North Pacific Fishery Management Council

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SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
December 8th – 10th, 2014

The SSC met from December 8th through 10th at the Hilton Hotel, Anchorage, AK.

Members present were:

Pat Livingston, Chair *NOAA Fisheries—AFSC*	Robert Clark, Vice Chair *Alaska Department of Fish and Game*	Milo Adkison *University of Alaska Fairbanks*
Alison Dauble *Oregon Dept. of Fish and Wildlife*	Sherri Dressel *Alaska Department of Fish and Game*	Brad Harris *Alaska Pacific University*
Anne Hollowed *NOAA Fisheries—AFSC*	George Hunt *University of Washington*	Seth Macinko *University of Rhode Island*
Steve Martell *Intl. Pacific Halibut Commission*	Lew Queirolo *NOAA Fisheries—Alaska Region*	Terry Quinn *University of Alaska Fairbanks*
Matt Reimer *University of Alaska Anchorage*	Farron Wallace *NOAA Fisheries—AFSC*	

Members absent were:

Chris Anderson *University of Washington*	Jennifer Burns *University of Alaska Anchorage*	Kate Reedy *Idaho State University Pocatello*

B-1 Plan Team Nomination
The SSC reviewed the Plan Team nomination of Laura Stichert to the BSAI Crab Plan Team. The SSC finds Laura to be well qualified, with appropriate expertise that will assist the Crab Plan Team. The SSC recommends that the Council approve this nomination.

C-2 BS Salmon Bycatch
The SSC received a presentation of the Initial Review EA/RIR/IRFA document from Diana Stram (NPFMC), Jim Ianelli (NMFS-AFSC), Alan Haynie (NMFS-AFSC), Jim Fall (ADF&G), and Katie Howard (ADF&G). The SSC received public testimony from Roy Ashenfelter (Kawerak), Ed Richardson (Pollock Conservation Cooperative), Paul Peyton and Gene Sandone (Bristol Bay Economic Development Corporation).

The purpose of the proposed action is to address prohibited species catch (PSC) of Chinook and chum salmon in the Bering Sea directed pollock fishery. The analysis examines multiple measures under consideration by the Council, including: modifying management of chum salmon prohibited species catch (PSC) by requiring incorporation into existing industry-run Chinook salmon incentive program agreements (IPA), modifying IPA requirements to add provisions and more stringent restrictions for

Chinook salmon PSC management, modifying the existing pollock seasons in the summer to begin earlier and/or end sooner, and setting a lower threshold performance standard for use as a target in management of Chinook PSC limits within the IPAs which would be employed in years of low Chinook abundance. The SSC previously commented on a discussion paper on this topic in June 2014.

The alternatives under consideration by the Council focus on changing the PSC avoidance behavior of vessel operators in the pollock fleet. The two fundamental questions for evaluating the efficacy of the alternative measures, relative to the status quo, are therefore: 1) to what extent will vessel behavior change and 2) how does altered vessel behavior translate into reduced salmon PSC? An ideal analysis would answer these two questions and frame the predicted effects of different management measures in terms of tradeoffs, such as foregone pollock revenue per adult equivalent (AEQ) spawning salmon saved. In this way, the Council would have a meaningful way to compare and contrast the alternatives. Unfortunately, insufficient information and modeling techniques preclude quantitative comparisons of estimated impacts. Instead, alternative measures are evaluated qualitatively by whether or not salmon PSC is expected to increase or decrease from the status quo. Estimated impacts are largely based on historical fishing patterns, with a caveat that these estimates are sensitive to changes in vessel behavior. The degree of change depends on how the fleet responds to the alternative measures. Without quantitative comparisons, it is difficult—if not impossible—to compare the alternative measures in terms of their estimated impacts on PSC reduction. In this sense, the analysis is not ideal, but is similar to analyses of previous actions (e.g., Amendment 91) on this issue.

Despite the limitations of the qualitative analysis, the analysts have done an excellent job identifying (and presenting) the major potential benefits, key concerns, trade-offs, and measurement issues among all of the alternative measures, from the perspective of the commercial fishery (e.g., Table 2). The document therefore provides the Council with vital information and issues for consideration as they focus their efforts to reduce Chinook and chum salmon PSC mortality. **The SSC therefore recommends that the draft be released for public review and that the following changes be incorporated before release, if possible:**

- Estimated impacts largely depend on how the industry will change its behavior in response to the measures under consideration, yet the magnitude of the industry's response is unknown. Accordingly:
    1) The analysis of Alternatives 4 and 5 would benefit from an expanded discussion on possible behavioral responses of the industry and the implications for salmon PSC reduction, rather than relying exclusively on historical fishing patterns.
    2) Since the magnitude of the estimated impacts is unknown, the estimated impacts should only indicate whether or not the alternative has the potential to reduce salmon PSC relative to the status quo, and refer the reader to Table 2 for the key factors that will determine the magnitude of the impacts or net benefits. For instance, on page 179 in the summation of alternatives with respect to net benefits, the analysts state that Alternative 3 is "not expected to result in reduced net national benefits," while Alternatives 4 and 5 are "expected to have positive effects on net national benefits as compared to the status quo." This text seems to suggest that Alternatives 4 and 5 may be "better" than Alternative 3. However, there is no justification for this in the analysis due to the uncertain nature of the industry's potential response to each alternative. Unjustified comments such as these should be removed from the document. The level of uncertainty about the final terms and details of the preferred alternative makes drawing summary conclusions about Net National Benefit outcomes premature. These required elements of the RIR must await further Council action.

- The analysis would benefit from a discussion of some of the ways in which incentive-based alternatives may be better suited for achieving reduced salmon PSC. Experience has shown that

PSC avoidance requires flexibility and the ability of vessels to adjust to real-time information and fishery conditions. In this sense, incentive-based measures are more adaptable compared to measures such as shortening the directed pollock season or requiring salmon excluders at all times, which redirect vessel behavior irrespective of current fishing conditions. The benefits of incentive-based alternatives are particularly true when there are uncertain future fishery conditions and limited information on future Council actions, as is the case for the action considered here.

- The 3-system index of Chinook salmon abundance presented in Alternative 5 is a reasonable and transparent approach to identifying years of low Chinook salmon abundance in coastal Western Alaska. The SSC and public testimony note that other indices of Chinook salmon abundance in coastal Western Alaska are possible. One method that should be considered is to first standardize the abundances from each river system and then add them together so that the influence of large stocks (e.g., Kuskokwim and Upper Yukon) is tempered against the abundance of the smallest stock (Unalakleet) in the index.
- Figure 10 in the document depicts trends in abundance of Chinook salmon stocks across Alaska. To provide better relevance to this action, the figure should be constructed solely from stocks in coastal Western Alaska.

The SSC offers the following recommendations to the authors for future iterations of the analysis:

- As the Council narrows down the alternatives under consideration for this action, the authors need to be clear about the data and information that are required for future analyses, including retrospective evaluations of the measures that are eventually chosen by the Council.
- There are significant deficiencies in the analysis pertaining to impacts beyond the commercial industry-level. This is a severe limitation to constructing a comprehensive understanding of all dimensions of this action. The AEQ with run reconstruction analysis is an excellent step in this direction, but the extension of these projections/estimates to subsequent users and uses remains deficient. While an elaborate appendix containing subsistence information is attached, very little on the topic has made it into the body of the analysis. Public testimony was persuasive, asserting that too little attention is paid within the draft to "post-pollock fishery" effects, e.g., the role of Chinook, but especially chum salmon PSC losses on AYK communities and subsistence users.
- In connection with GOA and BSAI Groundfish Fishery Management regulations, there is no obvious advantage to be found in substituting the broader, less precise term "bycatch", when the legally sanctioned and precise term "prohibited species catch" is the matter under consideration. The Council created and placed in regulation a clear distinction between "bycatch" and "prohibited species catch" within the two groundfish FMPs. The continued interchanging of the two terms is inadvisable within the formal public record, as confusion has occurred.

The SSC offers the following recommendations for the Council:

- An analysis of the social and non-monetary effects of potential alternatives on subsistence users in western Alaska will require additional fieldwork and data collection, including metrics to determine the viability (i.e., predictability and stability of the fishery over time) of subsistence fisheries in the face of declining abundance of Chinook salmon (cf. research priority 228).
- Specific information and methods are required for evaluating alternative measures for salmon PSC reduction in a meaningful way. The Council should continue to support industry transparency and the development of methods for evaluating industry behavior to meet these demands in the future.
- If the Council no longer believes a formal regulatory distinction between bycatch and PSC serves a useful purpose, the Council should consider amending the Groundfish FMPs appropriately.

C-4 BSAI and C-5 GOA specifications and SAFE report

The SSC received a presentation by Grant Thompson (NMFS-AFSC) on Plan Team recommendations for BSAI groundfish OFLs and ABCs. Jim Ianelli (NMFS-AFSC) presented the BSAI pollock stock assessment. GOA Plan Team recommendations were summarized by Jim Ianelli (NMFS-AFSC) and Jim Armstrong (NPFMC).

General SAFE Comments

The SSC reviewed the SAFE chapters and 2013 OFLs with respect to status determinations for BSAI and GOA groundfish. **The SSC accepts the status determination therein, which indicated that no stocks were subject to overfishing in 2013. Also, in reviewing the status of stocks with reliable biomass reference points (all Tier 3 and above stocks and rex sole), the SSC concurs that these stocks are not overfished or approaching an overfished condition.**

The SSC concurred with the Joint Plan Team recommendation regarding Council's stock structure and management policy, which is to adopt the four-level scale of concern that is better linked to the steps outlined in the Council's stock structure policy. The scale of concern would be adopted in the context of the Council's stock structure and spatial management policy (with the understanding that all actions described here would be contingent on SSC concurrence):

1) Little or no concern, in which case no action needs to be taken,
2) Moderate concern, in which case special monitoring (e.g., frequent updating of the template) is required at a minimum and Steps 2 and 3 of the Council's process may be activated,
3) Strong concern, in which case Steps 2 and 3 of the Council's process must be activated, and
4) Emergency, in which case the Team will recommend separate harvest specifications at the ABC level, the OFL level, or both, for the next season (straight to Step 4 of the Council policy).

The Plan Team noted several outstanding issues and questions regarding the policy that require further clarification, including whether the policy applies to the process of splitting stocks out of complexes. The SSC recommends that a workgroup comprised of Council, SSC, and Plan Team members be convened to address the questions. The SSC also concurred with the proposed public process and terminology regarding the application of a "maximum subarea species catch," which the stock assessment author would recommend to the Plan Team with subsequent review and comment by the SSC. This will ensure a more scientifically-based and transparent process for determining the subarea harvest recommendations and allow better tracking progress in meeting the management goals.

The SSC requests that stock assessment authors use the following model naming conventions in SAFE chapters:

- Model 0: last years' model with no new data,
- Model 1: last years' model with updated data, and
- Model numbers higher than 1 are for proposed new models.

The SSC also requests that stock assessment authors use the random effects model for area apportionment of ABCs.

The SSC supports the GOA Plan Team's comment that for thornyheads and a number of other species, it is critically important to the assessments that the GOA trawl surveys continue, that a full suite of stations are included in future trawl surveys (the 2013 survey was reduced by one-third), and that surveys extend to 1000 m to cover their habitat more completely.

The SSC notes from the BSAI Plan Team report that the Bering Sea slope survey was not conducted in 2014. Continuation of this survey is critical for assessment of Greenland turbot and several other species.

Table 1. SSC recommendations for GOA groundfish OFLs and ABCs for 2015 and 2016, shown with 2014 OFL, ABC, TAC, and catch amounts in metric tons (2014 catches through November 8th, 2014 from AKR catch accounting system). None of the SSC recommendations differed from those of the GOA Plan Team.

		2014				2015		2016	
Species	Area	OFL	ABC	TAC	Catch	OFL	ABC	OFL	ABC
Pollock	W(61)	-	36,070	36,070	13,318		31,634 [a]		41,472[a]
	C(62)	-	81,784	81,784	83,049		97,579 [a]		127,936[a]
	C(63)	-	39,756	39,756	42,068		52,594 [a]		68,958[a]
	WYAK	-	4,741	4,741	1,317		4,719 [a]		6,187[a]
	Subtotal	211,998	162,351	162,351	139,752	256,545	191,309	321,067	250,824
	EYAK/SEO	16,833	12,625	12,625	1	16,833	12,625	16,833	12,625
	Total	228,831	174,976	174,976	139,753	273,378	203,934	337,900	263,449
Pacific cod	W		32,745	22,922	20,910		38,702		38,702
	C		53,100	39,825	38,429		61,320		61,320
	E		2,655	1,991	294		2,828		2,828
	Total	107,300	88,500	64,738	59,633	140,300	102,850	133,100	102,850
Sablefish	W		1,480	1,480	1,195		1,474		1,338
	C		4,681	4,681	4,706		4,658		4,232
	WYAK		1,716	1,716	1,655		1,708		1,552
	SEO		2,695	2,695	2,819		2,682		2,436
	Total	12,500	10,572	10,572	10,375	12,425	10,522	11,293	9,558
Shallow-water flatfish	W		20,376	13,250	243		22,074		19,577
	C		17,813	17,813	4,144		19,297		17,115
	WYAK		2,039	2,039	1		2,209		1,959
	EYAK/SEO		577	577	1		625		554
	Total	50,007	40,805	33,679	4,389	54,207	44,205	48,407	39,205
Deep-water flatfish	W		302	302	68		301		299
	C		3,727	3,727	271		3,689		3,645
	WYAK		5,532	5,532	5		5,474		5,409
	EYAK/SEO		3,911	3,911	4		3,870		3,824
	Total	16,159	13,472	13,472	348	15,993	13,334	15,803	13,177
Rex sole	W		1,270	1,270	124		1,258		1,234
	C		6,231	6,231	3,382		5,816		5,707
	WYAK		813	813	1		772		758
	EYAK/SEO		1,027	1,027	-		1,304		1,280
	Total	12,207	9,341	9,341	3,507	11,957	9,150	11,733	8,979
Arrowtooth flounder	W		31,142	14,500	1,875		30,752		29,545
	C		115,612	75,000	33,085		114,170		109,692
	WYAK		37,232	6,900	50		36,771		35,328
	EYAK/SEO		11,372	6,900	16		11,228		10,787
	Total	229,248	195,358	103,300	35,026	226,390	192,921	217,522	185,352
Flathead sole	W		12,730	8,650	212		12,767		12,776
	C		24,805	15,400	2,284		24,876		24,893
	WYAK		3,525	3,525	1		3,535		3,538
	EYAK/SEO		171	171	-		171		171
	Total	50,664	41,231	27,746	2,497	50,792	41,349	50,818	41,378

[a] W/C/WYAK subarea amounts for pollock are apportionments of subarea ACL that allow for regulatory reapportionment

Table 1. continued.

