16. Assessment of the Other Rockfish stock complex in the Bering Sea/Aleutian Islands

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Executive Summary

Summary of Changes in Assessment Inputs

Changes in the input data

1) Catch and fishery lengths updated through October 25, 2014.
2) Biomass estimates, catch per unit effort (CPUE), and length frequency compositions were included from the 2014 AI trawl survey, the 2013 and 2014 EBS shelf surveys.

Changes in the assessment methodology

1) There were no changes in the assessment methodology.

Summary of Results

Summary for SST portion of the Other Rockfish complex.

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity	2014	2015	2015	2015
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	45,820	45,820	47,042	47,042
F_{OFL}	0.03	0.03	0.03	0.03
$maxF_{ABC}$	0.03	0.03	0.03	0.03
F_{ABC}	0.0225	0.0225	0.0225	0.0225
OFL (t)	1,375	1,375	1,411	1,411
maxABC (t)	1,031	1,031	1,058	1,058
ABC (t)	1,031	1,031	1,058	1,058
AI ABC (t)	367	367	376	376
EBS ABC (t)	664	664	682	682
	As determined *last* year for:		As determined *this* year for:	
Status	2012	2013	2013	2014
Overfishing		n/a		n/a

Summary for non-SST portion of the Other Rockfish complex.

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015	2016
M (natural mortality rate)	0.09	0.09	0.09	0.09
Tier	5	5	5	5
Biomass (t)	1,885	1,885	3,165	3,165
F_{OFL}	0.09	0.09	0.09	0.09
$maxF_{ABC}$	0.0675	0.0675	0.0675	0.0675
F_{ABC}	0.0675	0.0675	0.0675	0.0675
OFL (t)	170	170	285	285
maxABC (t)	128	128	214	214
ABC (t)	128	128	214	214
AI ABC (t)	106	106	194	194
EBS ABC (t)	22	22	20	20
Status	As determined *last* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing		n/a		n/a

Summary for the entire Other Rockfish complex (SST and non-SST combined).

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015	2015
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	47,705	47,705	50,050	50,050
F_{OFL}*	-	-	-	-
$maxF_{ABC}$	-	-	-	-
F_{ABC}	-	-	-	-
OFL (t)	1,550	1,550	1,696	1,696
maxABC (t)	1,163	1,163	1,272	1,272
ABC (t)	1,163	1,163	1,272	1,272
AI ABC (t)	473	473	570	570
EBS ABC (t)	690	690	702	702
Status	As determined *last* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing		n/a		n/a

*****Fishing mortality rates are specified separately for the SST and non-SST portions of the Other Rockfish complex.

Summaries for Plan Team

The following table gives the recent biomass estimates, catch, and harvest specifications, and projected biomass, OFL and ABC for 2015-2016.

Species	Year	Biomass[1]	OFL	ABC	TAC	Catch[2]
Other rockfish	2013	47,705	1,540	1,159	873	814
	2014	47,705	1,540	1,159	1,159	905
	2015	50,050	1,696	1,272		
	2106	50,050	1,696	1,272		

[1]Total biomass from trawl survey estimates.

[2] Current as of October 25, 2014. Source: NMFS AKRO BLEND/Catch Accounting System.

Responses to SSC and Plan Team Comments on Assessments in General

None pertaining to this assessment.

Responses to SSC and Plan Team Comments Specific to this Assessment

In December 2013 the SSC noted that the Other Rockfish authors presented some evidence for high harvest of the non-shortspine thornyhead portion of the stock in the November 2013 stock assessment. The SSC agreed with Plan Team to recommend the stock structure template be completed for this assessment by September 2014.

Authors' response: The stock structure template was completed for the BSAI Other Rockfish complex in September 2014. The main findings were that: 1) the Aleutian Island ABCs and TACs were exceeded in 2012, 2013, and 2014 (Table 1); and 2) Aleutian Islands exploitation rates are higher than target values (F_{ABC}) for non-SST species. Non-SST species consist primarily of dusky rockfish (*Sebastes variabilis*). Although uncertainty is high in biomass estimates for this species, catch has likely exceeded F_{OFL} since 2007 in the Aleutian Islands (Figure 1).

In September 2014, the authors presented the stock structure template for the Other Rockfish complex to the Plan Team. The Plan Team recommended that the authors monitor the spatial location of dusky rockfish catches.

Authors' response: This information will be presented to the September 2015 Plan Team meeting.

Introduction

The Bering Sea/Aleutian Islands (BSAI) Other Rockfish complex is defined by what it excludes rather than by what it includes. The Other Rockfish complex includes all species of *Sebastes* and *Sebastolobus*, other than Pacific ocean perch (POP, *Sebastes alutus*), northern rockfish (*Sebatses. polyspinis)* rougheye rockfish (*S. aleutianus*), and shortraker rockfish (*S. borealis*). Current definitions of the complex do not specifically exclude blackspotted rockfish (S. *melanostictus)*, a recently recognized species (Orr and Hawkins 2008) that had historically been identified as rougheye rockfish in research surveys. However, blackspotted is currently not distinguished from rougheye rockfish in the fishery catches, and is thus currently managed under the BSAI blackspotted/rougheye complex.

Rockfish are long-lived species which do not attain reproductive maturity until 5-20 years of age. They are viviparious; they mate and fertilize the eggs internally. Embryos develop within the female, and thousands or millions of tiny larvae are released after several months. Juveniles settle in kelp, eelgrass, or rocky habitat and move to deeper water as they mature.

An analysis was conducted in the 2001 Other Rockfish SAFE report to distinguish species expected to occur in the BSAI Other Rockfish complex from rarely observed and potentially misidentified species (Reuter and Spencer 2001, http://www.afsc.noaa.gov/REFM/docs/2010/BSAIshortraker.pdf). The criteria used for the analysis was occurrence in at least one haul of the BSAI surveys and/or occurrence in at least 1% of observed fishery hauls. Using data from 1999-2001, 7 species (shortspine thornyhead; *Sebastolobus alascanus*, dusky rockfish; *Sebastes variabilis*, redbanded rockfish; *Sebastes babcocki*, redstripe rockfish; *Sebastes proriger*, yelloweye rockfish; *Sebastes ruberrimus*, harlequin rockfish; *Sebastes variegatus*, and sharpchin rockfish; *Sebastes zacentrus*) were identified as meeting these criteria (Table 2). Dark rockfish also met the criteria, but have since been removed from the Other Rockfish complex and is now managed by the State of Alaska.

The two most abundant species for Other Rockfish complex are dusky rockfish and shortspine thornyheads (SST). In the Aleutian Islands (AI) and eastern Bering Sea (EBS) slope, shortspine thornyheads occur between 200 m and 500 m (Reuter and Spencer 2001). In contrast, dusky rockfish are typically captured between 125-200 m in the AI, and are rarely encountered on the EBS slope in either survey or fishery catches.

Fishery

In 2001, separate TACs were established for EBS and AI management areas, but the overfishing level pertained to the entire BSAI area. In 2005, the BSAI Other Rockfish complex was moved to a biennial assessment schedule to coincide with the frequency of trawl surveys in the AI and the EBS slope. These surveys occur in even years, and for these years a full assessment of the Other Rockfish complex in the BSAI area is conducted.

There is no directed fishery for the species included the Other Rockfish complex; however, between 2004 and 2014, approximately 15% of the “Other Rockfish” was caught in the directed rockfish fishery. The highest proportion (37%) has been caught in the Atka mackerel fishery, followed by the flatfish fishery (22%). Other less significant fisheries (under 6%) are, in order of

significance: sablefish (12%), Pacific cod (10%), and pollock (3%). Since 2004 they have been primarily caught by bottom trawl (66%) and hook and line (31%).

Foreign catch records did not identify the various Other Rockfish by species, but reported catches in categories such as "other species" (1977-1979), and "Other Rockfish" (1980-1990), with the definitions of these groups changing between years. In the domestic fishery, the NOAA Fisheries Alaska Regional Office “Blend” catch database often reported the catches of Other Rockfish species in a single “Other Rockfish” category, although species-specific catch records have been available with the Catch Accounting System (CAS) database beginning in 2003. Reported ABCs, TACs, and catches of Other Rockfish from 1988-2014 are shown in Table 3. From 1991-2002, species catches were reconstructed by computing the harvest proportions within management groups from the North Pacific Foreign Observer Program database, and applying these proportions to the estimated total catch obtained from the NOAA Fisheries Alaska Regional Office “Blend” database. An identical procedure was used to reconstruct the estimates of catch by species from the 1977-1989 foreign and joint venture fisheries. Estimated domestic catches in 1990 were obtained from Guttormsen et al. 1992. Catches from the domestic fishery prior to the domestic observer program were obtained from PACFIN records. Catches of Other Rockfish since 1977 by area are shown in Table 4. Some relatively high catches occurred in the late 1970s – early 1980s; total catch has only exceeded 1,000 t in 1978, 1979, 1980, 1982, and 1990. Tables 3 and 4 report only the catches of seven most common species identified above (dusky, yelloweye, sharpchin, redbanded, redstripe, and harlequin rockfish, and shortspine thornyhead).

The catches of Other Rockfish are composed primarily of dusky rockfish and shortspine thornyhead; from 2004 -2014, these two species composed 91% of the catch identified to species in the AI and in the 98% in the EBS (Tables 5 and 6). In the AI, the catches of dusky rockfish and SST average 243 t and 141 t, respectively, from 2004-2014. The proportion of SST in the EBS Other Rockfish catch was higher, as the catches of dusky rockfish and SST averaged 32 t and 166 t, respectively from 2004-2014. Discrepancy between total catch and individual catch (e.g. Tables 4 and 5) is due to the catch weight of less common species and to catch assigned to the “Other Rockfish“ group without being identified to species.

