	606.9	7.48	0.43
1957	146,472	72,843	141,190	90	52,120	768.4	9.45	0.54
1958	145,599	72,263	140,203	90	53,511	708.7	8.81	0.51
1959	145,012	71,770	139,475	89	54,064	678.4	8.50	0.49
1960	144,729	71,381	139,056	88	53,316	819.1	10.24	0.59
1961	144,610	71,038	138,857	88	51,795	683.9	8.65	0.49
1962	144,902	70,926	139,166	88	50,836	765.2	9.65	0.55
1963	145,317	70,938	139,686	88	50,909	437.8	5.62	0.31
1964	146,133	71,279	140,612	88	52,273	607.4	7.67	0.43
1965	146,752	71,615	141,256	89	54,194	262.1	3.36	0.19
1966	147,632	72,154	142,049	89	56,870	4,293.5	43.68	3.02
1967	144,729	70,425	138,968	87	57,242	4,830.6	48.80	3.48
1968	141,714	68,512	135,766	85	54,562	2,392.8	28.04	1.76
1969	141,428	68,102	135,387	84	47,054	852.4	11.01	0.63
1970	143,438	68,673	136,938	85	183,567	854.9	10.94	0.62

Table 26 continued

Year	Total biomass (mt)	Spawning Biomass (mt)	Age 4+ biomass (mt)	Spawning Depletion (%)	Age-0 recruits	Estimated Total Catch (mt)	1- SPR (%)	Relative exploitation rate (%)
1971	146,593	69,345	138,685	85.9	165,347	1,095.6	13.71	0.79
1972	150,916	69,966	140,010	86.7	20,133	923.9	11.58	0.66
1973	156,684	71,080	140,574	88.1	16,513	1,160.7	14.18	0.83
1974	165,840	73,085	155,420	90.6	21,659	907.5	11.12	0.58
1975	176,790	76,976	174,621	95.4	42,304	876.9	10.37	0.50
1976	183,763	82,643	181,483	102.4	13,930	1,325.8	14.23	0.73
1977	185,673	88,215	182,540	109.3	77,576	1,094.7	10.62	0.60
1978	184,190	91,905	179,680	113.9	126,120	1,582.8	14.33	0.88
1979	180,435	92,297	175,251	114.4	38,857	9,479.8	63.76	5.41
1980	168,182	86,310	158,871	106.9	71,023	22,055.1	117.11	13.88
1981	146,058	73,064	136,097	90.5	116,559	28,135.1	144.42	20.67
1982	123,036	57,897	116,660	71.7	62,529	27,091.1	156.32	23.22
1983	104,480	45,665	95,670	56.6	38,705	12,259.5	124.97	12.81
1984	103,446	43,126	93,932	53.4	71,077	12,129.6	124.60	12.91
1985	104,441	42,634	98,411	52.8	52,992	10,887.7	116.00	11.06
1986	106,063	43,349	100,732	53.7	27,258	11,450.8	116.05	11.37
1987	105,616	44,068	99,176	54.6	68,550	15,396.0	129.16	15.52
1988	100,513	42,699	95,486	52.9	40,112	12,539.4	118.85	13.13
1989	97,023	41,799	92,584	51.8	31,591	14,990.3	130.10	16.19
1990	89,731	38,959	83,877	48.3	48,538	13,911.4	130.38	16.59
1991	83,770	36,006	79,419	44.6	83,584	9,087.7	112.06	11.44
1992	82,201	35,142	77,546	43.5	33,130	8,804.9	111.85	11.35
1993	80,614	34,248	74,531	42.4	41,477	11,555.4	127.34	15.50
1994	76,610	31,960	70,027	39.6	38,823	8,998.7	117.86	12.85
1995	76,092	31,043	72,222	38.5	26,421	9,346.5	122.06	12.94
1996	74,666	30,276	70,607	37.5	19,168	8,428.4	117.75	11.94
1997	73,453	30,326	70,008	37.6	26,233	8,968.9	119.69	12.81
1998	70,886	30,082	68,180	37.3	48,636	6,654.6	103.70	9.76
1999	69,506	30,331	66,697	37.6	45,208	5,991.4	96.12	8.98
2000	67,904	30,274	64,017	37.5	46,814	4,786.7	81.50	7.48
2001	67,109	30,245	62,126	37.5	25,730	2,322.0	48.88	3.74
2002	69,187	30,978	64,655	38.4	22,267	484.6	13.51	0.75
2003	73,279	32,618	69,362	40.4	25,005	46.6	1.34	0.07
2004	77,822	34,770	74,993	43.1	66,318	99.2	2.66	0.13
2005	81,475	37,080	78,416	45.9	16,365	203.6	5.03	0.26
2006	84,312	39,164	80,300	48.5	53,702	220.7	5.13	0.27
2007	86,503	40,825	81,347	50.6	22,470	244.7	5.39	0.30
2008	89,833	42,031	86,157	52.1	157,219	272.4	5.78	0.32
2009	92,993	43,110	86,889	53.4	32,713	186.3	3.92	0.21
2010	97,809	44,280	90,515	54.9	120,622	178.9	3.67	0.20
2011	103,186	45,813	91,387	56.8	22,961	212.7	4.19	0.23
2012	112,258	47,912	106,032	59.4	43,443	271.3	5.19	0.26
2013	121,108	51,215	112,532	63.5	76,349	473.0	8.23	0.42
2014	130,704	55,669	126,652	69.0	66,109	726.2	11.44	0.57
2015	138,101	60,608	132,031	75.1	53,370	NA	NA	NA

Table 27: Quantities of interest from the sensitivity analyses. 'RSB2015' refers to depletion in 2015 (SB_{2015}/SB_0).

	Base	h = 0.40	h = 0.60	M = 0.081 both sexes	M = 0.124 (f) & 0.129 (m)	Remove 2012-2014 Survey Comps	No Dome Selectivity Midwater Trawl	Francis Weighting	Logistic Selectivity
M (females)	0.1572	0.1645	0.1584	0.0810	0.1240	0.1572	0.1579	0.1579	0.1549
Lmin (females)	16.37	16.38	16.37	16.62	16.53	15.73	16.42	16.99	15.92
Lmax (females)	50.36	50.35	50.35	49.85	50.16	50.23	50.36	50.55	50.21
k (females)	0.1987	0.1989	0.1988	0.2077	0.2029	0.2043	0.1983	0.1882	0.2045
CV young (females)	0.1768	0.1764	0.1768	0.1721	0.1736	0.1923	0.1760	0.1726	0.1830
CV old (females)	0.0366	0.0366	0.0366	0.0401	0.0380	0.0392	0.0367	0.0346	0.0367
M (males)	0.1705	0.1776	0.1716	0.0810	0.1290	0.1710	0.1709	0.1732	0.1692
Lmin (males)	19.36	19.34	19.35	19.34	19.42	20.72	19.36	19.14	19.22
Lmax (males)	44.89	44.90	44.89	44.57	44.75	44.99	44.87	45.22	45.04
k (males)	0.2406	0.2406	0.2406	0.2406	0.2406	0.2406	0.2406	0.2406	0.2406
CV young (males)	0.1027	0.1029	0.1028	0.1022	0.1016	0.0799	0.1026	0.1094	0.1051
CV old (males)	0.0476	0.0475	0.0476	0.0508	0.0491	0.0520	0.0477	0.0427	0.0462
lnR0	10.91	11.11	10.95	9.53	10.32	10.89	10.92	10.96	10.89
SB0	80,708	89,412	83,022	73,838	74,698	79,851	80,667	83,778	82,257
SB2015	60,608	39,469	53,226	17,106	42,824	59,631	61,250	64,091	59,744
RSB2015	75.1%	44.1%	64.1%	23.2%	57.3%	74.7%	75.9%	76.5%	72.6%
Yield SPR50	7,776	3,878	6,921	3,965	5,852	7,734	7,806	8,059	7,772
Likelihood				difference from base model likelihood					
Total	14046.9	2.6	0.6	50.7	10.4	*-199.1*	1.0	*-254.8*	18.9
Survey	-8.59	0.3	0.0	8.2	2.4	-0.3	0.0	-0.1	-0.3
Discard	12548.9	0.1	0.0	1.2	0.3	-1.5	0.0	-0.5	0.1
Length	635.7	-0.5	-0.2	0.6	-1.7	*-41.7*	0.4	*-274.2*	19.6
Age	863.3	0.0	0.0	13.6	4.9	*-152.4*	0.5	*21.5*	-0.7
Recruitment	4.78	-0.8	-0.4	28.8	5.6	-2.6	0.0	-1.5	0.3
Forecast Recruitment	0.98	0.1	0.0	0.1	0.0	-0.7	0.0	0.0	-0.1
Parameter Priors	1.82	3.4	1.1	-1.8	-1.1	0.0	0.0	0.1	-0.1
Parameter Bounds	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02

Table 28: Results from retrospective runs, sequentially removing data over the last five years using the base case assumptions.

Retrospective	Base	Retro -1	Retro -2	Retro -3	Retro -4	Retro -5
M (females)	0.157	0.156	0.153	0.150	0.144	0.147
Lmin (females)	16.37	16.11	15.37	15.74	15.79	12.85
Lmax (females)	50.36	50.23	50.22	50.25	50.15	49.51
k (females)	0.20	0.20	0.21	0.20	0.21	0.23
CV young (females)	0.18	0.18	0.20	0.19	0.19	0.21
CV old (females)	0.04	0.04	0.04	0.04	0.04	0.05
M (males)	0.170	0.170	0.168	0.165	0.158	0.162
Lmin (males)	19.36	19.33	20.25	20.84	20.74	17.60
Lmax (males)	44.89	44.71	44.98	45.04	44.74	43.98
k (males)	0.29	0.29	0.29	0.29	0.29	0.29
CV young (males)	0.10	0.10	0.09	0.08	0.08	0.08
CV old (males)	0.05	0.05	0.05	0.05	0.05	0.06
lnR0	10.91	10.89	10.84	10.80	10.74	10.76
SB0	80,708	81,269	80,217	80,342	83,999	81,878
SB Final Year	60,608	53,402	52,437	51,174	51,674	49,370
Depletion Final Year (%)	75.1%	65.7%	65.4%	63.7%	61.5%	60.3%
Yield SPR50	7,776	7,741	7,492	7,416	6,969	6,997

Table 29: Quantities of interest when profiling over R_0.

log(R0)	10.0	10.5	10.91	11.0	11.5	12	12.5	13	13.5	14
M (females)	0.115	0.138	0.157	0.162	0.186	0.207	0.223	0.235	0.242	0.246
Lmin (females)	16.58	16.44	16.37	16.36	16.35	16.40	16.48	16.57	16.64	16.68
Lmax (females)	50.15	50.26	50.36	50.38	50.48	50.54	50.56	50.56	50.54	50.52
k (females)	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.19
CV young (females)	0.17	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.16
CV old (females)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
M (males)	0.125	0.150	0.170	0.175	0.200	0.222	0.239	0.251	0.259	0.263
Lmin (males)	19.36	19.36	19.36	19.36	19.34	19.31	19.28	19.25	19.23	19.22
Lmax (males)	44.88	44.88	44.89	44.89	44.89	44.87	44.84	44.81	44.79	44.78
k (males)	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
CV young (males)	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
CV old (males)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
SB0	63,148	71,864	80,708	83,092	99,194	125,041	168,758	243,536	370,145	581,676
SB2015	25,725	43,771	60,608	64,742	88,616	118,707	162,294	231,813	346,791	537,669
Depl2015	40.7%	60.9%	75.1%	77.9%	89.3%	94.9%	96.2%	95.2%	93.7%	92.4%
Yield SPR50	4,451	6,054	7,776	8,246	11,366	16,094	23,644	36,073	56,705	90,889
Likelihood				difference from base model likelihood						
Total	13.3	2.5	0	0.1	4.1	11.6	19.6	26.3	31.2	34.5
Survey	4.2	1.2	0	-0.1	0.3	1.7	3.2	4.4	5.2	5.7
Discard	0.9	0.3	0	-0.1	0.1	0.4	0.7	0.9	0.9	0.9
Length	-1.5	-0.7	0	0.2	1.2	2.4	3.6	4.9	5.9	6.7
Age	-2.0	-1.2	0	0.4	3.0	6.1	9.0	11.4	13.0	14.1
Recruitment	12.8	3.5	0	-0.5	-1.4	-0.7	0.6	2.0	3.1	3.9
Forecast Rec	0.1	0.0	0	0.0	0.0	0.0	0.1	0.1	0.2	0.2
Parameter Priors	-1.3	-0.6	0	0.15	0.94	1.66	2.23	2.62	2.86	3.01

Table 30: Quantities of interest when profiling over steepness values

Steepness (*h*)	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.98
M (females)	0.174	0.164	0.160	0.158	0.158	0.157	0.157	0.157
Lmin (females)	16.41	16.38	16.37	16.37	16.37	16.37	16.37	16.37
Lmax (females)	50.36	50.35	50.35	50.35	50.36	50.36	50.36	50.36
k (females)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
CV young (females)	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
CV old (females)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
M (males)	0.187	0.178	0.173	0.172	0.171	0.170	0.170	0.170
Lmin (males)	19.35	19.34	19.34	19.35	19.36	19.36	19.37	19.37
Lmax (males)	44.90	44.90	44.89	44.89	44.89	44.89	44.89	44.89
k (males)	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
CV young (males)	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
CV old (males)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
lnR0	11.32	11.11	11.01	10.95	10.92	10.91	10.90	10.89
SB0	97,491	89,412	85,316	83,022	81,617	80,692	80,050	79,667
SB2015	29,311	39,469	47,381	53,226	57,497	60,663	63,065	64,593
Depl2015	30.1%	44.1%	55.5%	64.1%	70.4%	75.2%	78.8%	81.1%
Yield SPR50	0	3,878	6,003	6,921	7,440	7,781	8,026	8,179
Likelihood			difference from minimum likelihood at h=0.4605					
Total	1.1	0.1	0.0	0.2	0.5	0.7	0.9	1.0
Survey	0.8	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Discard	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	-0.2
Length	-0.1	-0.1	0.1	0.2	0.3	0.4	0.5	0.5
Age	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recruitment	0.0	-0.1	0.1	0.3	0.5	0.7	0.9	1.0
Forecast Rec	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
Parameter Priors	2.3	2.0	1.9	1.8	1.8	1.8	1.8	1.8

Table 31: Projection of potential OFL, landings, and catch, summary biomass (age-4 and older), spawning biomass, and depletion for the base case model projected with total catch equal to the default ACL of 2,000 mt annually. The predicted OFL is the calculated total catch determined by $F_{SPR=50\%}$.

Year	Predicted OFL (mt)	Projected Total Catch (mt)	Age 4+ biomass (mt)	Spawning Biomass (mt)	Depletion (%)
2015	4,137*	2,000	132,031	60,608	75.1
2016	3,990*	2,000	135,187	64,599	80.0
2017	14,130	2,000	140,098	67,674	83.9
2018	14,511	2,000	144,029	69,856	86.6
2019	14,746	2,000	146,237	71,533	88.6
2020	14,966	2,000	147,574	72,892	90.3
2021	15,132	2,000	148,209	73,866	91.5
2022	15,200	2,000	148,328	74,413	92.2
2023	15,179	2,000	148,098	74,604	92.4
2024	15,108	2,000	147,654	74,556	92.4
2025	15,016	2,000	147,099	74,369	92.2
2026	14,924	2,000	146,502	74,110	91.8

Table 32: Summary table of 12-year projections beginning in 2017 for alternate states of nature based on the axis of uncertainty (a combination of *M*, *h*, and 2010 recruitment strength). Columns range over low, mid, and high state of nature, and rows range over different assumptions of total catch levels (discards + retained). Catches in 2015 and 2016 are determined from the percentage of landings for each fleet in 2014.

			State of nature					
			Low		Base case		High	
Relative probability of ln(SB_2013)			0.25		0.5		0.25	
Management decision	Year	Catch (mt)	Spawning biomass (mt)	Depletion (%)	Spawning biomass (mt)	Depletion (%)	Spawning biomass (mt)	Depletion (%)
1000K	2017	1,000	52,762	64%	67,674	84%	79,913	99%
	2018	1,000	54,446	66%	69,856	87%	83,026	102%
	2019	1,000	56,079	68%	71,533	89%	84,926	105%
	2020	1,000	57,729	70%	72,892	90%	85,972	106%
	2021	1,000	59,239	72%	73,866	92%	86,277	106%
	2022	1,000	60,490	73%	74,413	92%	85,944	106%
	2023	1,000	61,486	75%	74,604	92%	85,158	105%
	2024	1,000	62,287	76%	74,556	92%	84,116	104%
	2025	1,000	62,954	76%	74,369	92%	82,969	102%
	2026	1000	63,529	77%	74,110	92%	81,815	101%
Current ACL	2017	2,000	52,762	64%	67,674	84%	79,913	99%
	2018	2,000	54,446	66%	69,856	87%	83,026	102%
	2019	2,000	56,079	68%	71,533	89%	84,926	105%
	2020	2,000	57,729	70%	72,892	90%	85,972	106%
	2021	2,000	59,239	72%	73,866	92%	86,277	106%
	2022	2,000	60,490	73%	74,413	92%	85,944	106%
	2023	2,000	61,486	75%	74,604	92%	85,158	105%
	2024	2,000	62,287	76%	74,556	92%	84,116	104%
	2025	2,000	62,954	76%	74,369	92%	82,969	102%
	2026	2,000	63,529	77%	74,110	92%	81,815	101%
ACL (P* =0.45 and sigma=0.36)	2017	13,514	52,762	64%	67,791	84%	79,913	99%
	2018	12,661	48,317	59%	64,014	79%	77,179	95%
	2019	11,837	44,578	54%	60,425	75%	73,894	91%
	2020	11,205	41,738	51%	57,392	71%	70,629	87%
	2021	10,696	39,486	48%	54,764	68%	67,448	83%
	2022	10,227	37,565	46%	52,362	65%	64,331	79%
	2023	9,791	35,913	44%	50,179	62%	61,384	76%
	2024	9,409	34,519	42%	48,269	60%	58,730	72%
	2025	9,090	33,351	41%	46,655	58%	56,434	70%
	2026	8,832	32,363	39%	45,317	56%	54,498	67%

11 Figures

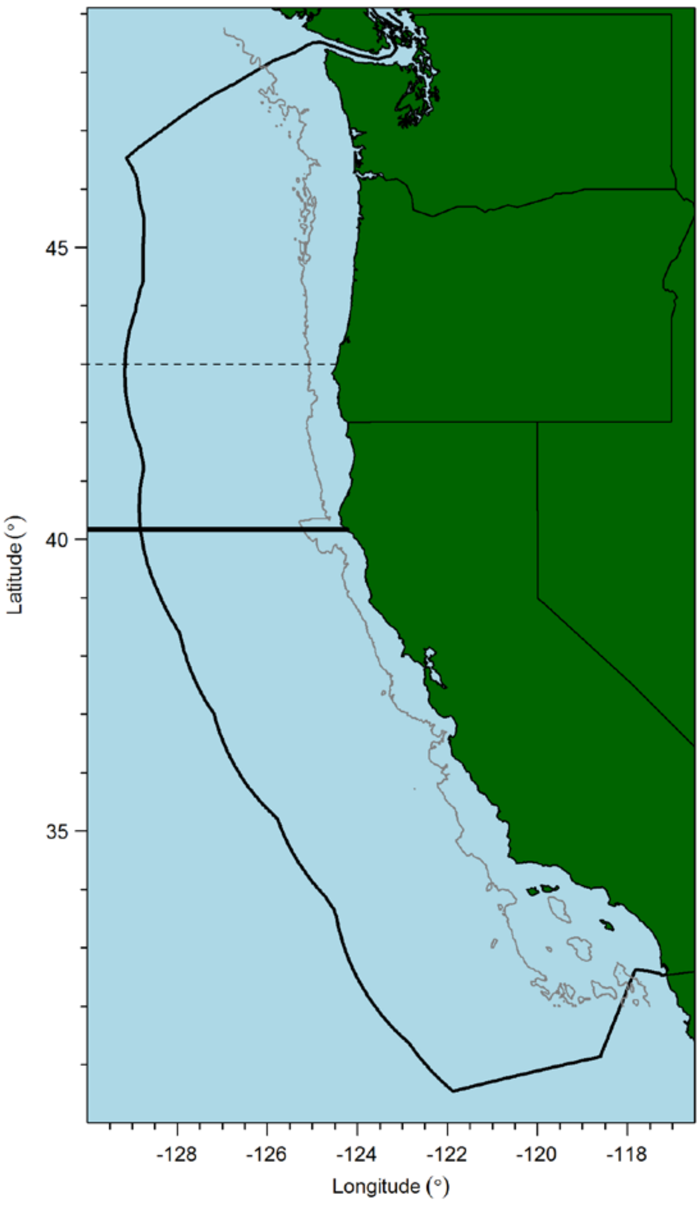


Figure 1: A map of the west coast of the U.S. with the EEZ and the 40° 10' line that divides management into northern and southern regions for some species (although not Widow Rockfish). The line at latitude 43° N latitude is where past assessment models have been stratified into two areas.

Figure 2: Observations of two cohorts (2008, top and 2010, bottom) from the NWFSC shelf/slope survey data. Darker circles indicate more observations (possibly within the same tow).

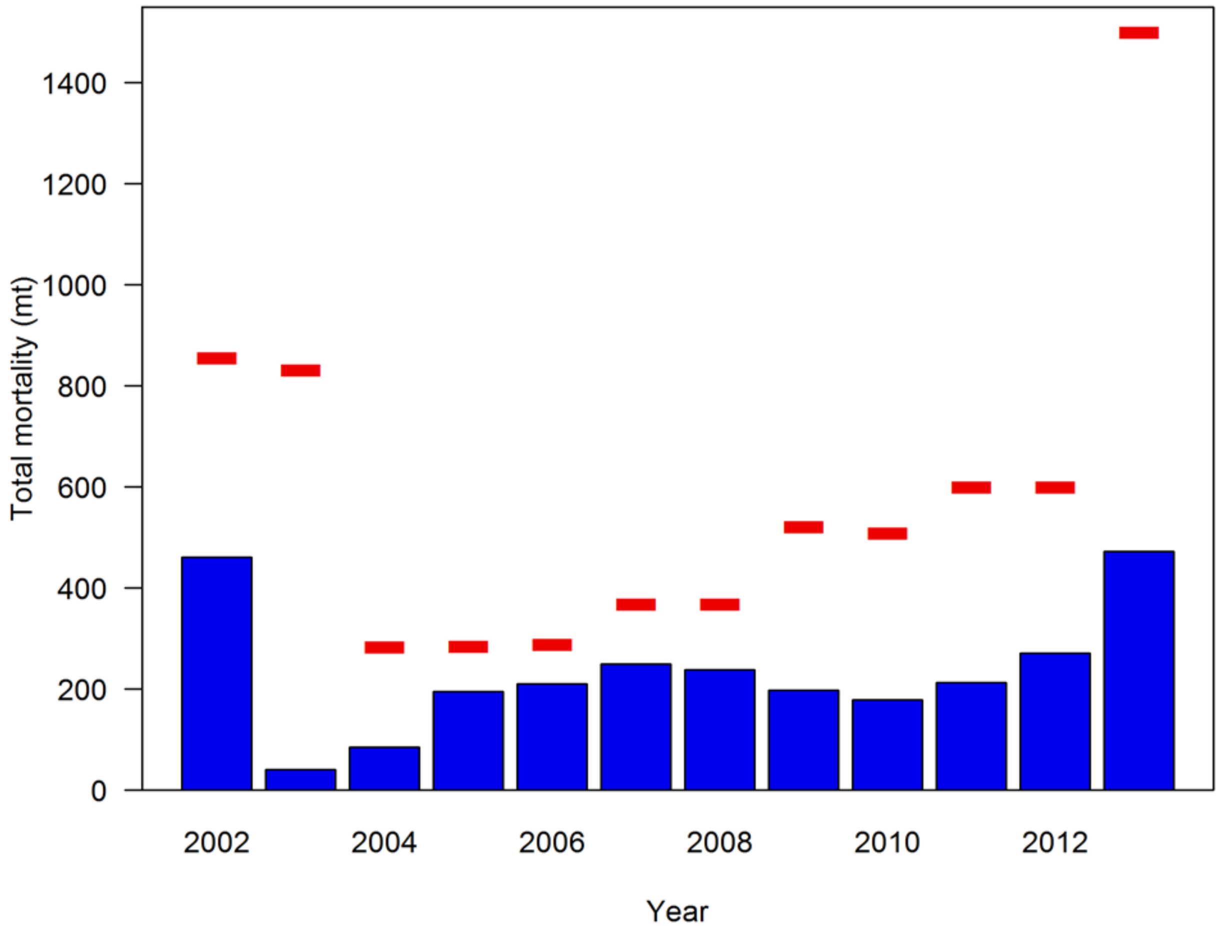


Figure 3: Total removals as estimated in the groundfish mortality report (pers. comm., Kayleigh Somers, WCGOP, NWFSC) for 2002 to 2013. The horizontal red lines represent the Widow Rockfish specific ACL for each year.

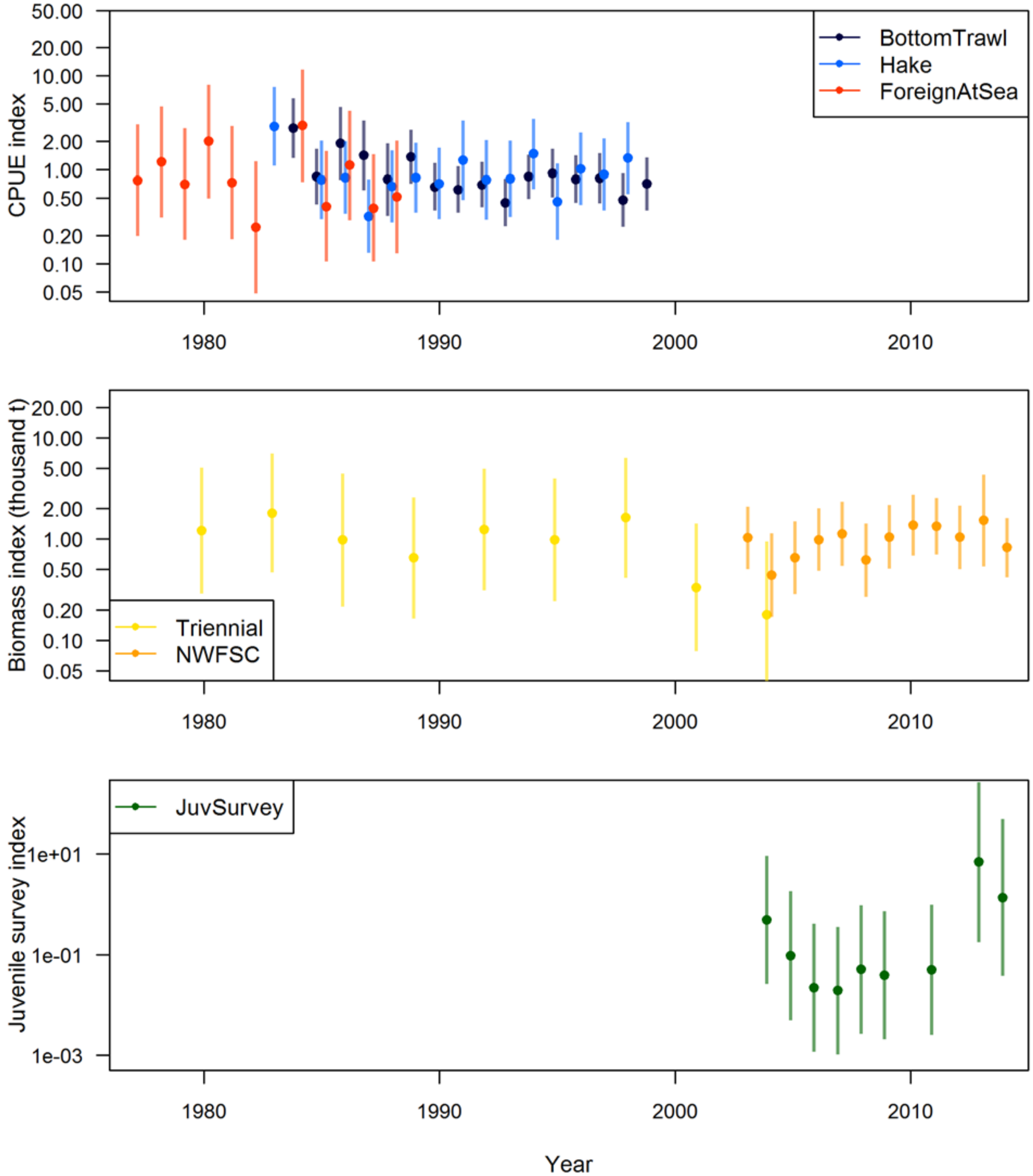


Figure 4: Fishery-dependent indices of abundance from the 2011 assessment (top), the bottom trawl survey indices (middle), and the juvenile survey index of young-of-the-year fish (bottom) scaled to the mean of their own series.

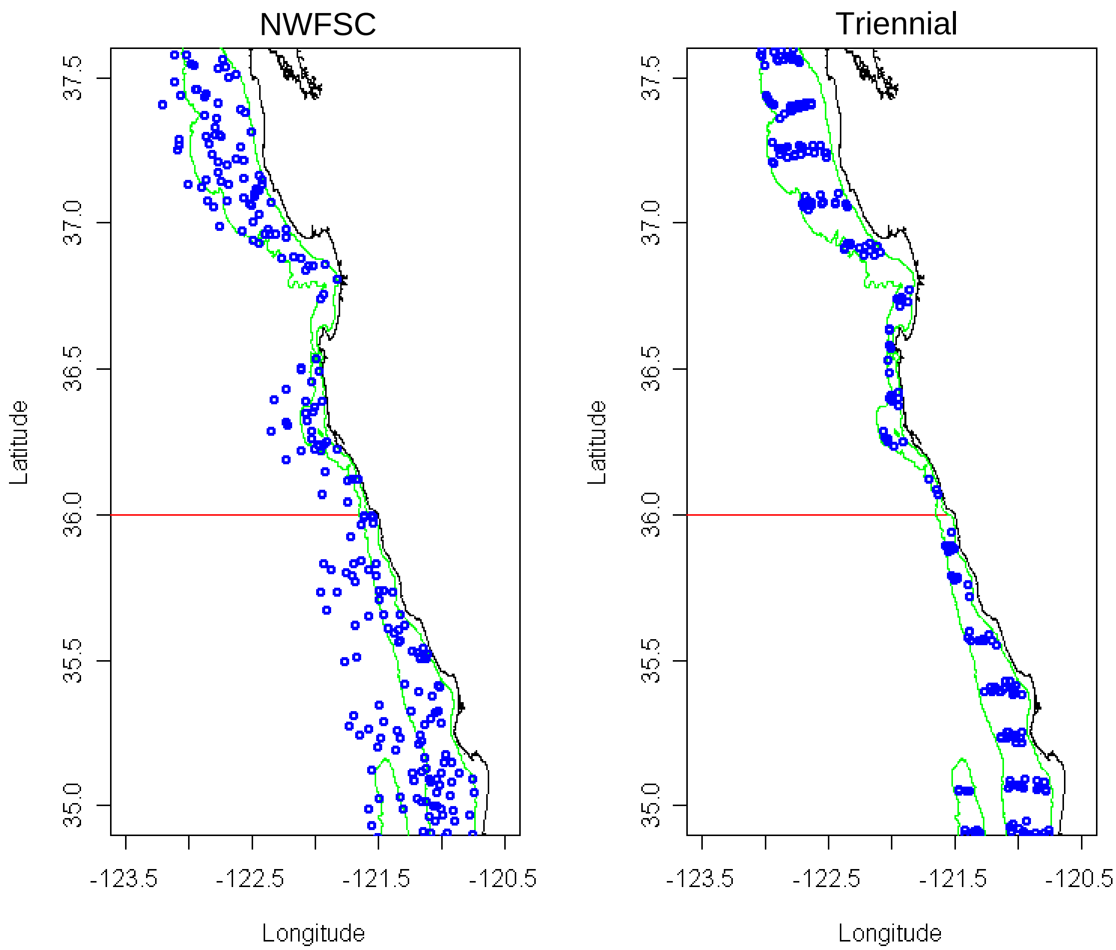


Figure 5: Survey tow locations in 2004, showing the difference in station design for the NWFSC survey relative to the Triennial trawl survey (Figure from Stewart (2007)).

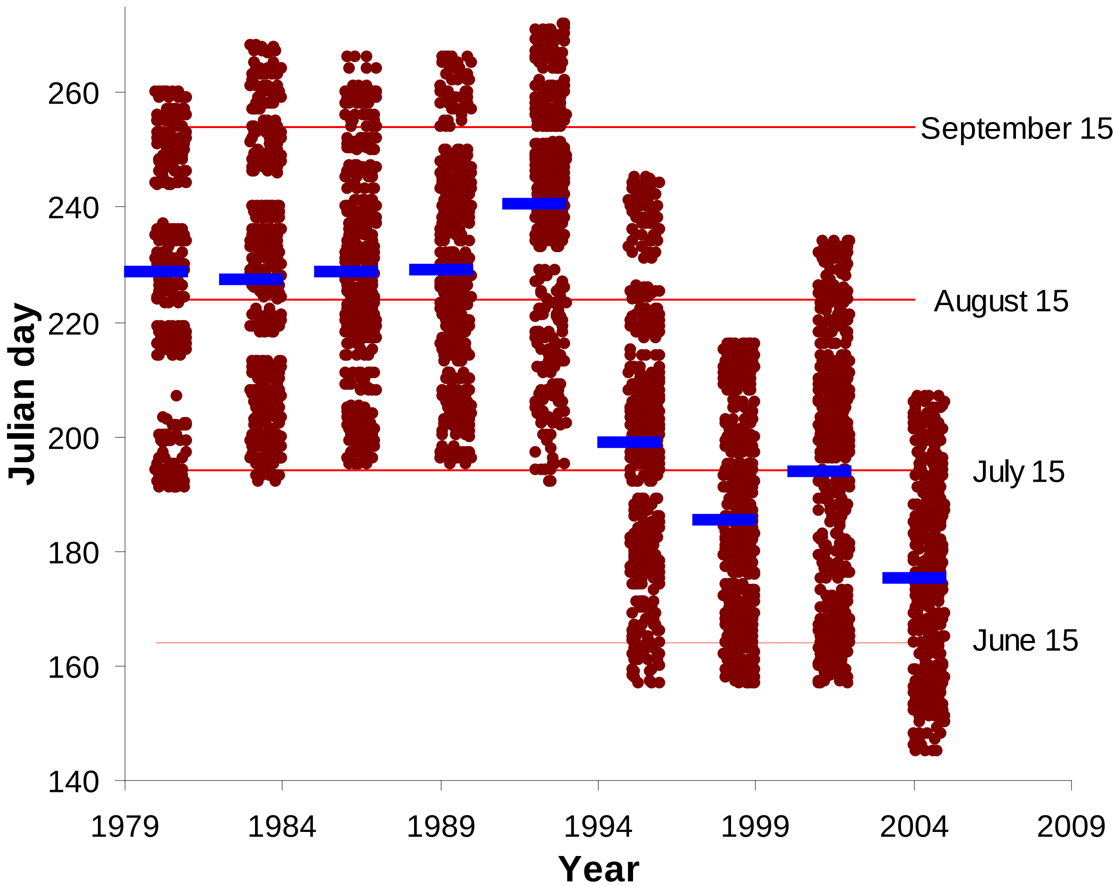
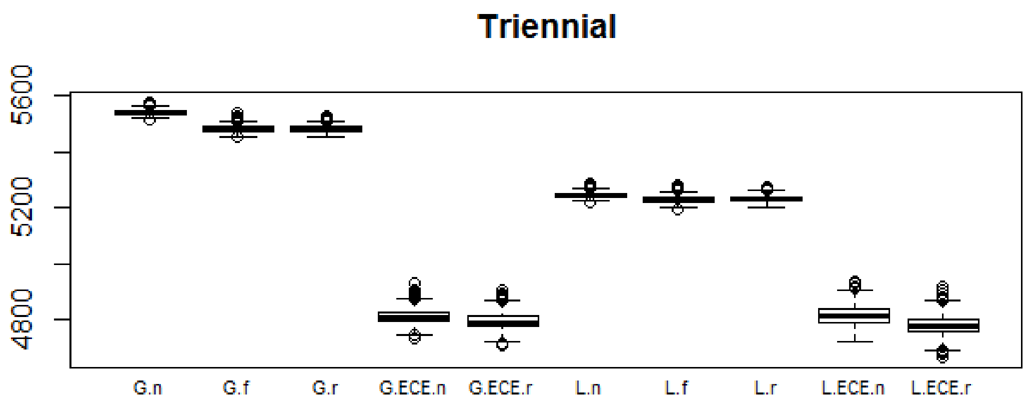


Figure 6: Distribution of dates of operation for the triennial survey (1980-2004). Solid bars show the mean date for each survey year, points represent individual hauls dates, but are jittered to allow better delineation of the distribution of individual points (Figure from (Stewart 2007)).



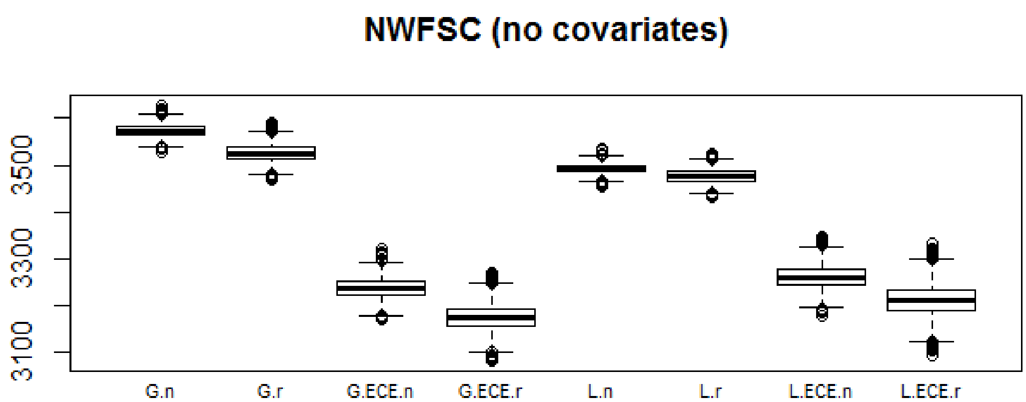


Figure 7: Deviance from six assumptions in the GLMM model for the five surveys. "G" refers to the gamma distribution and "L" refers to the lognormal distribution. No stratum effects, and random stratum effects are notated with "n" and "r", respectively.

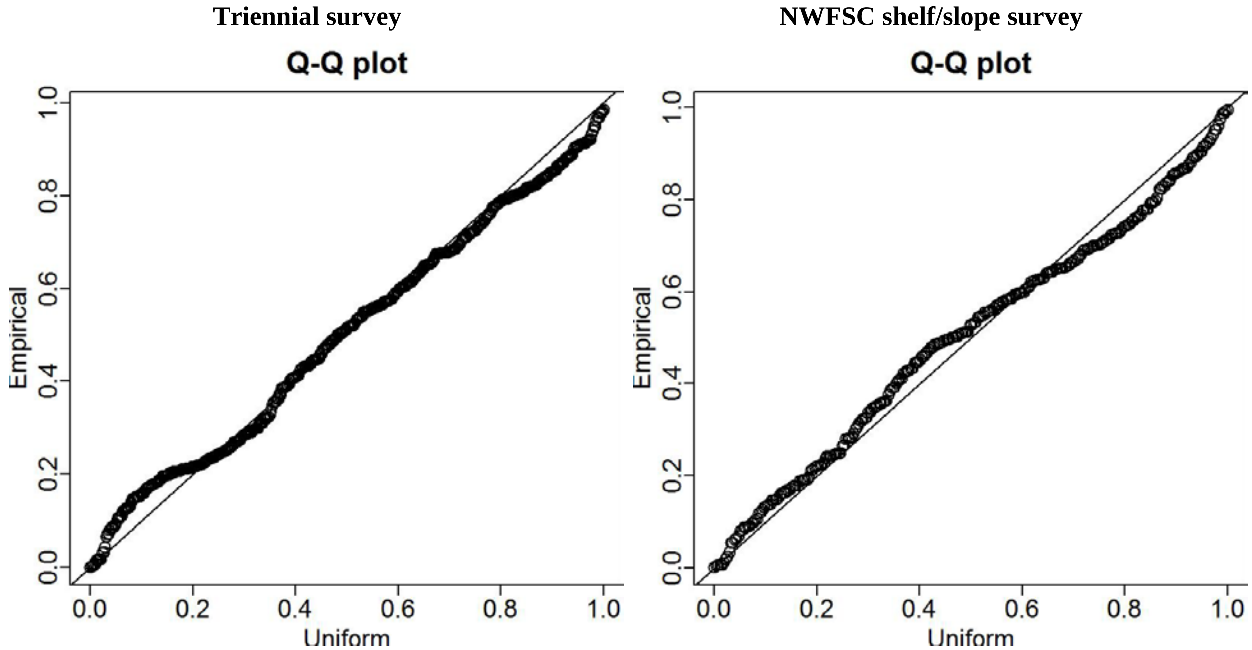


Figure 8: Q-Q plots for models with an extreme catch event (ECE) mixture distribution for the Triennial survey (left) and the NWFSC shelf/slope survey (right).

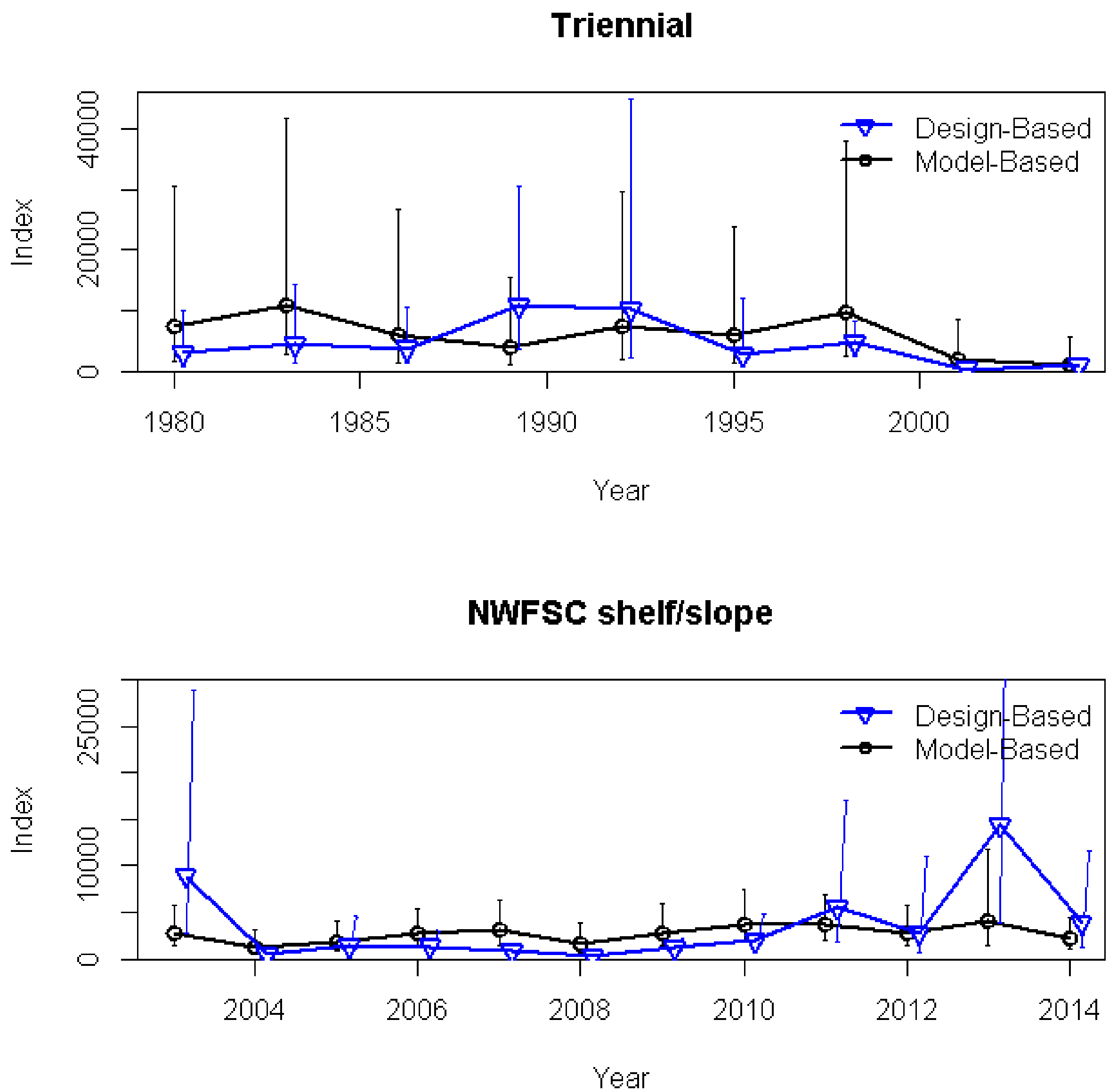


Figure 9: Model-based survey estimates for the Triennial and NWFSC shelf/slope surveys with estimated 95% confidence intervals. Design-based estimates and 95% confidence intervals are shown in blue for comparison.

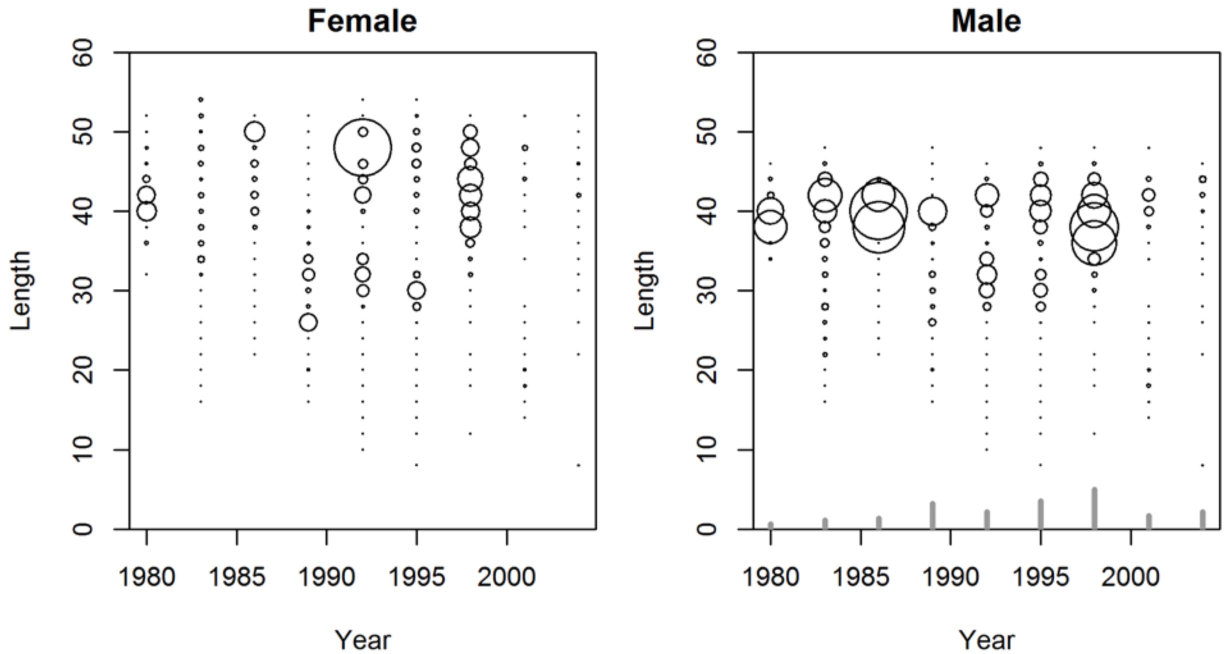


Figure 10: Expanded length compositions weighted by estimated numbers from the GLMM in each strata for the Triennial survey.

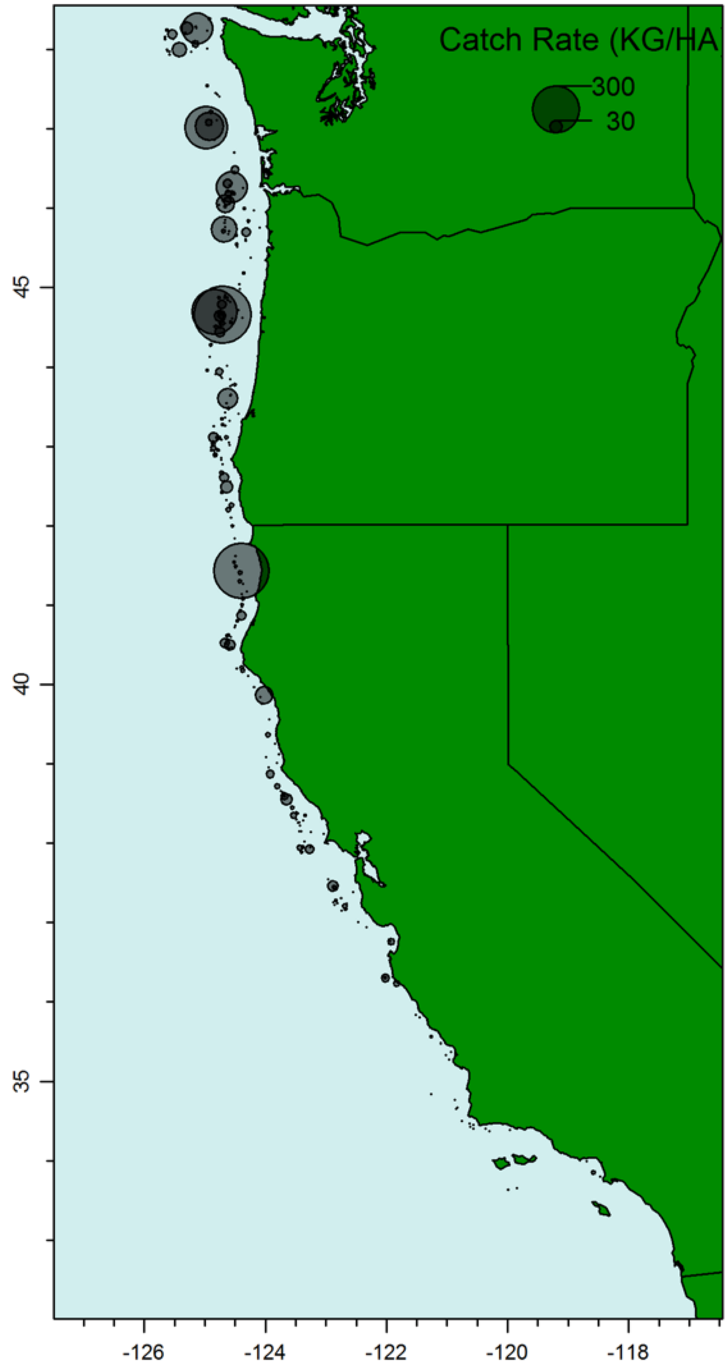


Figure 11: Catch-rates (gray circles) of Widow Rockfish for all years of the NWFSC shelf/slope survey.

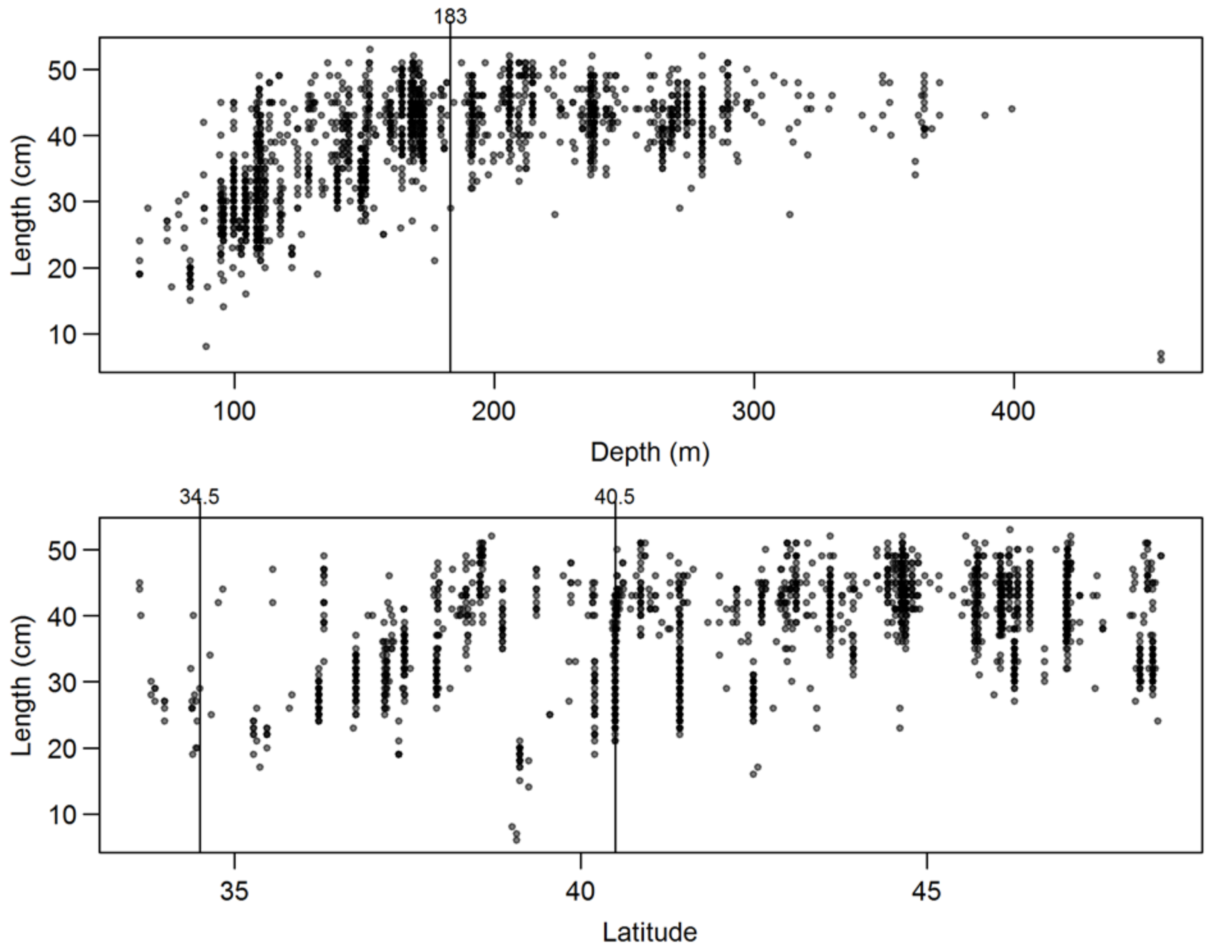


Figure 12: Observed Widow Rockfish lengths (cm) from the NWFSC shelf/slope survey plotted against depth (top) and latitude (bottom). Vertical lines are strata boundaries. Small fish above 400 m were removed and the few fish south of 34.5° N latitude were omitted.

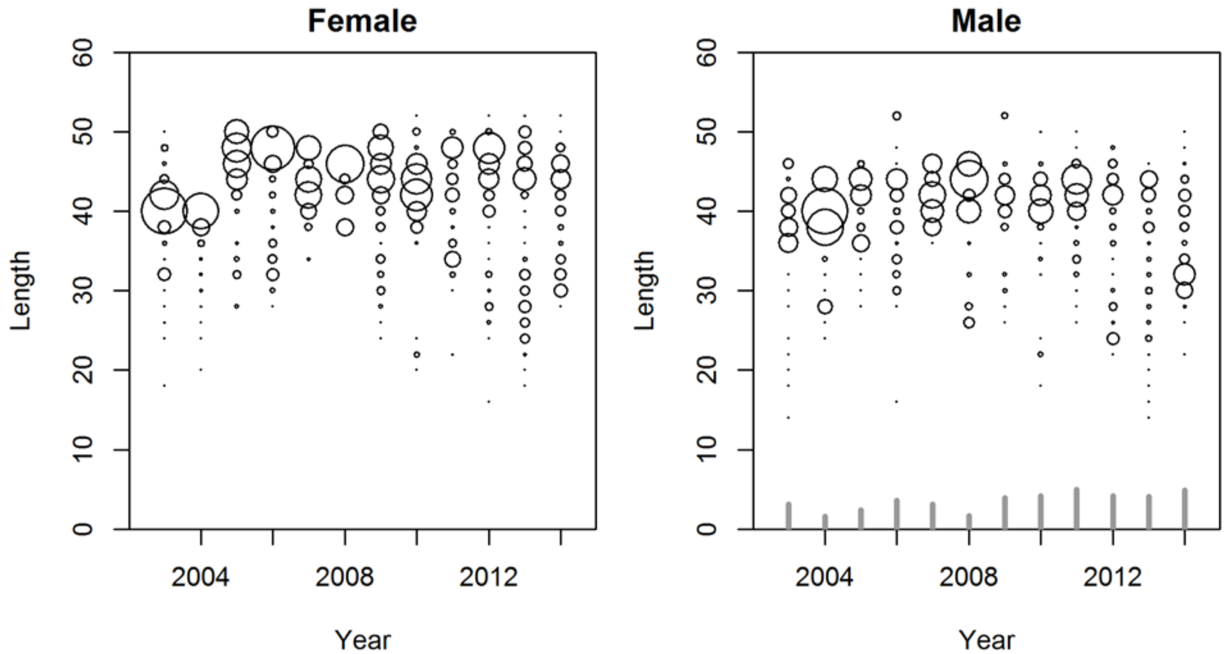


Figure 13: Expanded length compositions for the NWFSC shelf/slope survey weighted by estimated strata numbers from the GLMM. Gray bars in the left plot indicate relative number of tows that observed Widow Rockfish across years.

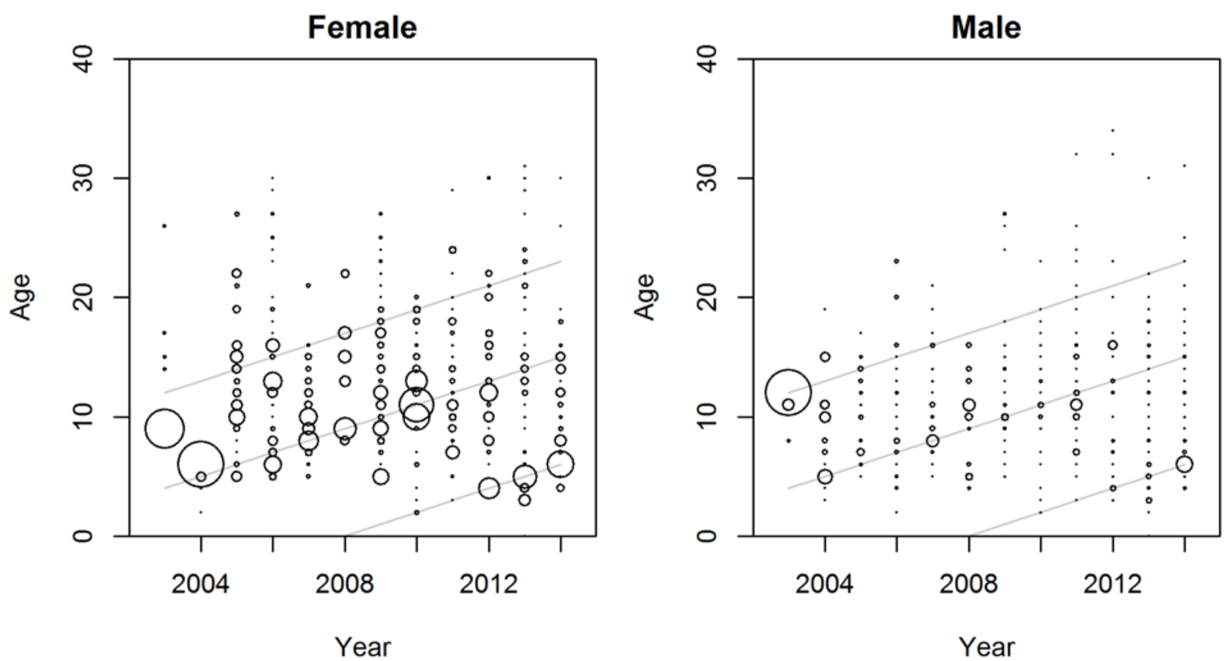


Figure 14: Expanded marginal age compositions from the NWFSC shelf/slope survey. Gray lines show the 1991, 1999, and 2008 cohorts, for reference.

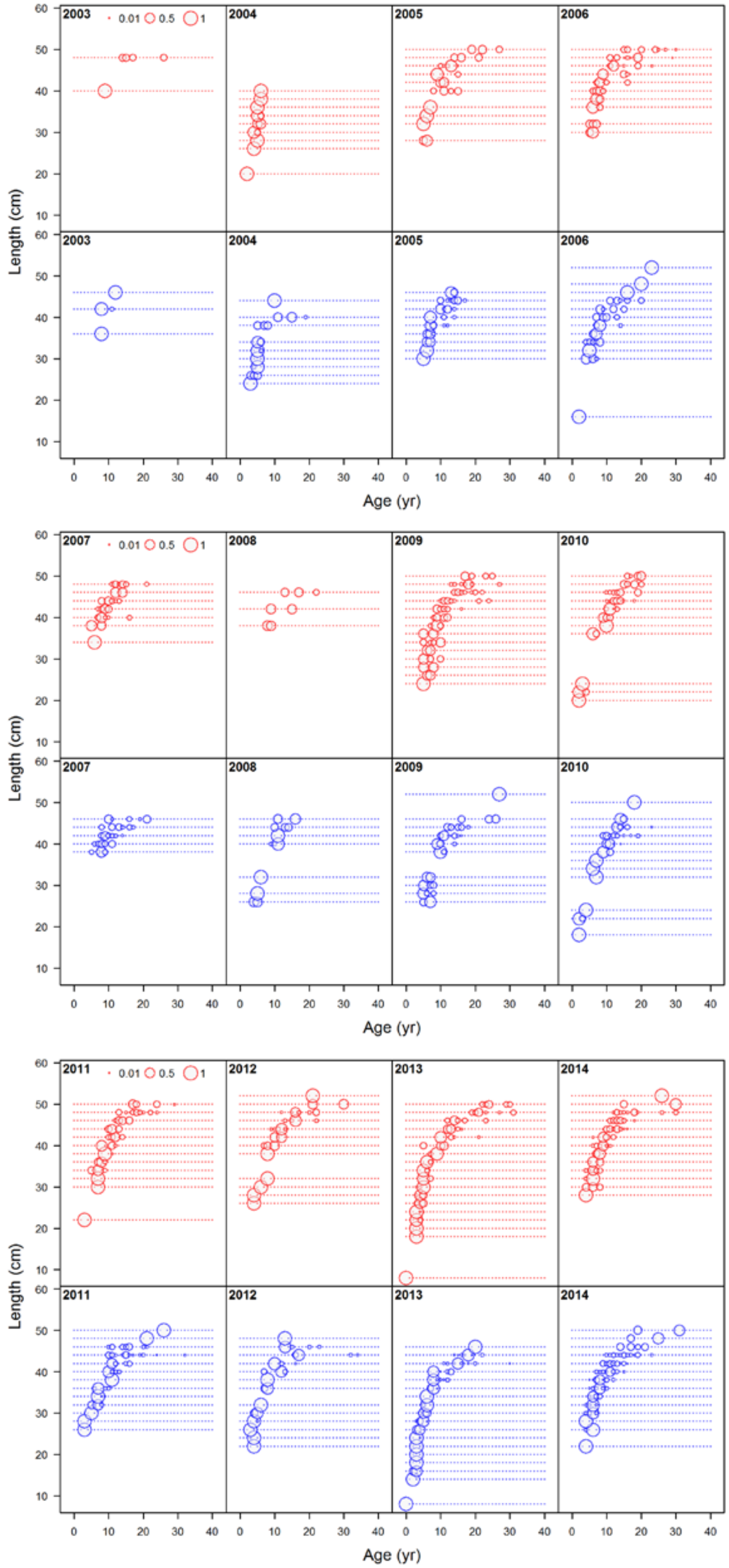


Figure 15: Conditional age-at-length from NWFSC shelf/slope observations for females (red) and males (blue).

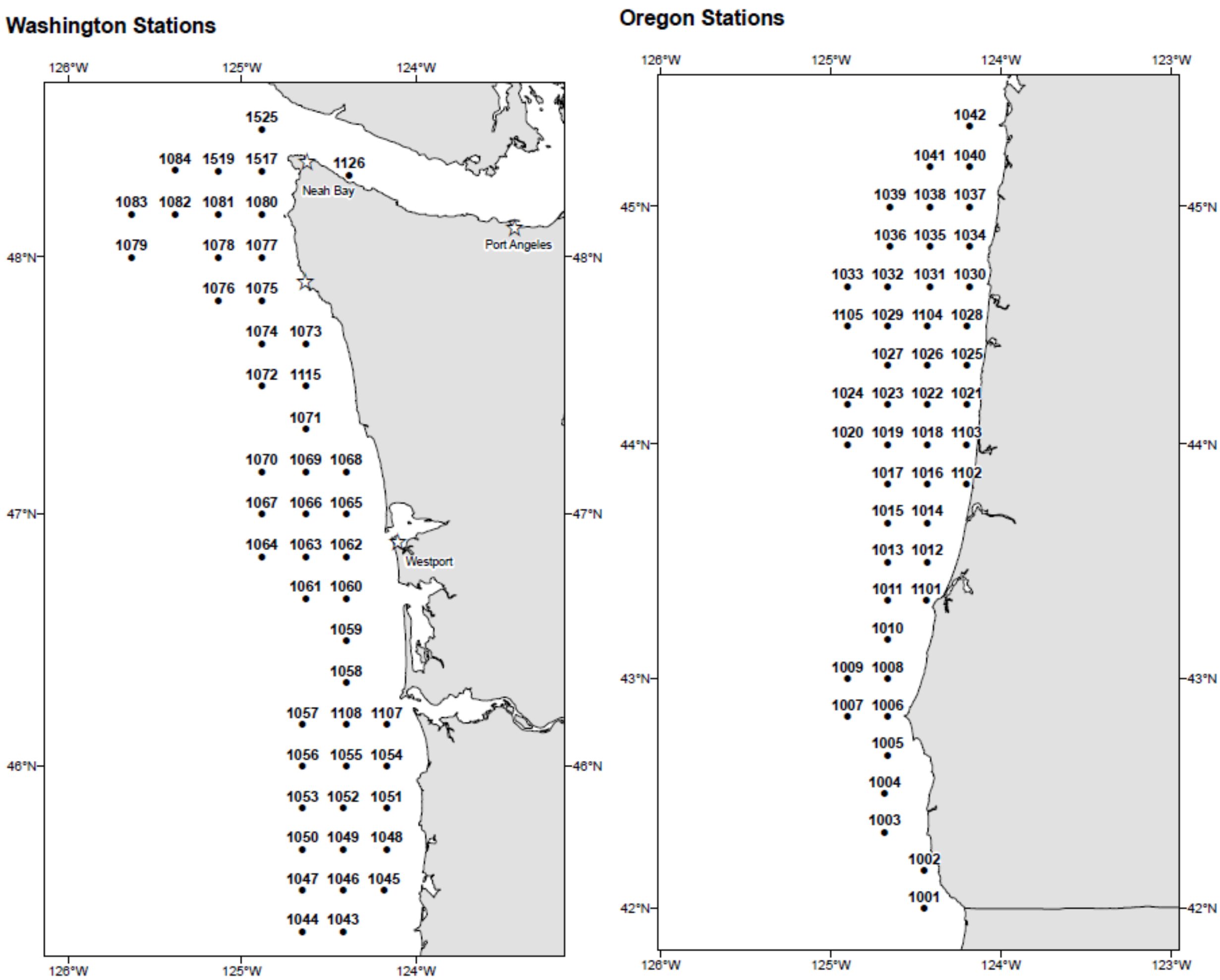


Figure 16: Station locations for the International Pacific Halibut Commission longline survey in Washington (left) and Oregon (right). Maps supplied by IPHC. See also http://www.iphc.int/research/37-survey-data.html.

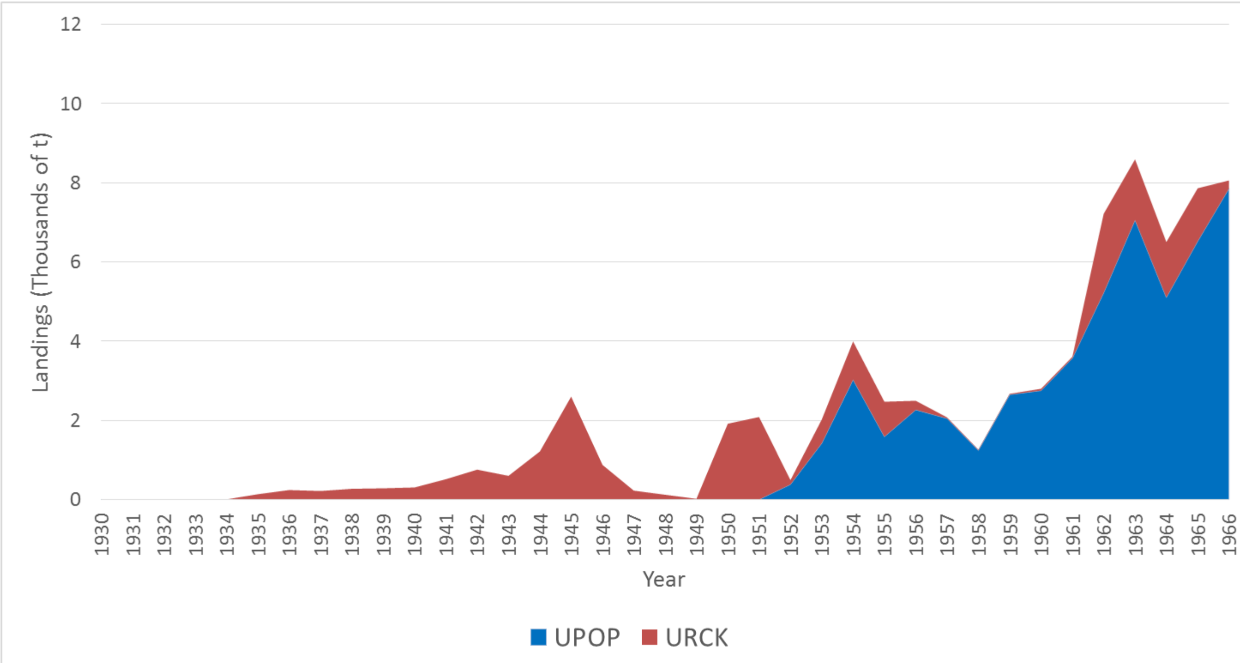


Figure 17: Cumulative landings of unidentified rockfish (URCK) and unidentified Pacific Ocean Perch (UPOP) from 1930–1969 from various sources used to reconstruct Widow Rockfish landings.

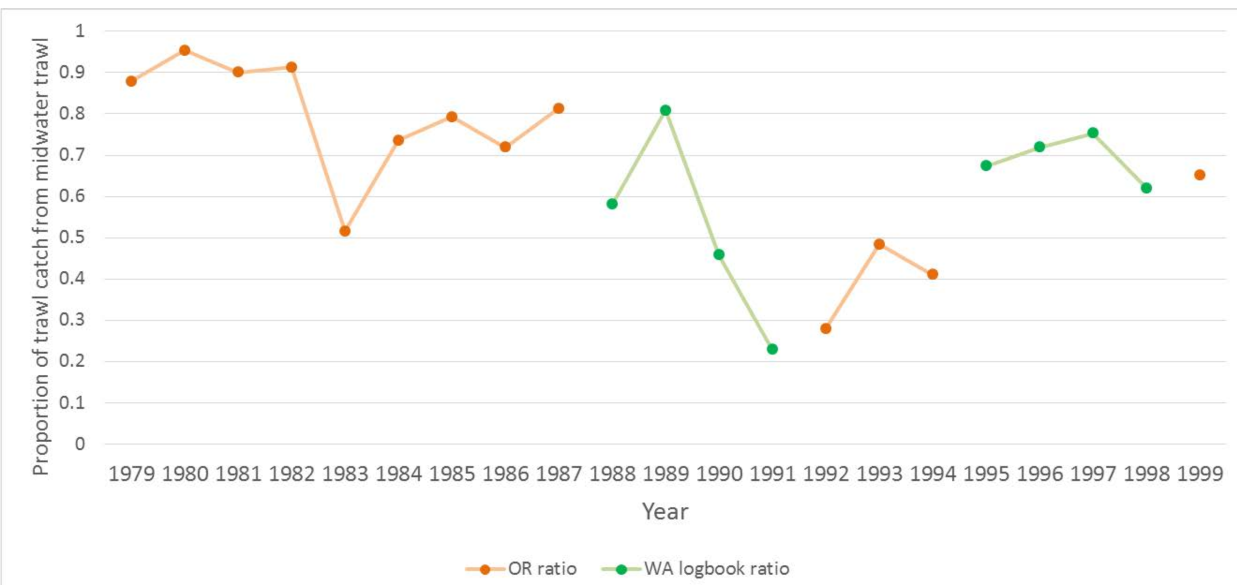


Figure 18: Proportion of midwater trawl catch out of the entire trawl catch used to split Washington trawl catches from 1979–1999. Orange points indicate ratios determined from Oregon trawl landings and green points indicate ratios determined from Washington logbooks.

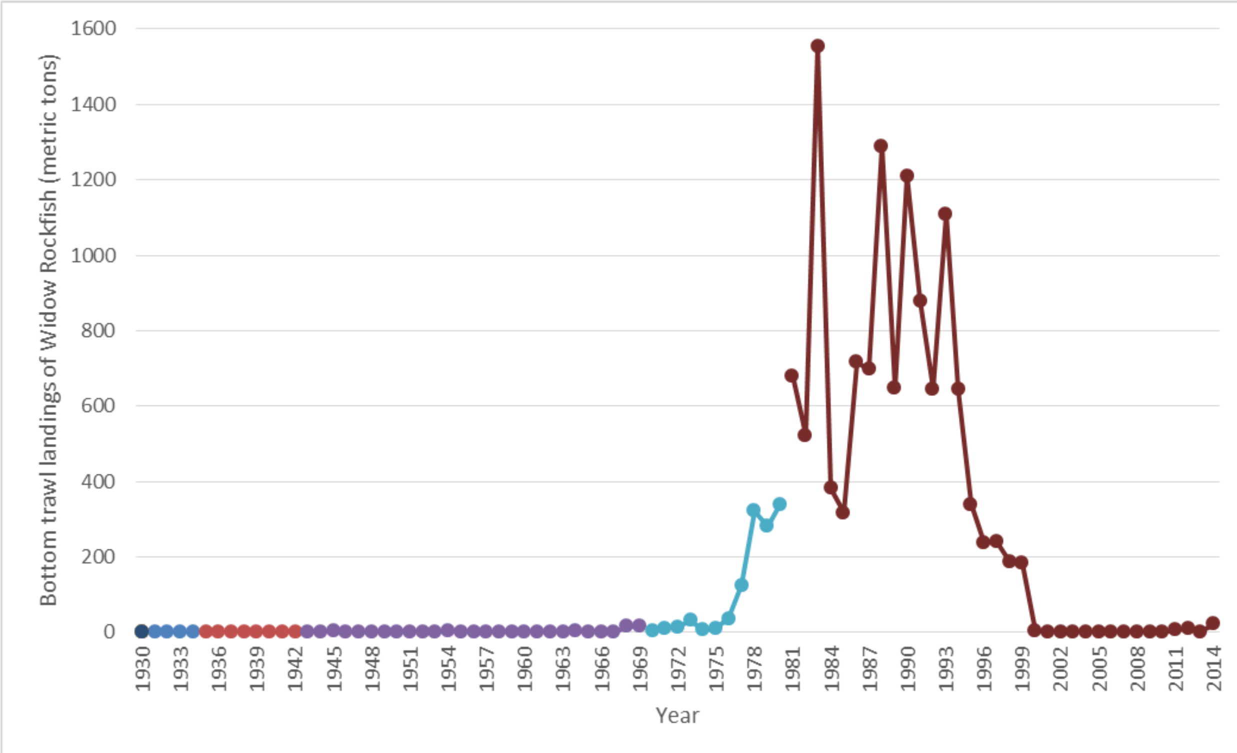


Figure 19: Reconstructed historical bottom trawl landings of Widow Rockfish (metric tons) in Washington from the sources described in the text. Landings after 1999 were directly compiled from the PacFIN database. The different colors show the different sources as discussed in the text.

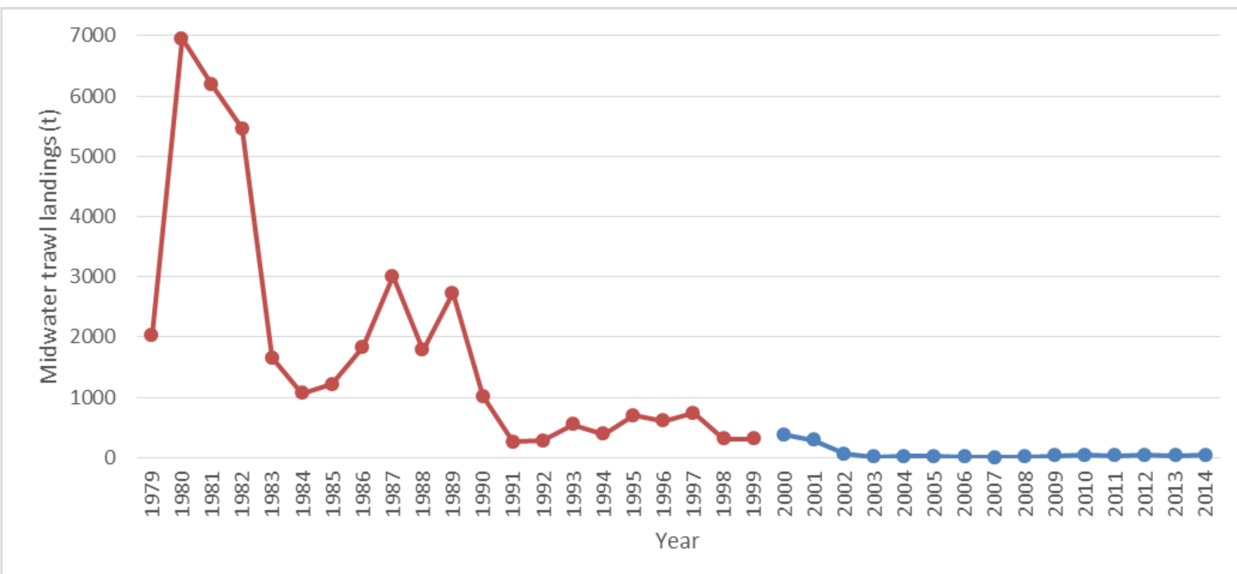


Figure 20: Reconstructed historical midwater trawl landings (mt) of Widow Rockfish (1979–1999) and midwater trawl landings (mt) of Widow Rockfish from the PacFIN database (2000–2014). Years in red were determined by proportioning trawls landings and the blue points were determined directly from gear codes in PacFIN.