Species	Area	2014 OFL	2014 ABC	2014 TAC	2014 Catch	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Pacific Ocean perch	W		2,399	2,399	2,063		2,302		2,358
	C		12,855	12,855	13,434		15,873		16,184
	WYAK		1,931	1,931	1,871		2,014		2,055
	W/C/WYAK	19,864		17,185	17,368	23,406		23,876	
	SEO	2,455	2,124	2,124	-	954	823	973	839
	E(subtotal)					-	-	-	-
	Total	22,319	19,309	19,309	17,368	24,360	21,012	24,849	21,436
Northern rockfish[b]	W		1,305	1,305	802		1,226		1,158
	C		4,017	4,017	3,410		3,772		3,563
	E		-		-		0*		0*-
	Total	6,349	5,322	5,322	4,212	5,961	4,998	5,631	4,721
Shortraker rockfish	W		92	92	73		92		92
	C		397	397	323		397		397
	E		834	834	253		834		834
	Total	1,764	1,323	1,323	649	1,764	1,323	1,764	1,323
Dusky rockfish	W		317	317	134		296		273
	C		3,584	3,584	2,825		3,336		3,077
	WYAK		1,384	1,384	87		1,288		1,187
	EYAK/SEO		201	201	4		189		174
	Total	6,708	5,486	5,486	3,050	6,246	5,109	5,759	4,711
Rougheye and blackspotted rockfish	W		82	82	25		115		117
	C		864	864	536		632		643
	E		298	298	172		375		382
	Total	1,497	1,244	1,244	733	1,345	1,122	1,370	1,142
Demersal shelf rockfish	Total	438	274	274	104	361	225	361	225
Thornyhead rockfish	W		235	235	237		235		235
	C		875	875	666		875		875
	E		731	731	218		731		731
	Total	2,454	1,841	1,841	1,121	2,454	1,841	2,454	1,841
Other rockfish (Other slope)[b]	I		-				-		-
	W/C		1,031	1,031	940		1,031		1,031
	WYAK		580	580	53		580		580
	EYAK/SEO		2,470	200	37		2,469		2,469
	Total	5,347	4,081	1,811	1,030	5,347	4,080	5,347	4,080
Atka mackerel	Total	6,200	4,700	2,000	981	6,200	4,700	6,200	4,700
Big skate	W		589	589	135		731		731
	C		1,532	1,532	1,150		1,257		1,257
	E		1,641	1,641	94		1,267		1,267
	Total	5,016	3,762	3,762	1,379	4,340	3,255	4,340	3,255
Longnose skate	W		107	107	51		152		152
	C		1,935	1,935	1,031		2,090		2,090
	E		834	834	336		976		976
	Total	3,835	2,876	2,876	1,418	4,291	3,218	4,291	3,218
Other skates	Total	2,652	1,989	1,989	1,559	2,980	2,235	2,980	2,235
Sculpins	GOA-wide	7,448	5,569	5,569	1,075	7,448	5,569	7,448	5,569
Sharks	GOA-wide	7,986	5,989	5,989	1,188	7,986	5,989	7,986	5,989
Squids	GOA-wide	1,530	1,148	1,148	92	1,530	1,148	1,530	1,148
Octopuses	GOA-wide	2,009	1,507	1,507	1,057	2,009	1,507	2,009	1,507
Total		790,468	640,675	499,274	292,544	870,064	685,597	910,895	731,049

[b] Note 1 mt was moved from the northern rockfish stock EGOA allocation to EGOA "other rockfish" category

Table 2. SSC recommendations for BSAI groundfish OFLs and ABCs for 2015 and 2016 are shown with the 2014 OFL, ABC, TAC, and Catch amounts in metric tons (2014 catches through November 8th from AKR Catch Accounting include CDQ). Recommendations are marked in **bold** where SSC recommendations differ from those of the BSAI Plan Team.

		2014			2014 Catch	2015		2016	
Species	**Area**	**OFL**	**ABC**	**TAC**	**as of 11/8/14**	**OFL**	**ABC**	**OFL**	**ABC**
Pollock	EBS	2,795,000	1,369,000	1,267,000	1,294,703	3,330,000	1,637,000	3,319,000	1,554,000
	AI	42,811	35,048	19,000	2,375	36,005	29,659	38,699	31,900
	Bogoslof	13,413	10,059	75	427	21,200	15,900	21,200	15,900
Pacific cod	BS	299,000	255,000	246,897	208,053	346,000	255,000	389,000	255,000
	AI	20,100	15,100	6,997	6,145	23,400	17,600	23,400	17,600
Sablefish	BS	1,584	1,339	1,339	315	1,575	1,333	1,431	1,211
	AI	2,141	1,811	1,811	817	2,128	1,802	1,934	1,637
Yellowfin sole	BSAI	259,700	239,800	184,000	143,805	266,400	248,800	262,900	245,500
Greenland turbot	BSAI	2,647	2,124	2,124	1,653	3,903	3,172	6,453	5,248
	BS	n/a	1,659	1,659	1,476	n/a	2,448	n/a	4,050
	AI	n/a	465	465	177	n/a	724	n/a	1,198
Arrowtooth flounder	BSAI	125,642	106,599	25,000	18,697	93,856	80,547	91,663	78,661
Kamchatka flounder	BSAI	8,270	7,100	7,100	6,395	10,500	9,000	11,000	9,500
Northern rock sole	BSAI	228,700	203,800	85,000	51,549	187,600	181,700	170,100	164,800
Flathead sole	BSAI	79,633	66,293	24,500	16,102	79,419	66,130	76,504	63,711
Alaska plaice	BSAI	66,800	55,100	24,500	18,808	54,000	44,900	51,600	42,900
Other flatfish	BSAI	16,700	12,400	2,650	4,388	17,700	13,250	17,700	13,250
Pacific Ocean perch	BSAI	39,585	33,122	33,122	32,373	42,558	34,988	40,809	33,550
	BS	n/a	7,684	7,684	7,429	n/a	8,771	n/a	8,411
	EAI	n/a	9,246	9,246	9,021	n/a	8,312	n/a	7,970
	CAI	n/a	6,594	6,594	6,439	n/a	7,723	n/a	7,406
	WAI	n/a	9,598	9,598	9,485	n/a	10,182	n/a	9,763
Northern rockfish	BSAI	12,077	9,761	2,594	2,339	15,337	12,488	15,100	12,295
Blackspotted/Rougheye	BSAI	505	416	416	196	**560**	**453**	**686**	**555**
rockfish	EBS/EAI	n/a	177	177	98	n/a	**149**	n/a	**178**
	CAI/WAI	n/a	239	239	98	n/a	**304**[a]	n/a	**377**[a]
Shortraker rockfish	BSAI	493	370	370	194	690	518	690	518
Other rockfish	BSAI	1,550	1,163	773	931	1,667	1,250	1,667	1,250
	BS	n/a	690	300	316	n/a	695	n/a	695
	AI	n/a	473	473	615	n/a	555	n/a	555
Atka mackerel	BSAI	74,492	64,131	32,322	30,947	125,297	106,000	115,908	98,137
	EAI/BS	n/a	21,652	21,652	21,185	n/a	38,493	n/a	35,637
	CAI	n/a	20,574	9,670	9,520	n/a	33,108	n/a	30,652
	WAI	n/a	21,905	1,000	242	n/a	34,400	n/a	31,848
Skates	BSAI	41,849	35,383	26,000	24,695	49,575	**41,658**	47,035	**39,468**
Sculpins	BSAI	56,424	42,318	5,750	4,570	52,365	39,725	52,365	39,725
Sharks	BSAI	1,363	1,022	125	122	1,363	1,022	1,363	1,022
Squids	BSAI	2,624	1,970	310	1,678	2,624	1,970	2,624	1,970
Octopuses	BSAI	3,450	2,590	225	351	3,452	2,589	3,452	2,589
Total	BSAI	4,196,553	2,572,819	2,000,000	1,872,627	**4,769,174**	**2,848,455**	**4,764,283**	**2,731,897**

[a] The SSC recommendation for "maximum subarea species catch" of Blackspotted/Rougheye rockfish in the WAI portion of the CAI/WAI is 46 mt in 2015 and 57 mt in 2016.

GOA – BSAI Sablefish

Public testimony was provided by Gerry Merrigan (Freezer Longline Coalition). He commented that fixing the spatial allocation of allowed harvest at the 2012 level has fishery impacts, and noted that the fisheries efficiency of the current apportionment scheme should be taken into consideration. He also noted that whale depredation continues to be problematic.

The 2014 sablefish stock assessment model was updated to include several new sources of data including relative abundance and length data from the 2014 longline survey, relative abundance and length data from the 2013 longline and trawl fisheries, age data from the 2013 longline survey and 2013 fixed gear fishery, updated historical catches 2006 - present due to changes in the Regional Office Catch Accounting Database, updated 2013 catch, and projected 2014 catch. There are no model changes.

Review of the sablefish longline survey shows that after a period of declining sablefish abundance, the 2014 relative population number (RPN) increased slightly. Stock projections indicate a continued decline in abundance through 2018. The 2008 year class continues to be slightly above average.

The SSC appreciated the sensitivity analysis presented in Appendix 3C. This sensitivity analysis explored the implications of correcting for whale depredation, treatment of new survey area sizes, and other issues. The authors noted that they are exploring a suite of potential model changes before implementing them in the assessment. The SSC agrees that this seems like a prudent approach to incorporating changes to the model. The authors plan to develop a full benchmark assessment in preparation for a Center of Independent Experts review of the sablefish assessment in 2016.

The authors presented an update to a model previously approved by the SSC. The retrospective analysis showed that the updated model addressed the retrospective pattern and the model now has very little retrospective bias (Mohn rho = 0.019) of the groundfish stocks.

The SSC recommends that sablefish be managed under Tier 3 harvest rules. Projected female spawning biomass (combined areas) for 2015 is 91,183 (88% of $B_{40\%}$), placing sablefish in Tier 3b. **The SSC supports the authors' recommendation for a maximum permissible value of F_{ABC} of 0.082, which translates into a 2015 ABC (combined areas) of 13,657 t. The OFL fishing mortality rate is 0.098, which translates into a 2015 OFL (combined areas) of 16,128 t.**

The authors and the Plan Team recommended keeping the area apportionment for harvest fixed at the proportions used in 2014. The SSC appreciated the authors' inclusion of the preliminary results of the spatial movement analysis. Dr. Quinn provided a progress report on development of a sablefish movement model that will be used to evaluate the performance of different spatial allocation strategies relative to several population attributes. The assessment authors and Kari Fenske (graduate student, UAF) are nearing completion of this movement model, which allows for them to conduct an evaluation of different spatial allocation strategies. For this reason, **the SSC accepts the Plan Team and authors' recommendation for fixing the spatial allocation for this assessment cycle.** The SSC looks forward to a more thorough analysis of the strengths and weaknesses of spatial allocation strategies which could improve on the weighted moving average approach used since 1995 or the random effects approach recently recommended by the Plan Team's Survey Averaging Working Group. The SSC notes that a flexible spatial allocation strategy is important for sablefish due to the importance of strong year classes in the population and the evidence for shifts in the spatial distribution of the population by age. The suite of proposed objectives included in the apportionment evaluation modeling will include:

1) Reduce annual variation in TAC changes,
2) Maximize economic yield by region and for the total fishery,
3) Maximize sustainable yield by region and for the total fishery, and
4) Maintain a minimum level of harvest in every region.

The proposed strategies to attain these objectives include:

1) Status quo (5-year exponential average of fishery and survey abundance),
2) Apportionment of terminal year abundance from a spatially explicit model,
3) Apportionment based on a longer-term (e.g., 10 year) average of abundance,
4) Apportionment based on equal allocation (i.e., divide TAC by the number of regions), and
5) Apportion based on relative population weight or relative population numbers (to protect spawning biomass).

The SSC suggests that the authors might benefit from engagement of the fishing community and the Council in the selection of suites of objectives for this analysis.