There is no directed fishing for any of the Other Rockfish species; however, incidental catch occurs in multiple fisheries and gear types. The catch of dusky rockfish and SST in various target fisheries and gear types from 2004-2014 are shown in Tables 7-10. In the EBS, dusky rockfish are primarily caught in the Pacific cod longline fishery (44%), followed by trawl fisheries for pollock (22%), rockfish (13%), Pacific cod (9%), flatfish (5%), and Atka mackerel (4%) (Table 7). Shortspine thornyhead catches in the EBS are obtained in the flatfish bottom trawl fishery (36%), followed by flatfish longline fisheries (19%), and the rockfish trawl fishery (15%) (Table 8). Dusky rockfish in the AI are caught in the atka mackerel trawl fishery (84%) followed by the rockfish trawl fishery (9%) and the Pacific cod longline gear (4%) (Table 9). Shortspine thornyhead in the AI are caught primarily in the sablefish longline fishery (48%) followed by the rockfish trawl fishery (27%), and the flatfish longline fishery (8%) (Table 10). Both species are caught primarily in NMFS reporting areas 517, 519, and 521 along the EBS slope (Tables 7 and 8). In the AI, the highest catch of dusky rockfish in in the eastern Aleutians (541; Table 9), and shortspine thornyhead catch is relatively evenly dispersed throughout the Aleutians (Table 10).

A summary of the Other Rockfish catch retained and discarded from 2004-2014 are shown in Table 11. From 2004-2014 the percent of Other Rockfish retained has ranged from 51% to almost 90%, and has generally increased over time. Low discard rates are observed for SST, particularly if they are caught using fixed-gear, which yields a higher quality product than trawl gear (Hiatt et al. 2002).

Data

Fishery:

Fishery length samples have been collected for both SST and dusky rockfish since 2002. Sample sizes are shown below by year.

Year	dusky rockfish	SST
2002	576	764
2003	251	881
2004	534	617
2005	383	809
2006	493	780
2007	749	929
2008	1,089	976
2009	543	609
2010	404	1,910
2011	1,079	1,650
2012	1,521	966
2013	1,077	1,714
2014	898	1,031

The fishery length frequencies for each species since 2002 show little change, with the bulk of the dusky rockfish between approximately 36 and 50 cm (Figure 2), and the bulk of the SST lengths between 30 and 60 cm (Figure 3).

Removals of the Other Rockfish complex from non-commercial sources (i.e. those not included in the Alaska Regional Office's Catch Accounting System) are shown in Appendix Table 1. Non-commercial removals ranged from 1-23 metric tons (t) between 1996-2014.

Survey:

Several bottom trawl surveys provide biomass estimates for the EBS and AI regions. The 1979-85 cooperative U.S.-Japan trawl surveys in the EBS were conducted both on the continental shelf and slope, and cooperative surveys were also conducted in the AI from 1980-1986. U.S domestic trawl surveys were conducted in 1988, 1991, 2002, 2004, 2008, 2010, and 2012 on the EBS slope, and in 1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, 2012, and 2014 in the AI (Tables 12, 13, and 14). The 2002 EBS slope survey represents the initiation of a new survey time series distinct from the previous surveys in 1988 and 1991. The EBS slope survey samples depths from 200 to ~1200 m, whereas the AI survey samples depths to 500 m. Thus, survey biomass estimates of deep-water species such as shortspine thornyhead are likely underestimated in the AI survey. The cooperative U.S. – Japan AI trawl survey were conducted with different vessels, survey gear, and sampling design relative to the U.S. domestic trawls surveys that began in 1991. The NMFS

EBS shelf survey has been conducted every year since 1982, but few rockfish are found there, primarily dusky and harlequin rockfish (Table 12).

From 1979-2004, the biomass estimates for Other Rockfish increased in both the AI and southern Bering Sea (SBS, the area from 165° W to 170° W) portions of the area covered by the AI trawl survey, and have remained fairly stable (Table 12). The 2012 Other Rockfish biomass estimate in the Aleutian Islands decreased by approximately 25% from the 2010 survey but increased by 60% in 2014 (Table 12). Biomass estimates for dusky rockfish and shortspine thornyhead in the Aleutian Islands increased in 2014, with a particularly large increase of over an order of magnitude in dusky rockfish, 5,773 t, CV = 0.82 (Tables 12 and 13). Such large fluctuations would not be expected in such a long-lived species, and are likely due to high uncertainty in the biomass estimates. Between 1997 and 2014, the dusky rockfish biomass estimate in the AI area has fluctuated between 236 t (2012) and 5,957 t (2006), although the large 2006 estimate was driven by a small number of very large tows, leading to a large coefficient of variation (CV) of 0.89 (Table 13). The biomass estimate of SST in the AI area increased from 6,153 t in 1991 to a high of 20,178 t in 2014, the highest on record in the AI (Table 14). The estimates of SST for the Southern Bering Sea between 1991 and 2012 have been lower and more variable, ranging between 187 t to 1,545 t with CVs between 0.41 and 0.73.

The Other Rockfish species captured in the EBS slope survey from 2002-2014 were primarily SST, but also included broadfin thornyhead, longspine thornyhead, dusky, silvergray, yellowmouth, and redbanded rockfish, although the estimated biomass for redbanded rockfish did not exceed 7 t for any year. The total for these species increased from 16,975 t in 2002 to 29,619 t in 2012 (Tables 12, 14).

The lengths of dusky rockfish obtained in the 1997-2014 AI surveys (dusky was not identified by species prior to 1997) were generally between 35 and 45 cm, corresponding closely to the length distribution in the BSAI fishery (Figure 4). Shortspine thornyhead lengths from the survey are smaller than those for the fishery, falling primarily between 20 and 44 cm (Figure 5). Assuming that larger SST in the AI inhabit deeper water, this difference is likely related to the 500 m depth limit of the AI survey. Length frequencies were generally consistent between years (Figure 5).

The spatial distribution of dusky rockfish biomass in the AI surveys shows concentrations near Amchitka Island and the Delarof Islands (Figure 6). The spatial distribution of SST shows high densities primarily west of the Petral Bank (Figure 7).

Very little age information exists for species in the Other Rockfish complex. The only available age data for dusky rockfish are from the 2002 AI survey (n = 108). Growth analysis of these data using a von Bertalanffy growth equation result in an L_{inf} of 41.6 cm, k=0.32 and a t_o=2.5 (Reuter and Spencer 2003). These results show that dusky rockfish in the AI grow to a smaller maximum length than dusky rockfish in the GOA (Clausen and Heifetz 2001). No age data exists for SST because an ageing technique has yet to be satisfactorily determined.

Analytic Approach

Model Structure

Other Rockfish are currently assessed with the Tier 5 methodology, which requires estimates of natural mortality (M) and population size. For Tier 5 stocks, F_{OFL} and F_{ABC} are defined as M and 0.75M, respectively. The acceptable biological catch (ABC) is obtained by multiplying F_{ABC} by

the estimated biomass and the overfishing level (OFL) is obtained by multiplying F_{OFL} by the estimated biomass. The estimated natural mortality differs between shortspine thornyhead (SST) and the remaining stocks in the Other Rockfish complex; therefore, ABC and OFL (and F_{OFL} and F_{ABC}) are calculated separately for SST and non-SST Other Rockfish. Biomass estimates for Other Rockfish were obtained by taking a weighted (4-6-9) biomass estimate of the most recent three surveys by area, with higher weights applied to more recent surveys (Bering Sea slope, Bering Sea shelf, and Aleutian Islands surveys). The EBS estimated biomass was obtained from summing the weighted average from the EBS slope survey with the weighted average from the SBS portion of the AI survey, and the AI biomass estimate was obtained using the AI portions of the AI surveys.

Biomass is also estimated using the Random Effects model for comparison, although this value is not used to set ABCs and OFLs (Figure 8). The random effects (RE) model is an approximation to the Kalman Filter approach. The process errors (step changes) from one year to the next are the random effects to be integrated over and the process error variance is a free parameter. The observations can be irregularly spaced; therefore this model can be applied to datasets with missing data. Large observation errors increase errors predicted by the model, which can provide a way to weight predicted estimates of biomass (http://www.afsc.noaa.gov/REFM/stocks/Plan_Team/2012/Sept/survey_average_wg.pdf), and an exploitation rate is then applied to estimate of current biomass to obtain the ABC and OFL.

Biomass estimates used for ABCs and OFLs are based on the 4-6-9 weighted average of the past 3 most recent surveys. Apportionments between the AI and the EBS are based on survey estimates in those regions.

Parameter Estimates

Estimates of natural mortality of SST have been variable due to the difficulty of ageing this species. In the GOA shortspine thornyhead assessment, Gaichas and Ianelli (2003) presented natural mortality estimates from several studies. Studies have calculated natural mortality differently due to the age of their oldest sample. Miller (1985) estimated natural mortality to be 0.07 from a sample of SST in Southeast Alaska whose oldest age was 62 years old. A study using west coast SST estimated a natural mortality between 0.05-0.07 with the oldest age in the sample being 80 (Kline 1996). Pearson and Gunderson (2003) suggest that SST from Alaska have an M = 0.013, based on a study using the gonadosomatic index to estimate natural mortality. A natural mortality rate that low suggests that these fish reach maximum ages from 250-350 years, which would be very old even among rockfish species. One source of variability in these estimates is the variation in otolith age reading techniques. Miller (1985) used surface ageing and the break and burn technique, and found that precision and comparability was low. Kline (1996) used a thin section technique that had better inter-reader ageing agreement, and radiometric verification supported this technique. Subsequent radiometric work by Kastelle et al. (2000) corroborated Kline's results. Thus, Kline's methodology and results are presumed to be the most accurate given the uncertainty of ageing SST. Work is currently being done at the Alaska Fisheries Science Center to determine the best ageing technique to use for SST (personal communication Betty Goetz, Age and Growth group, REFM, AFSC).