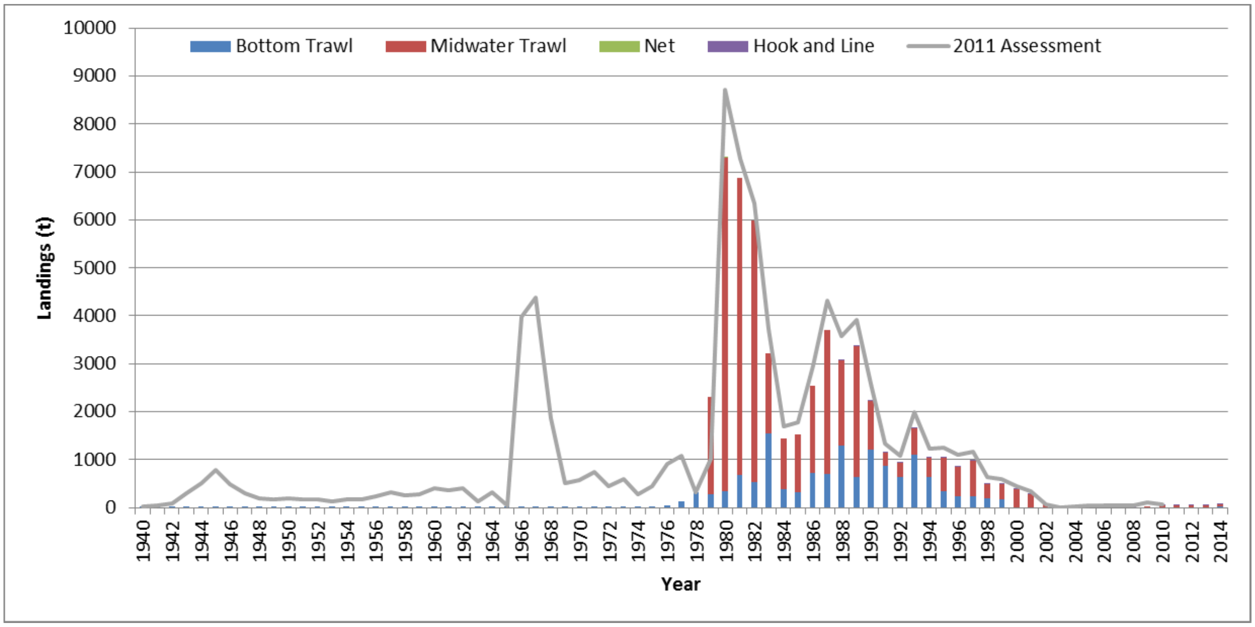


Figure 21: Catches in Washington from the 2011 assessment (gray line, landings plus discards) and landings reconstructed for this assessment by gear type (bars). Catches from the 2011 assessment include foreign at-sea catches which are not included as a gear type for the landings for this assessment.

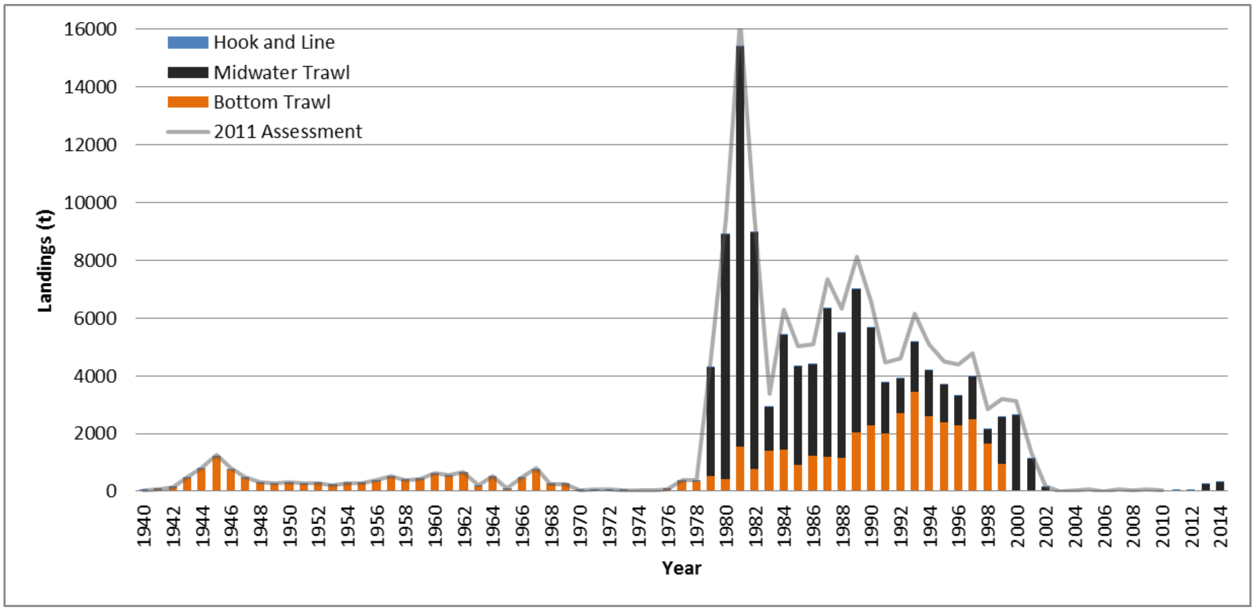


Figure 22: Catches in Oregon from the 2011 assessment (gray line, landings plus discards) and landings reconstructed for this assessment by gear type (bars). Catches from the 2011 assessment include foreign at-sea catches which are not included as a gear type for the landings for this assessment.

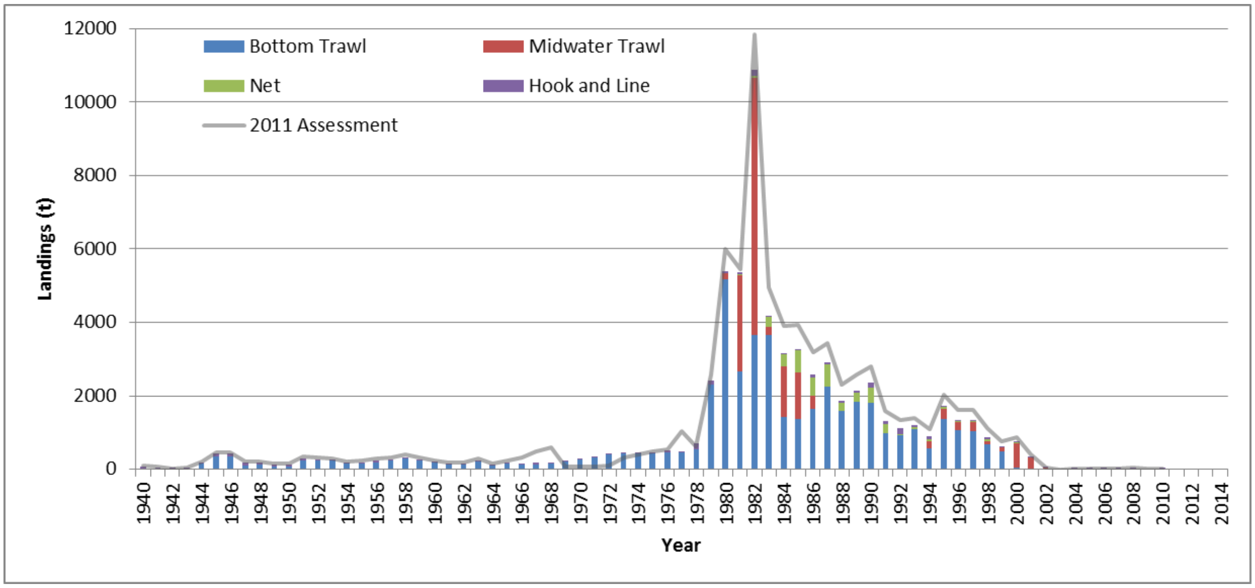


Figure 23: Catches in California from the 2011 assessment (gray line, landings plus discards) and landings reconstructed for this assessment by gear type (bars).

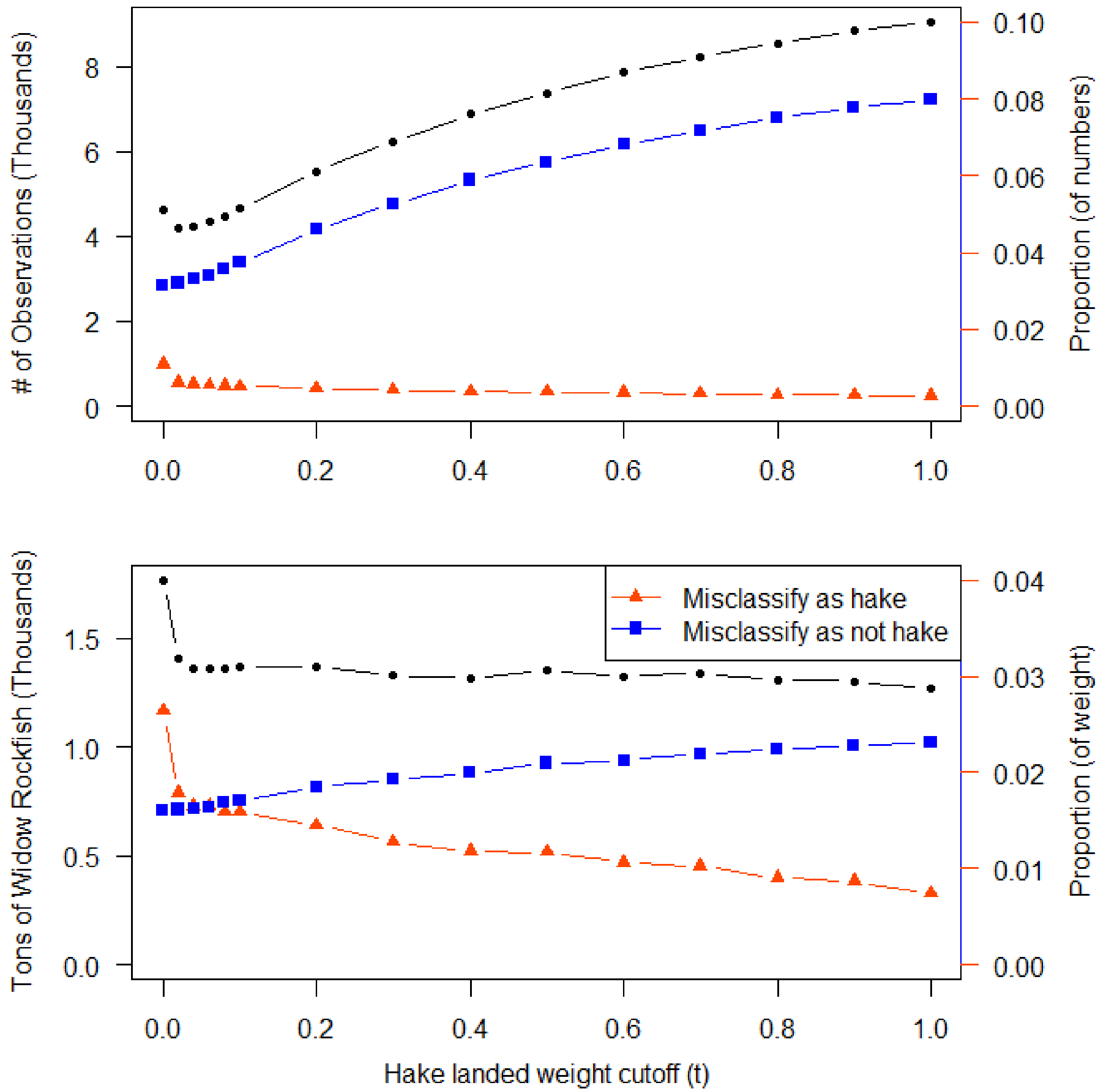


Figure 24: Misclassification of shoreside hake landings using a minimum weight of hake landed in tons (x-axis) and the months May–November. Total numbers of Widow Rockfish landings (top) and weight of Widow Rockfish (bottom) summed over all years from 1994–2014 are shown by the black line relative to the left axis. Proportions of misclassifying non-hake landings as hake (red) and hake landings as non-hake (blue) are shown relative to the right axis.

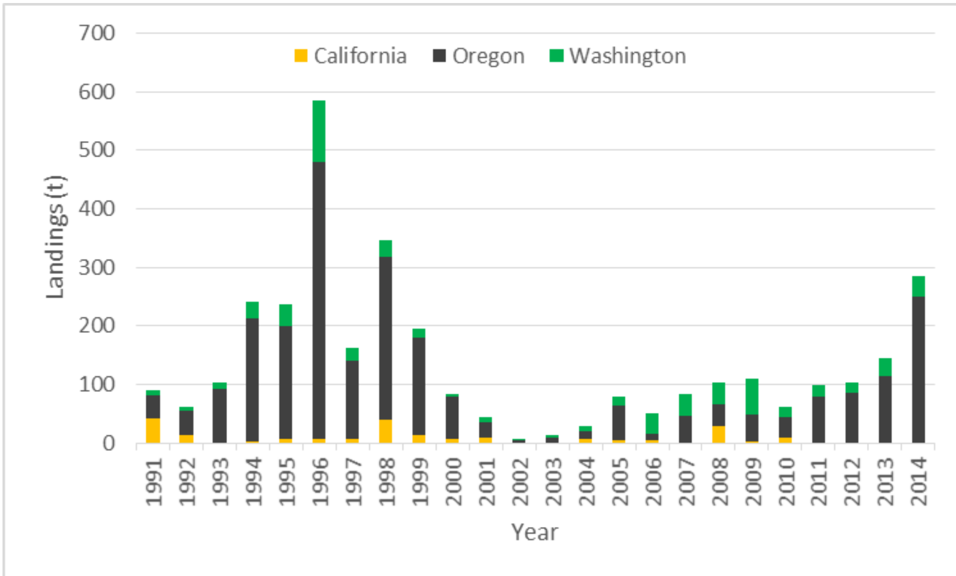


Figure 25: Landings of Widow Rockfish (mt) in the shoreside hake fishery.

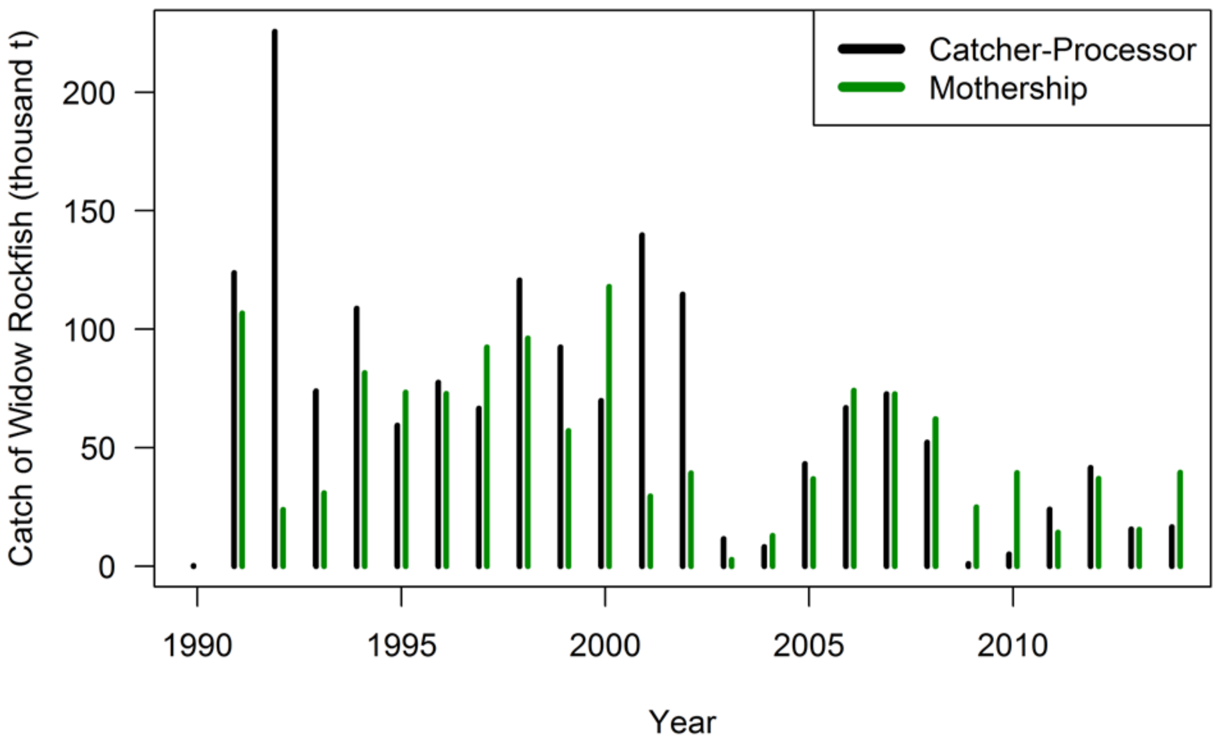


Figure 26: Catch of Widow Rockfish (thousands of mt) in the domestic Catcher-Processor and Mothership fleets.

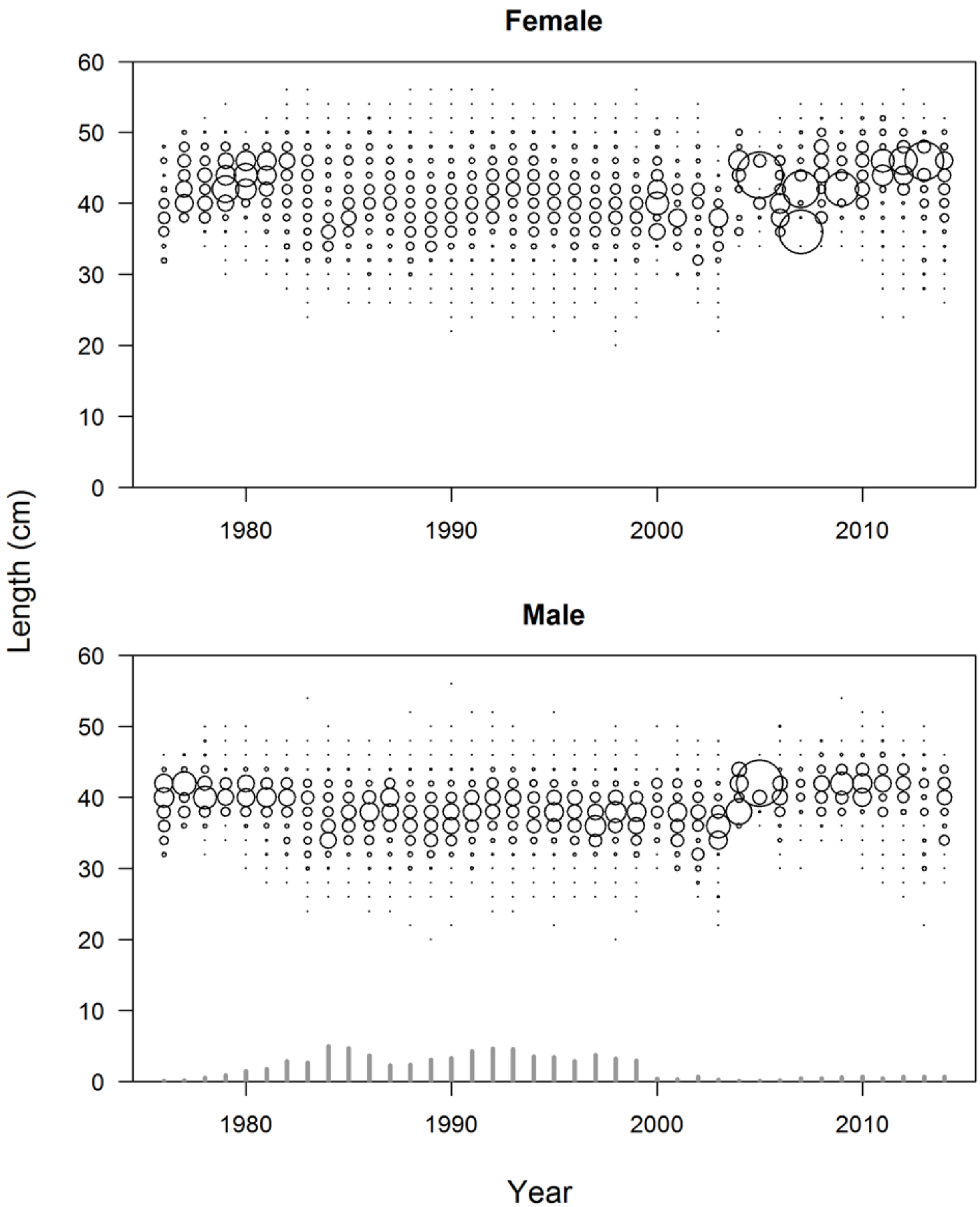


Figure 27: Expanded length compositions for the bottom trawl fishery. The area of the circle is proportional to the proportion-at-length. The gray bars at the bottom indicate relative number of tows.

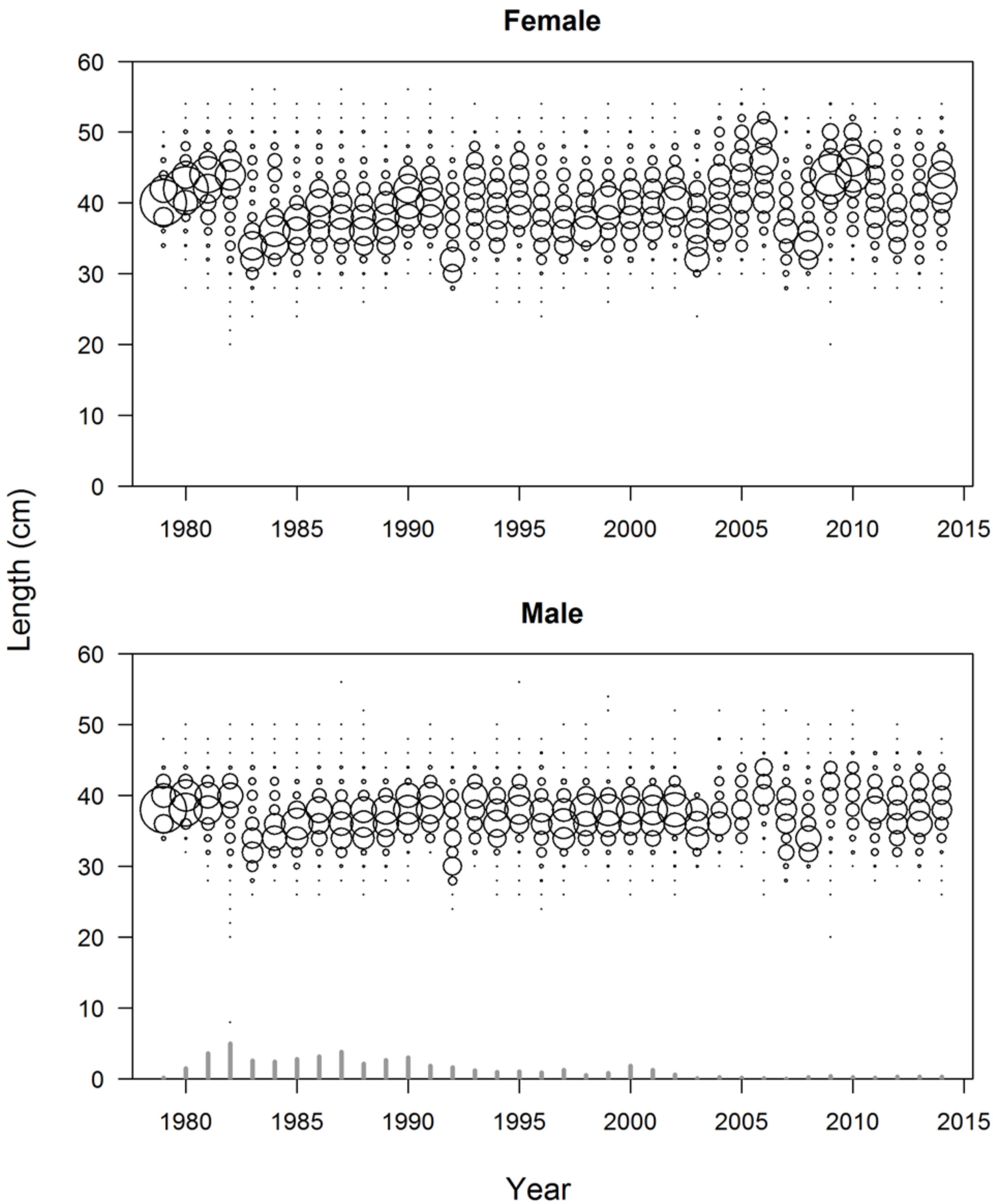


Figure 28: Expanded length compositions for the midwater trawl fishery. The area of the circle is proportional to the proportion-at-length. The gray bars at the bottom indicate relative number of tows.

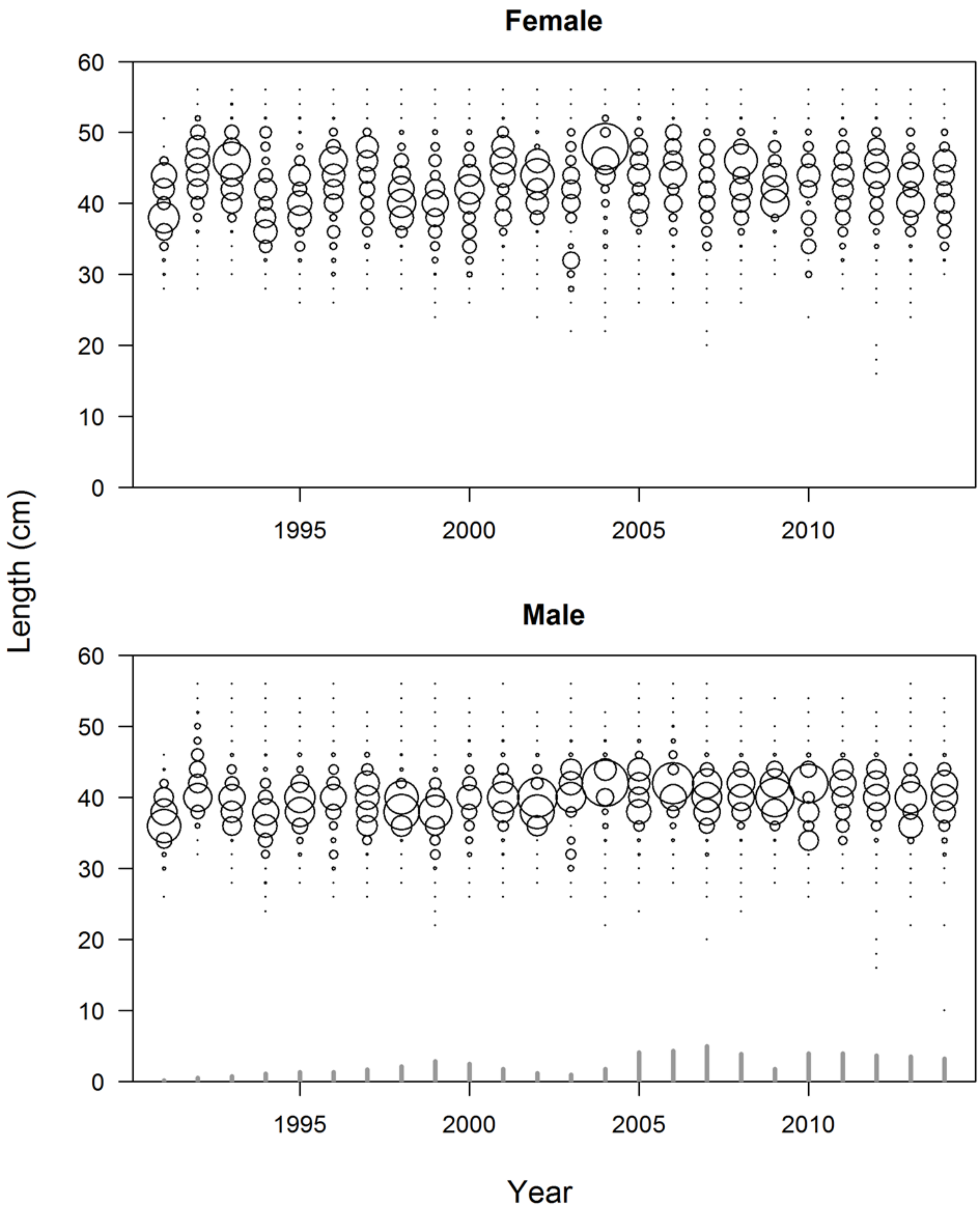


Figure 29: Expanded length compositions for the hake fishery. The area of the circle is proportional to the proportion-at-length. The gray bars at the bottom indicate relative number of tows.

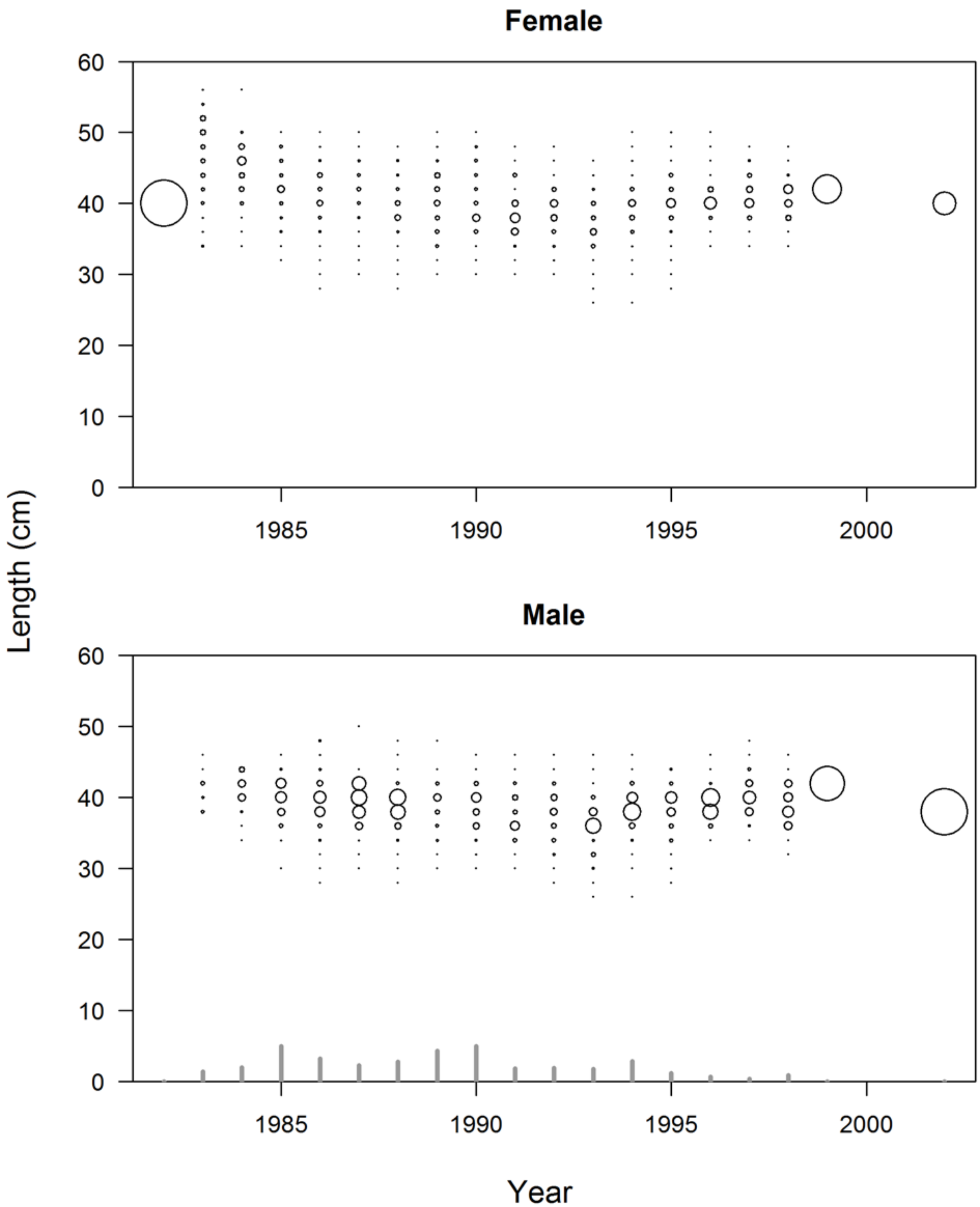


Figure 30: Expanded length compositions for the net fishery. The area of the circle is proportional to the proportion-at-length. The gray bars at the bottom indicate relative number of tows.

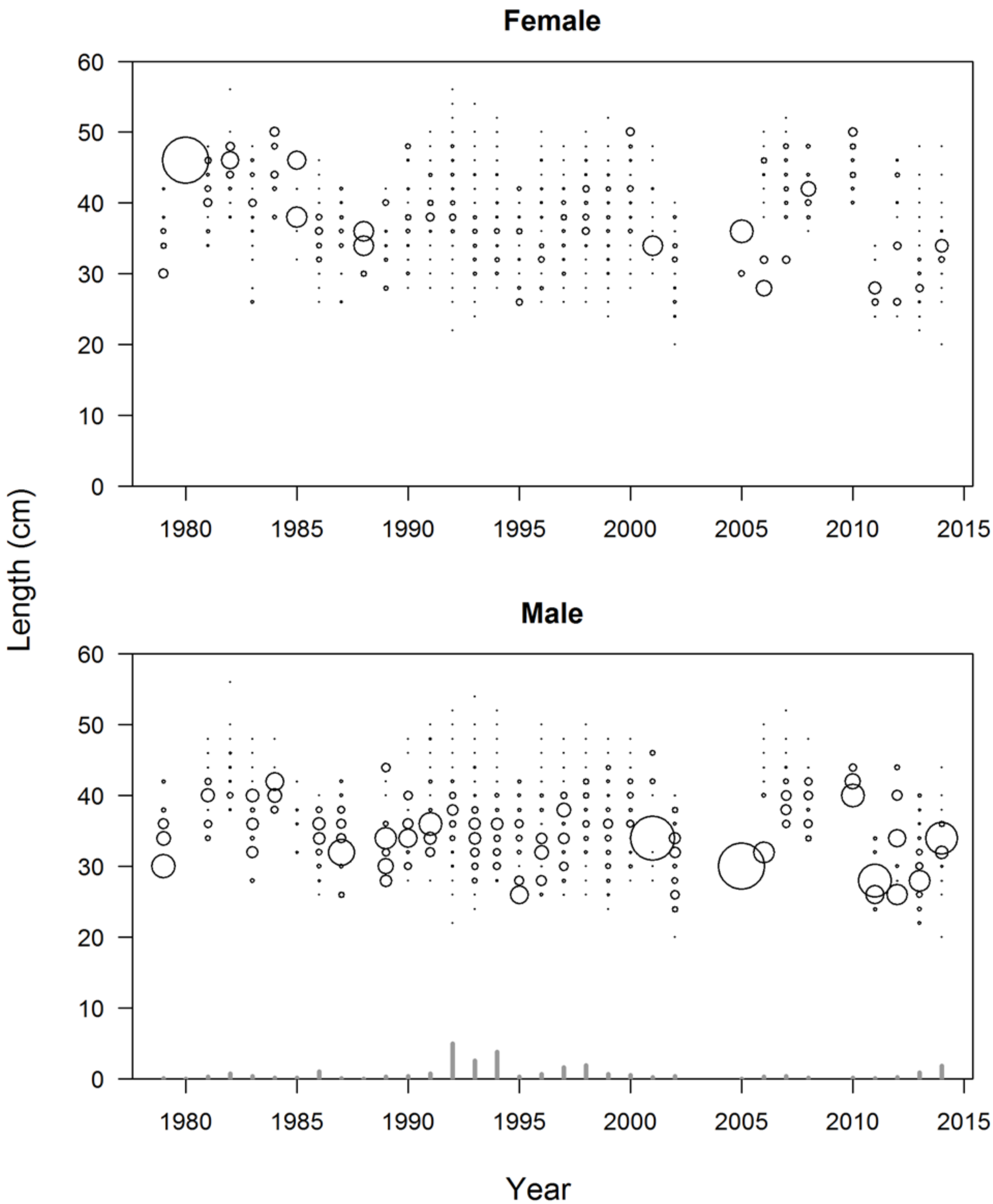


Figure 31: Expanded length compositions for the hook-and-line fishery. The area of the circle is proportional to the proportion-at-length. The gray bars at the bottom indicate relative number of tows.

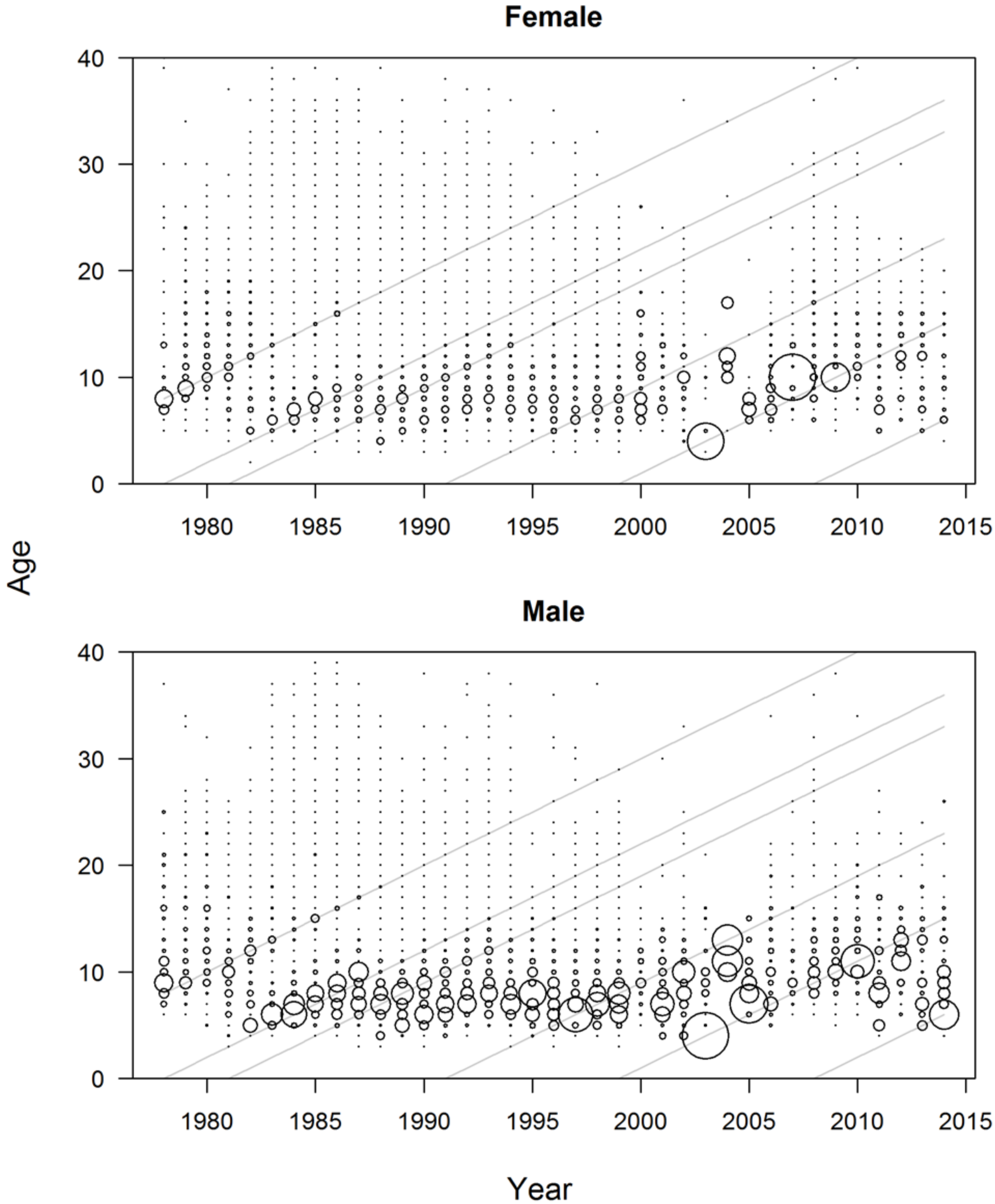


Figure 32: Expanded age compositions for the bottom trawl fishery. The area of the circle is proportional to the proportion-at-age. Gray lines show the 1970, 1978, 1981, 1991, 1999, and 2008 cohorts, for reference.

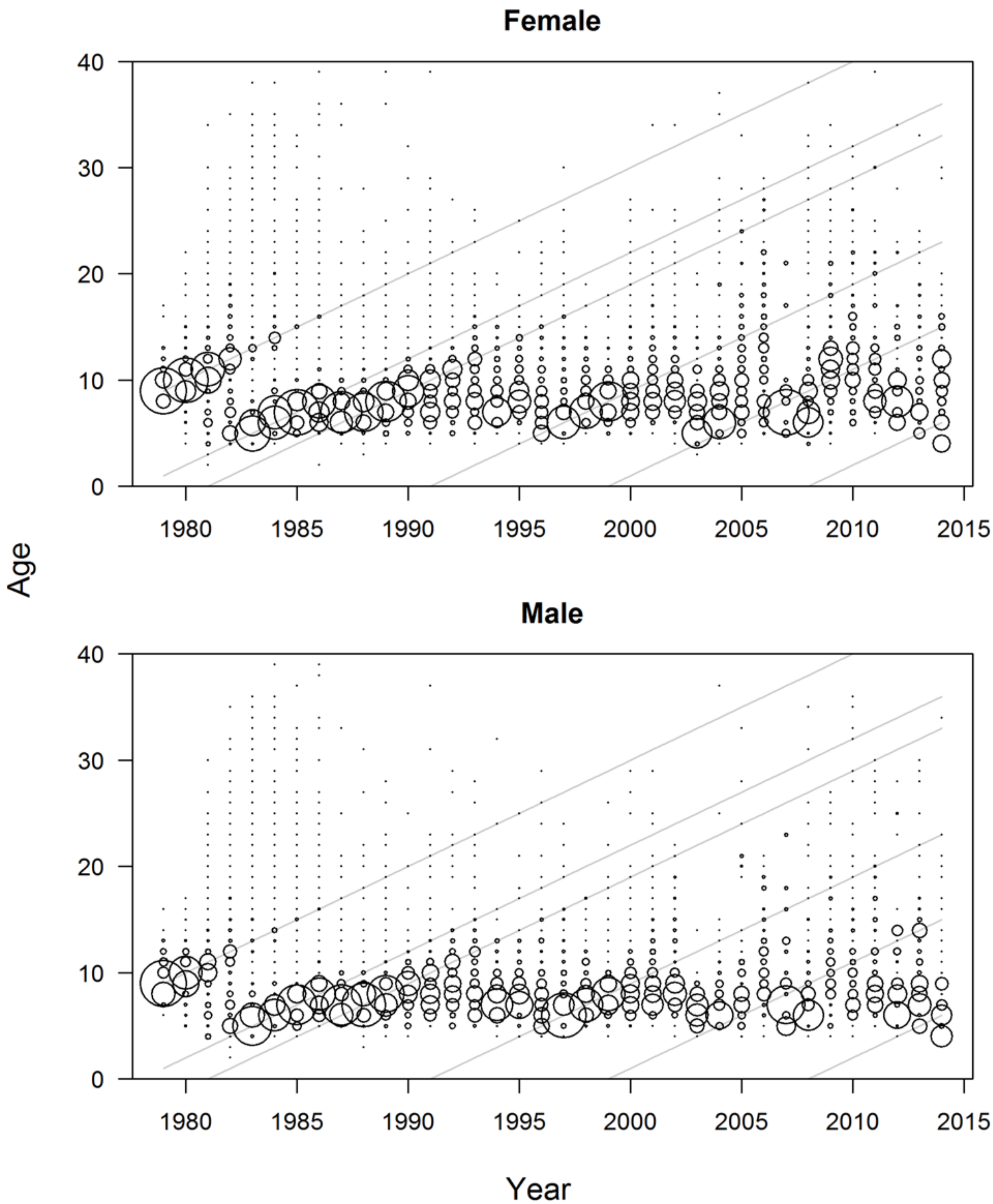


Figure 33: Expanded age compositions for the midwater trawl fishery. The area of the circles is proportional to the proportion-at-age. Gray lines show the 1970, 1978, 1981, 1991, 1999, and 2008 cohorts, for reference.

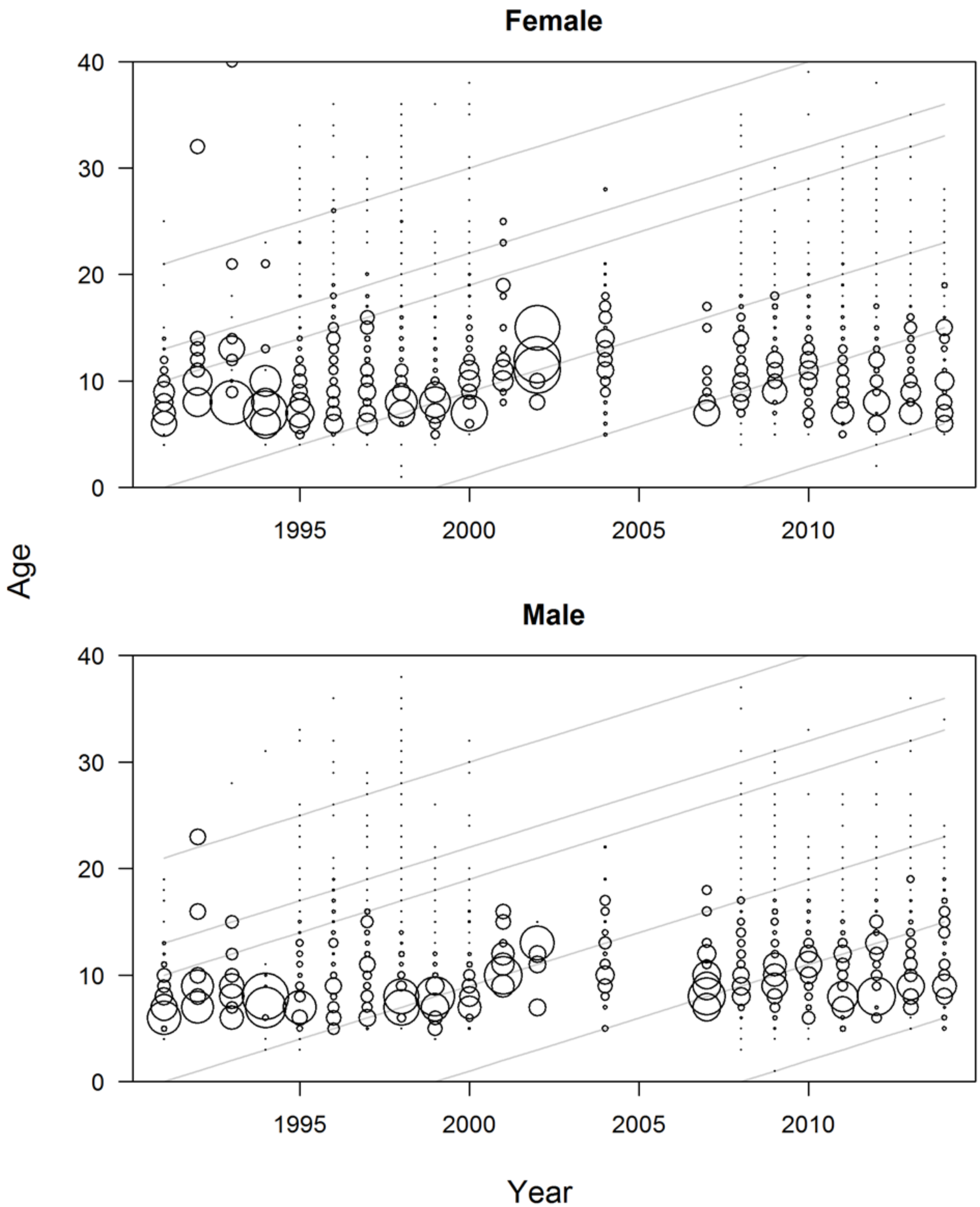


Figure 34: Expanded age compositions for the hake fishery. The area of the circles is proportional to the proportion-at-age. Gray lines show the 1970, 1978, 1981, 1991, 1999, and 2008 cohorts, for reference.

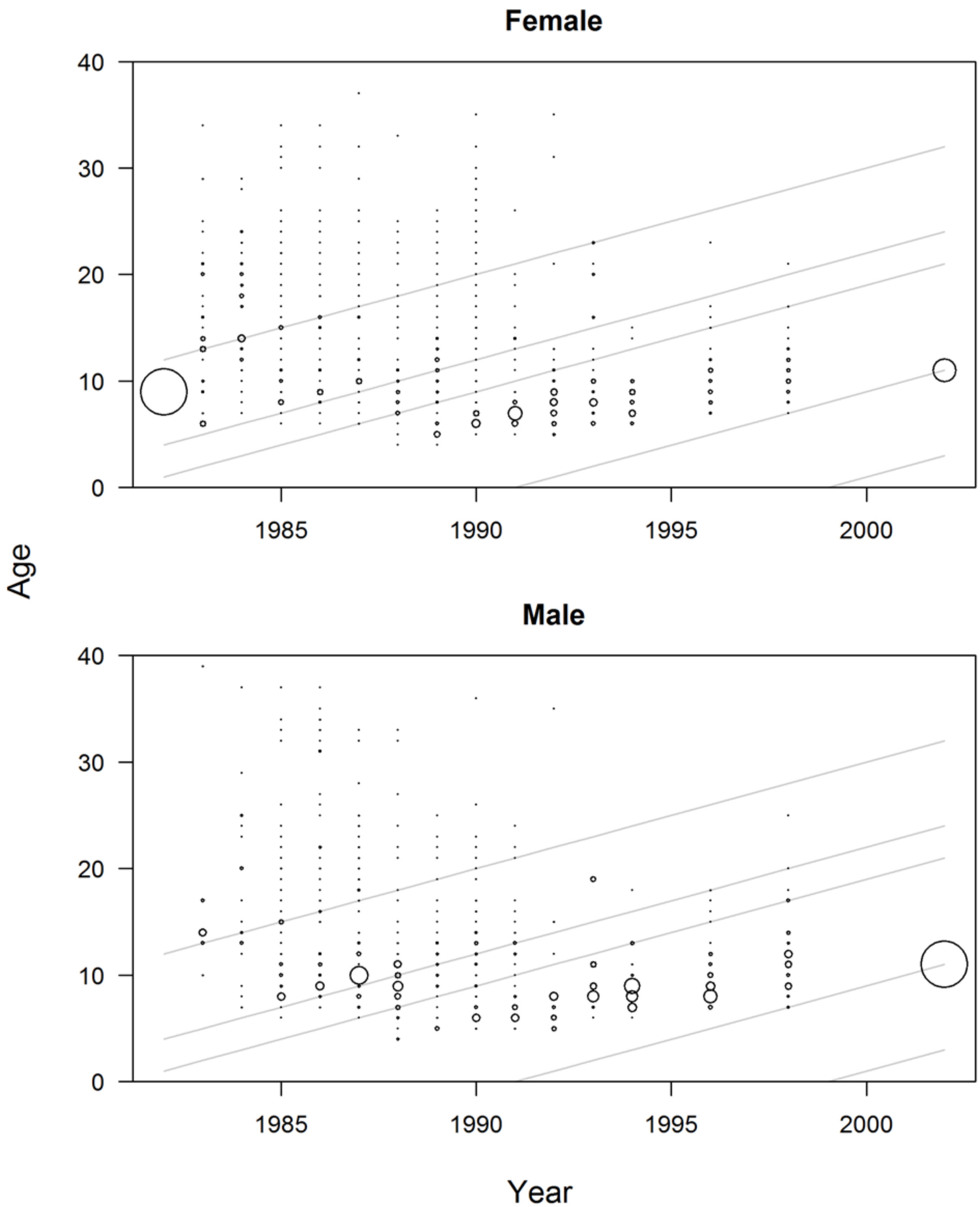


Figure 35: Expanded age compositions for the net fishery. The area of the circles is proportional to the proportion-at-age. Gray lines show the 1970, 1978, 1981, 1991, 1999, and 2008 cohorts, for reference.

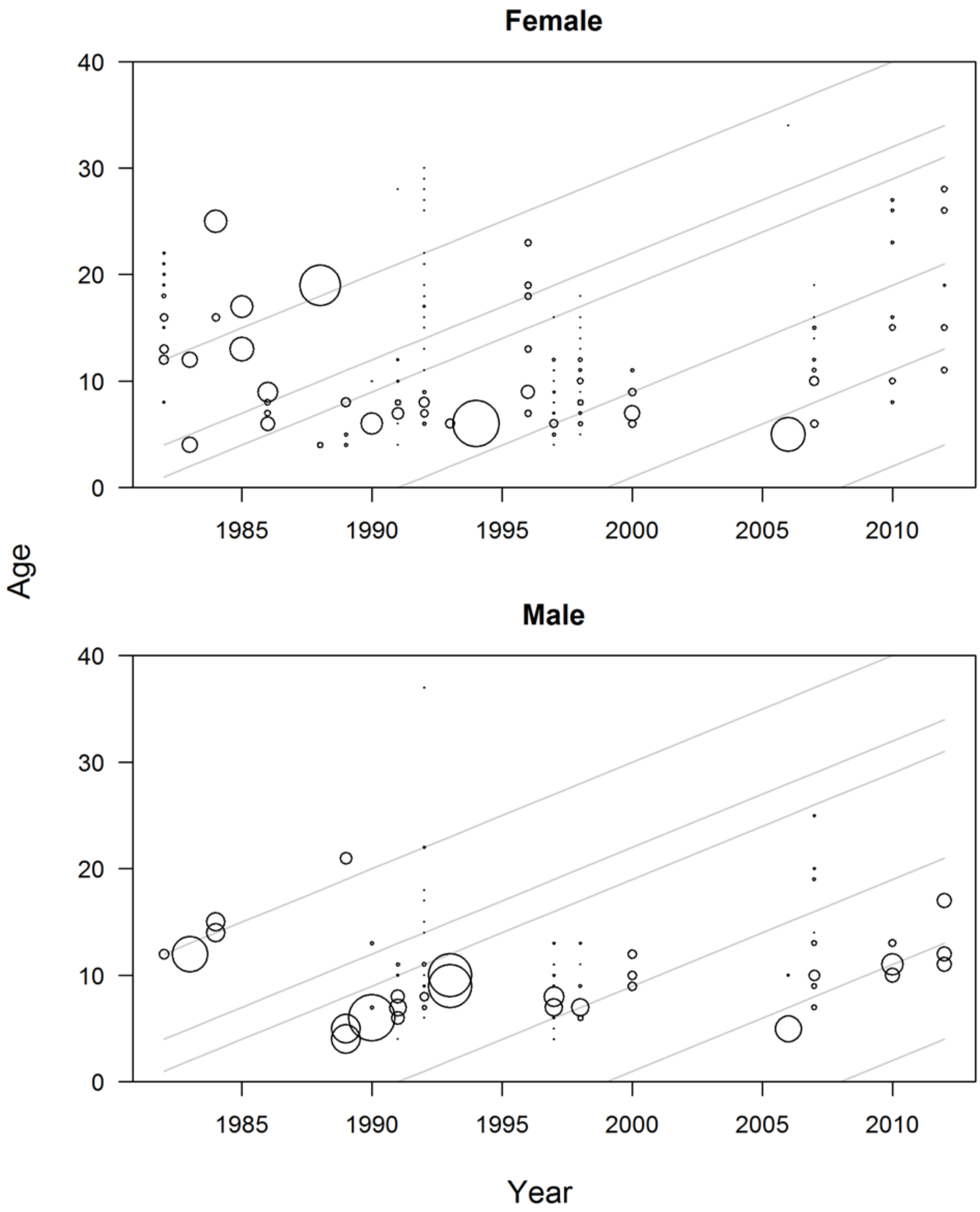


Figure 36: Expanded age compositions for the hook-and-line fishery. The area of the circles is proportional to the proportion-at-age. Gray lines show the 1970, 1978, 1981, 1991, 1999, and 2008 cohorts, for reference.

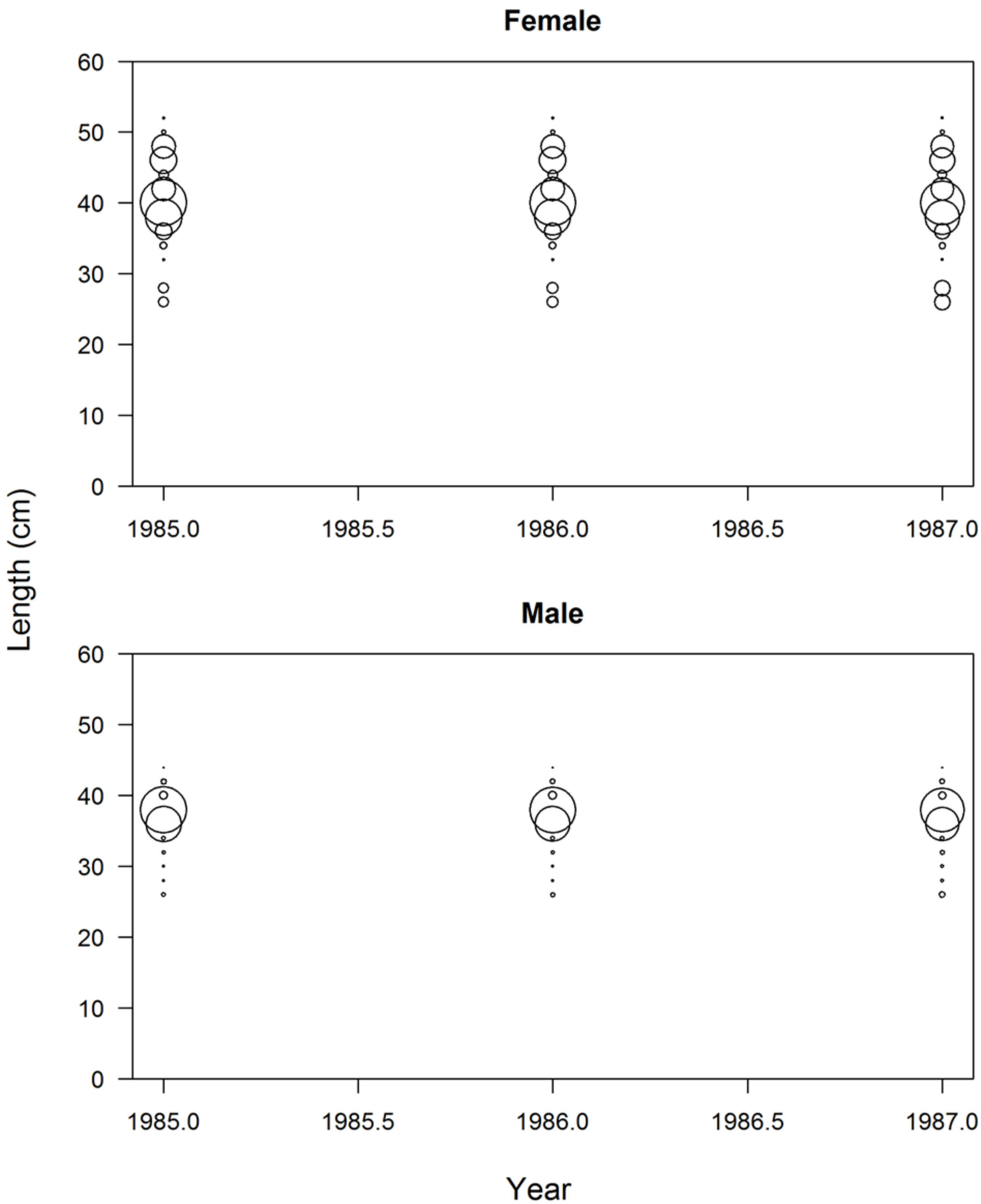


Figure 37: Length compositions for discards from the Pikitch study. The discard length comps were fit to in the model.

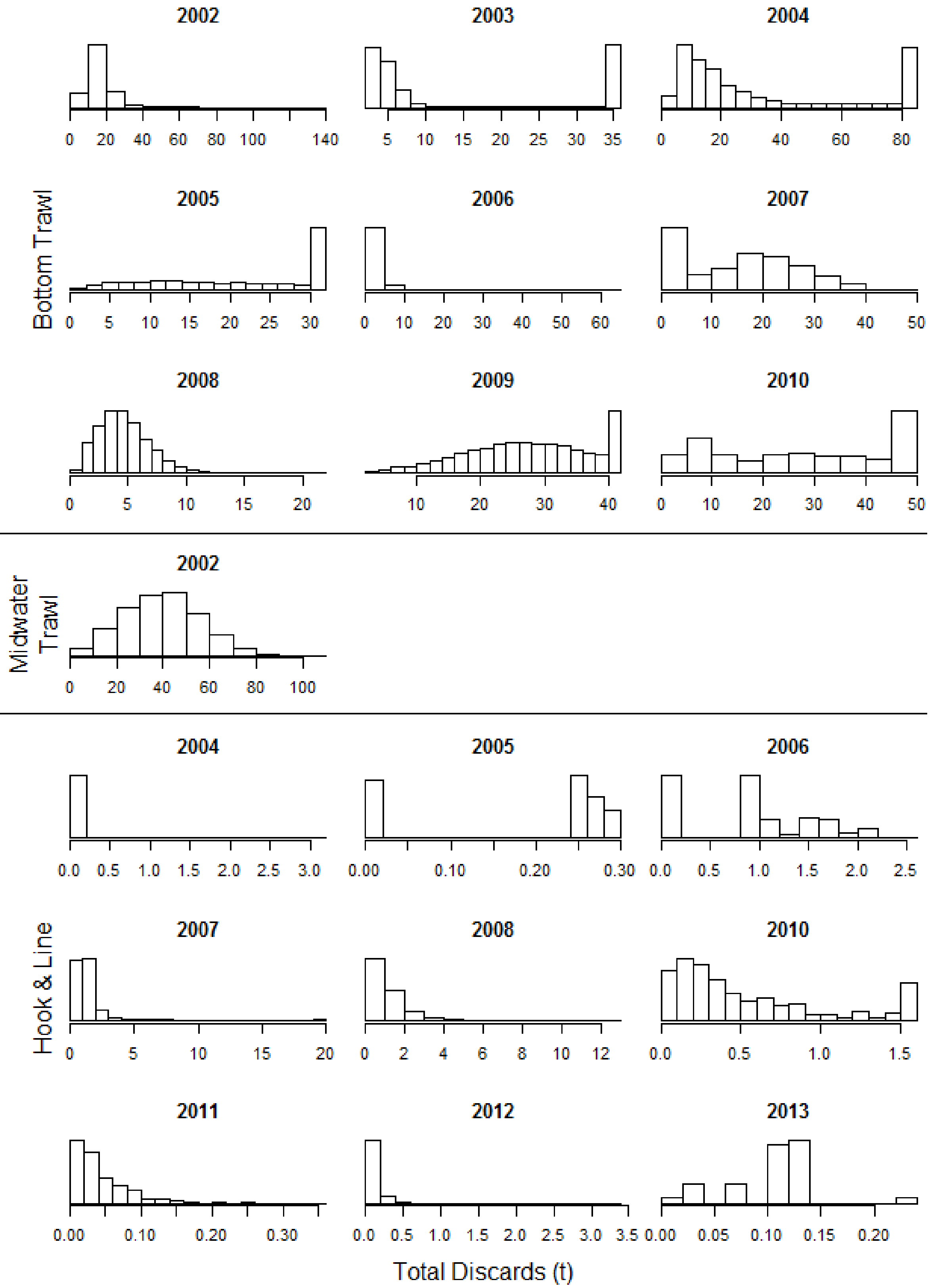


Figure 38: Histograms of bootstrap samples for WCGOP estimates of total discards (mt) for bottom trawl (top), midwater trawl (middle), and hook-and-line (bottom) gears.

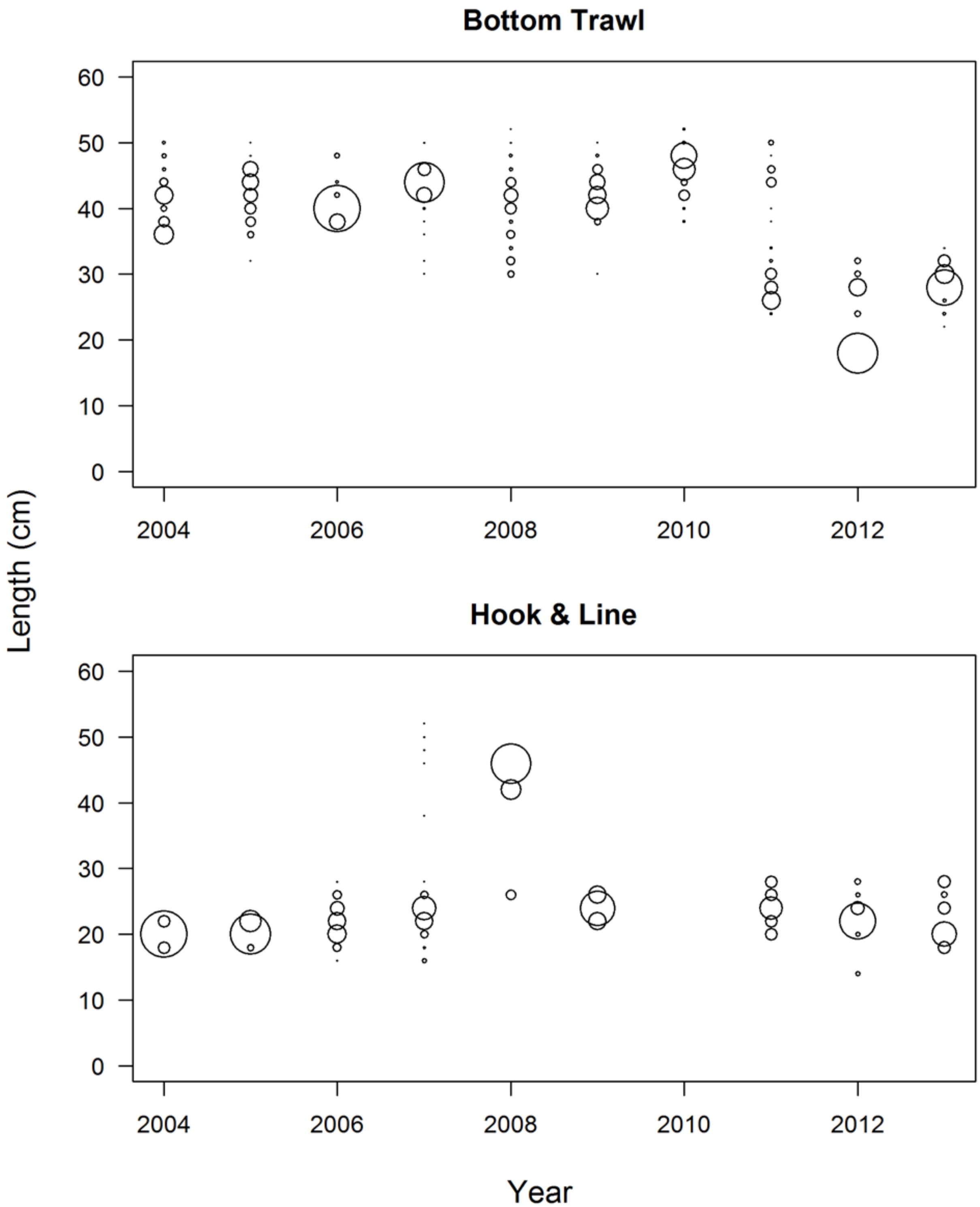


Figure 39: Length compositions of the discards for the bottom trawl (top) and hook-and-line (bottom) fleets.

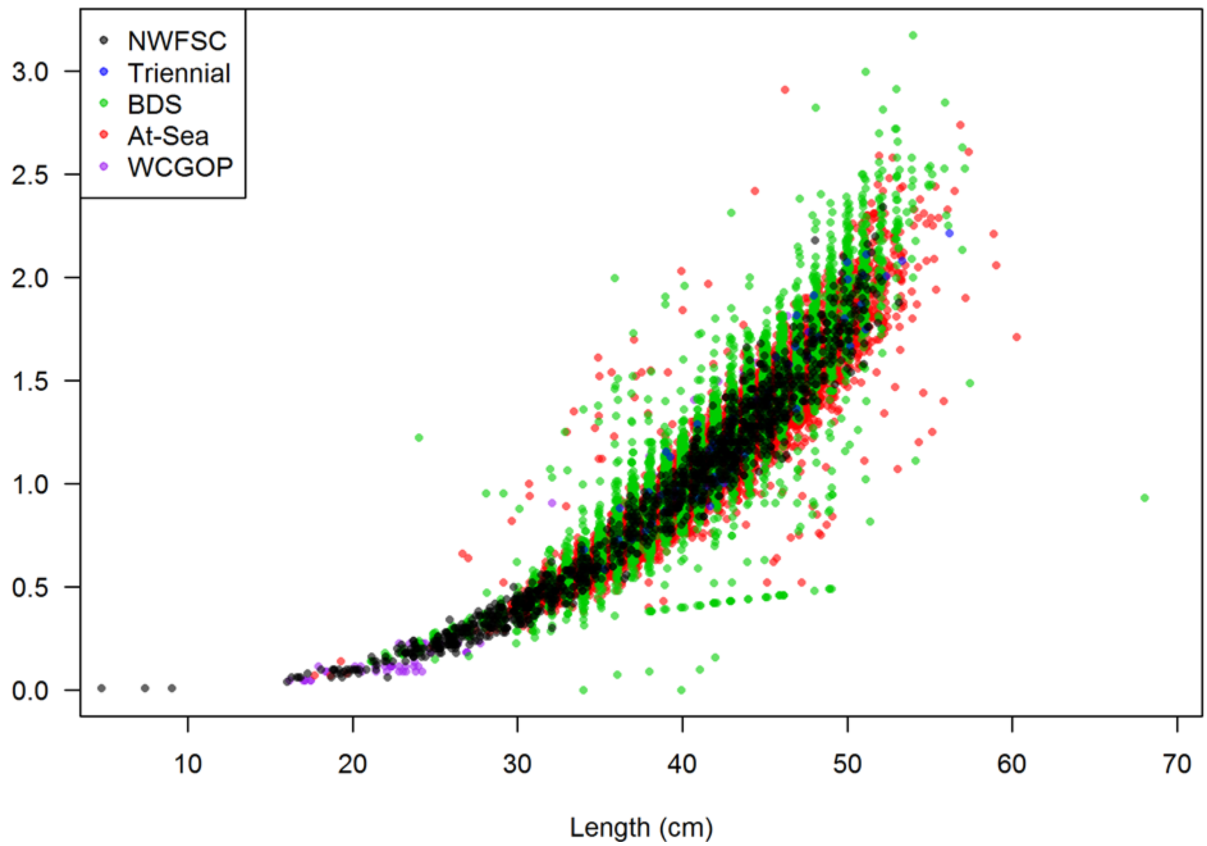


Figure 40: Weight-at-length observations of Widow Rockfish from different data sources.

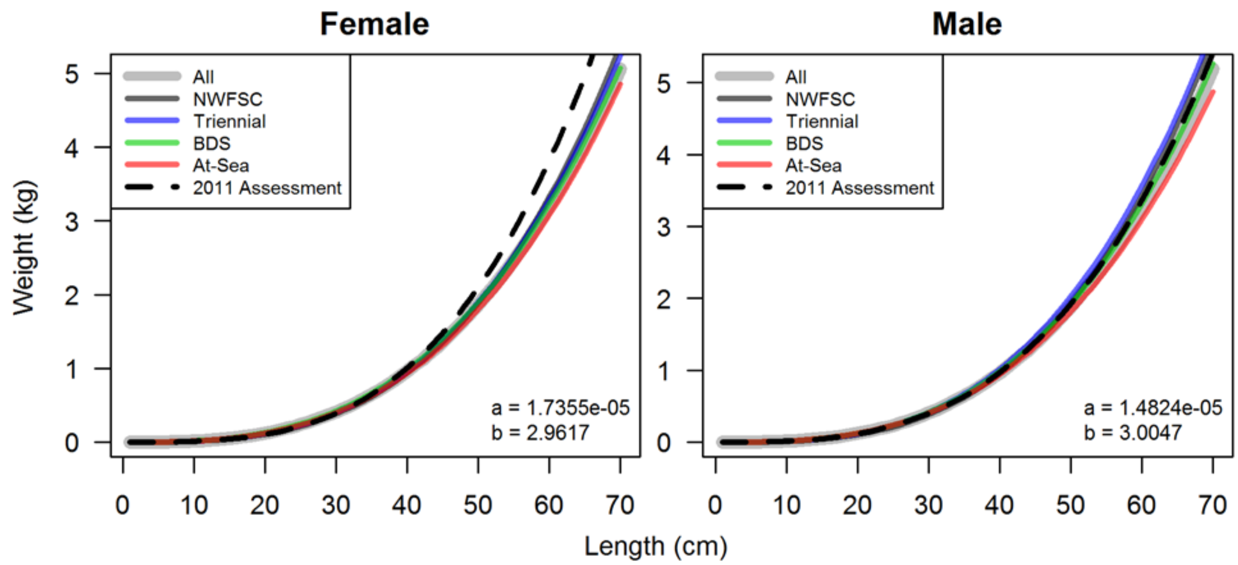


Figure 41: Fits to weight-at-length observations for females (left) and males (right) using observations from different data sources. The weight-at-length curve used in the 2011 assessment is shown as a dashed line. Estimates of the intercept (a) and slope (b) are show in the lower left for each sex. Observations from the WCGOP were not used due to potential biases and lack of older fish resulting in a lack of fit compared to other sources (81 observations) and length observations greater than 60 cm were removed.

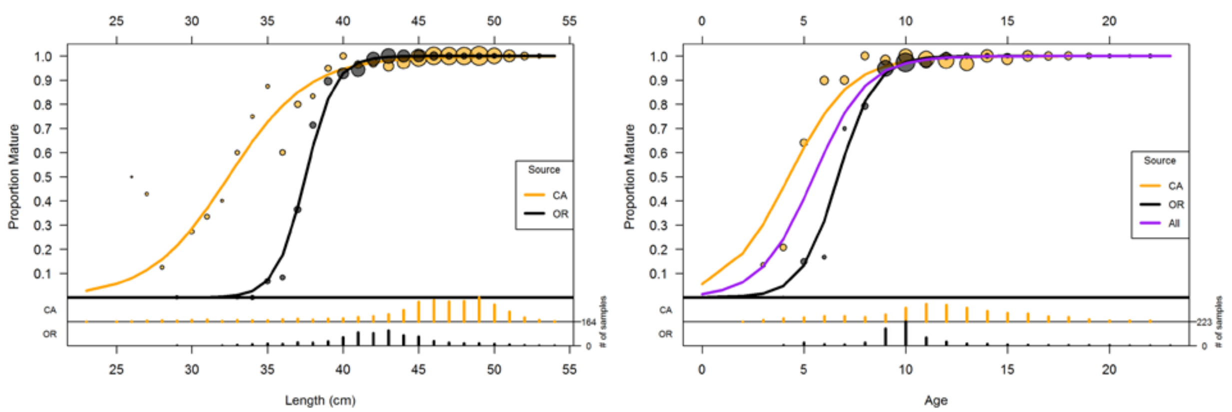


Figure 42: Maturity-at-length (left) and maturity-at-age (right) from data reported by Barss & Echeverria (1987). Circles are proportional to the number of observations at that length or age. Lines are estimated logistic curves fitted to the data. The bars at the bottom are the number of samples by each state. The purple line is the estimated maturity-at-age using all data with each state equally weighted, and is used in the assessment model with maturity-at-age for ages 2 and lower set equal to zero.

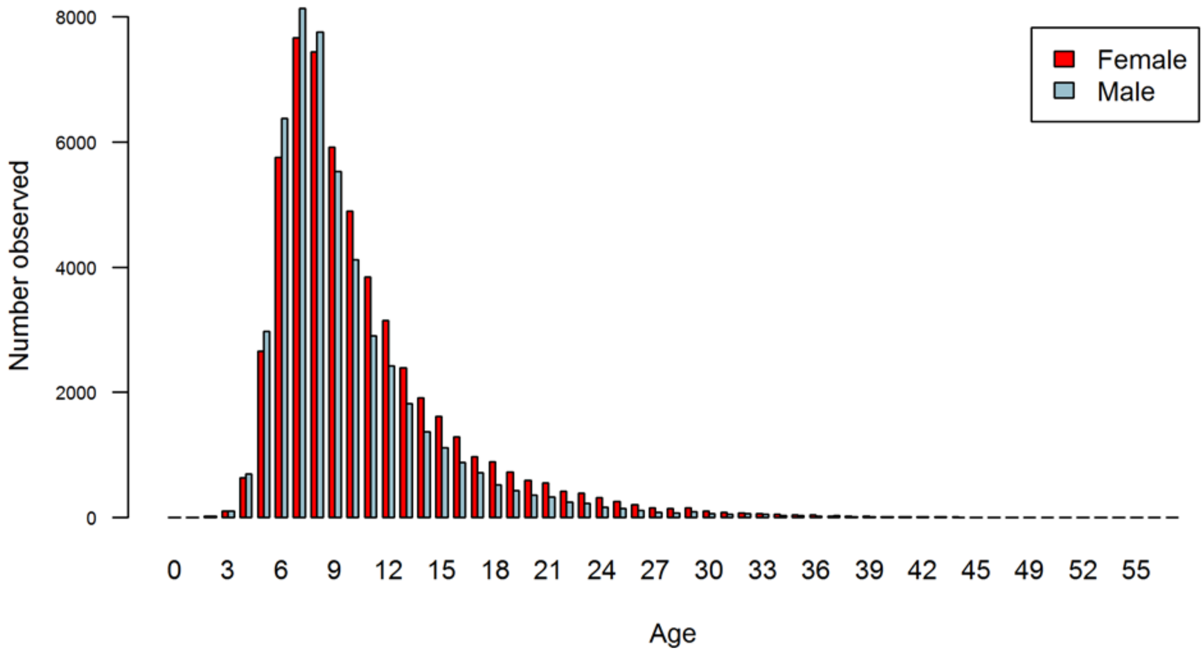


Figure 43: Number at age observed from all data for female and male Widow Rockfish.