Sablefish GOA

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Sablefish	W		1,474		1,338
	C		4,658		4,232
	WYAK		1,708		1,552
	SEO		2,682		2,436
	Total	12,425	10,522	11,293	9,558

Sablefish BSAI

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Sablefish	BS	1,575	1,333	1,431	1,211
	AI	2,128	1,802	1,934	1,637

C-4 BSAI SAFE and Harvest Specifications for 2015/16

EBS Walleye Pollock

Public testimony was provided by Ed Richardson (PCC) who believed that the stock assessment model was consistent with data, wanted ABC near 1.6 million t so that spawning biomass would not go above 3 million t, at which point he stated that recruitment would be below average 80% of the time, preferred that the treatment of average weight should be formalized, and that full Tier 1 projections should be undertaken with risk assessment and probability distributions; and Donna Parker (Arctic Storm) who thought the assessment showed that the pollock stock was in excellent shape, praised the science-based Council process, expressed one concern with warm temperatures affecting pollock and its assessment, and agreed with the Plan Team's ABC recommendation.

Hydroacoustic and trawl surveys in 2014 indicate higher estimated pollock biomasses, broadening of the spatial distribution, and expansion of range into the SE Bering Sea and Russia. Ages 6 and 7 (2008 and 2007 year classes) appear strong in the bottom trawl survey and age 2 (2012 year class) appears strong in the hydroacoustic survey, suggesting that some recent recruitments have been above average. There have been fairly large changes in growth interannually, suggesting a cohort effect (large year classes having low weight-at-age).

The authors considered the following three classes of models:

- Model 0: last year's model with updated data,
- Model 1: natural mortality as a function of age, and
- Model 2: density-dependent survey catchability.

Each updated dataset was added in sequence from most precise to least precise. There were three models for natural mortality at age, the status quo model, and two other well-known models from the literature. Model 2 used the Kotwicki index (a new efficiency correction for bottom trawl survey data).

The authors found no major problems in adding the updated datasets; there were no issues with model fitting. There was a small retrospective pattern upward. Thus, the authors proceeded to Models 1 and 2. They found that the status quo natural mortality model was as good as the other two models, so no change was made. They found the use of the Kotwicki index was promising but needed further study. Thus, the best model was last year's model with updated data and no structural changes.

The Plan Team agreed that this was the best model, and the SSC concurs. EBS pollock are in Tier 1a for biological reference points. The results from the best model indicate that the EBS pollock stock is in good health with biomass well above the MSY level and strong year classes in the composition. Table 1.3 shows that average catch was about 1.2 million t (range 0.8-1.5 million t) since 1977 (when NPFMC management began). Thus for almost 40 years, the management system has produced sustainable harvests around this magnitude. From this assessment, the 2015 maxABC has returned to a very high level of 2.900 million t, jumping from the 2014 ABC of 1.369 million t. Because this large a change requires moderation for robust determination, the authors proposed a Replacement Yield strategy (choosing yield equal to the surplus production to keep the population at the same level) of 1.35 million t. The Plan Team did not approve this type of strategy, and the SSC agrees, because the rationale to keep the stock well above B_{MSY} is lacking. The strategy of using average F for the last five years, which produces an ABC of 1.409 million t (Table 1.29), is more reasonable for rebuilding a stock, not one that is already rebuilt. The Plan Team instead recommended a Tier 3 strategy used in the past, which uses $F_{40\%}$ and $B_{40\%}$, considered conservative approximations to F_{MSY} and B_{MSY}. **The SSC agreed with this choice, which results in a 2015 ABC of 1.637 million t.** Unlike the Plan Team, the SSC is not concerned at this point about the concentrated age distribution with 50% of fish at age 6, because the population level is high. That would be a concern if there were weak year classes in the recent past and consequently there was concern about spawning biomass going too low. The SSC welcomes the return to this harvest control rule and believes it provides a more stable strategy than Replacement Yield or 5-year average fishing mortality.

The SSC requests that the following issues be addressed in future assessments:

1. Projection graphs should be included to better understand future responses.
2. Elaboration and justification are needed for the method used to calculate weight-at-age used to calculate biomass from numerical abundance.
3. The extent to which environmental variables affect year class strength and its uncertainty should be examined.
4. The extent to which temperature affects survey catchability and/or selectivity should be examined with attention to whether large increases in survey biomass are due to temperature effects rather than actual changes in biomass.

Stock/ Assemblage	**Area**	**2015 OFL**	**2015 ABC**	**2016 OFL**	**2016 ABC**
Pollock	EBS	3,330,000	1,637,000	3,319,000	1,554,000

Aleutian Islands Walleye Pollock

This assessment is a fairly routine update of last year's model, with updated catch data and the 2014 survey biomass estimate. Estimated biomass from the model gradually increased from a minimum level in 1999. As there have been no large year classes since 1989, the increased biomass is expected to be from major decreases in harvest. **The SSC concurs with the PT that the model should be used to determine biological reference points from Tier 3b.**

Stock/ Assemblage	**Area**	**2015 OFL**	**2015 ABC**	**2016 OFL**	**2016 ABC**
AI Pollock	AI	36,005	29,659	38,699	31,900

Bogoslof Walleye Pollock

The 2014 acoustic-trawl survey estimated biomass at 112,070 t, an increase of 67% from the 2012 value, but still on the low end of the range of survey biomasses since 2000. Under Tier 5, ABC and OFL were calculated with M = 0.2 and a random effects model. **The SSC concurs with this approach and the biological reference points.**

An age-structured model suggested that M is actually near 0.3. **The SSC agrees with the Plan Team that the author should bring forward this analysis next year to consider whether M should be changed.** Also, because there has been only minimal harvest since 1992, **it would be helpful to do a catch curve analysis** to provide additional information about the appropriate value for M.

Stock/ Assemblage	**Area**	**2015 OFL**	**2015 ABC**	**2016 OFL**	**2016 ABC**
Bogoslof pollock	Bogoslof	21,200	15,900	21,200	15,900

BSAI Pacific Cod

Public testimony was presented by Chad See and Gerry Merrigan (Freezer Longline Coalition) and Jason Anderson (Alaska Seafood Cooperative). Mr. See and Mr. Merrigan support the scientific approach and support the ABC recommendation of 255,000 mt. They expressed concerns about survey catchability and positive retrospective bias in the assessment model. Mr. Anderson expressed that Pacific cod is now the new "prohibited species cap" ("choke species"). In the Amendment 80 fisheries, they are actively avoiding Pacific cod and Pacific halibut species in pursuit of yellowfin sole and rock sole. He commented that the Pacific cod tend to separate from yellowfin sole in mid-September.

Bering Sea:

Two alternative assessment models were put forward this year for Bering Sea Pacific cod. Model 1 is the same Stock Synthesis model that has been in use since 2011. Model 2 differed significantly from Model 1 in that a single season was used instead of five seasons, a single fishery was defined where the composition data were catch weighted, Richards growth model, natural mortality, and survey catchability were all estimated internally. Survey catchability and selectivity were allowed to vary annually (based on a random walk), and an iterative method was used to tune the standard deviations for penalized deviation vectors.

The author and Plan Team recommended the use of Model 1 for specifying stock status and determining ABC and OFL levels. The 2015 maxABC for Model 1 is 295,000 mt; however, the author and Plan Team recommend rolling over the 2014 ABC due to the strong retrospective pattern in the estimated spawning biomass – the retrospective analysis suggest the biomass is over-estimated by as much as 50%. In contrast, Model 2, which has good statistical fits to the observed data, results in a 2015 max ABC of 112,000 mt. The author was not comfortable using this model due to difficulty in resolving questions about selectivity type 17 (random walk in selectivity with respect to age) in Stock Synthesis. Specifically, the use of the max function (not differentiable), difficulty including dev vectors at age of peak selectivity, and the tendency of the model to estimate extremely low selectivity values for ages with exception of age classes close to the plus group. The author attempted to identify the source of the retrospective bias, but no obvious solution was found. The SSC notes that Model 2 does not have the same retrospective bias problem and the solution to this bias must lie in the differences between Models 1 and 2.

Both the Plan Team and the SSC note that Model 2 has desirable properties with respect to improved fits to the data and improved retrospective performance. The SSC recommends that the author conduct a simulation study to better understand the estimability of the selectivity type 17 in Stock Synthesis and the estimation of annual deviations.

The vector of effective sample sizes for the composition data set was assumed to have a mean of 300 in Model 1. The author noted that in combining the fisheries data the effective sample size in Model 2 has a mean of 2700 (9 fleets times 300). The SSC recommends that a statistical approach be used to weight the composition data (i.e., iterative re-weighting, or other methods outlined in Francis 2011).

The SSC had a long discussion regarding major differences in the estimated reference points and ABC recommendations between the two models. Model 2 is preferable due to its better performance overall with respect to fitting data and minimal retrospective bias. However, trends in the trawl survey indicate a relatively stable (even slightly increasing) population since 2009, with commercial catches exceeding 200,000 mt since 2011. Since 2006, Model 1 does estimate above average recruitment, but these estimates are likely biased high due to the retrospective behavior in the model. The SSC agrees with the author and Plan Team recommendation of rolling over the 2014 ABC based on trends in the trawl biomass survey and using Model 1 for stock status determination. **The SSC recommends the rollover of the 2014 ABC/OFL for 2015, and the following ABC/OFL for 2016 (in mt).**

Stock/		2015		2016	
Assemblage	**Area**	**OFL**	**ABC**	**OFL**	**ABC**
Pacific cod	BS	346,000	255,000	389,000	255,000

Aleutian Islands:
The assessment author presented three models for the AI Pacific cod, one Tier 5 assessment based on the random effects model (Model 1), and two Tier 3 age-structured models. The author and Plan Team both recommend the Tier 5 assessment. The survey index for 2014 has increased by 8% from 2012 and biomass increased by 25%.

Model 2 and Model 3 are both age-structured models similar to the models used for the Bering Sea Pacific cod assessments, except the model starts in 1991. Model 3 differs from Model 2 by using a more logistic-like selectivity. The author and Plan Team were concerned about using these models at this stage due to the random walk in selectivity (same issue in the Bering Sea Model 2 assessment), and estimated biomass was on average 3.3 times larger than the survey biomass estimates.

The SSC recommends adopting Model 1 (Tier 5) for the purposes of setting ABC and OFL. The 2015 and 2016 ABC/OFL recommendations (in mt) below.

Stock/		2015		2016	
Assemblage	**Area**	**OFL**	**ABC**	**OFL**	**ABC**
Pacific cod	AI	23,400	17,900	23,400	17,900

BSAI Atka Mackerel
The SSC appreciates the authors' responsiveness to previous SSC and Plan Team recommendations, particularly completing a retrospective analysis, investigating down-weighting the survey, and estimating M and q. The SSC noted that the survey provides highly variable estimates of stock biomass or trends, and that this weakness contributed to the sensitivity of the assessment results to assumptions about M, q, and the effective sample size of composition data. Alternative assumptions result in significant changes to ABC and OFL levels. The SSC suggests that the high variability in survey abundance and trend estimates is the major source of uncertainty in the assessment, and should be featured prominently in "Data Gaps and Research Priorities".

There were no changes to the assessment methodology. **The SSC agrees that this stock is in Tier 3a and endorses the choice of assessment model and the resultant ABC and OFL levels recommended by the Plan Team (in mt) in the table below. The status quo 4-survey average was used to obtain the allocation of ABC to subareas until further guidance is provided. The SSC recommends the use of the random effects procedure for setting subarea ABC allocations in the future.**

The SSC looks forward to seeing the 2014 CIE reviews and the author/Plan Team's short- and long-term responses this fall.

The Plan Team expressed some concern about the potential relaxation of fishing area restrictions and the re-opening of parts of Area 543 in light of the recent poor performance of the Steller sea lion population in this area; the SSC shares these concerns. The SSC urges that the argument that localized depletions may affect prey availability be tempered, as the report that investigated this subject was not published in the peer-reviewed literature.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Atka mackerel	EAI/BS		38,493		35,637
	CAI		33,108		30,652
	WAI		34,400		31,848
	Total	125,247	106,000	115,908	98,137

BSAI Flatfish

Yellowfin Sole

There were no changes in the assessment methods this year. One minor change to the maturity schedule was made to the stock assessment for this year, and 2013 fishery age composition, 2013 survey age composition, 2013 fishery discards and retention estimates, 2014 trawl survey biomass estimate and standard error, and estimated catch through the end of 2014 were added to the model, and maturity estimates were updated with samples collected in 2012.

The SSC appreciates the authors' responsiveness to the request to update the assessment with new maturity data. The SSC supports the Plan Team's recommendations to test for differences of 1992/1993 and 2012 maturity curves, and to pool all maturity data for the next assessment if there are no significant differences. The SSC also supports the Plan Team's recommendations with respect to the weight-at-age analysis for the next assessment. The SSC looks forward to the analysis of the retrospective plots and associated bias in 2015.

The projected female spawning biomass estimate for 2015 is an increase from the 2014 estimate from last year's assessment. This stock had been declining over the past decade, but this is now reversed due to the influence of a strong 2003 year class. Female spawning biomass is projected to increase through 2019 if the fishing mortality rate continues at the same level as the average of the past 5 yrs. Annual average exploitation rates have averaged 5% since 1977. Yellowfin sole continue to be well-above B_{MSY} and the annual harvest remains below the ABC level.