Historically, the value of M of 0.07 has been used to assess the Other Rockfish stock, which represents an approximation based on knowledge of rockfish life histories from other areas. This value is based on the estimate for SST from Ianelli and Ito (1994), as this species comprises well over 90% of the Other Rockfish biomass (as calculated by survey data). In the 2003 GOA SST

assessment a value of M of 0.038 was used, which was obtained as an alternate value given in Pearson and Gunderson (2003). Because this value has been reviewed by the Plan Team and SSC, we use a value of 0.03 for the SST portion of the BSAI Other Rockfish biomass in order to maintain consistency with GOA SST. The majority of the non-SST Other Rockfish biomass is composed of dusky rockfish. The parameter estimate for natural mortality for dusky rockfish in the GOA is 0.09, and thus is currently the best estimate of *M* (Clausen and Heifetz 2001) For the 2014 assessment, we use an *M* of 0.09 for the remaining group of Other Rockfish.

Results

Harvest Recommendations

The 2014 weighted average biomass estimate of all species in the Other Rockfish complex is 50,050 t, 47,041 t for the SST component, and 3,165 t for the non-SST component. The random effect model estimates are similar, but provide uncertainty estimates. The 95% confidence intervals are higher for the non-SST component of the stock complex, reflecting uncertainty in those estimates. The total BSAI estimate for the Other Rockfish based on the random effects model is 49,630 t (42,528 - 56,731 t, 95% CI), with 46,647 t (39,849 - 53,444 t) for the SST and 2,983 t (927 - 5,039 t) for the non-SST components of the complex. These biomass estimates are used to estimate OFL and ABC in Appendix 1.

In recent years, BSAI Other Rockfish have been managed with a BSAI-wide OFL level and separate ABCs for the AI and EBS subareas. For the 2015 fishery, we recommend the maximum allowable ABC of 702 t for the Other Rockfish complex in the EBS and 570 t in the AI. We also recommend an OFL of 1,696 t for the entire complex. Further breakdowns of reference values for SST and the remaining stocks in the Other Rockfish complex are summarized in the following table.

Area	Species	M	2014 Weighted Survey Average Biomass	2014 Random Effects biomass estimate (95% confidence interval)	ABC	OFL
BSAI	SST	0.03	47,041	46,647 (39,849, 53,444)		1,411
BSAI	Non-SST	0.09	3,165	2,983 (927, 5,039)		285
BSAI	Total Other Rockfish		50,050	49,630 (42,528, 56,731)		1,696
EBS	SST	0.03	30,333	30,321 (25,370, 35,271)	682	
EBS	Non-SST	0.09	289	300 (165, 436)	20	
EBS	Total Other Rockfish		30,466	30,621 (25,668, 35,574)	702	
AI	SST	0.03	16,708	16,326 (11,668, 20,984)	376	
AI	Non-SST	0.09	2,876	2,682 (631, 4,733)	194	
AI	Total Other Rockfish		19,584	19,008 (13,919, 24,098)	570	

Ecosystem Considerations

Ecosystem Effects on Stock

Little to no information is available to determine the diet of Other Rockfish species, important predators, or their trends over time.

Fishery Effects on the Ecosystem

The Other Rockfish complex is not a targeted fishery, therefore reference on the effects of the fishery on the ecosystem will be described in the SAFE chapters of the fisheries in which Other Rockfish is taken as bycatch.

Data gaps and research priorities

Validating aging techniques of shortspine thornyheads, and obtaining ages from archived samples, remains research priorities and are required for age-structured population modeling. Little is known regarding most aspects of the biology of the species in the Other Rockfish complex, including the reproductive biology and distribution, duration, and habitat requirements of various life-history stages. Given the relatively unusual reproductive biology of rockfish and its importance in establishing management reference points, data on reproductive capacity should be collected on a periodic basis.

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Tables

Table 1. Catch, TAC, ABC, and OFL for the Other Rockfish complex are summarized in the following table.

[1]Updated October 25, 2014.

	BSAI	AI	EBS	Total
OFL (2012)	1,700			1,700
ABC (2012)		570	710	1,280
TAC (2012)		570	500	1,070
Catch (2012)		736	210	947
OFL (2013)	1,540			1,540
ABC (2013)		473	686	1,159
TAC (2013)		473	400	873
Catch (2013)		623	191	814
OFL (2014)	1,550			1,550
ABC (2014)		473	690	1,163
Catch (2014)[1]		601	304	905
TAC (2014)				686
OFL (2015)	1,550			1,550
ABC (2015)		473	690	1,163
OFL (2016)	1,550			1,550
ABC (2016)		473	690	1,163

Table 2. The percentage catch of "Other Rockfish" in AFSC research bottom trawl surveys (where at least one fish was observed) and in observed fisheries hauls (where fish were observed in >1% of hauls) from 1991-2001. Cases were no fish were observed are denoted with "~".

		EBS		**AI**	
Common name	Scientific name	**Survey**	**Fishery**	**Survey**	**Fishery**
Redbanded rockfish	*Sebastes babcocki*	~	~	1%	<1%
Dusky rockfish	*Sebastes variabilis*	18%	39%	22%	45%
Redstripe rockfish	*Sebastes proriger*	~	1%	~	1%
Yelloweye rockfish	*Sebastes ruberrimus*	~	1%	<1%	1%
Harlequin rockfish	*Sebastes variegatus*	~	1%	9%	5%
Sharpchin rockfish	*Sebastes zacentrus*	~	<1%	<1%	<1%
Shortspine thornyhead	*Sebastolobus alascanus*	62%	43%	61%	34%

Table 3. Total allowable catch (TAC), acceptable biological catch (ABC), and catch of seven Other Rockfish species (SST, dusky, redbanded, redstripe, yelloweye, harlequin, and sharpchin rockfish) from 1988 to 2014 in the Aleutian Islands (AI) and Eastern Bering Sea (BS). Source: 2004-2014 data is from the NMFS Alaska Regional Office Catch Accounting System, accessed October 25, 2014. Data previous to 2004 was obtained using several different sources that are described in the text.

Year	Area	ABC (t)	TAC (t)	Catch (t)
1988	BS	400	340	254
	AI	1,100	935	237
1989	BS	400	340	180
	AI	1,100	935	352
1990	BS	500	425	395
	AI	1,100	935	822
1991	BS	500	340	239
	AI	1,100	786	313
1992	BS	400	400	201
	AI	925	925	470
1993	BS	400	400	142
	AI	925	925	443
1994	BS	365	365	123
	AI	770	770	272
1995	BS	365	329	257
	AI	770	693	223
1996	BS	497	497	164
	AI	952	857	272
1997	BS	373	373	114
	AI	714	714	274
1998	BS	369	369	155
	AI	685	685	327
1999	BS	369	369	145
	AI	685	685	372
2000	BS	369	369	239
	AI	685	685	558
2001	BS	361	361	295
	AI	676	676	524
2002	BS	361	361	370
	AI	676	676	502
2003	BS	960	960	316
	AI	634	634	408
2004	BS	960	460	247
	AI	634	634	266
2005	BS	810	460	130
	AI	590	590	242
2006	BS	810	460	127
	AI	590	590	324
2007	BS	414	414	205
	AI	585	585	397
2008	BS	414	414	194
	AI	585	585	330
2009	BS	485	485	184
	AI	555	555	303

Table 3. Continued.

Year	Area	ABC (t)	TAC (t)	Catch (t)
2010	BS	485	485	224
	AI	555	555	432
2011	BS	485	485	298
	AI	555	555	594
2012	BS	710	500	168
	AI	570	500	648
2013	BS	686	400	165
	AI	473	473	593
2014	BS	686	686	276
	AI	473	473	517

Table 4. Catch (t) of seven Other Rockfish species (SST, dusky, redbanded, redstripe, yelloweye, harlequin, and sharpchin rockfish) from 1977 to 2014 in foreign, joint venture (JV), and domestic fisheries. Source: 2004-2014 data is from the NMFS Alaska Regional Office Catch Accounting System, accessed October 25, 2014. Data previous to 2004 was obtained using several different sources that are described in the text. Data prior to 1990 are on file at the Alaska Fisheries Science Center, 7600 Sand Point Way N.E., Seattle, WA 98115.

	Eastern Bering Sea				Aleutian Islands				BSAI
Year	Foreign	JV	Domestic	Total	Foreign	JV	Domestic	Total	Total
1977	52	0		52	537	0		537	589
1978	304	0		304	795	0		795	1,099
1979	281	0		281	2,053	0		2,053	2,334
1980	566	1		567	484	0		484	1,051
1981	337	0		337	236	0		236	574
1982	365	0		365	2,057	0		2,057	2,422
1983	208	1		210	717	4		721	931
1984	112	7		119	57	25		81	200
1985	35	1		36	1	14		15	51
1986	4	14	81	99	0	10	147	157	256
1987	3	4	535	542	0	5	138	143	684
1988	0	3	252	254	0	68	168	237	491
1989	0	9	171	180	0	0	352	352	533
1990			395	395			822	822	1,217
1991			239	239			313	313	552
1992			201	201			470	470	671
1993			142	142			443	443	584
1994			123	123			272	272	395
1995			257	257			223	223	479
1996			164	164			272	272	437
1997			114	114			274	274	388
1998			155	155			327	327	482
1999			145	145			372	372	517
2000			239	239			558	558	797
2001			295	295			524	524	819
2002			370	370			502	502	872
2003			316	316			408	408	724
2004			247	247			266	266	514
2005			130	130			242	242	372
2006			127	127			324	324	451
2007			205	205			397	397	602
2008			194	194			330	330	524
2009			184	184			303	303	487

Table 4. Continued.