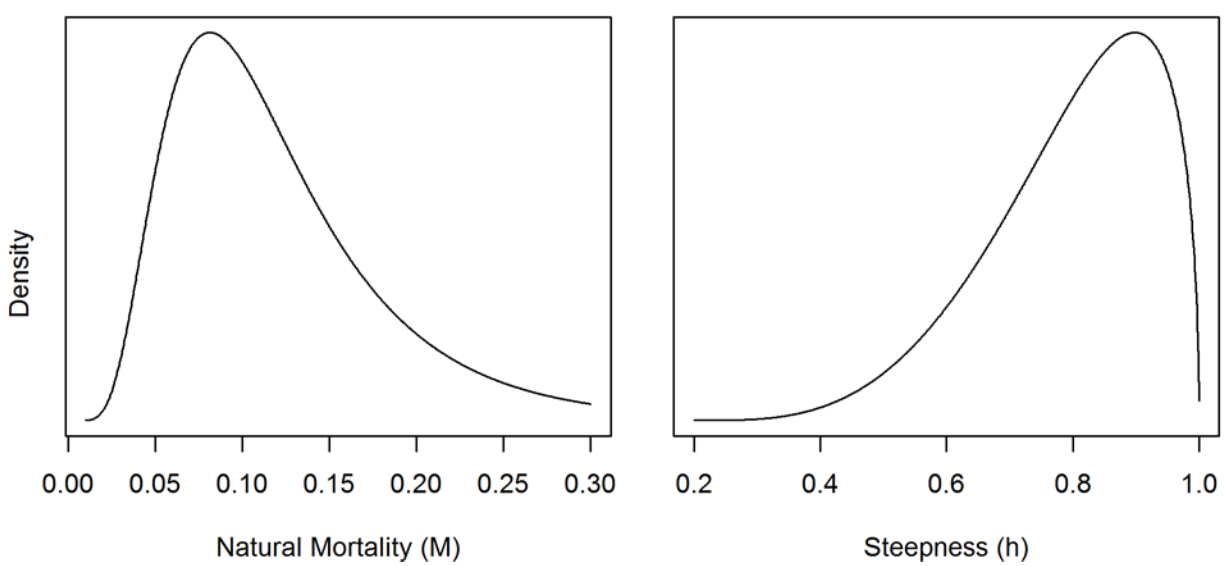


Figure 44: Prior distributions for natural mortality (*M*, left) and steepness (*h*, right).

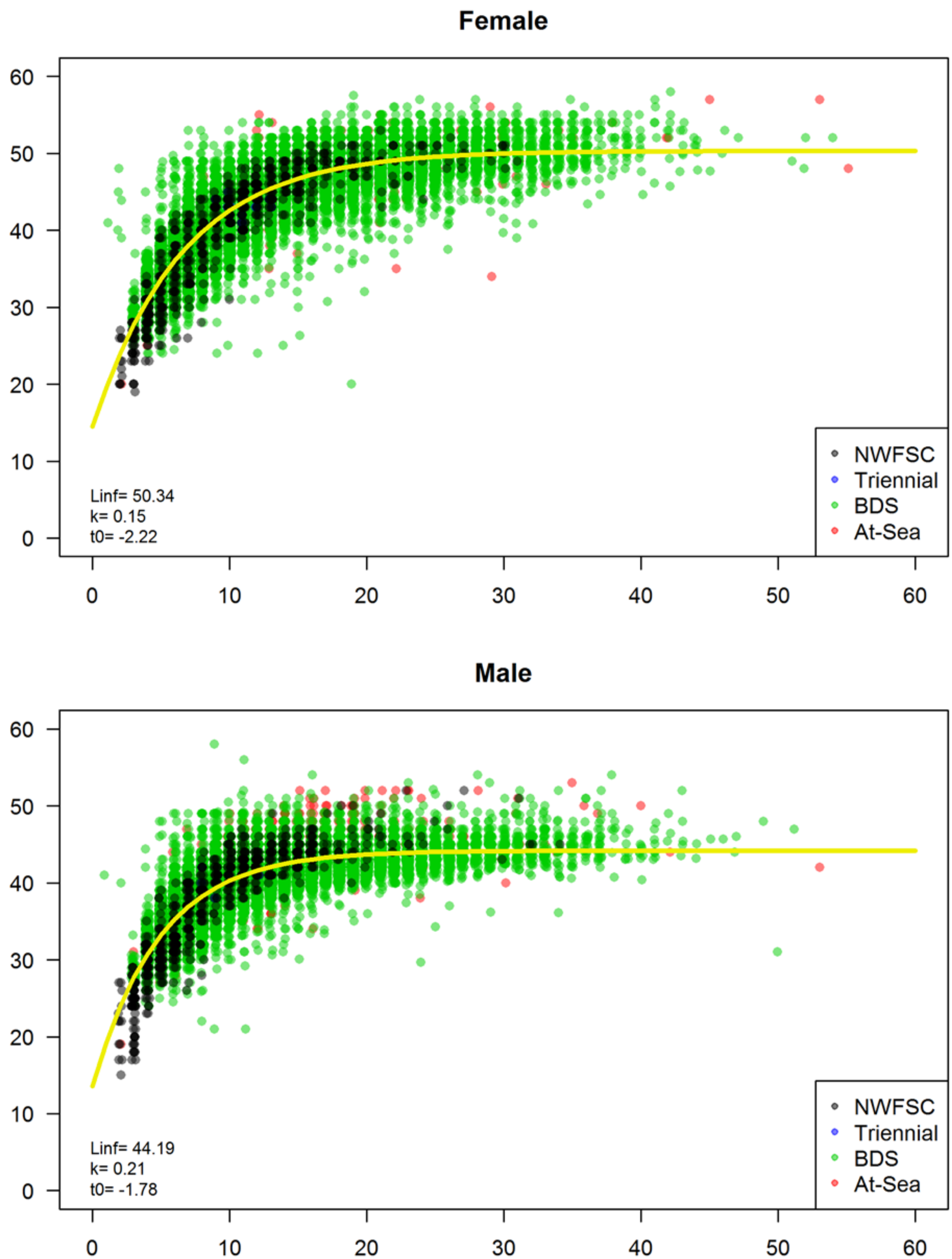


Figure 45: Length-at-age observations (points, slightly jittered) and predicted length-at-age von Bertalanffy curves for female (top) and male (bottom) Widow Rockfish collected from all fishery (BDS and At-Sea) and survey (Triennial and NWFSC) data.

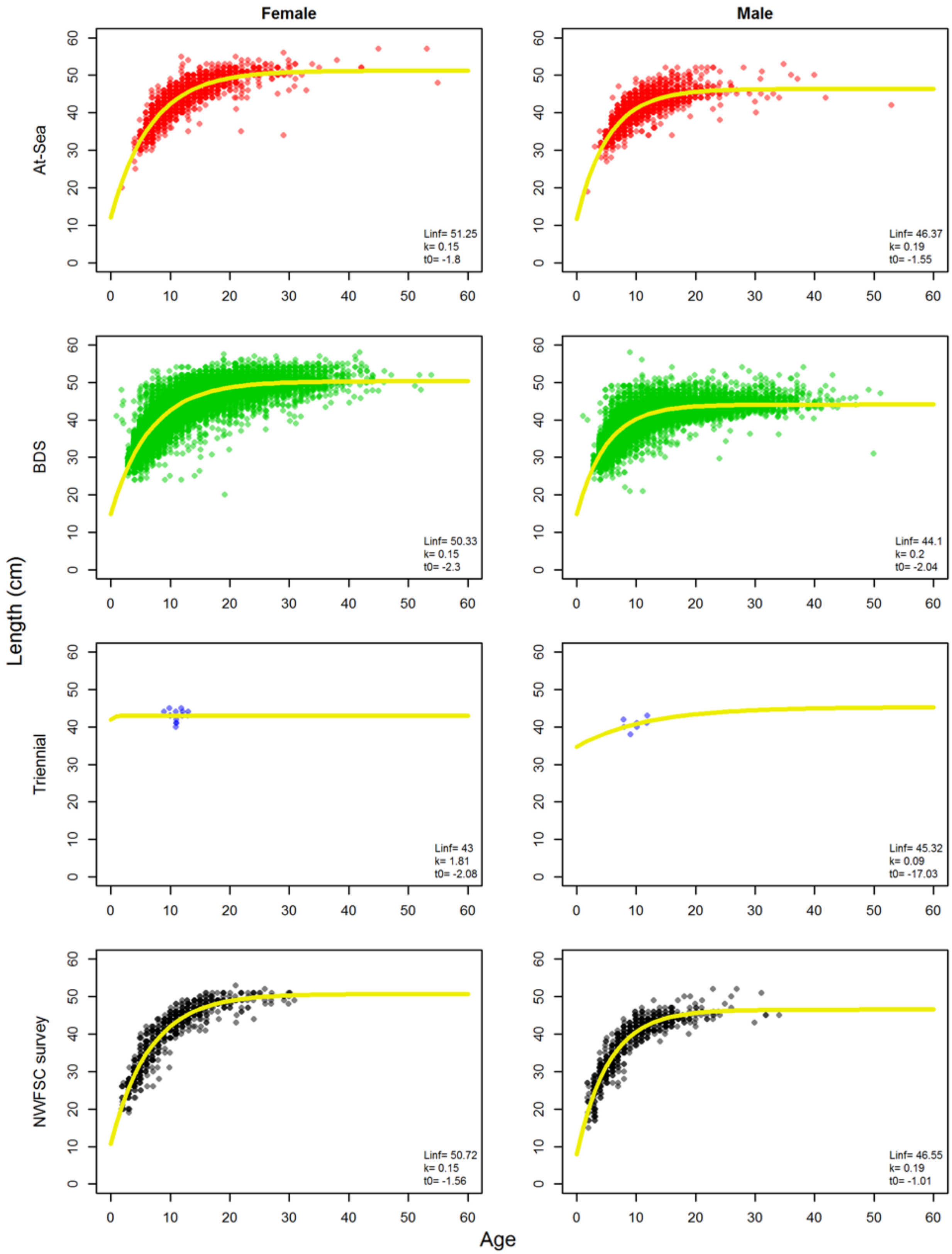


Figure 46: Length-at-age observations (points) and predicted length-at-age von Bertalanffy curves for female (left) and male (right) Widow Rockfish for each source.

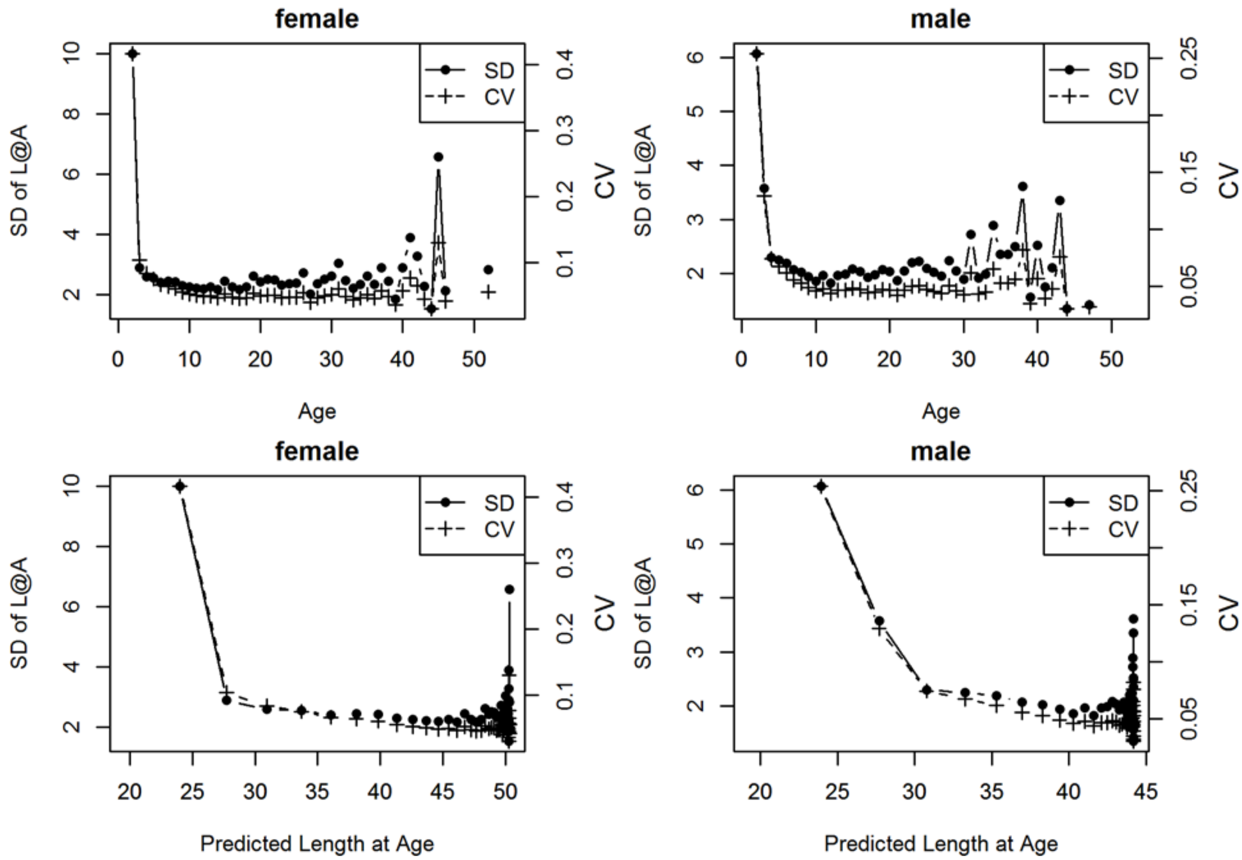


Figure 47: Standard deviation (SD) and coefficient of variation (CV) of length at age from all data sources as a function of age (top) and predicted length-at-age (bottom).

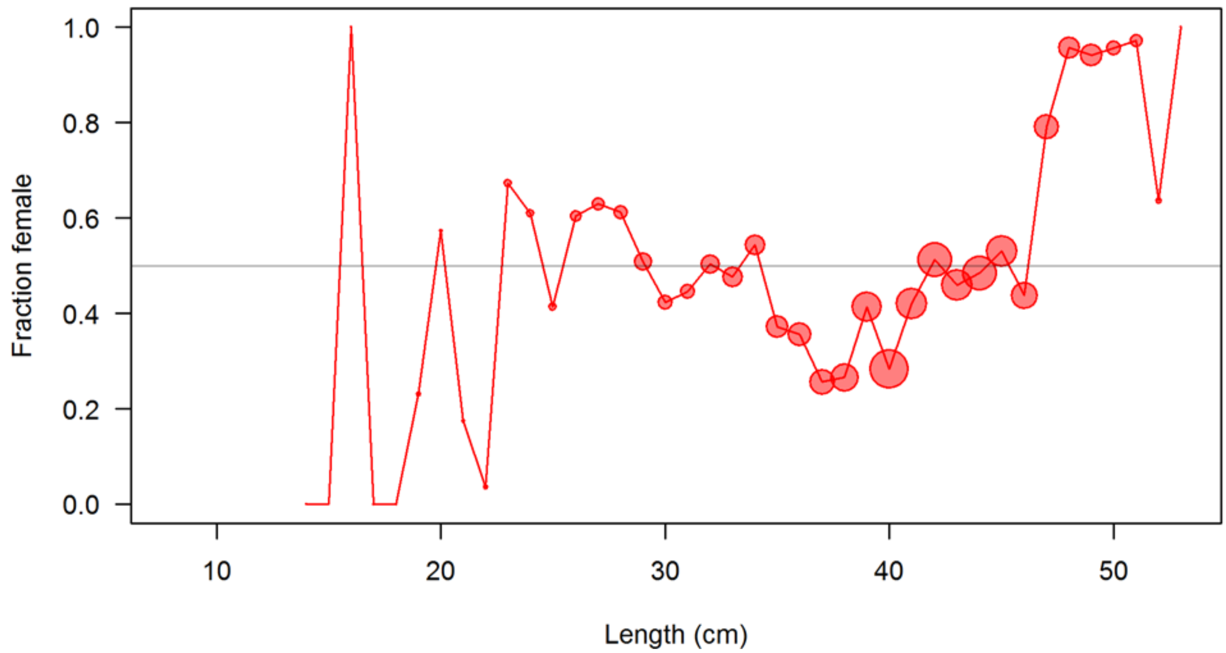


Figure 48: Proportion of females plotted against fish length (cm) from data collected on the NWFSC shelf/slope survey from 2003–2014. The area of the circle corresponds to the number of observations in that bin.

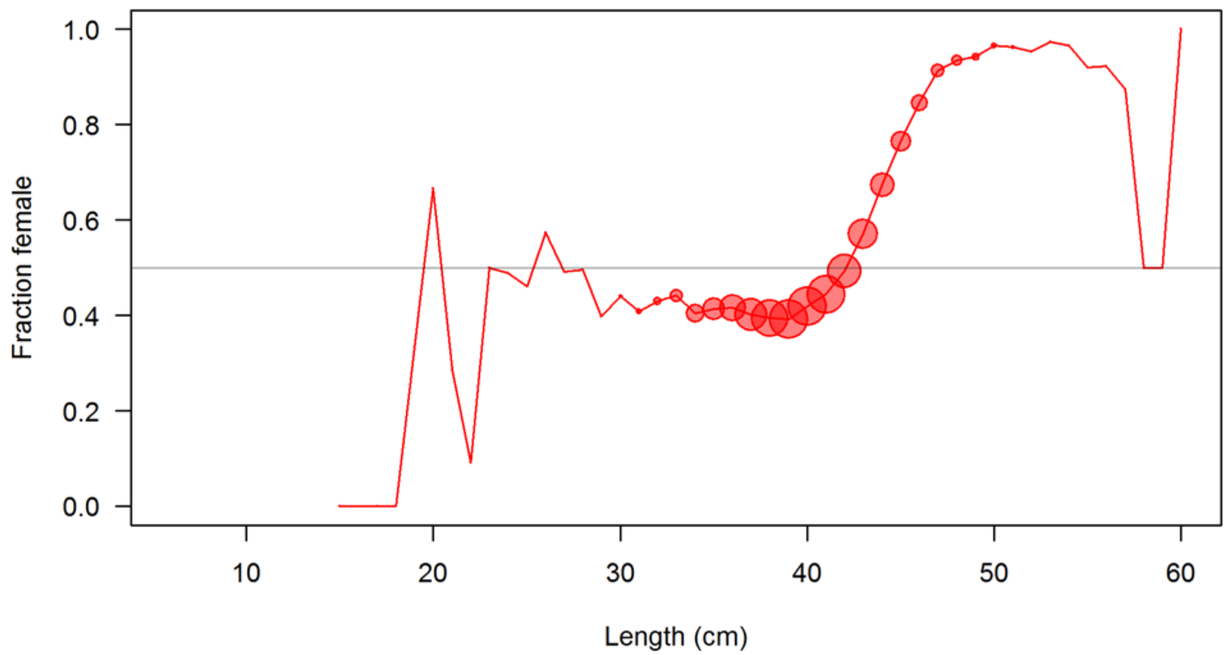


Figure 49: Proportion of females plotted against fish length (cm) from all data collected from fisheries and surveys. The area of the circle corresponds to the number of observations in that bin.

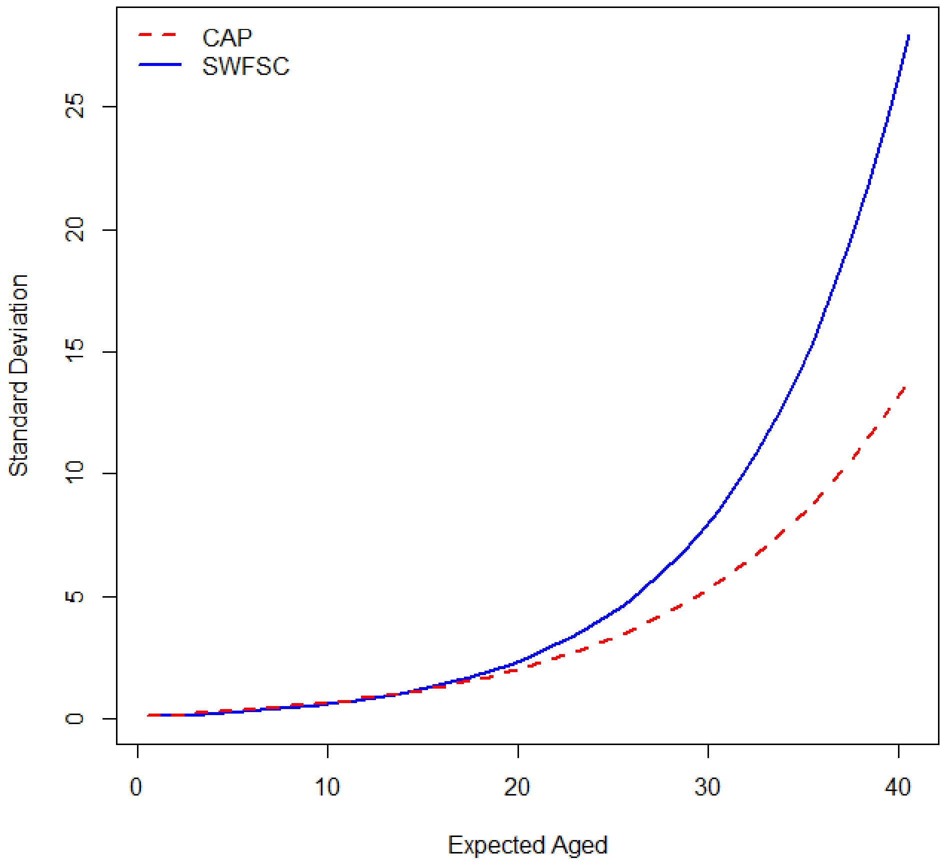


Figure 50: Estimated ageing error for the Cooperative Ageing Project lab and the SWFSC.

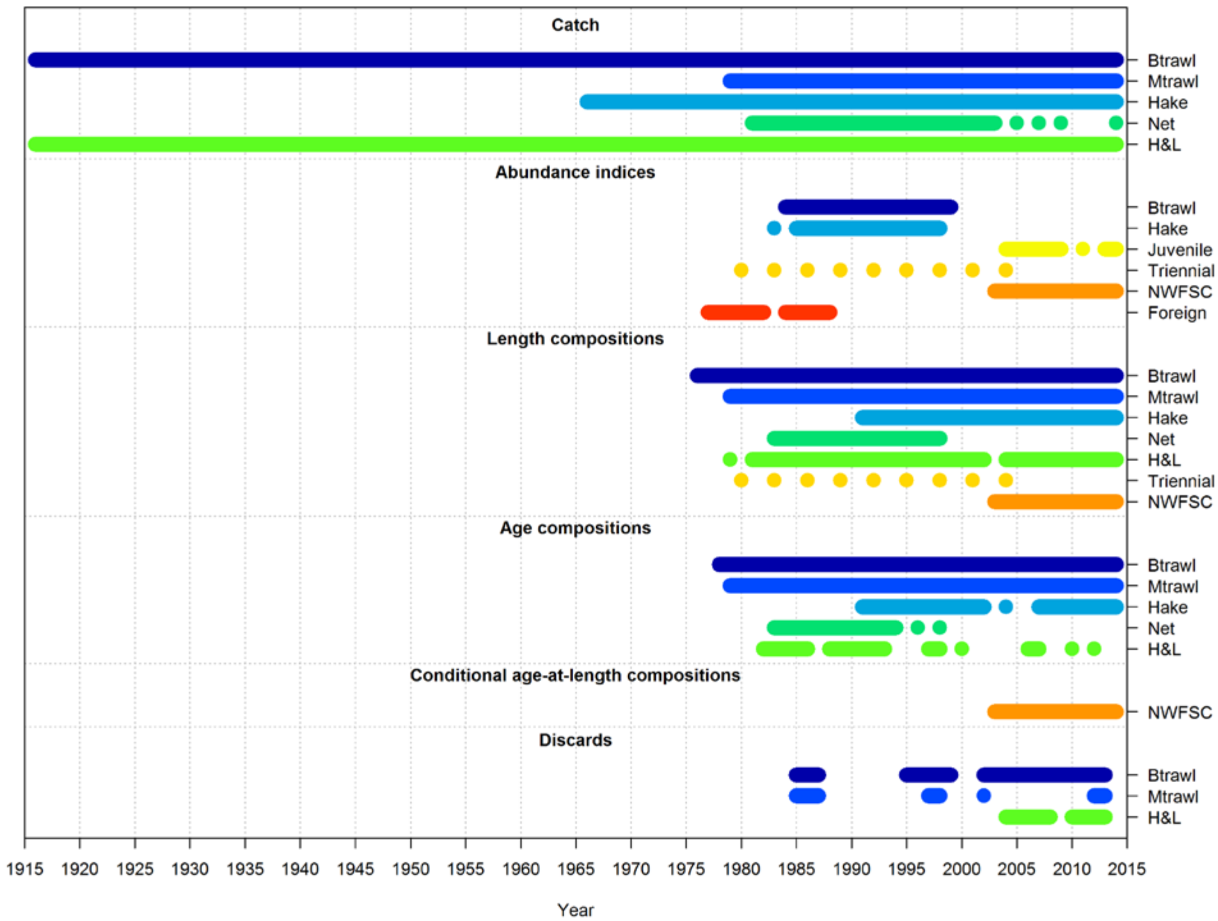


Figure 51: Data sources by type and year that were used in the base model.

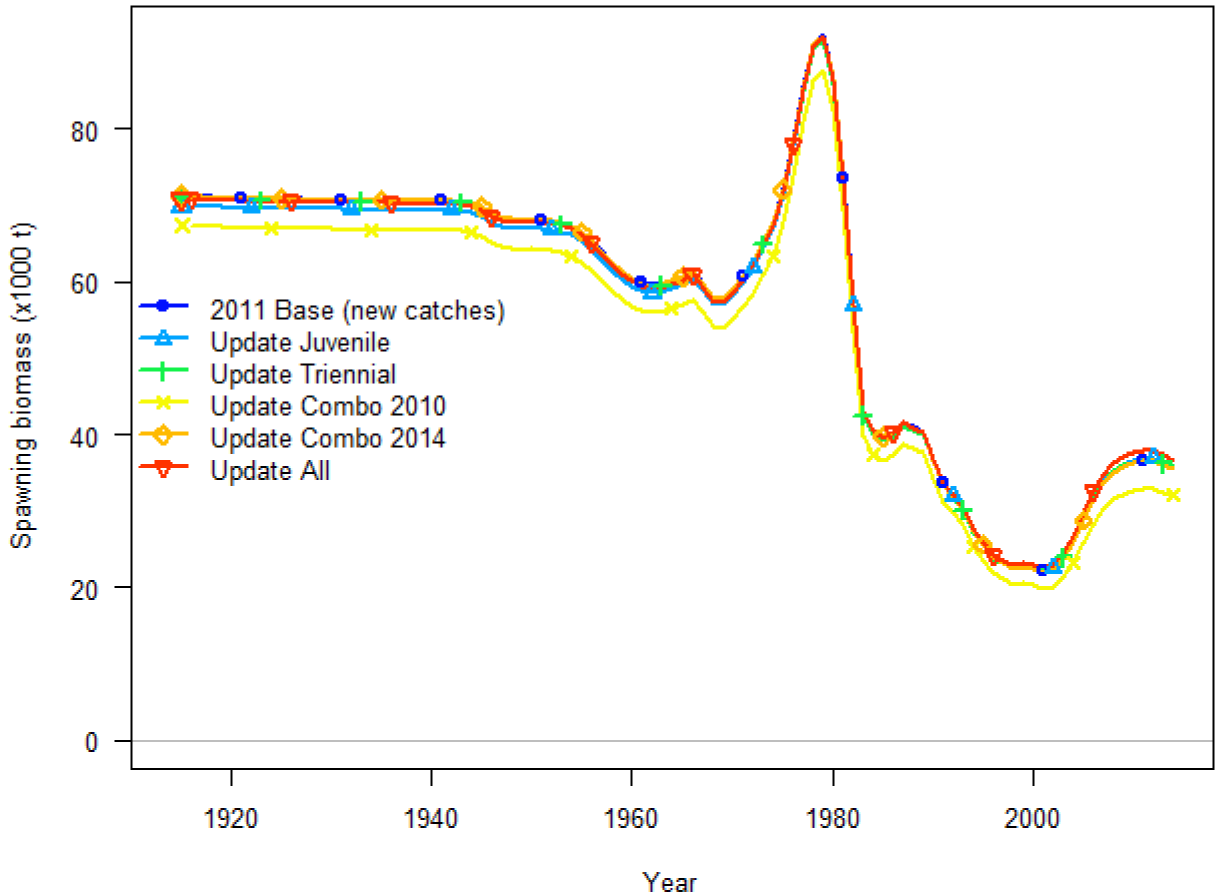


Figure 52: Bridging of survey indices from the 2011 assessment models with updated catches.

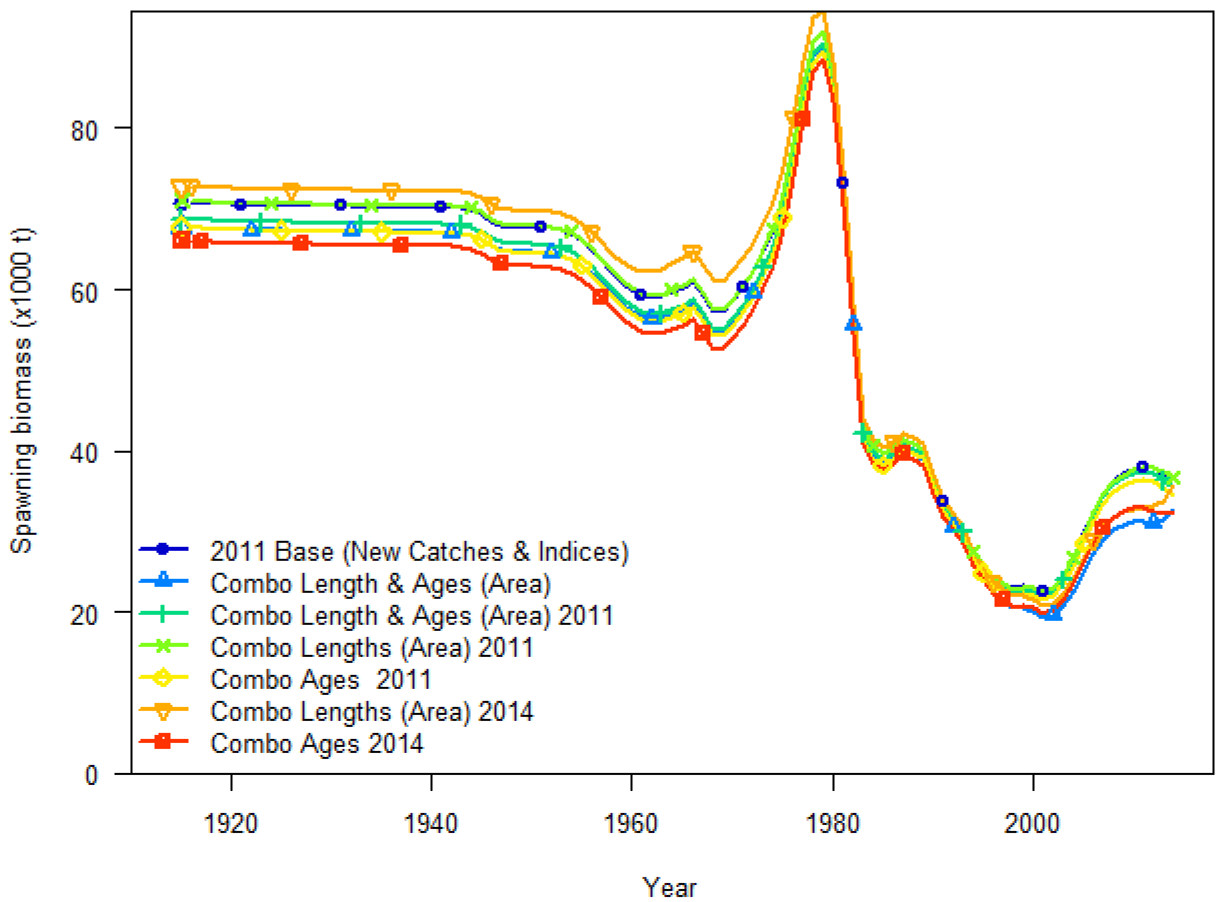


Figure 53: Bridging of NWFSC shelf/slope survey age and length data.

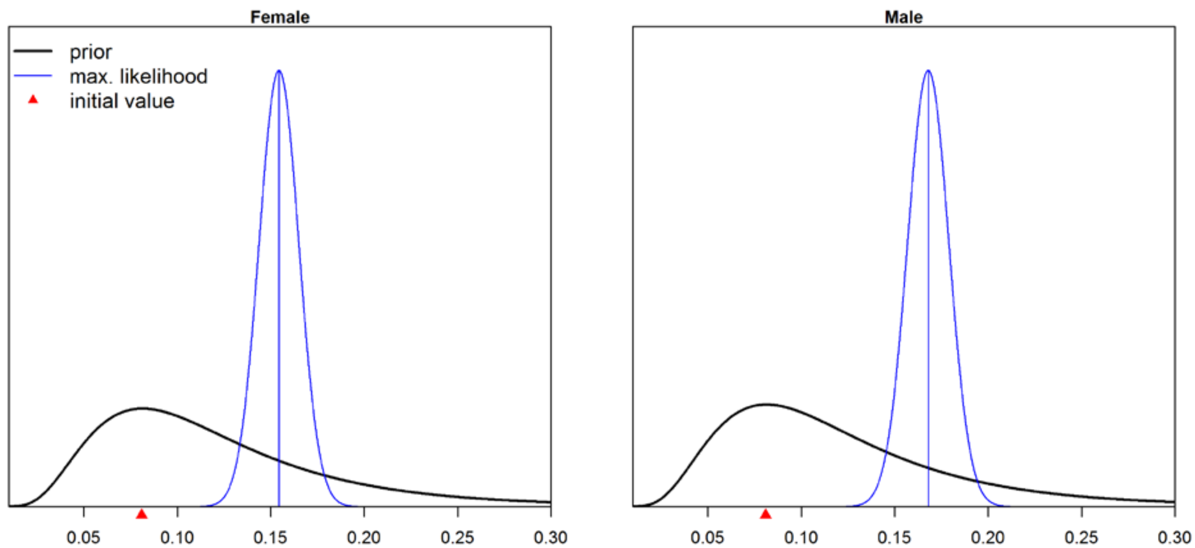


Figure 54: The prior for natural mortality (*M*, yr^{-1}) and the estimated *M* for females (left) and males (right) with asymptotic uncertainty based on maximum likelihood theory. The median of the prior is shown by the red triangle and the maximum likelihood estimate is shown by the vertical blue line.

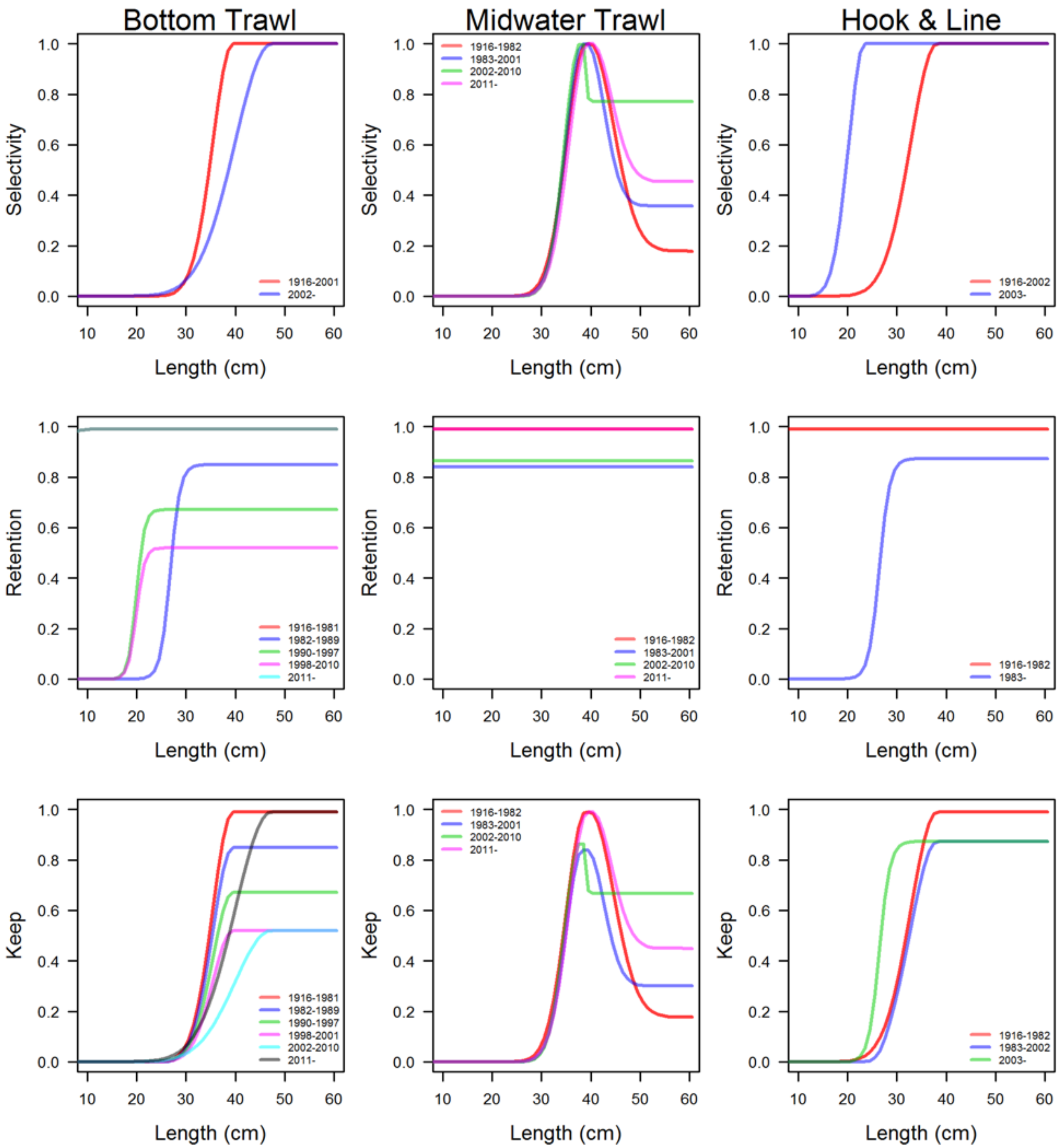


Figure 55: Estimated selectivity (top), retention (middle), and keep (bottom) curves for different blocks and the bottom trawl (left), midwater trawl (middle), and hook-and-line (right) fleets.

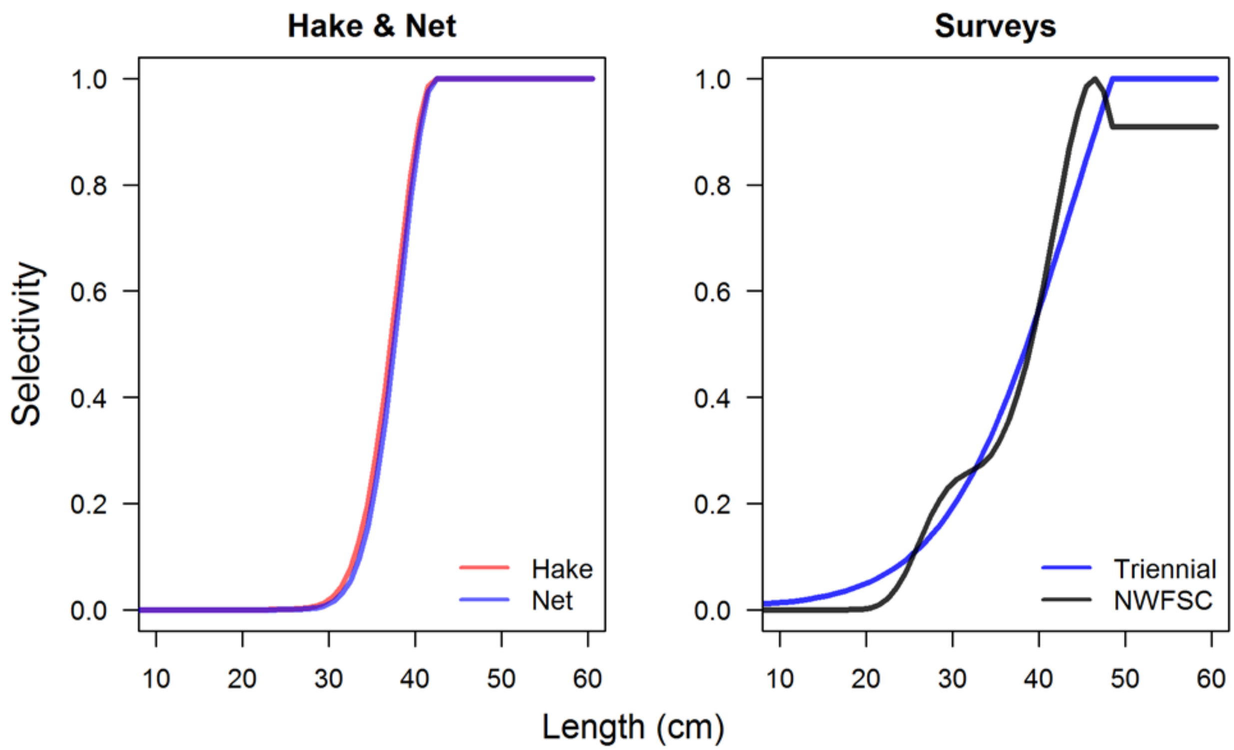


Figure 56: Estimated selectivity curves for the hake, net fishing fleets (left) and the fishery-independent surveys (right).

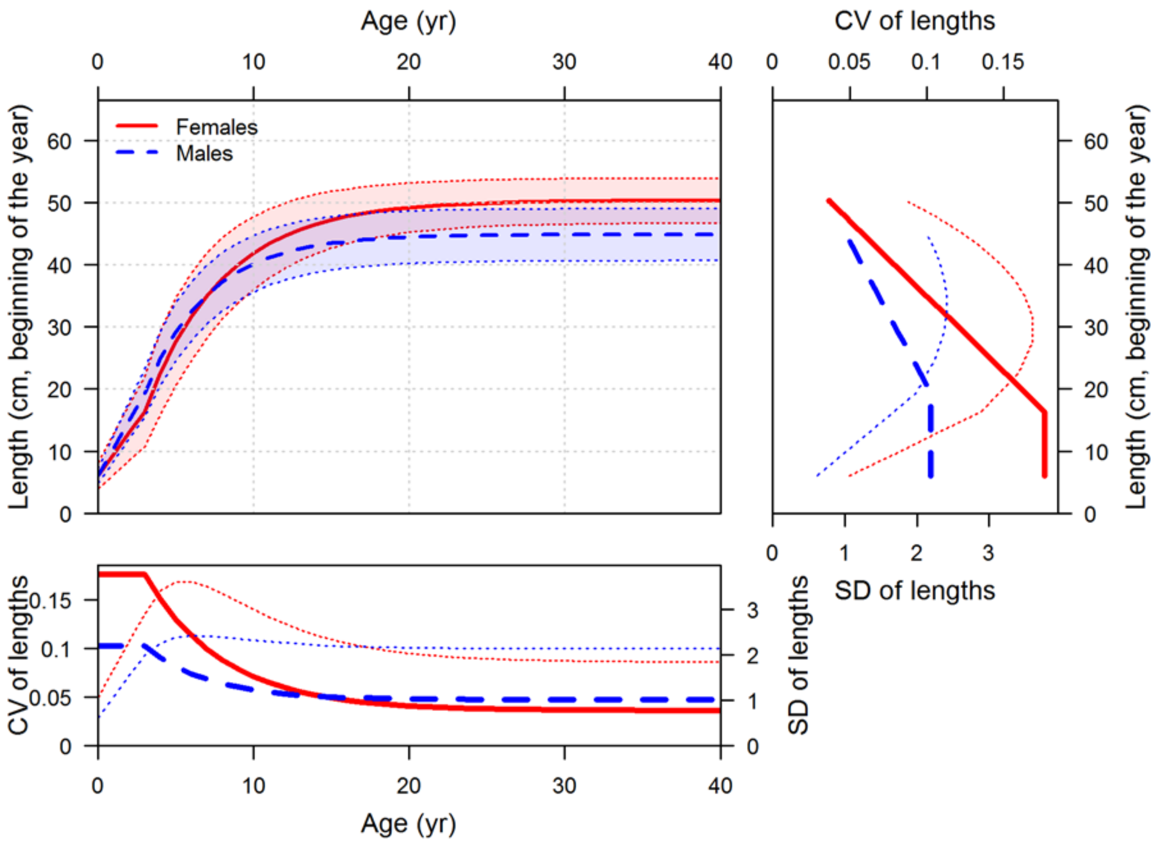


Figure 57: Length at age (top-left panel) with estimated coefficient of variation (CV, thick line) and calculated standard deviation (SD, thin line) versus length at age in the top-right panel and versus age in the lower-left panel.

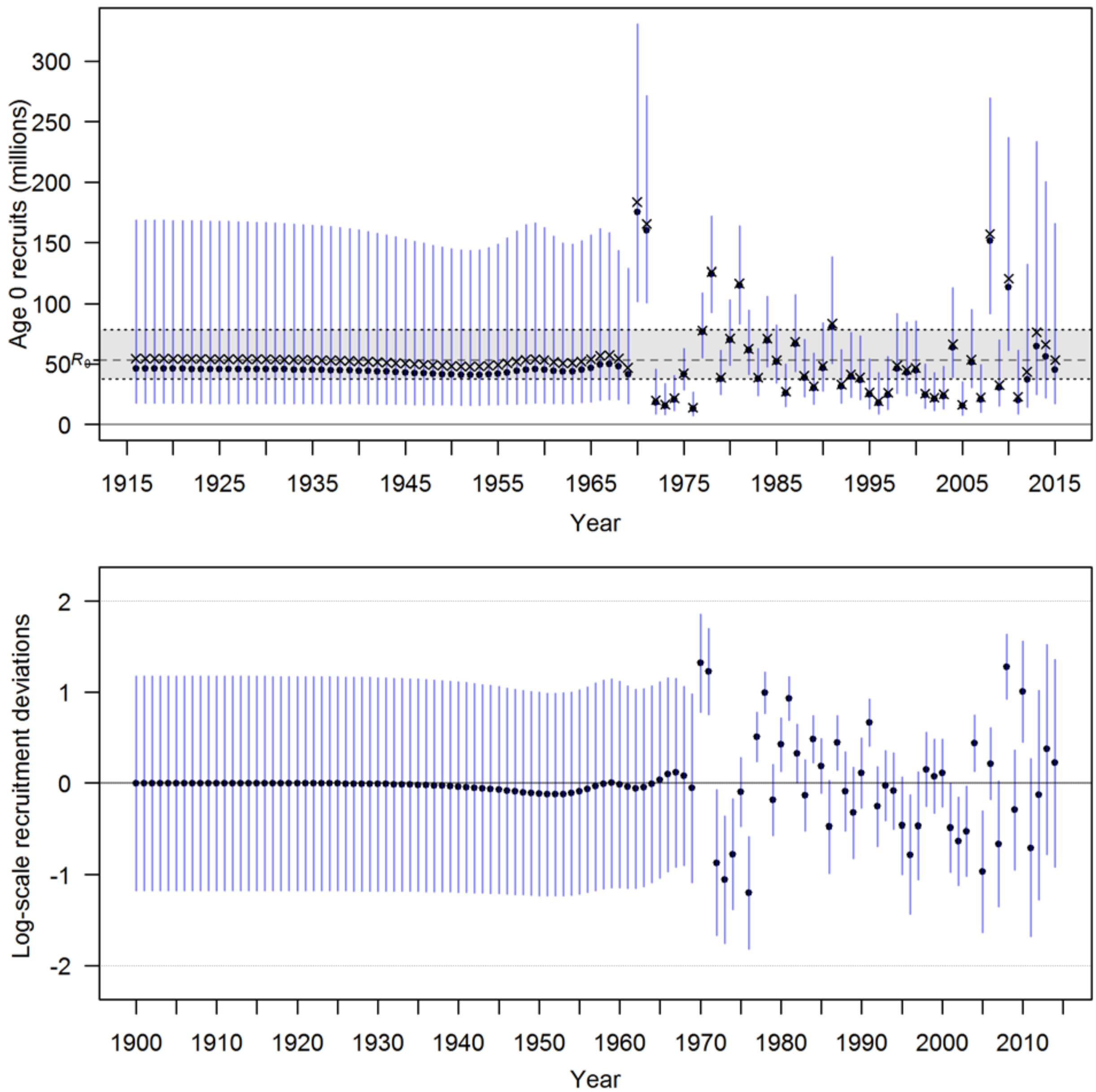


Figure 58: Estimates of recruitment (upper) and recruitment deviates (lower) with approximate asymptotic 95% confidence intervals (vertical lines) from the MLE estimates.

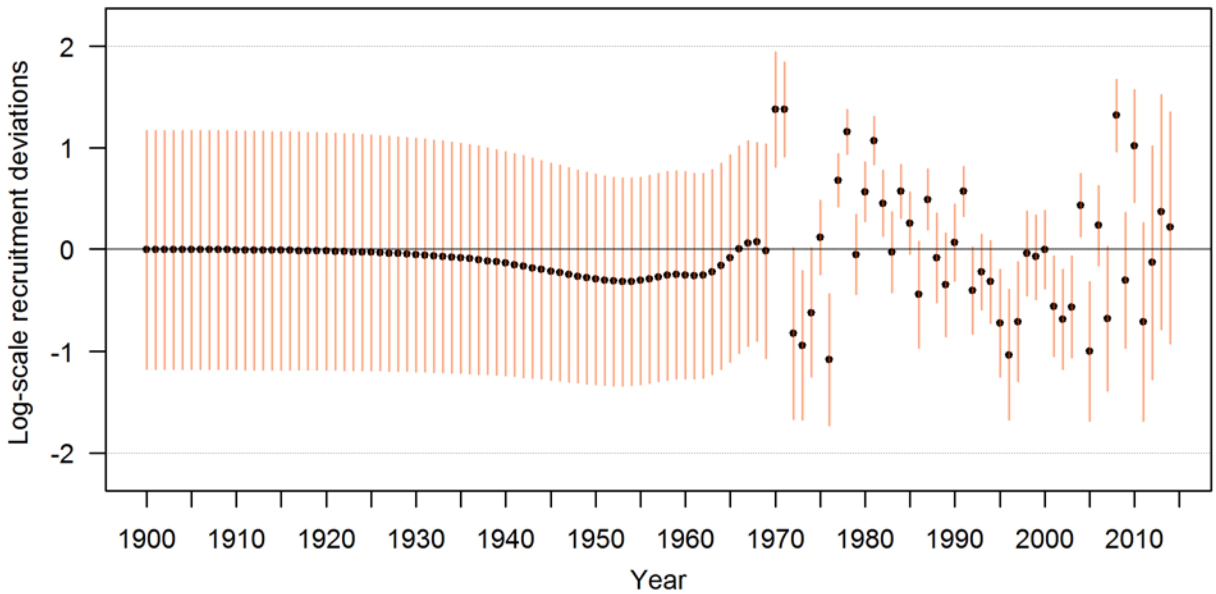


Figure 59: Estimates of recruitment deviations for a sensitivity model with natural mortality fixed at 0.124 and 0.129 for females and males, respectively.

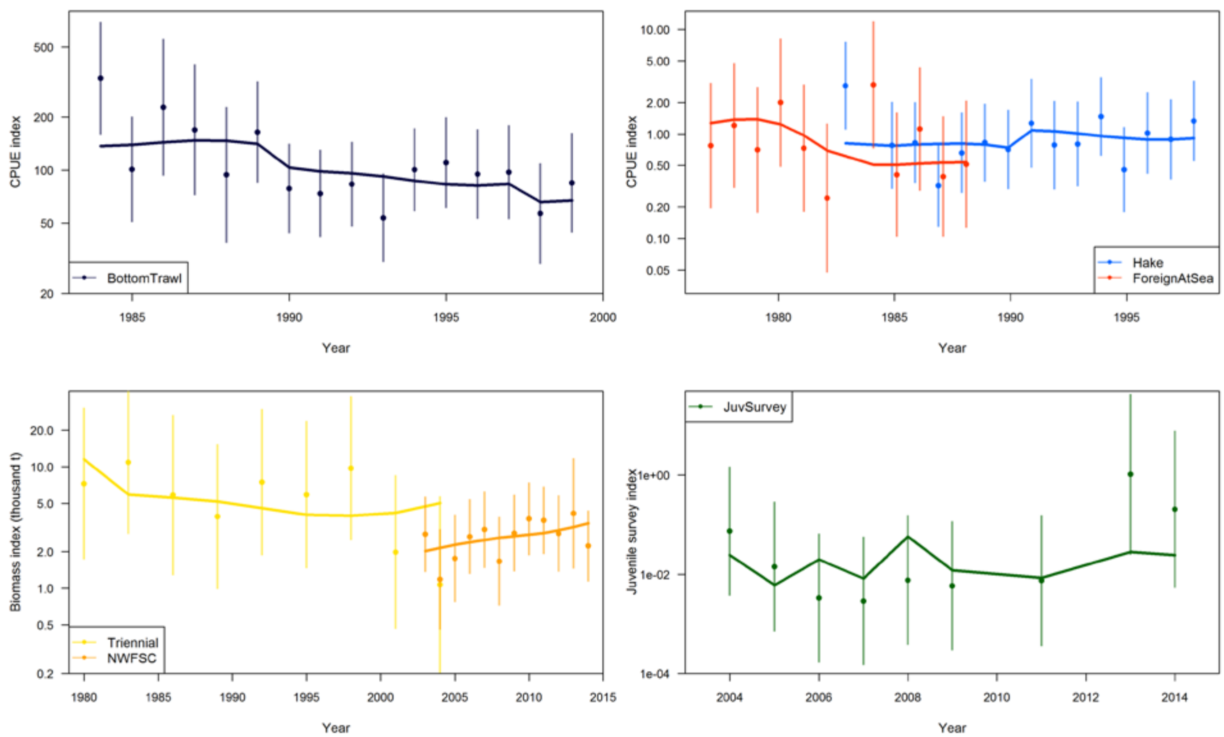


Figure 60: Fits (lines) to the abundance estimates (points) for the base model. Bottom trawl is in the top left, hake indices are in the top right (a separate *q* is estimated for the Hake series starting in 1991), the trawl survey indices are on the bottom left, and the juvenile survey index (in numbers) is on the bottom right. 95% confidence intervals are shown input the input standard errors, without the estimated extra variability added.

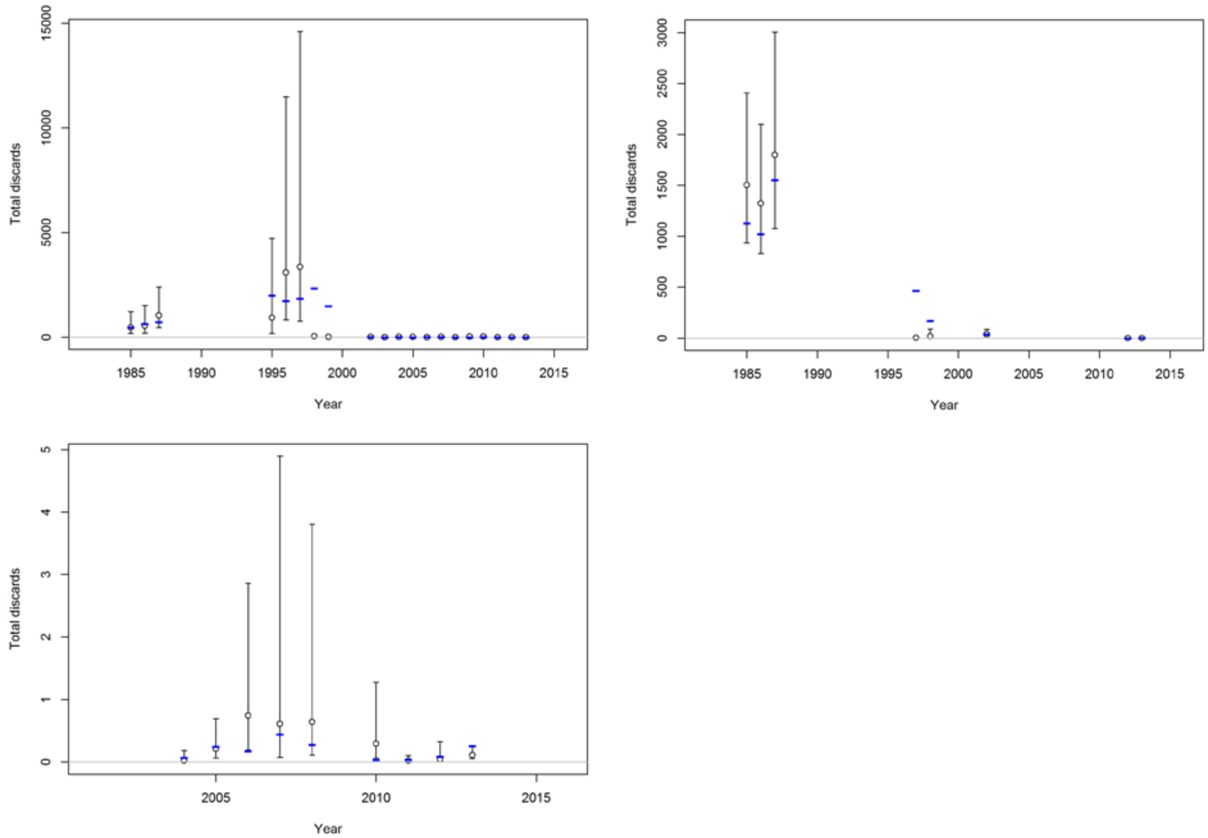


Figure 61: Predicted (blue line) and observed (open circles) discards for the bottom trawl (top left), midwater trawl (top right), and hook-and-line (bottom left) fleets from the base model. 95% confidence intervals are shown for the observations.

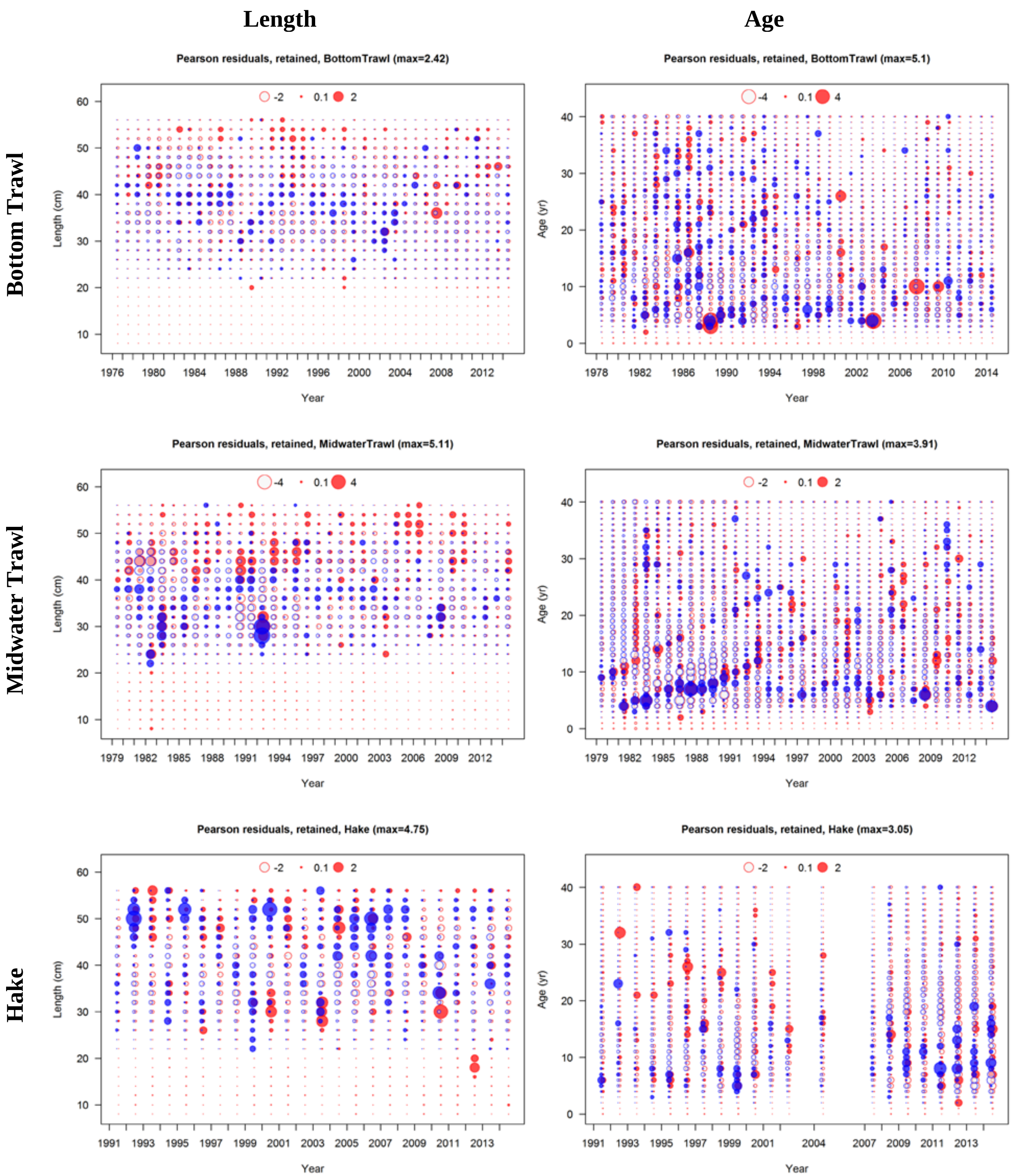


Figure 62: Pearson residuals for fits to length frequency data (left) and age frequency data (right) for landings from the trawl commercial fleets (rows). Filled circles indicate that the fitted proportion was less than the observed proportion. Red indicates females, blue males, and gray unsexed.

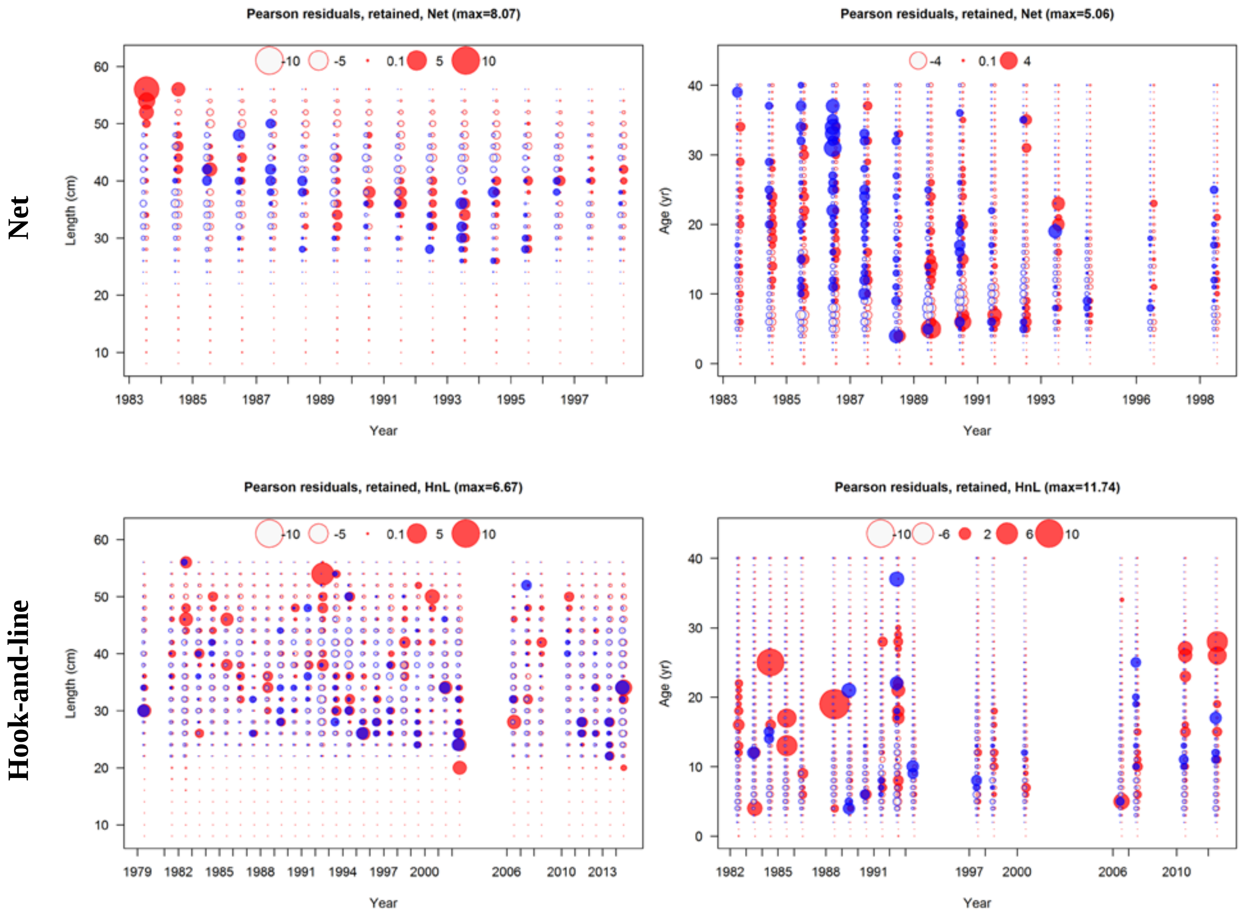


Figure 63: Pearson residuals for fits to length frequency data (left) and age frequency data (right) for landings from the net and hook-and-line commercial fleets (rows). Filled circles indicate that the fitted proportion was less than the observed proportion. Red indicates females, blue males, and gray unsexed.

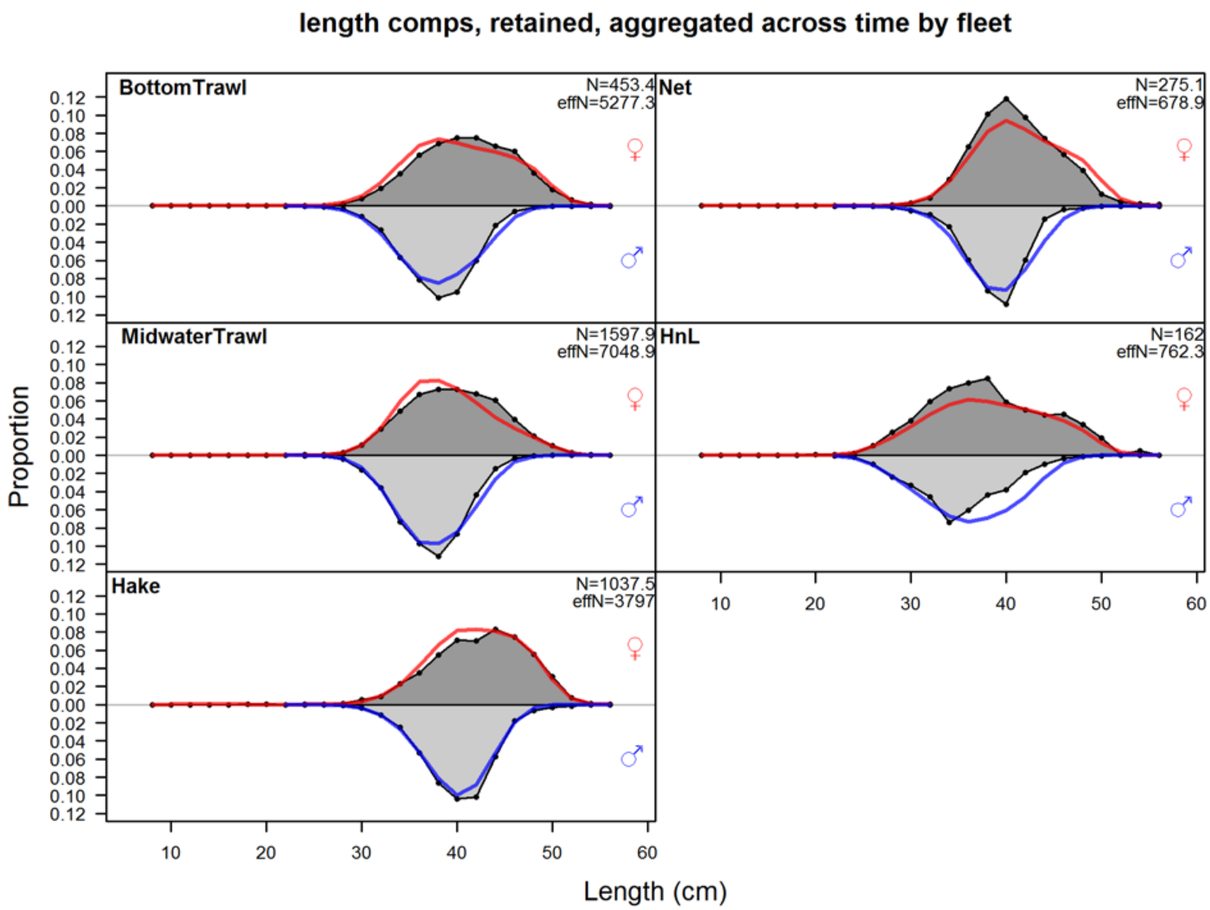


Figure 64: Combined length frequencies for all years from fishery length frequency data (points) for retained catch. Fits are shown by the red line (females) and blue line (males).

Figure 65: Pearson residuals for fits to the discard length frequencies from the bottom trawl (left) and hook-and-line (right) fleets. Filled circles indicate that the fitted proportion was less than the observed proportion. Red indicates females, blue males, and gray unsexed.

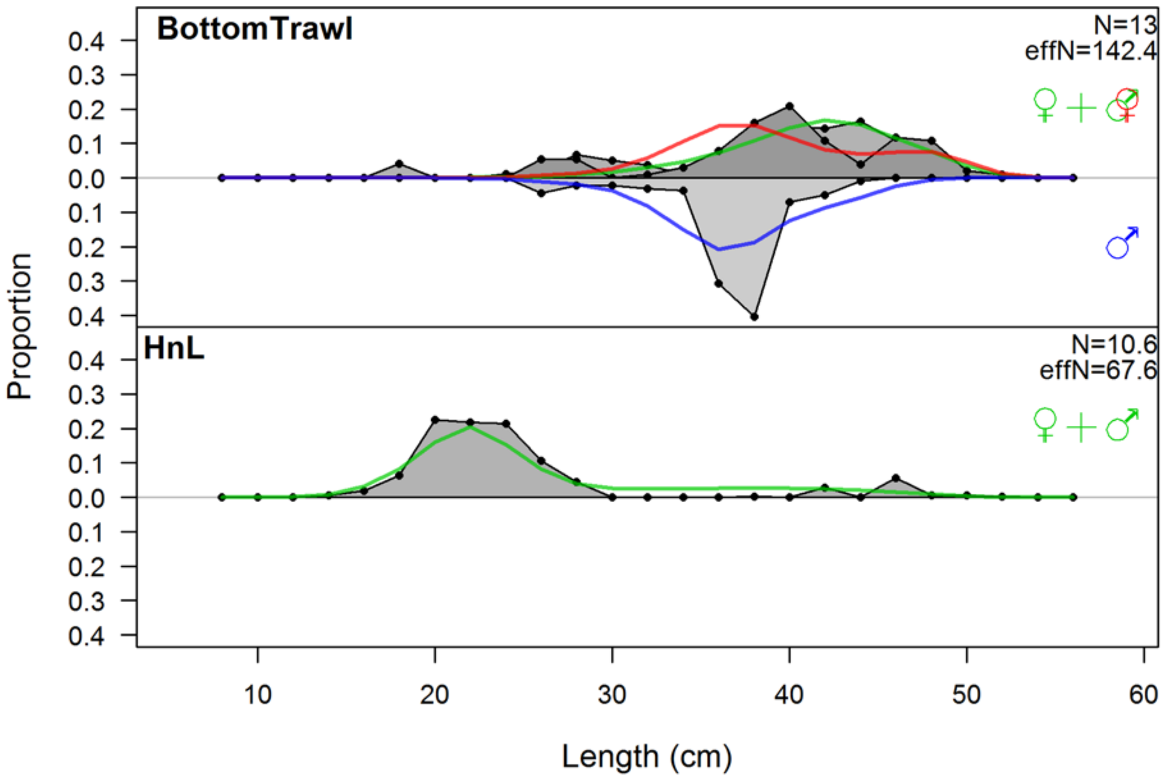


Figure 66: Combined length frequencies for all years from fishery discard length frequency data (points) with fits shown by the red line (females), the blue line (males), and the green line (unsexed).

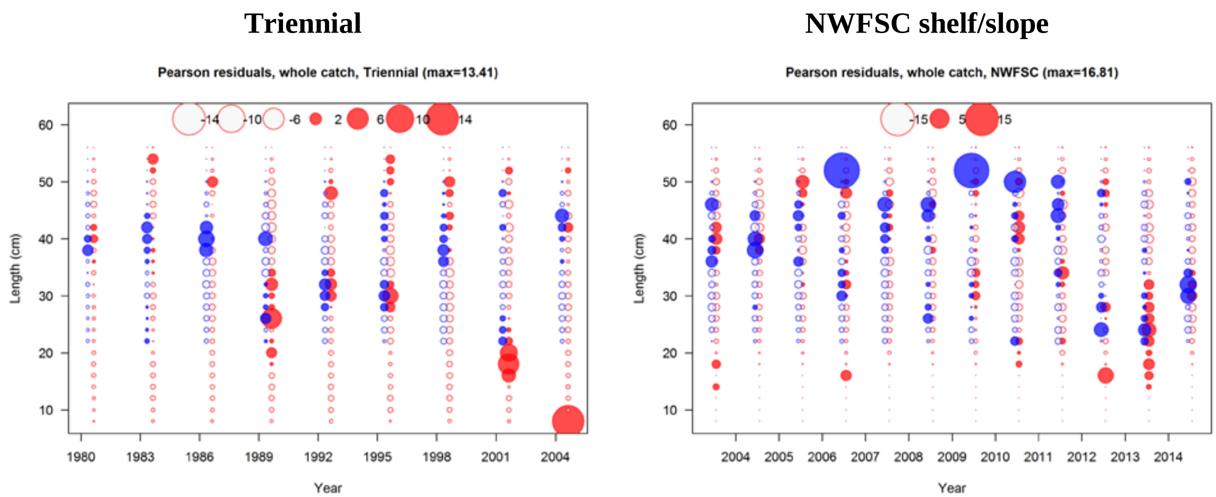


Figure 67: Pearson residuals for fits to the triennial survey length frequency data (left) and NWFSC shelf/slope survey length frequency data (right). Filled circles indicate that the fitted proportion was less than the observed proportion. Red indicates females, blue males, and gray unsexed.

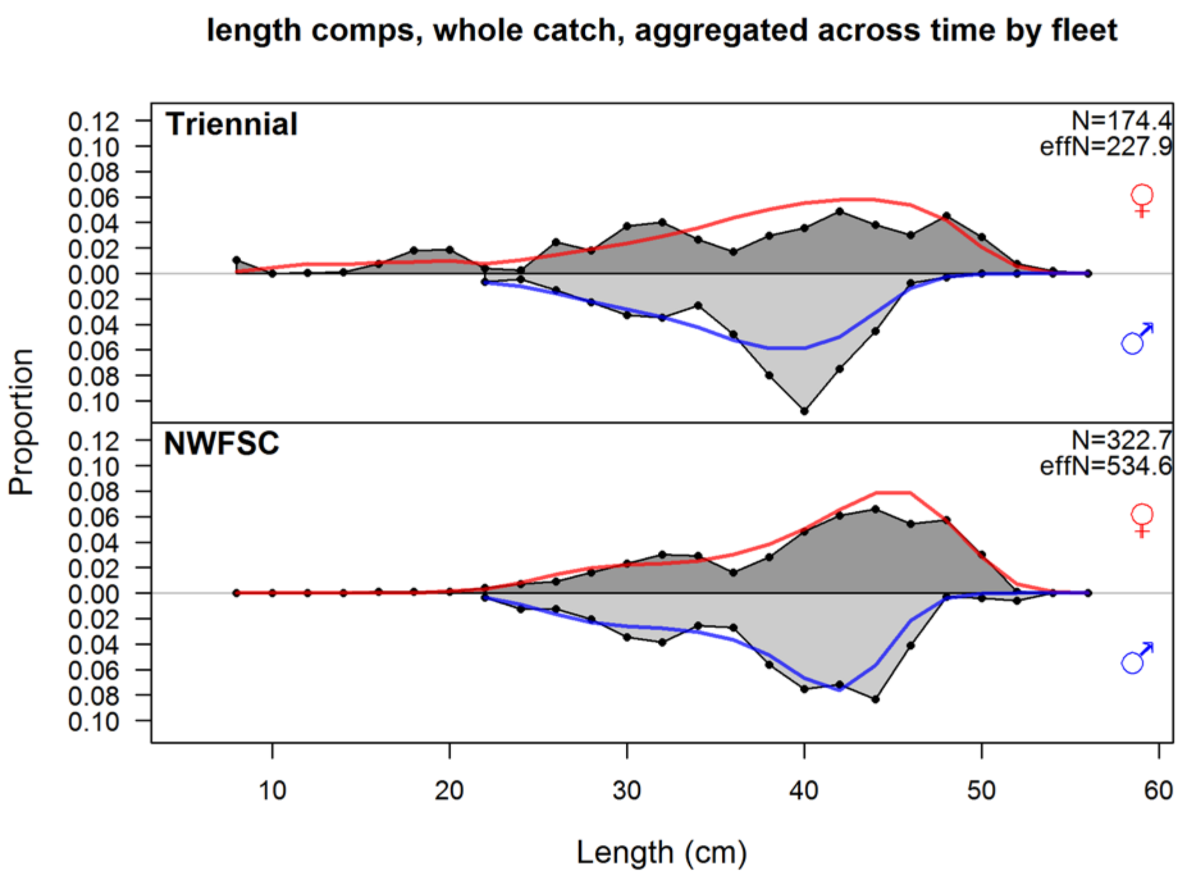


Figure 68: Combined length frequencies for all years from survey length frequency data (points) with fits shown by the red line (females) and the blue line (males).