Yellowfin sole is managed under Tier 1a. **The SSC recommends adopting the authors' and Plan Team's recommended ABCs and OFLs for 2015 and 2016 (in mt).**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Yellowfin sole	BSAI	266,400	248,800	262,900	245,500

Greenland Turbot

As in the past two full assessments, an alternative model (Model 2) was presented with an autocorrelation parameter on recruitment deviations and fixed shelf survey q and slope survey q. Model 1 is the current model used to assess this stock. Similar to previous assessments, the best fitting model was Model 2. Use of and rationale for the autocorrelation parameter in the model was aided by a recent meta-analysis (Thorson et al. 2014) that provided priors for this parameter. The SSC agrees with the authors' and Plan Team's selection of Model 2 and the resulting biological reference points. **The SSC supports the authors' and Team's ABC and OFL recommendations for 2015 and 2016 under Tier 3b below (in mt).**

The SSC notes that there was no slope survey in 2014 and that the assessment of this stock relies heavily on this survey. The SSC reiterates support for continued slope surveys to aid in the assessment of slope species such as Greenland turbot. We also agree with the Plan Team's recommendation to fit Model 1 with recruitments since at least 2007 to investigate whether the large increase in survey q is due to recruitment dispersion and/or autocorrelation parameters.

The SSC briefly discussed the retrospective bias that was present in the assessment model when the full data set was used to estimate survey q. The author identified that the addition of the new data was a source of retrospective bias. The authors' solution was to estimate survey q by excluding the 2007-2014 data, then fix survey q based on these results and reintroduce the 2007-2014 data. The SSC was concerned that the estimate of survey q may be biased because it is only informed by part of the time series.

Stock/		**2015**		**2016**	
Assemblage	**Area**	**OFL**	**ABC**	**OFL**	**ABC**
Greenland	BS		2,448		4,050
turbot	AI		724		1,198
	Total	3,903	3,172	6,453	5,248

Arrowtooth Flounder

Along with the usual update of survey, catch, and composition data, new assessment model components included non-parametric fishery selectivity rather than a 2-parameter logistic and adding a new likelihood component to incorporate the new AI age data. New female maturity information was evaluated against current information in an appendix to the assessment. The preferred and best fitting model (Model 1) used non-parametrically estimated fishery selectivity and the newer female maturity information. The SSC agrees with the authors' and Plan Team's choice of Model 1 and resulting biological reference points. **The SSC supports the authors' and Team's ABC and OFL recommendations for 2015 and 2016 under Tier 3a (in mt).**

The SSC agrees with the Plan Team recommendation to conduct a retrospective analysis during the next assessment.

Stock/		**2015**		**2016**	
Assemblage	**Area**	**OFL**	**ABC**	**OFL**	**ABC**
Arrowtooth flounder	BSAI	93,856	80,547	91,663	78,661

Kamchatka Flounder

Data added to the assessment were 2012-2014 catches, 2012-2013 fishery length compositions, 2013-2014 shelf survey biomass and length compositions, 2012 slope survey age composition, and 2014 AI survey biomass and length composition. No changes were made to the assessment model from the last assessment. As requested by the SSC, a Tier 5 assessment was also presented as a comparison to the Tier

3 assessment that was first approved last year. **The SSC supports the authors' and Team's ABC and OFL recommendations for 2015 and 2016 under Tier 3a (in mt).**

Despite the short time series for this stock, the SSC agrees with the Plan Team that a retrospective analysis be conducted and presented in the next assessment.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Kamchatka flounder	BSAI	10,500	9,000	11,000	9,500

Northern Rock Sole

This year a full assessment was completed for northern rock sole. The SSC appreciates the author's work investigating the effects of including temperature in the northern rock sole assessment. Results from seven models were presented, including a model that estimated survey catchability in relation to annual bottom temperature. The model with temperature gave similar results to the base model and resulted in improved fits to the survey estimates, but it did not fit the observed age compositions as well as the base model and was not selected as the model of choice based on AIC analysis. The SSC agrees with the author and Plan Team and recommends setting catch specifications with the base model.

Given the last four years of low recruitment and the corresponding offshore advection shown in the OSCURS model, the SSC suggests that the author explore a model that estimates an environmental effect on recruitment. **The SSC recommends conducting a retrospective analysis in the next assessment as suggested by the Plan Team.** The Plan Team recommended including the sex ratio as a likelihood component of the objective function. This could be accommodated using a multinomial density function that jointly estimates the sex ratio and size composition (similar to what is done in Stock Synthesis).
Northern rock sole are managed in Tier 1a. **The SSC recommends adopting the authors' and Plan Team's recommended ABCs and OFLs for 2015 and 2016 (in mt).**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Northern rock sole	BSAI	187,600	181,700	170,100	164,800

Flathead Sole

Data added to the assessment were updated 2013 catch and 2014 catch to date, fishery ages from 2011-2012, 2013-2014 lengths, 2013-2014 shelf survey biomass, 2014 AI survey biomass, 2013-2014 survey bottom temperature, 2013 survey ages, and 2014 survey lengths. No changes were made to the assessment model from the last assessment. **The SSC recommends adopting the authors' and Team's ABC and OFL recommendations for 2015 and 2016 under Tier 3a (in mt) below. For the next full assessment, the SSC reiterates its request from 2013 that the authors prepare an alternative assessment of flathead sole under Tier 1. The fitted stock-recruit model suggests that Tier 1 status may be appropriate as with yellowfin sole.**

The SSC notes that the residual pattern on survey length compositions (Figure 9-16) needs further investigation during the next assessment.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Flathead sole	BSAI	79,419	66,130	76,504	63,711

Alaska Plaice

A full assessment was completed for Alaska plaice this year. There were no changes in the assessment methodology from last year's assessment. Fishery and survey data were updated and the authors examined removing pre-1982 survey biomass data from the assessment, given the reported differences in survey catchability for other groundfish species associated with the switch from the 400 eastern to the 83-112 trawl in 1982. When the pre-1982 survey data were removed, population trends were very similar with only a small change in biomass in the early part of the time series and a slight difference in 2014. Given the unknown catchability between the survey trawls used before and after 1982, the SSC supports the authors' and Plan Team's recommendation to start the survey time series in 1982.

The SSC appreciated the authors' responsiveness to the SSC's request for updating maturity with more recent data and including a new maturity schedule based on 2012 data. As recommended for BSAI yellowfin sole, **the SSC recommends testing for differences in maturity curves and pooling all maturity data for the next assessment if no significant differences are found.**

A survey in 2010 found that 38% of the biomass of Alaska plaice resides in the northern Bering Sea. A challenge is how to incorporate this information into the assessment. Biomass estimates from the northern Bering Sea survey are not included in the current assessment, because that area has only been surveyed once; there are no plans to resurvey this northern area. The SSC agrees with the Plan Team that additional surveys in the northern Bering Sea would be needed before northern Bering Sea biomass could be incorporated into the model and advocates for further surveys.

The SSC noted a retrospective plot of spawning stock biomass was presented in the document. **The SSC recommends that a complete retrospective analysis, including a paragraph describing the results and reporting Mohn's rho, be included in all future assessments for this stock.**

The shelf survey biomass of Alaska plaice decreased 22% from 2012 to 2014 and age-3 recruitment has decreased, but there is little harvest on this stock and female spawning biomass is well above $B_{40\%}$. **The SSC recommends adopting the authors' and Plan Team's recommendations for continued management of the Alaska plaice stock under Tier 3a. The SSC agrees with the authors' and Team's recommended ABCs and OFLs for 2015 and 2016 (in mt).**

Stock/		**2015**		**2016**	
Assemblage	**Area**	**OFL**	**ABC**	**OFL**	**ABC**
Alaska plaice	BSAI	54,000	44,900	51,600	42,900

Other Flatfish

This year a full assessment was presented for Other Flatfish. Survey and fishery data were updated with recent estimates and authors responded to SSC requests to estimate confidence intervals on survey biomass estimates (included for five primary species) and to apply a random effects model. Other Flatfish include 15 species of flatfish, with catches comprised largely of starry flounder and rex sole. Other Flatfish are assessed using Tier 5 methods with F_{OFL} = M, FABC = 0.75 M and survey biomass.

The assessment authors and Plan Team recommended continued management of Other Flatfish in Tier 5 based on species-specific estimates of M and biomass estimates. **The SSC recommends supporting the authors' and Plan Team's recommendations for OFL and ABC (in mt).**

Stock/		**2015**		**2016**	
Assemblage	**Area**	**OFL**	**ABC**	**OFL**	**ABC**
Other flatfish	BSAI	17,700	13,250	17,700	13,250

For the next assessment, the SSC continues to recommend that the assessment authors consider the potential effects of temperature on the variance of survey catches of Other Flatfish. The SSC also requests the authors clarify how the F_{ABC} and F_{OFL} were averaged for the complex.

BSAI Rockfish

Pacific Ocean Perch (POP)

The 2014 AI survey biomass is large, near 1 million mt, and has been since 2010. This is supported by size composition data that continue to show relatively strong cohorts from 1994 to 2000.

The 2014 BSAI POP assessment was a full assessment and represents significant improvement in model structure and information content. Following Plan Team and SSC advice, the survey biomass estimates and age composition data from the U.S.-Japan cooperative survey (1980, 1983, and 1986) were removed. New data were also incorporated into the assessment including the 2014 AI survey biomass estimate and length composition, the 2012 AI survey and 2013 fishery age compositions and the 2012 fishery length composition. The length-at-age, weight-at-age, and age-to-length conversion matrices were also updated based on data from the NMFS AI trawl survey beginning in 1991.

The multinomial input sample sizes for the age and length composition were reweighted to balance the influence of these data on the model. The reweighting deemphasized the length data. Five models were explored, and Model 3, which used bi-cubic splines to estimate fishery selectivity as a function of year and age, was selected because it provided the best fit to the biomass survey and the age composition data. **The SSC endorses the Plan Team's and author's recommendations to incorporate bi-cubic spline selectivity and reweight the length composition data in the model. The SSC also endorses the use of the random effects model to the area biomass estimates, which were very similar to the survey average approach previously applied.**

The SSC agrees with the Plan Team's recommended changes to the model and the resulting ABCs and OFLs shown in the table below (in mt). The SSC has determined that reliable estimates of $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$ exist for this stock, thereby qualifying Pacific ocean perch for management under Tier 3a.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Pacific Ocean perch	EBS		8,771		8,441
	EAI		8,312		7,970
	CAI		7,723		7,406
	WAI		10,182		9,763
BSAI	Total	42,558	34,988	40,809	33,550

The SSC provides the following recommendations to the assessment author:

- Evaluate whether fishery CPUE data (1968-1979) are necessary and consider removing them in future models.
- Examine the evidence supporting the selectivity changes in the most recent years in the model. The shift from dome-shaped to asymptotic selectivity around 2010 appears to correspond with a divergence in modeled and survey estimated biomass.
- Explore a better prior for catchability through empirical studies and determine how to use the EBS slope survey biomass estimates.
- Explore estimates of biological parameters like maturity to see if there are trends in these estimates.
- Continue to evaluate potential sources for the retrospective trend including the impacts of estimating survey catchability in the model.
- Explore potential causes for survey biomass residual pattern.

Northern Rockfish
The trawl survey biomass estimate was up substantially in the EAI and WAI, but not the CAI. The trawl survey biomass estimates are highly variable for this species, however the top ten year classes track well in both the fishery and survey ages. Spawning biomass increased slowly and almost continuously from 1977 to recent years, where it appears to be leveling. Recent recruitment has generally been below average.

The 2014 AI survey biomass estimate and length composition were included in the assessment as was the 2012 AI survey age composition. New data since the last assessment also included the 2012 and 2013 fishery length compositions, length-at-age and weight-at-age. As in the Pacific Ocean perch assessment, the 1980s cooperative survey data were removed, and the compositional data were reweighted. The age-to-length conversion matrix was also revised based on data from the NMFS AI trawl survey beginning in 1991. Of the 6 models explored, the Plan Team concluded that Model 1 was the best choice.

The SSC accepts the Plan Team and author's model recommendation and has determined that this stock qualifies for management under Tier 3 due to the availability of reliable estimates for $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$. Because the projected female spawning biomass is greater than $B_{40\%}$, sub-tier "a" is applicable, with maximum permissible $F_{ABC} = F_{40\%}$ and $F_{OFL} = F_{35\%}$.

Stock/ Assemblage	**Area**	**2015 OFL**	**2015 ABC**	**2016 OFL**	**2016 ABC**
Northern rockfish	BSAI	15,337	12,488	15,100	12,295

The SSC shares Plan Team concern about the substantial increase in the natural mortality estimate from 2012 and requests the author provide further evaluation.

Shortraker Rockfish
The 2015 estimated shortraker rockfish biomass is 23,009 t, increasing from the previous estimate of 16,447 t primarily due to the inclusion of the 2002-2012 EBS slope survey biomass estimates. According to the random effects model, total biomass (AI and EBS slope combined) from 2002-2014 has been very stable, ranging from a low of 20,896 t in 2006 to a high of 23,938 t in 2002. The time series from the random effects model is much smoother than the time series for the raw data, due to large standard errors associated with the data.

The SSC has previously determined that reliable estimates of only biomass and natural mortality exist for shortraker rockfish, qualifying the species for management under Tier 5. **The SSC agrees with the Plan Team's recommendation for basing the biomass estimate on the random effects model and setting F_{ABC} at the maximum permissible level under Tier 5, which is 75 percent of M. The SSC accepts the ABC and OFL estimates for 2015 and 2016 (in mt) below:**

Stock/ Assemblage	**Area**	**2015 OFL**	**2015 ABC**	**2016 OFL**	**2016 ABC**
Shortraker rockfish	BSAI	690	518	690	518

The SSC notes that the continuation of the EBS slope survey is fundamental to providing information to this and other assessments.

Blackspotted and Rougheye Rockfish Complex
This year a full assessment was presented with updated data including: catch, fishery length composition data from 2012 and 2013, the 2014 AI survey biomass estimate and length composition and the 2012 AI survey age composition.