	Eastern Bering Sea				Aleutian Islands				BSAI
Year	Foreign	JV	Domestic	Total	Foreign	JV	Domestic	Total	Total
2010			224	224			432	432	657
2011			298	298			594	594	892
2012			168	168			648	648	816
2013			165	165			593	593	758
2014			276	276			517	517	794

Table 5. Catch (t) of Other Rockfish species in the Aleutian Islands from 2004-2014. Source: NMFS AKRO BLEND/Catch Accounting System, accessed October 25, 2014.

Year	dusky rockfish	SST	harlequin rockfish	sharpchin rockfish	yelloweye rockfish
2004	129.45	81.75	36.87	14.05	0.90
2005	134.16	87.94	14.35	0.01	5.57
2006	161.43	132.92	25.22	2.00	0.38
2007	231.28	123.32	39.93		0.57
2008	179.80	109.78	34.33	0.01	4.48
2009	141.96	137.80	22.76		0.22
2010	224.75	159.89	42.60	0.08	0.54
2011	380.51	153.10	59.26		0.26
2012	429.79	164.17	49.85		0.15
2013	331.43	234.62	25.94		0.53
2014	331.15	165.46	19.99		0.33
Average	243.25	140.98	33.74	1.47	1.27

Year	redbanded rockfish	redstripe rockfish	black rockfish	silvergray rockfish	darkblotched rockfish	Total catch (t)
2004	0.17	3.15	1.35		0.21	267.90
2005	0.17					242.19
2006	0.13	1.72	0.15		0.75	324.68
2007	1.42	0.53	0.09	3.01		400.15
2008	1.03	0.65	3.18	0.02	0.06	333.34
2009	0.39	0.05	1.24		0.01	304.43
2010	3.61	0.93	0.37			432.76
2011	0.40		0.12			593.64
2012	3.70	0.04	0.18			647.88
2013	0.96		0.01		0.03	593.52
2014*	0.42	0.05	0.22			517.63
Average	1.13	0.65	0.63	0.28	0.10	423.47

Table 6. Catch (t) of Other Rockfish species in the eastern Bering Sea from 2004- October 25, 2014. Species with catches less than 1 ton of catch from 2004-2014 are not shown. Source: NMFS AKRO BLEND/Catch Accounting System.

Year	dusky rockfish	SST	harlequin rockfish	yelloweye rockfish
2004	31.86	203.12	0.37	1.42
2005	36.22	92.33	0.19	0.74
2006	46.60	78.22	0.04	1.41
2007	44.95	158.05	0.03	1.72
2008	15.39	177.59	0.03	1.04
2009	10.25	172.58	0.07	1.07
2010	32.32	189.46	0.35	1.39
2011	43.72	248.26	4.58	1.38
2012	27.05	137.90	0.05	0.47
2013	27.81	136.05	0.63	0.21
2014*	36.06	233.41	1.25	0.91
Average	32.02	166.09	0.69	1.07

Year	redbanded rockfish	redstripe rockfish	black rockfish	Total catch (t)
2004	10.44	0.02	0.86	248.17
2005	0.31		7.20	137.26
2006	0.40	0.06	0.18	126.90
2007	0.05	0.04	0.29	205.17
2008	0.04	0.06	2.23	196.63
2009	0.22	0.05	0.18	184.54
2010	0.48		0.03	224.25
2011	0.42	0.03	2.16	300.66
2012	2.59	0.08	1.20	169.37
2013	0.09	0.04	0.17	165.02
2014*		4.74	0.35	276.71
Average	1.37	0.47	1.35	203.15

Table 7. Total catch (t) of EBS dusky rockfish from 2004-2014 by target fishery and gear type. Areas 508-524 refer to NMFS areas within the BSAI. Source: NMFS AKRO BLEND/Catch Accounting System, accessed October 25, 2014.

Gear	Target	508	509	513	514	516	517	518	519	521	523	524	Percentage
Atka Mackerel	Bottom Trawl								13.12				0.04
Atka Mackerel	Pelagic Trawl						0.01		0.03				0.00
Flatfish	Longline									1.87	0.05		0.01
Flatfish	Bottom Trawl		2.13	1.36		0.03	3.08	0.03	3.66	8.53		0.28	0.05
Halibut	Longline							0.10				0.04	0.00
Kamchatka Flounder	Bottom Trawl								0.04				0.00
Pacific Cod	Longline		0.15	3.32			12.75	0.02	4.28	135.33	0.21	0.01	0.44
Pacific Cod	Jig							0.07	0.04				0.00
Pacific Cod	Bottom Trawl		3.47				4.29		16.55	8.63	0.12	0.07	0.09
Pacific Cod	Pot		0.18				0.34		2.08				0.01
Pacific Cod	Pelagic Trawl						0.21						0.00
Pollock	Bottom Trawl		0.15				0.34		0.10	0.03			0.00
Pollock	Pelagic Trawl		6.94	0.53	0.06	0.03	43.53		15.49	9.75	0.90	0.27	0.22
Rockfish	Longline												0.00
Rockfish	Jig				0.58				0.09				0.00
Rockfish	Bottom Trawl	0.16					36.57	2.54	6.52	0.60	0.46		0.13
Sablefish	Longline							0.04					0.00
Sablefish	Bottom Trawl								0.08				0.00
Sum		0.16	13.02	5.21	0.63	0.06	101.12	2.80	62.07	164.75	1.74	0.66	352.22

Table 8. Total catch (t) of EBS shortspine thornyhead from 2004-2014 by target fishery and gear type. Areas 508-524 refer to NMFS areas within the BSAI. Source: NMFS AKRO BLEND/Catch Accounting System. NOTE: Thornyheads are identified to genus but not to species in commercial catches; therefore, the weight of shortspine thornyhead is extrapolated by multiplying the proportion of shortspine thornyhead by year in the total catch of thornyhead rockfish based on observer catch data from the NORPAC database.

Gear	Target	508	509	513	514	517	518	519	521	523	524	530	Percentage
Bottom Trawl	Atka					3.03		21.46					0.01
Bottom Trawl	Flatfish		0.04	2.72	0.06	468.97	6.05	150.13	33.21	0.74	1.18		0.36
Bottom Trawl	Kamchatka Flounder					86.68	1.44	38.71			0.15		0.07
Bottom Trawl	Pacific Cod					32.58		6.26	0.01				0.02
Bottom Trawl	Pollock		0.05			4.67	0.13	5.88	0.60				0.01
Bottom Trawl	Rockfish					121.27	0.83	118.50	35.39	3.72			0.15
Bottom Trawl	Sablefish					2.57		5.71					0.00
Longline	Flatfish					20.88	4.53	1.03	237.13	84.22	3.86		0.19
Longline	Halibut			0.25		7.52	35.17	4.71	6.18	3.81	0.04		0.03
Longline	Kamchatka Flounder									0.03			0.00
Longline	Other								0.52	0.11			0.00
Longline	Pacific Cod					5.88	0.37	1.43	22.46	1.55	0.15		0.02
Longline	Pollock												0.00
Longline	Rockfish					0.55	1.37	1.23	0.45	1.69			0.00
Longline	Sablefish	0.07			0.17	33.10	52.31	17.92	4.19	4.18		0.15	0.06
Pot	Flatfish												0.00
Pot	Sablefish					0.13	1.99	0.95					0.00
Pelagic Trawl	Pollock		0.40	0.19		74.87		35.67	0.20	0.01			0.06
Jig	Halibut												0.00
Trawl	Flatfish					0.23							0.00
Grand Total		0.07	0.48	3.16	0.23	862.95	104.20	409.58	340.35	100.07	5.37	0.15	1827

Table 9. Total catch (t) of AI dusky rockfish from 2004-2014 by target fishery and gear type. Areas 541, 542, and 543 refer to NMFS areas within the AI. Source: NMFS AKRO BLEND/Catch Accounting System, accessed October 25, 2014.

Gear	Target	541	542	543	Percentage of total
Bottom Trawl	Atka Mackerel	1804.38	387.78	60.48	0.84
Bottom Trawl	Flatfish	23.97			0.01
Longline	Flatfish		0.48		0.00
Longline	Halibut	0.03	0.31	0.01	0.00
Bottom Trawl	Kamchatka Flounder	7.83			0.00
Longline	Other		0.02	0.15	0.00
Bottom Trawl	Pacific Cod	31.47	5.59	2.96	0.01
Pot	Pacific Cod	0.03	0.41		0.00
Longline	Pacific Cod	46.80	37.16	16.99	0.04
Pelagic Trawl	Pollock	0.06			0.00
Bottom Trawl	Rockfish	165.68	59.65	23.32	0.09
Longline	Sablefish	0.08	0.07		0.00
Sum		2,080.33	491.47	103.91	2,675.71

Table 10. Total catches (t) of Aleutian Island (AI) shortspine thornyhead from 2004-2014 by target fishery and gear type. Areas 541, 542, and 543 refer to NMFS areas within the AI. Source: NMFS AKRO BLEND/Catch Accounting System. NOTE: Thornyheads are identified to genus but not to species in commercial catches; therefore, the weight of shortspine thornyhead is extrapolated by multiplying the proportion of shortspine thornyhead by year in the total catch of thornyhead rockfish based on observer catch data from the NORPAC database.

Gear	Target	541	542	543	Percentage of total
Bottom Trawl	Atka	4.70	33.71	35.36	0.05
Bottom Trawl	Flatfish	6.22			0.00
Bottom Trawl	Kamchatka Flounder	2.33			0.00
Bottom Trawl	Pacific Cod	0.18		0.41	0.00
Bottom Trawl	Pollock	0.02			0.00
Bottom Trawl	Rockfish	10.79	91.93	313.07	0.27
Longline	Flatfish	10.90	113.37		0.08
Longline	Halibut	34.81	52.67	19.34	0.07
Longline	Other	0.31	1.82		0.00
Longline	Pacific Cod	27.26	12.28	14.70	0.03
Longline	Rockfish	0.60	4.03	7.90	0.01
Longline	Sablefish	335.80	268.80	145.06	0.48
Pot	Pacific Cod		0.01		0.00
Pot	Rockfish	0.02			0.00
Pot	Sablefish	2.08	0.08		0.00
Jig	Pacific Cod	0.02			0.00
Sum		436	579	536	1,551

Table 11. Retained and discarded catch of seven Other Rockfish species (shortspine thornyhead, dusky rockfish, redbanded rockfish, redstripe rockfish, yelloweye rockfish, harlequin rockfish, and sharpchin rockfish) from 2004 to 2014 in the Aleutian Islands and Eastern Bering Sea. Accessed October 25, 2014 from the NMFS AKRO BLEND/Catch Accounting System.