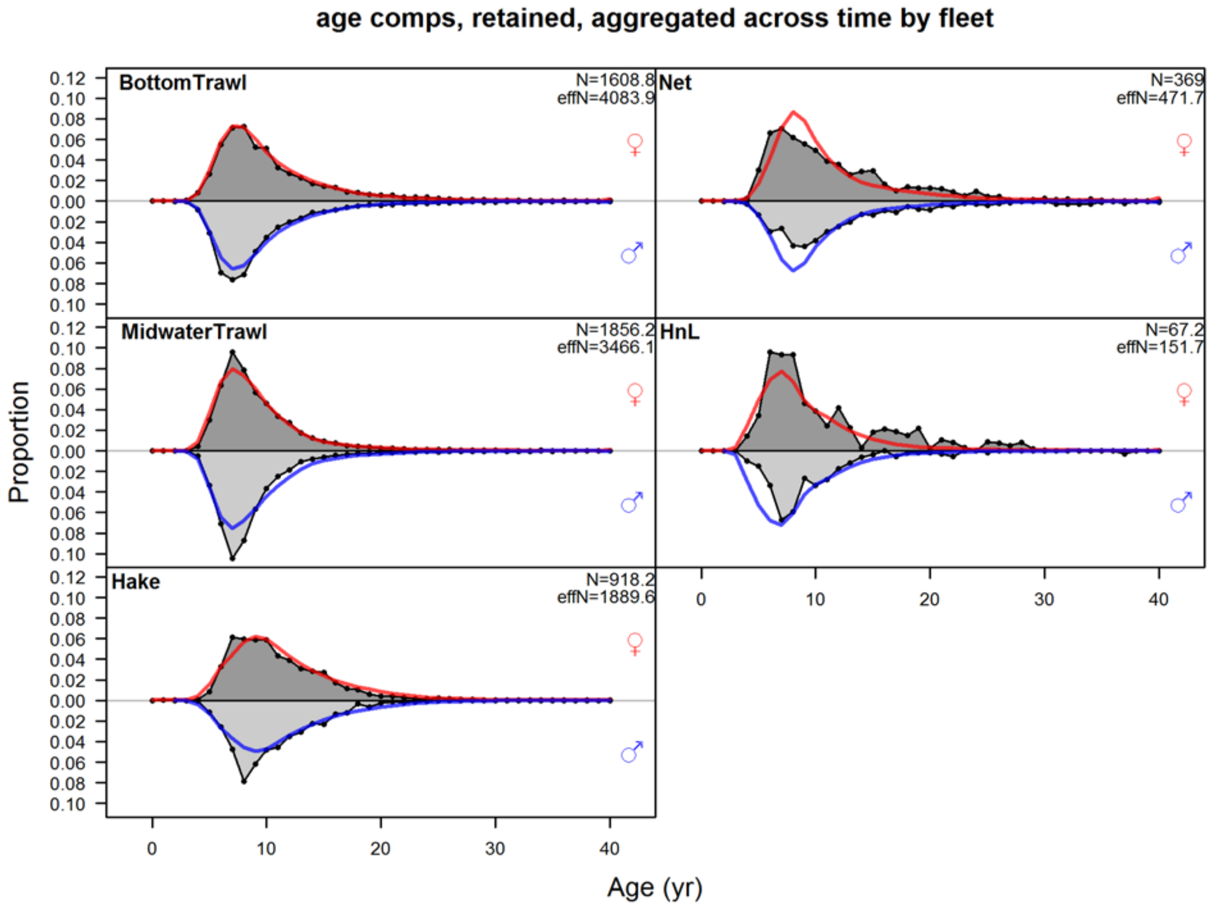


Figure 69: Combined age frequencies for all years from fishery age frequency data (points) for retained catch. Fits are shown by the red line (females) and blue line (males).

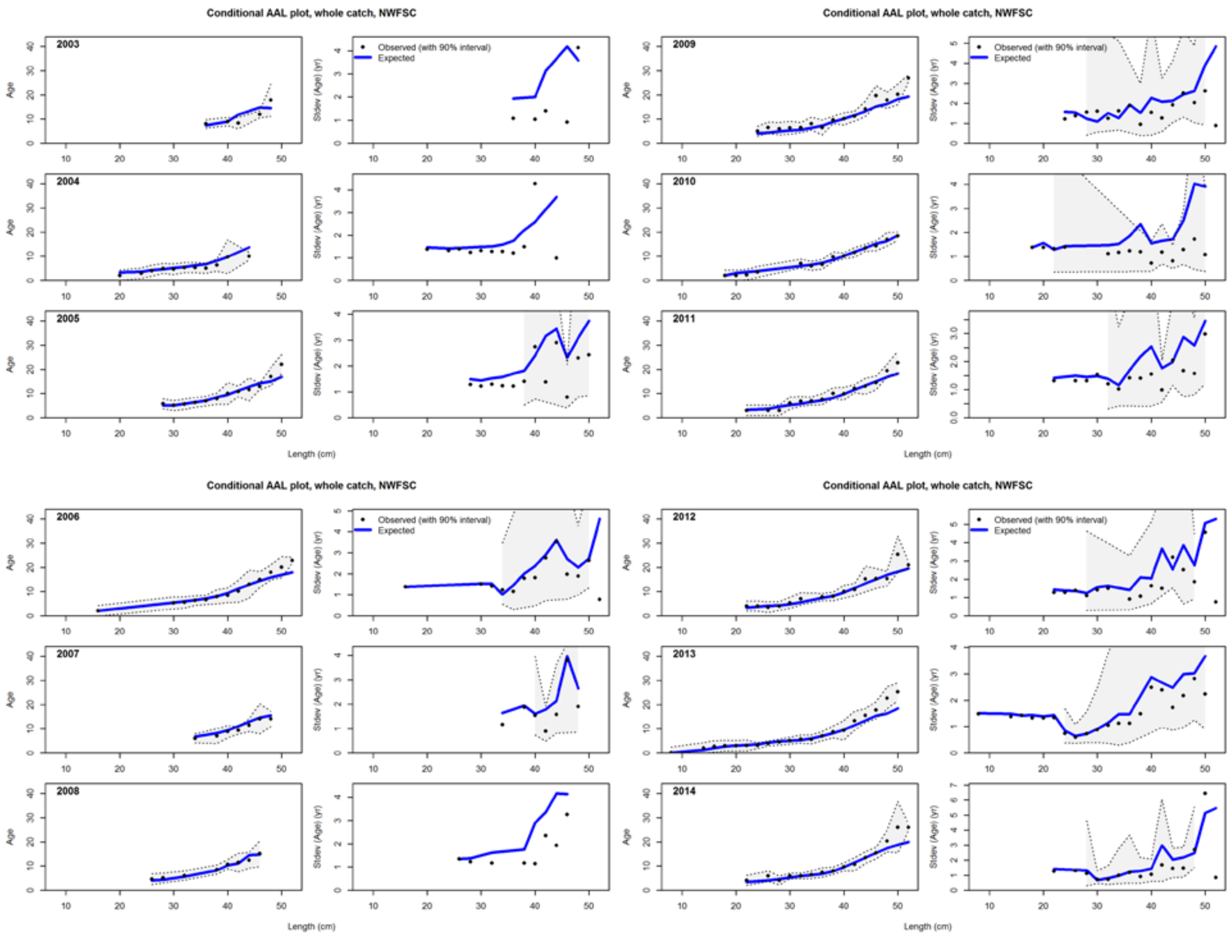


Figure 70: Observed and expected age-at-length with 95% confidence intervals (left) and observed and expected standard deviation of age-at-length with 95% confidence intervals (right) for the NWFSC shelf/slope survey data.

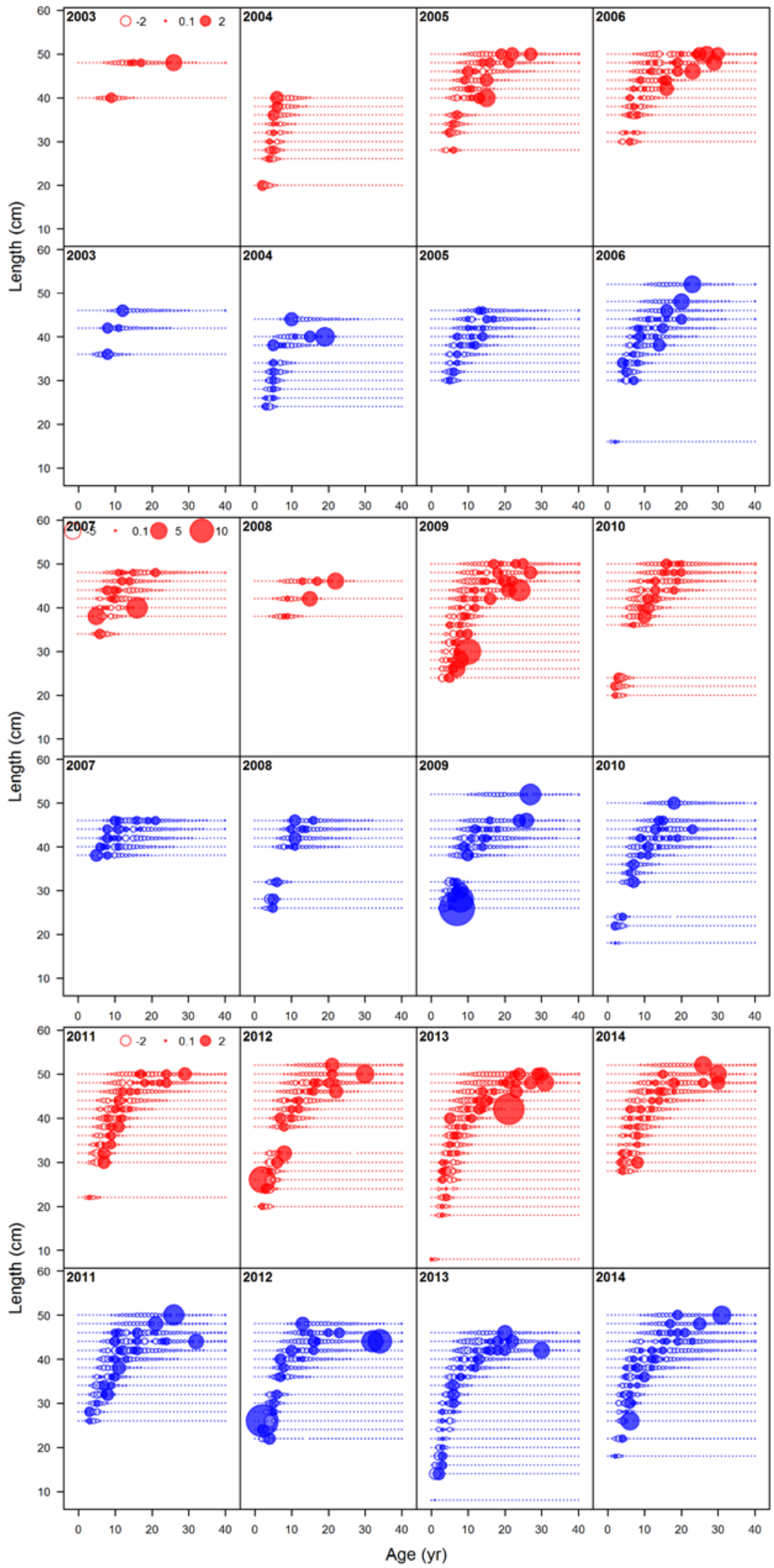


Figure 71: Pearson residuals for fits to age-at-length data for the NWFSC shelf/slope survey. Filled circles indicate that the fitted proportion was less than the observed proportion.

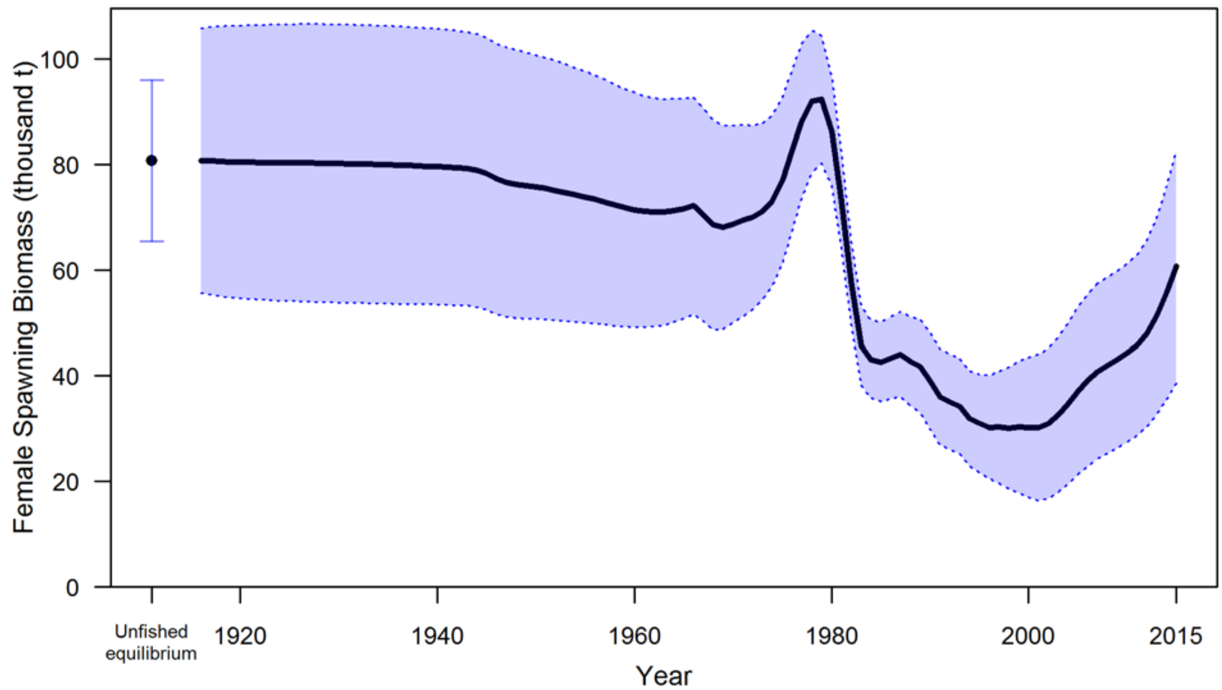


Figure 72: Predicted spawning biomass (thousand mt) for Widow Rockfish using the base assessment. The solid line is the MLE estimate and the shaded area depicts the approximate asymptotic 95% confidence intervals.

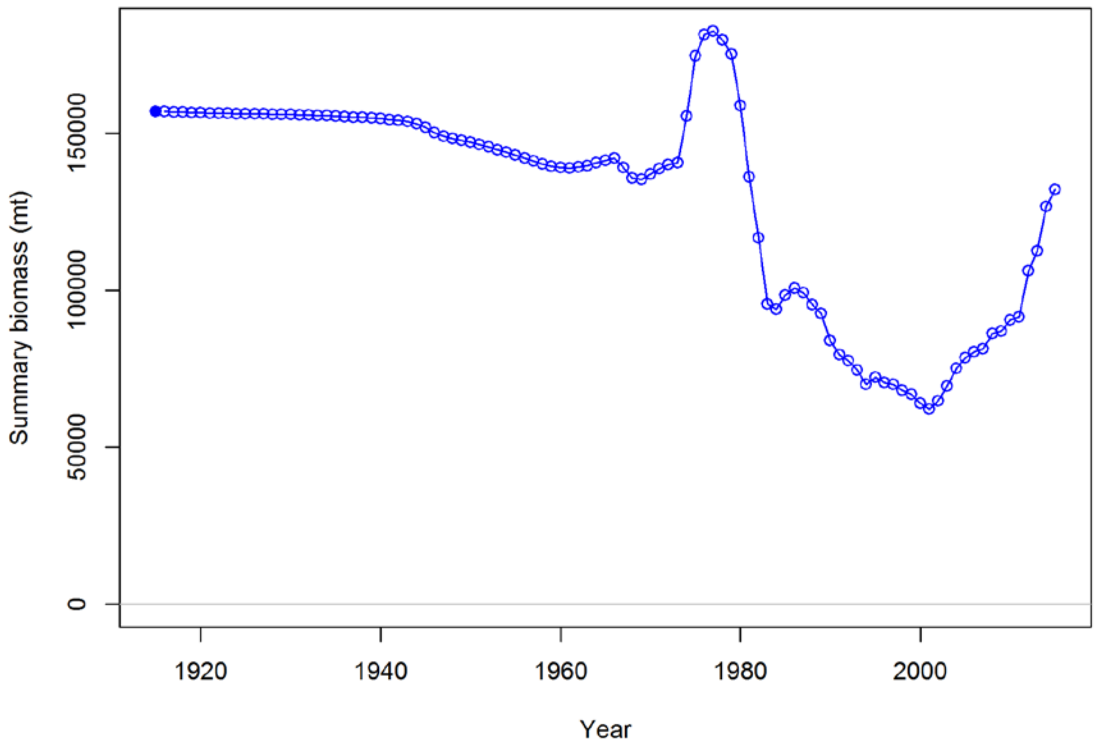


Figure 73: Predicted summary biomass (age 4+) from the base model.

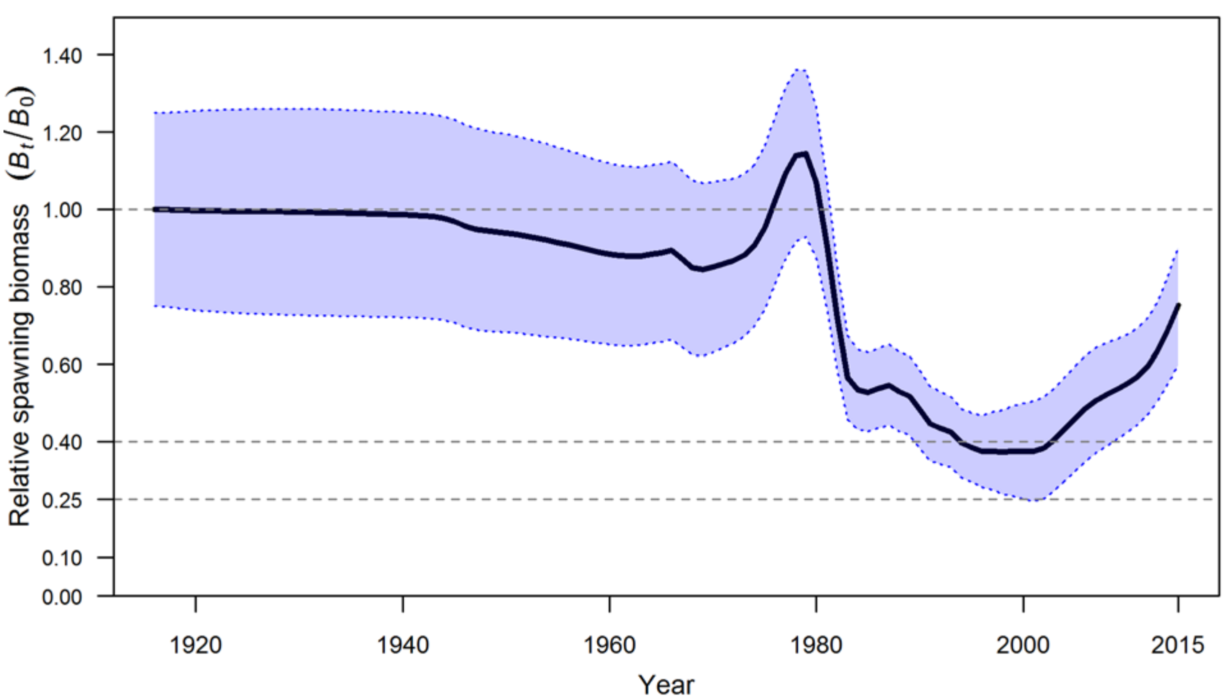


Figure 74: Predicted relative spawning biomass from the Widow Rockfish base case assessment. The solid line is the MLE estimate and the shaded area depicts the approximate asymptotic 95% confidence intervals. The dashed lines show the equilibrium level (100%), the management target of 40% of unfished biomass, and the minimum stock size threshold of 25% of unfished biomass.

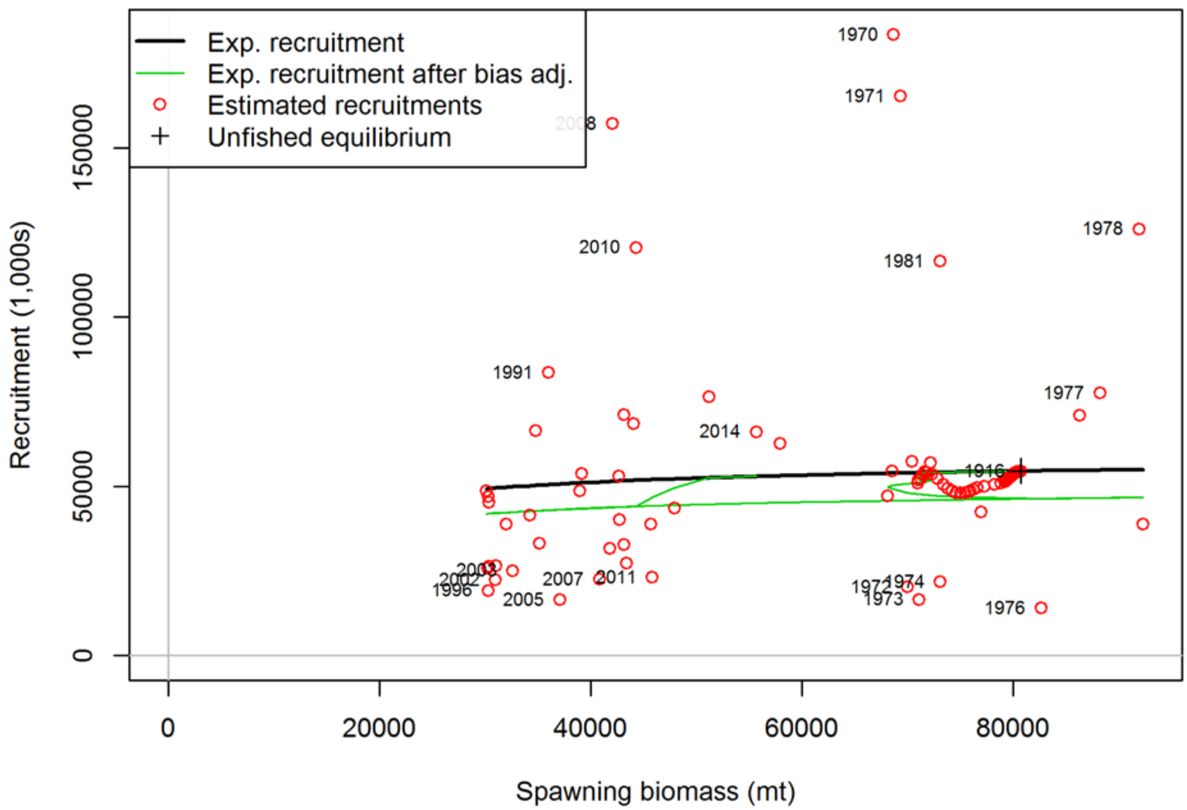


Figure 75: Estimated recruitment (red circles) and the assumed stock-recruit relationship (black line). The green line shows the effect of the bias correction for the lognormal distribution.

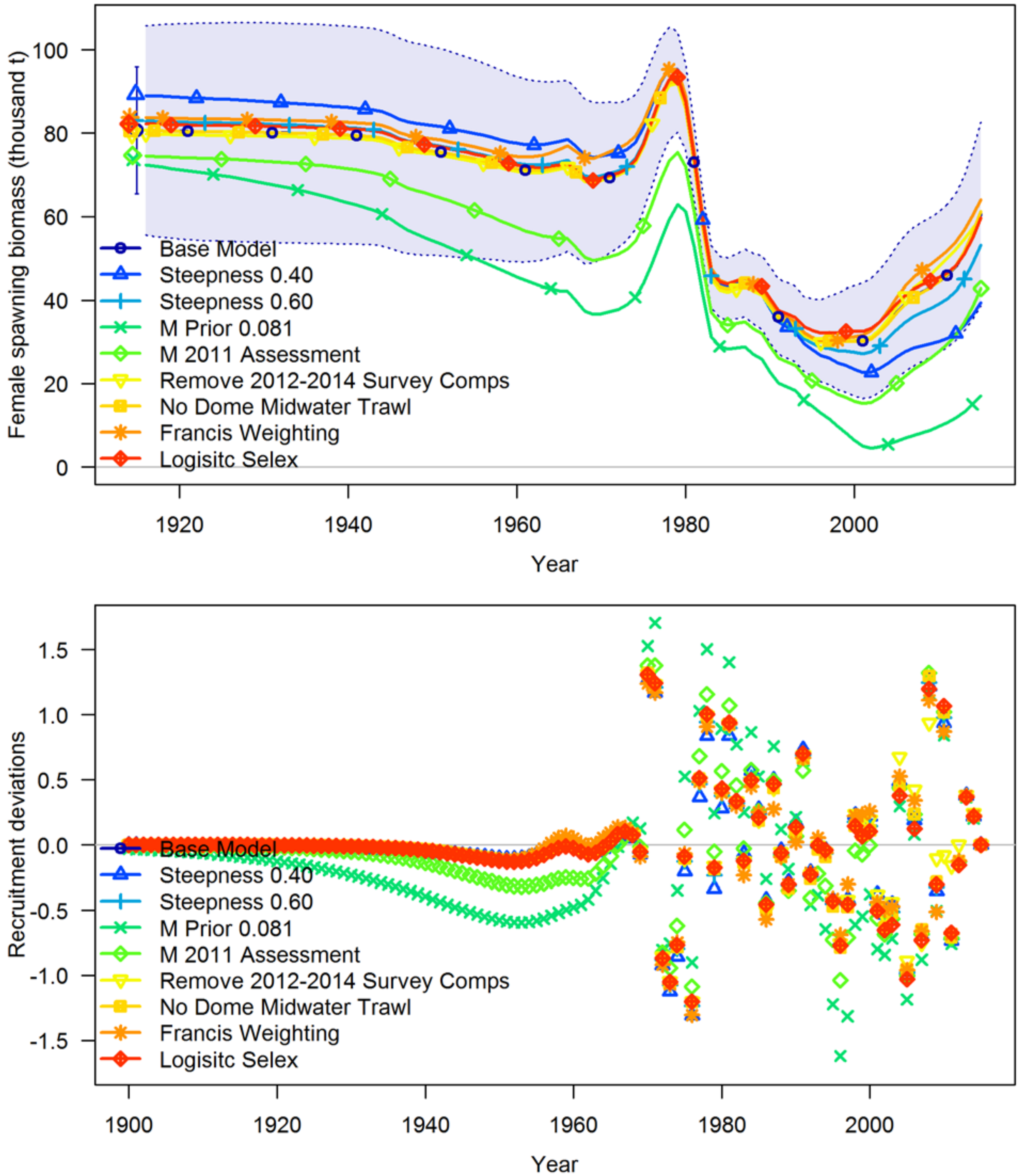


Figure 76: Spawning biomass (with 95% confidence interval around the base model) and recruitment deviations for the base model and sensitivity runs.

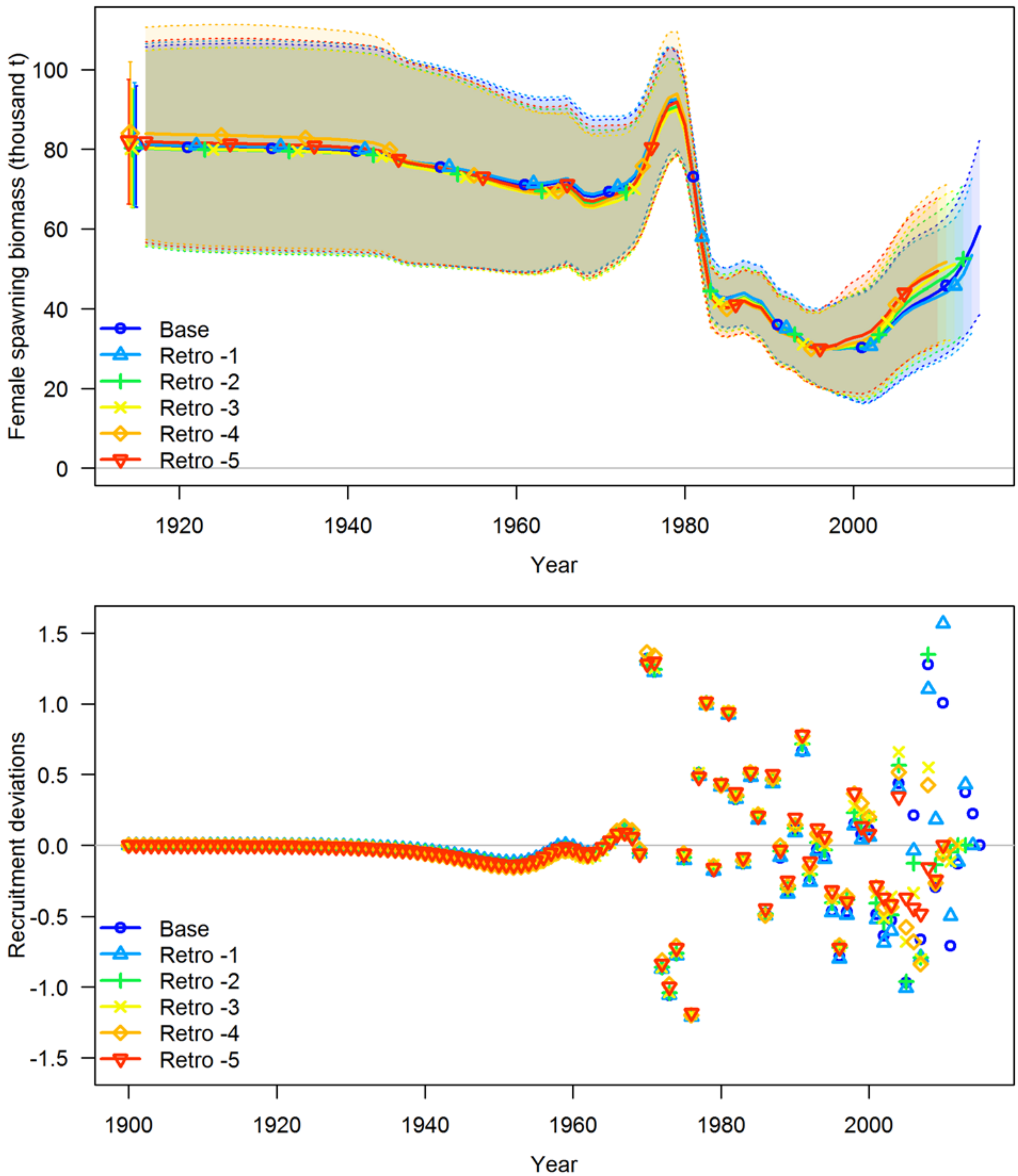


Figure 77: Five-year retrospective estimates of spawning biomass (top) and recruitment deviations (bottom).

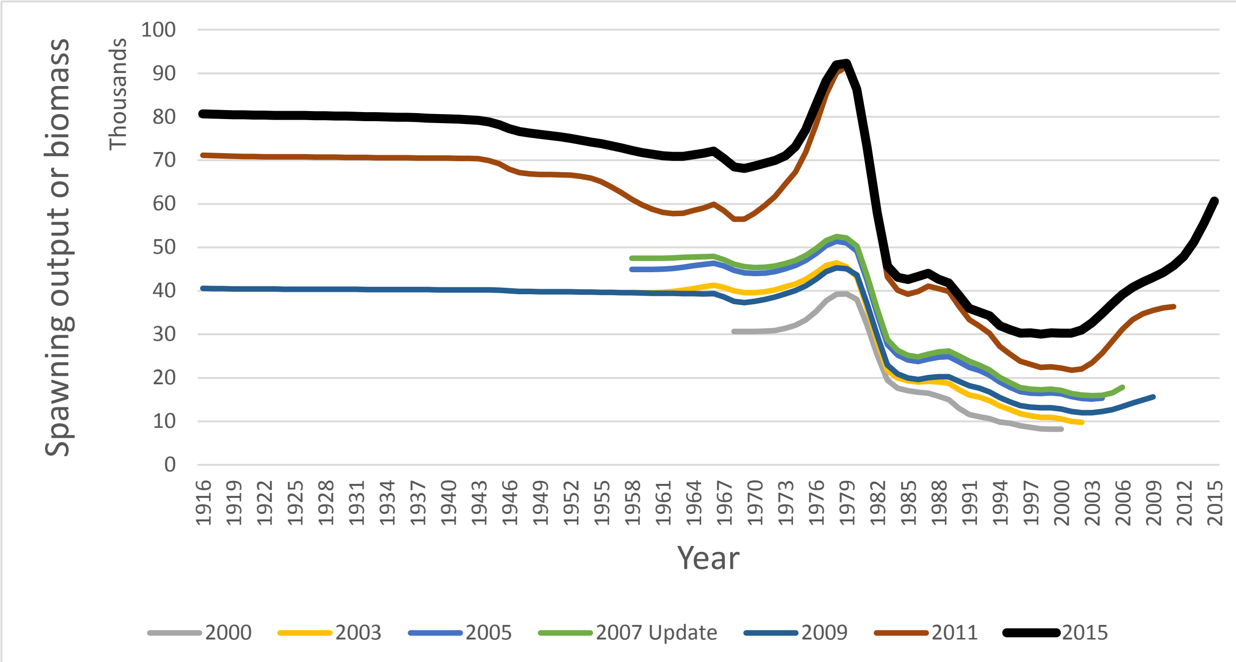


Figure 78: Predicted spawning biomass (2011 and 2015) or spawning output (2000-2009) from past assessments.

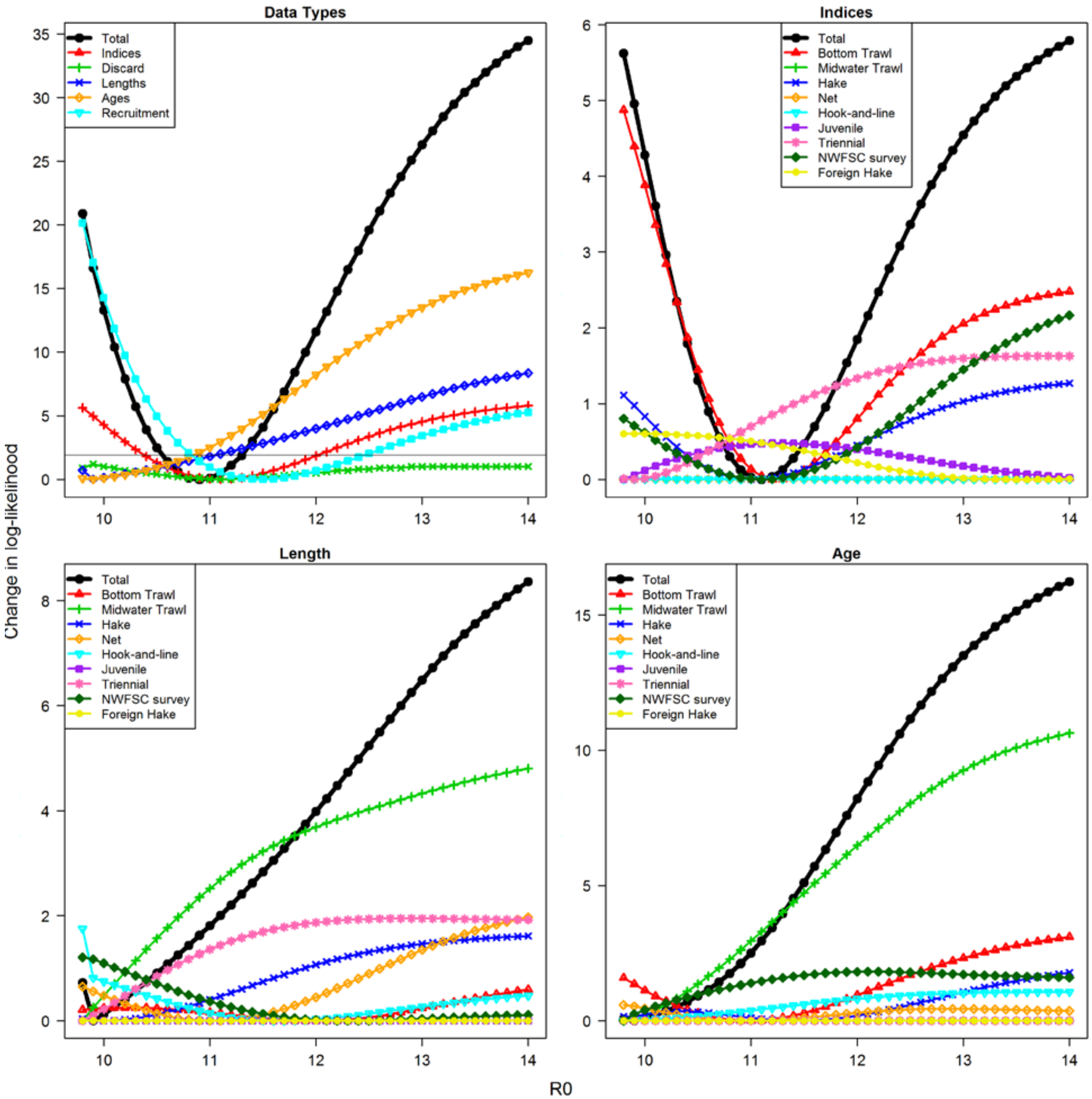


Figure 79: Likelihood components in the likelihood profile for unfished equilibrium recruitment (R_0).

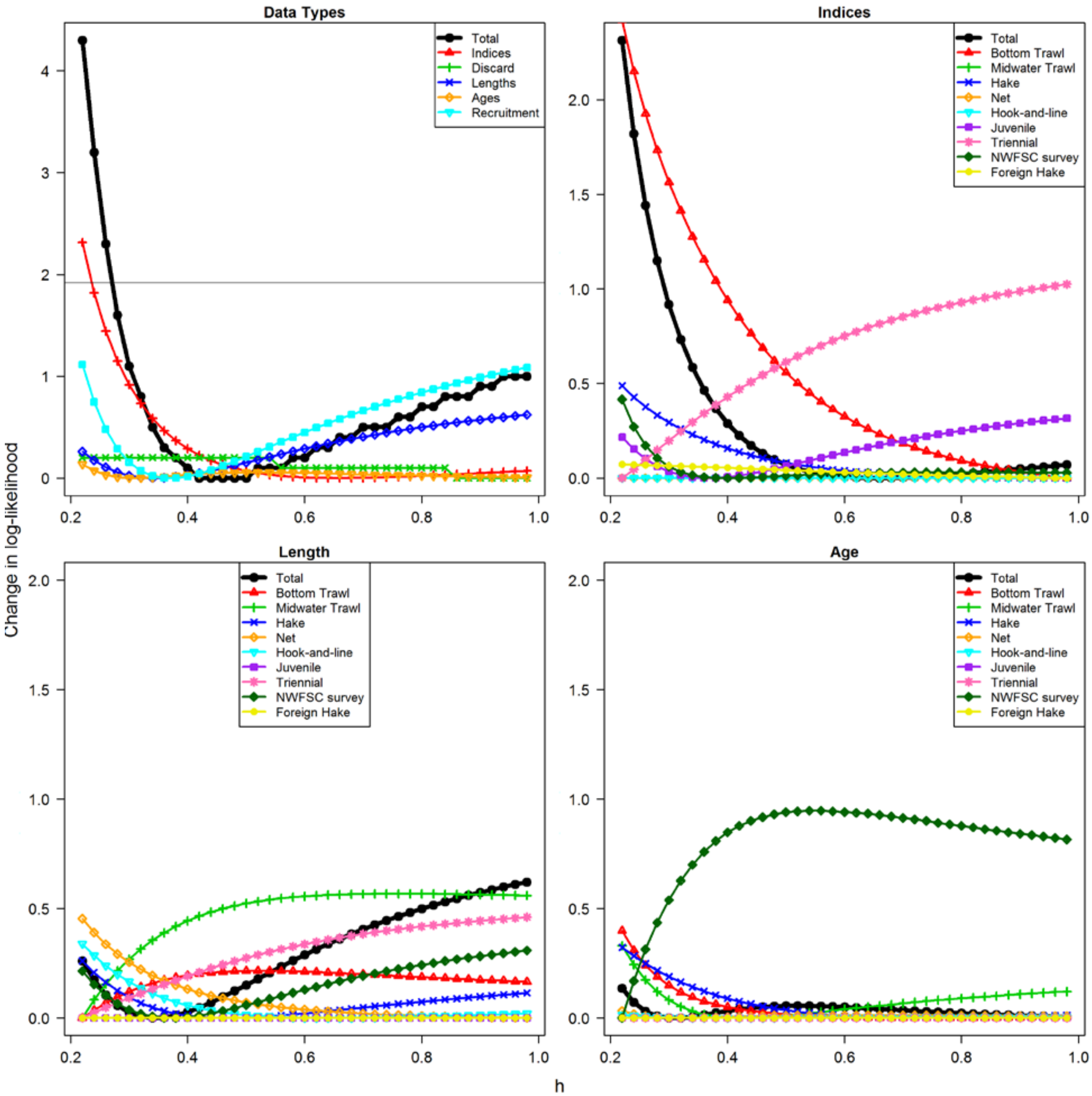


Figure 80: Likelihood components in the likelihood profile for steepness (*h*).

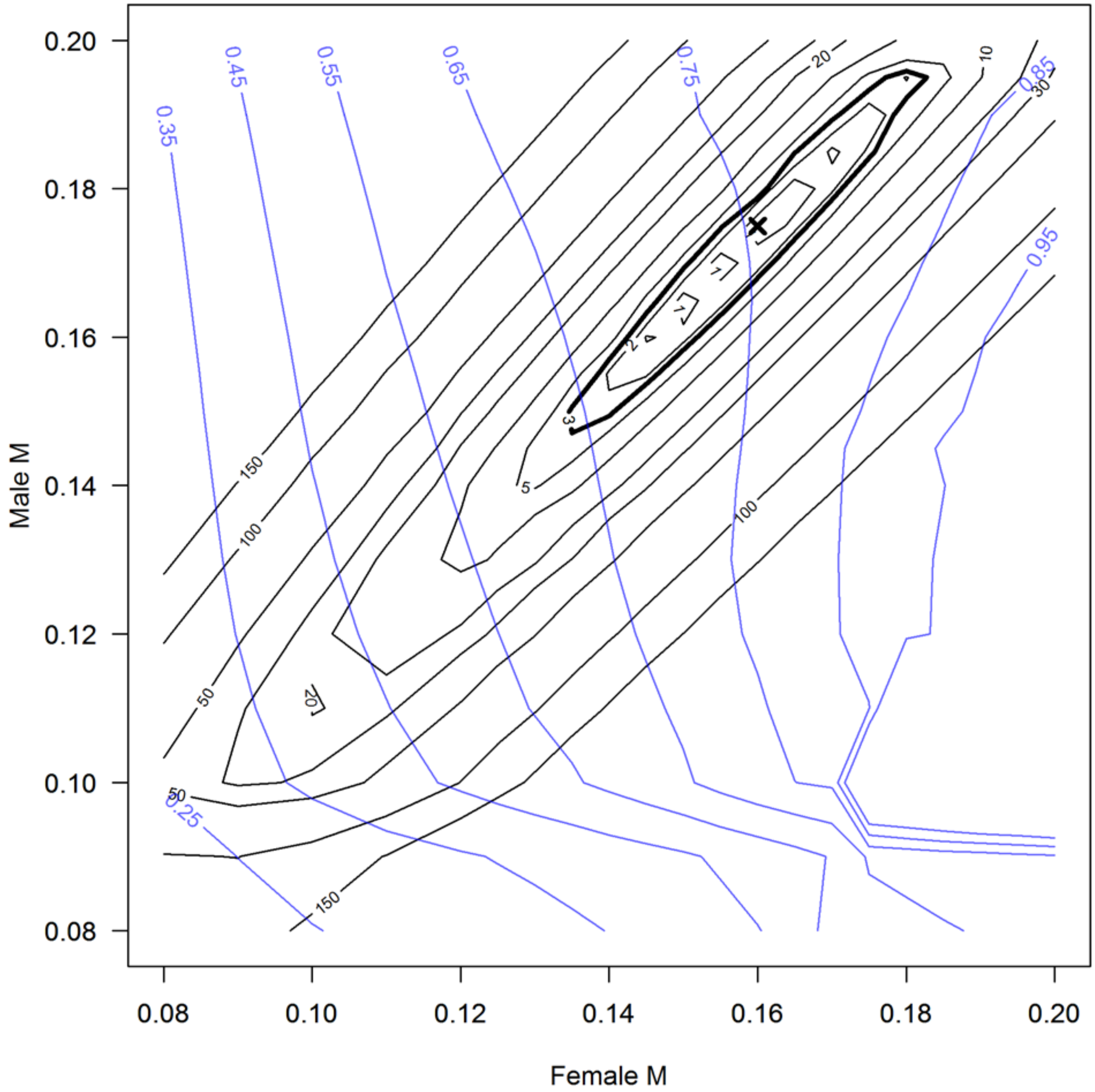


Figure 81: Likelihood profile (black contour lines) for female and male natural mortality (*M*, yr^{-1}). The dark black line is at a value of 3, which is approximately the level of 95% significance. The blue contour lines show the relative spawning biomass in 2015 at different combinations of male and female natural mortality.

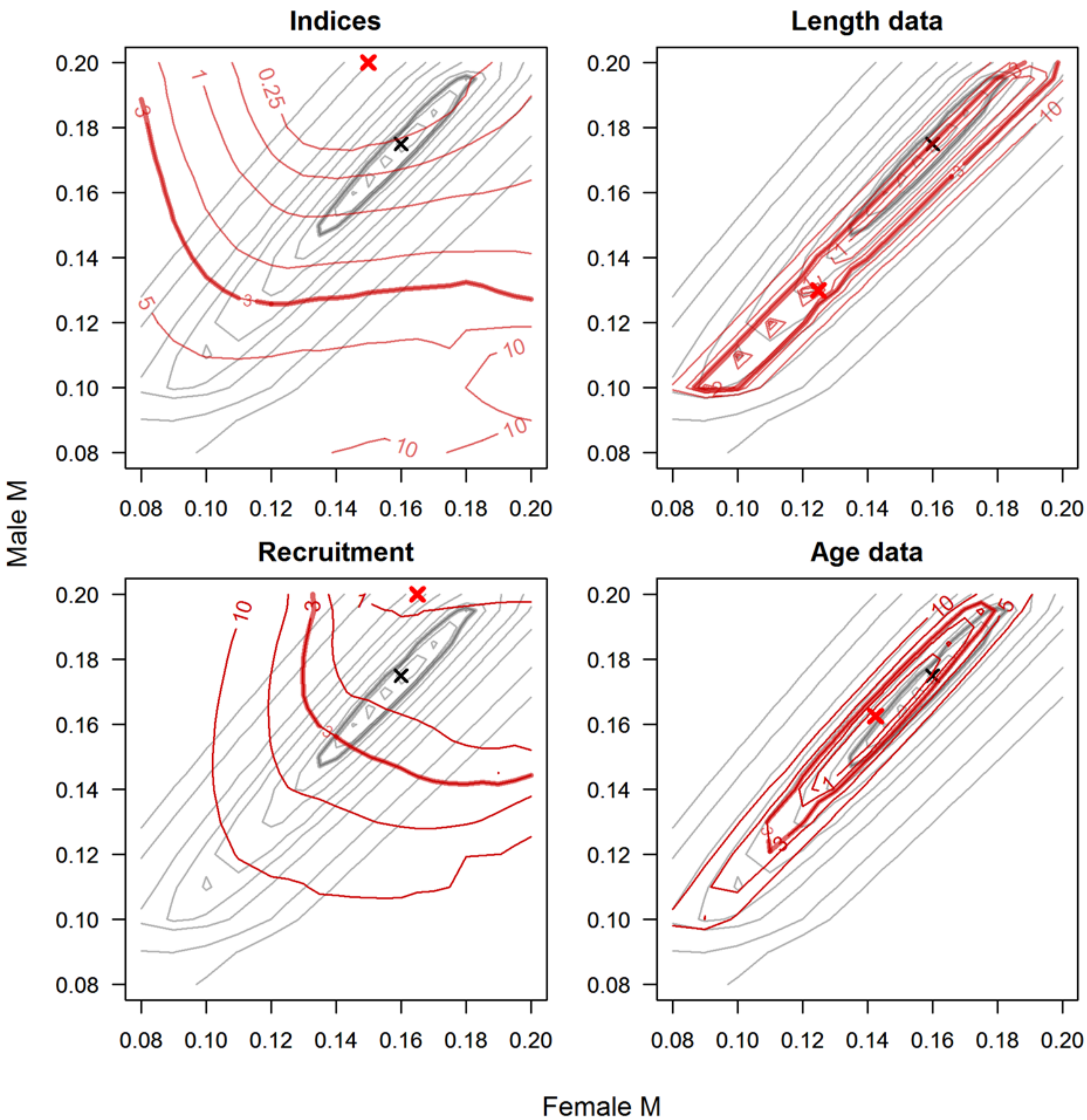


Figure 82: Likelihood components (red contour lines) in the bivariate likelihood profile for female and male natural mortality (*M*, yr^{-1}). Black contour lines show the total likelihood for comparison. Dark contours are at a value of 3 which is approximately the level of 95% significance.

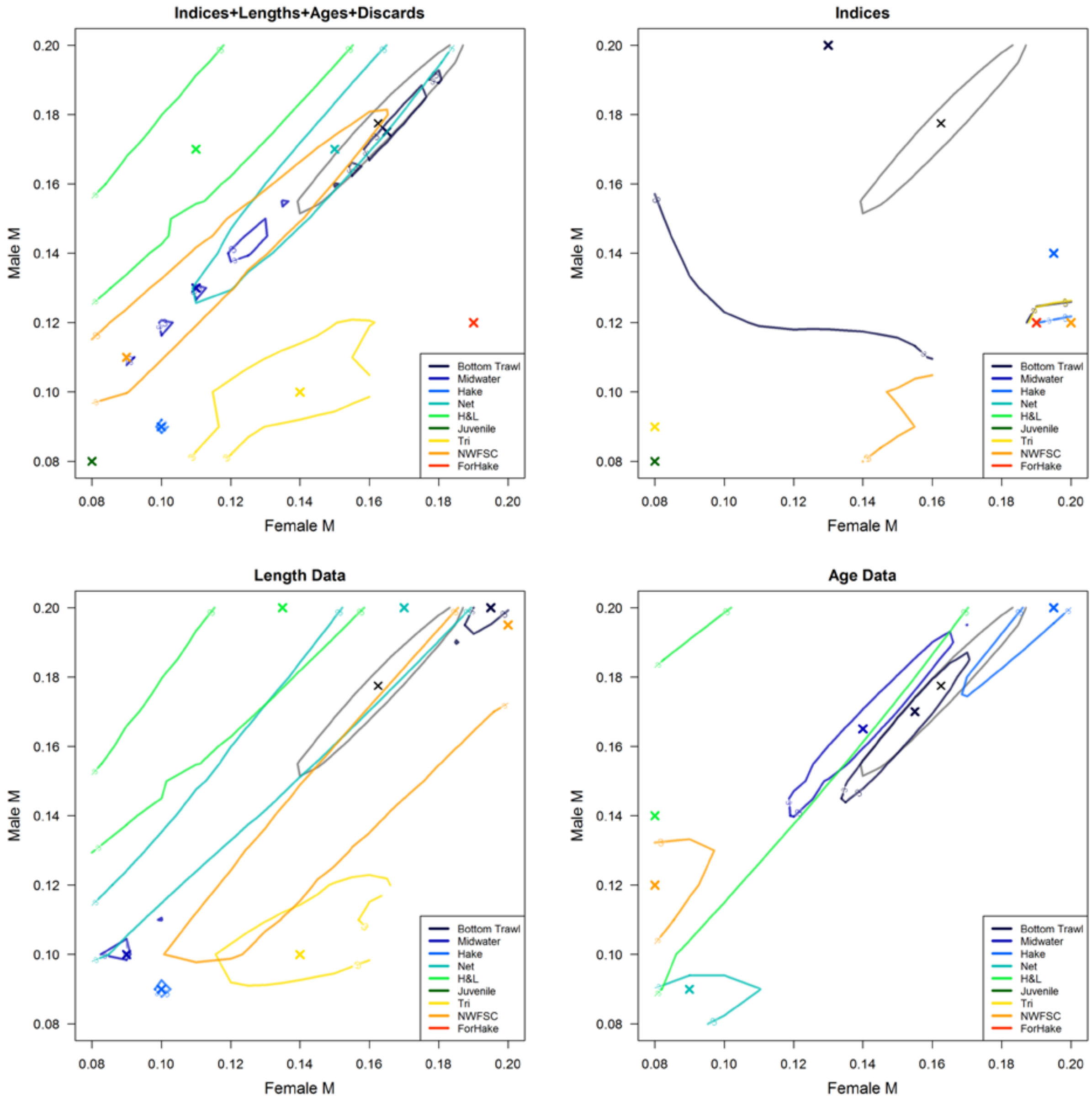


Figure 83: Fleet specific components of the bivariate likelihood profile for female and male natural mortality (*M*, yr^{-1}). Each fleet is shown as a different color with an "X" indicating the minimum likelihood value for that component and the contour showing where the difference in log-likelihood is 3. The grey and small "X" and contour show the total likelihood profile for comparison.

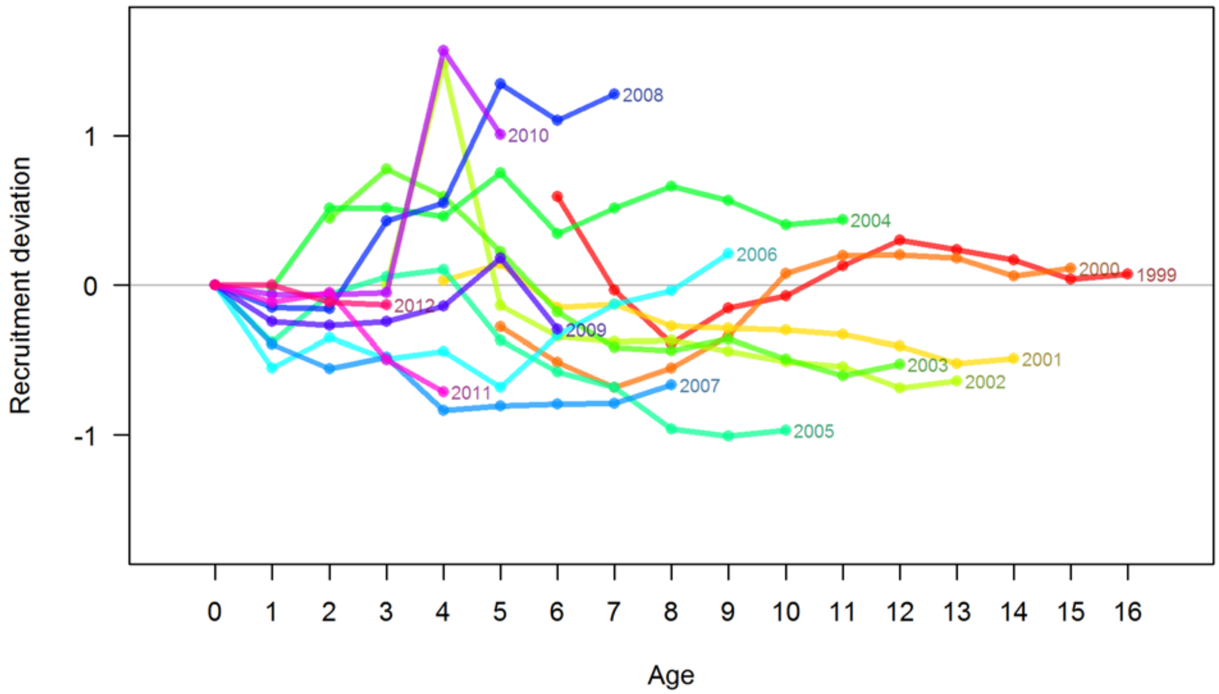


Figure 84: Retrospective estimates of recruitment deviations. Each line is a specific cohort and the estimated strength of it at a specific age.

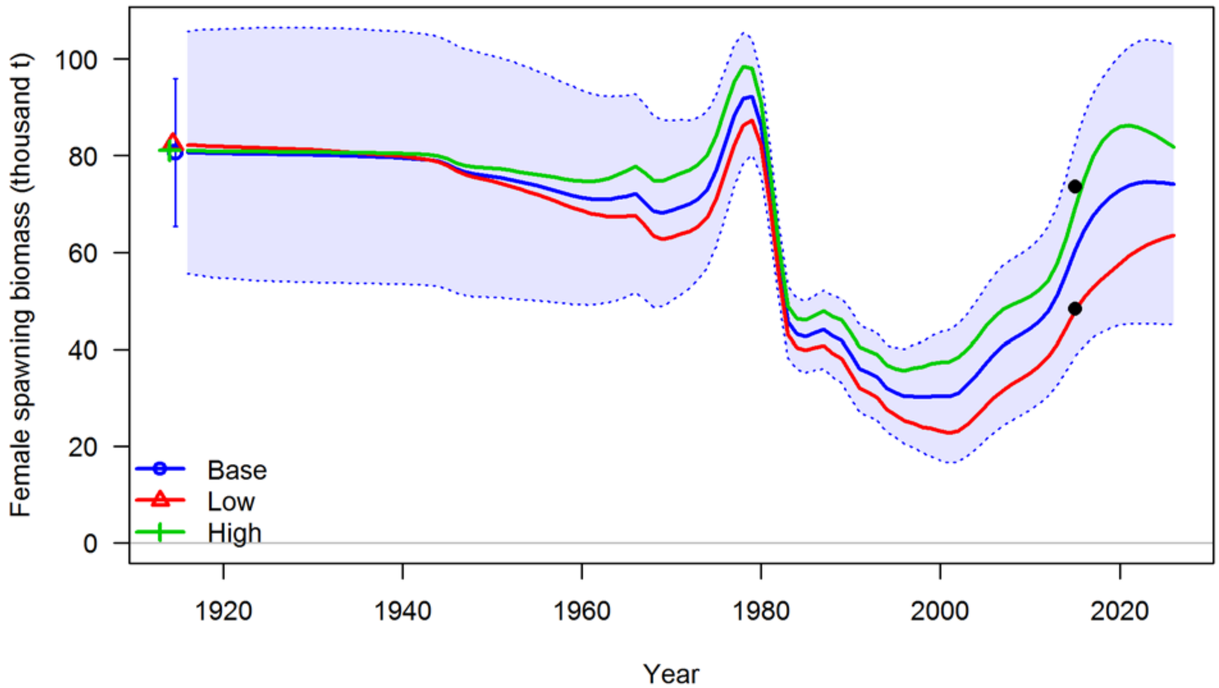


Figure 85: Base model, low state of nature, and high state of nature spawning biomass trajectories assuming a catch of 2,000 metric tons for 2015 to 2026. The black circles indicate the 12.5% and 87.5% lognormal quantiles of spawning biomass in 2015 from the base model.

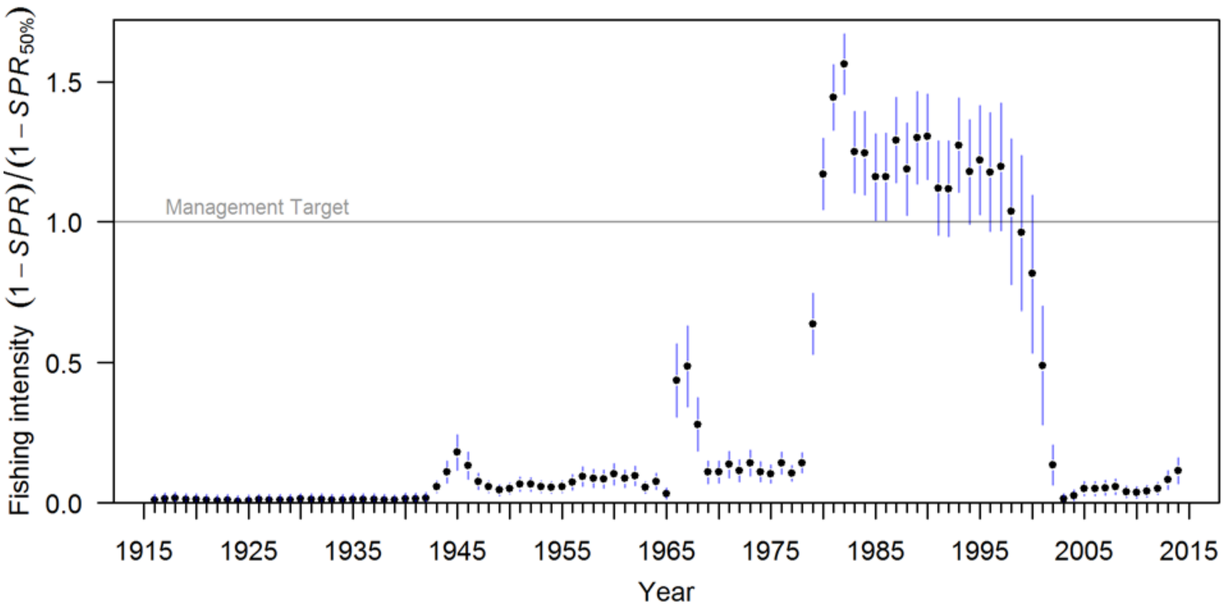


Figure 86: Plot of the predicted (1-SPR) for each year of the model with 95% confidence intervals.

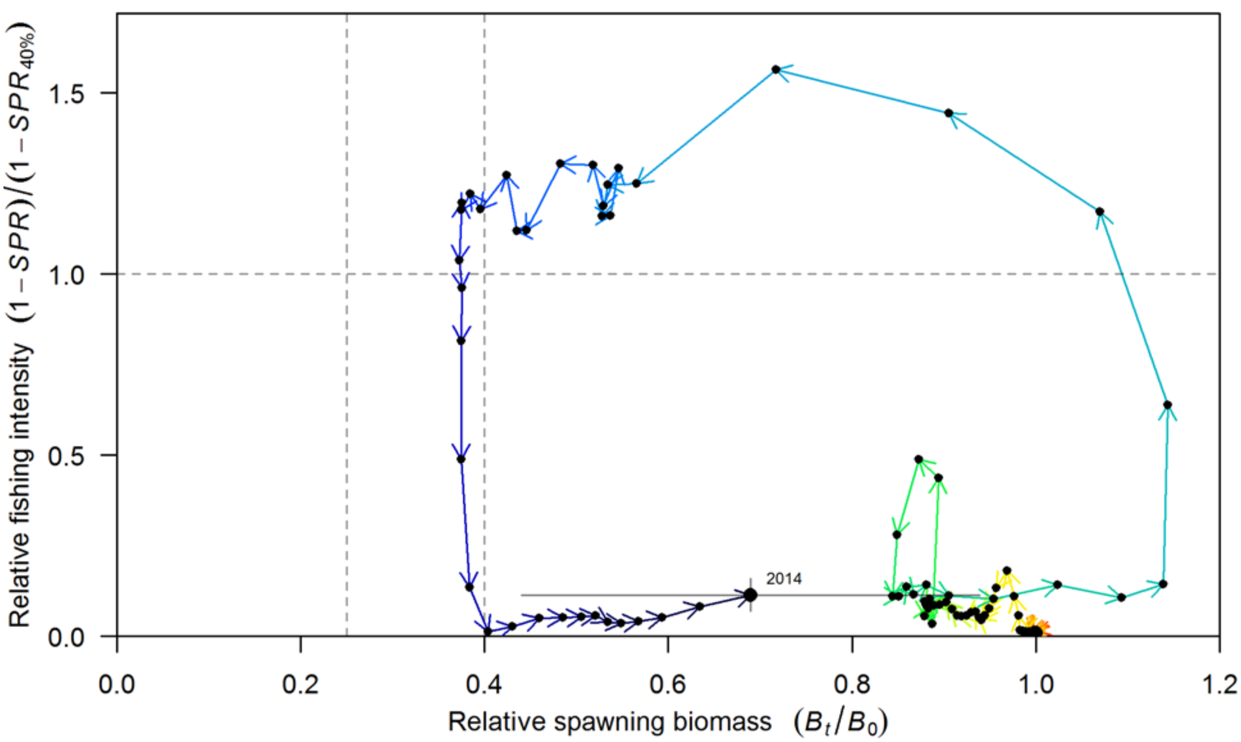


Figure 87: Phase plot of relative (1-SPR) (y-axis) and depletion (x-axis) for Widow Rockfish. The red point represent the year 2012.

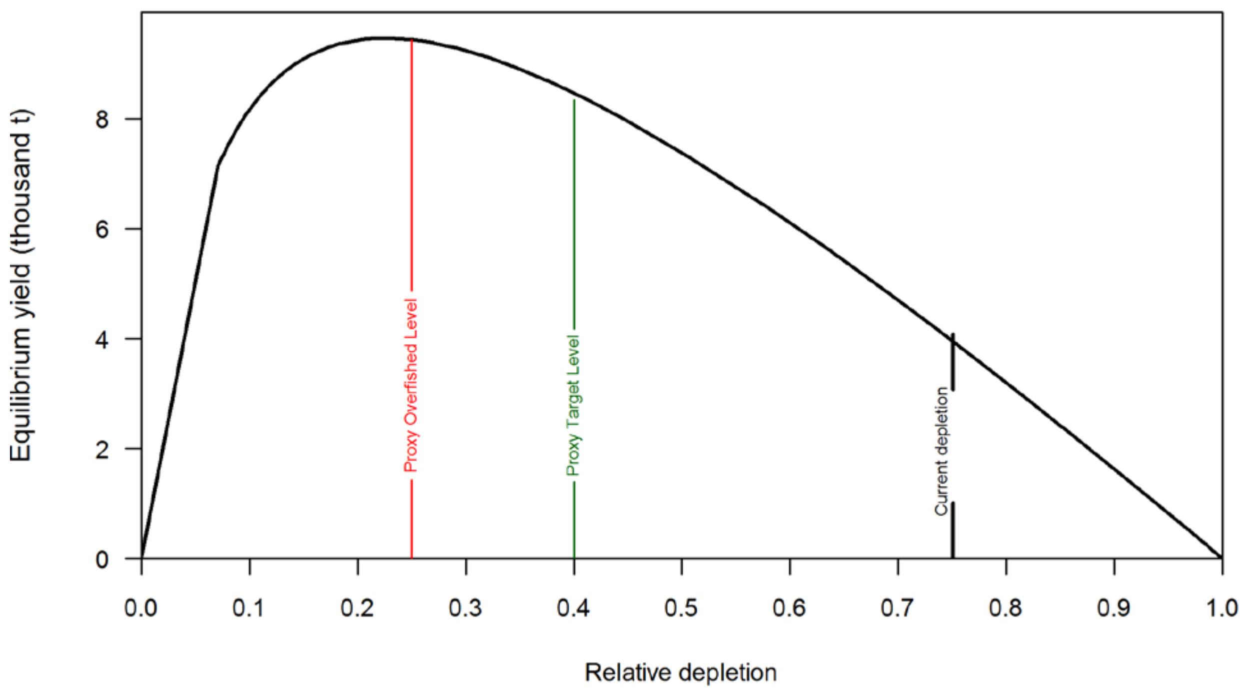


Figure 88: Estimated plot of equilibrium yield vs relative spawning biomass (*B/B_0*) with the current estimated depletion (black), the proxy 40% target biomass level (green), and the proxy 25% overfished level (red) shown as vertical lines.

Appendix A. **Year-specific fits to the length compositions**

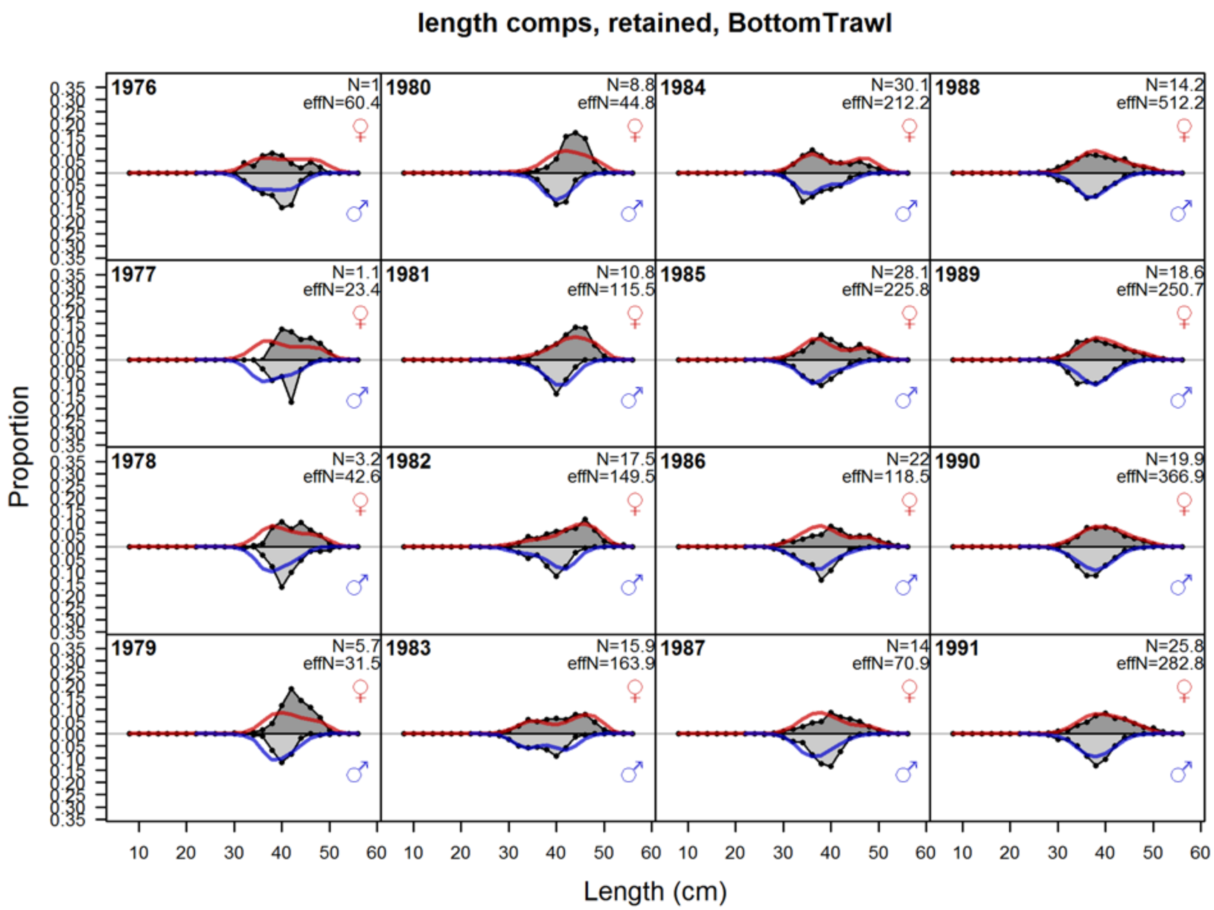


Figure A1: Fits to the retained length compositions for the bottom trawl fleet.

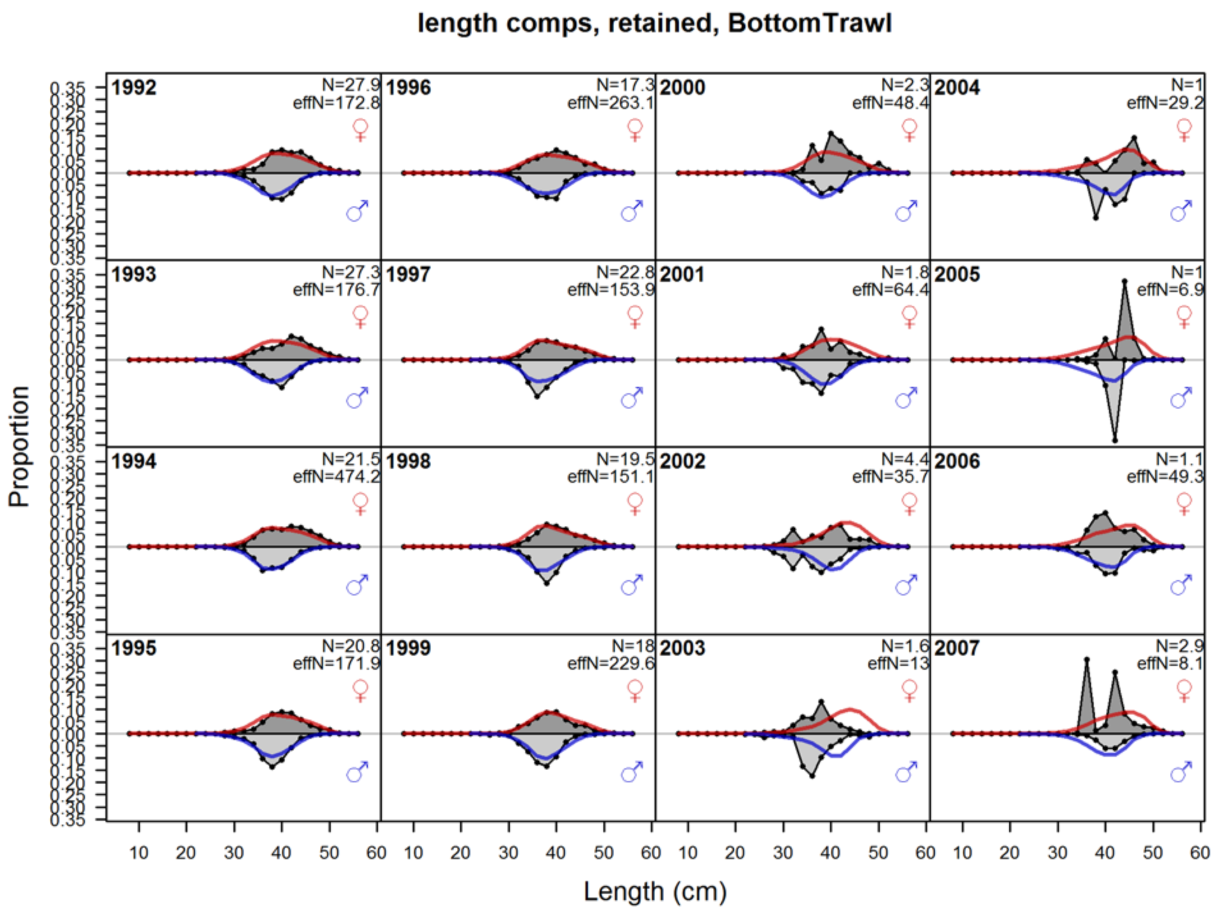


Figure A1: (continued) Fits to the retained length compositions for the bottom trawl fleet.

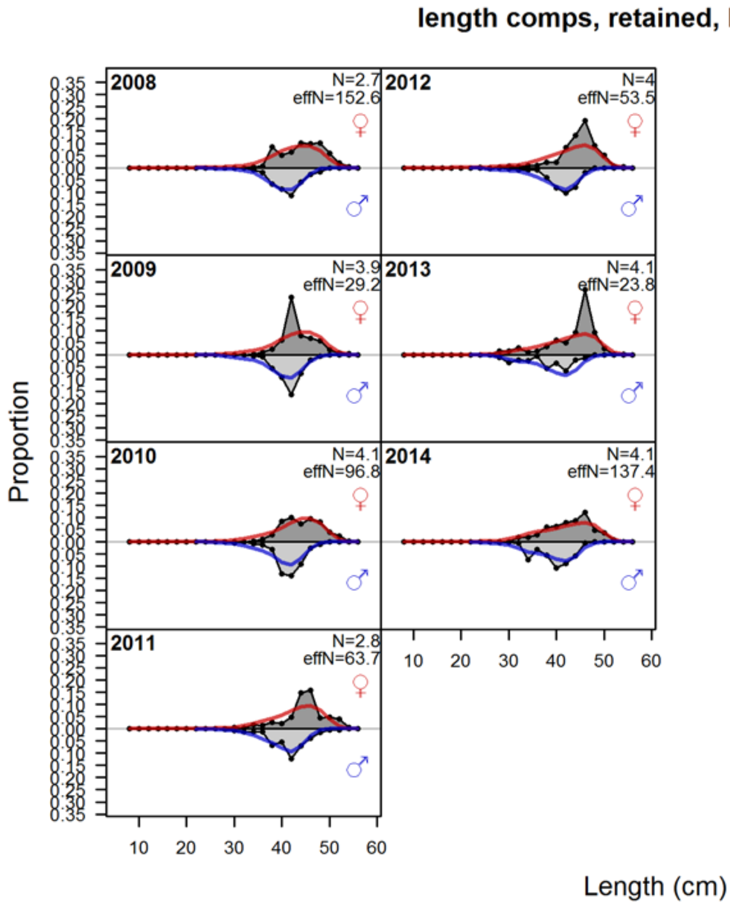


Figure A1: (continued) Fits to the retained length compositions for the bottom trawl fleet.