Similar to the BSAI POP and Northern rockfish assessments, the 1980s cooperative survey data were removed and the compositional data were reweighted. The age-to-length conversion matrix was also revised based on data from the NMFS AI trawl survey beginning in 1991. After evaluating several alternative methods of parameterizing selectivity, the Plan Team recommended a model that uses a double logistic curve; the SSC concurs with this choice. The SSC also endorses the use of a random effects model to estimate current biomass for the EBS component of this stock complex.

As was the case with the two most recent full assessments in 2010 and 2012, the authors and the Plan Team both expressed concerns about the appropriate range of year classes from which to estimate average recruitment. This year, the authors recommended using year classes that are at least 10% selected, which includes year classes through 1998. The Team recommends using year classes up through 1996 only, following the recommendations of the Stock Recruitment Working Group. **The SSC accepts the authors' recommendation and are looking forward to completion of the Working Group's recommendations.**

For the AI, this stock qualifies for management under Tier 3 due to the availability of reliable estimates for $B_{40\%}$, $F_{40\%}$, and $F_{35\%}$. Because the projected female spawning biomass for 2015 is greater than $B_{40\%}$, the stock qualifies as Tier 3a. **The SSC's recommended ABCs and OFLs are tabulated below (in mt):**

Stock/		2015		2016	
Assemblage	Area	OFL	ABC	OFL	ABC
Blackspotted/	EBS/EAI		149		178
rougheye	CAI/WAI		304		377
BSAI	Total	560	453	686	555

Given ongoing concerns about fishing pressure relative to biomass in the Western Aleutians, the SSC requested that the apportionment by sub-area be calculated and shared with the fishing industry as a maximum sub-area species catch. The maximum sub-area species catch levels were estimated for the WAI/CAI using the random effects model. For 2015, the amounts are 46 mt and 258 mt for the Western and Central AI areas respectively. In 2016, these are 57 mt and 320 mt in the Western and Central AI areas, respectively.

Other Rockfish Complex

The 2014 assessment reported that biomass of Other Rockfish was at an all-time high in both the most recent EBS slope survey (2012) and this year's AI survey.

New data in the 2014 assessment included updated catch and fishery lengths for 2014. Biomass estimates, CPUE, and length frequency compositions were also included from the 2014 Aleutian Island trawl survey, and the 2013 and 2014 eastern Bering Sea shelf survey. There was no Bering Sea slope survey in 2014. Of the new data, only the survey biomass estimate is used in computing recommended ABCs and OFLs.

To remain consistent with other Tier 5 assessments, the Plan Team recommends using a random effects model for each region to calculate the biomass estimate for the entire BSAI area and the SSC agrees.

The SSC agrees with Team recommended approach of setting F_{ABC} at the maximum allowable under Tier 5 (F_{ABC} = 0.75M). The accepted values of M for species in this complex are 0.03 for shortspine thornyheads and 0.09 for all other species. Multiplying these rates by the best biomass estimates of shortspine, thornyhead, and other rockfish species in the "other rockfish" yields the 2015 and 2016 ABCs, which are accepted by the SSC and tabulated below (in mt). The SSC supports Team recommendation that OFL be set for the entire BSAI area, which under Tier 5 is calculated by multiplying the best estimates of total biomass for the area by the separate natural mortality values and adding the results.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Other rockfish	EBS		695		695
	AI		555		555
	Total	1,667	1,251	1,667	1,251

BSAI Sharks
The SSC reviewed a full assessment of the BSAI sharks. There was public testimony by Gerry Merrigan (Freezer Longline Coalition) about the history of shark management in the BSAI. He testified that the shark catch in the BSAI is incidental and expressed disagreement with the idea of changing the Tier 6 calculations from maximum catch to average catch.

BSAI sharks have been managed in Tier 6 based on estimates of maximum catch in 1997-2007. The SSC discussed the possibility of moving to average catch due to SSC, Plan Team, and CIE concerns over declining survey and fishery catches for Pacific sleeper shark. Despite concerns, the SSC recommended keeping the Tier 6 calculation based on maximum catch and to re-evaluate options at the next full assessment (2016), after similar options are explored by the authors for GOA sharks in 2015.

The SSC accepts the Plan Team's recommended 2015 tier designations, and the 2015 and 2016 ABCs and OFLs for the shark complex (in mt).

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Shark	BSAI	1,363	1,022	1,363	1,022

The SSC agrees that adjustments to the time series of estimated shark catch should be delayed until more data are available from the restructured observer program. When sufficient data are available, the SSC looks forward to an evaluation of a comparison of CAS and HFICE estimates, as well as an exploration of adjustments to the historical catch time series.

BSAI Skates
A full assessment was presented for BSAI skates in 2014. This stock complex is divided into two units to generate separate recommendations that are aggregated for the entire complex. Alaska skate is managed under Tier 3 criteria and the remaining skate species ("other skates") are managed under Tier 5. New data in this year's assessment include updated catch, 2014 EBS shelf and AI survey data, 1982-1991 EBS shelf survey biomass estimates, reconstructed catch data beginning in 1954, and additional length- and weight-at-age data. As part of an ongoing effort to improve skate assessments, and in response to a 2013 CIE review, the BSAI Alaska skate model has undergone substantial modifications.

Four model alternatives were presented in 2014 for Alaska skate, including, as requested by the SSC, last year's model. Model 1 is last year's assessment model with updated data. Model 2 is the author's preferred model, with a start in 1950 instead of 1977, growth estimated within the model, removal of the embryonic stage, a return to the original Beverton-Holt spawner-recruit model, a maximum age of 25 instead of 30, and removal of age selectivity (but retention of length selectivity). Models 3 and 4 were specifically requested by the SSC at the October meeting. Model 3 is the same as Model 2 but with asymptotic selectivity curves for both the survey and the fishery, and finally, Model 4 is the same as Model 2 but with a starting year of 1977, as opposed to 1954.

The Plan Team accepted the author's preferred Model 2, though they noted some model concerns and modified the accompanying harvest recommendations. The primary Plan Team concern with Model 2 appeared to be the decrease in spawning biomass due to model change with a contrasting increase in the OFL and ABC. As a result of this concern, the Plan Team recommended rolling over the 2014 harvest specifications from Model 1, last year's model, with updated data. **In contrast to the Plan Team, the SSC recommends the acceptance of Model 2 for stock biomass and dynamics and use of Model 2 for 2015 harvest specifications.**

Acceptance of Model 2 is contingent upon having accurate historical catches between 1950 and 1977. It is unclear if the author addressed a primary concern of the SSC regarding the evaluation of historical catch data in regard to the assumptions on the proportion of gear-specific effort and species compositions. Further evaluation of selectivity as a function of age and/or length is also warranted.

Additionally, a new random effects model is also presented for other skates, which was recommended by the author to replace the 3-survey average biomass, as is consistent with other Tier 5 stocks. **The SSC concurs with this recommendation. The summary table below gives the total skate ABCs and OFLs, obtained as the sum of Alaska skate and other skates (in mt).**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Skate	BSAI	49,575	41,658	47,035	39,468

BSAI Sculpins

The BSAI sculpin complex is managed as a Tier 5 stock and a weighted-average of species-specific natural mortality rates is applied to the aggregate complex biomass to estimate harvest specifications. In previous years, the average of three most recent survey biomass estimates for each region (AI, BS shelf and BS slope) is used to calculate the aggregate complex biomass. However, this year, the author also brought forward an alternative that uses a random effects model to calculate BSAI biomass, as consistent with other Tier 5 assessments. The use of the random effects model results in a decrease in biomass estimate. The Plan Team recommends using the random effects model for 2015 harvest specifications, and **the SSC concurs with this recommendation**. Additionally, the SSC also agrees with the continued use of the weighted-average of species-specific natural mortality rate from the six most abundant sculpin species, resulting in an applied natural mortality rate of 0.29 in 2015.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Sculpin	BSAI	52,365	39,725	52,365	39,725

BSAI Squid

Tier 6 criteria are used to set harvest specifications for BSAI squid, using an average catch from 1978-1995. The SSC notes the large catch increase in 2014 that approaches the ABC more closely than in recent years (2009-2013). However, the 2014 catch level more closely approximates those of 2001-2008.

The assessment author brought forward multiple alternatives for setting harvest specifications, primarily resulting from the 2013 CIE review, and the SSC appreciates the continued efforts to evaluate alternatives to the status quo. New information on fishery-dependent length distributions was also presented that suggests multiple cohorts can be present throughout the year. The Plan Team concurred with the author's recommended OFL and ABC, which are unchanged from last year and based on the 1978-1995 time period.

The SSC had extensive discussion about whether the period before 1990 should be excluded, the period of the foreign and joint-venture fisheries. Arguments in favor of exclusion include: (1) this was a much different fishery than the current pollock fishery, so catches would not be reflective of current practice and (2) it may spur additional research to move the stock to Tier 5. Arguments against include: (1) the foreign and joint venture fisheries may have covered a broader area which could explain why the catches were higher, (2) the current pollock fishery covers only the edge of the distribution of squids, and (3) the ecosystem model estimate and study by Horne suggest that the squid population is much larger than the current catches, so there may not be a conservation concern. If the foreign and joint-venture periods before 1990 are removed, then one alternative time period would start in 1990. For consistency with the ending year of the GOA squid specifications, the end would be in 2007 yielding the range 1990-2007. Another alternative would be to use the same date range as the GOA of 1997-2007. Furthermore, if the foreign / joint-venture period is removed, then the alternative Tier 6 approach would use maximum catch instead of average catch.

If the average catch from the 1978-1995 time period is used, then the resultant OFL and ABC is 2,624 mt and 1,970 mt, respectively. If the 1990-2007 or 1997-2007 time periods are used, then the OFL and ABC values are 1,766 mt and 1,325 mt, respectively. Note that if this had been incorporated, the catch in 2014 would have exceeded this alternative ABC and approached the OFL.

In Table 6 of the SAFE squid chapter, several other time periods are examined, resulting in a range of ABCs from 728 mt to 6,728 mt (with most being in the range 700-1,400 mt) and a range of OFLs from 970 mt to 8,971 mt (with most being in the range 1,000-2,000 mt). Also shown in Table 6 are approaches similar to Tier 5 (based on fishing mortality related to *M* times biomass), resulting in ABCs and OFLs ranging from 1,000 to 400,000 mt. Clearly, the uncertainties in ABC and OFL for this complex are enormous.

If it is decided to exclude the foreign / joint-venture time period and followed the default Tier 6 procedure exactly, the SSC would recommend the ABC and OFL resulting from the excluded data. However, the SSC believes that the biomass of squid is probably larger, indeed much larger, than the catch, so that a reasonable ABC would be larger. **For this year the SSC agrees to the rollover of last year's ABC and OFL shown in the table below (mt).**

For next year, the SSC challenges the author to further investigate existing and additional approaches. A new approach may be to determine a multiplier for nominal ABC; for example, this multiplier could be an expansion from the current fishing area or depth range to that of the foreign / joint-venture fleet. In this regard, reexamination of the historical foreign / joint-venture information and comparison with the current fishery information may shed light on squid spatial distribution. In particular, looking at the historical area, gear, depth and target species of the foreign / joint-venture fleet would be informative.

The SSC also highlights the suggested research priority of investigating the impacts of squid removals on foraging by protected species, particularly for northern fur seals, and agree with the author's suggestion that this be a higher priority.

Stock/		2015		2016	
Assemblage	Area	OFL	ABC	OFL	ABC
Squids	BSAI	2,624	1,970	2,624	1,970

BSAI Octopus

Beginning in 2012, harvest specifications have been set for the BSAI octopus complex using an estimate of consumption of octopus by Pacific cod. The estimate has not been revised since 2012, but will be revisited once every five years. Octopuses are taken incidentally in the trawl, pot and longline fisheries throughout the BSAI and there is no directed fishery for BSAI octopus. Biomass estimates from BSAI trawl surveys are highly uncertain and generally considered unreliable. In response to SSC comments and a CIE review in 2013, the assessment author is examining a size-based assessment model to identify management metrics and potentially to fit to pot survey data, and the SSC looks forward to the further development of this model in 2015. Finally, the SSC also appreciates the appendix describing the substantial ongoing research efforts to resolve issues surrounding this stock assessment.

In agreement with the author and Plan Team, **the SSC recommends continuing with the alternative Tier 6 methodology, using a predation-based estimate of natural mortality, for setting catch limits for 2015.**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Octopus	BSAI	3,452	2,589	3,452	2,589

C-5 GOA SAFE and Harvest Specifications for 2015/16

GOA Walleye Pollock

The authors examined 10 assessment models, which differed by sequentially incorporating changes previously suggested by the SSC and the Plan Team. The model selected by the authors and endorsed by the Plan Team incorporated all changes with the exception of a net selectivity correction for the acoustic survey based on work by Williams et al. (2011). The authors felt this change hadn't been adequately explored, but it is anticipated to be included in future assessments.

The changes that were made to the assessment included incorporating recent data, extensive revision of historical data, exclusion of suspect data from early in the fishery, revisions to the treatment of bottom trawl catchability and selectivity, revisions to the treatment of temporal changes in fisheries selectivity, estimating and incorporating age-specific natural mortality, treating age-1 and age-2 acoustic survey indices separately from other ages, and tuning the weighting of age composition data. Although some of these revisions resulted in changes in the estimates of historical abundance, they were quite consistent in their estimation of current stock levels and recent trends. The SSC appreciates the responsiveness of the authors to our previous comments, and wishes to acknowledge the significant efforts evidenced by the revisions of the data and the changes in the assessment model.