Area	Year	Retained (t)	Discarded (t)	Total catch (t)	Percent Discarded
Aleutian Islands	2004	162	120	282	57.34%
	2005	185	82	267	68.99%
	2006	228	121	349	65.32%
	2007	208	197	405	51.36%
	2008	266	70	336	79.35%
	2009	253	55	308	82.14%
	2010	379	63	442	85.75%
	2011	472	126	598	78.86%
	2012	574	80	654	87.65%
	2013	461	137	598	77.09%
	2014	461	57	518	88.88%
Eastern Bering Sea	2004	221	65	286	77.42%
	2005	137	19	156	87.29%
	2006	119	23	142	84.02%
	2007	143	72	215	66.70%
	2008	140	63	203	68.72%
	2009	169	21	190	88.90%
	2010	199	37	236	84.25%
	2011	267	39	306	87.37%
	2012	146	28	174	84.03%
	2013	143	24	167	85.57%
	2014	237	41	278	85.24%

Table 12. Survey biomass estimates (t) and CVs (in parentheses) for Other Rockfish (including shortspine thornyhead) from 1979 - 2014. Southern Bering Sea refers to NMFS reporting area 799.

	AI survey			EBS Shelf survey	EBS Slope survey
Year	AI	S. Bering Sea	Total		
1979					3,251
1980	930 (0.18)	36 (0.73)	966 (0.18)		
1981					4,975
1982					4,381
1983	3,971 (0.17)	802 (0.23)	4,774 (0.15)		
1984				18 (1.0)	
1985				0	5,127
1986	6,550 (0.19)	3,253 (0.86)	9,803 (0.31)	0	
1987				0	
1988				0	8,759
1989				0	
1990				0	
1991	6,643 (0.22)	248 (0.48)	6,891 (0.22)	0	4,529
1992				0	
1993				0	
1994	6,452 (0.16)	1,172 (0.48)	7,624 (0.15)	0	
1995				0	
1996				36 (1.0)	
1997	9,539 (0.17)	1,683 (0.63)	11,223 (0.18)	0	
1998				538 (0.68)	
1999				398 (0.75)	
2000	11,924 (0.17)	1,107 (0.45)	13,031 (0.16)	0	
2001				0	
2002	14,781 (0.20)	1,111 (37)	15,892 (0.18)	0	16,975 (0.12)
2003				55 (0.70)	
2004	18,566 (0.18)	6,473 (67)	25,039 (0.22)	0	18,807 (0.09)
2005				36 (1.0)	
2006	23,879 (0.24)	1,706 (0.52)	25,585 (0.23)	357 (0.85)	
2007				0	
2008				0	26,072 (0.12)
2009				122 (0.58)	
2010	18,663 (0.15)	1,172 (0.66)	19,835 (0.15)	57 (0.92)	29,453 (0.12)
2011				56 (1.0)	
2012	14,694 (0.15)	586 (0.61)	15,280 (0.15)	37 (1.0)	29,619 (0.11)
2013				40 (1.0)	
2014	23,254 (0.27)	2799 (0.62)	26,053 (0.31)	28 (1.0)	

Table 13. Survey biomass estimates (t) and CVs (in parentheses) for Dusky rockfish from 1997 - 2014. Southern Bering Sea refers to NMFS reporting area 799.

	AI survey			EBS Slope survey
Year	AI	S. Bering Sea	Total	
1997	574 (0.76)	138 (0.46)	712 (0.62)	
1998				
1999				
2000	1,250 (0.34)	55 (0.36)	1,306 (0.33)	
2001				
2002	515 (0.32)	97 (0.36)	612 (0.27)	25 (0.57)
2003				
2004	730 (0.44)	1,359 (0.91)	2,089 (0.61)	13(0.57)
2005				
2006	5,956 (0.89)	731 (0.96)	6,687 (0.80)	
2007				
2008				10 (1.00)
2009				
2010	560 (0.34)	120 (0.44)	680 (0.29)	117 (0.87)
2011				
2012	236 (0.32)	135 (0.57)	371 (0.29)	41 (0.61)
2013				
2014	5542 (0.83)	231 (0.50)	5773 (0.82)	

Table 14. Survey biomass estimates (t) and CVs (in parentheses) for shortspine thornyhead from 1991- 2014. Southern Bering Sea refers to NMFS reporting area 799.

	AI survey			EBS Slope survey
Year	AI	S. Bering Sea	Total	
1991	6,153 (0.24)	187 (0.58)	6,341 (0.23)	
1992				
1993				
1994	6,240 (0.16)	1,071 (0.52)	7,311 (0.16)	
1995				
1996				
1997	8,896 (0.18)	1,545 (0.69)	10,441 (0.18)	
1998				
1999				
2000	10,649 (0.19)	1,051 (0.48)	11,700 (0.17)	
2001				
2002	14,243 (0.20)	1,012 (0.41)	15,255 (0.19)	16,950 (0.12)
2003				
2004	17,335 (0.19)	945 (0.56)	18,280 (0.18)	18,793 (0.09)
2005				
2006	17,876 (0.12)	968 (0.55)	18,844 (0.12)	
2007				
2008				26,055 (0.12)
2009				
2010	18,075 (0.16)	1,052 (0.73)	19,127 (0.16)	29,334 (0.12)
2011				
2012	14,443 (0.15)	452 (0.77)	14,895 (0.15)	29,574 (0.11)
2013				
2014	17,611 (0.24)	2,567 (0.67)	20,178 (0.23)	

Figures

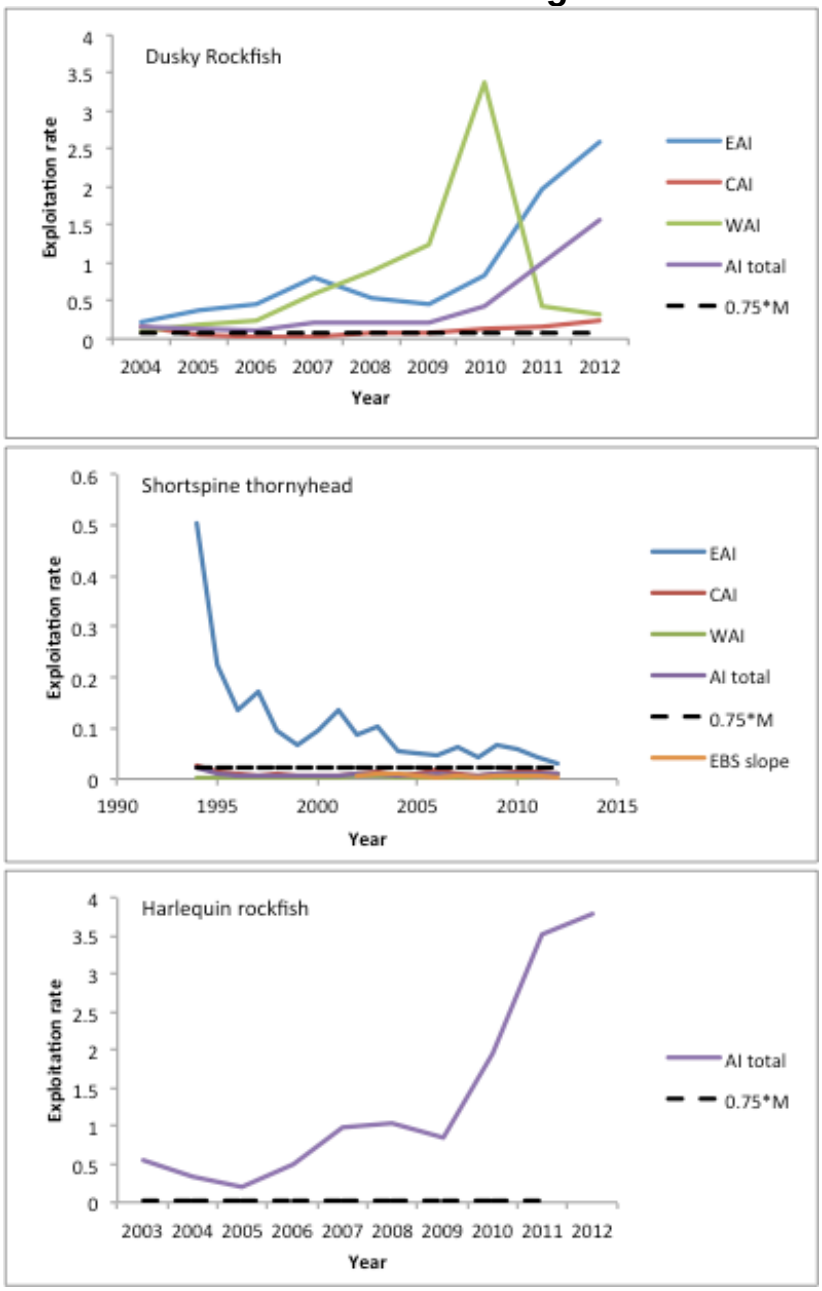

Figure 1. Exploitation rates for dusky rockfish in the western, central, and eastern Aleutian Islands (WAI, CAI, and EAI; 2004-2012), shortspine thornyhead from the three Aleutian Islands regions (1990-2012), and harlequin rockfish from the AI combined (2003-2012).