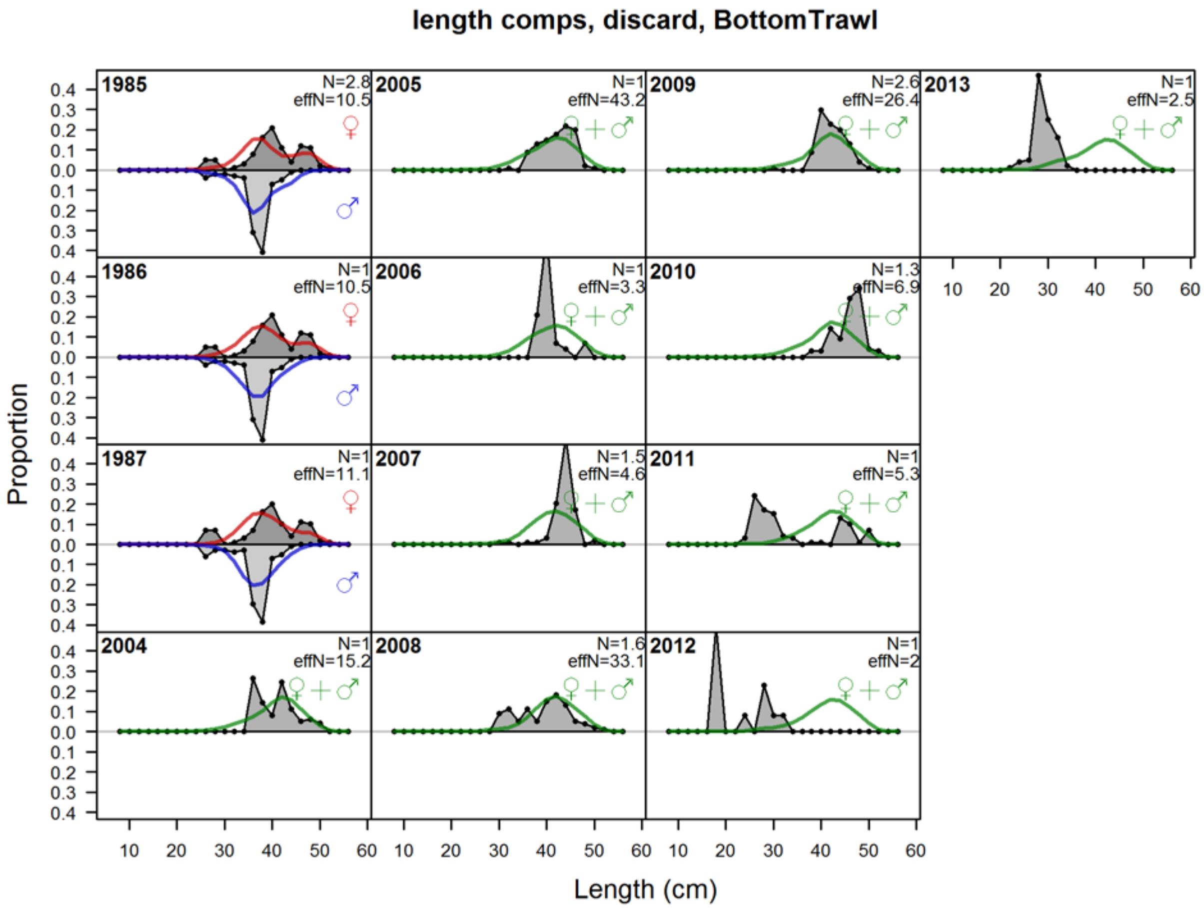


Figure A2: Fits to the discarded length compositions for the bottom trawl fleet.

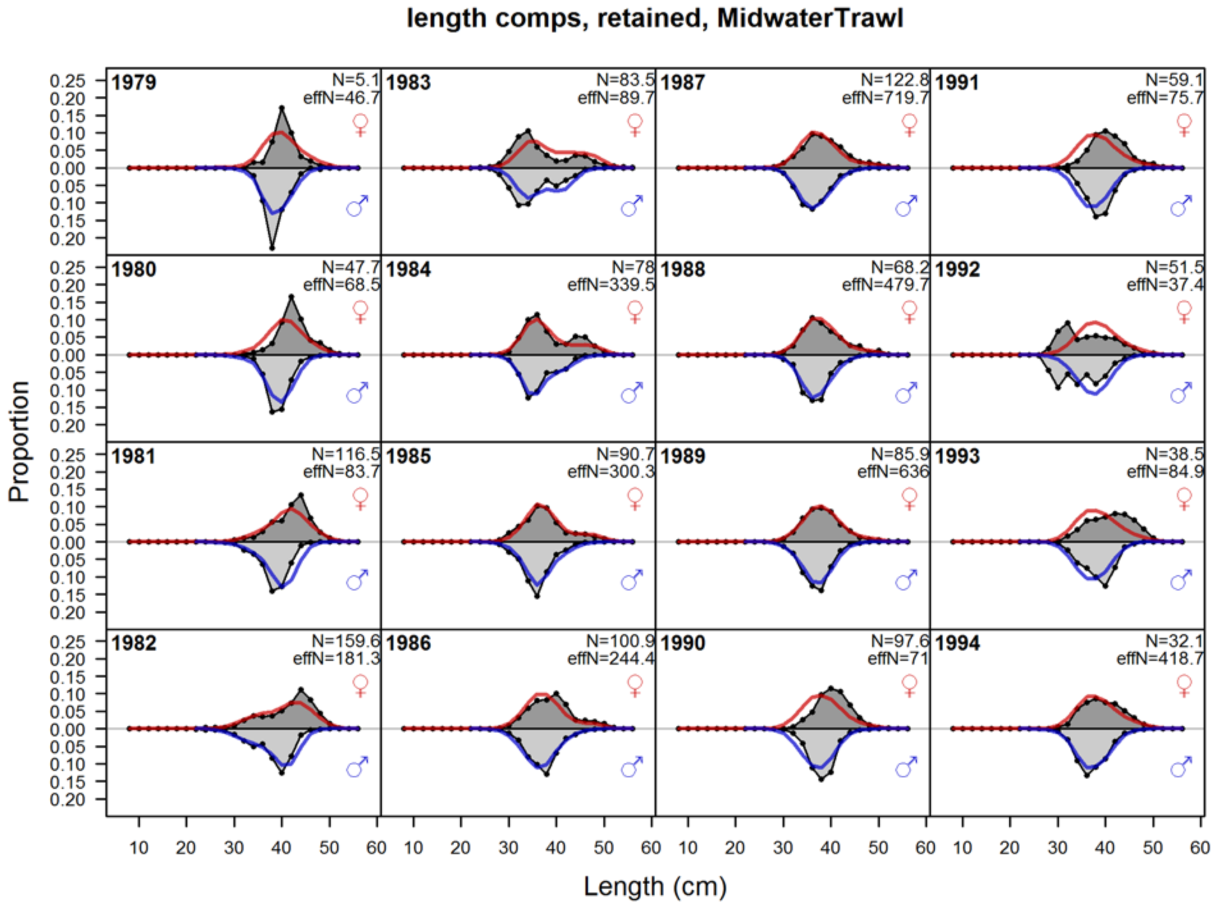


Figure A3: Fits to the retained length compositions for the midwater trawl fleet.

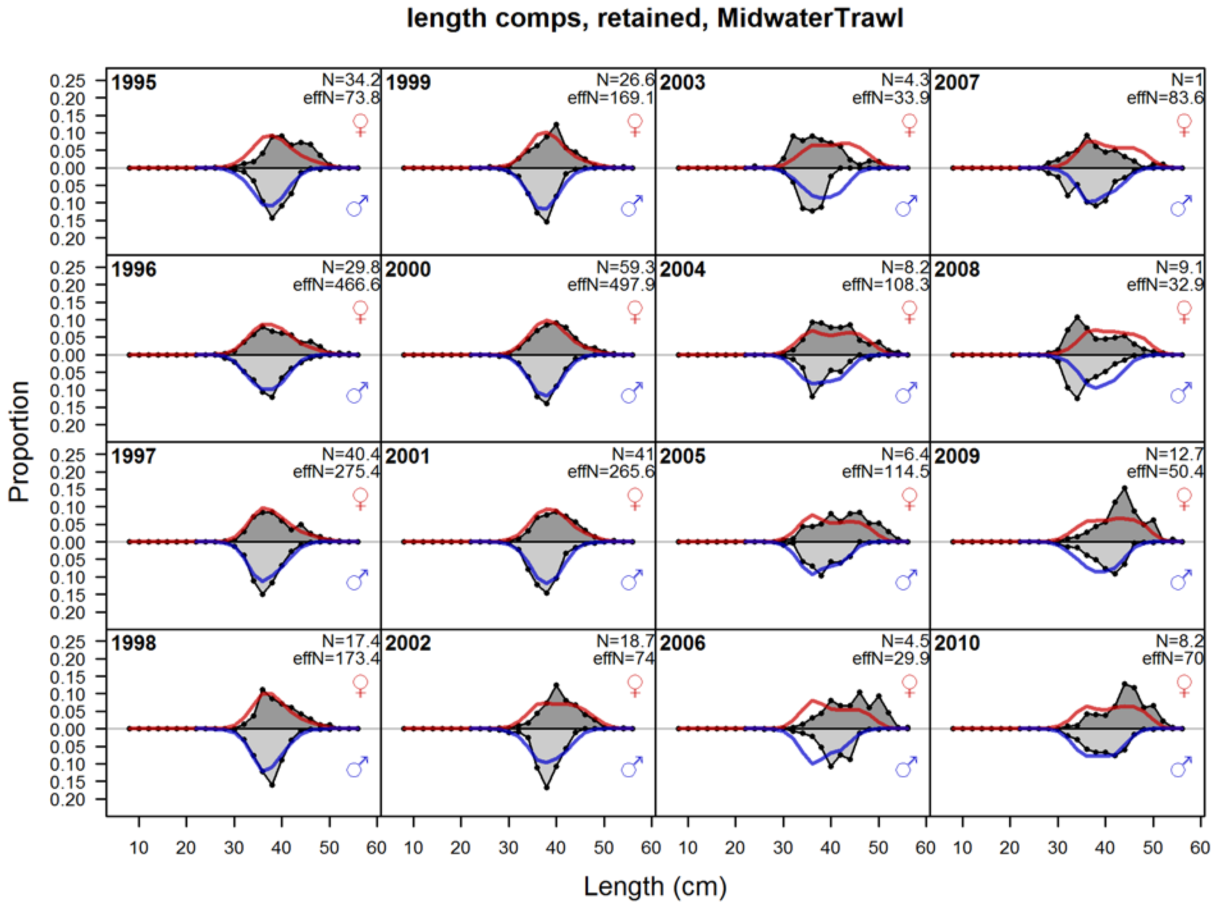


Figure A3: (continued) Fits to the retained length compositions for the midwater trawl fleet.

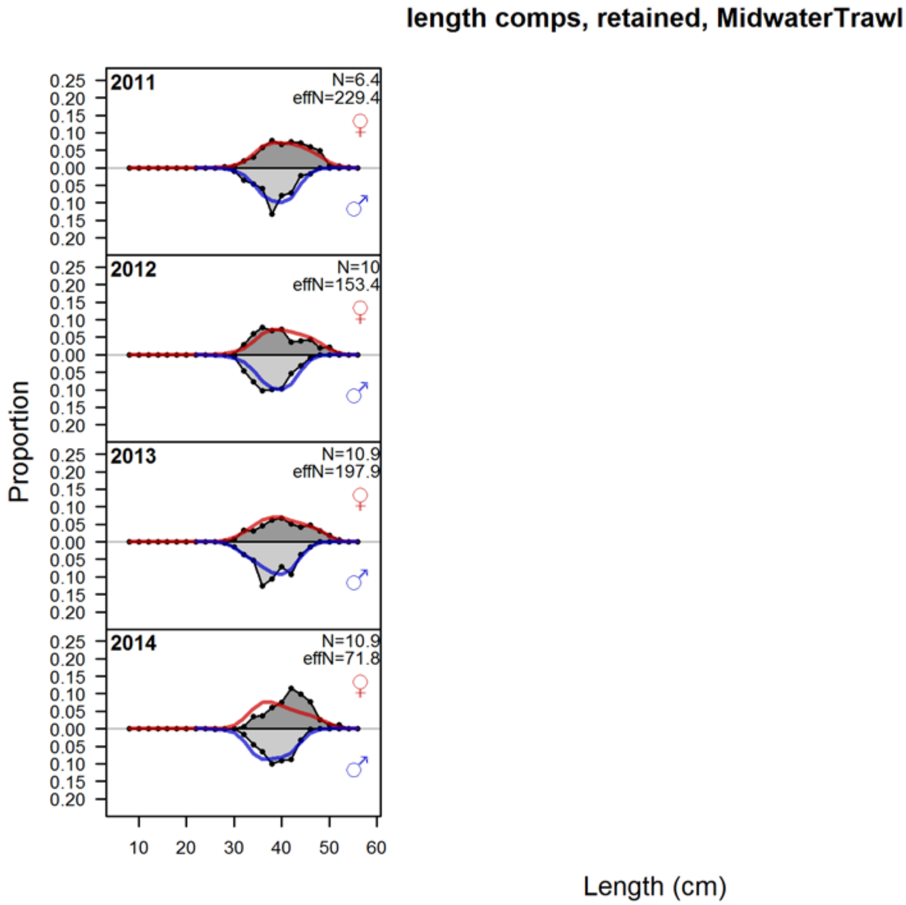


Figure A3: (continued) Fits to the retained length compositions for the midwater trawl fleet.

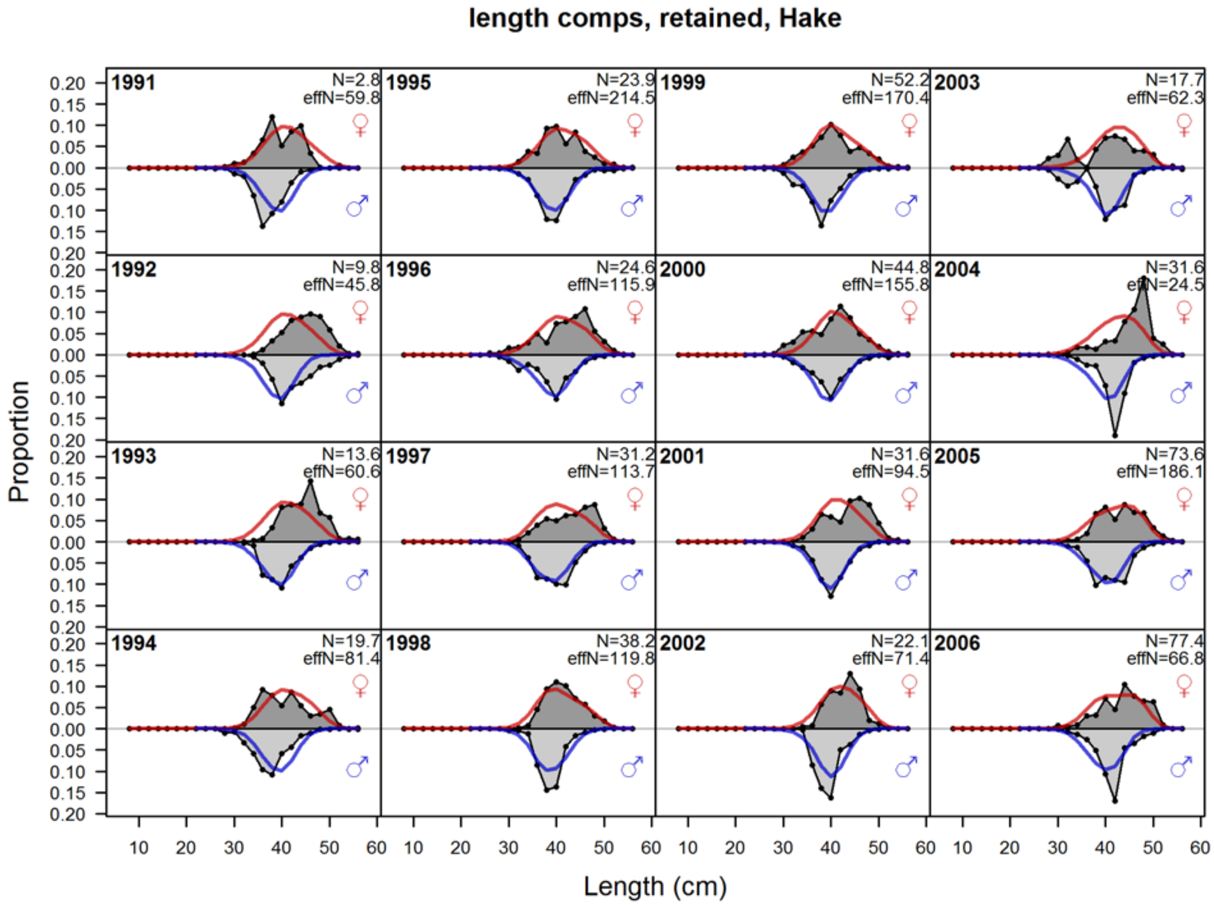


Figure A4: Fits to the retained length compositions for the hake fleet.

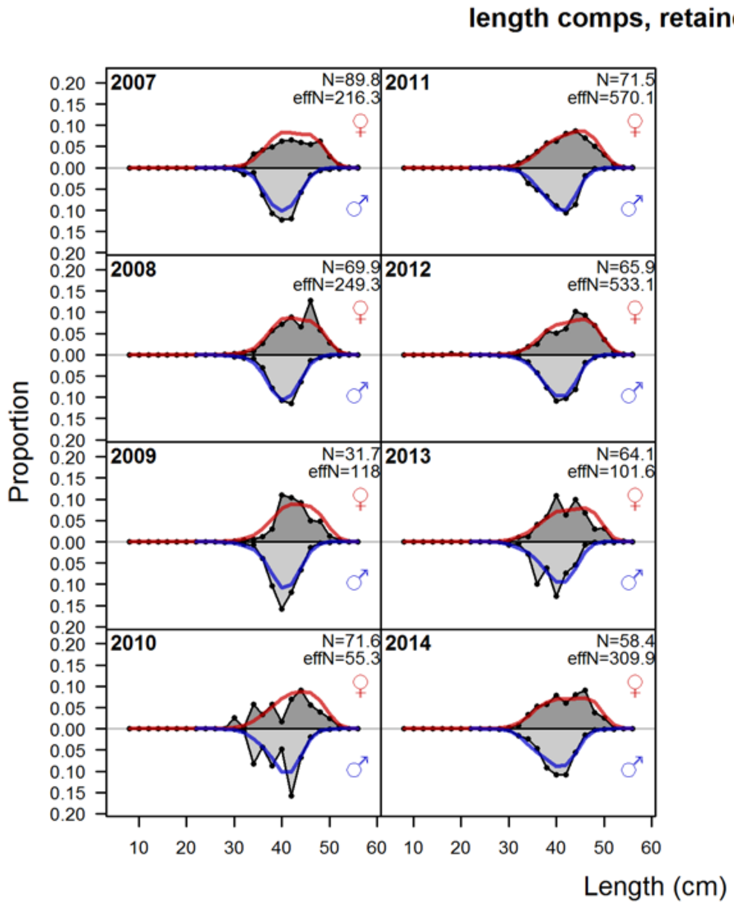


Figure A4: (continued) Fits to the retained length compositions for the hake fleet.

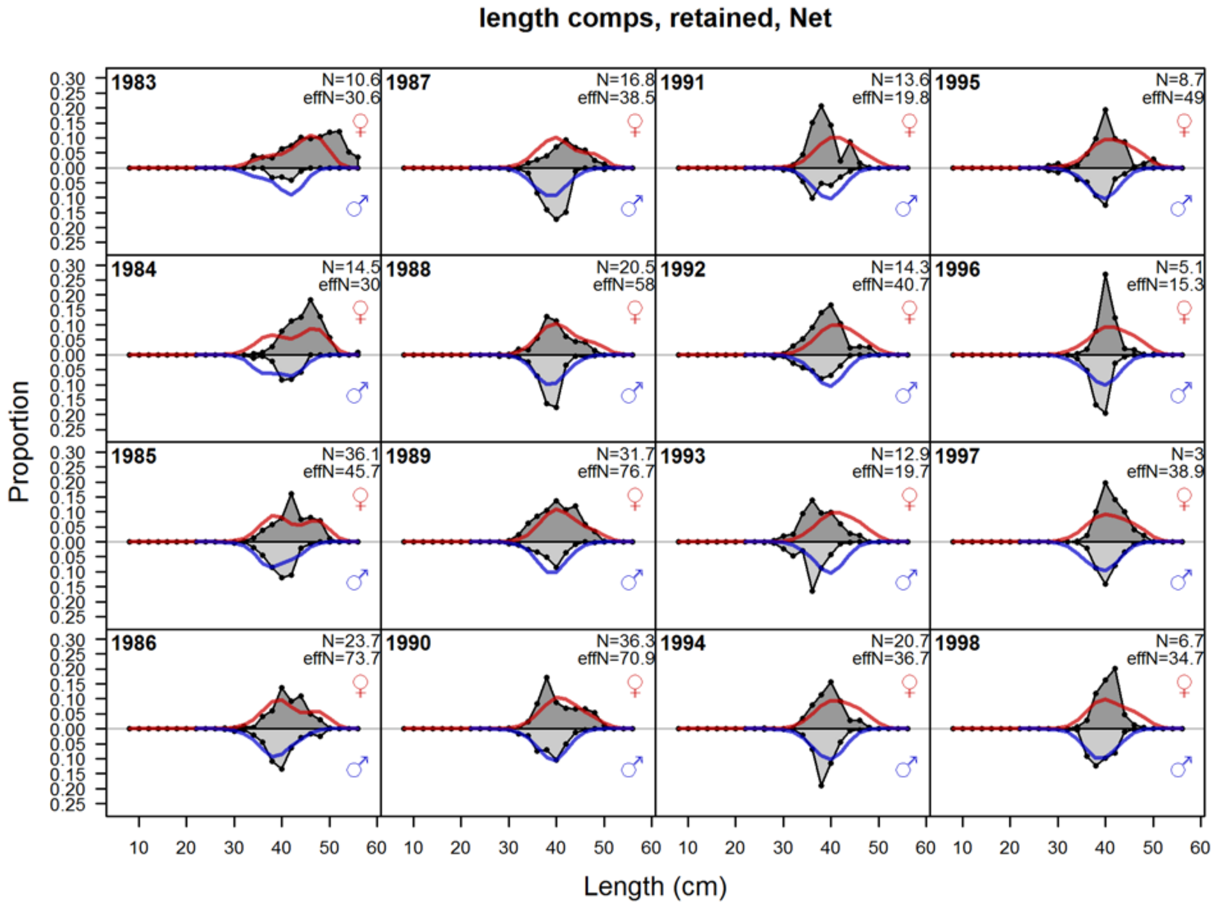


Figure A5: (continued) Fits to the retained length compositions for the net fleet.

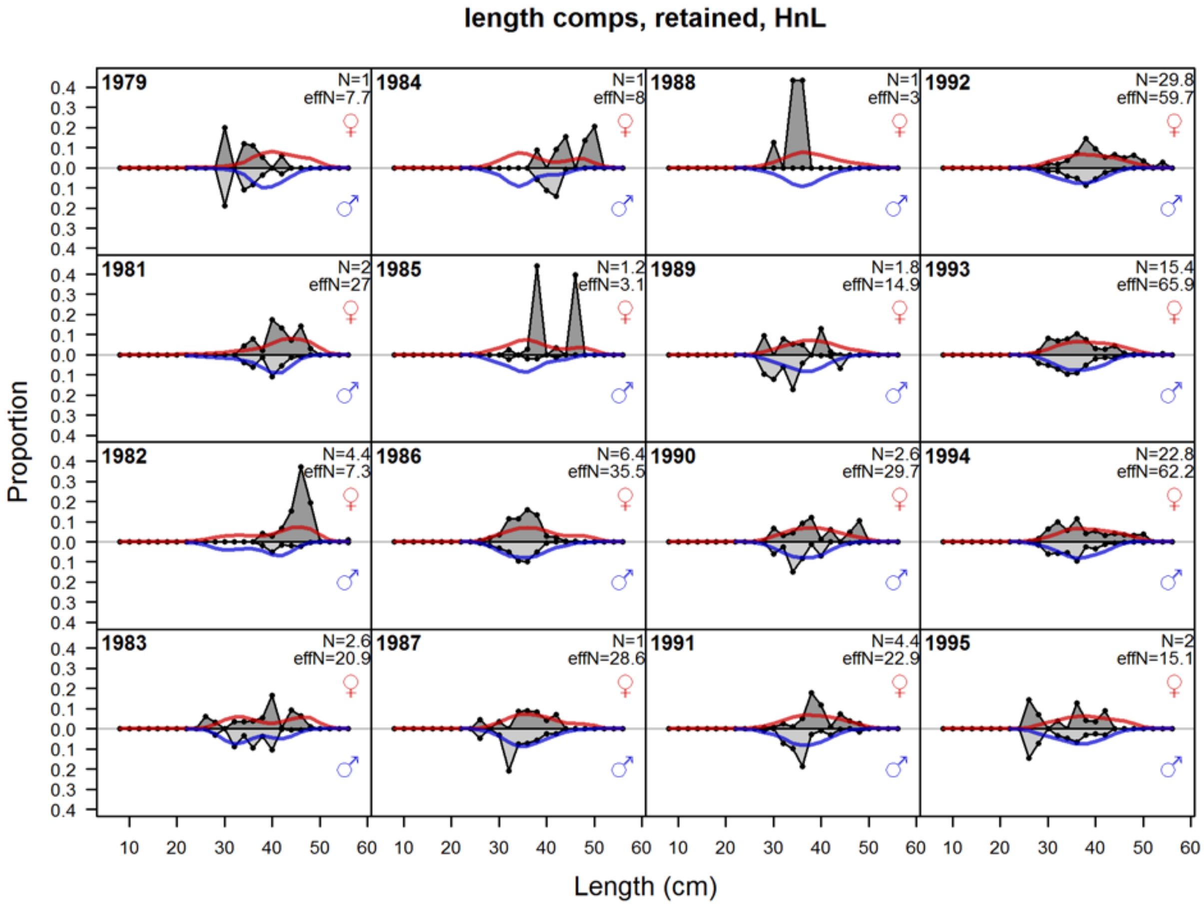


Figure A6: Fits to the retained length compositions for the hook-and-line fleet.

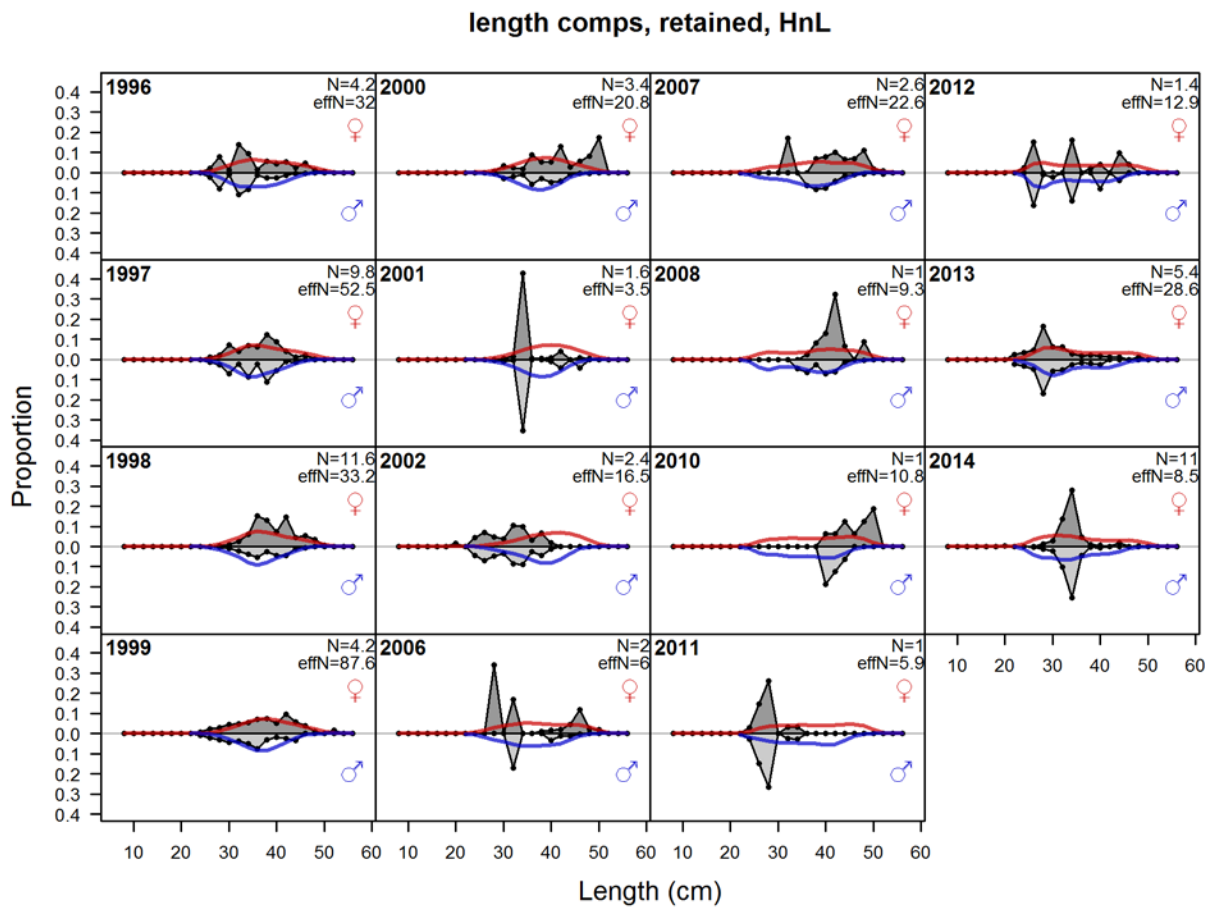


Figure A6: (continued) Fits to the retained length compositions for the hook-and-line fleet.

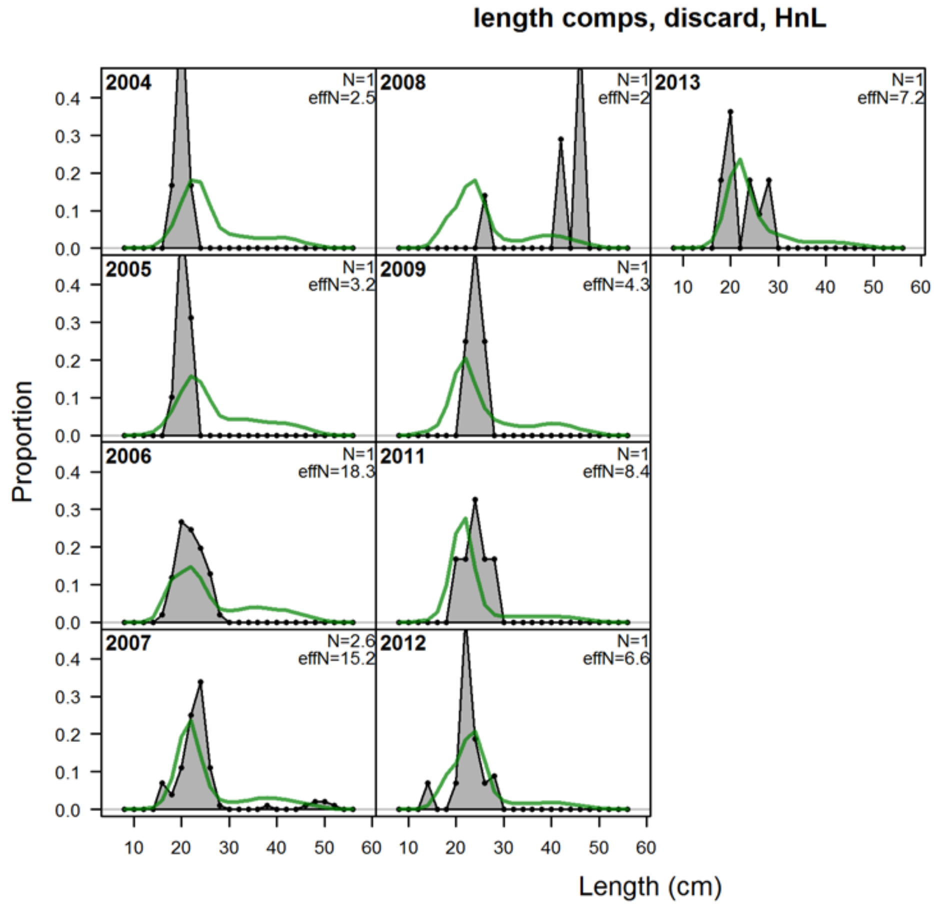


Figure A7: Fits to the discarded length compositions for the hook-and-line fleet.

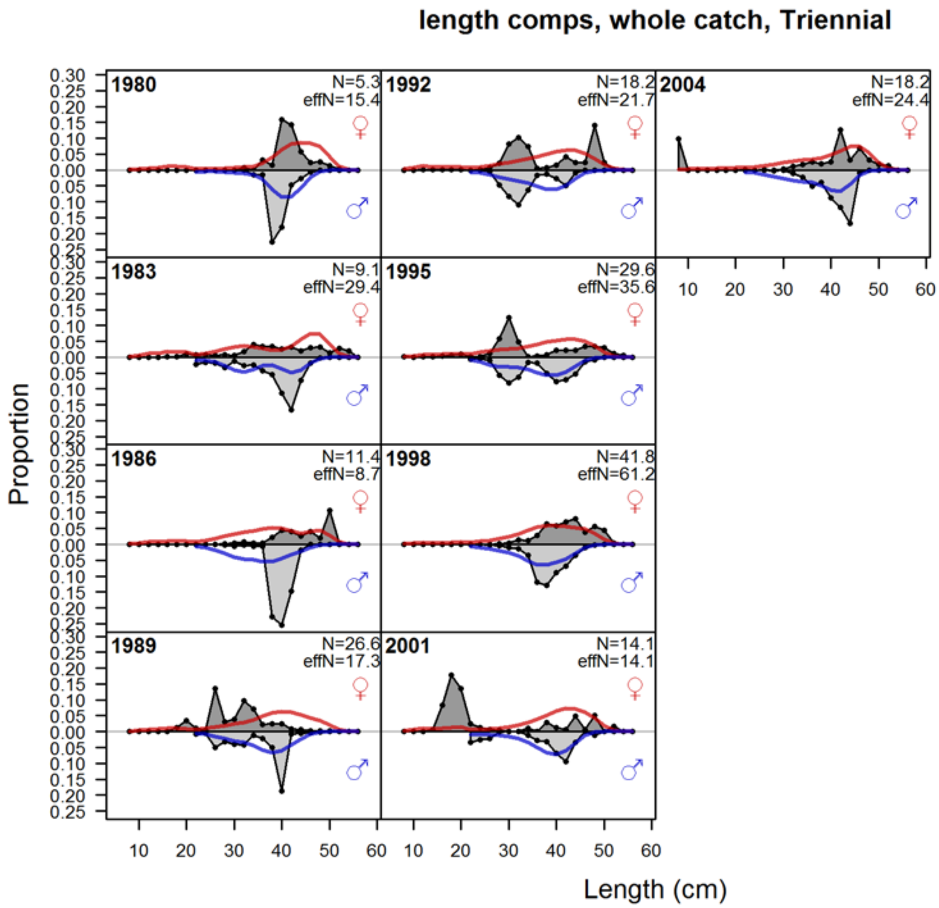


Figure A8: Fits to the length compositions for the triennial survey.

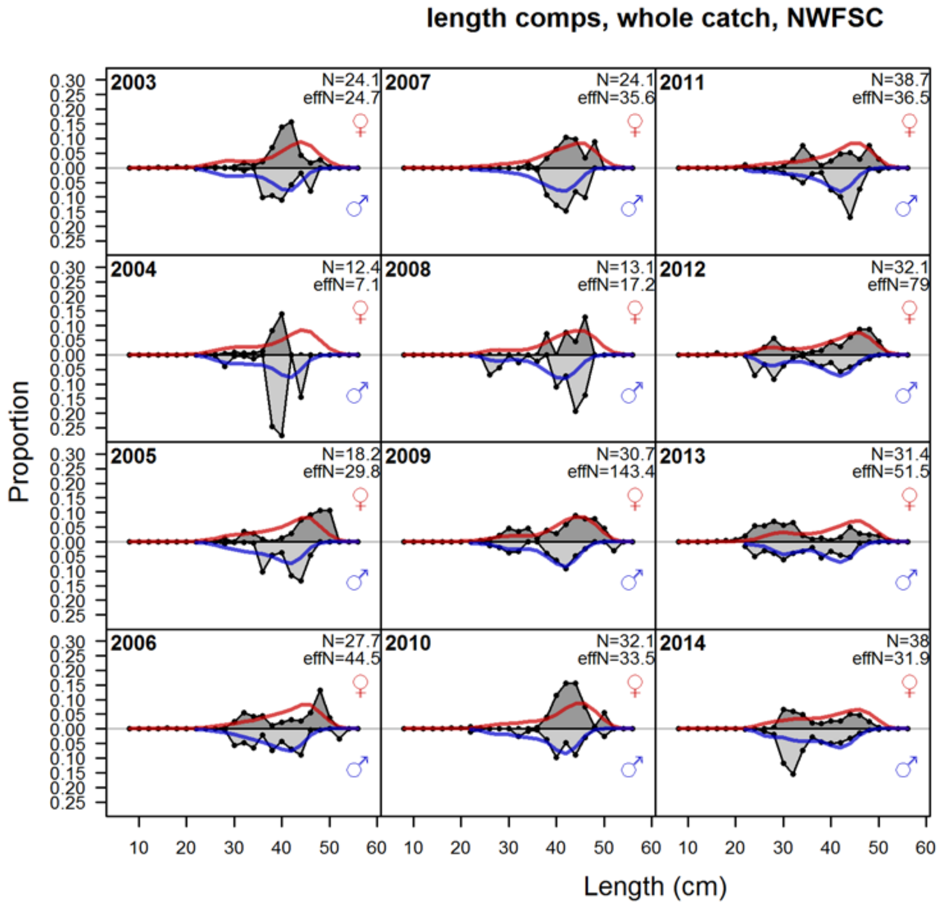


Figure A9: Fits to the length compositions for the NWFSC shelf/slope survey.

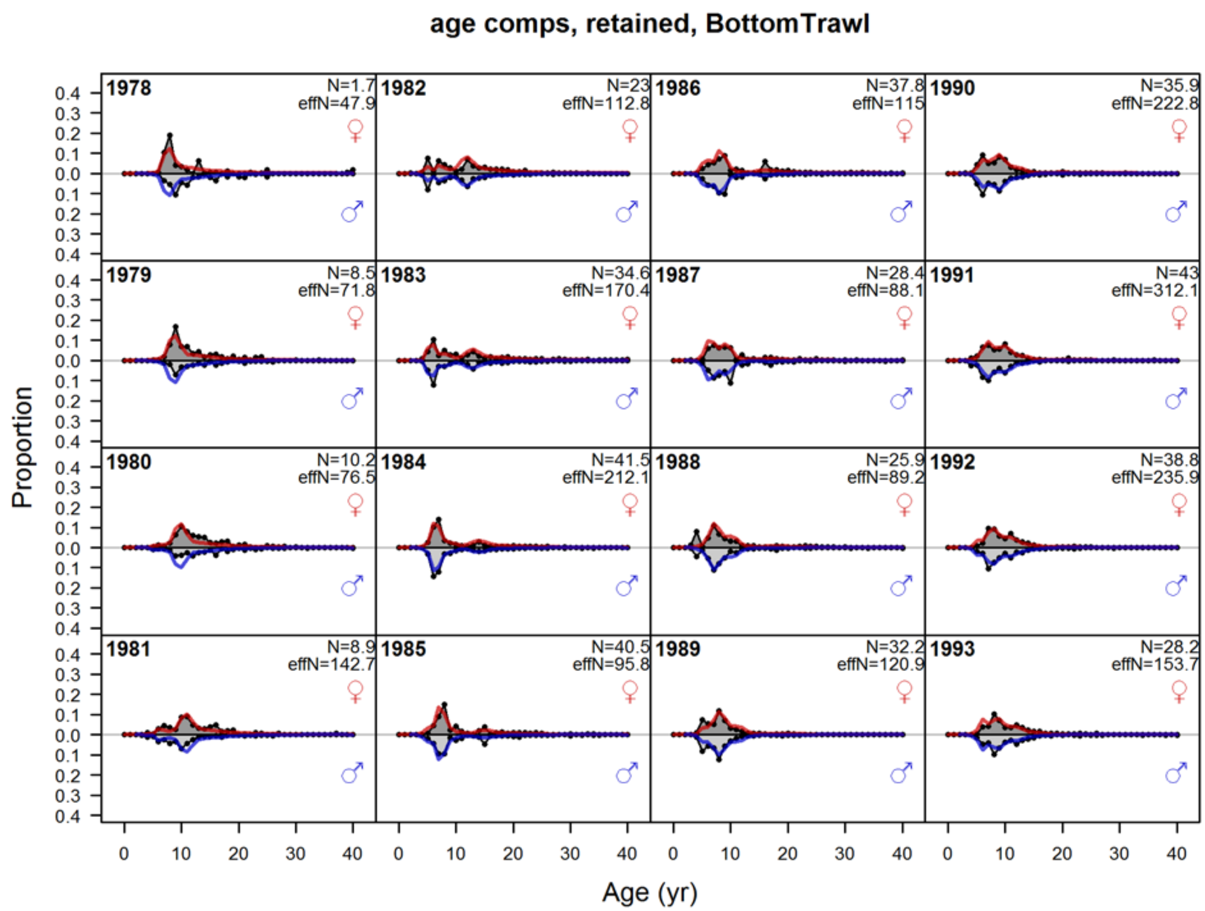


Figure A10: Fits to the retained age compositions for the bottom trawl fleet.

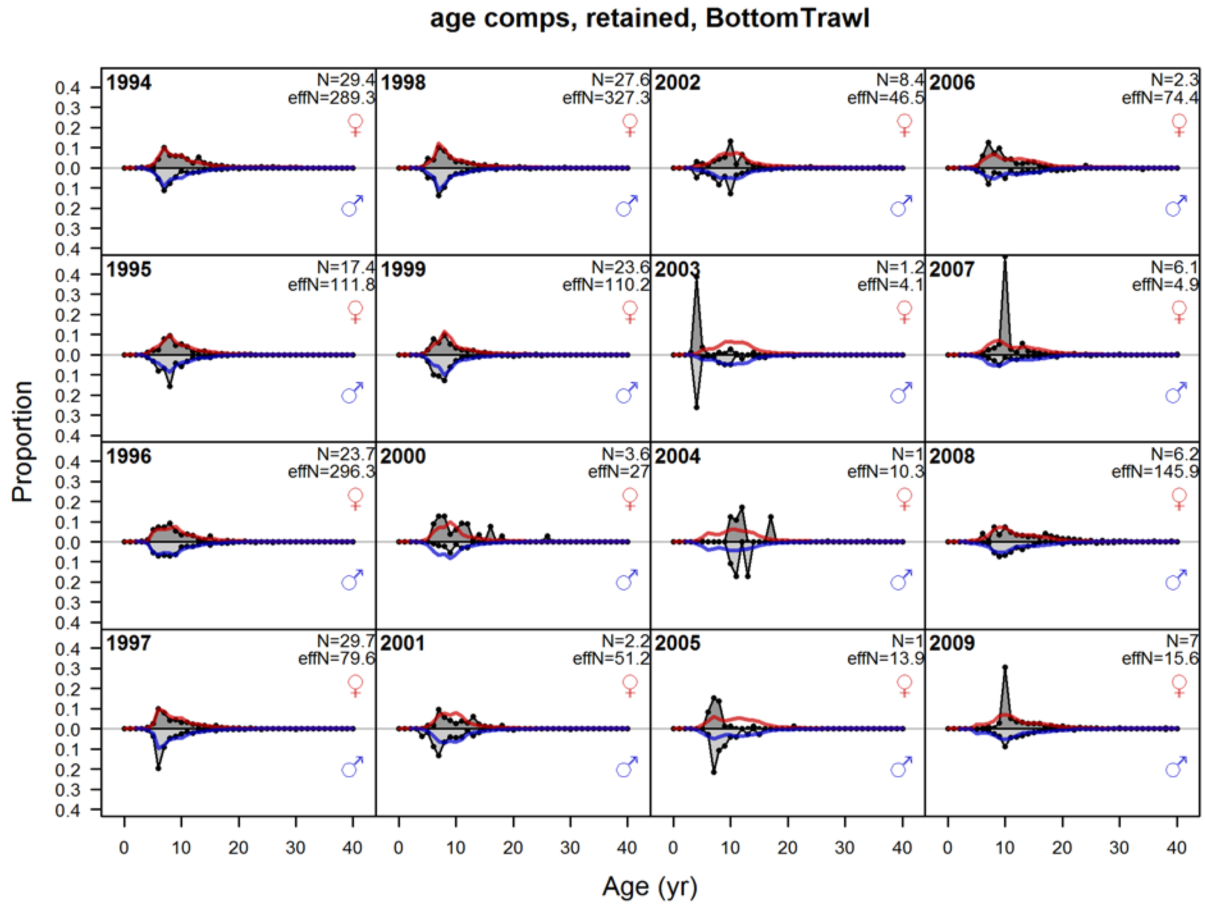


Figure A10: (continued) Fits to the retained age compositions for the bottom trawl fleet.

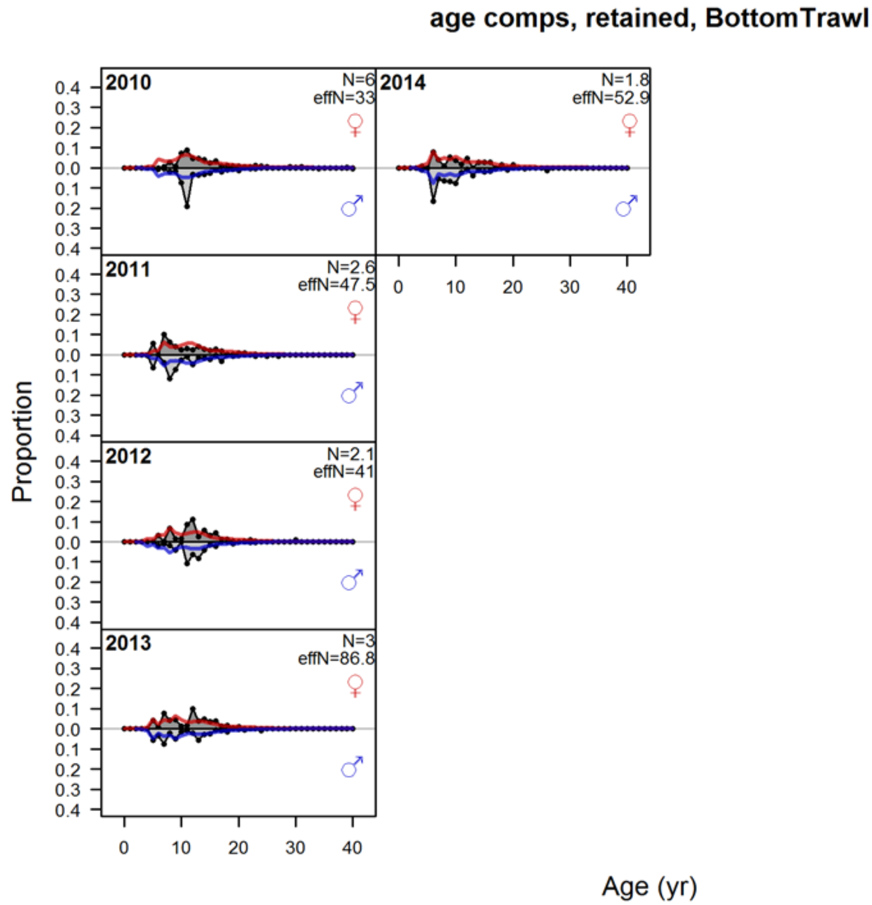


Figure A10: (continued) Fits to the retained age compositions for the bottom trawl fleet.

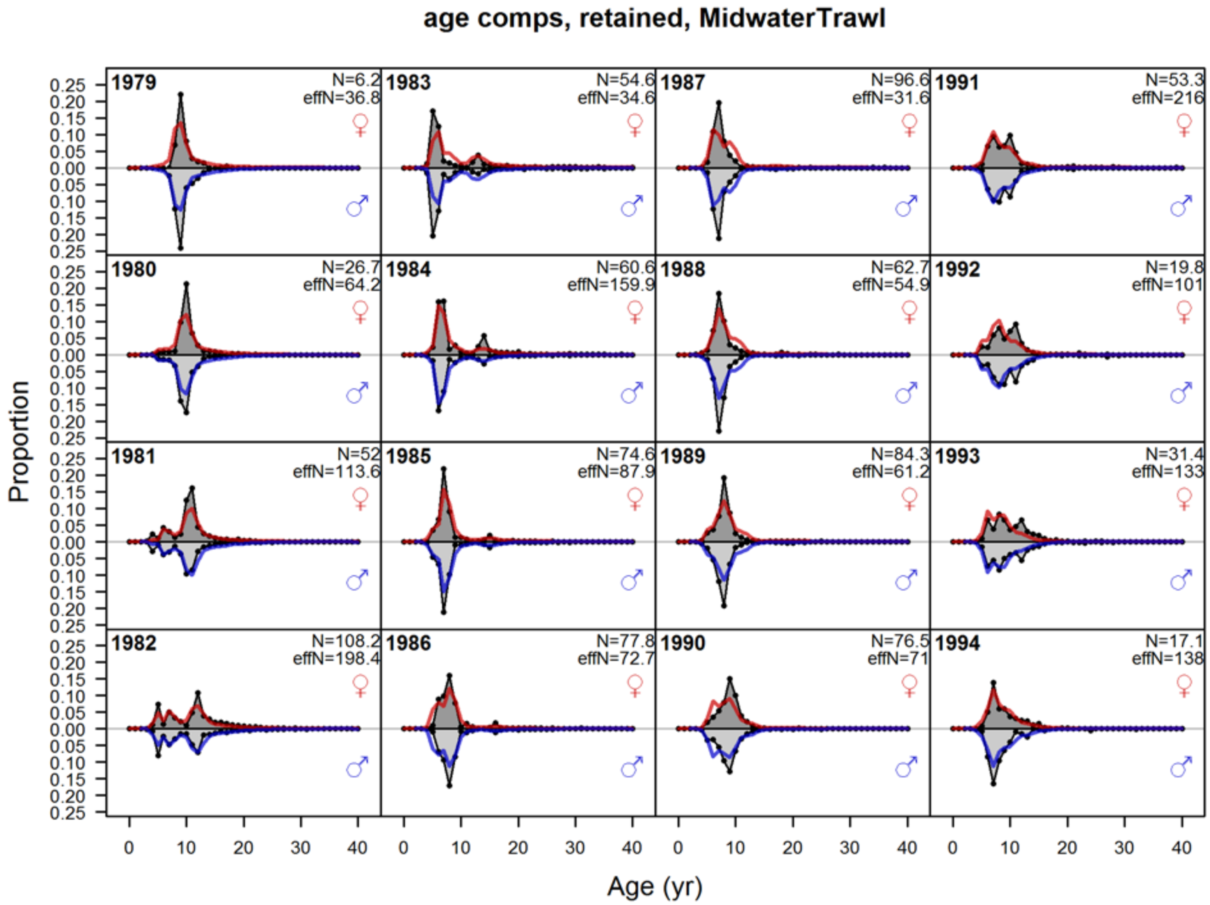


Figure A11: Fits to the retained age compositions for the midwater trawl fleet.

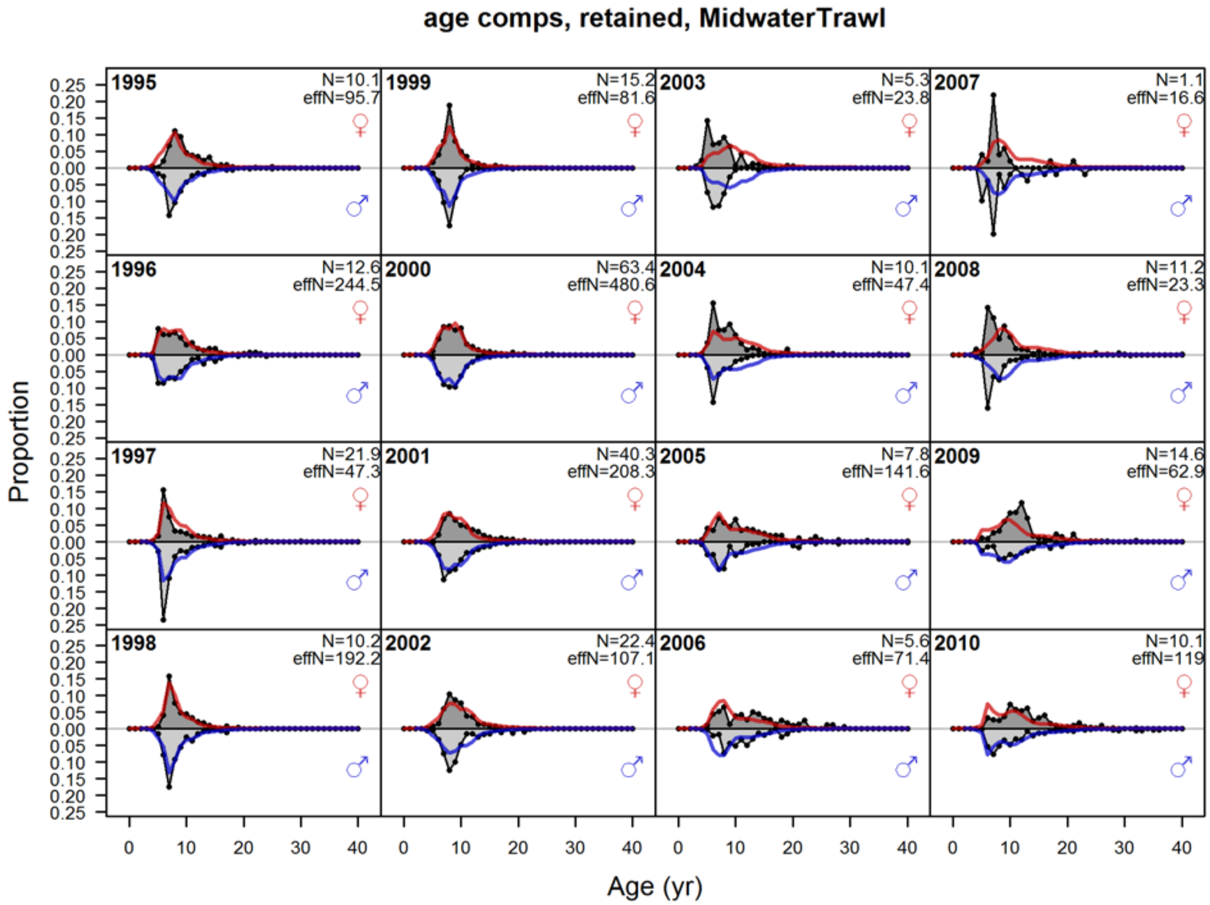


Figure A11: (continued) Fits to the retained age compositions for the midwater trawl fleet.

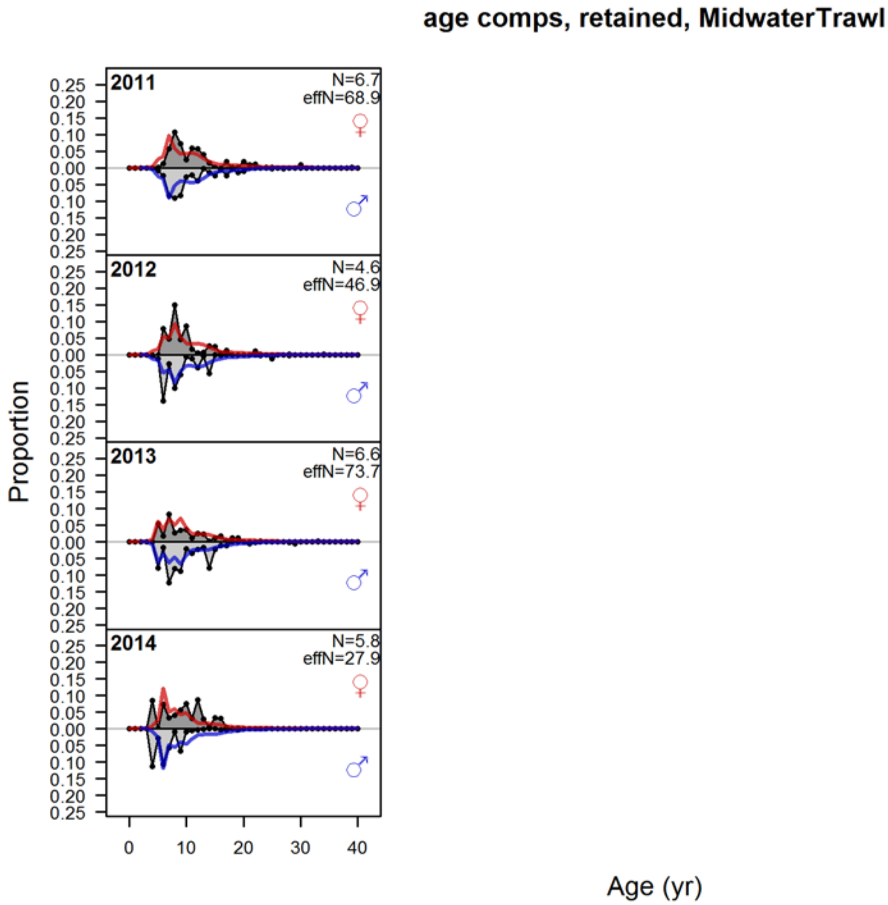


Figure A11: (continued) Fits to the retained age compositions for the midwater trawl fleet.

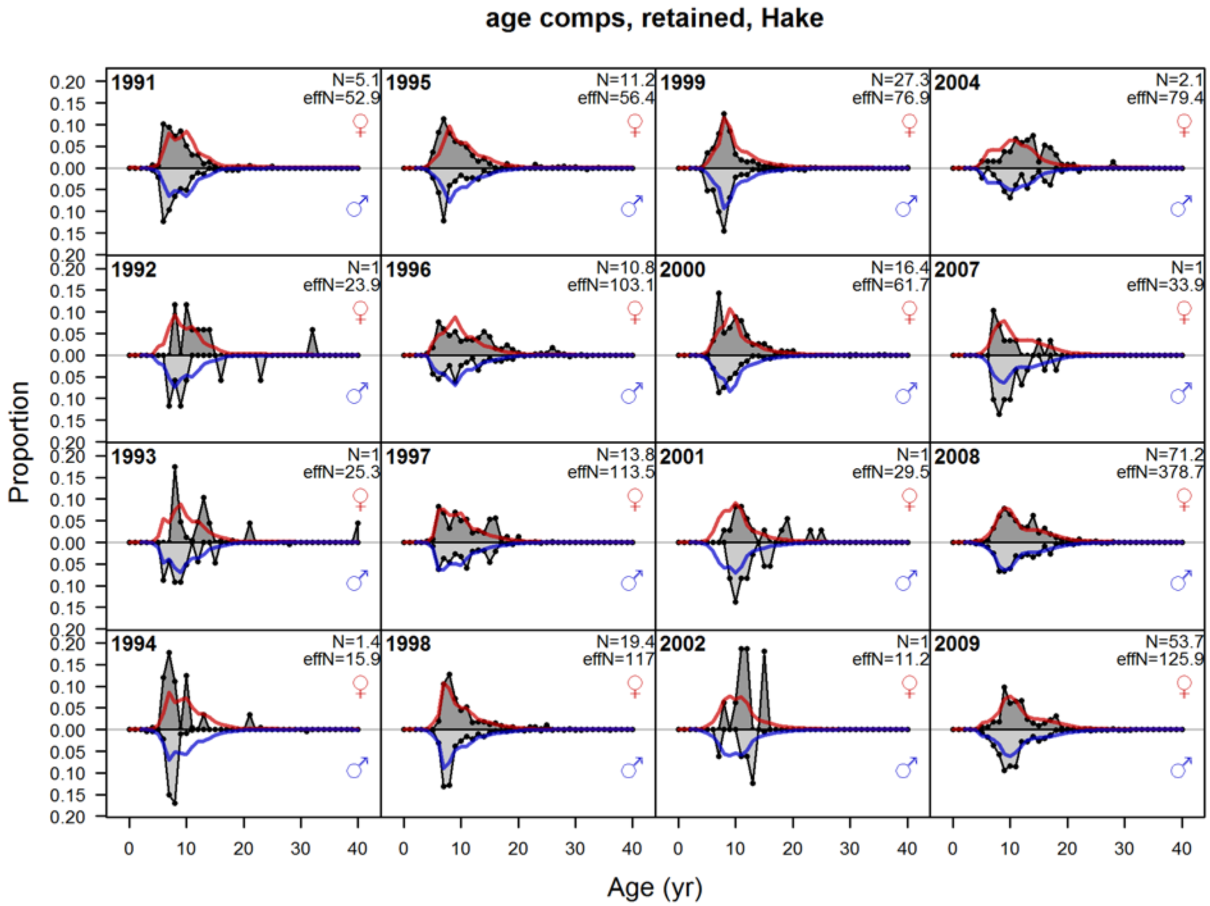


Figure A12: Fits to the retained age compositions for the hake fleet.

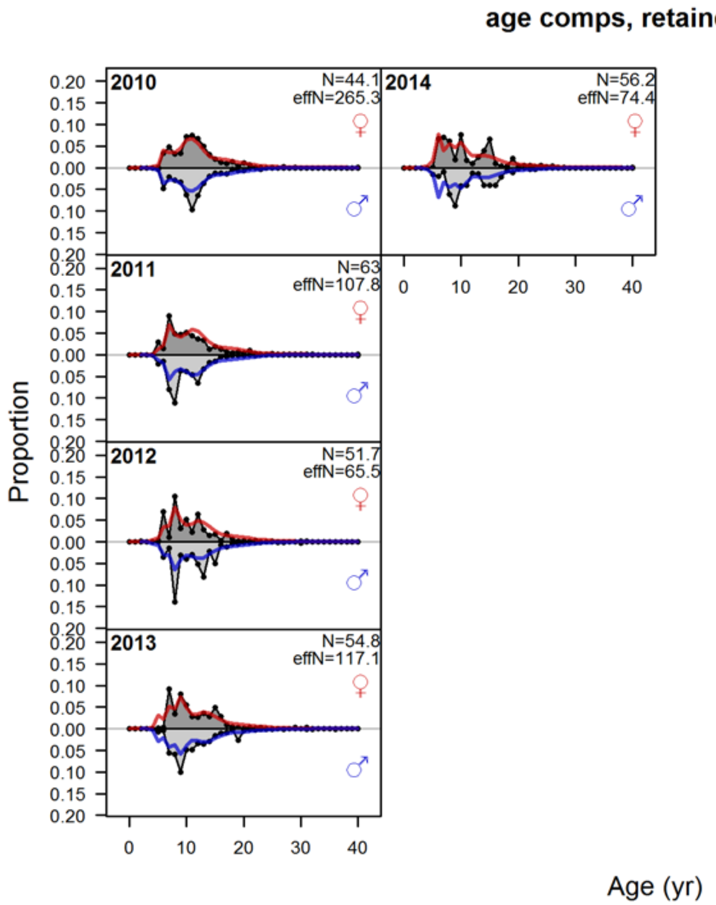


Figure A12: (continued) Fits to the retained age compositions for the hake fleet.

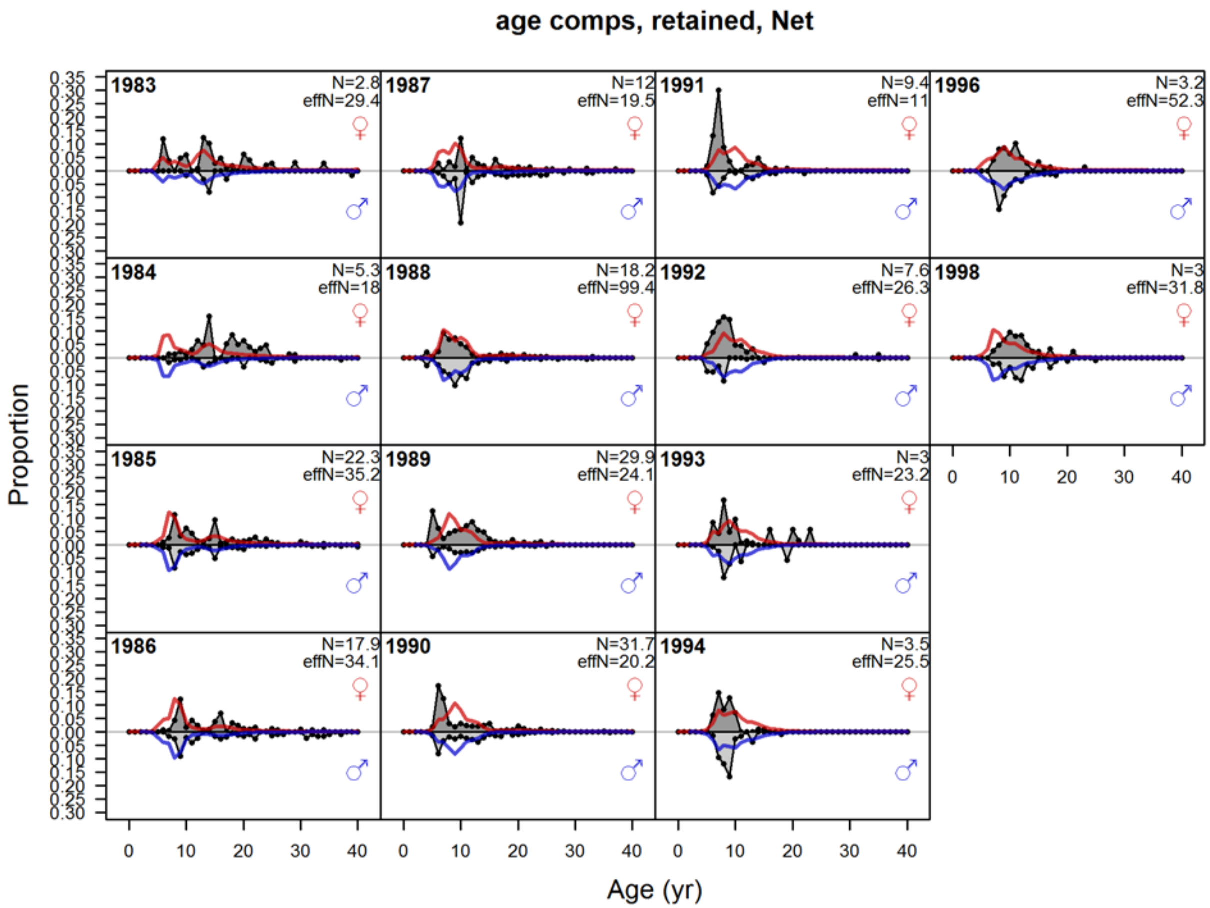


Figure A13: Fits to the retained age compositions for the net fleet.

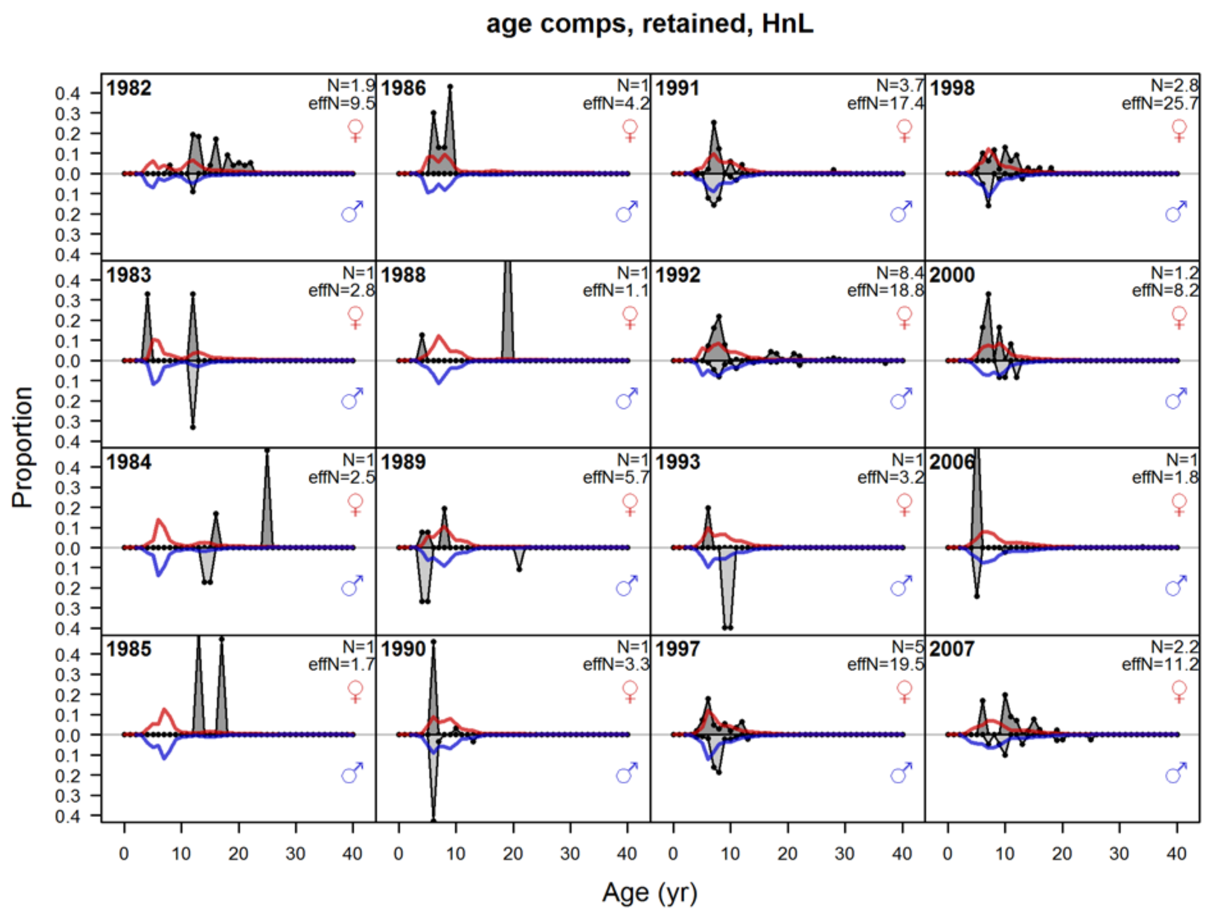


Figure A14: Fits to the retained age compositions for the hook-and-line fleet.

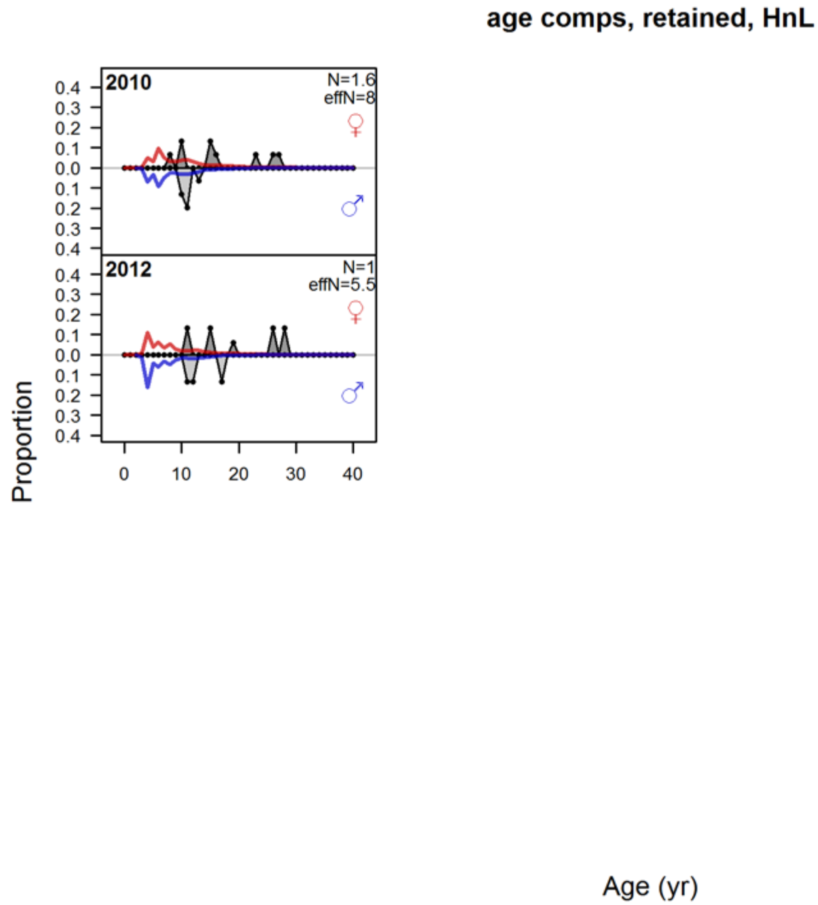


Figure A14: (continued) Fits to the retained age compositions for the hook-and-line fleet.

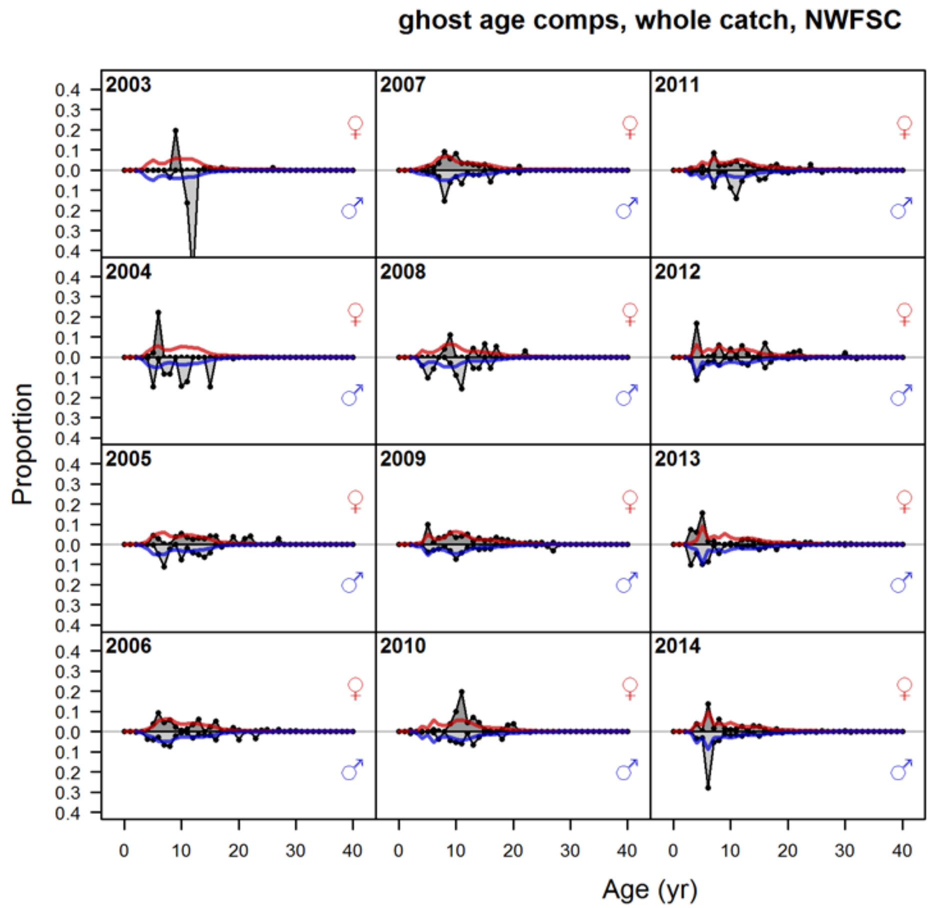


Figure A15: Implied fits to the age compositions for the NWFSC shelf/slope survey.