The female spawning biomass is estimated to be slightly below $\mathbf{B_{40\%}}$, resulting in a Tier 3b designation for this stock; the female spawning biomass is projected to exceed $\mathbf{B_{40\%}}$ by next year. Several data sources indicate a strong 2012 class, supporting this projection. The OFL and ABC are calculated based on this Tier 3b designation, and are an increase from 2014. The Plan Team concurred with the authors' recommendations. **The SSC agrees that this stock is in Tier 3b and endorses the choice of assessment model and the resultant ABC and OFL levels recommended by the authors and the Plan Team.**

The method for regional apportionments of subarea ACL for the W/C/WYAK ABC is based both on biomass distribution and ecosystem considerations (Appendix C of the assessment). The Plan Team chose to incorporate Prince William Sound GHL in the ABC and subtract it in calculating the TAC to account for the inclusion of the ADF&G survey and to avoid an incorrect impression that the ABC was exceeded; this is the method used to treat State GHL for Pacific cod. **The SSC endorses this decision.**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Pollock	W (61)		31,634[a]		41,472[a]
	C (62)		97,579[a]		127,936[a]
	C (63)		52,594[a]		68,958[a]
	WYAK		4,719[a]		6,187[a]
	Subtotal	256,545	191,309	321,067	250,824
	EYAK/SEO	16,833	12,625	16,833	12,625
	Total	273,378	203,934	337,900	263,449

[a] W/C/WYAK subarea amounts for pollock are apportionments of subarea ACL that allow for regulatory reapportionment

GOA Pacific cod
There were four alternative assessment models. Model 1 is an update of the 2013 assessment, Model 2 is the same as Model 1 with an additional recruitment variability multiplier added. The other two models represent a change in methodology, where 3 blocks of non-parametric or cubic spline-based selectivity parameters are used instead of the double normal. Survey at age data were substituted for conditional age-at-length data, and the GOA NMFS trawl survey data are treated as a single index rather than split into sub-27 and 27-plus for the abundance indices.

The author and Plan Team recommend Model S1a, which uses non-parametric selectivity with 3 time blocks. The SSC noted that the spawning biomass for this stock has been increasing since 2009, and the length composition data indicate a new cohort starting to recruit. Model S1a does have retrospective bias on the order of 20%-40%, and therefore the Plan Team recommends adjusting the ABC downward from 117,200 mt to 102,850 mt (split the difference).

The SSC recommends adopting the author and Plan Team recommendations of OFL and ABC for 2015 and 2016 (in mt).

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Pacific cod	W		38,702		38,702
	C		61,320		61,320
	E		2,828		2,828
	Total	140,300	102,850	133,100	102,850

GOA Atka Mackerel
The OFL and ABC recommended for this Tier 6 stock were unchanged as the reference period was unchanged. **The SSC endorses the OFL and ABC levels (in mt) recommended by the author and the Plan Team.**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Atka mackerel	GOA-wide	6,200	4,700	6,200	4,700

GOA Flatfish
Apportionment of ABC among areas for these stocks was based on relative abundances estimated in the 2013 survey. **The SSC endorses the Plan Team's recommendation to examine area apportionment using the random effects model for 2015 assessments.**

Shallow-water Flatfish Complex
Northern and southern rock sole. The SSC appreciates the further development of an age- and sex-structured approach suited to a Tier 3 assessment. The SSC also appreciates the author's responsiveness to recommendations of both the Plan Team and the SSC; in particular, the use of the age-at-length approach, investigation of estimating selectivity as a function of length, weighting of composition data using the number of hauls, estimating male mortality, and using a 50:50 allocation of the undifferentiated catch.

Nonetheless, the description of the model lacked detail, making it difficult to understand. For instance, the growth equation was not specified and weight-at-age parameter values were not presented. The selectivity functional form used was not specified or justified, but appeared to be a double normal. It was unclear why survey catchability for the time period 1984-1993 was not estimated for the N and S models when it was for the U models. It was unclear what fishery or survey data were sex-specific, and how such information was used in the assessment. It was unclear how undifferentiated catch samples were allocated to species after 1996, as species identification was not complete. It was unclear whether there were any constraints forcing similarity or identity among time-varying selectivity parameters. Parameter definitions were not provided in Table 4.1.5, 4.1.6, or 4.1.12. Many of the figures had terse captions and text that ran off of the page. **The SSC recommends that the assessment document be edited to improve specificity and clarity.**

Entire complex. The assessments for the remainder of the shallow water flatfish assemblage, yellowfin sole, butter sole, starry flounder, English sole, sand sole and Alaska plaice (all Tier 5 stocks), were executive summaries only, as it was an off-cycle year. With no new survey, none changed their ABC or OFL reference points. Area apportionment was based on the 2013 survey biomass. **The SSC supports the author and Plan Team recommendations for ABC and OFL in 2015 and 2016 and area apportionments using combined Tier 3 and Tier 5 calculations for this stock complex (see table at end of flatfish section).**

<u>Deepwater Flatfish Complex</u>

The deepwater complex is comprised of Dover sole, Greenland turbot, and deepsea sole. Only the executive summaries were presented, as this is an off-cycle year. New catch information was added for Dover sole, the only Tier 3 species; this resulted in negligible changes in ABC and OFL levels. The other species are Tier 6 species and ABC and OFL levels are thus unchanged. **The SSC supports the author's and Plan Team's recommendations for ABC and OFL for 2015 and 2016 and area apportionments for the GOA deepwater flatfish assemblage.**

<u>Rex Sole</u>

As this is an off-cycle year, only an executive summary was provided. Although a Tier 3 assessment model is used for determining stock status, F_{OFL} and F_{ABC} levels are based on Tier 5 calculations. The updated catch information resulted in negligible changes to ABC and OFL levels. Area apportionment was based on the 2013 survey. **The SSC supports the author and Plan Team recommendations for ABC and OFL and area apportionments for 2015 and 2016.**

<u>Arrowtooth Flounder</u>

As this is an off-cycle year, only an executive summary was provided. The assessment was updated with recent catch estimates, resulting in negligible changes to ABC and OFL levels. **The SSC supports the authors' and Plan Team's recommendations for ABC and OFL and area apportionments for 2015 and 2016.** The SSC looks forward to the changes the authors anticipate making for the 2015 assessment.

<u>Flathead Sole</u>

As this is an off-cycle year, only an executive summary was provided. The assessment was updated with recent catch estimates, resulting in negligible changes to ABC and OFL levels. **The SSC supports the authors' and Plan Team's recommendations for ABC and OFL and area apportionments for 2015 and 2016.** The SSC looks forward to the changes the authors anticipate making for the 2015 assessment.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Shallow-water flatfish	W		22,074		19,577
	C		19,297		17,115
	WYAK		2,209		1,959
	EYAK/SEO		625		554
	Total	54,207	44,205	48,407	39,205
Deep-water flatfish	W		301		299
	C		3,689		3,645
	WYAK		5,474		5,409
	EYAK/SEO		3,870		3,824
	Total	15,993	13,334	15,803	13,177
Rex sole	W		1,258		1,234
	C		5,816		5,707
	WYAK		772		758
	EYAK/SEO		1,304		1,280
	Total	11,957	9,150	11,733	8,979
Arrowtooth flounder	W		30,752		29,545
	C		114,170		109,692
	WYAK		36,771		35,328
	EYAK/SEO		11,228		10,787
	Total	226,390	192,921	217,522	185,352
Flathead sole	W		12,767		12,776
	C		24,876		24,893
	WYAK		3,535		3,538
	EYAK/SEO		171		171
	Total	50,792	41,349	50,818	41,378

GOA Rockfish

Pacific Ocean Perch

A full assessment model was presented, but is identical to the model the SSC accepted in December 2013 except for inclusion of updated weight-at-age, an updated size-at-age transition matrix, updated catch for 2013, new catch estimates for 2014-2016, and new maturity data. Including the updated growth data resulted in a 5% increase in spawning biomass on average compared to the base model. Including updated growth data with new maturity data resulted in a larger increase in spawning biomass, on average about 22%, which is expected given the decrease in the age at 50% maturity when including the new maturity information.

For this assessment a random effects model was fit to the survey biomass estimates (with associated variance) for the Western, Central, and Eastern GOA. This model results in estimates of apportioned survey biomass of 11.0% for the Western area, 75.5% for the Central area, and 13.5% for the Eastern area.

The random effects model was not applied for the WYAK and EYAK/SEO split because (1) uncertainty estimates for WYAK and EYAK/SEO survey biomass were not available so the random effects model could not be used to fit the time-series of survey biomass in these two regions, and (2) the use of the upper 95% confidence interval from WYAK to calculate the ratio between WYAK and EYAK/SEO was a policy decision that allowed for additional harvest of Pacific Ocean perch in the WYAK area. Therefore the weighting method (95% confidence of the ratio in biomass) used in previous assessments was used.

The SSC accepts the OFL and ABC recommendations of the Plan Team and the assessment authors (in mt). The SSC accepts the recommendation of the authors and Plan Team to use the random-

effects model for area apportionment of ABCs among GOA areas. The SCC agrees with the authors' and Plan Team's recommendation to continue using the upper 95% confidence interval of the ratio in biomass to apportion catch between WYAK and EYAK/SEO following the previous assessments.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Pacific ocean perch	W		2,302		2,358
	C		15,873		16,184
	WYAK		2,014		2,055
	W/C/WYAK	23,406		23,878	
	SEO	954	823	973	839
	Total	24,360	21,012	24,849	21,436

The SSC requests the authors estimate these area apportionments using both the current method and the random effects model so the Plan Team and SSC can assess the impacts to harvest of Pacific Ocean perch in the WYAK and EYAK/SEO.

Northern Rockfish

This year an executive summary was provided for northern rockfish to recommend harvest levels for the next two years. There were no changes in the assessment model or the area apportionment methods. New data added to the projection model included updated 2013 catch and new estimated total year catches for 2014-2016.

Northern rockfish is a Tier 3a stock. The 2015 spawning biomass estimate (39,838 t) is above $B_{40\%}$ (30,073 t) and projected to decrease to 37,084 t in 2016. The Plan Team agreed with the authors' recommendation to use the maximum permissible ABC and OFL values and area apportionment.

The SSC supports the ABCs and OFLs (in mt) recommended by the authors and Plan Team.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Northern rockfish	W		1,226		1,158
	C		3,772		3,563
	E		0*		0*
	Total	5,961	4,998	5,631	4,721

* The small northern rockfish ABC apportionments from the Eastern Gulf are combined with "Other Rockfish" for management purposes.

Shortraker Rockfish

The SSC reviewed the executive summary of the GOA shortraker rockfish assessment. **The SSC accepts the Plan Team and author's recommendations for ABC and OFL and the area apportionments (in mt).** The SSC recommends that this stock continue to be managed as a Tier 5 stock.

The SSC appreciates the author's past review of area apportionment methods and expects that the author will include the random effects approach in next year's assessment. A full stock assessment will be presented next year.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Shortraker rockfish	W		92		92
	C		397		397
	E		834		834
	Total	1,764	1,323	1,764	1,323

Other Rockfish (Combination of Slope Rockfish and Pelagic Shelf Complex Species)
The SSC reviewed the executive summary of the GOA other rockfish assessment. **The SSC accepts the Plan Team's and authors' recommendations for ABC and OFL and the area apportionments (in mt).** The SSC supports the Plan Team's recommendation for authors to complete a stock structure template for other rockfish. The SSC also supports the Plan Team recommendation for authors to evaluate the IPHC survey data for the distribution of yelloweye/DSR in the Gulf of Alaska. In addition, the SSC recommends evaluation of the IPHC CPUE time series for DSR in the Gulf of Alaska.

Assemblage /Stock	**Area**	**2015 OFL**	**ABC**	**2016 OFL**	**ABC**
Other rockfish	W				
	C				
	W/C		1,031		1,031
	WYAK		580		580
	EYAK/SEO		2,469		2,469
	Total	5,347	4,080	5,347	4,080

Dusky Rockfish
The SSC reviewed the executive summary of the GOA dusky rockfish assessment. **The SSC accepts the Plan Team and author's recommendations for ABC and OFL and the area apportionments (in mt).** The author will address several SSC comments and suggestions in the 2015 full assessment. The SSC recommends continuing management for this stock under Tier 3.

Assemblage /Stock	**Area**	**2015 OFL**	**ABC**	**2016 OFL**	**ABC**
Dusky rockfish	W		296		273
	C		3,336		3,077
	WYAK		1,288		1,187
	EYAK/SEO		189		174
	Total	6,246	5,109	5,759	4,711

Rougheye and Blackspotted Rockfish
Due to the federal government furlough in 2013, a full assessment for the rougheye/blackspotted rockfish complex was presented in 2014 rather than 2013. The 2014 assessment incorporated several new sources of data including: updated catch, new fishery age data from 2009 and 2012, updated fishery length data from 2011, 2013 trawl biomass estimates, 2009 and 2011 trawl ages, and revised longline abundance estimates. The author brought forward models that incorporated these new data.

The SSC agrees with the author and the Plan Team that Relative Population Numbers (RPN) rather than Relative Population Weight (RPW) should be used as the input time series representing the longline abundance time series. The 2013 trawl biomass estimate was the lowest on record, however the 2014 longline RPN showed an increase. The SSC agrees with the Plan Team and the author that Model 2 should be used as the basis for the 2015 stock assessment.

The SSC noted that misreporting rates have decreased in both the survey and the fishery. The SSC continues to be supportive of research that would improve species identification including research projects to assess whether or not there is disproportionate harvest of one of the two species in this complex. The long-term goal is to develop separate species-specific assessments of each stock.

The authors examined the performance of the existing 4:6:9 weighting for area apportionments and the random effects approach. The SSC requests that the authors bring forward both approaches in the full assessment in 2015.