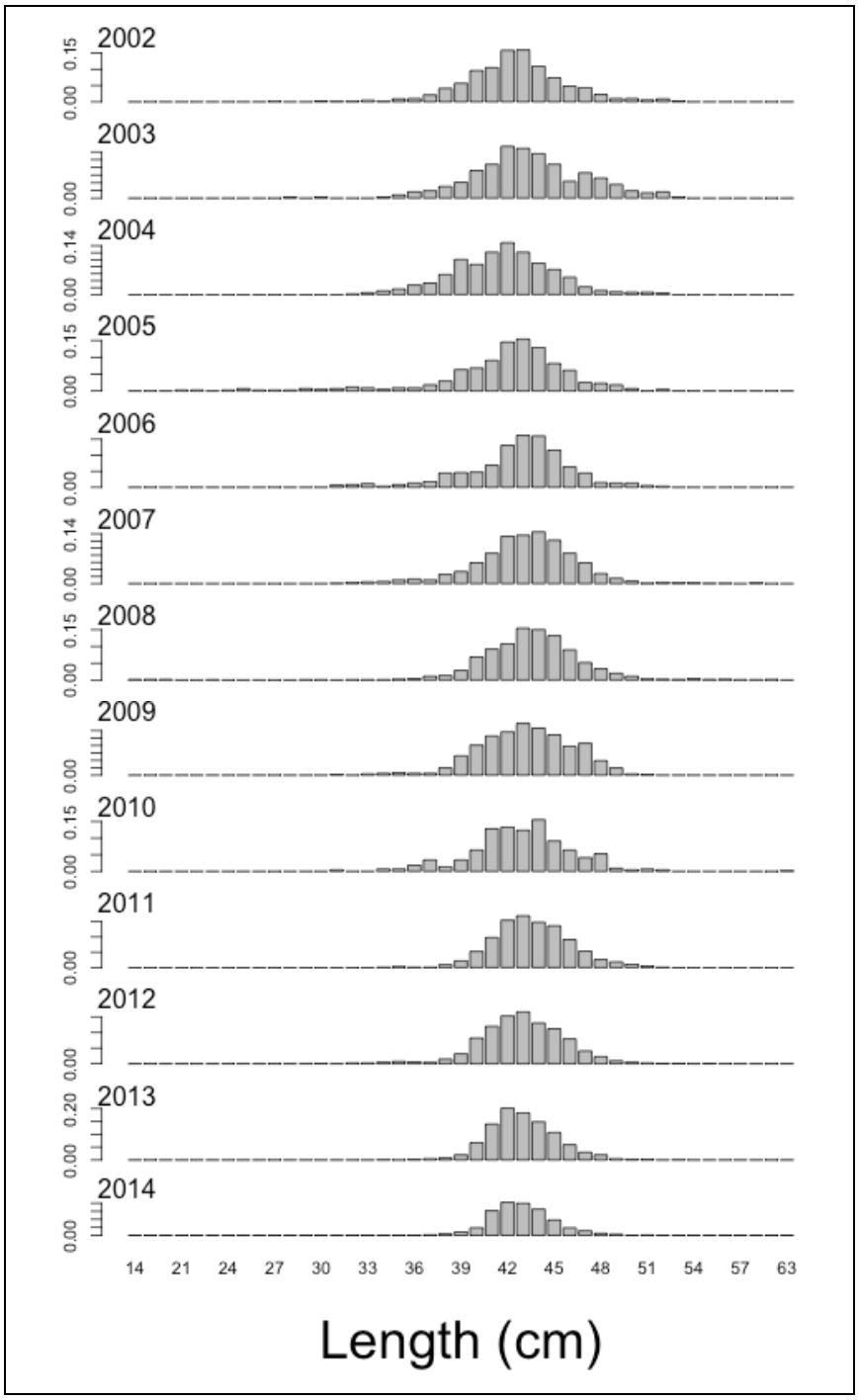

Figure 2. Dusky rockfish length frequency data from fishery observers. Source: NMFS AFSC FMA Observer Debriefed Haul and Length tables.

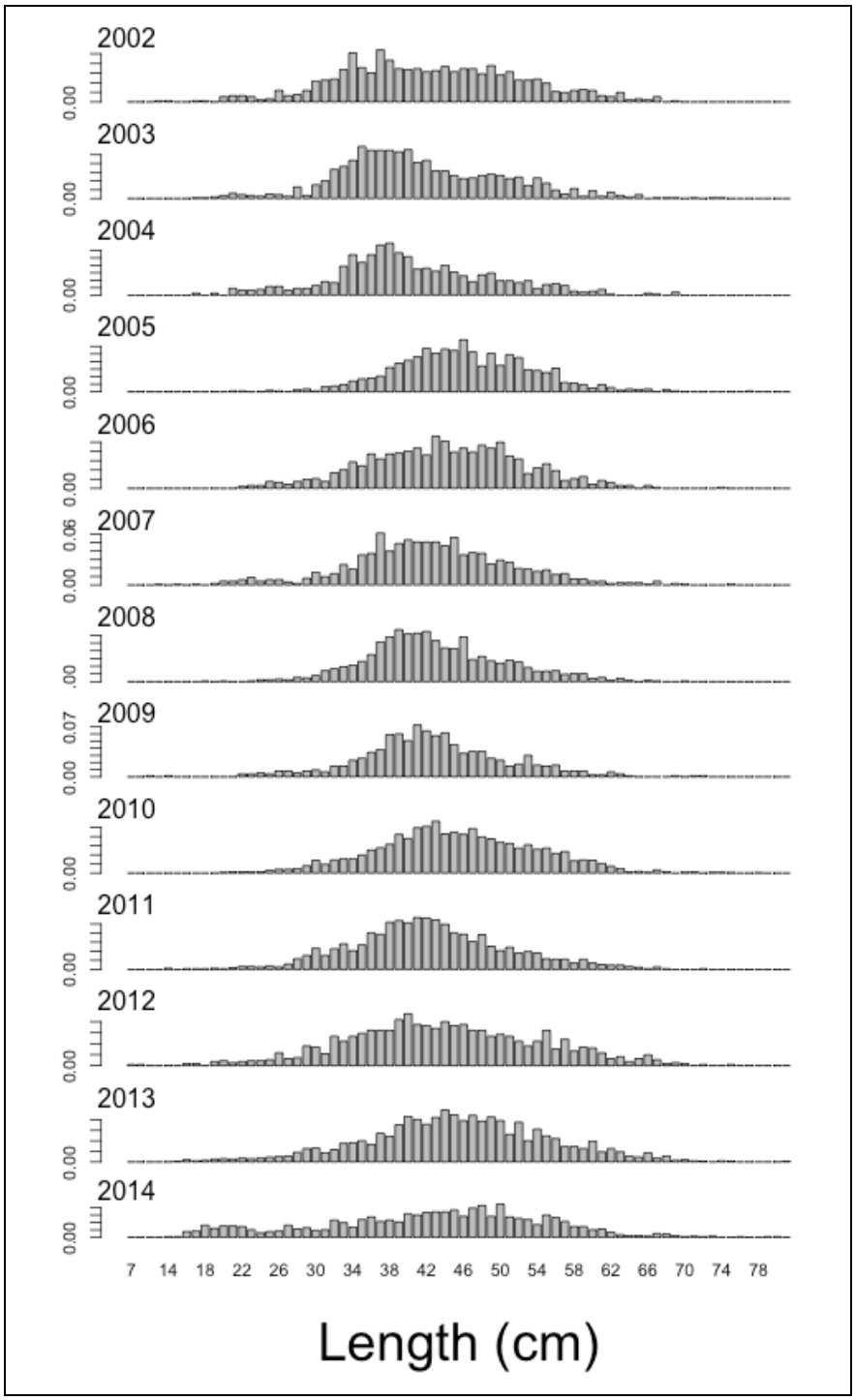

Figure 3. Shortspine thornyhead length frequency data from fisheries observers. Source: NMFS AFSC FMA Observer Debriefed Haul and Length tables.