Appendix B. **Predicted numbers-at-age**

Female numbers-at-age

	Age													
Year	0	1	2	3	4	5	6	7	8	9	10-19	20-29	30-39	40+
1916	27,195	23,244	19,866	16,979	14,511	12,401	10,598	9,057	7,740	6,615	30,795	6,394	1,327	59
1917	27,187	23,238	19,862	16,976	14,508	12,399	10,595	9,053	7,736	6,611	30,776	6,391	1,327	59
1918	27,178	23,231	19,857	16,972	14,506	12,396	10,592	9,048	7,730	6,605	30,746	6,385	1,325	59
1919	27,167	23,224	19,852	16,968	14,503	12,394	10,589	9,045	7,725	6,599	30,713	6,378	1,324	59
1920	27,156	23,215	19,845	16,963	14,500	12,392	10,588	9,045	7,724	6,597	30,691	6,374	1,323	59
1921	27,144	23,205	19,837	16,958	14,495	12,389	10,587	9,044	7,724	6,596	30,671	6,369	1,322	59
1922	27,130	23,195	19,829	16,951	14,490	12,386	10,585	9,043	7,724	6,597	30,658	6,365	1,321	59
1923	27,115	23,183	19,820	16,944	14,485	12,382	10,582	9,042	7,724	6,597	30,650	6,361	1,321	59
1924	27,098	23,170	19,810	16,937	14,479	12,377	10,578	9,039	7,723	6,597	30,643	6,357	1,320	59
1925	27,078	23,155	19,799	16,928	14,472	12,372	10,575	9,037	7,722	6,597	30,644	6,355	1,319	59
1926	27,056	23,139	19,787	16,919	14,465	12,366	10,570	9,034	7,719	6,595	30,642	6,351	1,319	59
1927	27,031	23,120	19,773	16,908	14,457	12,360	10,565	9,029	7,715	6,592	30,633	6,346	1,318	59
1928	27,003	23,098	19,756	16,896	14,448	12,353	10,560	9,025	7,711	6,589	30,627	6,342	1,317	59
1929	26,970	23,074	19,738	16,882	14,438	12,345	10,554	9,020	7,707	6,585	30,617	6,338	1,316	59
1930	26,933	23,046	19,717	16,866	14,426	12,336	10,547	9,015	7,704	6,582	30,606	6,334	1,315	59
1931	26,891	23,015	19,693	16,849	14,412	12,326	10,539	9,008	7,698	6,578	30,589	6,329	1,314	59
1932	26,844	22,979	19,667	16,828	14,397	12,315	10,530	9,002	7,693	6,574	30,574	6,325	1,313	59
1933	26,791	22,939	19,636	16,805	14,380	12,302	10,521	8,994	7,687	6,569	30,557	6,322	1,312	59
1934	26,731	22,893	19,602	16,779	14,360	12,287	10,510	8,987	7,682	6,565	30,542	6,320	1,311	58
1935	26,662	22,842	19,563	16,750	14,338	12,270	10,498	8,978	7,675	6,560	30,525	6,319	1,310	58
1936	26,585	22,783	19,519	16,716	14,313	12,251	10,483	8,967	7,667	6,554	30,505	6,316	1,309	58
1937	26,497	22,717	19,469	16,679	14,284	12,230	10,466	8,954	7,657	6,547	30,481	6,314	1,308	58
1938	26,396	22,642	19,412	16,636	14,252	12,205	10,448	8,940	7,646	6,538	30,456	6,311	1,307	58
1939	26,280	22,555	19,348	16,588	14,216	12,178	10,428	8,925	7,635	6,530	30,432	6,309	1,306	58
1940	26,148	22,456	19,274	16,533	14,175	12,147	10,405	8,908	7,623	6,521	30,407	6,308	1,305	58
1941	25,997	22,344	19,189	16,470	14,128	12,112	10,378	8,887	7,607	6,509	30,369	6,303	1,304	58
1942	25,827	22,215	19,093	16,398	14,074	12,072	10,348	8,864	7,589	6,494	30,323	6,299	1,303	58
1943	25,639	22,069	18,983	16,315	14,012	12,026	10,313	8,838	7,568	6,478	30,269	6,293	1,302	58
1944	25,437	21,909	18,858	16,221	13,941	11,972	10,270	8,799	7,532	6,445	30,128	6,269	1,297	58
1945	25,217	21,736	18,722	16,115	13,861	11,911	10,218	8,748	7,479	6,393	29,873	6,222	1,288	57
1946	24,982	21,548	18,574	15,998	13,770	11,840	10,157	8,684	7,408	6,318	29,462	6,141	1,272	57
1947	24,756	21,348	18,413	15,871	13,670	11,764	10,102	8,645	7,372	6,278	29,173	6,083	1,260	56
1948	24,537	21,154	18,242	15,734	13,562	11,679	10,043	8,613	7,360	6,271	29,025	6,051	1,254	56
1949	24,332	20,967	18,076	15,588	13,445	11,588	9,974	8,567	7,340	6,267	28,938	6,027	1,249	56
1950	24,154	20,792	17,917	15,446	13,320	11,488	9,897	8,511	7,305	6,255	28,890	6,007	1,246	55
1951	24,026	20,640	17,767	15,310	13,199	11,381	9,810	8,444	7,255	6,223	28,831	5,984	1,242	55
1952	23,975	20,531	17,637	15,182	13,083	11,277	9,717	8,367	7,192	6,175	28,727	5,953	1,237	55
1953	24,040	20,487	17,544	15,071	12,973	11,178	9,629	8,288	7,127	6,122	28,605	5,923	1,231	55
1954	24,261	20,543	17,507	14,991	12,878	11,085	9,546	8,215	7,063	6,069	28,479	5,895	1,227	55
1955	24,674	20,731	17,554	14,960	12,810	11,004	9,466	8,144	7,001	6,015	28,337	5,868	1,222	54
1956	25,295	21,085	17,715	15,000	12,783	10,945	9,397	8,076	6,940	5,962	28,170	5,840	1,217	54
1957	26,060	21,615	18,017	15,138	12,818	10,922	9,345	8,012	6,876	5,904	27,953	5,808	1,211	54
1958	26,755	22,269	18,471	15,396	12,935	10,951	9,323	7,963	6,816	5,842	27,682	5,771	1,203	54
1959	27,032	22,863	19,029	15,783	13,156	11,052	9,349	7,946	6,776	5,793	27,414	5,741	1,196	53
1960	26,658	23,099	19,537	16,260	13,487	11,240	9,435	7,969	6,763	5,761	27,154	5,715	1,188	53
1961	25,898	22,780	19,739	16,694	13,895	11,523	9,594	8,038	6,776	5,743	26,877	5,682	1,179	53
1962	25,418	22,130	19,466	16,867	14,265	11,871	9,837	8,178	6,841	5,760	26,666	5,654	1,172	52
1963	25,454	21,720	18,910	16,634	14,413	12,188	10,134	8,383	6,956	5,811	26,492	5,618	1,163	52
1964	26,137	21,751	18,560	16,159	14,214	12,315	10,408	8,646	7,144	5,924	26,475	5,593	1,158	52
1965	27,097	22,334	18,587	15,860	13,808	12,144	10,514	8,875	7,361	6,077	26,527	5,557	1,151	52
1966	28,435	23,155	19,085	15,882	13,552	11,798	10,373	8,976	7,572	6,278	26,792	5,534	1,147	51
1967	28,621	24,298	19,786	16,308	13,572	11,576	10,051	8,775	7,519	6,285	26,202	5,296	1,100	49
1968	27,281	24,457	20,763	16,907	13,935	11,592	9,855	8,486	7,326	6,213	25,614	5,035	1,050	47
1969	23,527	23,312	20,899	17,742	14,447	11,905	9,886	8,371	7,167	6,155	25,694	4,899	1,026	46
1970	91,783	20,104	19,921	17,858	15,161	12,344	10,163	8,425	7,119	6,085	26,123	4,841	1,019	45
1971	82,674	78,430	17,179	17,022	15,260	12,954	10,540	8,664	7,168	6,046	26,432	4,787	1,012	45

						Age							
Year	0	1	2	3	4	5	6	7	8	9	10-19	20-29	30-39	40+
1972	10,066	70,646	67,020	14,680	14,546	13,038	11,058	8,979	7,362	6,077	26,606	4,728	1,002	44
1973	8,257	8,602	60,368	57,269	12,544	12,428	11,130	9,423	7,635	6,249	26,829	4,688	994	44
1974	10,830	7,055	7,350	51,585	48,937	10,717	10,608	9,480	8,004	6,471	27,101	4,653	983	44
1975	21,152	9,254	6,029	6,281	44,080	41,811	9,149	9,040	8,063	6,796	27,575	4,649	974	43
1976	6,965	18,075	7,908	5,152	5,367	37,662	35,697	7,799	7,691	6,849	28,246	4,674	964	43
1977	38,788	5,952	15,445	6,757	4,402	4,585	32,146	30,403	6,624	6,518	28,742	4,711	951	43
1978	63,060	33,145	5,086	13,198	5,774	3,761	3,914	27,388	25,851	5,625	28,941	4,791	941	42
1979	19,429	53,886	28,323	4,346	11,278	4,933	3,209	3,331	23,243	21,897	28,251	4,870	928	42
1980	35,512	16,602	46,046	24,202	3,713	9,620	4,166	2,656	2,702	18,627	39,431	4,802	891	41
1981	58,280	30,345	14,186	39,346	20,678	3,158	7,962	3,260	1,960	1,924	41,191	4,449	812	37
1982	31,265	49,801	25,929	12,122	33,614	17,531	2,556	5,837	2,145	1,207	27,527	3,918	710	32
1983	19,353	26,716	42,553	22,156	10,355	28,428	13,946	1,781	3,499	1,168	16,955	3,246	590	27
1984	35,539	16,537	22,829	36,361	18,930	8,809	23,508	10,857	1,299	2,448	12,314	2,753	497	22
1985	26,496	30,368	14,131	19,507	31,068	16,103	7,271	18,177	7,834	901	10,219	2,419	435	19
1986	13,629	22,641	25,949	12,075	16,667	26,446	13,362	5,709	13,466	5,612	7,845	2,170	391	17
1987	34,275	11,646	19,347	22,174	10,317	14,188	21,957	10,516	4,245	9,681	9,472	1,909	350	15
1988	20,056	29,289	9,951	16,531	18,945	8,773	11,678	16,840	7,478	2,888	12,944	1,600	306	13
1989	15,796	17,138	25,027	8,503	14,125	16,122	7,268	9,138	12,405	5,318	11,213	1,329	275	11
1990	24,269	13,498	14,644	21,385	7,265	12,009	13,258	5,561	6,474	8,405	10,860	1,479	239	10
1991	41,792	20,738	11,534	12,513	18,271	6,177	9,894	10,213	3,981	4,421	12,725	1,376	200	8
1992	16,565	35,712	17,721	9,855	10,692	15,558	5,150	7,889	7,756	2,927	12,453	1,020	174	7
1993	20,739	14,155	30,516	15,142	8,421	9,103	12,970	4,110	6,004	5,718	11,189	748	151	6
1994	19,411	17,721	12,095	26,075	12,937	7,161	7,522	10,086	2,990	4,179	11,606	531	125	5
1995	13,211	16,587	15,143	10,335	22,279	11,012	5,951	5,944	7,542	2,156	11,242	430	108	4
1996	9,584	11,289	14,174	12,939	8,831	18,958	9,130	4,669	4,390	5,355	9,440	314	91	4
1997	13,116	8,190	9,646	12,111	11,056	7,517	15,768	7,227	3,499	3,170	10,446	351	78	3
1998	24,318	11,208	6,998	8,243	10,348	9,409	6,239	12,407	5,367	2,504	9,482	473	65	3
1999	22,604	20,780	9,577	5,980	7,043	8,816	7,879	5,038	9,627	4,051	8,860	419	54	3
2000	23,407	19,316	17,757	8,184	5,109	6,002	7,389	6,377	3,930	7,339	9,715	441	64	2
2001	12,865	20,002	16,505	15,173	6,993	4,356	5,039	6,005	5,015	3,040	13,134	601	68	2
2002	11,134	10,993	17,092	14,104	12,965	5,969	3,691	4,202	4,929	4,083	13,104	665	57	2
2003	12,502	9,514	9,394	14,605	12,052	11,077	5,094	3,141	3,567	4,177	14,422	688	48	2
2004	33,159	10,684	8,130	8,027	12,480	10,298	9,465	4,351	2,683	3,046	15,595	868	42	2
2005	8,182	28,335	9,129	6,947	6,859	10,664	8,798	8,083	3,714	2,289	15,646	988	39	2
2006	26,851	6,992	24,213	7,801	5,936	5,861	9,110	7,510	6,893	3,165	15,118	992	34	2
2007	11,235	22,945	5,975	20,690	6,666	5,072	5,007	7,777	6,406	5,875	15,109	1,283	45	2
2008	78,610	9,600	19,606	5,106	17,680	5,696	4,333	4,274	6,633	5,459	17,544	1,375	71	1
2009	16,357	67,173	8,204	16,754	4,363	15,106	4,865	3,698	3,644	5,650	19,278	1,455	71	5
2010	60,311	13,977	57,400	7,010	14,316	3,728	12,905	4,154	3,155	3,107	20,701	1,756	82	4
2011	11,480	51,536	11,944	49,049	5,990	12,233	3,185	11,018	3,544	2,691	19,203	2,535	117	0
2012	21,722	9,810	44,039	10,206	41,913	5,118	10,450	2,719	9,400	3,021	18,157	2,622	133	0
2013	38,174	18,562	8,383	37,632	8,721	35,814	4,372	8,921	2,319	8,009	17,334	2,902	138	1
2014	33,054	32,621	15,861	7,163	32,156	7,451	30,581	3,728	7,593	1,971	20,816	3,125	174	1

Male numbers-at-age

	Age													
Year	0	1	2	3	4	5	6	7	8	9	10-19	20-29	30-39	40+
1916	27,195	22,938	19,347	16,318	13,763	11,607	9,790	8,256	6,963	5,872	25,859	4,704	855	35
1917	27,187	22,933	19,344	16,315	13,760	11,605	9,786	8,252	6,959	5,869	25,842	4,701	855	35
1918	27,178	22,926	19,339	16,312	13,758	11,602	9,783	8,247	6,953	5,863	25,818	4,697	854	35
1919	27,167	22,918	19,333	16,308	13,755	11,600	9,780	8,244	6,949	5,858	25,790	4,692	853	35
1920	27,156	22,910	19,327	16,303	13,752	11,598	9,779	8,243	6,948	5,856	25,771	4,689	853	35
1921	27,144	22,900	19,319	16,298	13,748	11,596	9,778	8,243	6,947	5,855	25,754	4,685	852	35
1922	27,130	22,890	19,311	16,292	13,744	11,593	9,776	8,242	6,947	5,855	25,742	4,682	852	35
1923	27,115	22,878	19,303	16,285	13,738	11,589	9,774	8,241	6,947	5,856	25,735	4,680	851	35
1924	27,098	22,866	19,293	16,278	13,733	11,584	9,770	8,239	6,946	5,855	25,729	4,677	851	35
1925	27,078	22,851	19,282	16,270	13,726	11,580	9,767	8,237	6,945	5,855	25,730	4,675	850	35
1926	27,056	22,835	19,270	16,260	13,720	11,575	9,763	8,234	6,943	5,854	25,728	4,672	850	35
1927	27,031	22,816	19,256	16,250	13,712	11,568	9,758	8,229	6,939	5,851	25,721	4,669	849	35
1928	27,003	22,795	19,241	16,238	13,703	11,562	9,753	8,226	6,936	5,849	25,715	4,666	849	35
1929	26,970	22,771	19,223	16,225	13,693	11,555	9,748	8,221	6,933	5,846	25,707	4,663	848	35
1930	26,933	22,743	19,202	16,210	13,682	11,546	9,742	8,217	6,929	5,843	25,698	4,659	848	35
1931	26,891	22,712	19,179	16,193	13,669	11,537	9,734	8,210	6,924	5,839	25,683	4,656	847	35
1932	26,844	22,677	19,153	16,173	13,655	11,526	9,726	8,204	6,919	5,835	25,671	4,653	846	35
1933	26,791	22,637	19,123	16,151	13,639	11,514	9,717	8,198	6,914	5,831	25,657	4,651	846	35
1934	26,731	22,592	19,090	16,126	13,620	11,500	9,708	8,191	6,910	5,827	25,644	4,649	845	35
1935	26,662	22,542	19,052	16,098	13,599	11,485	9,696	8,183	6,904	5,823	25,630	4,648	844	35
1936	26,585	22,484	19,009	16,066	13,575	11,467	9,682	8,173	6,896	5,818	25,613	4,646	844	35
1937	26,497	22,419	18,960	16,030	13,548	11,446	9,667	8,161	6,887	5,811	25,592	4,644	843	35
1938	26,396	22,344	18,905	15,989	13,518	11,424	9,650	8,148	6,877	5,804	25,571	4,642	842	35
1939	26,280	22,259	18,843	15,942	13,483	11,398	9,632	8,135	6,868	5,796	25,551	4,641	842	35
1940	26,148	22,161	18,771	15,890	13,444	11,370	9,610	8,119	6,857	5,788	25,530	4,640	841	35
1941	25,997	22,050	18,688	15,829	13,399	11,336	9,585	8,100	6,842	5,777	25,497	4,637	841	35
1942	25,827	21,923	18,594	15,760	13,348	11,299	9,557	8,079	6,826	5,765	25,459	4,633	840	35
1943	25,639	21,779	18,487	15,680	13,290	11,256	9,526	8,055	6,807	5,750	25,413	4,629	839	35
1944	25,437	21,621	18,366	15,590	13,223	11,206	9,485	8,019	6,774	5,721	25,296	4,611	836	35
1945	25,217	21,450	18,233	15,488	13,146	11,148	9,436	7,971	6,726	5,675	25,082	4,577	830	34
1946	24,982	21,265	18,089	15,375	13,060	11,082	9,379	7,911	6,661	5,608	24,740	4,517	819	34
1947	24,756	21,067	17,932	15,254	12,966	11,010	9,328	7,875	6,627	5,571	24,498	4,475	812	33
1948	24,537	20,876	17,766	15,122	12,863	10,931	9,274	7,847	6,616	5,563	24,374	4,451	808	33
1949	24,332	20,692	17,604	14,981	12,752	10,846	9,211	7,807	6,599	5,560	24,299	4,433	805	33
1950	24,154	20,518	17,449	14,845	12,633	10,752	9,140	7,756	6,569	5,550	24,258	4,418	803	33
1951	24,026	20,369	17,303	14,714	12,519	10,652	9,061	7,695	6,524	5,523	24,208	4,401	800	33
1952	23,975	20,261	17,177	14,591	12,408	10,555	8,975	7,625	6,468	5,480	24,121	4,379	797	33
1953	24,040	20,218	17,086	14,485	12,304	10,462	8,893	7,553	6,409	5,433	24,018	4,357	793	33
1954	24,261	20,273	17,049	14,408	12,215	10,375	8,816	7,486	6,351	5,386	23,911	4,337	790	33
1955	24,674	20,459	17,096	14,377	12,150	10,299	8,743	7,422	6,296	5,339	23,789	4,317	788	33
1956	25,295	20,808	17,252	14,416	12,124	10,244	8,679	7,360	6,241	5,292	23,646	4,297	784	32
1957	26,060	21,331	17,547	14,549	12,157	10,222	8,631	7,302	6,184	5,240	23,462	4,273	780	32
1958	26,755	21,976	17,988	14,797	12,268	10,249	8,610	7,257	6,129	5,185	23,233	4,246	775	32
1959	27,032	22,562	18,532	15,169	12,478	10,344	8,634	7,241	6,093	5,141	23,008	4,223	770	32
1960	26,658	22,796	19,026	15,628	12,792	10,520	8,713	7,261	6,081	5,112	22,790	4,204	766	32
1961	25,898	22,480	19,223	16,045	13,178	10,785	8,860	7,324	6,093	5,096	22,559	4,180	760	31
1962	25,418	21,839	18,957	16,211	13,530	11,111	9,085	7,452	6,151	5,112	22,384	4,159	755	31
1963	25,454	21,434	18,417	15,986	13,670	11,407	9,359	7,638	6,255	5,157	22,241	4,133	750	31
1964	26,137	21,465	18,075	15,530	13,481	11,526	9,613	7,879	6,424	5,257	22,232	4,115	746	31
1965	27,097	22,041	18,101	15,243	13,096	11,366	9,711	8,087	6,619	5,393	22,282	4,087	742	31
1966	28,435	22,851	18,586	15,264	12,854	11,043	9,581	8,180	6,809	5,571	22,514	4,070	739	31
1967	28,621	23,979	19,269	15,674	12,872	10,834	9,282	8,000	6,771	5,591	22,071	3,896	709	29
1968	27,281	24,135	20,221	16,250	13,217	10,849	9,101	7,736	6,600	5,535	21,636	3,705	677	28
1969	23,527	23,006	20,353	17,052	13,703	11,142	9,131	7,629	6,452	5,479	21,736	3,605	662	27
1970	91,783	19,840	19,400	17,163	14,379	11,553	9,386	7,678	6,404	5,408	22,099	3,563	657	27
1971	82,674	77,399	16,731	16,360	14,473	12,124	9,735	7,897	6,448	5,369	22,349	3,524	653	27

							Age							
Year	0	1	2	3	4	5	6	7	8	9	10-19	20-29	30-39	40+
1972	10,066	69,717	65,270	14,108	13,796	12,203	10,213	8,184	6,623	5,397	22,480	3,482	646	27
1973	8,257	8,489	58,791	55,041	11,897	11,632	10,280	8,588	6,868	5,550	22,652	3,454	641	26
1974	10,830	6,963	7,158	49,578	46,414	10,031	9,797	8,640	7,200	5,747	22,872	3,431	634	26
1975	21,152	9,132	5,871	6,037	41,808	39,133	8,450	8,239	7,252	6,035	23,265	3,431	628	26
1976	6,965	17,837	7,701	4,951	5,090	35,250	32,968	7,107	6,918	6,081	23,830	3,454	622	26
1977	38,788	5,874	15,042	6,494	4,175	4,292	29,689	27,708	5,959	5,788	24,246	3,487	614	25
1978	63,060	32,709	4,953	12,684	5,476	3,520	3,615	24,958	23,249	4,994	24,395	3,551	607	25
1979	19,429	53,177	27,583	4,177	10,696	4,616	2,963	3,035	20,901	19,437	23,773	3,612	599	25
1980	35,512	16,384	44,843	23,260	3,522	9,000	3,841	2,415	2,425	16,506	33,316	3,492	563	24
1981	58,280	29,946	13,816	37,815	19,611	2,953	7,319	2,945	1,748	1,695	33,977	3,035	481	20
1982	31,265	49,146	25,252	11,650	31,879	16,379	2,340	5,223	1,889	1,049	20,889	2,347	369	16
1983	19,353	26,365	41,442	21,294	9,820	26,544	12,725	1,580	3,038	998	11,331	1,632	256	11
1984	35,539	16,320	22,233	34,946	17,954	8,237	21,571	9,703	1,130	2,090	8,152	1,357	212	9
1985	26,496	29,969	13,762	18,748	29,466	15,061	6,681	16,313	6,848	766	6,798	1,151	179	7
1986	13,629	22,343	25,272	11,605	15,808	24,739	12,290	5,139	11,842	4,807	5,159	1,005	156	6
1987	34,275	11,493	18,841	21,311	9,785	13,271	20,198	9,479	3,747	8,353	6,847	865	137	5
1988	20,056	28,904	9,692	15,888	17,968	8,205	10,730	15,141	6,589	2,493	9,925	703	115	4
1989	15,796	16,913	24,373	8,173	13,396	15,079	6,683	8,222	10,928	4,594	8,526	572	101	4
1990	24,269	13,320	14,262	20,553	6,891	11,231	12,179	4,996	5,693	7,236	8,387	647	84	3
1991	41,792	20,466	11,232	12,026	17,328	5,775	9,089	9,180	3,505	3,820	10,127	609	69	3
1992	16,565	35,242	17,258	9,472	10,140	14,551	4,737	7,116	6,858	2,541	9,936	446	59	2
1993	20,739	13,969	29,719	14,553	7,986	8,512	11,933	3,712	5,327	4,987	8,913	325	51	2
1994	19,411	17,489	11,780	25,061	12,270	6,695	6,911	9,091	2,652	3,653	9,331	230	42	2
1995	13,211	16,369	14,747	9,933	21,130	10,298	5,472	5,358	6,681	1,884	9,049	192	35	1
1996	9,584	11,140	13,804	12,436	8,375	17,729	8,394	4,209	3,887	4,671	7,510	141	30	1
1997	13,116	8,082	9,394	11,640	10,485	7,031	14,504	6,521	3,101	2,768	8,447	176	25	1
1998	24,318	11,061	6,815	7,922	9,814	8,799	5,737	11,189	4,755	2,184	7,654	260	21	1
1999	22,604	20,507	9,327	5,747	6,679	8,246	7,253	4,554	8,551	3,544	7,169	233	17	1
2000	23,407	19,062	17,293	7,865	4,846	5,615	6,804	5,768	3,494	6,419	7,902	257	21	1
2001	12,865	19,739	16,074	14,583	6,632	4,076	4,643	5,431	4,454	2,652	10,739	363	23	1
2002	11,134	10,849	16,645	13,555	12,297	5,586	3,405	3,812	4,389	3,569	10,640	402	19	1
2003	12,502	9,389	9,148	14,037	11,431	10,368	4,704	2,859	3,192	3,670	11,788	419	16	1
2004	33,159	10,543	7,917	7,715	11,837	9,639	8,742	3,965	2,410	2,690	12,834	543	14	1
2005	8,182	27,962	8,891	6,677	6,506	9,981	8,127	7,367	3,340	2,029	12,895	628	14	1
2006	26,851	6,900	23,580	7,497	5,630	5,486	8,414	6,846	6,201	2,810	12,435	633	12	1
2007	11,235	22,643	5,819	19,885	6,322	4,748	4,625	7,089	5,763	5,216	12,488	845	18	1
2008	78,610	9,474	19,094	4,907	16,768	5,331	4,002	3,896	5,968	4,847	14,648	920	32	0
2009	16,357	66,290	7,989	16,102	4,138	14,139	4,494	3,371	3,279	5,018	16,160	982	33	2
2010	60,311	13,793	55,902	6,737	13,578	3,489	11,920	3,786	2,838	2,759	17,414	1,210	41	1
2011	11,480	50,859	11,632	47,141	5,681	11,450	2,941	10,043	3,188	2,389	16,159	1,799	61	0
2012	21,722	9,681	42,889	9,809	39,753	4,791	9,653	2,478	8,456	2,683	15,223	1,866	71	0
2013	38,174	18,318	8,164	36,167	8,271	33,521	4,039	8,132	2,086	7,112	14,518	2,079	74	0
2014	33,054	32,192	15,447	6,885	30,499	6,974	28,245	3,398	6,831	1,750	17,586	2,252	95	1

Appendix C. SS data file

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#C 2015 Widow Rockfish Assessment
#C Allan C. Hicks and Chantel R. Wetzel
#C NWFSC, NOAA, Seattle, WA

1916  #_styr
2014  #_endyr
1   #_nseas
12    #_months/season
1   #_spawn_seas
5   #_Nfleet
4   #_Nsurveys
1   #_N_areas

BottomTrawl%MidwaterTrawl%Hake%Net%HnL%JuvSurvey%Triennial%NWFSC%ForeignAtSea
#BTr  MTr  Hak  Net  HnL  JvS  Tri  NWS  FAS
# 1    2     3   4    5    6    7    8    9
0.5   0.5  0.5  0.5  0.5  0.5  0.55 0.65 0.5  #Fleet and survey timing in season
 1     1    1    1    1    1    1    1    1   #Area of each fleet and survey
 1     1    1    1    1                       #Units of each fleet: 1=Biomass(mt),2=Numbers(1000s)
0.01  0.01 0.01 0.01 0.01                     # SE of log(catch) by fleet for equilibrium and continuous options

2                                          #_Ngenders
40                                         #_Nages
 0    0    0     0    0                    #_init_equil_catch_for_each_fishery

99      #_N_lines_of_catch_to_read
#_catch_biomass(mt):_columns_are_fisheries,year,season
#BottomTrawl  MidwaterTrawl Hake  Net HnL Year  Season
6.20     0.00     0.00     0.00    72.11   1916  1
9.63     0.00     0.00     0.00    112.22  1917  1
11.23    0.00     0.00     0.00    128.84  1918  1
7.80     0.00     0.00     0.00    88.90   1919  1
7.96     0.00     0.00     0.00    91.01   1920  1
6.58     0.00     0.00     0.00    75.48   1921  1
5.66     0.00     0.00     0.00    65.58   1922  1
6.14     0.00     0.00     0.00    72.10   1923  1
3.62     0.00     0.00     0.00    46.64   1924  1
3.06     0.00     0.00     0.00    59.17   1925  1
8.68     0.00     0.00     0.00    85.96   1926  1
11.74    0.00     0.00     0.00    66.81   1927  1
16.60    0.00     0.00     0.00    72.80   1928  1
23.36    0.00     0.00     0.00    63.40   1929  1
20.80    0.00     0.00     0.00    91.56   1930  1
20.39    0.00     0.00     0.00    79.52   1931  1
22.13    0.00     0.00     0.00    77.96   1932  1
34.53    0.00     0.00     0.00    51.34   1933  1
30.69    0.00     0.00     0.00    60.23   1934  1
29.76    0.00     0.00     0.00    68.36   1935  1
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25.17	0.00	0.00	0.00	85.48	1936	1
35.89	0.00	0.00	0.00	67.63	1937	1
33.27	0.00	0.00	0.00	50.56	1938	1
41.69	0.00	0.00	0.00	34.89	1939	1
75.27	0.00	0.00	0.00	45.37	1940	1
93.58	0.00	0.00	0.00	35.94	1941	1
133.37	0.00	0.00	0.00	13.27	1942	1
468.72	0.00	0.00	0.00	21.91	1943	1
921.32	0.00	0.00	0.00	39.37	1944	1
1553.45	0.00	0.00	0.00	67.92	1945	1
1089.08	0.00	0.00	0.00	70.98	1946	1
551.20	0.00	0.00	0.00	92.01	1947	1
436.80	0.00	0.00	0.00	40.86	1948	1
329.83	0.00	0.00	0.00	44.52	1949	1
359.46	0.00	0.00	0.00	64.15	1950	1
504.25	0.00	0.00	0.00	49.69	1951	1
501.06	0.00	0.00	0.00	40.42	1952	1
455.27	0.00	0.00	0.00	14.03	1953	1
426.22	0.00	0.00	0.00	21.71	1954	1
446.34	0.00	0.00	0.00	18.65	1955	1
558.84	0.00	0.00	0.00	42.04	1956	1
722.76	0.00	0.00	0.00	37.97	1957	1
664.89	0.00	0.00	0.00	36.74	1958	1
642.75	0.00	0.00	0.00	28.83	1959	1
788.79	0.00	0.00	0.00	22.08	1960	1
661.65	0.00	0.00	0.00	15.44	1961	1
741.75	0.00	0.00	0.00	15.80	1962	1
413.46	0.00	0.00	0.00	19.95	1963	1
588.18	0.00	0.00	0.00	13.11	1964	1
238.71	0.00	0.00	0.00	20.75	1965	1
579.45	0.00	3670.00	0.00	37.81	1966	1
886.31	0.00	3902.00	0.00	33.03	1967	1
412.41	0.00	1956.00	0.00	20.07	1968	1
469.50	0.00	358.00	0.00	19.98	1969	1
287.99	0.00	554.00	0.00	9.86	1970	1
378.59	0.00	701.00	0.00	12.04	1971	1
477.77	0.00	421.00	0.00	20.15	1972	1
481.42	0.00	656.00	0.00	18.25	1973	1
440.23	0.00	418.00	0.00	44.40	1974	1
450.93	0.00	391.16	0.00	30.00	1975	1
559.54	0.00	718.52	0.00	41.70	1976	1
924.82	0.00	119.34	0.00	40.75	1977	1
1215.76	0.00	191.88	0.00	161.22	1978	1
3139.81	5945.77	197.90	0.00	103.47	1979	1
5924.81	15580.85	272.00	0.00	59.63	1980	1
4868.53	22672.78	227.95	15.51	71.45	1981	1
4961.49	20650.50	157.51	38.11	186.56	1982	1
6625.36	3357.17	131.46	279.96	33.73	1983	1
3244.91	6425.92	294.74	324.80	26.62	1984	1
2575.58	5919.60	182.61	585.78	27.16	1985	1
3586.53	5346.79	256.77	500.83	83.39	1986	1

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4145.12  8127.60  181.31   584.62  55.12   1987  1
4028.37  6090.58  231.61   220.71  73.46   1988  1
4513.47  7684.59  211.96   253.61  45.10   1989  1
5312.38  4373.87  230.18   411.15  134.37  1990  1
3864.50  2040.17  562.23   234.80   95.20  1991  1
4273.45  1466.21  451.49   45.43   175.50  1992  1
5655.13  2255.97  275.75   51.61   108.96  1993  1
3802.73  2161.90  612.07   58.40   81.71   1994  1
4086.87  2276.82  464.72   57.58   26.32   1995  1
3586.77  1846.39  837.74   16.12   32.67   1996  1
3777.00  2442.52  378.81   16.36   37.98   1997  1
2515.61  882.72   614.99   48.73   86.57   1998  1
1612.77  2050.19  386.14   10.03   43.77   1999  1
56.65    3665.02  288.67   6.76    14.48   2000  1
39.10    1689.78  218.63   7.03    7.23    2001  1
17.21    251.40   159.98   0.02    0.57    2002  1
3.57     9.67      27.10   0.41    0.82    2003  1
8.33     28.74     49.57   0.00    0.31    2004  1
3.13     32.82    157.99   0.13    1.22    2005  1
6.01     12.86    193.19   0.00    0.88    2006  1
4.81     1.55     228.39   2.91    1.93    2007  1
2.15     42.15    217.96   0.00    1.25    2008  1
4.19     36.45    135.35   0.21    0.41    2009  1
4.73     54.67    106.35   0.00    0.15    2010  1
18.34    43.88    149.65   0.00    0.12    2011  1
41.23    47.36    181.43   0.00    0.33    2012  1
51.27    241.09   176.41   0.00    0.98    2013  1
71.28    306.62   342.16   0.03    1.84    2014  1
#################################################################

72 #_N_cpue_and_surveyabundance_observations
#_Units:  0=numbers; 1=biomass; 2=F
#_Errtype:  -1=normal; 0=lognormal; >0=T
#_Fleet Units Errtype
1 1 0   # 1 Bottom Trawl
2 1 0   # 2 Midwater Trawl
3 1 0   # 3 Hake
4 1 0   # 4 Net
5 1 0   # 5 HnL
6 0 0   # 6 SCJuvSurvey
7 1 0   # 7 Triennial
8 1 0   # 8 NWFSC
9 1 0   # 9 Foreign At-sea (overlaps with JV)
#_year seas index obs        se(log)
# Oregon bottom trawl survey same as in previous assessments (yers=16)
 1984   1   1     331.4700    0.2121
 1985   1   1     100.8800    0.1875
 1986   1   1     227.0800    0.2928
 1987   1   1     169.0800    0.2730
 1988   1   1      93.9700    0.2897
 1989   1   1     164.1000    0.1749
```

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 1990   1   1      78.4900    0.1348
 1991   1   1      73.5900    0.1275
 1992   1   1      83.1600    0.1179
 1993   1   1      53.5800    0.1314
 1994   1   1     100.3400    0.1128
 1995   1   1     109.9600    0.1387
 1996   1   1      94.8100    0.1357
 1997   1   1      97.2300    0.1502
 1998   1   1      56.5600    0.1718
 1999   1   1      84.4600    0.1684
# JV At-sea Bycatch (years=7)
 1983   1   3       2.8890    0.1202
 1985   1   3       0.7760    0.1165
 1986   1   3       0.8230    0.0809
 1987   1   3       0.3200    0.0875
 1988   1   3       0.6590    0.0774
 1989   1   3       0.8240    0.0635
 1990   1   3       0.7100    0.0740
# Dom At-sea Bycatch (years=8)
 1991   1   3       1.2640    0.1251
 1992   1   3       0.7810    0.1251
 1993   1   3       0.8010    0.1038
 1994   1   3       1.4650    0.0685
 1995   1   3       0.4550    0.1057
 1996   1   3       1.0180    0.0824
 1997   1   3       0.8860    0.0767
 1998   1   3       1.3300    0.0786
# Juvenile survey indices copied from Ralston report supllied by Field (03/20/2015) (year=9)
2004    1   6      73.6998   0.6013
2005    1   6      14.1540   0.6089
2006    1   6      3.2871    0.6013
2007    1   6      2.8577    0.5936
2008    1   6      7.5383    0.6089
2009    1   6      5.8124    0.6013
2011    1   6      7.3891    0.6240
2013    1   6      1032.7702 0.9800
2014    1   6      204.3839  0.9340
#Triennial Survey (delta-GLMM with gamma ECE and random strata:year effect) (years=9)
1980    1   7  7255.865841 0.732
1983    1   7  10838.68441 0.690
1986    1   7  5847.209382 0.774
1989    1   7  3884.95191  0.702
1992    1   7  7441.370551 0.707
1995    1   7  5885.029811 0.712
1998    1   7  9717.837618 0.696
2001    1   7  1980.617889 0.742
2004    1   7  1069.111566 0.853
# NWFSC combo survey (delta-GLMM gamma ECE with random strata:year and no covariates) (years=12)
2003    1   8  2779.535033 0.364
2004    1   8  1182.169013 0.485
2005    1   8  1760.564208 0.423
```

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2006    1   8  2656.898268 0.362
2007    1   8  3035.756487 0.370
2008    1   8  1668.115919 0.428
2009    1   8  2836.496094 0.370
2010    1   8  3720.149288 0.353
2011    1   8  3613.069077 0.327
2012    1   8  2814.298996 0.369
2013    1   8  4121.929003 0.534
2014    1   8  2224.452458 0.344
# Foreign At-sea Bycatch (years=11)
1977    1   9    0.7700    0.1153
1978    1   9    1.2050    0.1118
1979    1   9    0.7030    0.1186
1980    1   9    1.9930    0.1311
1981    1   9    0.7280    0.1257
1982    1   9    0.2430    0.2467
1984    1   9    2.9370    0.1254
1985    1   9    0.4070    0.1074
1986    1   9    1.1110    0.1027
1987    1   9    0.3900    0.0881
1988    1   9    0.5130    0.1243


###########################################################
# #CHECK THE DISCARD AMOUNTS
3 #_N_fleets_with_discard
# #Fleet  Units  Error
 1       1      -2
 2       1      -2
 5       1      -2
37 #_N_discard_obs
# #I calculated median from ptEst and SElog
# #Year Season Fleet Observation Error
# #Bottom Trawl, Pikitch (years=3, limit it to the years of the study)
1985    1   1   462.9   0.4953
1986    1   1   534.8   0.5311
1987    1   1   1035.5  0.4257
# #EDCP (years=5)
1995    1   1   924.8   0.8318
1996    1   1   3084.5  0.6707
1997    1   1   3353.3  0.7506
1998    1   1   42.6    0.4880
1999    1   1   4.8     0.6878
# #WCGOP (years=12)
2002    1   1   13.22  0.4307
2003    1   1   1.21   0.8196
2004    1   1   5.13   0.7589
2005    1   1   10.17  0.4461
2006    1   1   0.03   1.3556
2007    1   1   13.86  0.6157
2008    1   1   3.90   0.4454
```

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2009    1   1   26.57  0.3377
2010    1   1   22.74  0.5432
2011    1   1   0.08   0.05
2012    1   1   0.01   0.05
2013    1   1   2.43   0.05
# #Midwater Trawl, Pikitch (years=3, limit to years of study)
1985    1   2   1502.0  0.2409
1986    1   2   1321.2  0.2364
1987    1   2   1798.4  0.2620
# #Midwater Trawl (years=2)
1997    1   2      1.0  0.8326
1998    1   2     18.7  0.8
# #Midwater trawl WCGOP (assume no discards for midwater trawl in catch shares) (years=3)
2002    1   2     39.4  0.4071
2012    1   2     0.01  0.05
2013    1   2     0.01  0.05
# #Hook & Line, WCGOP  (years=9)
2004    1   5     0.02 1.1392
2005    1   5     0.21 0.6059
2006    1   5     0.74 0.6893
2007    1   5     0.61 1.0622
2008    1   5     0.64 0.9093
2010    1   5     0.29 0.7564
2011    1   5     0.02 0.8494
2012    1   5     0.04 1.0628
2013    1   5     0.11 0.4096
############################################################################

0 #_N_meanbodywt_obs
30  #_DF_for_meanbodywt_T-distribution_like

2  # length bin method: 1=use databins; 2=generate from width, min,max below; 3=read nbins, then vector
1 6 60
# no additional input for option 1
# read binwidth, minsize, lastbin size for option 2
# read N poplen bins, then vector of bin lower boundaries, for option 3

-1    #_comp_tail_compression
0.0001  #_add_to_comp
7   #_combine males into females at or below this bin number

25  #_N_LengthBins
8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56

197 #_N_Length_obs

#Length comps: 8-56cm by 2cm interval
#BOTTOM TRAWL
#year   Season  Fleet   gender  partition   nSamps  F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
```

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1976    1  1    3  2    14  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.08    2.72
7.04    8.08    6.96    3.92    1.92    4.32    2.32    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    3.36    6.32    8.40    9.44    14.24   13.28   3.28    0.32    0.00    0.00    0.00    0.00    0.00
1977    1  1    3  2    31  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    6.62    12.64   11.61   8.26    8.96    6.82    3.14    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    3.83    8.45    6.90    17.47   3.97    1.34    0.00    0.00    0.00    0.00    0.00
1978    1  1    3  2    91  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.64
1.32    7.78    10.36   7.40    9.99    6.80    4.86    1.32    0.05    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.64    0.05    3.41    8.07    16.72   10.46   5.41    1.74    1.80    1.22    0.00    0.00    0.00
1979    1  1    3  2    163 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.26    0.08    0.45
1.57    4.16    11.60   18.52   13.87   10.98   6.53    1.36    0.00    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.34    0.90    6.80    11.69   8.33    1.84    0.02    0.44    0.25    0.00    0.00    0.00
1980    1  1    3  2    252 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.24    0.37
0.90    2.29    5.57    14.85   16.43   14.11   4.76    0.82    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.04    0.10    0.57    2.71    7.41    13.00   12.00   3.09    0.57    0.02    0.17    0.00    0.00    0.00
1981    1  1    3  2    309 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.17    0.90    0.47
2.90    4.85    6.50    10.19   13.32   13.09   6.09    1.65    0.11    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.12    0.50    1.35    1.29    3.54    7.65    14.07   8.32    2.83    0.04    0.05    0.00    0.00    0.00    0.00
1982    1  1    3  2    499 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.10    0.65    1.62    4.09
3.31    5.18    6.21    6.98    7.76    11.21   6.84    2.39    1.10    0.90    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.08    0.46    2.35    4.64    3.41    7.80    12.03   8.14    2.23    0.40    0.10    0.00    0.00    0.00    0.00
1983    1  1    3  2    455 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.15    0.55    1.25    3.34    5.79
5.09    5.85    6.33    5.85    7.88    7.88    4.83    1.55    0.70    0.38    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.04    0.13    0.62    2.42    4.97    5.70    5.43    6.53    9.22    5.82    1.18    0.43    0.03    0.00    0.00    0.01    0.00
1984    1  1    3  2    859 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.09    0.88    3.62    7.08
9.51    6.89    4.47    4.09    3.60    4.70    2.87    1.62    0.37    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.01    0.32    1.50    4.49    11.95   9.93    7.36    6.63    5.37    1.90    0.58    0.06    0.08    0.00    0.00    0.00
1985    1  1    3  2    804 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.16    0.75    2.25    3.64
7.31    10.22   8.28    5.98    4.27    6.35    3.55    1.71    0.37    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.09    0.29    1.21    2.68    6.52    9.04    10.69   7.88    4.80    1.50    0.41    0.01    0.00    0.00    0.00    0.00
1986    1  1    3  2    629 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.12    0.56    2.10    2.14    3.13
4.46    5.08    8.42    6.84    4.26    4.61    4.57    2.60    1.59    0.41    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.04    0.09    0.70    1.97    3.28    6.47    7.38    13.57   9.68    4.50    0.98    0.40    0.02    0.00    0.00    0.00    0.00
1987    1  1    3  2    399 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.06    0.43    1.04    1.98    3.04
4.49    5.15    8.81    6.86    6.07    5.12    2.85    1.44    0.25    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.01    0.16    0.27    1.52    2.98    3.52    8.72    12.31   13.30   7.42    1.84    0.29    0.03    0.00    0.00    0.00    0.00
1988    1  1    3  2    406 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.12    0.68    2.38    4.03    5.82
7.66    7.25    6.49    5.31    5.59    2.97    2.38    1.57    0.42    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.04    0.00    0.04    0.58    2.93    3.86    6.92    10.34   9.57    6.53    4.39    1.46    0.41    0.14    0.00    0.09    0.00    0.00
1989    1  1    3  2    530 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.09    0.13    1.20    2.22    7.38
7.90    7.99    6.75    5.84    4.35    3.49    2.00    0.99    0.57    0.01    0.05    0.00    0.00    0.00    0.00    0.00    0.00    0.09
0.00    0.00    0.08    0.19    1.47    5.02    9.72    9.03    9.89    7.57    3.92    1.47    0.50    0.09    0.02    0.00    0.00    0.00
1990    1  1    3  2    568 0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.01    0.02    0.04    0.70    1.97    4.15
7.98    7.77    8.07    7.18    4.59    3.44    2.25    1.09    0.30    0.06    0.05    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.04    0.00    0.02    0.17    0.87    3.50    7.78    11.73   11.76   7.71    4.44    1.52    0.54    0.16    0.05    0.00    0.00    0.02
1991    1  1    3  2    736 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.02    0.41    1.14    1.44    3.42
4.74    7.50    8.44    6.39    6.23    4.19    2.80    2.30    0.80    0.22    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.56    2.27    2.40    4.92    9.24    13.07   10.42   4.87    1.55    0.56    0.06    0.00    0.01    0.00    0.00
1992    1  1    3  2    796 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.16    0.40    1.36    1.59
3.61    8.57    9.27    8.27    8.50    5.90    3.36    1.73    0.82    0.28    0.09    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.07    0.07    0.07    0.81    1.49    3.31    6.48    10.47   10.89   8.15    3.15    0.97    0.04    0.04    0.03    0.00    0.00
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1993    1  1    3  2    781 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.05    0.16    0.51    1.58    3.13
4.68    4.81    6.56    9.81    8.68    5.76    4.23    2.21    1.23    0.17    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.02    0.03    0.21    1.19    1.85    5.27    6.62    8.73    11.47   6.84    3.16    0.70    0.26    0.05    0.00    0.00    0.00
1994    1  1    3  2    613 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.11    0.25    0.54    1.27    3.94
6.75    7.35    7.04    8.53    7.86    6.34    4.54    2.13    0.86    0.16    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.11    0.21    0.56    1.69    4.61    9.78    8.63    8.33    5.24    2.17    0.64    0.34    0.00    0.00    0.00    0.00
1995    1  1    3  2    593 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.01    0.17    0.62    1.18    1.16    1.98
4.70    8.20    8.98    8.50    5.93    3.54    2.10    1.60    0.25    0.08    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.01    0.00    0.03    0.61    1.14    2.01    4.06    10.33   13.59   10.84   5.63    1.85    0.75    0.07    0.00    0.06    0.00    0.00
1996    1  1    3  2    495 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.11    0.02    0.22    0.71    2.30    4.84
5.92    7.55    9.45    8.06    6.23    3.47    3.46    1.38    0.39    0.23    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.03    0.31    0.68    2.55    6.12    9.53    10.18   10.52   3.64    1.44    0.36    0.28    0.00    0.00    0.00    0.00
1997    1  1    3  2    650 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.15    0.12    0.52    1.76    4.03
7.20    7.93    7.37    5.59    5.35    3.74    2.38    0.97    0.46    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.02    0.43    0.71    2.79    9.28    15.05   11.47   7.24    4.09    0.96    0.19    0.18    0.00    0.00    0.00    0.00
1998    1  1    3  2    557 0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.08    0.02    0.00    0.19    0.52    1.29    3.20
5.69    9.24    8.46    6.99    4.72    4.20    2.64    1.61    0.56    0.23    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03
0.00    0.00    0.06    0.28    0.91    2.19    4.40    10.22   15.11   10.59   4.03    1.64    0.56    0.19    0.12    0.00    0.00    0.00
1999    1  1    3  2    513 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.08    0.01    0.37    0.64    3.05    4.14
6.62    8.74    9.13    5.72    3.41    3.54    1.25    0.80    0.20    0.04    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.06    0.35    0.31    0.83    3.89    7.36    11.78   13.50   9.32    3.45    1.02    0.28    0.11    0.00    0.00    0.00    0.00
2000    1  1    3  2    67  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.28    1.58
11.31   5.09    16.28   13.13   8.19    6.11    2.36    3.90    1.17    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.15    0.39    3.60    4.03    8.54    6.40    7.23    0.15    0.00    0.00    0.06    0.00    0.00    0.00
2001    1  1    3  2    52  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.76    0.00    5.54
5.71    12.69   4.50    7.52    3.10    2.36    0.52    0.13    0.67    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    3.52    3.63    9.30    9.89    13.64   6.25    6.53    1.72    0.88    0.10    0.03    0.00    0.00    0.00
2002    1  1    3  2    125 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.31    0.88    2.32    7.20    2.02
4.54    4.01    7.89    8.91    3.24    3.15    2.77    0.48    0.33    0.39    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.23    2.38    3.99    8.96    3.30    8.25    10.57   7.22    4.94    0.96    0.58    0.18    0.00    0.00    0.00    0.00
2003    1  1    3  2    46  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.15    0.41    0.61    0.78    0.73    3.49    6.95
6.48    13.30   6.17    3.51    1.86    0.75    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.15    0.20    1.42    0.68    0.73    1.29    13.31   17.39   9.61    5.14    2.91    0.12    0.61    1.23    0.00    0.00    0.00    0.00
2004    1  1    3  2    13  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.32
5.56    3.84    0.00    4.90    9.49    14.31   3.84    4.49    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    3.84    18.54   7.01    13.00   10.85   0.00    0.00    0.00    0.00    0.00    0.00
2005    1  1    3  2    16  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.37
0.37    2.04    8.53    0.24    32.25   9.01    0.39    0.37    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.86    1.55    10.48   33.16   0.00    0.37    0.00    0.00    0.00    0.00    0.00
2006    1  1    3  2    31  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
6.74    12.47   13.90   7.67    6.31    7.17    2.82    0.67    0.30    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.67    0.90    2.94    2.27    7.55    10.97   10.72   2.58    0.63    1.25    1.46    0.00    0.00    0.00
2007    1  1    3  2    84  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.27
30.53   1.39    3.60    25.35   8.34    4.38    2.83    2.50    1.01    0.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.13    0.00    0.21    0.80    2.56    5.97    5.94    3.08    0.86    0.19    0.00    0.00    0.00    0.00
2008    1  1    3  2    77  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.37
0.64    8.52    5.29    6.43    10.30   9.88    10.19   5.99    1.96    0.33    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.94    1.93    6.61    8.90    11.31   5.99    2.79    1.61    0.00    0.00    0.00    0.00
2009    1  1    3  2    112 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.15
1.13    2.35    5.90    23.71   7.86    6.76    5.76    2.12    0.66    0.54    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.48    0.75    5.47    9.35    16.42   7.78    2.27    0.43    0.00    0.00    0.11    0.00
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2010    1  1   3  2   116 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.36
0.96    2.84    8.46    10.04   7.47    9.46    8.17    3.91    2.27    0.15    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.49    0.05    0.79    1.19    3.12    13.24   14.08   9.29    2.66    0.94    0.01    0.01    0.00    0.00
2011    1  1   3  2   80  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.00    0.08    0.55    0.19    1.75
1.38    2.58    2.23    4.71    14.80   15.99   4.66    4.74    3.95    0.59    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.08    0.59    1.14    1.24    1.15    6.84    5.38    12.32   6.98    3.85    1.48    0.36    0.36    0.00    0.00
2012    1  1   3  2   114 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.00    0.20    0.65    0.35    0.93
0.86    2.25    2.31    8.30    13.42   19.42   9.10    5.27    0.58    0.53    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.22    0.11    0.28    0.95    0.79    0.86    3.91    8.23    10.25   8.09    1.98    0.11    0.00    0.00    0.00    0.00
2013    1  1   3  2   118 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.52    1.41    2.84    1.08
1.66    3.43    6.05    4.98    9.24    26.85   9.18    2.47    0.34    0.13    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.01    0.00    0.00    0.98    3.17    2.20    2.42    0.69    5.54    3.51    6.55    2.12    1.39    0.12    0.12    0.00    0.00    0.00
2014    1  1   3  2   118 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.05    0.10    1.82    1.74
2.96    6.13    6.39    7.80    8.82    12.01   4.85    3.71    0.92    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.13    0.29    0.40    7.28    3.22    5.44    10.66   8.92    5.74    0.60    0.00    0.00    0.00    0.00    0.00
#Pikitch Bottom Trawl discards
############WHAT ARE SAMPLE SIZES
1985    1  1   1  1   85  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.05    0.05    0.00    0.01    0.03
0.08    0.16    0.21    0.11    0.04    0.12    0.11    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.05    0.05    0.00    0.01    0.03    0.08    0.16    0.21    0.11    0.04    0.12    0.11    0.02    0.01    0.00    0.00
1985    1  1   2  1   80  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.02    0.02    0.03    0.04
0.31    0.41    0.07    0.05    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.04    0.02    0.02    0.03    0.04    0.31    0.41    0.07    0.05    0.01    0.00    0.00    0.00    0.00    0.00    0.00
1986    1  1   1  1   7   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.05    0.05    0.00    0.01    0.03
0.08    0.16    0.21    0.11    0.04    0.12    0.11    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.05    0.05    0.00    0.01    0.03    0.08    0.16    0.21    0.11    0.04    0.12    0.11    0.02    0.01    0.00    0.00
1986    1  1   2  1   5   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.02    0.02    0.03    0.04
0.31    0.41    0.07    0.05    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.04    0.02    0.02    0.03    0.04    0.31    0.41    0.07    0.05    0.01    0.00    0.00    0.00    0.00    0.00    0.00
1987    1  1   1  1   1   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.07    0.07    0.00    0.01    0.03
0.07    0.16    0.20    0.10    0.04    0.11    0.10    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.07    0.07    0.00    0.01    0.03    0.07    0.16    0.20    0.10    0.04    0.11    0.10    0.02    0.01    0.00    0.00
1987    1  1   2  1   1   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.06    0.03    0.03    0.04    0.03
0.30    0.39    0.07    0.05    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.06    0.03    0.03    0.04    0.03    0.30    0.39    0.07    0.05    0.01    0.00    0.00    0.00    0.00    0.00    0.00
#WCGOP dicards for HnL
2004    1  1   0  1   14  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.26    0.14    0.08    0.24    0.11    0.05    0.06    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.26    0.14    0.08    0.24    0.11    0.05    0.06    0.04    0.00    0.00    0.00
2005    1  1   0  1   24  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.00
0.09    0.13    0.15    0.18    0.22    0.20    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.09    0.13    0.15    0.18    0.22    0.20    0.02    0.01    0.00    0.00    0.00
2006    1  1   0  1   6   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.21    0.61    0.07    0.04    0.00    0.07    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.21    0.61    0.07    0.04    0.00    0.07    0.00    0.00    0.00    0.00
2007    1  1   0  1   42  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.01    0.00
0.01    0.01    0.03    0.20    0.52    0.17    0.00    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.01    0.01    0.00    0.01    0.01    0.03    0.20    0.52    0.17    0.00    0.02    0.00    0.00    0.00
2008    1  1   0  1   45  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.09    0.11    0.05
0.11    0.05    0.15    0.18    0.13    0.05    0.04    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.09    0.11    0.05    0.11    0.05    0.15    0.18    0.13    0.05    0.04    0.02    0.01    0.00    0.00
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2009    1  1   0  1   75  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.01   0.00   0.00
0.00    0.09   0.30   0.23   0.20   0.13   0.04   0.01   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.00   0.01   0.00   0.00   0.00   0.09   0.30   0.23   0.20   0.13   0.04   0.01   0.00   0.00   0.00
2010    1  1   0  1   37  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.03   0.03   0.14   0.09   0.29   0.34   0.04   0.03   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.03   0.03   0.14   0.09   0.29   0.34   0.04   0.03   0.00   0.00
2011    1  1   0  1   14  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.03   0.24   0.17   0.15   0.04   0.03
0.00    0.01   0.01   0.00   0.13   0.10   0.01   0.07   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.03   0.24   0.17   0.15   0.04   0.03   0.00   0.01   0.01   0.00   0.13   0.10   0.01   0.07   0.00   0.00   0.00
2012    1  1   0  1   4   0.00   0.00   0.00   0.00   0.00   0.53   0.00   0.00   0.08   0.00   0.23   0.08   0.08   0.00
0.00    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.53   0.00
0.00    0.08   0.00   0.23   0.08   0.08   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2013    1  1   0  1   21  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.01   0.04   0.05   0.47   0.25   0.16   0.02
0.00    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.01    0.04   0.05   0.47   0.25   0.16   0.02   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
#MIDWATER TRAWL
#year   Season  Fleet   gender  partition   nSamps  F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
1979    1  2   3  2   39  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.49
1.51    7.40   17.19  10.10  3.21   1.91   0.71   0.50   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.00   0.00   0.00   2.29   9.36   23.07  11.96  7.09   1.70   0.00   0.50   0.00   0.00   0.00   0.00
1980    1  2   3  2   367 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.02   0.00   0.27   0.68
1.50    3.32   9.23   16.67  10.20  4.19   3.40   1.51   0.26   0.01   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.00   0.00   0.33   1.19   5.46   16.28  15.53  7.23   1.93   0.60   0.15   0.05   0.00   0.00   0.00
1981    1  2   3  2   896 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.07   0.48   1.07   1.32
2.90    5.62   6.11   10.69  13.43  6.79   2.72   1.12   0.23   0.01   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.13   0.62   2.32   3.52   6.36   14.16  12.87  6.10   1.17   0.19   0.01   0.00   0.00   0.00   0.00
1982    1  2   3  2  1228 0.00   0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.33   0.33   0.38   1.01   2.39   3.71
3.45    3.76   5.25   7.43   11.22  8.20   4.39   1.49   0.23   0.04   0.00   0.02   0.00   0.00   0.00   0.00   0.00   0.01
0.10    0.30   0.29   0.44   1.51   3.37   5.04   4.39   8.33   12.59  7.76   1.76   0.39   0.06   0.01   0.00   0.00   0.00
1983    1  2   3  2   642 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.03   0.32   1.14   4.62   8.85   10.55
6.03    3.51   1.93   2.09   3.63   3.41   1.75   0.82   0.48   0.22   0.02   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.22   1.93   5.74   10.61  10.28  6.61   3.58   5.18   3.61   2.33   0.39   0.13   0.01   0.00   0.00   0.00
1984    1  2   3  2   600 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.08   0.87   4.85   10.03
11.46   6.74   3.17   3.02   5.20   5.16   2.58   0.93   0.18   0.04   0.01   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.08   1.57   5.60   12.38  10.41  5.19   4.99   3.99   1.14   0.24   0.06   0.02   0.00   0.00   0.00
1985    1  2   3  2   698 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.01   0.01   0.50   2.51   4.45   6.16
10.34   9.81   5.41   2.53   2.36   2.25   1.40   0.99   0.18   0.02   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.03   0.67   2.96   5.02   11.25  15.58  8.63   3.64   2.36   0.72   0.15   0.03   0.04   0.00   0.00   0.00
1986    1  2   3  2   776 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.15   0.91   3.10   5.89
8.10    8.34   10.12  6.93   2.54   2.45   2.05   1.46   0.38   0.05   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.05   0.04   1.25   3.21   8.06   10.23  12.92  6.87   2.75   1.51   0.46   0.14   0.04   0.00   0.00   0.00
1987    1  2   3  2   945 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.29   1.34   3.30   5.54
9.58    9.11   7.75   5.91   3.45   1.80   1.51   0.97   0.43   0.02   0.01   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.16   1.58   5.43   10.44  11.80  9.55   5.89   2.21   1.42   0.33   0.09   0.03   0.00   0.00   0.04
1988    1  2   3  2   525 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.04   0.35   0.90   2.58   7.09
10.53   9.17   6.74   4.97   2.74   2.44   0.66   1.16   0.19   0.01   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.06   0.08   1.33   2.86   10.77  13.11  12.83  5.35   2.24   1.40   0.28   0.03   0.04   0.05   0.00   0.00
1989    1  2   3  2   661 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.24   0.88   2.79   6.71
9.38    9.79   8.60   5.03   3.04   1.33   0.82   0.58   0.24   0.09   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    0.00   0.00   0.03   1.25   3.27   8.71   12.62  14.01  7.05   2.52   0.72   0.31   0.00   0.00   0.00   0.00   0.00
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1990	1  2	3  2	751 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.50	2.61
4.76	9.73	11.61	10.72	6.85	3.10	1.15	0.46	0.15	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.06	1.20	4.24	11.20	14.36	12.33	3.44	1.10	0.24	0.10	0.00	0.00	0.00	0.00
1991	1  2	3  2	455 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.63	1.88
5.14	9.38	10.64	9.06	6.93	2.92	1.49	1.13	0.29	0.19	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.72	4.53	8.71	13.96	13.06	6.51	1.98	0.57	0.11	0.07	0.00	0.00	0.00
1992	1  2	3  2	396 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.76	6.80	9.12	4.38
5.14	5.41	4.94	4.75	3.03	1.95	0.31	0.50	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.06	0.29	4.42	9.35	5.58	8.52	5.68	8.23	6.07	2.33	1.09	0.21	0.03	0.00	0.00	0.00	0.00
1993	1  2	3  2	296 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	1.62	3.48
6.03	6.33	7.10	8.00	7.94	6.26	3.74	1.05	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.42	2.37	5.95	7.50	10.01	12.60	7.39	1.49	0.55	0.00	0.00	0.00	0.00	0.00
1994	1  2	3  2	247 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.07	0.51	1.25	5.81
7.57	8.59	7.52	7.25	5.18	3.18	1.34	0.44	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.03	0.06	0.68	3.09	9.07	13.41	10.94	8.52	3.60	1.27	0.50	0.04	0.02	0.00	0.00	0.00
1995	1  2	3  2	263 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.31	1.16	1.67
4.17	8.85	9.07	6.49	7.21	6.76	3.66	0.76	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.02	0.12	0.52	1.15	3.80	9.59	14.30	10.89	7.35	1.34	0.28	0.38	0.00	0.00	0.00	0.03
1996	1  2	3  2	229 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.15	0.28	1.10	3.57	5.90
8.00	6.66	6.13	5.61	3.49	3.74	2.35	0.44	0.49	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.06	0.03	1.00	2.09	4.81	7.17	10.58	12.05	6.63	3.95	2.13	0.90	0.39	0.00	0.00	0.00	0.00
1997	1  2	3  2	311 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.34	2.98	7.11
8.39	8.41	6.03	3.41	4.89	2.36	1.42	0.58	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.04	0.02	1.28	3.92	11.12	14.98	11.65	6.82	2.82	0.84	0.17	0.00	0.02	0.00	0.00	0.00
1998	1  2	3  2	134 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	1.40	3.61
11.24	8.64	7.22	6.09	4.30	2.81	1.05	1.22	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.28	3.00	7.68	12.24	16.10	8.90	3.30	0.50	0.11	0.08	0.05	0.00	0.00	0.00
1999	1  2	3  2	205 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.07	0.51	2.71	4.96
6.37	8.94	12.37	5.86	4.48	2.43	0.64	0.30	0.05	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.23	1.10	2.36	7.38	12.85	15.53	8.04	1.78	0.47	0.02	0.00	0.00	0.02	0.02	0.00
2000	1  2	3  2	456 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	2.02	4.55
6.87	8.61	9.09	7.84	4.66	2.33	1.96	0.83	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.06	0.35	0.48	2.40	6.30	11.89	14.05	9.04	4.11	1.14	0.52	0.04	0.00	0.00	0.00	0.00
2001	1  2	3  2	315 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.28	0.94	3.08
7.01	7.75	8.69	7.40	5.74	3.39	1.47	0.23	0.33	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.06	0.41	2.21	7.92	12.29	14.63	10.35	3.25	1.61	0.49	0.36	0.00	0.00	0.00	0.00
2002	1  2	3  2	144 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.23	0.86	1.64
4.40	7.35	12.47	8.14	6.77	4.00	2.54	0.48	0.23	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.18	0.38	1.11	0.92	2.49	11.06	16.86	10.82	5.65	1.05	0.02	0.01	0.00	0.01	0.00	0.00
2003	1  2	3  2	33  0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	2.60	9.11	7.85
9.08	8.03	7.15	6.08	2.40	0.78	1.86	1.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	1.18	4.10	11.53	12.29	11.30	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1  2	3  2	63  0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	1.51	4.34
9.39	9.15	7.86	7.91	8.58	4.26	3.01	3.69	1.32	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.56	1.31	3.64	11.90	8.22	4.43	4.74	1.86	0.00	1.05	0.00	0.15	0.00	0.00
2005	1  2	3  2	49  0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	1.00	4.39
4.45	5.21	8.11	5.83	8.07	8.37	5.24	5.24	2.86	0.70	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.88	0.28	5.72	7.03	9.70	5.76	6.08	4.26	0.07	0.15	0.00	0.00	0.00	0.00
2006	1  2	3  2	35  0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.37	1.35
3.08	4.50	8.05	6.66	6.65	10.50	6.03	9.36	4.56	0.37	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.08	0.08	0.00	0.71	1.18	2.20	5.18	10.81	7.49	8.78	1.30	0.06	0.05	0.01	0.00	0.00
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2007    1  2    3  2    7  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.43    2.35    3.98    5.09
9.21    6.21    4.51    5.09    3.27    2.00    0.00    1.00    0.98    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    1.57    2.65    8.02    4.91    9.79    10.79   9.49    3.91    2.73    1.00    0.00    0.00    0.02    0.00    0.00
2008    1  2    3  2    70 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.42    1.49    7.11    10.72
7.71    4.48    4.60    4.88    5.45    3.06    1.63    0.82    0.49    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.27    1.81    9.36    12.54   7.51    6.20    4.75    2.67    1.56    0.25    0.18    0.01    0.00    0.00    0.00
2009    1  2    3  2    98 0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.00    0.01    0.05    0.25    0.99    1.50
2.82    4.37    5.66    11.29   15.45   8.88    5.01    6.15    0.40    0.77    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01
0.00    0.00    0.01    0.06    0.50    1.36    1.71    3.84    5.21    7.65    9.18    6.41    0.28    0.08    0.08    0.00    0.00    0.00
2010    1  2    3  2    63 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.06    0.81    0.98
4.28    3.99    3.96    6.42    12.79   11.71   6.15    6.58    2.23    0.39    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.09    1.88    3.13    5.81    6.70    6.71    7.64    5.93    1.58    0.10    0.07    0.01    0.00    0.00
2011    1  2    3  2    49 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.29    0.50    1.90    2.99
5.77    7.83    6.66    7.50    7.06    5.98    4.79    0.63    0.50    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.13    1.05    3.52    4.55    5.87    13.30   7.96    7.19    2.23    1.74    0.00    0.00    0.00    0.00    0.00
2012    1  2    3  2    77 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.08    2.86    6.06
7.88    6.93    7.25    3.66    3.93    4.43    1.93    2.24    0.38    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.59    4.61    7.69    10.23   9.92    9.70    5.31    3.16    0.95    0.11    0.04    0.00    0.00    0.00
2013    1  2    3  2    84 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.19    0.75    3.27    3.12
4.66    6.18    6.82    5.16    4.29    4.80    3.05    1.85    0.52    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.27    1.41    3.61    5.27    12.59   10.61   7.13    9.29    3.63    1.51    0.00    0.00    0.00    0.00    0.00
2014    1  2    3  2    84 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.07    0.07    0.07    0.64    3.53
3.72    6.00    7.47    11.55   9.89    7.78    2.65    1.07    1.14    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.13    0.20    0.01    1.54    4.62    6.57    10.04   9.18    8.77    3.23    0.05    0.02    0.00    0.00    0.00    0.00
#HAKE
#year   Season  Fleet   gender  partition   nSamps  F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
1991    1  3    3  2    46 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.26    1.01    1.26    3.40
6.54    11.98   5.30    8.53    9.85    3.39    0.11    0.00    0.54    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.26    0.00    1.38    1.96    6.60    13.82   10.84   8.01    3.51    0.96    0.49    0.00    0.00    0.00    0.00    0.00
1992    1  3    3  2    164 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.02    0.17
1.16    3.27    5.27    8.14    8.84    9.60    8.97    5.92    2.12    0.24    0.27    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.01    0.48    2.02    5.75    11.53   7.77    6.72    5.07    2.86    2.45    1.01    0.28    0.06
1993    1  3    3  2    227 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.07    0.26
0.80    3.37    8.13    8.74    8.90    14.42   6.76    5.72    0.82    0.72    0.58    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.01    0.32    0.96    7.89    8.89    10.85   5.68    3.74    1.51    0.59    0.12    0.06    0.05    0.01
1994    1  3    3  2    328 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.12    1.15    5.01
9.25    7.96    5.53    8.62    5.52    3.05    3.54    4.63    0.71    0.09    0.19    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.94    0.71    3.32    5.82    9.61    10.88   5.83    4.29    1.68    1.02    0.16    0.11    0.03    0.06    0.17
1995    1  3    3  2    399 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.06    0.12    1.42    3.92
3.43    9.31    9.73    5.61    8.48    3.93    2.48    1.03    0.83    0.10    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.14    0.16    1.45    2.77    6.62    12.12   12.41   7.39    2.74    1.78    0.49    0.61    0.68    0.18    0.00
1996    1  3    3  2    410 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.49    0.35    1.58    1.82    2.88
5.03    2.85    7.41    7.80    9.02    10.84   5.60    3.17    0.99    0.05    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.49    1.58    3.63    2.21    3.32    6.35    10.49   5.43    3.98    1.73    0.57    0.25    0.02    0.00    0.04
1997    1  3    3  2    520 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.07    0.61    2.09
3.88    5.42    4.99    6.13    6.50    8.17    8.72    3.21    0.62    0.08    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.02    0.04    0.20    0.82    3.74    8.44    8.79    9.92    10.10   4.77    2.17    0.39    0.07    0.01    0.00    0.00
1998    1  3    3  2    637 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.15    0.83
4.57    9.41    11.01   10.14   7.20    5.73    3.03    1.86    0.29    0.01    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.37    0.42    1.13    8.58    14.50   13.73   4.18    1.56    0.86    0.27    0.08    0.01    0.00    0.00
```

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1999    1  3   3  2   870 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.05    0.74    2.46    3.65
5.26    7.19    10.21   7.71    3.86    4.77    3.38    2.02    0.38    0.26    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.10    0.10    0.12    0.22    1.29    4.04    4.31    8.05    13.73   7.81    4.86    1.93    0.62    0.37    0.26    0.21    0.01    0.00
2000    1  3   3  2   746 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.08    0.23    2.27    2.93    5.44
5.61    4.74    8.38    11.49   8.72    5.03    3.61    1.98    0.69    0.24    0.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.01    0.05    0.41    1.88    2.97    4.24    6.31    10.18   5.69    3.57    1.47    0.78    0.19    0.65    0.08    0.00
2001    1  3   3  2   527 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.06    1.03
3.01    6.56    5.93    4.61    9.65    10.31   8.83    4.36    0.94    0.42    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.01    0.87    1.36    4.37    8.86    12.91   8.42    4.71    1.63    0.95    0.02    0.15    0.00    0.00
2002    1  3   3  2   368 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.01    0.05    0.46
0.72    5.72    8.89    8.44    13.05   9.40    1.93    1.22    0.19    0.04    0.05    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.01    0.02    0.26    8.55    14.00   16.33   5.01    3.73    1.38    0.45    0.05    0.01    0.00    0.00
2003    1  3   3  2   295 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.17    2.15    2.90    6.70    1.97
0.16    4.25    7.08    7.45    6.68    4.02    4.04    3.11    0.09    0.32    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.01    0.44    2.59    4.26    3.16    0.24    4.38    12.21   9.64    8.75    1.73    1.01    0.07    0.07    0.01    0.30
2004    1  3   3  2   526 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.01    0.01    0.10    0.16    0.58    1.82
1.71    1.31    3.09    3.27    7.90    10.64   18.10   3.86    2.54    0.08    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.01    0.00    0.01    0.04    0.08    0.19    1.09    2.42    2.53    7.27    19.03   9.09    1.78    0.75    0.33    0.16    0.00    0.00
2005    1  3   3  2  1226 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.03    0.17    0.26    0.65
1.97    6.68    8.10    5.28    8.78    6.94    6.84    3.30    1.33    0.25    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.01    0.00    0.01    0.04    1.00    1.36    4.54    10.22   8.42    9.11    9.45    3.19    1.40    0.49    0.07    0.02    0.01
2006    1  3   3  2  1290 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.73    0.42    0.92
3.07    3.24    7.07    4.58    10.39   7.68    6.48    6.31    0.91    0.03    0.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.01    0.11    0.66    1.31    2.52    5.07    10.73   16.98   4.44    3.44    1.83    0.94    0.03    0.02    0.00
2007    1  3   3  2  1496 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.04    0.44    3.34
4.10    4.90    6.27    6.58    6.03    5.53    6.27    2.59    0.67    0.08    0.05    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.01    0.06    0.33    1.49    1.03    6.41    10.72   12.35   11.96   5.79    1.66    0.66    0.35    0.19    0.03    0.03
2008    1  3   3  2  1165 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.11    0.29    0.54    0.84
2.65    5.77    7.19    8.92    6.69    12.86   5.94    2.91    0.89    0.11    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.03    0.08    0.08    0.40    0.70    0.95    3.06    7.82    10.77   11.48   6.33    1.45    0.59    0.29    0.16    0.05    0.00
2009    1  3   3  2   528 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.12    0.48    0.54
1.24    2.95    10.98   10.43   9.25    5.03    4.87    1.33    0.46    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.12    0.17    0.58    0.80    3.95    10.50   15.83   11.92   6.68    1.36    0.34    0.07    0.00    0.02    0.00
2010    1  3   3  2  1193 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.00    2.56    0.35    5.77
3.42    5.75    1.68    6.93    9.03    5.64    4.02    2.39    0.57    0.05    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.01    0.02    0.11    0.56    8.21    4.35    8.72    4.80    15.89   6.81    1.91    0.37    0.04    0.01    0.01    0.00
2011    1  3   3  2  1192 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.31    1.21    2.42
3.88    5.89    6.29    8.15    8.66    7.09    5.06    3.10    0.80    0.05    0.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.03    0.20    0.52    3.67    5.22    6.63    8.96    10.69   8.71    1.88    0.22    0.12    0.07    0.04    0.00
2012    1  3   3  2  1098 0.00    0.00    0.00    0.00    0.02    0.12    0.09    0.00    0.00    0.01    0.06    0.12    0.69    1.91
2.50    5.56    5.07    6.15    10.24   9.37    6.92    3.64    0.71    0.16    0.05    0.00    0.00    0.00    0.00    0.02    0.14    0.07
0.00    0.02    0.00    0.09    0.09    0.66    1.61    4.32    7.79    10.85   10.23   8.11    1.79    0.55    0.18    0.10    0.00    0.00
2013    1  3   3  2  1068 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.02    0.06    0.08    1.03    1.13
4.01    5.91    10.94   6.28    10.00   6.82    2.99    3.13    0.22    0.09    0.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.02    0.00    0.01    0.06    0.72    0.50    2.79    9.99    6.25    12.90   7.35    5.40    0.76    0.18    0.10    0.09    0.02    0.03
2014    1  3   3  2   973 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.26    0.76    3.35
5.31    5.71    7.82    6.03    8.10    9.09    3.80    2.62    0.15    0.01    0.02    0.00    0.02    0.00    0.00    0.00    0.00    0.00
0.01    0.00    0.00    0.06    0.19    1.57    2.31    4.70    9.15    10.79   10.80   5.51    1.44    0.31    0.07    0.04    0.01    0.00
#NET (no CALCOM)
#year   Season  Fleet   gender  partition   nSamps  F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
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-1982 1 4 3 2 1 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 100.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
1983 1 4 3 2 46 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 4.03
3.64 3.28 6.38 7.37 10.30 9.80 10.51 11.99 12.22 5.29 3.47 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 3.20 2.97 4.24 1.15 0.17 0.00 0.00 0.00 0.00 0.00
1984 1 4 3 2 63 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.44
0.85 2.74 7.91 11.39 12.53 18.45 12.86 5.70 0.00 0.00 0.86 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 1.06 0.48 2.20 8.47 8.12 5.91 0.00 0.00 0.00 0.00 0.00 0.00
1985 1 4 3 2 157 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.14 1.31
3.93 5.84 8.05 16.08 7.54 8.14 7.01 1.05 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.32 0.00 1.87 4.43 8.48 12.12 11.05 2.10 0.54 0.00 0.00 0.00 0.00 0.00
1986 1 4 3 2 103 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.16 0.20 0.93 0.52
4.09 6.16 13.72 9.30 11.07 4.99 3.07 0.23 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.18 0.85 0.38 2.00 4.42 10.97 13.41 6.39 2.93 1.62 2.42 0.00 0.00 0.00 0.00
1987 1 4 3 2 73 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.10 0.08 1.59
2.65 4.01 6.92 9.42 6.86 5.91 2.55 1.15 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.52 0.31 1.76 8.35 13.94 17.33 14.82 1.15 0.00 0.00 0.57 0.00 0.00 0.00
1988 1 4 3 2 89 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.13 0.20 1.95 1.64
5.60 12.82 11.28 6.24 4.52 4.18 1.52 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.40 0.40 0.93 2.44 7.16 16.33 17.55 3.45 0.43 0.68 0.16 0.00 0.00 0.00 0.00
1989 1 4 3 2 138 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.53 2.43 6.17
8.67 10.54 13.77 10.76 12.00 5.72 3.43 0.18 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.64 0.95 2.62 3.32 5.14 8.47 3.70 0.75 0.00 0.21 0.00 0.00 0.00 0.00
1990 1 4 3 2 158 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.33 0.14 2.44
8.47 17.21 8.82 6.82 6.63 6.66 5.42 1.21 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.20 1.74 2.36 7.42 7.09 10.41 5.04 1.14 0.46 0.00 0.00 0.00 0.00 0.00
1991 1 4 3 2 59 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.01 1.04 4.48
15.19 20.76 14.24 2.25 8.67 1.53 0.05 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.67 0.97 4.51 10.18 5.15 5.96 3.08 1.14 0.13 0.00 0.00 0.00 0.00 0.00
1992 1 4 3 2 62 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.40 3.00 5.26
9.13 14.09 16.79 10.53 2.36 2.67 2.62 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.87 0.47 2.89 4.42 5.39 7.95 7.00 3.75 0.33 0.06 0.00 0.00 0.00 0.00 0.00
1993 1 4 3 2 56 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.10 0.34 1.98 2.52 9.38
13.97 9.76 9.94 5.97 2.85 2.04 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.10 0.37 2.34 4.77 3.04 16.56 8.87 4.38 0.59 0.10 0.03 0.00 0.00 0.00 0.00 0.00
1994 1 4 3 2 90 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.17 0.00 0.11 0.18 3.45
8.07 11.43 15.80 9.24 2.90 2.87 0.40 0.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.16 0.00 0.13 0.22 2.10 6.80 19.04 11.45 4.42 0.49 0.43 0.00 0.00 0.00 0.00 0.00
1995 1 4 3 2 38 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.88 1.37 0.41 0.97
4.73 9.76 19.54 9.82 8.75 0.26 1.32 2.84 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.98 1.60 0.49 3.86 4.88 9.23 12.53 3.82 1.96 0.00 0.00 0.00 0.00 0.00 0.00
1996 1 4 3 2 22 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.31
1.91 7.97 27.03 12.35 2.05 1.78 0.22 0.22 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 1.32 5.08 16.69 19.59 2.78 0.68 0.02 0.00 0.00 0.00 0.00 0.00
1997 1 4 3 2 13 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.16
2.10 10.05 19.70 14.18 10.18 4.18 2.19 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.19 2.20 8.82 14.10 8.04 3.34 0.56 0.01 0.00 0.00 0.00 0.00
1998 1 4 3 2 29 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.74
2.77 11.75 16.40 20.24 4.85 1.38 0.49 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.43 0.27 9.15 12.46 9.81 8.17 0.92 0.16 0.00 0.00 0.00 0.00 0.00
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-1999   1   4   3   2   1  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    62.52   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    37.48   0.00    0.00    0.00    0.00    0.00    0.00    0.00
-2002   1   4   3   2   1  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    50.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    50.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
#HNL
#year   Season  Fleet   gender  partition   nSamps  F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
1979    1   5   3   2   3  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    20.09   0.00    12.11
11.15   5.33    0.00    6.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    19.05   0.00    11.08   8.42    3.72    0.00    3.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00
-1980   1   5   3   2   2  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    100.00  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1981    1   5   3   2   10 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.46
7.81    2.06    17.55   13.22   7.19    14.26   3.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    3.99    6.26    1.35    10.89   5.47    1.26    1.14    0.10    0.00    0.00    0.00    0.00
1982    1   5   3   2   22 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    4.09    2.82    6.73    15.29   37.34   19.33   0.24    0.00    0.00    1.07    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.80    5.00    1.54    1.84    2.22    0.42    0.02    0.00    0.00    0.26
1983    1   5   3   2   13 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    6.26    3.11    0.00    3.52    3.48
3.93    5.60    16.55   0.40    9.34    6.35    1.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    3.15    0.00    8.99    3.31    9.64    3.84    10.41   0.13    0.48    0.44    0.03    0.00    0.00    0.00    0.00
1984    1   5   3   2   5  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    8.94    0.00    9.19    15.48   0.00    13.63   20.54   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    5.91    11.17   14.28   0.78    0.00    0.08    0.00    0.00    0.00    0.00
1985    1   5   3   2   6  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.59    0.00
2.69    44.19   0.00    3.51    0.00    39.74   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    2.12    0.00    2.03    1.94    0.00    1.19    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1986    1   5   3   2   32 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.62    1.98    3.61    11.59   11.40
15.96   13.57   2.89    2.19    0.27    0.27    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.62    1.99    3.25    5.04    9.43    9.89    4.98    0.46    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1987    1   5   3   2   4  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.65    0.00    3.68    0.00    8.76
8.95    8.26    4.36    6.99    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    4.71    0.00    3.24    21.01   7.53    7.34    5.58    2.56    2.37    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1988    1   5   3   2   2  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    12.61   0.00    43.69
43.69   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1989    1   5   3   2   9  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    9.47    0.00    7.79    5.50
5.14    0.00    12.99   1.63    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    9.60    12.33   6.24    17.34   4.16    0.00    0.43    0.55    6.83    0.00    0.00    0.00    0.00    0.00    0.00
1990    1   5   3   2   13 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.45    6.56    3.20    4.53
9.24    12.04   1.22    6.02    0.00    4.89    10.64   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.45    5.97    2.61    14.86   8.14    1.12    7.12    0.00    0.00    0.60    0.35    0.00    0.00    0.00    0.00
1991    1   5   3   2   22 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.81    0.81    2.77    0.90
5.31    17.87   11.76   1.00    7.29    3.82    2.63    0.16    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.81    0.00    7.30    9.95    18.61   2.72    0.91    2.95    0.15    0.02    1.47    0.01    0.00    0.00    0.00
1992    1   5   3   2   149 0.00   0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.15    0.16    2.10    1.75    3.71
7.49    14.53   9.46    5.46    6.63    5.13    6.29    3.25    0.08    2.63    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.01    0.00    0.06    0.25    1.83    1.61    4.27    5.34    8.75    5.38    2.29    0.93    0.34    0.06    0.03    0.01    0.00    0.00
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1993    1  5    3  2    77  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.06    0.02    1.72    8.16    7.05    7.81
10.35   7.61    3.13    2.91    4.49    0.80    0.16    0.25    0.00    0.45    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.06    0.02    4.06    5.20    6.94    9.48    9.10    5.25    1.94    1.27    1.55    0.07    0.01    0.02    0.00    0.09    0.00
1994    1  5    3  2    114 0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.71    6.54    9.90    5.86
11.39   4.00    5.37    3.22    4.30    3.60    3.12    3.87    0.10    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    1.72    5.98    5.75    5.25    9.45    2.69    3.36    1.38    0.72    0.34    0.11    0.28    0.01    0.00    0.00
1995    1  5    3  2    10  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    14.42   7.22    0.01    4.00    0.03
12.77   4.28    3.60    8.88    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    14.59   7.28    0.01    3.27    4.76    6.52    2.99    2.35    3.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1996    1  5    3  2    21  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.26    8.00    1.12    13.88   9.55
1.58    5.64    4.29    5.29    2.30    4.61    1.06    0.50    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    2.28    8.11    1.06    11.01   8.47    1.30    2.79    2.79    1.27    0.38    0.38    0.04    0.05    0.00    0.00    0.00
1997    1  5    3  2    49  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.14    2.30    7.35    4.00    6.82
6.43    12.48   8.76    4.01    1.30    2.22    0.20    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    1.16    2.73    6.96    2.34    8.66    2.33    11.06   5.48    0.94    1.16    0.17    0.01    0.00    0.00    0.00    0.00
1998    1  5    3  2    58  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.18    1.06    2.51    5.96
15.21   13.03   7.31    14.77   4.61    5.57    3.46    0.59    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.02    0.19    0.97    2.32    3.84    5.49    2.39    4.45    4.58    0.78    0.54    0.10    0.06    0.00    0.00    0.00
1999    1  5    3  2    21  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.74    2.21    2.95    4.67    4.73    5.48
6.97    7.38    5.03    9.56    5.90    3.78    0.95    0.00    1.68    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.74    2.24    2.98    4.29    3.74    5.10    7.62    3.23    1.97    2.47    3.53    0.03    0.03    0.00    0.00    0.00    0.00
2000    1  5    3  2    17  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.39    3.26    2.52    1.87
8.77    5.17    5.25    12.84   2.78    5.53    8.17    17.33   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.40    2.88    2.02    0.96    5.88    2.94    4.89    4.11    1.22    0.54    0.28    0.00    0.00    0.00    0.00
2001    1  5    3  2    8   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.51    1.54    42.96
0.51    0.51    1.03    4.24    0.00    1.03    0.51    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.51    1.03    0.51    35.59   0.00    0.00    1.03    4.24    0.00    4.24    0.00    0.00    0.00    0.00    0.00
2002    1  5    3  2    12  0.00    0.00    0.00    0.00    0.00    0.00    0.80    0.00    4.59    6.94    4.80    3.71    10.68   9.83
3.26    6.77    1.99    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.80
0.00    4.57    7.00    4.86    3.36    8.64    8.99    2.62    4.49    1.30    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
-2005    1  5    3  2    1  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    12.83   0.00    0.00
50.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    37.17   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2006    1  5    3  2    10  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    34.21   0.00    17.11   0.00
0.00    1.07    1.53    2.13    4.51    11.73   2.24    2.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    17.11   0.00    0.00    0.00    3.50    1.07    1.30    0.37    0.07    0.04    0.00    0.00    0.00
2007    1  5    3  2    13  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    17.03   0.00
0.00    6.85    7.92    10.16   6.50    6.75    11.05   1.75    0.88    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    6.33    8.28    7.92    4.27    1.58    0.97    0.88    0.00    0.88    0.00    0.00
2008    1  5    3  2    5   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2.59    8.30    12.87   32.45   6.75    0.00    8.80    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    4.55    6.50    2.50    7.02    6.18    1.20    0.00    0.30    0.00    0.00    0.00    0.00
2010    1  5    3  2    5   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    6.25    6.25    12.50   6.25    12.50   18.75   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    18.75   12.50   6.25    0.00    0.00    0.00    0.00    0.00    0.00
2011    1  5    3  2    3   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.95    14.65   26.32   0.00    3.31    3.16
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    2.93    14.76   26.62   0.00    2.57    2.72    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2012    1  5    3  2    7   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.35    15.06   0.00    0.00    0.00    16.31
0.00    2.19    4.04    0.00    9.91    4.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    16.44   1.18    2.35    0.00    14.01   0.00    0.00    8.08    0.00    4.04    0.00    0.00    0.00    0.00    0.00    0.00
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2013    1   5   3   2   27  0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.42    3.36    4.81    16.68   6.47    6.37    2.74
1.94    2.14    1.80    1.37    1.37    0.00    1.35    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2.42    3.34    4.85    16.88   5.86    5.09    2.54    1.61    1.92    2.69    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2014    1   5   3   2   55  0.00    0.00    0.00    0.00    0.00    0.00    0.16    0.00    0.00    0.16    1.32    2.98    13.62   28.17
4.87    0.91    0.70    0.00    1.99    0.00    0.27    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.16
0.00    0.00    0.16    1.33    2.18    10.18   25.41   4.38    0.25    0.70    0.00    0.09    0.00    0.00    0.00    0.00    0.00    0.00
#WCGOP dicards for HnL
2004    1   5   0   1   1   0.00    0.00    0.00    0.00    0.00    0.17    0.67    0.17    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.17    0.67
0.17    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2005    1   5   0   1   3   0.00    0.00    0.00    0.00    0.00    0.10    0.58    0.31    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.10    0.58
0.31    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2006    1   5   0   1   5   0.00    0.00    0.00    0.00    0.02    0.12    0.27    0.25    0.20    0.13    0.02    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.02    0.12    0.27
0.25    0.20    0.13    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2007    1   5   0   1   13  0.00    0.00    0.00    0.00    0.07    0.04    0.11    0.25    0.34    0.11    0.01    0.00    0.00    0.00
0.00    0.01    0.00    0.00    0.00    0.01    0.02    0.02    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.07    0.04    0.11
0.25    0.34    0.11    0.01    0.00    0.00    0.00    0.00    0.01    0.00    0.00    0.00    0.01    0.02    0.02    0.01    0.00    0.00
2008    1   5   0   1   2   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.14    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.29    0.00    0.57    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.14    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.29    0.00    0.57    0.00    0.00    0.00    0.00    0.00
2009    1   5   0   1   1   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.25    0.50    0.25    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.25    0.50    0.25    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2011    1   5   0   1   3   0.00    0.00    0.00    0.00    0.00    0.00    0.17    0.17    0.33    0.17    0.17    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.17
0.17    0.33    0.17    0.17    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2012    1   5   0   1   4   0.00    0.00    0.00    0.07    0.00    0.00    0.07    0.52    0.19    0.07    0.09    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.07    0.00    0.00    0.07
0.52    0.19    0.07    0.09    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2013    1   5   0   1   4   0.00    0.00    0.00    0.00    0.00    0.18    0.36    0.00    0.18    0.09    0.18    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.18    0.36
0.00    0.18    0.09    0.18    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
#Triennial survey (sample size is number of tows)
#year    season  fleet   gender  partition   Nsamp   F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
1980    1       7       3       0       14      0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.77
        0.00    3.07    1.53    16.02   14.40   5.89    2.30    2.47    1.41    0.23    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
        0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.53    1.53    22.71   18.02   4.69    2.71    0.70    0.00    0.00    0.00    0.00
        0.00
1983    1       7       3       0       24      0.00    0.00    0.00    0.00    0.06    0.06    0.24    0.73    0.73    0.61    0.79    0.49    1.72
        3.95    3.47    3.34    2.64    3.16    1.91    2.90    3.20    1.41    2.77    2.07    0.00    0.00    0.00    0.00    0.00    0.18    0.18
        0.73    2.19    1.70    1.82    3.34    1.21    2.69    2.44    4.28    5.50    11.47   16.61   7.23    1.92    0.25    0.00    0.00    0.00
        0.00
1986    1       7       3       0       30      0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.04    0.03    0.12    0.38    0.84
        0.36    0.34    2.25    4.36    4.12    2.58    4.12    2.05    10.73   0.40    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
        0.00    0.03    0.04    0.01    0.18    0.59    0.17    0.62    0.68    22.86   25.49   14.75   1.84    0.00    0.00    0.00    0.00    0.00
        0.00
1989    1       7       3       0       70      0.00    0.00    0.00    0.00    0.03    0.60    1.86    1.02    0.50    13.71   3.12    3.95    9.83
        7.05    2.32    2.42    2.39    0.78    0.74    0.27    0.29    0.19    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.08    0.71
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     1.64   0.75   0.46   5.08   3.17   3.97   4.17   1.10   2.27   5.04   18.79  0.78   0.52   0.30   0.05   0.00   0.00   0.00
     0.00
1992 1      7      3      0      48     0.00   0.00   0.01   0.01   0.02   0.02   0.01   0.01   0.05   0.67   2.05   8.18   10.16
     7.42   0.60   0.79   1.52   4.22   2.43   2.39   14.05  2.42   0.04   0.01   0.00   0.00   0.00   0.01   0.01   0.02   0.01
     0.02   0.02   0.04   0.46   4.69   8.47   11.04  6.43   1.76   1.32   2.78   4.97   0.82   0.03   0.00   0.00   0.00   0.00
     0.00
1995 1      7      3      0      78     0.04   0.00   0.04   0.13   0.09   0.22   0.43   0.13   0.23   1.18   5.89   12.43  4.92
     0.18   0.42   0.82   2.24   2.28   2.22   3.34   3.38   2.99   1.27   0.51   0.00   0.04   0.00   0.04   0.13   0.28   0.42
     0.50   0.61   0.43   1.08   5.66   8.22   6.30   1.70   1.90   5.02   7.63   7.19   5.26   1.43   0.79   0.00   0.00   0.00
     0.00
1998 1      7      3      0      110    0.00   0.00   0.02   0.00   0.00   0.02   0.02   0.02   0.00   0.05   0.14   0.37   1.37
     1.21   2.81   6.56   5.81   7.10   8.09   3.85   5.59   4.38   0.35   0.00   0.00   0.00   0.00   0.02   0.00   0.00   0.07
     0.07   0.07   0.00   0.14   0.43   1.08   1.48   3.39   11.98  12.95  8.82   6.91   3.47   1.09   0.26   0.00   0.00   0.00
     0.00
2001 1      7      3      0      37     0.00   0.00   0.00   0.48   3.69   9.29   6.70   2.42   1.29   0.70   0.48   0.00   0.00
     0.97   0.00   2.92   1.29   0.63   4.87   0.63   5.16   0.00   1.72   0.00   0.00   0.00   0.00   0.00   0.16   4.65   8.66
     6.96   3.39   2.59   2.11   0.16   0.00   0.00   1.19   2.87   3.25   6.75   9.37   3.44   0.00   1.18   0.00   0.00   0.00
     0.00
2004 1      7      3      0      48     4.88   0.00   0.00   0.00   0.00   0.00   0.00   0.05   0.00   0.05   0.00   0.25   1.18
     1.66   2.61   1.99   2.47   12.61  3.10   6.80   3.23   1.82   1.29   0.00   0.00   4.88   0.00   0.00   0.00   0.00   0.00
     0.00   0.16   0.00   0.16   0.25   0.00   1.11   2.28   5.05   3.90   8.68   11.79  16.91  0.82   0.00   0.00   0.00   0.00
     0.00
#NWFSC Combo survey (sample size is number of tows that caught Widow)
#year    Season  Fleet   gender  partition   nSamps  F8  F10 F12 F14 F16 F18 F20 F22 F24 F26 F28 F30 F32 F34 F36 F38 F40 F42 F44 F46 F48 F50
F52 F54 F56 M8  M10 M12 M14 M16 M18 M20 M22 M24 M26 M28 M30 M32 M34 M36 M38 M40 M42 M44 M46 M48 M50 M52 M54 M56
#weighted by GLMM numbers
2003    1   8   3   0   33  0.00    0.00    0.00    0.00    0.00    0.08    0.00    0.00    0.25    0.34    0.17    0.25    1.75    0.79
2.16    6.85    14.03   15.83   4.22    1.69    2.78    0.33    0.00    0.00    0.00    0.00    0.00    0.00    0.11    0.00    0.24    0.08
0.34    0.17    0.00    0.08    0.34    0.85    0.00    10.12   9.45    11.06   5.87    1.72    8.05    0.00    0.00    0.00    0.00    0.00
2004    1   8   3   0   17  0.00    0.00    0.00    0.00    0.00    0.00    0.05    0.00    0.13    0.26    0.48    0.81    0.62    0.62
1.37    8.23    14.08   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.05    0.20    3.92    0.49    0.57    1.37    0.00    24.69   27.63   0.00    14.43   0.00    0.00    0.00    0.00    0.00    0.00
2005    1   8   3   0   25  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.10    0.00    3.62    2.75
0.91    0.00    1.27    2.96    7.42    9.26    10.68   10.66   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.63    0.17    0.17    0.34    10.27   4.55    3.79    11.54   13.37   4.53    0.00    0.00    0.00    0.00    0.00
2006    1   8   3   0   38  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.34    2.41    5.51    4.14
4.35    1.08    2.23    3.16    2.71    5.54    13.14   3.72    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.31    0.00    0.00
0.00    0.00    0.00    0.34    5.66    4.82    6.48    2.24    7.39    4.32    7.00    8.98    0.37    0.37    0.00    3.40    0.00    0.00
2007    1   8   3   0   33  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.38
0.00    3.24    6.60    10.41   9.89    3.40    8.85    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.77    9.27    12.79   14.84   8.29    10.28   0.00    0.00    0.00    0.00    0.00
2008    1   8   3   0   18  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    7.22    0.00    7.55    4.61    12.84   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    6.74    4.47    0.00    2.69    0.00    2.18    0.00    11.11   7.26    19.34   13.97   0.00    0.00    0.00    0.00    0.00
2009    1   8   3   0   42  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.46    0.95    2.09    4.61    3.56    4.71
1.06    4.04    2.94    5.90    9.04    7.95    8.01    4.60    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    1.38    1.90    3.62    3.35    0.00    0.00    3.94    6.42    9.15    4.91    2.29    0.00    0.00    3.13    0.00    0.00
2010    1   8   3   0   44  0.00    0.00    0.00    0.00    0.00    0.00    0.20    0.79    0.20    0.00    0.00    0.00    0.00    0.00
0.38    4.10    11.53   15.54   15.56   7.58    0.65    5.48    0.13    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.20    0.00
0.98    0.20    0.00    0.00    0.00    2.52    0.83    0.38    3.57    9.86    4.74    8.97    3.10    0.00    2.52    0.00    0.00    0.00
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2011    1   8   3   0   53  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.98    0.00    0.00    0.00    0.63    2.76    7.70
3.62    0.83    2.34    4.78    5.11    2.97    7.52    2.91    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    1.08    0.21    1.64    3.06    5.07    2.06    1.64    7.54    9.88    17.03   7.38    0.31    0.98    0.00    0.00    0.00
2012    1   8   3   0   44  0.00    0.00    0.00    0.00    0.63    0.00    0.00    0.00    0.63    2.51    5.64    2.06    1.90    0.50
1.01    1.51    4.44    2.78    6.18    8.72    8.77    4.53    0.26    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.23    7.11    3.36    8.40    3.76    1.13    0.50    2.64    3.96    2.66    5.80    4.24    2.71    1.44    0.00    0.00    0.00    0.00
2013    1   8   3   0   43  0.00    0.00    0.00    0.00    0.00    0.06    0.18    1.89    5.46    5.39    7.12    5.73    6.61    2.19
0.83    1.30    0.40    1.49    5.01    2.85    2.43    2.29    0.33    0.00    0.00    0.00    0.00    0.00    0.06    0.18    0.42    0.42
1.60    4.95    3.01    3.86    6.24    3.86    3.31    1.85    5.37    3.23    4.50    5.25    0.33    0.00    0.00    0.00    0.00    0.00
2014    1   8   3   0   52  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.44    6.61    6.03    4.85
1.95    1.76    2.63    2.61    5.14    4.71    2.56    0.43    0.13    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.10    0.00    0.77    1.97    11.87   15.49   7.43    2.76    4.55    5.00    4.75    3.26    1.54    0.43    0.22    0.00    0.00    0.00
##########################################################################################################################################
#############################################

41  #_N_age_bins
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

2 #_N_ageerror_definitions
#Ageing error for NWFSC and SWFSC
#NWFSC
0.5 1.5 2.5 3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5    11.5    12.5    13.5    14.5    15.5    16.5    17.5    18.5    19.5    20.5    21.5    22.5
23.5    24.5    25.5    26.5    27.5    28.5    29.5    30.5    31.5    32.5    33.5    34.5    35.5    36.5    37.5    38.5    39.5    40.5
0.144685 0.144685 0.186767    0.232724    0.282913    0.337724    0.397582    0.462953    0.534344    0.612309    0.697454    0.79044 0.891989
1.00289 1.124   1.25627 1.40072 1.55847 1.73074 1.91888 2.12435 2.34874 2.59379 2.86141 3.15368 3.47285 3.82143 4.2021  4.61783 5.07184
5.56766 6.10914 6.70049 7.34629 8.05157 8.8218  9.66295 10.5816 11.5848 12.6804 13.8769
#SWFSC
0.515025    1.54508 2.57513 3.60518 4.63523 5.66528 6.69533 7.72538 8.75543 9.78548 10.8155 11.8456 12.8756 13.9057 14.9357 15.9658 16.9958
18.0259 19.0559 20.086  21.116  22.1461 23.1761 24.2062 25.2362 26.2663 27.2963 28.3264 29.3564 30.3865 31.4165 32.4466 33.4766 34.5067
35.5367 36.5668 37.5968 38.6269 39.6569 40.687  41.717
0.111336    0.111336    0.147152    0.187437    0.232748    0.283712    0.341034    0.405507    0.478023    0.559587    0.651326    0.75451
0.870568    1.0011  1.14793 1.31306 1.49881 1.70772 1.9427  2.20699 2.50425 2.8386  3.21467 3.63764 4.11339 4.6485  5.25036 5.9273  6.6887
7.54509 8.50833 9.59173 10.8103 12.1809 13.7225 15.4564 17.4066 19.6001 22.0673 24.8423 27.9635

388 #number of lines with age comps
3 #_Lbin_method: 1=poplenbins; 2=datalenbins; 3=lengths
2 #_combine males into females at or below this bin number

#year   Season  Fleet   gender  partition   ageErr  LbinLo  LbinHi  nSamps  F0  F1  F2  F3  F4  F5  F6  F7  F8  F9  F10 F11 F12 F13 F14 F15
F16 F17 F18 F19 F20 F21 F22 F23 F24 F25 F26 F27 F28 F29 F30 F31 F32 F33 F34 F35 F36 F37 F38 F39 F40 F0.1    F1.1    F2.1    F3.1    F4.1
F5.1    F6.1    F7.1    F8.1    F9.1    F10.1   F11.1   F12.1   F13.1   F14.1   F15.1   F16.1   F17.1   F18.1   F19.1   F20.1   F21.1   F22.1
F23.1   F24.1   F25.1   F26.1   F27.1   F28.1   F29.1   F30.1   F31.1   F32.1   F33.1   F34.1   F35.1   F36.1   F37.1   F38.1   F39.1   F40.1
#Bottom Trawl     (n=877)
#NWFSC survey
2003    1       8       1       0       1       40      40      1       0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    100.00
        0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
        0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
        0.00    0.00    0.00    0.00    100.00  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
        0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2003    1       8       1       0       1       48      48      4       0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
        0.00    0.00    0.00    0.00    26.13   26.13   0.00    23.87   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    23.87   0.00
```