The SSC requests that the authors further examine trawl selectivity, as it seems unusual for age 9-11 rockfish to be selected 20% more than other ages. The SSC supports the authors' intent to re-evaluate that age of the plus group and suggests the authors update with an appendix to acknowledge the restructuring of the observer program.

Rougheye and blackspotted rockfish are managed as a Tier 3 stock complex. Current stock status places this stock in Tier 3a. The SSC supports the authors' and Plan Team's preferred model (Model 2) and recommended ABCs and OFLs for 2015 and 2016 (in mt).

Assemblage /Stock	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Rougheye/blackspotted rockfish	W		115		117
	C		632		643
	E		375		382
	Total	1,345	1,122	1,370	1,142

Demersal Shelf Rockfish (DSR)

The demersal shelf rockfish (DSR) complex is assessed on a biennial cycle, with full stock assessments typically conducted in odd calendar years. However, a full stock assessment was presented this year to coincide with new survey data and the development of a new model. Historically, the stock assessment was based on relative abundance estimates from a manned submersible, which was retired from use in 2010. As a result, no surveys were conducted in 2010 or 2011. In 2012 and 2013 stock assessment surveys were completed with an ADF&G remotely operated vehicle (ROV). The 2014 survey was cancelled due to weather. The ABC and OFL were based on the most recent ROV and submersible density estimates of yelloweye rockfish in each management area using the historical methodology.

The DSR complex is managed under Tier 4, and is particularly vulnerable to overfishing given the species' longevity, late maturation, and habitat-specific residency. Therefore, as in previous years, the authors and Plan Team recommended a harvest rate lower than the maximum allowed under Tier 4. $F = M = 0.02$ was used instead of $F_{ABC} = F_{40\%} = 0.026$ to survey biomass.

The SSC agrees with the OFLs and ABCs recommended by the authors and Plan Team (in mt). The SSC notes that the continued availability of the ROV is critical to this assessment.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Demersal rockfish	Total	361	225	361	225

The Team had a number of recommendations to aid in the development of the DSR age structured assessment which the SSC supports, including:

- The Team recommends that an age error matrix for yelloweye rockfish be developed (perhaps using the software and methods provided by Punt et al. 2008).
- The Team supports the SSC recommendation to form a small, informal model-development working group.
- The Team also recommends that the working group evaluate the feasibility of developing a southeast Alaska yelloweye/DSR age structured model and a GOA wide yelloweye/DSR age structured model.

The SSC also recommends the authors complete the stock structure template and provide clarification of what catch data are being used and whether discards are fully incorporated.

Thornyhead Rockfish

Thornyheads are assessed on a biennial schedule to coincide with the timing of survey data. In this off-cycle year, estimates from 2013 are rolled over for the next two years. An executive summary was presented. New information includes updated 2013 and estimated 2014 catch.

The SSC supports the ABCs and OFLs recommended by the authors and Plan Team (in mt).

Stock/		2015		2016	
Assemblage	Area	OFL	ABC	OFL	ABC
Thornyhead rockfish	W		235		235
	C		875		875
	E		731		731
	Total	2,454	1,841	2,454	1,841

The SSC notes that continuation of the deep stations in the trawl survey and the timely continuation of the slope survey is necessary for continued assessment of this species group.

GOA Sharks

There was public testimony by Gerry Merrigan (Freezer Longline Coalition) asking for research on survey catchability for spiny dogfish and discard mortality of shark species from hook and line gear. The SSC supports the on-going research on these two topics.

The shark complex (spiny dogfish, Pacific sleeper shark, salmon shark and other/unidentified sharks) in the Gulf of Alaska (GOA) is assessed on a biennial schedule. Although a full stock assessment would normally have been developed in 2013, an off-year assessment was provided due to the federal government furlough, and another off-year assessment was provided in 2014. Due to the off-season assessment, there was no new assessment methodology. The total catch for the GOA sharks was updated and reported for 2003-2014.

As in previous years, biological reference points for GOA sharks were calculated as the sum of estimates from an "alternative Tier 6" assessment approach used for spiny dogfish and a traditional Tier 6 approach for Pacific sleeper shark, salmon shark, and other/unidentified sharks. **The SSC accepts the authors' and Plan Team's recommended 2015 tier designations, and the 2015 and 2016 ABCs and OFLs (in mt) for the shark complex.**

The SSC appreciates the authors' exploration of biomass and catch methods for the GOA shark assessment. For the full assessment the next year, the SSC looks forward to a comparison of demographic modeling analysis, biomass dynamics models, and length based models for spiny dogfish (tier 5 approach), as well as average catch, maximum catch, and 95% or 99% confidence intervals around catch (tier 6) for both spiny dogfish and other shark species. The SSC supports Plan Team suggestions to investigate using a random effects model for calculating biomass. The SSC also asks that the authors include an explanation as to why each of these methods is or is not appropriate due to the restructured observer program.

The authors addressed four of our research questions regarding treatment of shark catches in area 649/659. The SSC agrees with the authors that it would be difficult to determine whether the large estimated shark catch in the 2013 Pacific halibut target group was an anomaly, a change in fishing behavior, or a result of the restructured observer program. The SSC also agrees that adjustments to the time series of estimated shark catch in areas 649/659 should be delayed until more data are available. When there are more data available for the restructured observer program, the SSC looks forward to an evaluation of a comparison of CAS and HFICE estimates, as well as an exploration of potential recreation of a historical catch time series. The SSC supports the Plan Team's suggestion to include "other" removals as an appendix or calculate the impacts of these removals on reference points and specifications.

The SSC continues to recommend that deducting catch from areas 649 (Prince William Sound) and 659 (Southeast Inside) from the Federal TACs for federally specified species (50 CFR part 679, Table 2a FMP Groundfish Species) that do not have State GHL fisheries be delayed until the biomass (for Tier 5) or catch (for Tier 6) in state waters can be appropriately accounted for in the stock assessment. Because of this, the SSC asks for next year that authors present catch estimates with and without catch from areas 649 and 659 and provide any results of methods that expand biomass of spiny dogfish into these areas.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Sharks	GOA-wide	7,986	5,989	7,986	5,989

GOA Skates
A full assessment was presented for GOA skates in 2014, because the federal government furlough prevented one last year. This stock complex is divided into three groups to generate separate recommendations that are aggregated for the entire complex: big skates, longnose skates, and other skates. Generally, there has been a decrease in biomass for big skates and increases for the other two groups. These skate groups are managed under Tier 5 criteria with M = 0.1 and estimated biomass from a random effects model for each group. **The SSC supports this approach as does the Plan Team**, which leads to the overall ABC and OFL recommendations in the table (in mt).

Subarea ABCs are also determined using a random effects model. First, the SSC requests clarification about whether the random effects model is used to determine subarea proportions or subarea totals for big skates and longnose skates. The summary tables in the SAFE starting on page 864 present subarea biomasses that supposedly do not add up to the reported Gulf-wide total, but the difference between the summation and reported values are negligible for both big skates and longnose skates. According to the footnotes, they do not add up, but they should for consistency. Second, it is unclear from the methods whether a random effects model is done or needed for other skates; the table above and the summary table in the SAFE only show a Gulf-wide total. **The SSC suggests that scaling the subarea biomasses to the Gulf-wide total would be a simple solution.**

Provisionally the SSC accepts the subarea ABCs presented. An issue that needs attention in the next assessment is created by the many overages in subarea catches in reference to subarea ABCs, especially for big and longnose skates. The stock structure template suggests that skates are vulnerable in their subareas with respect to harvesting. The SSC believes that the subarea ABCs should be considered as real ABCs and not as apportionments. **Thus the SSC is concerned about these overages in subarea ABCs.**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Big skate	W		731		731
	C		1,257		1,257
	E		1,267		1,267
	Total	4,340	3,255	4,340	3,255
Longnose skate	W		152		152
	C		2,090		2,090
	E		976		976
	Total	4,291	3,218	4,291	3,218
Other skates	GOA-wide	2,980	2,235	2,980	2,235

GOA Sculpins
As this is a rollover, the SSC approves the OFL and ABC determinations (in mt) based on a Tier 5 approach, with species-specific natural mortality and biomass. The author was very responsive to all

Plan Team and SSC comments, including examining species-specific calculation of biomass and reference points and exploration of random effects models for species-specific biomass. The author conducted several analyses related to species-specific calculations, which resulted in the Plan Team recommendation that they apply species-specific Ms to respective biomass estimates (summed) for ABC and OFL calculations. Furthermore, it appears that random effects models are viable for biomass calculations. **Thus the SSC supports the use of random effects models with species-specific calculations in the future.**

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Sculpins	GOA-wide	7,448	5,569	7,448	5,569

GOA Squid

As this is a rollover, the SSC approves the OFL and ABC determinations (in mt) based on a Tier 6 approach.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Squid	GOA-wide	1,530	1,148	1,530	1,148

GOA Octopus

As this is a rollover, the SSC approves the OFL and ABC determinations (in mt) based on a modified Tier 6 approach.

Stock/ Assemblage	Area	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Octopus	GOA-wide	2,009	1,507	2,009	1,507

Groundfish SAFE Appendices

GOA – BSAI Grenadiers

In August 2014, amendments to the BSAI and GOA FMPs were approved to add grenadiers as Ecosystem Components (EC). The final rule will likely be effective for the beginning of the 2015 fishing year. As an EC species, no stock assessment is required for grenadiers and no OFLs/ABCs are set. However, the SSC received an abbreviated SAFE report for the BSAI/GOA combined for the purposes of tracking abundance and catch trends. **The SSC agrees with the Plan Team recommendation that an abbreviated assessment for grenadiers be produced every other year for both regions.**

Though these values are not used for management, unofficial OFL/ABC values were calculated using Tier 5 calculations based on giant grenadiers, the most common grenadier species. A new random effects model was used to estimate current exploitable biomass in the GOA from trawl survey data. In the BSAI, the average of the three most recent trawl surveys with data to 1,000 m estimates exploitable biomass. Catches are well below the unofficial OFLs and ABCs. To determine AI biomass estimates from trawl survey data, which do not extend deeper than 500m, an expansion method was used that uses a ratio estimator between the trawl and longline surveys, making a critical assumption that the ratio between these surveys does not differ with depth. The SSC appreciates the authors' effort to validate this assumption.

GOA Forage Fish

The SSC appreciates the efforts of the author to provide a comprehensive overview of forage species in the GOA and the alternating biennial focus on the GOA and the BSAI. The distribution of forage species catches in various surveys provides some of the most helpful information on the distributions of these species and some of the only information on the distribution of these species when they are not near shore. The SSC appreciates the author's responses to SSC comments from December 2011. The SSC encourages continued effort towards addressing remaining comments, such as including the development of a table or set of figures that would show the importance of forage species in the diets of their major predators, including fish, marine mammals and seabirds. This information would provide a clear picture of the importance of forage species in each of the managed ecosystems, and would be beneficial for fishery management. It would also be helpful to include a "data gaps and research priorities" section, similar to those in traditional stock assessments.

The present forage fish contribution is one of several in the SAFE documents, and it would be useful to cross-list all of the various forage fish contributions (Ressler et al., on acoustic surveys of euphausiids; Zador et al., analyses of forage fish use by seabirds). This would help make readers aware that there are several efforts to assess inter-annual variation in forage fish abundance and use by predators.

Finally, it would be helpful to include a map of where the data presented in Figures 14, 24, 25, and 26 were obtained with a code for each location which could then be inserted at the end of each line of data in the figures.

Ecosystem Considerations
The SSC received a report on the Ecosystem Considerations SAFE chapter from Stephani Zador (NMFS-AFSC). There were no public comments.

The SSC acknowledges the tremendous amount of effort that compiling this document takes for the editor and the contributors, and thanks the editor for her presentation to the SSC. We appreciate the editor's changes to the format and the steady increase in the quantity and quality of the content. The SSC commends the attempts to align this document with the ongoing Integrated Ecosystem Assessments and with species-specific stock assessments; these efforts will only improve the utility of the document. The authors and editor have been very responsive to SSC comments, and this year is no exception. Many of our comments from 2013 were directly addressed or are now active areas of effort.

The SSC appreciated the updated regional ecosystem assessments for all four regions, and specifically, the progress that has been made to develop a GOA assessment with an initial list of appropriate ecosystem indicators. The SSC looks forward to the inclusion of a GOA report card and ecosystem assessment in the near future. The continued efforts to expand the Arctic assessment and the responsiveness to our comments regarding this region's assessment from last year are extremely valuable. We would reiterate our request for the development of an Arctic report card in the future. Also, the SSC appreciated the general effort towards using the information within the entire chapter to begin to predict future conditions, and specifically, highlighting the preliminary forecast of conditions in the EBS for 2015. These predictive capabilities will improve as the time series on which they are based grow. Effort should be made to relate these indices to process-oriented models, or to develop process-oriented models that will provide a mechanistic understanding of the ecological basis of the index, which would provide additional confidence in the predictions. The SSC further suggests looking at NOAA's climate forecast system for the GOA (Saha et al. 2012 and Saha et al. 2014).

The SSC had a short list of additional sections for consideration. First, the SSC suggested including relevant terrestrial indicators, which may strongly influence marine systems. Two such indicators include estimated freshwater contributions resulting from glacial melt and permafrost thaw. Second, the SSC suggested developing a Disease Ecology (or similarly named section) section under Ecosystem Indicators to allow for the inclusion and tracking of available information about diseases and parasites, such as the mushy halibut syndrome or *Ichthyophonus*. Third, the SSC suggested developing a Tradeoffs (or similarly named) section under Ecosystem-Based Management (Fishing-related) Indicators which includes conceptual models depicting the expected interactions / effects of management actions on relevant ecosystem indicators.