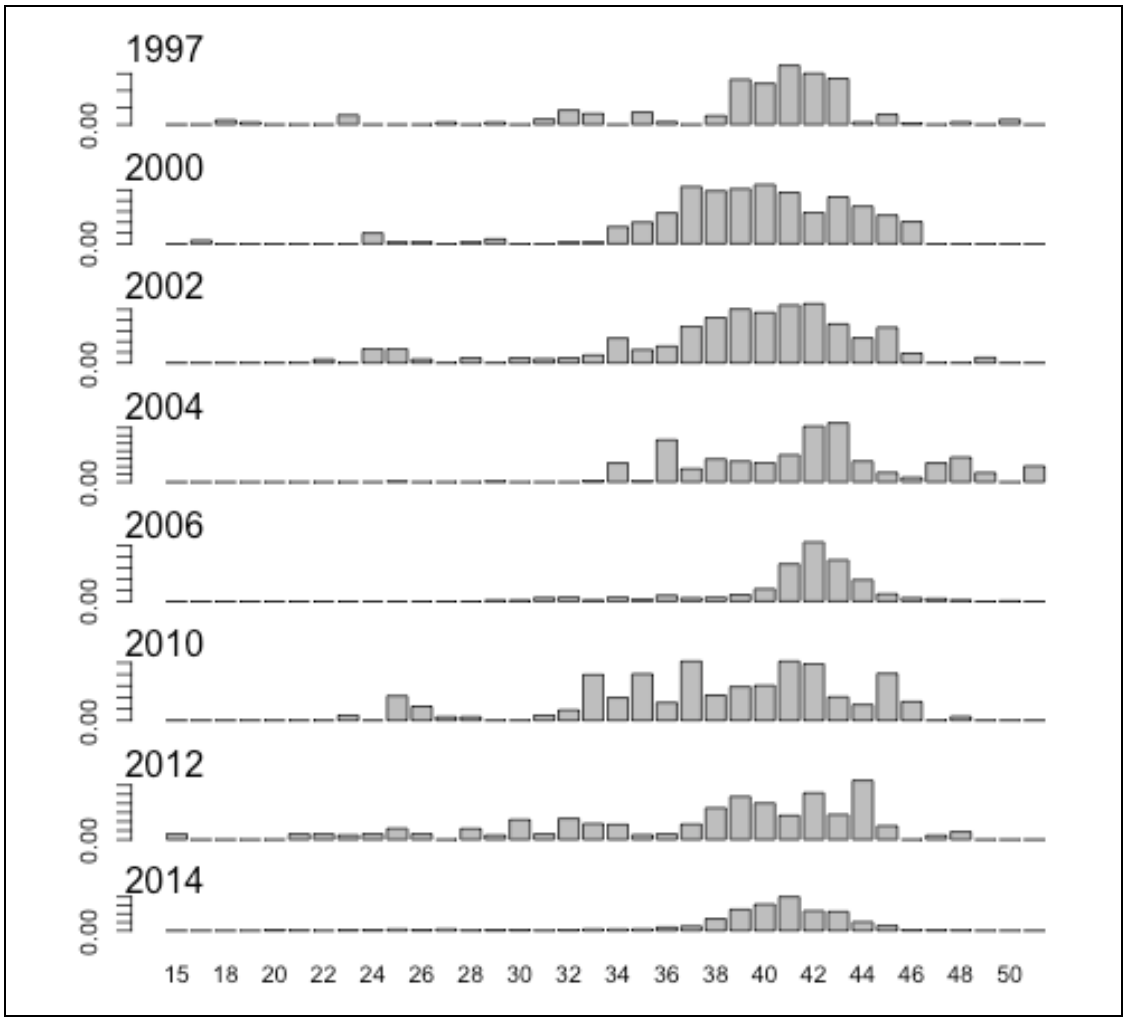

Figure 4. Dusky rockfish lengths (cm) from Aleutian Islands survey data 1997-2014. Source: NMFS AFSC FMA Observer Debriefed Haul and Length tables.

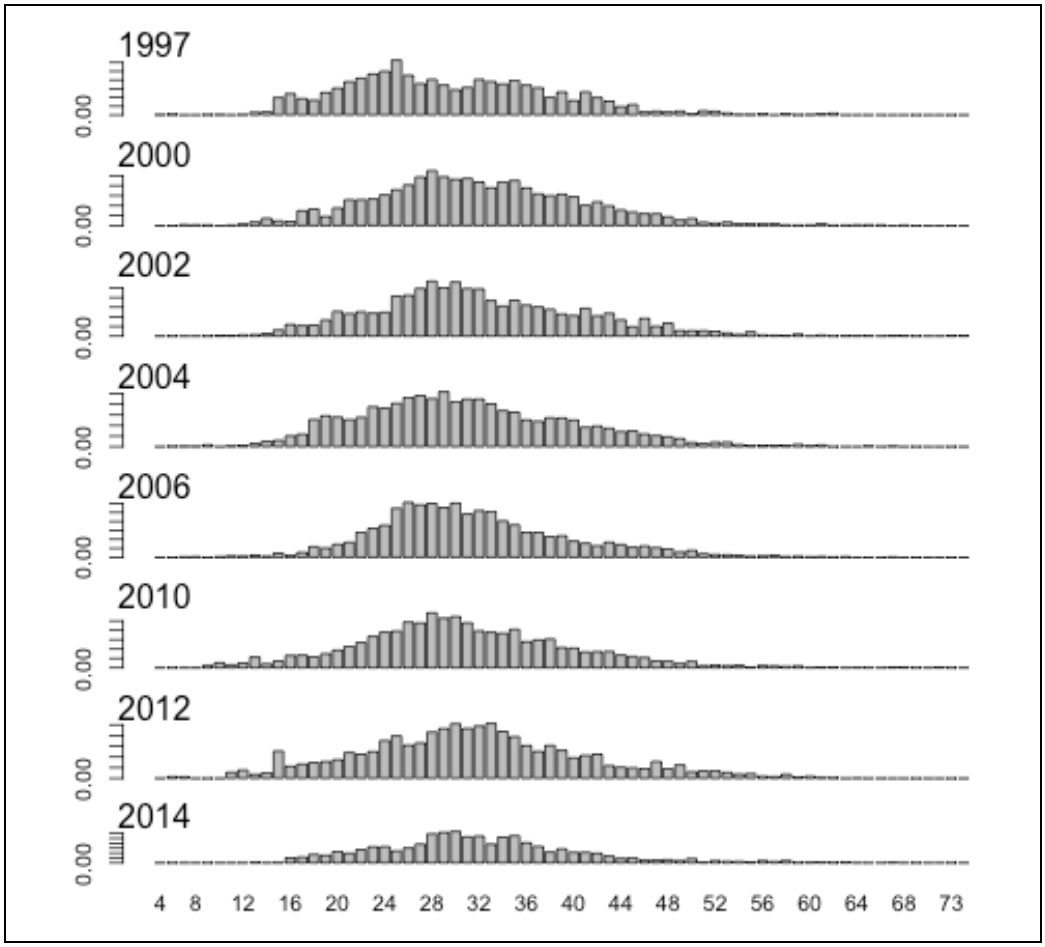

Figure 5. Shortspine thornyhead rockfish length frequencies from Aleutian Islands survey data, 2002-2014.

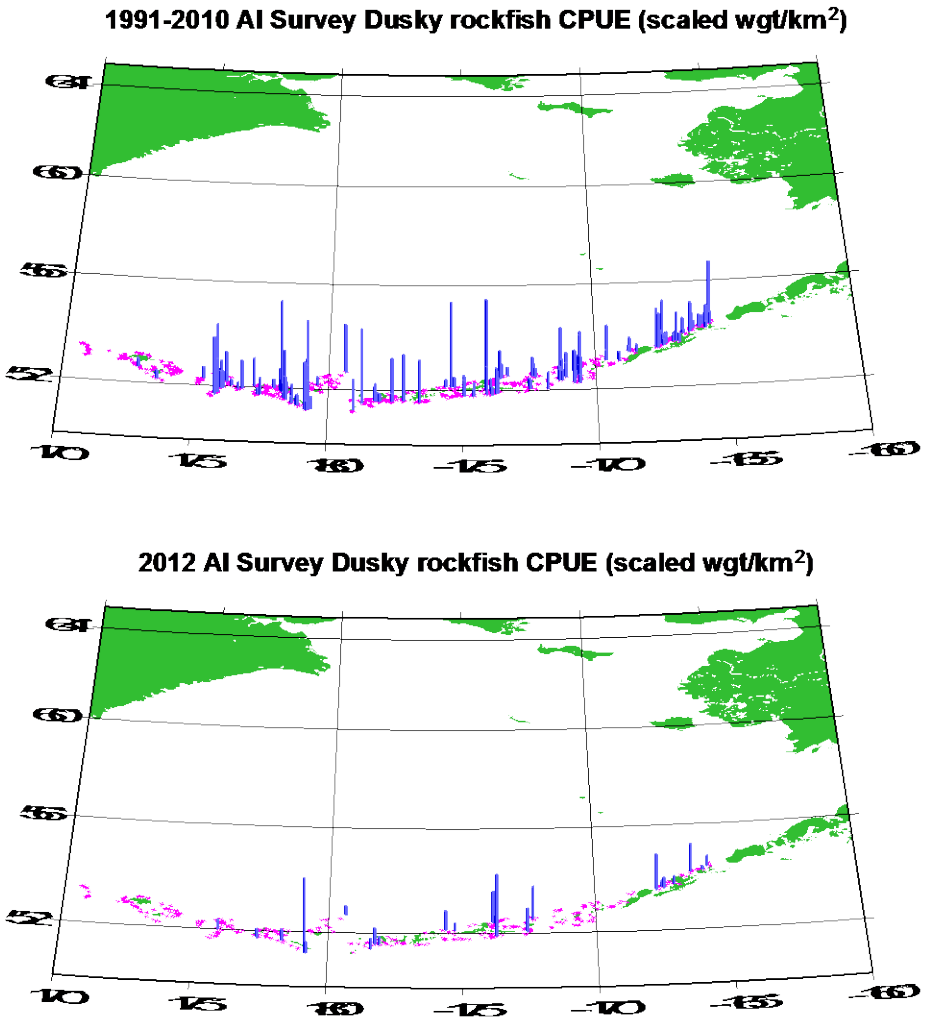

Figure 6. AI survey CPUE (scaled kg/km^2) of dusky rockfish from 1997 to 2012.