	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.13	26.13	0.00	23.87	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	23.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	20	20	1	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	26	26	2	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	28	28	3	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	30	30	2	0.00	0.00	0.00	0.00	77.68	22.32	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.68
	22.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	32	32	2	0.00	0.00	0.00	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	34	34	2	0.00	0.00	0.00	0.00	0.00	77.68	22.32	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	77.68	22.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	36	36	2	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	38	38	1	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	1	8	1	0	1	40	40	1	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	28	28	2	0.00	0.00	0.00	0.00	0.00	35.49	64.51	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	35.49	64.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	32	32	2	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	34	34	1	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	36	36	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	40	40	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.66	0.00
	0.00	35.49	0.00	17.17	0.00	27.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	19.66	0.00	0.00	35.49	0.00	17.17	0.00	27.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	42	42	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	44	44	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.05
	0.00	0.00	0.00	0.00	0.00	15.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	84.05	0.00	0.00	0.00	0.00	0.00	15.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	46	46	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12.96	4.32	8.64	70.96	0.00	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	12.96	4.32	8.64	70.96	0.00	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	48	48	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	31.53	0.00	37.20	0.00	0.00	0.00	0.00	31.27	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.53	0.00	37.20	0.00	0.00	0.00	0.00	31.27	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	1	8	1	0	1	50	50	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.83	0.00	0.00	40.52	0.00	0.00	0.00	0.00	23.65
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.83	0.00	0.00	40.52
	0.00	0.00	0.00	0.00	23.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	30	30	3	0.00	0.00	0.00	0.00	0.00	33.33	66.67	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	33.33	66.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	32	32	3	0.00	0.00	0.00	0.00	0.00	33.33	33.33	33.33	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	33.33	33.33	33.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	36	36	4	0.00	0.00	0.00	0.00	0.00	0.00	77.52	0.00	22.48	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	77.52	0.00	22.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	38	38	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.95	34.05	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	65.95	34.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	40	40	4	0.00	0.00	0.00	0.00	0.00	0.00	19.96	28.99	35.19	15.86
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	19.96	28.99	35.19	15.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	42	42	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.59	50.41	0.00
	14.40	0.00	0.00	0.00	0.00	0.00	17.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	17.59	50.41	0.00	14.40	0.00	0.00	0.00	0.00	0.00	17.59	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	44	44	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	57.26
	0.00	0.00	0.00	0.00	0.00	31.08	11.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	57.26	0.00	0.00	0.00	0.00	0.00	31.08	11.66	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	46	46	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	16.71	52.84	0.00	0.00	4.82	0.00	0.00	0.00	22.14	0.00	0.00	0.00	3.48	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	16.71	52.84	0.00	0.00	4.82	0.00	0.00	0.00	22.14	0.00	0.00	0.00
	3.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	48	48	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	22.14	0.00	18.95	0.00	1.70	9.83	1.52	1.70	42.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	22.14	0.00	18.95	0.00	1.70	9.83	1.52	1.70	42.48	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	1	8	1	0	1	50	50	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	20.77	20.77	0.00	0.00	0.00	20.77	0.00	0.00	0.00	20.77	6.77	0.00	6.77
	0.00	0.00	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.77	20.77	0.00	0.00	0.00	20.77	0.00	0.00
	0.00	20.77	6.77	0.00	6.77	0.00	0.00	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	1	8	1	0	1	34	34	1	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	1	8	1	0	1	38	38	3	0.00	0.00	0.00	0.00	0.00	57.85	0.00	0.00	42.15	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	57.85	0.00	0.00	42.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	1	8	1	0	1	40	40	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.73	53.44	7.71
	7.02	0.00	0.00	0.00	0.00	0.00	12.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	19.73	53.44	7.71	7.02	0.00	0.00	0.00	0.00	0.00	12.09	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	1	8	1	0	1	42	42	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.39	20.19	42.31
	26.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	11.39	20.19	42.31	26.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	1	8	1	0	1	44	44	9.540129398		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.10
	0.00	35.09	16.61	9.37	11.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	27.10	0.00	35.09	16.61	9.37	11.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00																	
2007	1	8	1	0	1	46	46	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	53.18	0.00	46.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.18	0.00	46.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2007	1	8	1	0	1	48	48	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	9.99	25.71	7.87	27.42	17.71	0.00	0.00	0.00	0.00	0.00	11.30	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	9.99	25.71	7.87	27.42	17.71	0.00	0.00	0.00	0.00	0.00	11.30	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2008	1	8	1	0	1	38	38	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.61	47.39
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	52.61	47.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2008	1	8	1	0	1	42	42	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.61
	0.00	0.00	0.00	0.00	0.00	47.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	52.61	0.00	0.00	0.00	0.00	0.00	47.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2008	1	8	1	0	1	46	46	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	37.53	0.00	0.00	0.00	43.15	0.00	0.00	0.00	0.00	19.31	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.53	0.00	0.00	0.00	43.15	0.00	0.00	0.00	0.00	19.31
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	24	24	1	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	26	26	2	0.00	0.00	0.00	0.00	0.00	0.00	48.23	51.77	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	48.23	51.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	28	28	4	0.00	0.00	0.00	0.00	0.00	53.63	0.00	0.00	46.37	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	53.63	0.00	0.00	46.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	30	30	5	0.00	0.00	0.00	0.00	0.00	53.63	0.00	23.19	0.00	0.00
	23.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	53.63	0.00	23.19	0.00	0.00	23.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	32	32	2	0.00	0.00	0.00	0.00	0.00	0.00	50.00	50.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	50.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	34	34	6	0.00	0.00	0.00	0.00	0.00	24.06	0.00	12.03	17.53	0.00
	46.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	24.06	0.00	12.03	17.53	0.00	46.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	36	36	2	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00	50.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50.00	0.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	38	38	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.96	0.00	65.47
	21.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	12.96	0.00	65.47	21.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	40	40	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.75	29.92
	0.00	26.88	31.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	11.75	29.92	0.00	26.88	31.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	42	42	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.45
	21.81	18.86	17.18	0.00	0.00	0.00	4.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	37.45	21.81	18.86	17.18	0.00	0.00	0.00	4.70	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	44	44	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8.24	25.17	23.38	12.19	6.90	0.00	0.00	0.00	0.00	0.00	0.00	13.39	0.00	0.00	10.73	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	0.00	0.00	0.00	0.00	0.00	8.24	25.17	23.38	12.19	6.90	0.00	0.00	0.00	0.00	0.00	0.00	13.39	0.00
	0.00	10.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	46	46	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	20.03	25.45	12.28	10.97	0.00	6.87	13.73	0.00	10.67	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.03	25.45	12.28	10.97	0.00	6.87	13.73	0.00	10.67
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	48	48	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	9.24	9.24	0.00	8.27	9.74	45.95	8.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.24
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.24	9.24	0.00	8.27	9.74	45.95	8.30	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	9.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009	1	8	1	0	2	50	50	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.39	0.00	18.17	0.00	0.00	0.00	20.22	0.00	20.22	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.39	0.00	18.17	0.00	0.00	0.00
	20.22	0.00	20.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	20	20	1	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	22	22	4	0.00	0.00	75.03	0.00	24.97	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.03	0.00	24.97
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	24	24	1	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	36	36	2	0.00	0.00	0.00	0.00	0.00	0.00	76.81	23.19	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	76.81	23.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	38	38	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	40	40	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.46
	28.23	25.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	46.46	28.23	25.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	42	42	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10.59	76.15	0.95	12.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	0.00	0.00	0.00	0.00	0.00	10.59	76.15	0.95	12.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	44	44	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6.07	3.42	26.19	31.20	24.27	4.42	0.00	0.00	4.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	6.07	3.42	26.19	31.20	24.27	4.42	0.00	0.00	4.42	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	46	46	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7.91	10.14	12.02	17.57	26.18	0.00	0.00	0.00	0.00	26.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	7.91	10.14	12.02	17.57	26.18	0.00	0.00	0.00	0.00	26.18	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	48	48	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	32.57	18.18	0.00	32.57	0.00	16.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.57	18.18	0.00	32.57	0.00	16.67	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	1	8	1	0	2	50	50	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	19.30	7.88	0.00	29.70	43.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.30	7.88	0.00	29.70	43.12	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	22	22	1	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	30	30	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	32	32	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	34	34	6	0.00	0.00	0.00	0.00	0.00	29.70	0.00	58.98	0.00	11.32
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	29.70	0.00	58.98	0.00	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	36	36	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.93	54.75	11.32
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	33.93	54.75	11.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	38	38	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.02
	0.00	3.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	0.00	0.00	0.00	0.00	96.02	0.00	3.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	40	40	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.57	0.00
	0.00	29.81	7.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	62.57	0.00	0.00	29.81	7.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	42	42	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.00
	17.45	23.71	42.50	0.00	15.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.66	0.00	0.00	17.45	23.71	42.50	0.00	15.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	44	44	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05
	27.47	46.55	0.85	24.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	1.05	27.47	46.55	0.85	24.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	46	46	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	10.33	28.61	32.46	0.00	28.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.33	28.61	32.46	0.00	28.61	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	48	48	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	19.38	0.00	5.56	0.75	14.14	21.28	13.40	5.56	0.00	13.40	0.00	6.54	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.38	0.00	5.56	0.75	14.14	21.28	13.40	5.56	0.00	13.40
	0.00	6.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	1	8	1	0	1	50	50	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	3.06	45.13	23.98	0.00	0.00	0.00	0.00	0.00	23.98	0.00	0.00	0.00
	0.00	3.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.06	45.13	23.98	0.00	0.00	0.00	0.00
	0.00	23.98	0.00	0.00	0.00	0.00	3.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	26	26	3	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	28	28	4	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	30	30	1	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	32	32	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	38	38	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	40	40	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.90	33.61	0.00
	46.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	19.90	33.61	0.00	46.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	42	42	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	46.96	0.00	53.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	46.96	0.00	53.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	44	44	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.60
	5.91	11.94	70.90	5.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	5.60	5.91	11.94	70.90	5.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	46	46	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	9.48	0.00	7.73	74.24	0.00	0.00	0.00	0.00	0.00	8.55	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.48	0.00	7.73	74.24	0.00	0.00	0.00	0.00	0.00	8.55
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	48	48	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	4.52	0.00	0.00	3.92	49.49	8.46	0.00	0.00	8.85	0.00	24.75	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.52	0.00	0.00	3.92	49.49	8.46	0.00	0.00	8.85	0.00	24.75
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	50	50	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	1	8	1	0	1	52	52	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	8	8	0.5	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	18	18	1	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00

	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	20	20	3	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	22	22	3	0.00	0.00	0.00	86.57	13.43	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.57	13.43
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	24	24	10	0.00	0.00	0.00	95.22	2.85	1.93	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.22	2.85
	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	26	26	17	0.00	0.00	0.00	10.77	58.17	31.06	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.77	58.17
	31.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	28	28	11	0.00	0.00	0.00	6.43	64.72	28.86	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.43	64.72
	28.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	30	30	7	0.00	0.00	0.00	3.08	6.16	90.75	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.08	6.16
	90.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	32	32	5	0.00	0.00	0.00	0.00	0.00	80.00	0.00	20.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	80.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	34	34	4	0.00	0.00	0.00	0.00	0.00	87.10	12.90	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	87.10	12.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	36	36	5	0.00	0.00	0.00	0.00	0.00	0.00	87.17	12.83	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	87.17	12.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	38	38	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.43	0.00	86.57
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	0.00	0.00	13.43	0.00	86.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	40	40	3	0.00	0.00	0.00	0.00	0.00	23.36	0.00	0.00	0.00	0.00
	38.32	38.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	23.36	0.00	0.00	0.00	0.00	38.32	38.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	42	42	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	73.30	0.00	0.00	15.93	5.39	0.00	0.00	0.00	0.00	0.00	0.00	5.39	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	73.30	0.00	0.00	15.93	5.39	0.00	0.00	0.00	0.00	0.00	0.00	5.39	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	44	44	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	40.52	44.39	0.00	11.63	3.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.52	44.39	0.00	11.63	3.47	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	46	46	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	14.51	0.00	43.52	14.51	0.00	14.51	0.00	0.00	0.00	0.00	0.00	12.97	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.51	0.00	43.52	14.51	0.00	14.51	0.00	0.00	0.00	0.00	0.00
	12.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	48	48	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.41	17.41	34.81	0.00	6.48	0.00	0.00	0.00	6.48
	0.00	0.00	0.00	17.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.41	17.41	34.81	0.00
	6.48	0.00	0.00	0.00	6.48	0.00	0.00	0.00	17.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	1	8	1	0	1	50	50	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.67	16.67	33.33	0.00	0.00	0.00
	0.00	16.67	16.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.67
	16.67	33.33	0.00	0.00	0.00	0.00	16.67	16.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	28	28	4	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	30	30	16	0.00	0.00	0.00	0.00	33.83	0.00	44.12	0.00	22.06	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.83
	0.00	44.12	0.00	22.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	32	32	10	0.00	0.00	0.00	0.00	9.38	0.00	90.62	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.38
	0.00	90.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	34	34	7	0.00	0.00	0.00	0.00	8.96	4.49	51.93	17.31	17.31	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.96

	4.49	51.93	17.31	17.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	36	36	6	0.00	0.00	0.00	0.00	0.00	6.47	60.50	0.00	33.04	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6.47	60.50	0.00	33.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	38	38	9	0.00	0.00	0.00	0.00	0.00	0.69	2.77	29.73	66.80	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.69	2.77	29.73	66.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	40	40	13	0.00	0.00	0.00	0.00	0.00	0.00	6.95	17.64	9.74	54.38
	5.22	6.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	6.95	17.64	9.74	54.38	5.22	6.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	42	42	5	0.00	0.00	0.00	0.00	0.00	0.00	3.47	0.00	0.00	55.95
	25.72	0.00	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	3.47	0.00	0.00	55.95	25.72	0.00	14.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	44	44	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.97
	22.50	24.29	8.65	28.17	8.65	2.88	2.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	1.97	22.50	24.29	8.65	28.17	8.65	2.88	2.88	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	46	46	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	17.15	18.24	24.05	24.62	12.75	0.00	0.00	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	17.15	18.24	24.05	24.62	12.75	0.00	0.00	3.19	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	48	48	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	6.52	20.15	8.46	7.76	6.52	0.00	24.18	4.70	0.00	0.00	0.00	0.00	0.00	0.00	9.31	0.00
	0.00	0.00	12.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.52	20.15	8.46	7.76	6.52	0.00	24.18	4.70	0.00	0.00	0.00
	0.00	0.00	0.00	9.31	0.00	0.00	0.00	12.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	50	50	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	30.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	69.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	69.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014	1	8	1	0	1	52	52	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2003	1	8	2	0	1	36	36	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2003	1	8	2	0	1	42	42	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	89.448	0.000
	0.000	10.552	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	89.448	0.000	0.000	10.552	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2003	1	8	2	0	1	46	46	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	24	24	1	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	26	26	3	0.000	0.000	0.000	33.333	33.333	33.333	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.333	33.333
	33.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	28	28	3	0.000	0.000	0.000	0.000	9.095	90.905	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.095
	90.905	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	30	30	3	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	32	32	6	0.000	0.000	0.000	0.000	0.000	90.877	9.123	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	90.877	9.123	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	34	34	3	0.000	0.000	0.000	0.000	0.000	70.377	29.623	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	70.377	29.623	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	38	38	3	0.000	0.000	0.000	0.000	0.000	33.333	0.000	33.333	33.333	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33.333	0.000	33.333	33.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	40	40	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	42.651	0.000	0.000	0.000	50.144	0.000	0.000	0.000	7.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	0.000	0.000	0.000	42.651	0.000	0.000	0.000	50.144	0.000	0.000	0.000	7.205	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004	1	8	2	0	1	44	44	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	30	30	1	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	32	32	1	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	34	34	2	0.000	0.000	0.000	0.000	0.000	0.000	50.000	50.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	50.000	50.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	36	36	7	0.000	0.000	0.000	0.000	0.000	0.000	40.980	51.690	7.330	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	40.980	51.690	7.330	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	38	38	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	62.541	25.594	0.000
	0.000	6.017	5.848	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	62.541	25.594	0.000	0.000	6.017	5.848	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	40	40	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	77.275	0.000	0.000
	0.000	14.660	0.000	0.000	8.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	77.275	0.000	0.000	0.000	14.660	0.000	0.000	8.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	42	42	4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	51.542	7.973	32.512	0.000	7.973	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	51.542	7.973	32.512	0.000	7.973	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	44	44	7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	25.037	0.000	7.260	7.260	24.055	29.129	0.000	7.260	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	25.037	0.000	7.260	7.260	24.055	29.129	0.000	7.260	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005	1	8	2	0	1	46	46	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	70.961	29.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.961	29.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	16	16	1	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	30	30	3	0.000	0.000	0.000	0.000	55.861	0.000	35.186	8.952	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	55.861
	0.000	35.186	8.952	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	32	32	1	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	34	34	7	0.000	0.000	0.000	0.000	15.438	18.500	17.593	15.438	33.031	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.438
	18.500	17.593	15.438	33.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	36	36	3	0.000	0.000	0.000	0.000	0.000	0.000	32.407	67.593	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	32.407	67.593	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	38	38	6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	19.997	70.958	0.000
	0.000	0.000	0.000	0.000	9.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	19.997	70.958	0.000	0.000	0.000	0.000	0.000	9.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	40	40	6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.629	0.000	27.200
	28.629	0.000	0.000	15.542	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	28.629	0.000	27.200	28.629	0.000	0.000	15.542	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	42	42	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.781	8.303
	0.000	0.000	28.776	0.000	0.000	22.139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	40.781	8.303	0.000	0.000	28.776	0.000	0.000	22.139	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	44	44	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	26.189	0.000	26.189	10.664	0.000	18.479	0.000	0.000	0.000	18.479	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	26.189	0.000	26.189	10.664	0.000	18.479	0.000	0.000	0.000	18.479	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	46	46	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	48	48	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2006	1	8	2	0	1	52	52	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	1	8	2	0	1	38	38	7	0.000	0.000	0.000	0.000	0.000	12.831	0.000	11.345	58.112	17.711
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	12.831	0.000	11.345	58.112	17.711	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	1	8	2	0	1	40	40	10	0.000	0.000	0.000	0.000	0.000	0.000	12.704	15.292	26.144	18.499
	0.000	27.361	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	12.704	15.292	26.144	18.499	0.000	27.361	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	1	8	2	0	1	42	42	11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.086	39.952
	14.063	12.999	9.609	0.000	5.292	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	18.086	39.952	14.063	12.999	9.609	0.000	5.292	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2007	1	8	2	0	1	44	44	7.459870602		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.331
	0.000	0.000	24.620	0.000	23.402	9.078	0.000	17.492	9.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	16.331	0.000	0.000	24.620	0.000	23.402	9.078	0.000	17.492	9.078	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000																	
2007	1	8	2	0	1	46	46	6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	38.345	6.052	0.000	0.000	0.000	0.000	15.728	0.000	0.000	6.052	0.000	33.822	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	38.345	6.052	0.000	0.000	0.000	0.000	15.728	0.000	0.000	6.052	0.000	33.822	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	26	26	2	0.000	0.000	0.000	0.000	52.607	47.393	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	52.607
	47.393	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	28	28	1	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	32	32	1	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	40	40	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.657
	9.657	80.686	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	9.657	9.657	80.686	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	42	42	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	44	44	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	34.213	0.000	0.000	32.893	32.893	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	34.213	0.000	0.000	32.893	32.893	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2008	1	8	2	0	1	46	46	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	42.615	0.000	0.000	0.000	0.000	57.385	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	42.615	0.000	0.000	0.000	0.000	57.385	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	26	26	3	0.000	0.000	0.000	0.000	0.000	33.333	0.000	66.667	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	33.333	0.000	66.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	28	28	4	0.000	0.000	0.000	0.000	0.000	69.084	15.458	0.000	15.458	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	69.084	15.458	0.000	15.458	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	30	30	4	0.000	0.000	0.000	0.000	0.000	53.626	0.000	23.187	23.187	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	53.626	0.000	23.187	23.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	32	32	3	0.000	0.000	0.000	0.000	0.000	0.000	53.626	46.374	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	53.626	46.374	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	38	38	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	84.749	15.251	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	84.749	15.251	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	40	40	8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	61.326
	29.278	0.000	0.000	0.000	9.396	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	0.000	61.326	29.278	0.000	0.000	0.000	9.396	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	42	42	12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	18.840	51.061	0.000	2.974	17.907	6.243	2.974	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	18.840	51.061	0.000	2.974	17.907	6.243	2.974	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	44	44	6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	29.326	20.964	0.000	21.040	20.964	0.000	7.706	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.326	20.964	0.000	21.040	20.964	0.000	7.706	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	46	46	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	27.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.538	0.000	37.994	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.468	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	34.538	0.000	37.994	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2009	1	8	2	0	2	52	52	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	18	18	1	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	22	22	5	0.000	0.000	80.013	19.987	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	80.013	19.987	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	24	24	1	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	32	32	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	34	34	1	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	36	36	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	38	38	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	72.819
	0.000	27.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	72.819	0.000	27.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	40	40	11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.396
	44.153	50.611	1.783	0.000	2.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	1.396	44.153	50.611	1.783	0.000	2.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	42	42	11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	19.927
	26.286	7.205	14.078	13.256	0.000	4.393	0.000	5.295	0.000	9.559	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	19.927	26.286	7.205	14.078	13.256	0.000	4.393	0.000	5.295	0.000	9.559	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	44	44	8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	4.239	57.461	19.597	2.399	14.037	0.000	0.000	0.000	0.000	0.000	0.000	2.267	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.239	57.461	19.597	2.399	14.037	0.000	0.000	0.000	0.000	0.000	0.000
	2.267	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	46	46	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	69.033	30.967	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	69.033	30.967	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2010	1	8	2	0	2	50	50	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	26	26	1	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	28	28	1	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	30	30	1	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	32	32	5	0.000	0.000	0.000	0.000	0.000	34.157	0.000	58.293	7.550	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	34.157	0.000	58.293	7.550	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	34	34	10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	97.462	1.269	1.269
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	97.462	1.269	1.269	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	36	36	5	0.000	0.000	0.000	0.000	0.000	0.000	8.171	72.966	0.000	9.432
	9.432	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	8.171	72.966	0.000	9.432	9.432	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	38	38	2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	40	40	10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.787
	70.108	9.866	9.396	9.843	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.787	70.108	9.866	9.396	9.843	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	42	42	15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.270
	0.000	58.282	12.182	0.000	0.000	11.367	17.899	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.270	0.000	58.282	12.182	0.000	0.000	11.367	17.899	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	44	44	22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	20.970	14.116	6.215	0.742	5.360	24.450	5.311	4.086	0.000	5.360	7.333	0.000	0.000	0.869	0.987	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	4.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	20.970	14.116	6.215	0.742	5.360	24.450	5.311	4.086	0.000	5.360	7.333	0.000	0.000
	0.869	0.987	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	46	46	10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	8.697	17.396	0.000	0.000	17.640	17.816	23.742	0.000	0.000	0.000	8.697	6.012	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	8.697	17.396	0.000	0.000	17.640	17.816	23.742	0.000	0.000	0.000	8.697	6.012	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	48	48	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2011	1	8	2	0	1	50	50	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	22	22	1	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000

	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	24	24	3	0.000	0.000	0.000	2.828	97.172	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.828	97.172
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	26	26	1	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	28	28	3	0.000	0.000	0.000	0.000	95.012	4.988	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	95.012
	4.988	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	30	30	3	0.000	0.000	0.000	0.000	33.333	66.667	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.333
	66.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	32	32	1	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	36	36	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	25.775	74.225	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	25.775	74.225	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	38	38	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	40	40	4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.974	0.000	0.000
	0.000	0.000	68.147	12.879	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	18.974	0.000	0.000	0.000	0.000	68.147	12.879	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	42	42	4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	83.160	0.000	13.568	0.000	0.000	0.000	3.272	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	83.160	0.000	13.568	0.000	0.000	0.000	3.272	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	44	44	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	18.901	69.128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	6.858	0.000	5.113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.901	69.128	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.858	0.000	5.113	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	46	46	4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	74.241	0.000	8.454	0.000	0.000	0.000	0.000	9.322	0.000	0.000	7.983	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	74.241	0.000	8.454	0.000	0.000	0.000	0.000	9.322	0.000	0.000
	7.983	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2012	1	8	2	0	1	48	48	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	8	8	0.5	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	14	14	1	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	16	16	3	0.000	0.000	34.735	65.265	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.735	65.265	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	18	18	7	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	20	20	6	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	22	22	2	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	24	24	21	0.000	0.000	0.000	98.833	1.167	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.833	1.167
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	26	26	11	0.000	0.000	0.000	40.278	59.722	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.278	59.722

	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	28	28	14	0.000	0.000	0.000	4.699	23.991	69.713	1.596	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.699	23.991
	69.713	1.596	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	30	30	10	0.000	0.000	0.000	0.000	7.999	54.901	37.100	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.999
	54.901	37.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	32	32	5	0.000	0.000	0.000	0.000	0.000	8.524	91.476	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	8.524	91.476	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	34	34	2	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	36	36	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.616	73.179	2.204
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	24.616	73.179	2.204	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	38	38	7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.125	75.675	5.105
	5.105	3.111	9.878	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	1.125	75.675	5.105	5.105	3.111	9.878	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	40	40	5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	67.910	0.000
	0.927	0.000	10.312	20.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	67.910	0.000	0.927	0.000	10.312	20.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	42	42	17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	5.105	6.012	0.324	2.844	68.537	4.918	0.000	3.168	0.000	8.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	1.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	5.105	6.012	0.324	2.844	68.537	4.918	0.000	3.168	0.000	8.053	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	44	44	12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	2.584	1.733	5.168	2.584	78.447	1.733	0.000	0.000	7.752	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.584	1.733	5.168	2.584	78.447	1.733	0.000	0.000	7.752
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2013	1	8	2	0	1	46	46	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	22	22	1	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	26	26	2	0.000	0.000	0.000	0.000	9.383	0.000	90.617	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.383
	0.000	90.617	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	28	28	5	0.000	0.000	0.000	0.000	100.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	30	30	27	0.000	0.000	0.000	0.000	8.796	8.824	74.141	8.238	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.796
	8.824	74.141	8.238	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	32	32	23	0.000	0.000	0.000	0.000	6.686	5.927	82.104	5.283	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.686
	5.927	82.104	5.283	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	34	34	9	0.000	0.000	0.000	0.000	0.000	6.469	63.792	14.869	14.869	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6.469	63.792	14.869	14.869	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	36	36	10	0.000	0.000	0.000	0.000	0.000	2.467	8.493	7.260	66.028	7.260
	8.493	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2.467	8.493	7.260	66.028	7.260	8.493	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	38	38	14	0.000	0.000	0.000	0.000	0.000	1.156	1.156	22.050	54.990	1.156
	11.783	0.000	7.711	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1.156	1.156	22.050	54.990	1.156	11.783	0.000	7.711	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	40	40	17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.112	6.176	9.717
	3.926	45.440	10.950	10.753	0.000	3.926	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	9.112	6.176	9.717	3.926	45.440	10.950	10.753	0.000	3.926	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2014	1	8	2	0	1	42	42	16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.188
	11.832	22.496	15.595	16.140	2.305	11.287	2.157	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

```
        0.000  0.000  0.000  0.000  18.188 11.832 22.496 15.595 16.140 2.305  11.287 2.157  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
2014    1      8      2      0      1      44     44     17     0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        7.075  7.602  13.589 7.602  8.468  16.070 9.335  7.075  4.055  14.677 0.000  0.000  0.000  4.451  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  7.075  7.602  13.589 7.602  8.468  16.070 9.335  7.075  4.055  14.677 0.000  0.000  0.000
        4.451  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
2014    1      8      2      0      1      46     46     4      0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  28.960 0.000  0.000  28.960 0.000  16.200 0.000  25.881 0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  28.960 0.000  0.000  28.960 0.000  16.200 0.000  25.881 0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
2014    1      8      2      0      1      48     48     2      0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  30.799 0.000  0.000  0.000  0.000  0.000  0.000  0.000  69.201 0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  30.799 0.000  0.000  0.000  0.000  0.000
        0.000  0.000  69.201 0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
2014    1      8      2      0      1      50     50     2      0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  35.873 0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  64.127 0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  35.873 0.000  0.000  0.000
        0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  64.127 0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.000
#MARGINAL AGE COMPS (not fitted to if conditionals are in)
#year   Season  Fleet   gender  partition   ageErr  LbinLo  LbinHi  nSamps  F0  F1  F2  F3  F4  F5  F6  F7  F8  F9  F10 F11 F12 F13 F14 F15
F16 F17 F18 F19 F20 F21 F22 F23 F24 F25 F26 F27 F28 F29 F30 F31 F32 F33 F34 F35 F36 F37 F38 F39 F40 F0.1    F1.1    F2.1    F3.1    F4.1
F5.1    F6.1    F7.1    F8.1    F9.1    F10.1   F11.1   F12.1   F13.1   F14.1   F15.1   F16.1   F17.1   F18.1   F19.1   F20.1   F21.1   F22.1
F23.1   F24.1   F25.1   F26.1   F27.1   F28.1   F29.1   F30.1   F31.1   F32.1   F33.1   F34.1   F35.1   F36.1   F37.1   F38.1   F39.1   F40.1
#Bottom Trawl
1978    1  1    3  2    2  -1   -1  21  0.00    0.00    0.00    0.00    0.00    0.02    0.49    10.50   18.97   4.02    3.50    1.79    0.00
6.35    0.04    0.50    0.49    0.00    1.01    0.02    0.00    0.00    0.49    0.00    0.13    1.75    0.02    0.00    0.00    0.00    0.02
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.49    1.75    0.00    0.00    0.00    0.00    0.00    0.00    0.13    3.67
5.46    10.52   4.51    5.73    1.98    1.75    0.50    1.88    3.50    0.02    1.75    0.17    1.75    2.06    0.00    0.35    0.00    1.75
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.18    0.00    0.00    0.00
1979    1  1    3  2    2  -1   -1  106 0.00    0.00    0.00    0.00    0.00    0.14    0.10    1.72    7.94    16.93   6.84    6.97    3.49
4.33    2.02    2.92    3.08    1.99    1.02    2.32    0.49    1.58    0.19    1.66    1.94    0.00    0.17    0.00    0.00    0.00    0.40
0.00    0.00    0.00    0.38    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.10    1.37
2.09    7.04    3.09    3.06    2.27    1.24    2.34    0.43    2.44    1.18    0.80    0.01    0.40    1.32    0.28    0.38    0.37    0.40
0.59    0.19    0.00    0.00    0.00    0.00    0.00    0.01    0.01    0.00    0.00    0.00    0.00    0.00    0.00
1980    1  1    3  2    2  -1   -1  127 0.00    0.00    0.00    0.00    0.00    0.40    1.29    0.62    2.22    6.49    10.65   7.86    6.03
5.44    5.19    2.63    2.17    2.92    3.17    0.70    1.20    1.53    0.31    0.03    0.12    1.11    0.72    0.28    0.59    0.00    0.28
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.07    0.56    0.54
1.38    4.00    3.95    2.58    4.21    2.41    2.34    1.23    3.78    0.49    1.80    0.81    0.45    1.21    0.28    1.07    0.67    0.01
0.40    0.23    0.14    0.00    0.00    0.00    0.17    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.28
1981    1  1    3  2    2  -1   -1  111 0.00    0.00    0.00    0.00    1.08    0.49    2.80    4.68    3.47    2.73    8.67    8.95    4.92
3.19    3.01    4.00    4.90    1.71    1.98    2.30    0.09    0.37    0.14    1.12    0.56    0.00    0.00    0.56    0.00    0.13    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.56    0.00    0.00    0.00    0.00    0.00    0.00    0.35    1.19    0.94    3.57    2.35
4.55    3.45    6.91    4.54    2.62    1.28    0.86    0.76    0.67    1.05    0.13    0.14    0.16    0.56    0.08    0.63    0.12    0.13
0.56    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1982    1  1    3  2    2  -1   -1  287 0.00    0.00    0.11    0.00    0.62    7.41    1.31    6.22    4.29    2.73    1.27    2.08    7.05
3.71    2.68    3.12    2.12    1.96    2.02    1.93    0.87    0.96    1.33    0.26    0.24    0.21    0.24    0.57    0.28    0.30    0.11
0.08    0.03    0.17    0.00    0.00    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.68    8.19    0.90    4.44
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3.52	2.17	1.58	3.19	6.44	2.73	2.34	1.92	1.00	0.46	0.79	0.44	0.70	0.48	0.45	0.28	0.25	0.26
0.00	0.34	0.09	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02			
1983	1 1	3 2	2 -1	-1 433	0.00	0.00	0.00	0.00	0.83	4.54	10.49	2.43	5.08	2.91	3.04	1.38	2.83
4.52	2.30	1.17	1.73	0.92	1.69	1.89	0.84	1.04	0.81	0.68	0.86	0.75	0.09	0.48	0.92	0.61	0.13
0.40	0.21	0.49	0.01	0.16	0.12	0.18	0.10	0.20	0.45	0.00	0.00	0.00	0.00	0.34	4.71	12.27	2.81
2.90	1.56	0.77	0.63	1.96	4.10	0.91	1.11	1.29	0.65	1.27	0.86	0.26	0.47	0.38	0.55	0.60	0.42
0.51	0.05	0.18	0.25	0.21	0.08	0.04	0.03	0.00	0.14	0.01	0.19	0.00	0.00	0.20			
1984	1 1	3 2	2 -1	-1 519	0.00	0.00	0.00	0.00	0.00	2.52	10.18	14.07	3.39	2.27	1.56	1.02	0.64
1.33	2.89	1.34	0.71	0.80	0.52	0.78	1.12	0.69	0.53	0.49	0.65	0.19	0.55	0.15	0.09	0.43	0.01
0.12	0.01	0.04	0.02	0.04	0.01	0.00	0.09	0.00	0.04	0.00	0.00	0.00	0.00	0.00	3.25	14.56	12.19
3.20	2.96	1.64	0.92	0.62	1.42	2.00	1.65	0.92	0.98	0.72	0.53	0.47	0.31	0.17	0.07	0.29	0.15
0.45	0.04	0.03	0.42	0.01	0.02	0.17	0.07	0.37	0.00	0.02	0.01	0.00	0.00	0.11			
1985	1 1	3 2	2 -1	-1 506	0.00	0.00	0.00	0.01	0.02	0.74	4.62	8.99	15.05	2.15	4.37	1.55	0.71
0.15	2.11	4.05	0.39	0.92	1.39	0.83	1.00	1.06	0.87	0.66	0.88	0.69	0.22	0.04	0.17	0.05	0.26
0.03	0.06	0.39	0.29	0.06	0.03	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.00	0.38	1.69	4.47	9.47
9.56	1.57	2.64	1.81	0.38	0.62	1.35	4.81	0.41	0.40	0.58	0.44	0.81	1.11	0.30	0.21	0.39	0.22
0.23	0.13	0.06	0.00	0.40	0.05	0.23	0.07	0.09	0.08	0.03	0.01	0.01	0.01	0.06			
1986	1 1	3 2	2 -1	-1 472	0.00	0.00	0.00	0.00	0.33	2.57	4.48	5.47	7.20	8.81	1.42	2.10	1.45
0.31	0.14	0.54	5.92	1.94	1.75	1.07	1.38	0.97	0.36	0.47	0.52	0.20	0.29	0.04	0.12	0.16	0.04
0.48	0.25	0.43	0.14	0.24	0.29	0.00	0.22	0.00	0.23	0.00	0.00	0.00	0.00	0.59	2.67	5.86	6.36
9.67	10.38	0.80	2.06	1.68	0.16	0.10	0.44	2.73	0.59	0.27	0.52	0.38	0.58	0.17	0.27	0.16	0.17
0.36	0.19	0.10	0.05	0.01	0.18	0.00	0.01	0.06	0.02	0.00	0.05	0.01	0.04	0.00			
1987	1 1	3 2	2 -1	-1 355	0.00	0.00	0.00	0.26	0.08	0.97	5.94	7.78	6.46	6.57	6.44	0.63	2.69
0.71	1.01	0.10	1.64	1.68	0.79	0.54	0.36	0.24	0.94	0.22	0.28	0.84	0.29	0.23	0.23	0.02	0.21
0.01	0.10	0.00	0.02	0.02	0.02	0.05	0.00	0.00	0.27	0.00	0.00	0.00	0.26	0.03	1.24	4.94	8.78
7.45	5.37	11.13	0.52	2.36	1.61	0.06	0.00	1.00	2.19	0.79	0.58	0.40	0.83	0.11	0.19	0.48	0.00
0.03	0.01	0.04	0.12	0.21	0.00	0.08	0.05	0.11	0.09	0.00	0.24	0.00	0.00	0.05			
1988	1 1	3 2	2 -1	-1 324	0.00	0.00	0.00	1.24	7.92	0.76	4.66	10.89	6.87	4.35	3.19	3.17	1.03
0.98	0.88	0.40	0.35	0.48	1.02	0.57	0.42	0.35	0.51	1.02	0.60	0.53	0.17	0.40	0.19	0.01	0.21
0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.29	4.60	1.30	5.58	11.32
8.02	4.99	1.84	2.46	0.65	0.48	0.51	0.20	0.16	0.64	1.22	0.34	0.23	0.07	0.11	0.36	0.42	0.09
0.02	0.06	0.01	0.02	0.01	0.29	0.00	0.03	0.19	0.00	0.00	0.00	0.00	0.00	0.16			
1989	1 1	3 2	2 -1	-1 402	0.00	0.00	0.00	0.00	0.95	7.38	5.49	5.17	12.04	7.03	3.19	2.75	1.64
0.74	0.57	0.63	0.28	0.17	0.27	0.48	0.59	0.25	0.18	0.12	0.19	0.19	0.16	0.07	0.04	0.14	0.00
0.02	0.16	0.07	0.04	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	8.18	5.71	6.52
12.56	5.65	2.98	1.68	0.88	0.63	0.62	0.39	0.02	0.10	0.31	0.53	0.25	0.22	0.15	0.03	0.04	0.07
0.02	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1990	1 1	3 2	2 -1	-1 449	0.00	0.00	0.00	0.08	0.27	4.24	9.20	4.97	5.40	8.25	7.04	3.03	1.95
1.49	0.74	0.83	0.20	0.19	0.17	0.30	0.98	0.31	0.10	0.13	0.24	0.07	0.11	0.04	0.01	0.00	0.02
0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.29	5.20	10.73	4.83
5.54	8.61	4.10	2.22	1.92	1.57	0.97	0.41	0.62	0.37	0.05	0.15	0.63	0.18	0.12	0.33	0.13	0.09
0.09	0.00	0.03	0.06	0.16	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.06	0.00	0.00			
1991	1 1	3 2	2 -1	-1 537	0.00	0.00	0.00	0.05	1.37	2.25	6.75	7.48	5.47	5.55	8.11	4.21	2.75
2.54	0.88	0.65	0.56	0.36	0.07	0.32	0.31	1.13	0.32	0.34	0.32	0.26	0.03	0.08	0.02	0.23	0.02
0.05	0.00	0.00	0.01	0.00	0.21	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	2.49	2.13	8.42	9.95
5.93	3.86	6.27	2.98	1.11	1.35	0.56	0.14	0.57	0.10	0.07	0.09	0.13	0.36	0.19	0.14	0.03	0.07
0.00	0.03	0.06	0.00	0.13	0.05	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1992	1 1	3 2	2 -1	-1 485	0.00	0.00	0.00	0.00	0.01	1.12	2.14	9.72	9.36	5.90	4.44	6.98	3.84
2.90	2.21	1.16	0.35	0.40	0.12	0.24	0.30	0.46	0.55	0.29	0.28	0.32	0.16	0.08	0.08	0.01	0.02
0.16	0.09	0.02	0.01	0.00	0.00	0.15	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.08	1.90	2.94	10.52

7.42	5.00	2.74	5.19	2.27	2.42	1.40	0.68	0.47	0.63	0.15	0.22	0.40	0.18	0.60	0.26	0.03	0.04
0.12	0.00	0.03	0.26	0.00	0.00	0.12	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.00			
1993	1 1	3 2	2 -1	-1 352	0.00	0.00	0.00	0.00	0.01	0.36	3.98	4.34	10.21	7.05	3.67	3.50	5.02
3.64	2.25	1.53	1.57	0.73	0.81	0.55	0.31	0.28	0.39	0.76	0.27	0.05	0.60	0.01	0.13	0.11	0.02
0.00	0.09	0.02	0.00	0.04	0.00	0.02	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	1.45	4.60	4.04
9.82	6.71	3.70	2.79	4.70	2.74	2.10	1.40	0.59	0.38	0.49	0.06	0.28	0.02	0.08	0.61	0.06	0.20
0.16	0.17	0.04	0.04	0.01	0.00	0.05	0.04	0.12	0.01	0.00	0.00	0.08	0.00	0.12			
1994	1 1	3 2	2 -1	-1 368	0.00	0.00	0.00	0.14	0.26	1.06	4.36	10.01	6.33	5.84	5.92	4.28	2.31
5.44	2.57	1.82	1.19	1.25	0.55	0.56	0.26	0.33	0.04	0.14	0.41	0.05	0.41	0.10	0.01	0.15	0.04
0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.32	1.31	5.51	11.32
7.67	4.60	1.78	2.41	2.48	2.16	0.80	0.65	0.71	0.85	0.31	0.03	0.42	0.04	0.01	0.07	0.11	0.01
0.00	0.02	0.20	0.13	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.01	0.00	0.00	0.00			
1995	1 1	3 2	2 -1	-1 217	0.00	0.00	0.00	0.00	1.27	2.29	2.41	8.10	9.51	4.80	5.40	4.00	1.59
1.56	1.72	0.47	0.33	0.64	0.25	0.19	0.34	0.14	0.14	0.09	0.06	0.03	0.00	0.01	0.00	0.00	0.00
0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41	3.36	8.19	6.68
15.61	4.06	5.65	3.19	1.27	1.63	1.07	1.21	0.32	0.38	0.37	0.00	0.00	0.00	0.05	0.13	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1996	1 1	3 2	2 -1	-1 296	0.00	0.00	0.00	0.29	0.94	5.97	7.37	7.36	9.18	5.55	3.40	3.84	3.13
1.37	0.88	2.76	0.09	0.16	0.72	0.22	0.10	0.44	0.00	0.06	0.06	0.11	0.12	0.00	0.00	0.00	0.00
0.00	0.06	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.31	5.44	7.08	6.85
7.18	6.48	2.53	2.10	2.15	1.12	0.27	1.49	0.42	0.57	0.55	0.35	0.00	0.06	0.00	0.16	0.06	0.00
0.27	0.00	0.00	0.00	0.00	0.09	0.12	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00			
1997	1 1	3 2	2 -1	-1 371	0.00	0.00	0.00	0.01	0.76	2.68	10.08	7.98	4.37	4.52	3.22	3.37	2.24
1.73	1.63	0.82	1.61	0.70	0.23	0.37	0.31	0.06	0.27	0.18	0.01	0.01	0.15	0.13	0.01	0.04	0.00
0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	3.65	19.69	9.20
4.74	3.90	2.61	1.67	2.16	1.02	0.85	0.27	0.76	0.25	0.32	0.09	0.18	0.11	0.03	0.01	0.14	0.00
0.00	0.00	0.01	0.00	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07			
1998	1 1	3 2	2 -1	-1 345	0.00	0.00	0.00	0.00	0.10	4.60	4.10	10.15	8.60	5.29	3.12	2.97	2.48
1.96	1.27	1.41	0.43	1.04	0.20	0.17	0.10	0.55	0.09	0.02	0.02	0.00	0.00	0.00	0.00	0.09	0.00
0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	4.85	5.22	13.84
9.69	4.57	2.99	2.35	1.84	1.33	1.19	0.41	0.20	0.62	0.03	0.15	0.26	0.16	0.12	0.28	0.00	0.15
0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00			
1999	1 1	3 2	2 -1	-1 295	0.00	0.00	0.00	0.01	0.37	2.53	8.04	5.99	9.84	5.51	3.46	2.35	1.75
2.22	0.91	1.09	0.67	0.15	0.37	0.17	0.20	0.04	0.14	0.09	0.11	0.02	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.44	3.24	9.89	10.64
13.02	6.24	2.89	1.68	0.81	1.08	0.91	0.35	0.30	0.20	0.51	0.28	0.55	0.29	0.16	0.11	0.04	0.23
0.05	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02			
2000	1 1	3 2	2 -1	-1 45	0.00	0.00	0.00	0.00	0.00	0.11	9.10	12.86	12.89	3.83	5.99	9.26	9.06
0.88	3.56	0.02	7.62	0.00	2.89	0.00	0.01	0.00	0.00	0.00	0.00	0.00	2.75	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	1.09	1.97
2.13	5.55	1.24	3.14	2.96	0.42	0.14	0.28	0.14	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2001	1 1	3 2	2 -1	-1 27	0.00	0.00	0.00	0.00	0.00	1.81	1.81	9.64	5.69	4.14	2.69	3.80	2.93
6.29	2.38	1.39	0.98	0.00	1.67	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.82	1.81	8.82	13.46
6.71	3.93	4.29	4.12	1.03	3.53	1.96	0.14	0.00	0.00	0.00	0.13	0.69	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2002	1 1	3 2	2 -1	-1 105	0.00	0.00	0.00	0.00	2.97	2.07	1.19	3.36	4.44	5.19	13.41	1.68	6.61
2.62	1.30	1.01	0.31	0.28	0.29	0.12	0.08	0.08	0.08	0.08	0.42	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.80	1.99	2.89	4.92

8.47	4.42	13.01	3.73	2.60	1.95	0.77	0.83	0.46	0.70	0.00	0.36	0.00	0.00	0.20	0.08	0.00	0.08
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2003	1 1	3 2	2 -1	-1 15	0.00	0.00	0.00	1.26	39.05	3.78	0.00	0.00	1.26	0.73	2.71	0.73	0.00
0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.46	1.26	0.73	1.45
3.97	4.70	4.70	0.00	1.99	0.00	0.73	1.26	1.26	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2004	1 1	3 2	2 -1	-1 5	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	12.35	10.95	17.35
0.00	0.00	0.00	0.00	12.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00
0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	10.95	17.35	0.00	17.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2005	1 1	3 2	2 -1	-1 8	0.00	0.00	0.00	0.00	0.00	0.00	8.46	15.34	13.71	1.21	1.21	0.00	0.00
0.00	1.21	0.00	0.00	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.82	21.77
10.89	8.46	4.03	4.03	0.00	2.82	0.00	2.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2006	1 1	3 2	2 -1	-1 29	0.00	0.00	0.00	0.00	0.00	0.71	6.02	12.60	7.09	9.93	4.30	4.22	2.19
2.10	2.69	2.61	1.00	0.99	0.99	0.00	0.00	0.00	0.00	0.00	1.01	0.30	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	2.13	8.23
2.44	3.02	5.17	1.30	3.09	2.14	1.72	1.91	1.98	0.71	0.99	1.46	0.99	0.73	0.73	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00			
2007	1 1	3 2	2 -1	-1 76	0.00	0.00	0.00	0.00	0.00	0.00	0.96	2.41	3.62	5.49	49.29	2.77	1.35
5.77	1.80	1.49	1.05	0.45	0.13	0.61	0.26	0.00	0.71	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.12
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.44	1.58
2.82	5.26	1.36	1.81	2.14	0.98	0.65	0.78	1.12	0.00	0.71	1.02	0.00	0.12	0.19	0.00	0.00	0.35
0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2008	1 1	3 2	2 -1	-1 77	0.00	0.00	0.00	0.00	0.00	0.00	4.19	0.58	7.48	3.39	7.47	4.85	3.59
3.26	2.44	2.84	2.13	4.31	2.82	2.33	1.58	1.59	1.32	0.95	0.21	0.61	0.12	0.65	0.00	0.24	0.20
0.25	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.21	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.94
5.57	7.27	6.71	5.03	2.77	3.91	2.18	1.56	0.20	0.00	0.00	0.12	0.90	0.00	0.68	0.20	0.22	0.00
0.57	0.21	0.24	0.24	0.00	0.00	0.12	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00			
2009	1 1	3 2	2 -1	-1 87	0.00	0.00	0.00	0.00	0.00	0.15	0.23	1.11	0.37	3.02	30.88	5.33	3.43
3.24	2.54	2.69	2.47	1.15	1.53	0.91	1.19	0.71	0.44	0.57	0.25	0.31	0.54	0.00	0.00	0.00	0.23
0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.17	0.88
2.62	3.82	8.84	4.51	3.98	3.32	2.60	1.97	0.86	0.61	0.31	0.59	0.29	0.00	0.65	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00			
2010	1 1	3 2	2 -1	-1 75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	2.77	0.69	7.34	8.72	4.63
4.70	4.06	2.37	3.31	0.87	1.01	0.88	0.87	0.66	0.66	1.25	0.69	0.66	0.00	0.00	0.00	0.37	0.29
0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.58
1.97	1.80	7.59	19.23	3.17	3.61	3.15	2.77	0.93	1.89	1.09	0.88	1.28	0.00	0.40	0.29	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.37			
2011	1 1	3 2	1 -1	-1 32	0.00	0.00	0.00	0.00	0.00	5.55	0.00	10.14	6.31	4.05	2.38	3.08	2.60
4.01	2.94	2.34	2.75	1.84	0.33	0.33	0.94	0.94	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	6.44	0.00	3.77
11.74	7.31	2.53	0.94	4.81	1.21	1.54	2.15	0.29	3.36	0.00	0.61	0.34	0.00	0.00	0.61	0.00	0.61
0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2012	1 1	3 2	1 -1	-1 26	0.00	0.00	0.00	0.00	0.00	0.00	3.36	0.39	6.75	1.70	1.56	8.73	11.18
2.63	5.85	3.34	4.34	1.32	1.42	0.39	0.00	0.39	1.03	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.93
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.81	0.78

```
1.88    4.11    0.00    10.92   6.43    8.39    4.28    1.70    2.35    0.00    0.00    0.93    0.00    0.00    0.39    0.32    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2013    1   1   3   2   1   -1  -1  37  0.00    0.00    0.00    0.00    0.00    4.30    0.67    7.71    4.13    4.40    1.42    1.82    10.01
3.83    4.81    3.47    4.02    1.46    1.64    0.50    1.15    0.10    0.10    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.10    0.00    0.00    0.00    0.00    0.00    5.67    3.50    7.69
2.27    5.20    1.42    0.80    2.27    5.58    2.78    2.51    0.65    0.90    1.64    0.00    0.20    0.40    0.00    0.00    0.87    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2014    1   1   3   2   1   -1  -1  22  0.00    0.00    0.00    0.00    0.91    0.00    7.73    3.92    0.91    5.17    3.83    1.82    4.54
0.00    2.83    2.74    2.83    0.00    1.42    0.00    1.42    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.91    0.00    16.80   5.42
6.64    6.96    7.67    2.47    0.80    4.04    1.05    1.94    1.85    0.53    0.00    0.91    0.00    0.00    0.53    0.00    0.00    0.00
1.42    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
#Midwater   Trawl
1979    1   2   3   2   2   -1  -1  39  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    6.82    22.27   7.99    2.91    1.91
1.42    0.00    0.00    0.21    0.50    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.31    2.48
12.42   24.37   6.02    4.70    3.19    1.49    0.50    0.00    0.50    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1980    1   2   3   2   2   -1  -1  167 0.00    0.00    0.00    0.00    0.08    0.81    0.91    0.89    1.18    9.78    21.53   6.58    2.93
1.09    1.04    0.89    0.51    0.00    0.43    0.32    0.19    0.00    0.13    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.13    1.42    1.65
3.34    13.90   17.41   5.30    3.44    1.18    0.48    0.88    0.32    0.25    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1981    1   2   3   2   2   -1  -1  325 0.00    0.00    0.03    0.16    2.26    1.20    4.31    3.05    1.26    2.33    12.65   16.32   4.38
2.56    1.77    1.23    0.86    0.83    0.48    0.68    0.40    0.31    0.12    0.09    0.09    0.00    0.03    0.00    0.08    0.00    0.03
0.00    0.00    0.00    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.86    1.04    3.94    3.09
1.34    3.57    9.72    8.58    2.89    1.47    1.06    0.76    0.48    0.45    0.22    0.24    0.12    0.19    0.11    0.14    0.02    0.08
0.00    0.06    0.00    0.00    0.02    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1982    1   2   3   2   2   -1  -1  676 0.00    0.00    0.00    0.00    1.12    7.31    1.37    5.11    3.26    2.12    1.04    4.97    10.80
3.99    2.99    2.05    1.91    1.61    1.27    1.09    0.76    0.61    0.66    0.36    0.32    0.30    0.31    0.20    0.11    0.17    0.02
0.00    0.00    0.00    0.00    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01    0.12    0.79    8.13    2.20    4.85
3.14    1.51    1.52    4.78    7.08    1.85    1.75    1.34    0.77    1.12    0.57    0.57    0.27    0.50    0.18    0.19    0.24    0.21
0.06    0.12    0.01    0.15    0.00    0.05    0.03    0.00    0.00    0.02    0.00    0.00    0.00    0.00    0.00
1983    1   2   3   2   2   -1  -1  341 0.00    0.00    0.00    0.00    1.20    17.18   12.58   2.11    1.39    0.65    0.63    0.15    1.66
3.78    1.01    0.80    0.49    0.37    0.66    0.27    0.21    0.35    0.14    0.40    0.16    0.16    0.27    0.30    0.32    0.40    0.30
0.03    0.08    0.06    0.26    0.18    0.00    0.00    0.01    0.00    0.21    0.00    0.00    0.00    0.00    1.55    20.54   13.08   2.00
3.38    1.34    0.83    0.07    1.25    1.74    0.53    1.02    0.40    0.28    0.30    0.29    0.04    0.40    0.09    0.04    0.03    0.22
0.19    0.04    0.21    0.42    0.15    0.18    0.30    0.08    0.04    0.18    0.02    0.00    0.00    0.00    0.00
1984    1   2   3   2   2   -1  -1  379 0.00    0.00    0.00    0.00    0.10    2.19    16.03   16.19   1.70    2.94    0.87    0.61    0.32
2.56    5.75    1.41    0.91    0.75    0.75    0.54    0.96    0.09    0.31    0.24    0.19    0.06    0.00    0.23    0.07    0.30    0.13
0.11    0.12    0.10    0.09    0.09    0.00    0.00    0.06    0.00    0.03    0.00    0.00    0.00    0.00    0.15    1.77    16.91   11.09
1.30    2.28    0.75    0.76    0.59    1.30    2.75    0.33    0.60    0.32    0.22    0.15    0.45    0.22    0.15    0.19    0.06    0.08
0.16    0.11    0.01    0.29    0.00    0.03    0.03    0.05    0.02    0.06    0.03    0.00    0.00    0.03    0.00
1985    1   2   3   2   2   -1  -1  466 0.00    0.00    0.00    0.00    0.00    3.58    6.73    22.08   9.04    1.44    1.41    0.79    0.03
0.10    0.59    1.92    0.41    0.22    0.22    0.30    0.17    0.15    0.27    0.16    0.05    0.06    0.10    0.09    0.00    0.00    0.06
0.00    0.05    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.20    4.67    6.81    21.21
9.87    1.02    0.94    0.49    0.13    0.24    0.69    1.66    0.21    0.34    0.15    0.06    0.14    0.20    0.14    0.15    0.09    0.12
0.07    0.08    0.00    0.08    0.03    0.02    0.02    0.03    0.00    0.00    0.00    0.04    0.00    0.00    0.03
1986    1   2   3   2   2   -1  -1  486 0.00    0.00    0.10    0.00    0.00    0.96    9.00    9.87    16.09   7.79    0.67    1.61    0.66
0.02    0.08    0.46    1.84    0.19    0.24    0.24    0.29    0.16    0.15    0.26    0.18    0.07    0.15    0.01    0.06    0.07    0.00
0.18    0.00    0.00    0.04    0.02    0.04    0.00    0.00    0.03    0.01    0.00    0.00    0.00    0.00    0.00    0.89    6.89    9.40
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17.14	8.56	0.73	1.17	0.53	0.03	0.04	0.18	1.13	0.35	0.16	0.09	0.30	0.22	0.12	0.09	0.05	0.18
0.14	0.04	0.00	0.00	0.03	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.02	0.01	0.01			
1987	1 2	3 2	2 -1	-1 604	0.00	0.00	0.00	0.00	0.13	1.61	10.98	19.78	8.12	3.75	2.14	0.20	0.52
0.28	0.02	0.07	0.20	0.19	0.13	0.03	0.00	0.02	0.00	0.07	0.00	0.00	0.00	0.00	0.04	0.00	0.00
0.00	0.00	0.00	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48	12.52	21.42
7.29	4.31	2.36	0.28	0.32	0.30	0.05	0.03	0.30	0.44	0.00	0.17	0.16	0.05	0.00	0.00	0.00	0.11
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1988	1 2	3 2	2 -1	-1 392	0.00	0.00	0.00	0.11	0.47	1.39	7.40	18.54	10.17	2.99	2.15	1.14	0.67
0.55	0.14	0.12	0.01	0.22	0.65	0.35	0.00	0.23	0.00	0.09	0.06	0.00	0.00	0.00	0.09	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.13	1.30	7.28	23.13
12.92	3.43	2.18	0.88	0.01	0.12	0.05	0.09	0.00	0.27	0.22	0.00	0.07	0.18	0.10	0.00	0.00	0.00
0.00	0.01	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1989	1 2	3 2	2 -1	-1 527	0.00	0.00	0.00	0.00	0.45	2.65	3.67	7.81	19.46	8.66	2.56	1.32	0.57
0.47	0.24	0.07	0.14	0.11	0.21	0.12	0.12	0.21	0.12	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.57	1.89	5.40	12.05
19.44	6.83	1.72	0.98	0.27	0.08	0.11	0.05	0.07	0.21	0.17	0.39	0.28	0.00	0.12	0.07	0.00	0.00
0.06	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1990	1 2	3 2	2 -1	-1 478	0.00	0.00	0.00	0.00	0.00	1.91	3.60	5.38	8.02	15.18	10.03	3.99	2.15
0.80	0.28	0.19	0.06	0.08	0.00	0.00	0.04	0.29	0.00	0.07	0.00	0.00	0.04	0.00	0.00	0.04	0.00
0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	3.36	3.22	5.58
9.55	13.00	6.65	3.07	1.44	0.77	0.34	0.00	0.14	0.00	0.17	0.00	0.06	0.00	0.00	0.00	0.00	0.09
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1991	1 2	3 2	2 -1	-1 333	0.00	0.00	0.00	0.00	0.02	1.05	6.46	9.43	6.25	6.76	9.89	4.57	1.28
1.11	0.34	0.31	0.16	0.08	0.05	0.14	0.31	0.43	0.08	0.18	0.15	0.09	0.17	0.00	0.23	0.09	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.86	6.38	9.84
10.34	6.25	8.84	3.92	1.00	1.01	0.31	0.24	0.16	0.08	0.00	0.03	0.19	0.42	0.14	0.10	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00			
1992	1 2	3 2	2 -1	-1 124	0.00	0.00	0.00	0.00	0.00	2.45	2.20	6.03	8.04	4.73	7.14	9.29	3.53
1.57	0.80	0.21	0.21	0.23	0.22	0.07	0.20	0.00	0.50	0.12	0.00	0.00	0.00	0.07	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.30	2.97	6.77
8.90	8.84	4.76	8.15	3.25	2.36	1.50	0.00	0.26	0.00	0.00	0.14	0.07	0.07	0.22	0.18	0.00	0.00
0.00	0.52	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1993	1 2	3 2	2 -1	-1 196	0.00	0.00	0.00	0.00	0.07	1.06	6.66	3.85	8.41	6.51	3.71	4.57	6.67
3.19	2.24	1.97	1.03	0.40	0.51	0.18	0.12	0.00	0.00	0.12	0.00	0.27	0.12	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.63	7.31	5.53
8.57	5.00	3.90	3.28	5.64	2.48	1.74	1.40	0.63	0.00	0.24	0.12	0.00	0.12	0.11	0.43	0.00	0.00
0.12	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1994	1 2	3 2	2 -1	-1 107	0.00	0.00	0.00	0.00	0.00	0.74	5.10	13.89	6.06	5.99	3.71	3.17	2.62
2.34	1.22	1.65	0.38	0.00	0.00	0.21	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.79	8.41	16.66
9.70	6.56	4.01	0.99	1.58	2.48	0.00	0.14	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1995	1 2	3 2	2 -1	-1 63	0.00	0.00	0.00	0.00	0.42	0.15	2.12	6.70	11.25	9.42	4.53	3.89	3.41
2.15	3.23	0.78	0.82	0.84	0.24	0.00	0.00	0.00	0.13	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	1.72	2.55	14.32
10.44	7.11	4.24	2.40	1.54	1.90	0.64	0.00	0.00	0.56	0.71	0.00	0.00	0.25	0.00	0.00	0.00	0.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1996	1 2	3 2	2 -1	-1 79	0.00	0.00	0.00	0.00	0.28	7.93	6.19	6.16	6.67	5.20	3.06	3.62	1.97
1.27	1.81	1.95	0.52	0.00	0.23	0.07	0.25	0.78	0.72	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	8.46	8.51	7.00

7.19	5.12	3.63	1.33	1.02	2.77	0.94	1.95	0.94	0.00	0.06	0.45	0.00	0.16	0.00	0.00	0.39	0.00
0.06	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1997	1 2	3 2	2 -1	-1 137	0.00	0.00	0.00	0.00	0.21	1.75	15.72	7.52	3.28	3.11	2.61	1.77	1.74
1.47	1.34	0.49	1.82	0.15	0.49	0.21	0.03	0.00	0.31	0.03	0.10	0.00	0.09	0.00	0.00	0.00	0.18
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	2.84	23.59	11.12
4.36	2.63	3.02	1.73	1.53	1.07	0.19	1.11	1.45	0.00	0.00	0.28	0.30	0.00	0.09	0.00	0.03	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1998	1 2	3 2	2 -1	-1 64	0.00	0.00	0.00	0.00	0.00	0.60	4.11	15.89	7.88	4.91	4.42	3.36	2.18
1.80	1.05	0.19	0.00	0.78	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45	7.93	17.64
9.15	5.50	2.56	3.70	1.57	0.65	0.54	0.19	0.51	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1999	1 2	3 2	2 -1	-1 95	0.00	0.00	0.00	0.00	0.00	1.62	4.08	8.01	18.95	7.97	4.93	3.33	0.71
1.36	0.76	0.00	0.68	0.33	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.52	3.90	10.57
17.49	8.97	2.98	0.49	0.41	0.07	0.27	0.04	0.00	0.04	0.05	0.29	0.00	0.00	0.04	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2000	1 2	3 2	2 -1	-1 396	0.00	0.00	0.00	0.00	0.00	1.17	4.79	8.42	8.59	7.57	8.11	3.19	2.38
1.56	0.96	0.97	0.55	0.33	0.14	0.65	0.18	0.35	0.01	0.05	0.00	0.20	0.06	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	5.59	8.89
9.75	9.68	6.36	3.51	2.23	0.81	0.40	0.56	0.28	0.27	0.13	0.05	0.09	0.00	0.00	0.00	0.00	0.01
0.00	0.08	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2001	1 2	3 2	2 -1	-1 252	0.00	0.00	0.00	0.00	0.00	0.16	2.12	6.88	8.61	6.58	5.04	4.72	3.72
3.00	1.93	1.26	0.86	1.08	0.79	0.83	0.11	0.29	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	3.99	11.34
8.87	8.34	5.40	3.29	3.09	2.34	1.44	1.27	0.65	0.25	0.55	0.27	0.12	0.04	0.00	0.00	0.14	0.10
0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2002	1 2	3 2	2 -1	-1 140	0.00	0.00	0.00	0.00	0.18	0.81	1.52	6.12	10.40	8.76	7.73	3.82	3.73
1.48	1.48	0.87	0.81	0.31	0.04	0.18	0.03	0.04	0.01	0.10	0.00	0.10	0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.59	3.15	7.41
12.52	10.08	4.88	1.40	1.43	2.53	1.64	1.51	0.42	1.07	0.01	1.28	0.00	0.82	0.11	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2003	1 2	3 2	2 -1	-1 33	0.00	0.00	0.00	0.44	2.16	14.26	7.09	7.54	9.22	6.57	0.70	4.23	0.26
1.29	1.08	0.54	0.54	0.00	0.00	0.63	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	7.46	11.79	11.56
7.88	2.80	0.64	0.00	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2004	1 2	3 2	2 -1	-1 63	0.00	0.00	0.00	0.00	0.26	3.62	15.58	7.44	7.58	9.19	5.97	3.40	1.58
2.04	1.54	0.31	0.31	0.00	0.32	1.62	0.00	0.04	0.07	0.00	0.16	0.16	0.16	0.42	0.00	0.16	0.00
0.00	0.00	0.00	0.00	0.07	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.99	14.38	5.88
4.36	4.18	1.99	1.46	0.88	0.14	0.11	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00			
2005	1 2	3 2	2 -1	-1 49	0.00	0.00	0.00	0.00	0.55	4.14	3.52	7.11	5.90	4.69	6.77	3.54	3.81
3.70	2.87	2.53	1.88	1.96	2.03	0.07	0.00	1.25	0.00	0.60	1.62	0.60	0.00	0.00	0.49	0.00	0.00
0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.69	3.83	3.95	8.26
8.05	1.36	4.08	3.02	0.94	0.68	0.57	0.00	0.00	0.00	0.00	0.07	1.20	1.80	0.00	0.00	0.60	0.00
0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.15			
2006	1 2	3 2	2 -1	-1 35	0.00	0.00	0.00	0.00	0.00	1.23	4.40	5.26	6.60	1.32	3.85	4.30	2.80
5.04	4.51	3.07	2.67	1.38	2.47	1.85	0.98	1.32	2.50	0.06	0.00	0.06	1.18	1.18	0.06	0.59	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.17	2.02	1.78

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7.27   4.47   5.17   3.29   4.92   3.07   1.29   1.88   1.18   0.00   2.56   1.58   0.30   0.30   0.00   0.00   0.00   0.00
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2007   1  2   3  2   2  -1  -1  7   0.00   0.00   0.00   0.00   0.00   4.00   2.00   22.00  4.00   6.00   2.00   0.00   0.00
0.00   0.00   0.00   0.00   2.00   0.00   0.00   0.00   2.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   10.00  4.00   20.00
2.00   6.00   2.00   0.00   2.00   4.00   0.00   0.00   2.00   0.00   2.00   0.00   0.00   0.00   0.00   2.00   0.00   0.00
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2008   1  2   3  2   2  -1  -1  70  0.00   0.00   0.00   0.00   1.67   0.98   14.33  11.12  4.85   8.63   5.43   1.88   1.72
1.58   0.39   1.14   0.44   0.13   0.53   0.00   0.05   0.08   0.44   0.09   0.04   0.53   0.04   0.09   0.00   0.48   0.09
0.00   0.04   0.04   0.00   0.00   0.00   0.00   0.04   0.00   0.08   0.00   0.00   0.00   0.00   0.51   1.27   16.06  6.59
7.50   3.33   1.78   1.63   1.05   0.65   0.04   1.10   0.00   0.22   0.22   0.00   0.00   0.40   0.40   0.00   0.04   0.00
0.09   0.00   0.00   0.00   0.00   0.13   0.00   0.00   0.00   0.04   0.00   0.00   0.00   0.00   0.00
2009   1  2   3  2   2  -1  -1  91  0.00   0.00   0.00   0.00   0.04   1.08   0.99   2.69   3.31   6.19   8.68   8.97   11.74
7.16   1.82   1.07   1.18   0.60   2.26   1.57   0.08   2.25   0.26   0.02   0.22   0.24   0.12   0.15   0.08   0.00   0.00
0.00   0.29   0.00   0.04   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.11   2.71   1.44   1.30
5.20   5.08   3.95   4.51   3.32   2.72   1.84   0.53   0.21   1.90   0.24   1.27   0.24   0.04   0.00   0.00   0.21   0.03
0.01   0.04   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2010   1  2   3  2   2  -1  -1  63  0.00   0.00   0.00   0.00   0.00   0.00   3.26   2.79   2.52   3.76   7.35   5.79   5.50
6.14   2.34   3.29   4.05   1.67   1.04   0.48   0.54   0.93   1.69   0.52   0.38   0.26   0.93   0.00   0.26   0.12   0.00
0.13   0.26   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.04   0.18   5.39   7.74
5.14   3.39   4.77   3.07   3.21   0.68   2.01   1.30   1.23   0.62   0.56   0.54   0.45   0.72   0.00   0.32   0.13   0.00
0.00   0.00   0.32   0.53   0.00   0.00   0.45   0.58   0.00   0.32   0.32   0.00   0.00   0.00   0.00
2011   1  2   3  2   1  -1  -1  42  0.00   0.00   0.00   0.00   0.00   0.07   1.33   5.75   10.77  7.29   2.50   5.86   5.72
4.03   1.41   0.17   0.00   1.93   0.05   0.12   1.88   0.94   1.04   0.00   0.08   0.05   0.00   0.00   0.00   0.00   0.94
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.08   0.00   0.00   0.00   0.00   0.00   0.00   0.78   2.48   8.42
9.10   8.30   2.69   2.10   3.85   0.22   1.36   2.46   0.35   2.39   0.23   1.45   0.97   0.05   0.00   0.00   0.00   0.25
0.08   0.25   0.08   0.08   0.08   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2012   1  2   3  2   1  -1  -1  29  0.00   0.00   0.00   0.00   0.00   0.00   7.93   4.73   15.10  4.70   8.61   1.61   0.61
0.64   2.68   2.49   0.44   1.30   0.00   0.00   0.00   0.00   1.15   0.14   0.00   0.00   0.00   0.00   0.15   0.00   0.00
0.00   0.00   0.00   0.14   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.14   1.15   13.96  2.74
10.13  6.11   0.65   1.15   3.81   0.43   5.73   0.00   0.15   0.00   0.00   0.00   0.00   0.00   0.00   0.15   0.00   1.15
0.00   0.00   0.15   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2013   1  2   3  2   1  -1  -1  41  0.00   0.00   0.00   0.00   0.00   5.50   1.71   8.42   2.71   3.39   3.66   1.12   2.53
2.40   0.12   1.25   1.74   0.16   1.15   1.15   0.00   0.06   0.06   0.10   0.03   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.10   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   7.98   1.65   12.31
8.14   8.99   2.11   3.42   2.24   1.74   7.89   2.31   1.12   1.12   0.00   0.03   0.00   0.59   0.15   0.00   0.00   0.03
0.00   0.00   0.20   0.59   0.03   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
2014   1  2   3  2   1  -1  -1  36  0.00   0.00   0.00   0.00   8.52   0.00   7.39   3.27   4.19   5.65   7.56   3.05   8.79
3.01   0.67   3.30   3.07   0.35   0.09   0.25   0.03   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.03   0.02
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   11.31  2.82   10.76  5.70
0.85   6.65   0.83   0.51   0.37   0.05   0.04   0.00   0.27   0.24   0.00   0.27   0.03   0.02   0.00   0.02   0.00   0.00
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.03   0.00   0.00   0.00   0.00   0.00   0.00
#Hake (shoreside and at-sea, weighted by catch, see hakeComps.xls)
1991   1  3   3  2   2  -1  -1  46  0.00   0.00   0.00   0.00   0.68   0.57   10.23  9.42   7.35   8.57   5.08   3.07   3.09
0.95   1.45   0.42   0.00   0.00   0.00   0.34   0.00   0.54   0.00   0.00   0.00   0.42   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.52   2.15   12.46  9.78
6.55   4.84   5.17   2.08   1.02   1.32   0.00   0.42   0.00   0.54   0.42   0.54   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
1992   1  3   3  2   2  -1  -1  3   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   11.76  0.00   11.76  5.88   5.88
5.88   5.88   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   5.88   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   11.76
```

```
5.88    11.76   5.88    0.00    0.00    0.00    0.00    0.00    5.88    0.00    0.00    0.00    0.00    0.00    0.00    5.88    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1993    1   3   3   2   2   -1  -1  7   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    17.64   4.82    1.24    0.41    4.82
10.47   4.41    0.00    0.41    0.00    0.41    0.00    0.00    4.41    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.41    0.00    0.00    0.00    0.00    0.00    0.00    8.82    4.41
9.23    9.23    5.23    0.00    4.41    0.00    0.00    4.82    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.41    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1994    1   3   3   2   2   -1  -1  13  0.00    0.00    0.00    0.00    0.45    0.00    12.12   17.99   11.22   0.00    12.54   0.45    0.00
3.43    0.00    0.00    0.00    0.00    0.00    0.00    0.00    3.43    0.00    0.45    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.45    0.45    0.00    2.26    15.12
17.17   1.01    0.90    0.12    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.45    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1995    1   3   3   2   2   -1  -1  102 0.00    0.00    0.00    0.00    0.30    3.60    8.31    11.47   8.18    6.27    5.82    4.84    2.87
1.60    2.18    1.00    0.09    0.00    1.01    0.16    0.03    0.01    0.00    0.89    0.17    0.00    0.02    0.18    0.41    0.02    0.17
0.00    0.01    0.00    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.55    2.26    5.68    12.23
4.07    3.00    1.65    2.36    2.34    2.63    0.70    1.19    0.62    0.21    0.10    0.10    0.01    0.00    0.02    0.08    0.02    0.01
0.03    0.00    0.00    0.00    0.00    0.00    0.41    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1996    1   3   3   2   2   -1  -1  98  0.00    0.00    0.00    0.00    0.38    1.70    7.72    6.02    4.65    5.52    3.20    3.69    3.54
3.93    5.47    4.24    1.62    1.47    2.40    1.34    0.63    0.12    0.01    0.19    0.45    0.44    1.80    0.53    0.28    0.00    0.00
0.11    0.00    0.01    0.04    0.00    0.01    0.00    0.00    0.00    0.03    0.00    0.00    0.00    0.00    0.00    4.35    5.56    4.27
2.41    6.14    2.47    1.62    0.79    3.40    1.56    0.82    1.32    1.33    0.69    0.88    0.04    0.20    0.00    0.00    0.00    0.03
0.04    0.00    0.00    0.29    0.01    0.00    0.21    0.00    0.00    0.00    0.01    0.00    0.00    0.00    0.01
1997    1   3   3   2   2   -1  -1  125 0.00    0.00    0.00    0.00    0.26    0.77    8.41    6.85    3.27    6.98    5.08    5.37    2.26
2.71    2.22    5.37    5.61    0.83    1.41    0.00    1.27    0.00    0.00    0.19    0.01    0.00    0.15    0.01    0.01    0.01    0.00
0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.87    6.25    3.78
4.56    2.69    3.30    5.95    2.14    1.76    1.90    4.61    2.12    0.14    0.21    0.36    0.01    0.00    0.02    0.03    0.13    0.03
0.00    0.01    0.03    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.01
1998    1   3   3   2   2   -1  -1  176 0.00    0.01    0.01    0.00    0.01    0.00    1.92    10.64   12.85   7.16    4.57    5.26    1.69
1.85    1.76    1.18    1.47    0.90    0.26    0.56    0.01    0.15    0.56    0.57    0.21    1.10    0.07    0.06    0.09    0.12    0.02
0.02    0.01    0.03    0.01    0.01    0.01    0.00    0.00    0.00    0.01    0.00    0.00    0.00    0.00    0.00    0.05    3.16    13.23
12.95   3.79    2.61    1.57    2.16    1.04    1.62    0.63    0.23    0.18    0.44    0.15    0.10    0.32    0.04    0.02    0.24    0.00
0.04    0.01    0.06    0.02    0.03    0.04    0.02    0.01    0.00    0.01    0.06    0.00    0.01    0.00    0.00
1999    1   3   3   2   2   -1  -1  248 0.00    0.00    0.00    0.00    0.09    3.46    4.60    8.06    12.54   8.54    3.26    1.91    1.47
1.55    0.85    0.43    0.75    0.24    0.60    0.00    0.01    0.01    0.12    0.12    0.07    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.00    0.00    0.09    0.00    0.00    0.00    0.00    0.56    5.25    5.17    10.24
14.58   6.86    2.09    1.50    1.54    0.35    0.39    0.53    0.27    0.32    0.46    0.02    0.25    0.34    0.44    0.00    0.00    0.00
0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2000    1   3   3   2   2   -1  -1  149 0.00    0.00    0.00    0.00    0.00    0.29    3.47    14.49   5.18    6.35    8.85    7.99    4.66
2.50    2.70    2.60    1.67    0.34    0.98    0.93    1.02    0.06    0.03    0.02    0.01    0.03    0.00    0.01    0.00    0.02    0.15
0.08    0.00    0.00    0.00    0.12    0.14    0.00    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.80    2.93    8.62
7.40    5.42    4.25    2.10    1.31    0.17    0.09    0.82    0.83    0.14    0.03    0.16    0.04    0.00    0.00    0.00    0.01    0.02
0.00    0.00    0.00    0.06    0.12    0.00    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2001    1   3   3   2   2   -1  -1  5   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.78    2.78    8.33    8.33    5.56
2.78    0.00    2.78    0.00    0.00    2.78    5.56    0.00    0.00    0.00    2.78    0.00    2.78    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    8.33    13.89   8.33    8.33    2.78    0.00    5.56    5.56    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2002    1   3   3   2   2   -1  -1  3   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    6.25    0.00    6.25    18.75   18.75
0.00    0.00    18.14   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    6.25
```

```
0.00    0.00    0.00    6.25    6.25    12.50   0.00    0.61    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2004    1   3   3   2   2   -1  -1  19  0.00    0.00    0.00    0.00    0.00    1.56    1.54    1.56    1.54    3.88    3.88    6.84    5.93
6.57    7.47    1.42    5.30    4.64    3.10    0.78    0.78    0.78    0.00    0.00    0.00    0.00    0.00    0.00    1.42    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.32    0.00    1.56
3.10    5.42    6.96    3.86    1.56    4.62    2.32    0.78    3.08    3.86    0.00    0.78    0.00    0.00    0.78    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2007    1   3   3   2   2   -1  -1  5   0.00    0.00    0.00    0.00    0.00    0.00    0.00    10.34   6.90    3.45    3.45    3.45    0.00
0.00    0.00    3.45    0.00    3.45    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    10.34
13.79   10.34   10.34   3.45    6.90    3.45    0.00    0.00    3.45    0.00    3.45    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2008    1   3   3   2   2   -1  -1  647 0.00    0.00    0.00    0.00    0.30    0.16    0.45    3.34    6.18    7.92    6.57    5.12    3.53
3.57    6.25    2.22    3.34    1.94    1.21    0.57    0.55    0.35    0.68    0.20    0.09    0.35    0.04    0.04    0.09    0.04    0.00
0.00    0.04    0.04    0.04    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.04    0.30    0.35    0.97    2.52
6.76    6.75    6.17    3.11    3.29    2.89    3.48    2.61    0.87    2.67    0.35    0.33    0.34    0.44    0.09    0.04    0.00    0.04
0.09    0.07    0.04    0.00    0.00    0.04    0.00    0.00    0.00    0.04    0.00    0.04    0.00    0.00    0.00
2009    1   3   3   2   2   -1  -1  488 0.00    0.00    0.00    0.00    0.00    0.63    0.61    1.77    1.82    9.92    6.08    6.54    6.75
2.44    1.52    0.96    1.47    2.31    3.23    0.28    0.17    0.14    0.09    0.15    0.11    0.00    0.06    0.00    0.12    0.00    0.06
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.06    0.00    0.02    0.00    0.00    0.02    0.67    1.71    3.61
5.72    9.57    8.43    8.65    2.80    2.78    1.60    2.66    2.11    1.23    0.12    0.20    0.03    0.09    0.14    0.10    0.23    0.03
0.05    0.03    0.00    0.06    0.04    0.03    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2010    1   3   3   2   2   -1  -1  401 0.00    0.00    0.00    0.00    0.00    0.11    3.37    4.82    3.17    3.40    7.17    7.61    6.80
5.01    3.03    1.96    1.35    0.96    1.39    0.36    1.07    0.61    0.09    0.03    0.00    0.11    0.00    0.19    0.01    0.07    0.00
0.00    0.00    0.00    0.00    0.01    0.00    0.00    0.00    0.01    0.03    0.00    0.00    0.00    0.00    0.03    0.32    4.75    2.13
2.89    3.31    6.24    9.69    6.44    3.60    1.99    1.18    1.29    1.39    0.40    0.57    0.57    0.07    0.02    0.36    0.00    0.00
0.00    0.01    0.00    0.00    0.00    0.00    0.00    0.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2011    1   3   3   2   1   -1  -1  573 0.00    0.00    0.00    0.00    0.00    2.95    1.39    9.10    4.82    4.76    5.15    4.45    3.66
3.45    1.38    1.97    1.34    0.78    0.45    0.75    0.40    1.00    0.25    0.17    0.12    0.28    0.17    0.11    0.14    0.12    0.14
0.05    0.06    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.05    0.00    0.00    0.00    0.00    0.00    2.11    1.52    8.12
11.23   3.81    3.84    4.69    6.58    3.36    1.76    1.54    0.50    0.48    0.19    0.10    0.22    0.07    0.19    0.00    0.05    0.00
0.05    0.04    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.11
2012    1   3   3   2   1   -1  -1  470 0.00    0.00    0.20    0.00    0.03    0.28    6.98    1.03    10.54   3.07    5.25    2.29    6.36
2.79    1.51    1.85    0.27    1.98    0.59    0.18    0.25    0.17    0.24    0.00    0.04    0.19    0.02    0.06    0.01    0.04    0.18
0.20    0.03    0.00    0.00    0.00    0.00    0.00    0.05    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    3.57    1.41
14.05   3.19    4.08    2.94    5.15    8.18    2.26    4.99    0.70    1.11    0.37    0.44    0.15    0.13    0.18    0.09    0.00    0.00
0.06    0.06    0.00    0.00    0.22    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2013    1   3   3   2   1   -1  -1  498 0.00    0.00    0.00    0.00    0.00    0.24    0.35    9.24    3.42    8.04    5.48    2.81    2.73
3.66    2.81    4.94    2.91    0.88    0.41    0.26    0.21    0.37    0.15    0.26    0.08    0.00    0.00    0.03    0.00    0.25    0.00
0.25    0.08    0.00    0.00    0.08    0.00    0.00    0.00    0.00    0.07    0.00    0.00    0.00    0.00    0.00    0.65    0.46    5.58
5.91    10.06   4.84    4.87    3.35    3.53    2.98    1.64    0.94    0.88    0.32    2.68    0.38    0.12    0.21    0.15    0.10    0.08
0.00    0.14    0.00    0.00    0.00    0.03    0.03    0.00    0.00    0.00    0.03    0.00    0.00    0.00    0.00
2014    1   3   3   2   1   -1  -1  511 0.00    0.00    0.00    0.00    0.00    0.03    6.85    7.13    6.26    1.84    7.70    1.78    1.04
2.46    3.91    6.61    1.01    0.41    0.34    2.22    0.39    0.51    0.51    0.25    0.47    0.18    0.43    0.02    0.03    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.00    0.00    0.00    0.00    0.00    1.56    1.96    0.92
6.11    8.91    4.17    4.05    1.18    1.38    4.12    4.08    4.06    2.13    0.71    1.12    0.25    0.07    0.41    0.29    0.03    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.00    0.00    0.00    0.00    0.00    0.03
#Net
-1982   1   -4  3   2   2   -1  -1  1   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    100.00  0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
```

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1983	1 4	3 2	2 -1	-1 12	0.00	0.00	0.00	0.00	0.00	0.00	11.88	3.69	0.00	4.79	5.86	0.00	0.97
12.35	10.19	2.73	4.79	0.97	1.93	0.00	6.26	4.10	0.97	0.00	2.16	2.73	0.00	0.00	0.00	3.13	0.00
0.00	0.00	0.00	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	1.66	0.00	0.00	3.13	8.02	0.00	0.00	3.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66	0.00			
1984	1 4	3 2	2 -1	-1 23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	1.33	2.27	1.30	3.07	6.48
4.87	15.58	0.00	0.00	5.34	8.56	5.02	6.50	4.00	2.48	3.54	4.82	0.00	0.00	0.00	1.33	1.14	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.62
0.87	0.65	0.00	0.00	0.65	3.42	2.20	1.14	0.00	1.14	0.00	0.00	3.32	0.00	0.00	0.65	1.33	2.01
0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00			
1985	1 4	3 2	2 -1	-1 97	0.00	0.00	0.00	0.00	0.00	0.00	0.90	2.75	11.44	3.34	6.17	4.24	1.49
1.29	2.44	9.34	0.63	1.32	2.13	1.29	1.44	2.04	2.84	0.64	2.19	0.92	0.81	0.00	0.00	0.00	1.24
0.57	0.09	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.91	1.15
8.61	2.56	3.50	3.11	1.77	0.65	1.11	5.03	0.71	1.04	0.89	1.13	1.75	0.11	0.13	0.29	0.38	0.00
0.39	0.00	0.00	0.00	0.00	0.00	0.57	0.14	0.65	0.00	0.00	0.57	0.00	0.00	0.61			
1986	1 4	3 2	2 -1	-1 78	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.64	4.41	12.46	1.74	4.37	2.56
0.41	1.01	3.89	7.14	0.00	3.53	2.34	1.24	1.06	1.70	0.16	0.23	1.20	0.78	0.00	0.00	0.00	0.97
0.00	0.78	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74
2.70	9.05	2.07	4.14	2.39	0.00	0.00	1.52	2.69	1.82	0.51	1.06	1.56	0.97	2.56	0.00	0.00	1.30
0.97	0.78	0.00	0.00	0.00	2.34	0.78	1.56	1.56	0.78	0.00	1.01	0.00	0.00	0.00			
1987	1 4	3 2	2 -1	-1 52	0.00	0.00	0.00	0.00	0.00	0.00	2.83	0.22	3.16	1.53	12.32	0.22	4.96
2.56	1.77	0.00	4.25	1.52	0.71	0.92	1.42	0.71	1.42	0.11	0.00	0.71	0.71	0.00	0.00	0.71	0.00
0.00	0.82	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	2.12
4.60	3.05	19.68	0.71	4.36	2.13	1.42	0.00	1.17	1.42	2.23	1.42	1.88	1.42	1.42	0.71	1.77	1.42
0.00	0.00	0.71	0.00	0.00	0.00	0.71	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1988	1 4	3 2	2 -1	-1 79	0.00	0.00	0.00	0.00	2.23	0.46	2.42	9.38	6.95	7.50	5.24	4.17	1.47
0.00	0.46	0.87	0.41	1.73	0.83	1.22	0.00	1.20	0.46	0.37	0.37	0.46	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.15	2.70	5.03
6.41	10.47	6.37	7.79	1.86	1.84	0.69	1.18	0.00	0.53	1.17	0.00	0.00	0.37	0.36	0.00	0.55	0.00
0.00	0.46	0.00	0.00	0.00	0.00	0.46	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1989	1 4	3 2	2 -1	-1 130	0.00	0.00	0.00	0.00	0.35	12.81	6.29	2.43	4.43	5.35	5.76	7.29	8.60
5.61	4.85	2.16	1.11	0.82	0.81	1.92	0.15	0.99	0.17	0.68	1.27	0.10	0.70	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.20	1.58	0.68
1.35	2.82	2.81	2.55	2.95	2.14	1.23	0.35	0.61	0.35	0.00	0.62	0.00	0.20	0.16	0.35	0.00	0.41
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1990	1 4	3 2	2 -1	-1 138	0.00	0.00	0.00	0.00	0.00	1.98	17.50	12.64	3.11	1.94	3.19	2.53	2.13
2.27	2.52	3.24	0.30	0.45	0.75	0.66	2.23	1.19	0.51	0.21	0.96	0.37	0.51	0.36	0.37	0.14	0.14
0.00	0.14	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48	8.11	3.38
1.78	2.49	1.65	2.41	2.77	3.83	2.06	0.91	1.44	1.62	0.00	1.11	0.95	0.55	0.23	0.23	0.00	0.00
0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00			
1991	1 4	3 2	2 -1	-1 41	0.00	0.00	0.00	0.00	0.00	1.72	13.18	30.32	8.76	3.57	0.00	0.13	1.92
2.28	4.66	1.67	0.00	0.79	0.00	0.93	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	8.20	5.63
2.66	0.16	0.85	0.19	2.56	3.06	1.86	0.32	0.93	0.93	0.00	0.00	0.00	0.13	0.93	0.00	0.13	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1992	1 4	3 2	2 -1	-1 33	0.00	0.00	0.00	0.00	0.00	5.22	9.50	13.52	15.41	14.30	4.75	4.50	2.22
3.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.13	0.00	0.00	0.00	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.06	5.28	3.19

```
8.74    0.00    0.00    0.00    0.44    0.00    0.00    1.69    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.40    0.00    0.00    0.00    0.00    0.00
1993    1   4   3   2   2   -1  -1  13  0.00    0.00    0.00    0.00    0.00    0.00    8.35    4.29    16.96   4.83    9.67    0.67    1.34
0.67    0.00    0.00    5.69    0.00    0.00    0.00    5.69    1.65    0.00    5.69    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.65    2.32
12.32   7.17    0.00    6.36    0.00    0.00    0.00    0.00    0.00    0.00    0.00    5.69    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1994    1   4   3   2   2   -1  -1  15  0.00    0.00    0.00    0.00    0.00    0.00    6.33    14.66   8.48    12.75   7.33    0.00    0.00
0.00    0.91    0.91    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.27    9.56
12.07   16.71   2.59    1.68    0.00    3.83    0.00    0.00    0.00    0.00    0.91    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1996    1   4   3   2   2   -1  -1  14  0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.10    8.15    8.62    6.31    10.37   4.95
2.69    0.00    3.16    0.90    1.37    0.00    0.00    0.00    0.00    0.00    1.37    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.52
14.52   9.57    5.42    3.16    4.05    1.37    0.00    0.90    1.37    1.37    1.79    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1998    1   4   3   2   2   -1  -1  13  0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.56    4.89    6.78    9.56    8.06    8.28
4.89    2.33    2.33    0.00    3.39    0.00    0.00    0.00    2.33    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.33
2.11    7.00    3.61    7.44    8.50    2.56    3.83    0.00    0.00    3.61    1.28    0.00    1.28    0.00    0.00    0.00    0.00    1.06
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
-2002   1   -4  3   2   2   -1  -1  1   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    50.00   0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    50.00   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
#HookAndLine
1982    1   5   3   2   2   -1  -1  6   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.04    0.00    0.00    0.00    19.52
18.44   0.00    4.04    17.22   0.00    9.15    4.04    5.18    4.04    5.18    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    9.15    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1983    1   5   3   2   2   -1  -1  2   0.00    0.00    0.00    0.00    33.33   0.00    0.00    0.00    0.00    0.00    0.00    0.00    33.33
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    33.33   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1984    1   5   3   2   2   -1  -1  2   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    17.12   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    48.63   0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    17.12   17.12   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1985    1   5   3   2   2   -1  -1  2   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
52.11   0.00    0.00    0.00    47.89   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
1986    1   5   3   2   2   -1  -1  3   0.00    0.00    0.00    0.00    0.00    0.00    30.33   13.11   13.11   43.44   0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
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0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1988	1 5	3 2	2 -1	-1 2	0.00	0.00	0.00	0.00	12.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	87.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1989	1 5	3 2	2 -1	-1 3	0.00	0.00	0.00	0.00	7.77	7.77	0.00	0.00	19.61	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.00	27.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.87	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1990	1 5	3 2	2 -1	-1 3	0.00	0.00	0.00	0.00	0.00	0.00	46.59	0.00	0.00	0.00	3.41	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.18	3.41
0.00	0.00	0.00	0.00	0.00	3.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1991	1 5	3 2	2 -1	-1 12	0.00	0.00	0.00	0.00	1.00	0.00	2.00	25.67	12.46	0.00	5.99	0.00	4.35
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	12.22	15.87
12.46	0.00	1.79	3.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1992	1 5	3 2	2 -1	-1 27	0.00	0.00	0.00	0.00	0.00	0.00	7.34	16.32	22.11	8.06	0.00	0.70	0.00
0.95	0.00	0.36	0.70	4.34	3.31	0.44	0.00	3.48	2.28	0.00	0.00	0.00	0.36	0.71	1.14	0.70	0.36
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	4.40
8.08	2.10	0.80	3.91	0.00	0.00	1.14	0.17	0.00	0.71	0.70	0.00	0.00	0.00	2.25	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00			
1993	1 5	3 2	2 -1	-1 3	0.00	0.00	0.00	0.00	0.00	0.00	19.87	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	40.07	40.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
-1994	1 -5	3 2	2 -1	-1 1	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
-1996	1 -5	3 2	2 -1	-1 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.29	0.00	28.57	0.00	0.00	0.00
14.29	0.00	0.00	0.00	0.00	14.29	14.29	0.00	0.00	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1997	1 5	3 2	2 -1	-1 16	0.00	0.00	0.00	0.00	1.95	7.35	18.00	4.83	3.04	5.38	2.01	3.69	6.42
0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	0.98	1.92	16.41
18.73	2.06	2.26	1.28	0.00	2.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1998	1 5	3 2	2 -1	-1 9	0.00	0.00	0.00	0.00	0.00	2.62	10.24	6.38	11.73	2.27	13.08	6.13	9.21
1.14	2.62	1.14	2.73	0.00	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.35	16.15

```
0.00 2.73 0.00 1.14 0.00 2.62 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2000 1 5 3 2 2 -1 -1 4 0.00 0.00 0.00 0.00 0.00 0.00 16.69 33.32 0.00 16.65 0.00 8.33 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 8.34 8.33 0.00 8.34 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2006 1 5 3 2 2 -1 -1 3 0.00 0.00 0.00 0.00 0.00 73.18 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.31 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 24.39 0.00 0.00
0.00 0.00 2.12 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2007 1 5 3 2 2 -1 -1 7 0.00 0.00 0.00 0.00 0.00 0.00 17.03 0.00 0.00 0.00 19.85 9.17 7.13
0.00 1.89 7.61 2.54 0.00 0.00 2.19 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 4.59
0.00 4.59 10.21 0.00 0.00 4.59 0.65 0.00 0.00 0.00 0.00 2.88 2.54 0.00 0.00 0.00 0.00 2.54
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2010 1 5 3 2 2 -1 -1 5 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 6.67 0.00 13.33 0.00 0.00
0.00 0.00 13.33 6.67 0.00 0.00 0.00 0.00 0.00 0.00 6.67 0.00 0.00 6.67 6.67 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 13.33 20.00 0.00 6.67 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2012 1 5 3 2 1 -1 -1 3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 13.42 0.00
0.00 0.00 13.42 0.00 0.00 0.00 6.09 0.00 0.00 0.00 0.00 0.00 0.00 13.42 0.00 13.42 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 13.42 13.42 0.00 0.00 0.00 0.00 13.42 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
#NWFSC (weighted by strata biomass)
2003 1 -8 3 0 1 -1 -1 6 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 19.85 0.00 0.00 0.00
0.00 1.30 1.30 0.00 1.18 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.18 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
3.69 0.00 0.00 16.50 55.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2004 1 -8 3 0 1 -1 -1 15 0.00 0.00 0.05 0.00 0.46 2.29 22.49 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.37 0.41 14.66 0.74 8.23
8.23 0.00 14.43 12.13 0.00 0.00 0.00 14.86 0.00 0.00 0.00 0.64 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2005 1 -8 3 0 1 -1 -1 24 0.00 0.00 0.00 0.00 0.00 4.54 2.92 0.17 0.12 3.73 5.45 3.59 2.72
3.26 2.84 4.11 4.23 0.00 0.00 3.73 0.00 2.75 4.11 0.00 0.00 0.00 0.00 2.75 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.17 4.84 11.28
2.29 0.00 7.51 1.82 4.28 5.06 6.25 4.11 0.00 1.36 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2006 1 -8 3 0 1 -1 -1 32 0.00 0.00 0.00 0.00 0.00 3.86 9.42 4.42 5.91 2.23 0.55 1.36 3.65
6.15 0.00 2.45 5.13 0.41 0.46 1.99 0.55 0.00 0.00 0.33 0.55 0.92 0.00 0.92 0.00 0.46 0.46
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.31 0.00 3.86 4.24 2.75 6.59
7.39 2.26 0.55 0.55 3.10 1.53 1.43 1.96 3.94 0.00 0.00 0.00 3.94 0.00 0.00 3.40 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2007 1 -8 3 0 1 -1 -1 32 0.00 0.00 0.00 0.00 0.00 1.69 1.38 3.40 9.15 5.53 8.29 3.32 3.46
2.67 2.17 2.65 1.23 0.00 0.00 0.00 0.00 1.69 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.69 1.41 3.28
```

```
15.43   6.21    3.23    6.84    1.23    2.43    2.25    0.00    5.84    1.00    0.00    1.00    0.00    1.51    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2008    1   -8  3   0   1   -1  -1  18  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.22    11.20   0.00    0.00    0.00
4.57    0.00    6.66    0.00    5.26    0.00    0.00    0.00    0.00    3.01    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    4.05    10.43   5.96    0.00
0.00    3.01    8.88    15.82   0.00    5.64    5.64    0.00    5.64    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2009    1   -8  3   0   2   -1  -1  40  0.00    0.00    0.00    0.00    0.00    10.00   0.92    3.17    4.00    5.83    3.58    4.10    5.02
1.51    3.35    1.80    2.26    3.66    2.57    2.38    1.41    0.71    0.75    0.93    0.57    0.93    0.00    0.93    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    3.92    2.87    2.08
0.92    3.17    7.41    3.99    1.55    1.50    2.58    2.14    2.21    0.00    0.58    0.00    0.00    0.00    0.00    0.00    0.75    0.00
0.83    3.13    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2010    1   -8  3   0   2   -1  -1  36  0.00    0.00    0.79    0.20    0.20    0.00    0.88    0.27    0.00    3.89    10.15   19.90   4.58
7.18    4.57    1.14    0.52    0.15    1.14    3.42    3.83    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.98    0.20    0.20    0.00    0.44    3.80
0.00    4.25    5.30    6.09    0.76    6.72    2.68    0.78    0.88    0.10    3.69    0.18    0.00    0.00    0.00    0.14    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2011    1   -8  3   0   1   -1  -1  41  0.00    0.00    0.00    0.98    0.00    1.85    0.00    8.66    2.01    2.40    3.02    4.45    1.79
2.76    1.96    0.49    0.61    1.89    2.87    0.68    0.49    0.00    0.68    0.00    2.88    0.00    0.00    0.00    0.00    0.07    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.45    0.00    1.39    0.06    8.29
1.41    1.12    8.66    14.12   5.43    1.51    1.04    4.93    4.24    0.75    0.00    0.98    1.47    0.73    0.00    0.06    0.07    0.00
0.98    0.00    0.00    0.00    0.00    0.00    0.77    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2012    1   -8  3   0   1   -1  -1  38  0.00    0.00    0.00    0.00    16.87   0.00    0.18    1.20    5.96    0.22    4.07    0.95    5.65
1.45    0.00    1.38    6.84    1.56    0.00    0.00    1.63    2.54    3.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    2.28
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    1.59    11.23   5.07    2.28    2.01
3.78    0.00    0.85    0.00    3.08    3.95    0.00    0.72    5.02    2.28    0.00    0.00    0.80    0.00    0.00    0.68    0.00    0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.68    0.00    0.17    0.00    0.00    0.00    0.00    0.00    0.00
2013    1   -8  3   0   1   -1  -1  35  0.03    0.00    0.00    7.37    6.24    15.60   1.56    1.73    0.00    0.06    0.59    0.11    2.18
2.71    1.68    1.68    0.24    0.42    0.00    0.42    0.42    1.26    0.42    0.89    0.84    0.00    0.00    0.24    0.00    0.42    0.42
0.42    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.03    0.00    0.12    10.37   4.60    9.98    8.47    0.58
4.54    0.16    0.15    0.35    1.73    0.58    0.84    2.41    1.73    0.42    2.65    0.24    0.59    0.00    1.26    0.00    0.00    0.00
0.00    0.00    0.00    0.00    0.24    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
2014    1   -8  3   0   1   -1  -1  46  0.00    0.00    0.00    0.00    3.85    0.37    13.89   1.72    6.02    1.56    1.06    1.49    2.78
0.46    2.87    2.62    0.90    0.00    1.46    0.32    0.00    0.00    0.00    0.00    0.00    0.00    0.23    0.00    0.00    0.00    0.26
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    3.57    3.14    27.96   5.24
4.25    1.20    1.84    1.58    2.29    1.22    0.63    2.08    0.59    0.89    0.26    0.69    0.00    0.13    0.00    0.28    0.00    0.13
0.00    0.00    0.00    0.00    0.00    0.15    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00

-1    #_N_MeanSize-at-Age_obs
#Yr Seas Flt/Svy Gender Part Ageerr Ignore datavector(female-male)  samplesize(female-male)
0 #_N_environ_variables
0 #_N_environ_obs
0 # no wtfreq data
0 # no tag data
0 # no morphcomp data
999
ENDDATA
```

Appendix D. **SS control file**

```
# 2015 Widow Rockfish Assessment
# Allan C. Hicks and Chantel R. Wetzel
# NWFSC, NOAA, Seattle, WA

1   #_N_Growth_Patterns
1   #_N_Morphs_Within_GrowthPattern

7         #_Nblock_Designs
3 2 1 1 1 1 3#_blocks_per_pattern
1982 1989 1990 1997 1998 2010 # Block Years for Bottom Trawl Retention    large trip limits 1982, smaller trip limits 1985, serious trip limits on bottom trawl, bottom trawl landings greatly declined (pre-1982 same as post-2010)
1982 1989 1990 2010 # Block Years for BT Retention    large trip limits 1982, smaller trip limits 1985, RCA in 2002 (does it matter for midwater?) & midwater trawl landings greatly declined (pre-1982 same as post-2010)
1916 1982           # retention in HnL. Unknown pre 2004. 1983 is when trip limits went into affect for the entire year.
1916 2001 # Block Years for before RCA's (Bottom Trawl)
1916 2002 # HnL before RCA's
1995 2012 # Block Pattern for Triennial Selectivity when they started going deeper
1916 1982 1983 2001 2002 2010  #blocks for MWT selex and retention based on changes in catch

0.5 #_fracfemale
0   #_natM_type:_0=1Parm; 1=N_breakpoints;_2=Lorenzen;_3=agespecific;_4=agespec_withseasinterpolate
1   # GrowthModel: 1=vonBert with L1&L2; 2=vonBert with A0&Linf; 3=Richards; 4=readvector
3   #_Growth_Age_for_L1
40  #_Growth_Age_for_L2 (999 to use as Linf)
0   #_SD_add_to_LAA (set to 0.1 for SS2 V1.x compatibility)
0   #_CV_Growth_Pattern:  0 CV=f(LAA); 1 CV=F(A); 2 SD=F(LAA); 3 SD=F(A); 4 logSD=F(A)
2   #_maturity_option:  1=length logistic; 2=age logistic; 3=read age-maturity for each female GP; 4=read age-fecundity for each female GP
3   #_First_Mature_Age (from Barss & Echecverria 1987)
1   #_fecundity option:(1)eggs=Wt*(a+b*Wt);(2)eggs=a*L^b;(3)eggs=a*Wt^b;(4)eggs=a+b*L;(5)eggs=a+B*W
0   #_hermaphroditism   option: 0=none; 1=age-specific  fxn
1   #_parameter_offset_approach (1=none, 2= M, G, CV_G as offset from female-GP1, 3=like SS2 V1.x)
2   #_env/block/dev_adjust_method   (1=standard;    2=logistic  transform   keeps   in  base    parm    bounds; 3=standard  w/  no  bound check)

#Biology parameters
#_LO    HI      INIT    PRIOR   PR_type SD      PHASE   env usdev   dminyr  dmaxyr  dev_std Block   Block_Fxn
0.01    0.3     0.12   -2.51     3      0.52    5       0   0       0       0       0       0       0   # NatM_p_1_Fem_GP_1
10      40      20.0    27      -1      99      3       0   0       0       0       0       0       0   # L_at_Amin_Fem_GP_1
35      60      50      50      -1      99      2       0   0       0       0       0       0       0   # L_at_Amax_Fem_GP_1
0.01    0.4     0.19    0.15    -1      99      2       0   0       0       0       0       0       0   # VonBert_K_Fem_GP_1
0.01    0.4     0.10    0.07    -1      99      2       0   0       0       0       0       0       0   # CV_young_Fem_GP_1
0.01    0.4     0.04    0.04    -1      99      3       0   0       0       0       0       0       0   # CV_old_Fem_GP_1

0.01    0.3     0.12   -2.51     3      0.52    5       0   0       0       0       0       0       0   # NatM_p_1_Male_GP_1
10      40      20.0    27      -1      99      3       0   0       0       0       0       0       0   # L_at_Amin_Male_GP_2
35      60      45      45      -1      99      2       0   0       0       0       0       0       0   # L_at_Amax_Male_GP_2
0.01    0.4     0.24    0.19    -1      99      2       0   0       0       0       0       0       0   # VonBert_K_Male_GP_2
0.01    0.4     0.10    0.07    -1      99      2       0   0       0       0       0       0       0   # CV_young_Male_GP_2
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0.01    0.4     0.04    0.04    -1      99      3       0   0       0       0       0       0       0   # CV_old_Male_GP_2

-3      3   0.00001736  0.0     -1      99      -99     0   0       0       0       0       0       0   # Wtlen1_Fem
-3      10      2.962   2.962   -1      99      -99     0   0       0       0       0       0       0   # Wtlen2_Fem
#Maturity from CA and OR samples from Barss & Echeverria 1987
-3    50    5.47        7       -1      99      -99     0   0       0       0       0       0       0   # Mat50_Fem
-3    3   -0.7747      -1       -1      99      -99     0   0       0       0       0       0       0   # Mat_slope_Fem
#proportional using option 1 (Dick's results show non-significant slope)
-1       1       1       1      -1      99      -99     0   0       0       0       0       0       0   # Eggs/kg_inter_Fem
0        1       0       0      -1      99      -99     0   0       0       0       0       0       0   # Eggs/kg_slope_wt_Fem

-3      3   0.00001484  0.0     -1      99      -99     0   0       0       0       0       0       0   # Wtlen1_Mal
-3      10      3.005 3.005     -1      99      -99     0   0       0       0       0       0       0   # Wtlen2_Mal

# Unused recruitment interactions
0   2   1   1   -1  99  -99 0   0   0   0   0   0   0   #RecrDist_GP_1
0   2   1   1   -1  99  -99 0   0   0   0   0   0   0   #RecrDist_Area
0   2   1   1   -1  99  -99 0   0   0   0   0   0   0   #RecrDist_Seas
0   2   1   1   -1  99  -99 0   0   0   0   0   0   0   #CohortGrowDev

#_seasonal_effects_on_biology_parms
#_femwtlen1 femwtlen2   mat1    mat2    fec1    fec2    Malewtlen1  malewtlen2  L1  K
0           0           0       0       0       0       0           0           0   0


#_Spawner-Recruitment
#_SR functions: 1=Beverton Holt with flat-top beyond Bzero; 2=Ricker; 3= Standard BH; 4=SCAA; 5=Hockey; 6=Shepard_3Parm
3   #_SR_function

#_LO    HI  INIT    PRIOR   PR_type     SD      PHASE
1       20  11.0     10      -1          99      1       # SR_R0
0.2     1   0.798    0.798   2       0.132      -5      # SR_steep: Thorson's new prior for 2015 assessments without widow
0       2   0.60    0.65    -1          99      -50     # SR_sigmaR
-5      5   0       0       -1          1       -99     # SR_envlink
-5      5   0       0       -1          1       -99     # SR_R1_offset
0       0.5 0       0       -1          99      -99     # SR_autocorr

0       #_SR_env_link
0       #_SR_env_target_0=none;1=devs;_2=R0;_3=steepness

1       # do_recdev:  0=none; 1=devvector; 2=simple deviations
1970    # first year of main recr_devs; early devs can preceed this era
2010   # last year of main recr_devs; forecast devs start in following year
2       #_recdev phase
1       # (0/1) to read 13 advanced options
    1900    #_recdev_early_start (0=none; neg value makes relative to recdev_start)
    4       #_recdev_early_phase
    0       #_forecast_recruitment phase (incl. late recr) (0 value resets to maxphase+1)
    1       #_lambda for forecast recr dev occurring before endyr+1
    1962    #_last_early_yr_nobias_adj_in_MPD
    1976    #_first_yr_fullbias_adj_in_MPD
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    2010    #_last_yr_fullbias_adj_in_MPD
    2013    #_first_recent_yr_nobias_adj_in_MPD
    0.90    # Max bias adjustment
    0       #_period of cycles in recruitment (N parms read below)
    -5      #min rec_dev
    5       #max rec_dev
    0       #_read_recdevs
    #_end of advanced SR options


#Fishing Mortality info
0.05    # F ballpark for tuning early phases
-1982    # F ballpark year (neg value to disable)
1       # F_Method:  1=Pope; 2=instan. F; 3=hybrid (hybrid is recommended)
0.9     # max F or harvest rate, depends on F_Method
# no additional F input needed for Fmethod 1

#_initial_F_parms
#_LO    HI  INIT    PRIOR   PR_type SD  PHASE
0       0.5 0       0       -1      99  -99  # InitF_1 BottomTrawl
0       0.5 0       0       -1      99  -99  # InitF_2 MidwaterTrawl
0       0.5 0       0       -1      99  -99  # InitF_3 Hake
0       0.5 0       0       -1      99  -99  # InitF_4 Net
0       0.5 0       0       -1      99  -99  # InitF_5 HnL


#_Q_setup
# Q_type options:  <0=mirror, 0=median_float, 1=mean_float, 2=parameter, 3=parm_w_random_dev, 4=parm_w_randwalk,
5=mean_unbiased_float_assign_to_parm
#Den-dep  env-var  extra_se  Q_type
 0        0        1         0       # 1 BottomTrawl
 0        0        0         0       # 2 MidwaterTrawl
 0        0        1         4       # 3 Hake   #Q type 4 to break JV and Domestic
 0        0        0         0       # 4 Net
 0        0        0         0       # 5 HnL
 0        0        1         0       # 6 JuvSurvey
 0        0        1         4       # 7 Triennial
 0        0        1         0       # 8 NWFSCcombo
 0        0        1         0       # 9 ForeignAtSea

1 # Par setup: 0=read one parm for each fleet with random q; 1=read a parm for each year of index
#_Cond 0 #_If q has random component, then 0=read one parm for each fleet with random q; 1=read a parm for each year of index
#_Q_parms(if_any)

#Extra SD parameters for surveys
#Lo Hi  Init    Prior  Prior Prior Phase
0   2   0.15    0      -1    99    2   #BottomTrawl
0   2   0.15    0      -1    99    2   #Hake
0   2   0.25    0      -1    99    2   #JuvSurvey
0   2   0.00    0      -1    99    -2   #Triennial
0   2   0.00    0      -1    99    -2   #NWFSC_combo
```

```
0   2   0.15    0      -1    99    2   #ForeignAtSea

# Lo    Hi  Init Prior PrType PrSD Phase
# Early period
 -20    2  -10   0     -1      99   1    # Hake JV and Domestic (log) base parameter (1983)
 -4     4   0    0     -1      99   -50  # Hake JV and Domestic 1985 deviation
 -4     4   0    0     -1      99   -50  # Hake JV and Domestic 1986 deviation
 -4     4   0    0     -1      99   -50  # Hake JV and Domestic 1987 deviation
 -4     4   0    0     -1      99   -50  # Hake JV and Domestic 1988 deviation
 -4     4   0    0     -1      99   -50  # Hake JV and Domestic 1989 deviation
 -4     4   0    0     -1      99   -50  # Hake JV and Domestic 1990 deviation
# Late period
  -4    4   0.4  0     -1      99   1    # Hake JV and Domestic 1991 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1992 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1993 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1994 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1995 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1996 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1997 deviation
  -4    4   0    0     -1      99   -50  # Hake JV and Domestic 1998 deviation

# Lo    Hi  Init Prior PrType PrSD Phase
# Early period
 -10    2  -2   0   -1  99  1   # Triennial (log) base parameter (1980)
 -4     4   0   0   -1  99  -50 # Triennial 1983 deviation
 -4     4   0   0   -1  99  -50 # Triennial 1986 deviation
 -4     4   0   0   -1  99  -50 # Triennial 1989 deviation
 -4     4   0   0   -1  99  -50 # Triennial 1992 deviation
# Late period
  -4    4   0   0   -1  99  -1   # Triennial 1995 deviation
  -4    4   0   0   -1  99  -50 # Triennial 1998 deviation
  -4    4   0   0   -1  99  -50 # Triennial 2001 deviation
  -4    4   0   0   -1  99  -50 # Triennial 2004 deviation


#_size_selex_Setup
#_SelPattern    Do_retain   Do_male Special
24 1 0 0    # 1 BottomTrawl
24 1 0 0    # 2 MidwaterTrawl
24 0 0 0    # 3 Hake
24 0 0 0    # 4 Net
24 1 0 0    # 5 HnL
 0 0 0 0    # 6 JuvSurvey
27 0 0 3    # 7 Triennial 8-56 with
27 0 0 3    # 8 NWFSCcombo
 5 0 0 3    # 9 ForeignAtSea mirrors Hake

#_age_selex_Setup
#_SelPattern    Do_retain   Do_male Special
 10 0 0 0   # 1 BottomTrawl
 10 0 0 0   # 2 MidwaterTrawl
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```
 10 0 0 0   # 3 Hake
 10 0 0 0   # 4 Net
 10 0 0 0   # 5 HnL
 11 0 0 0   # 6 JuvSurvey (selects age 0)
 10 0 0 0   # 7 Triennial
 11 0 0 0   # 8 NWFSCcombo (type 11 to select age 0)
 10 0 0 0   # 9 ForeignAtSea

# double normal parameter comments
# P1=PEAL: beginning size for the plateau; P2=TOP: width of plateau, as logistic between PEAK and MAXLENG
# P3=ASC-WIDTH: ln(width); P4=DESC-WIDTH: ln(width); P5=INIT: logistive between 0 and 1; P6=FINAL: logistic between 0 and 1
# for initial P5 parameter: -999 or -1000: ignore the inital selectivity algorithm and simply decay small fish according to P3

#LO    HI       INIT    PRIOR  PRtype SD    PHASE    env-var use_dev dev_minyr dev_maxyr dev_stddev Block Block_Fxn
########### Bottom Trawl
10      59      45.0    45.0   -1      0.05    1       0   0   0   0   0.5   4   2  #PEAK
-5.0    10.0    2.5     5.0    -1      0.05    3       0   0   0   0   0.5   0   0  #TOP_WIDTH
-4.0    12.0    4.5     3.0    -1      0.05    2       0   0   0   0   0.5   4   2  #ASC_WIDTH
-2.0    10.0    9.0    10.0    -1      0.05   -4       0   0   0   0   0.5   0   0  #DESC_WIDTH
-9      10.0    -9      0.5    -1      0.05   -3       0   0   0   0   0.5   0   0  #INIT
-9      9.0      8      0.5    -1      0.05   -4       0   0   0   0   0.5   0   0  #FINAL
#-999    5.0    -999    -999   -1      0.05   -3       0   0   0   0   0.5   0   0  #INIT
#-999    10.0   -999     5.0   -1      0.05   -4       0   0   0   0   0.5   0   0  #FINAL
#RETENTION Bottom Trawl (discard comps may suggest Horizontal line/constant)
 -5      60       2      0     -1      99      4       0   0   0   0   0     2   2    #inflection
0.01     8      1.0     1.0    -1      99      4       0   0   0   0   0     2   2    #slope
0.2      1      0.99    1      -1      99     -2       0   0   0   0   0     1   2    #asymptote
-10     10      0.0     0.0    -1      99    -99       0   0   0   0   0     0   0    #male offset to inflection (arithmetic)

############ Midwater Trawl
10      59      38.0    45.0   -1      0.05    1       0   0   0   0   0.5   7   2  #PEAK
-10.0   10.0   -5.0     5.0    -1      0.05    3       0   0   0   0   0.5   0   0  #TOP_WIDTH
-4.0    12.0    3.0     3.0    -1      0.05    2       0   0   0   0   0.5   7   2  #ASC_WIDTH
-2.0    10.0    5.0    10.0    -1      0.05    4       0   0   0   0   0.5   7   2  #DESC_WIDTH
-9      10.0    -9      0.5    -1      0.05   -3       0   0   0   0   0.5   0   0  #INIT
-9      9.0      8      0.5    -1      0.05    4       0   0   0   0   0.5   7   2  #FINAL
#RETENTION MIDWATER TRAWL (Horizontal line/constant because no comps)
 -5      60      -5      0     -1      99     -9       0   0   0   0   0     0   0    #inflection
0.01     8      1.2     1.0    -1      99     -9       0   0   0   0   0     0   0    #slope
0.2      1      0.99    1      -1      99     -2       0   0   0   0   0     7   2    #asymptote
-10     10      0.0     0.0    -1      99    -99       0   0   0   0   0     0   0    #male offset to inflection (arithmetic)

######### Hake
10      59      40.0    45.0   -1      0.05    1       0   0   0   0   0.5   0   0  #PEAK
-5.0    10.0    2.5     5.0    -1      0.05    3       0   0   0   0   0.5   0   0  #TOP_WIDTH
-4.0    12.0    3.5     3.0    -1      0.05    2       0   0   0   0   0.5   0   0  #ASC_WIDTH
-2.0    10.0    9.0    10.0    -1      0.05   -4       0   0   0   0   0.5   0   0  #DESC_WIDTH
-9      10.0    -9      0.5    -1      0.05   -3       0   0   0   0   0.5   0   0  #INIT
-9      9.0      8      0.5    -1      0.05   -4       0   0   0   0   0.5   0   0  #FINAL

########## Net
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10      59      40.0    45.0    -1      0.05    1       0   0   0   0   0.5   0   0  #PEAK
-5.0    10.0    2.5     5.0     -1      0.05    3       0   0   0   0   0.5   0   0  #TOP_WIDTH
-4.0    12.0    4.0     3.0     -1      0.05    2       0   0   0   0   0.5   0   0  #ASC_WIDTH
-2.0    10.0    9.0    10.0     -1      0.05   -4       0   0   0   0   0.5   0   0  #DESC_WIDTH
-9      10.0    -9      0.5     -1      0.05   -3       0   0   0   0   0.5   0   0  #INIT
-9      9.0      8      0.5     -1      0.05   -4       0   0   0   0   0.5   0   0  #FINAL

#############  HnL
10      59      30.0    45.0    -1      0.05    1       0   0   0   0   0.5   5   2  #PEAK
-5.0    10.0    2.5     5.0     -1      0.05    3       0   0   0   0   0.5   0   0  #TOP_WIDTH
-5.0    12.0    3.0     3.0     -1      0.05    2       0   0   0   0   0.5   5   2  #ASC_WIDTH
-2.0    10.0    9.0    10.0     -1      0.05   -4       0   0   0   0   0.5   0   0  #DESC_WIDTH
-9      10.0    -9      0.5     -1      0.05   -3       0   0   0   0   0.5   0   0  #INIT
-9      9.0      8      0.5     -1      0.05   -4       0   0   0   0   0.5   0   0  #FINAL
#RETENTION HnL (discard comps suggest size based sorting)
 -5      60      25       0     -1      99      2       0   0   0   0   0     3   2    #inflection
0.01     8       1      1.0     -1      99      3       0   0   0   0   0     3   2    #slope
0.2      1     0.9      1       -1      99      1       0   0   0   0   0     3   2    #asymptote
-10     10      0.0     0.0     -1      99    -99       0   0   0   0   0     0   0    #male offset to inflection (arithmetic)

############### Juvenile Survey
#No parameters for length

############### Triennial Survey
0       2        0      0       -1      0     -99      0   0   0   0   0.5   0   0  #Spline code
-0.001  1        0.15   0       -1      0       2      0   0   0   0   0.5   0   0  #Spline GradLo
-1      1        0.03   0       -1      0       2      0   0   0   0   0.5   0   0  #Spline GradHi
 8      56       24    -10      -1      0     -99      0   0   0   0   0.5   0   0  #Spline Knot1
 8      56       34    -10      -1      0     -99      0   0   0   0   0.5   0   0  #Spline Knot2
 8      56       48    -10      -1      0     -99      0   0   0   0   0.5   0   0  #Spline Knot3
-10     10       -2    -10      -1     99       2      0   0   0   0   0.5   0   0  #Spline Val1
-10     10       -1    -10      -1     99      -99     0   0   0   0   0.5   0   0  #Spline Val2
-10     10        0    -10      -1     99       2      0   0   0   0   0.5   0   0  #Spline Val3

############### NWFSCcombo Survey
0       2        0      0       -1      0     -99      0   0   0   0   0.5   0   0  #Spline code
-0.001  1        0.15   0       -1      0       2      0   0   0   0   0.5   0   0  #Spline GradLo
-1      1       -0.03   0       -1      0       2      0   0   0   0   0.5   0   0  #Spline GradHi
 8      56       24    -10      -1      0     -99      0   0   0   0   0.5   0   0  #Spline Knot1
 8      56       34    -10      -1      0     -99      0   0   0   0   0.5   0   0  #Spline Knot2
 8      56       48    -10      -1      0     -99      0   0   0   0   0.5   0   0  #Spline Knot3
-10     10       -3    -10      -1     99       2      0   0   0   0   0.5   0   0  #Spline Val1
-10     10       -1    -10      -1     99      -99     0   0   0   0   0.5   0   0  #Spline Val2
-10     10        0    -10      -1     99       2      0   0   0   0   0.5   0   0  #Spline Val3

############# Foreign At-sea fleet
-2      60       0      0       -1      0.2    -99      0   0   0   0   0.5   0   0 #MinBin (<=0 means first bin)
-2      60       0      0       -1      0.2    -99      0   0   0   0   0.5   0   0 #MaxBin (<=0 means last bin)

############### Juvenile Survey (Age paramters, select only age 0)
0      1        0       0       -1      99    -99        0   0   0   0   0.5  0   0    # Min
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0      1        0       0      -1      99    -99       0   0   0   0   0.5  0   0    # Max

############### NWFSCcombo Survey (Age paramters, select age 0+)
0      1        0       0      -1      99    -99       0   0   0   0   0.5  0   0    # Min
0      50       40      0      -1      99    -99       0   0   0   0   0.5  0   0    # Max


1 #Custom Block Setup (0/1)
#LO     HI      INIT    PRIOR  PR_TYPE  SD    PHASE
#SELECTIVITY Bottom Trawl
10      59    40.0    45.0    -1      0.05   1  #PEAK (1930-2001)
-4.0    12.0   3.5     3.0    -1      0.05   2  #ASC_WIDTH (1930-2002)
#RETENTION Bottom trawl
 -5     50     25       34    -1      99     3  #inflection (1982-1989)
 -5     50     20       34    -1      99     3  #inflection (1990-2010)
0.01    5      0.9      1.0   -1      99     3  #slope (1982-1989)
0.01    5      0.9      1.0   -1      99     3  #slope (1990-2010)
0.2     1      0.8      1     -1      99     2  #asymptote (1982-1989)
0.2     1      0.5      1     -1      99     2  #asymptote (1990-1999)
0.2     1      0.5      1     -1      99     2  #asymptote (2000-2010)
#SELECTIVITY Midwtaer Trawl
10      59      38.0    45.0   -1      0.05    1   #PEAK
10      59      38.0    45.0   -1      0.05    1   #PEAK
10      59      38.0    45.0   -1      0.05    1   #PEAK
-4.0    12.0    3.0     3.0    -1      0.05    2   #ASC_WIDTH
-4.0    12.0    3.0     3.0    -1      0.05    2   #ASC_WIDTH
-4.0    12.0    3.0     3.0    -1      0.05    2   #ASC_WIDTH
-2.0    10.0    9.0    10.0    -1      0.05   4   #DESC_WIDTH
-2.0    10.0    9.0    10.0    -1      0.05   4   #DESC_WIDTH
-2.0    10.0    9.0    10.0    -1      0.05   4   #DESC_WIDTH
-9      9.0      3      0.5    -1      0.05   4       #FINAL
-9      9.0      3      0.5    -1      0.05   4       #FINAL
-9      9.0      3      0.5    -1      0.05   4       #FINAL
#RETENTION Midwater trawl
0.2     1     0.99     1      -1      99     -2  #asymptote (1916-1982)
0.2     1     0.8      1      -1      99     2  #asymptote (1983-2001)
0.2     1     0.8      1      -1      99     2  #asymptote (2002-2010)
#SELECTIVITY HnL
15      59    38.0    45.0    -1      0.05   1   #PEAK  (1916-2002)
-4.0    12.0  3.0     3.0     -1      0.05   2   #ASC_WIDTH (1916-2002)
#RETENTION HnL
 -5      50     -5     34    -1       99    -2   #inflection (1916-1983)
0.1      8      1.2    1.0   -1       99    -3   #slope  (1916-1983)
0.2      1      0.99   1     -1       99    -3   #asymptote  (1916-1983)
# #Selectivity Triennial
# -9      9.0      5     0.5   -1      0.05    3    #FINAL


1 #selparm_adjust_method: 1=standard; 2=logistic trans to keep in base parm bounds

# Tag loss and Tag reporting parameters go next
```

```
0  # TG_custom:  0=no read; 1=read if tags exist

1 #_Variance_adjustments_to_input_values
#_fleet: 1    2    3     4     5     6    7     8     9
         0    0    0     0     0     0    0     0     0     #_add_to_survey_CV
         0    0    0     0     0     0    0     0     0     #_add_to_discard_stddev
         0    0    0     0     0     0    0     0     0     #_add_to_bodywt_CV
         1    1    1     1     1     1    1     1     1     #_mult_by_lencomp_N
         1    1    1     1     1     1    1     1     1    #_mult_by_agecomp_N
         1    1    1     1     1     1    1     1     1     #_mult_by_size-at-age_N

1 #_maxlambdaphase
1 #_sd_offset
#
13 # number of changes to make to default Lambdas (default value is 1.0)
# Like_comp codes:  1=surv; 2=disc; 3=mnwt; 4=length; 5=age; 6=SizeFreq; 7=sizeage; 8=catch;
# 9=init_equ_catch; 10=recrdev; 11=parm_prior; 12=parm_dev; 13=CrashPen; 14=Morphcomp; 15=Tag-comp; 16=Tag-negbin
#like_comp fleet/survey  phase  value  sizefreq_method
4          1            1      0.035    1    # lgth comps for bottom trawl
4          2            1      0.13    1    # lgth comps for midwater trawl
4          3            1      0.06    1    # lgth comps for hake
4          4            1      0.23    1    # lgth comps for net
4          5            1      0.20    1    # lgth comps for HnL
4          7            1      0.38    1    # lgth comps for Tri
4          8            1      0.73    1    # lgth comps for NWFSC
5          1            1      0.08    1    # age comps for bottom trawl
5          2            1      0.16    1    # age comps for midwater trawl
5          3            1      0.11    1    # age comps for hake
5          4            1      0.23    1    # age comps for net
5          5            1      0.31    1    # age comps for HnL
5          8            1      0.33    1    # age comps for NWFSC

0 # (0/1) read specs for more stddev reporting
999
```

Appendix E. SS starter file

```
# 2015 Widow Rockfish Assessment
# Allan C. Hicks and Chantel R. Wetzel
# NWFSC, NOAA, Seattle, WA

2015widow.dat
2015widow.ctl

0       # 0=use init values in control file; 1=use ss3.par
1       # run display detail (0,1,2)
1       # detailed age-structured reports in SS2.rep (0,1)
0       # write detailed checkup.sso file (0,1)
0       # write parm values to ParmTrace.sso (0=no,1=good,active; 2=good,all; 3=every_iter,all_parms)
0       # write to cumreport.sso (0=no,1=like&timeseries; 2=add survey fits)
1       # Include prior_like for non-estimated parameters (0,1)
1       # Use Soft Boundaries to aid convergence (0,1) (recommended)
0       # Number of bootstrap datafiles to produce
10      # Turn off estimation for parameters entering after this phase
1       # MCMC burn interval
1       # MCMC thin interval
0.0     # jitter initial parm value by this fraction
-1      # begin annual SD report in start year
-2      # end annual SD report in end year (-2=end of annual SD report in last forecast year
0       # N individual STD years (0=none), (vector of year values)
0.0001  # final convergence criteria (e.g. 1.0e-04)
0       # retrospective year relative to end year (e.g. -4)
4       # min age for calc of summary biomass (age 4 is when all fleets significantly begin seeing fish)
1       # Depletion basis:  denom is: 0=skip; 1=rel X*B0; 2=rel X*Bmsy; 3=rel X*B_styr
1       # Fraction (X) for Depletion denominator (e.g. 0.4)
1       # (1-SPR)_reporting:  0=skip; 1=rel(1-SPR); 2=rel(1-SPR_MSY); 3=rel(1-SPR_Btarget);
        #4=no denominator (report actural 1-SPR values)
1       # F_report_units: 0=skip; 1=exploitation(Bio); 2=exploitation(Num); 3=sum(Frates);
        #4=true F for range of ages
0       # F_report_basis: 0=raw; 1=rel Fspr; 2=rel Fmsy ; 3=rel Fbtgt
999     # check value for end of file
```

Appendix F. SS forecast file

```
# 2015 Widow Rockfish Assessment
# Allan C. Hicks and Chantel R. Wetzel
# NWFSC, NOAA, Seattle, WA

#for all year entries except rebuilder; enter either: actual year, -999 for styr, 0 for endyr, neg number for rel. endyr
1      # Benchmarks: 0=skip; 1=F(SPR); 2=F(MSY);3=F(Btarget); 4=F(endyr); 5=Ave recent F (not implemented); 6= read Fmult (not implemented)
2      # MSY: 1= set to F(SPR); 2=calc F(MSY); 3=set to F(Btgt); 4=set to F(endyr)
0.50  # SPR target (e.g. 0.40), 0.5 for west coast groundfish
0.40  # Biomass target (e.g. 0.40)
#_Bmark_years: beg_bio, end_bio, beg_selex, end_selex, beg_relF, end_relF (enter actual year, or values of 0 or -integer to be rel. endyr)
0 0 0 0 0 0

1   #Bmark_relF_Basis: 1 = use year range; 2 = set relF same as forecast below

1   # Forecast: 0=none; 1=F(SPR); 2=F(MSY) 3=F(Btgt); 4=Ave F (uses first-last relF yrs); 5=input annual F scalar
12  # N forecast years
1   # F scalar (only used for Do_Forecast==5)
#_Fcast_years:  beg_selex, end_selex, beg_relF, end_relF  (enter actual year, or values of 0 or -integer to be rel. endyr)
0 0 0 0

1       # Control rule method (1=catch=f(SSB) west coast; 2=F=f(SSB) )
0.40    # Control rule Biomass level for constant F (as frac of Bzero, e.g. 0.40)
0.10    # Control rule Biomass level for no F (as frac of Bzero, e.g. 0.10)
0.9548  # Control rule target as fraction of Flimit (e.g. 0.75)

3       #_N forecast loops (1-3) (fixed at 3 for now)
3       #_First forecast loop with stochastic recruitment
0       #_Forecast loop control #3 (reserved for future bells&whistles)
0       #_Forecast loop control #4 (reserved for future bells&whistles)
0       #_Forecast loop control #5 (reserved for future bells&whistles)

2027    #FirstYear for caps and allocations (should be after years with fixed inputs)
0       # stddev of log(realized catch/target catch) in forecast (set value>0.0 to cause active impl_error) (if=0,
        #there will be N_forecase_years less parameters estimated)
0       # Do West Coast gfish rebuilder output (0/1)
2015    # Rebuilder:  first year catch could have been set to zero (Ydecl)(-1 to set to 1999)
2015    # Rebuilder:  year for current age structure (Yinit) (-1 to set to endyear+1)
1       # fleet relative F:  1=use first-last alloc year; 2=read seas(row) x fleet(col) below

# Note that fleet allocation is used directly as average F if Do_Forecast=4
2       # basis for fcast catch tuning and for fcast catch caps and allocation  (2=deadbio; 3=retainbio; 5=deadnum; 6=retainnum)
# Conditional input if relative F choice = 2
# Fleet relative F:  rows are seasons, columns are fleets
```

```
#_Fleet:  FISHERY
#  1
# max totalcatch by fleet (-1 to have no max) must enter value for each fleet
-1 -1 -1 -1 -1

# max totalcatch by area (-1 to have no max); must enter value for each fleet
-1

# fleet assignment to allocation group (enter group ID# for each fleet, 0 for not included in an alloc group)
0 0 0 0 0

#_Conditional on >1 allocation group
# allocation fraction for each of: 0 allocation groups
# no allocation groups
10      # Number of forecast catch levels to input (else calc catch from forecast F)
2       # basis for input Fcast catch:  2=dead catch; 3=retained catch; 99=input Hrate(F) (units are from fleetunits; note new codes in SSV3.20)
# Input fixed catch values
#Year Seas Fleet Catch(or_F)
2015   1      1      197.7855179
2015   1      2      850.7996
2015   1      3      949.4148821
2015   1      4      0
2015   1      5      2
2016   1      1      197.7855179
2016   1      2      850.7996
2016   1      3      949.4148821
2016   1      4      0
2016   1      5      2


999 # verify end of input
```