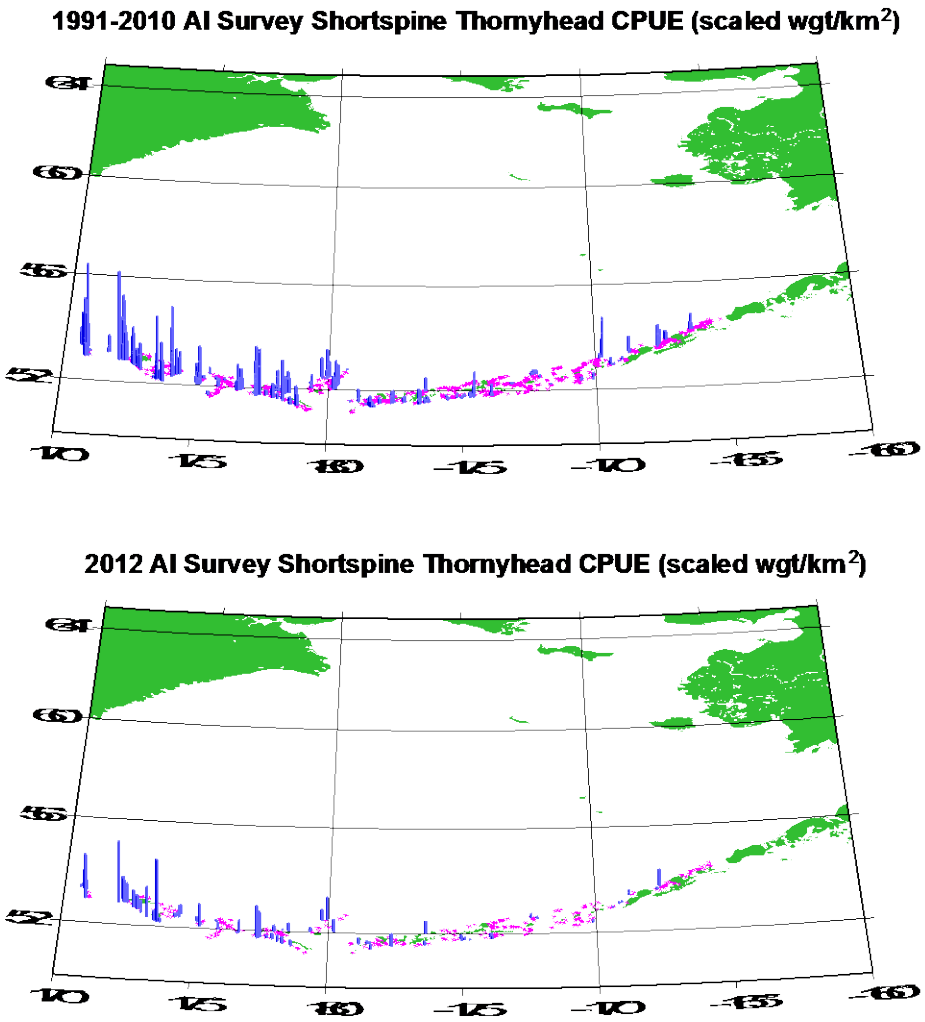

Figure 7. AI survey CPUE (scaled kg/km^2) of shortspine thornyhead from 1980 to 2012.

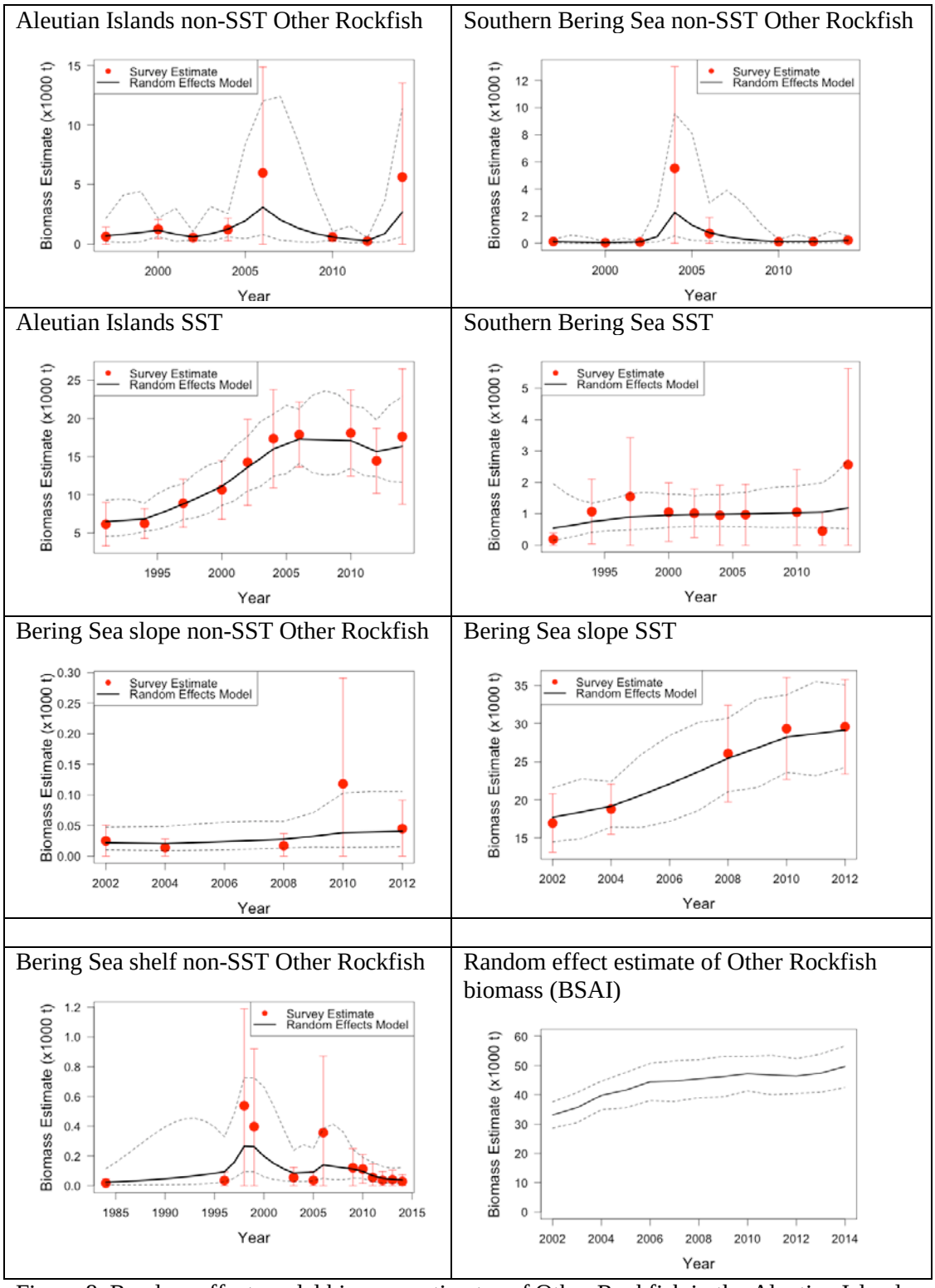

Figure 8. Random effect model biomass estimates of Other Rockfish in the Aleutian Islands, Southern Bering Sea, Bering Sea shelf and slope.

Appendix Table 1. Removals from sources other than those included in the Alaska Region's official estimate of catch (e.g., removals due to scientific surveys, subsistence fishing, recreational fishing, fisheries managed under other FMPs). Source: AKR.V_NONCOMMERCIAL_FISHERY_CATCH table.

Year	Catch (t)
1996	3.18
1997	2.48
1998	3.32
1999	0.62
2000	1.59
2001	1.02
2002	1.55
2003	1.36
2004	1.46
2005	1.36
2006	1.68
2007	1.78
2008	1.49
2009	2.00
2010	13.54
2011	23.39
2012	10.22
2013	3.86
2014	3.00

Appendix 1. Assessment of the other rockfish complex in the Bering Sea and Aleutian Islands, using alternative methodology

Introduction

Here we explore alternative methodology for calculating the estimate of BSAI other rockfish complex biomass. In the past, and in the main assessment presented here, a 4-6-9 weighted average of three most recent surveys for each region (Aleutian Islands, Bering Sea shelf, and Bering Sea slope) has been used, with the highest weights given to the most recent surveys. This appendix calculates the BSAI estimate of biomass using the random effects model. The model was applied separately to survey biomass estimates from the Aleutian Islands, Bering Sea shelf, and Bering Sea slope surveys. The 2014 random effects model estimate of other rockfish biomass in the BSAI is the sum of the random effects biomass estimate for the Bering Sea slope, Shelf, and Aleutian Islands. The variance is summed to obtain 95% confidence intervals. The total BSAI estimate for the Other Rockfish based on the random effects model is 49,630 t (42,528 - 56,731 t, 95% CI), with 46,647 t (39,849 - 53,444 t) for the SST and 2,983 t (927 - 5,039 t) for the non-SST components of the complex.

Results using the random effects estimates of biomass are shown in the following summary tables.

Summary of Results

Summary for SST portion of the Other Rockfish complex.

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity	2014	2015	2015	2015
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	45,820	45,820	46,647	46,647
F_{OFL}	0.03	0.03	0.03	0.03
$maxF_{ABC}$	0.03	0.03	0.03	0.03
F_{ABC}	0.0225	0.0225	0.0225	0.0225
OFL (t)	1,375	1,375	1,399	1,399
maxABC (t)	1,031	1,031	1,050	1,050
ABC (t)	1,031	1,031	1,050	1,050
AI ABC (t)	367	367	373	373
EBS ABC (t)	664	664	676	676
	As determined *last* year for:		As determined *this* year for:	
Status	2012	2013	2013	2014
Overfishing		n/a		n/a

Summary for non-SST portion of the Other Rockfish complex.

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015	2016
M (natural mortality rate)	0.09	0.09	0.09	0.09
Tier	5	5	5	5
Biomass (t)	1,885	1,885	2,983	2,983
F_{OFL}	0.09	0.09	0.09	0.09
$maxF_{ABC}$	0.0675	0.0675	0.0675	0.0675
F_{ABC}	0.0675	0.0675	0.0675	0.0675
OFL (t)	170	170	268	268
maxABC (t)	128	128	201	201
ABC (t)	128	128	201	201
AI ABC (t)	106	106	182	182
EBS ABC (t)	22	22	19	19
Status	As determined *last* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing		n/a		n/a

Summary for the entire Other Rockfish complex (SST and non-SST combined).

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015	2015
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	47,705	47,705	49,630	49,630
F_{OFL}*	-	-	-	-
$maxF_{ABC}$	-	-	-	-
F_{ABC}	-	-	-	-
OFL (t)	1,550	1,550	1,667	1,667
maxABC (t)	1,163	1,163	1,251	1,251
ABC (t)	1,163	1,163	1,251	1,251
AI ABC (t)	473	473	555	555
EBS ABC (t)	690	690	695	695
Status	As determined *last* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing		n/a		n/a

*****Fishing mortality rates are specified separately for the SST and non-SST portions of the Other Rockfish complex.