In addition to updates to a large number of ecosystem indicators, there are new contributions to the list of indicators, for example, the Chinook salmon abundance index for SE Alaska and the preliminary euphausiid index in the GOA. The SSC notes the multiple new indicators in the Groundfish section, primarily the addition of the groundfish condition contributions for the GOA and the AI. Here, weight-at-age for groundfish stocks, where age information is available, may be an alternative to length-weight residuals for groundfish condition. This would allow assessment of the impacts of year-classes on the condition indicator. A potential new ecosystem indicator estimating centers of distribution of specific fish species over time in the EBS, GOA and AI is available on the OceanAdapt website (http://oceanadapt.rutgers.edu/). Finally, the SSC appreciated the ongoing effort to improve the implications sections for each of the ecosystem indicators and would like to see these efforts continued, as the quality of the implications sections remains variable.

The SSC particularly noted the strong positive SST anomalies that impacted the North Pacific in late 2013 and persisted into 2014, which influenced physical conditions in all of the regions and is exemplified in the "warm blob" in the GOA discussed in the hot topics section. The SSC commends the contributors and editor for attempting to incorporate this information into explanations of why other indicators may be changing, for example, into the discussions regarding the generally successful year for seabird reproduction and some of the groundfish biomass indicators. Importantly, the PDO transitioned to positive in 2014. Regarding the regime shift indicator, newly separated into EBS and GOA components, the SSC noted the timing when the leading principal component of the 16 biological time series went negative was also a period when pollock biomass was quite high and still rising. It would be interesting to know if pollock was driving this, or simply responding.

In the Western Aleutian Islands, the negative weight–length residuals of groundfish suggest some sort of bottom-up limitation. It would be of interest to pull together oceanographic data that might shed light on whether there may be bottom-up limitation of fish growth there.

Specific to the EBS, a serious omission is the lack of recent data from the two time series on Bering Sea copepods. The zooplankton time series are extremely important for relating variations in pollock recruitment to climate variability. Both the sampling in spring and the BASIS sampling in late summer/fall are needed.

In the AI, care is needed in interpreting forage fish abundance trends from the tufted puffin chick meals. The decline in use of a particular prey may indicate a decline in the abundance or availability of that prey, or it may signal that an alternative prey has become more available. That said, it could be useful to explore the feasibility of the use of squid by puffins as an indicator of squid abundance. Additionally, a negative winter NPI is most likely to affect the auklet breeding by depriving them of food in winter so that they are in too poor condition to breed successfully. The SSC also agrees that reproductive anomalies may be a better indicator for planktivorous fish species than chick diets, as breeding success integrates environmental conditions over a long period of time, at least from when the birds return to the colonies in spring until the chicks fledge in late summer or fall.

In the GOA, the OCSEAP time series was focused on upwelling and the foraging of shearwaters along the rims of the troughs or canyons; this may help to explain why euphausiids are changing in this area. Again, the SSC noted the new salmon indicators included in the GOA assessment, and it is very encouraging to see these developing indices and the attempts to relate them to the physical environment. Sydeman and colleagues have developed some indicators using birds in the California Current System (Progress in Oceanography, 101, 1-146, August 2012), and the EBS (Deep-Sea Research II 55 (2008) 1877– 1882) that could be useful in this regard.

Trends in non-target species suggest another case of odd/even year differences; specifically, more jellyfish were caught in even years. It might be useful to pull together all of the examples of odd/even year differences in abundance, reproduction, etc., and see if there are any connections of interest.

As a final point, the SSC echoes the concerns brought up by the Plan Team regarding the ecosystem indicator that describes the trawl disturbance area. As currently estimated, there is potential for underestimating reductions in trawl effort and the SSC supports the Plan Team recommendation that alternatives to this index be investigated.

C-6 GOA Sablefish Pots

The SSC received a presentation of the Initial Review Draft of the GOA Sablefish Pot Longline proposed action from Sam Cunningham (NPFMC). Public testimony was provided by Jan Standert (Deep-Sea Fisherman's Association), Bernie Burkholder and Paul Clampett (fishermen), and Linda Behnken (ALFA).

This action is being considered by the Council as a means to address a recent, but chronic problem in the current GOA sablefish IFQ fishery, involving depredation of "hooked" fish during haul-back by sperm and killer whales. This depredation behavior raises a series of management concerns, including increased risk of gear entanglement of ESA and MMPA protected species; unknown and unaccounted for mortality incurred by GOA sablefish stocks, with accompanying risk of adverse impacts on stock abundance indices, assessment modeling, ABC, and TAC estimates; reduced CPUEs, associated gross revenue losses and increases in operating costs. The action alternative would permit, but not require, the use of long-line pot gear when fishing sablefish IFQ in Federal GOA management areas.

The SSC believes the initial draft EA/RIR/IRFA should incorporate the revisions outlined below, with respect to misstatements of the Council Purpose and Need, and the nature of monitoring and enforcement aspects of the action alternative, before release. The other recommended changes should also be undertaken, to extent practicable. **Upon completion of feasible revisions, the SSC recommends that the draft be made available for public review.**

The draft analysis does a very impressive job, in general, of documenting the problems faced by GOA sablefish IFQ hook-and-line (HAL) fishermen due to cetacean depredation. The narrative is comprehensive in its treatment of the historical commercial experience of this fishery in the GOA, including the short-lived use of sablefish pots. It describes how HAL operators, confronted with whale depredation, have sought operation-based solutions, with limited success, leading to an appeal from industry members for regulatory relief through gaining the option to employ pots, which physically isolates catch from depredation. The document would benefit from a table in the executive summary that contains a list of the alternatives with each of their potential benefits, key concerns, and major trade-offs.

The requested opportunity to fish pot gear is acknowledged to have a number of implications, both positive and negative, for the GOA sablefish IFQ sectors. The description of possible operational responses and logistical burdens for commercial fishery participants is clear and comprehensive. The draft identifies a suite of potential changes in the fishery that may accompany a mixed gear sablefish IFQ management structure comprised of the elements contained in the action alternative. The likelihood of impacts on gross operating costs, needed capital outlays, and economic incentives to undertake vessel modification should pots become an available option are all appropriately highlighted. As is often the case at initial review, some analytical arguments could be enhanced with reasonably obvious elaboration, both quantitatively and qualitatively. These elaborations should include the prospective economic, social, and operational effects that extend beyond the commercial ex vessel and first wholesale levels. These include expected implications for sablefish markets and consumers of sablefish products; non-market effects on subsistence users; impacts on demand for, and price effects on, sablefish IFQ shares.

The SSC has identified a list of specific concerns with the current draft, each of which requires resolution. First, there is a repeated "misstatement" of the Council's Purpose and Need for the action. The Council's Purpose and Need statement expressed its intent that, "*The use of pot gear for sablefish could reduce sperm whale and killer whale interactions with fishing gear in the Gulf of Alaska*". The analysis, however, asserts that "... *the Council's purpose and need for this action (is) specifically, reducing the* *amount of prey availability for marine mammals and seabirds (sablefish and other groundfish hooked on HAL gear)."* There is a substantial difference between these two expressions of the Council's motivation for the action. The document should adhere to the Council's articulated rationale (i.e., modify the conflicting text before release).

The draft also reflects incorrect application of terminology, as pertaining to the GOA Groundfish FMP. In addition to the misuse of bycatch, when PSC is the correct term, the document identifies Pacific halibut as a groundfish; and attributes halibut removals by sablefish HAL fishermen as both bycatch and PSC, in consecutive passages [e.g., Section 4.5.4.2, page 98 and Table 22, with comments]. The document also errs in identifying seabird takes as bycatch, despite the fact that the MSA, under the authority of which the action is proposed, strictly limits application of the term "bycatch" to fish.

There are several sections of the document in which the narrative leaves out key information, necessary for a full understanding of the point being made. In many of these instances, the necessary elaboration is provided, but much later in the document. For example, at Section 2.2, pages 23 and 24, the reader is introduced to an element of the program that would either "require pots to be removed from the grounds upon departure of the vessel" or "allow pots to remain in the water", with the option of exempting certain vessels from any removal requirement. The information provided here raises obvious questions, e.g., does this mean pots may be stored on the grounds? If so, the definition of what 'configuration' the pot must be in is relevant (but unstated). For example, must pots be left unbaited, with escape panels open? If not, the pots are fishing. But the same passage references a requirement that any consequential fish found in the pot "*... may not be retained (must be discarded) ...*" So, are the pots allowed to be baited and left fishing or must they be in a non-fishing condition? It is not until Section 4.7.1.3, on page 124, that a complete explanation of the way pot gear deployment would be handled under this element is offered. Some careful structural editing of the document should be considered to assure all the information necessary for the reader to understand the action is presented when an action element is first introduced.

There are several places in the draft when it is declared that an element of the action cannot be monitored or enforced. Even with the occasional inclusion of a caveat "*with current resources and personnel*", such assertions establish a very high threshold for the Council to overcome, should it subsequently recommend the subject element as part of its preferred action. It is even more problematic if an assertion is made that monitoring and/or enforcement are impossible. It is not suggested that these references necessarily be omitted, only that each one be carefully reviewed before release of the document, with an emphasis on the strength of the supporting information and arguments for each such conclusion. Monitoring and enforcement of this action alternative is difficult and not yet fully or satisfactorily resolved. The Council and its Enforcement Committee are taking this matter up at this meeting, which will likely lead to better identification of the issues in subsequent drafts.

This action has raised question of possible consolidation that might result. In the sablefish IFQ rationalization structure, shares are capped, IFQ are regionally designated, and vessel-size class categories are attached to shares. All of these Sablefish IFQ FMP features were expressly designed to preclude excessive consolidation, effort concentration, or capacity migration. Emphasizing these existing programmatic elements to control undesirable consolidation and displacement may warrant further emphasis under the section dealing with consolidation concerns. The SSC notes that consolidation has been a positive outcome of some rationalization programs (e.g., ending the race-for-fish in Pacific halibut off Alaska). Consolidation, by definition, has winners and losers, and both aspects need to be accounted for.

The SSC believes that further analysis and discussion of consolidation could be conducted regarding quota share (QS) use caps and vessel IFQ caps. In particular, it would be helpful to a) broaden the discussion of how QS is split across areas and vessel classes; b) calculate the maximum possible consolidation that could occur within a vessel class/area combination, using both QS use caps and vessel

IFQ caps; and c) compare the maximum possible consolidation with the status quo. In this sense, the analyst can portray how much "room" there is for consolidation, within a vessel class and area. The analysis would also benefit from showing recent trends in consolidation, rather than just showing how much consolidation has occurred since IFQ implementation.

In the sections pertaining to gear retrieval requirements, the analysis reports that "*... small vessel operators have suggested to the analysts that they are interested in contracting with larger vessels for assistance in moving pots onto the fishing grounds.*" The SSC recommends that the details of such an option be explicitly stated. One could interpret the reported interest to mean a "smaller" sablefish IFQ pot boat may wish to contract with a "larger" sablefish IFQ boat to move the former's pots onto and off of the grounds. The necessary incentive structure that would be required to see such an arrangement emerge should be addressed. The SSC notes that if the larger vessels, referenced in this passage, are not sablefish IFQ-licensed vessels, there is some question as to whether a non-IFQ licensed vessel would be permitted to carry, set, and retrieve pots on sablefish fishing grounds. It could be difficult to distinguish this activity from "fishing sablefish" by the unlicensed vessel. If the Council does not choose to incorporate this concept into the action alternative, further clarification may be unnecessary.

The analysis contains a good discussion of the changes in the sablefish fishery pre- and post- IFQ, but elsewhere implies influences of the "race-for-fish" model linger in this fishery. The argument that small boats are vulnerable to being out-competed by the larger vessels may be of dubious merit, given it seems to stem, in large part, from the old "race-for-fish" management model. When IFQ largely ended that race, it substantially reduced, if not completely eliminated the influence of capital-stuffing among fleet members.

The RIR cites what it acknowledges are very limited empirical data on ex vessel price differentials, paid for HAL and pot-caught IFQ sablefish in the BSAI. Based on these data, the text suggests, with caveats, that for sablefish processor impacts, "*A shift to more pot catch could increase margins for processing plants, if the difference in wholesale revenues generated by each gear type were similar.*" Implicit in this assertion is the notion that processors will incur no additional cost to process, nor realize effects on product recovery-rates or product quality, between HAL and pot-caught sablefish; yet, they are assumed to simply continue to "pay" fishermen less for pot-caught sablefish, extracting excess rents from the pot-gear segment of the fishery. The evidence presented does not adequately provide support that this is a sustainable long-term solution. Either supporting evidence should be provided or the conclusions re-visited.

Treatment of implicit tax effects of the proposed action alternative requires further examination or more compelling evidence for the conclusions asserted. Sablefish IFQs and halibut IFQs are area-specific. Sablefish are a high valued and relatively perishable species, demanding care in handling and transporting. Small boat operators fishing sablefish IFQ likely have limited alternative delivery options or locations. That being so, local tax implications (to the degree they exist at all) are inter-community transfers, neither costs nor benefits.

The Cumulative Effects section of the EA should also consider how the proposed action might interact with the PSC and bycatch measures being considered for the Gulf of Alaska groundfish trawl fisheries.
The IRFA is, as would be expected at initial review, incomplete. Nonetheless, the small entity size thresholds contained in the draft have been superseded by SBA guidance. When the IRFA is prepared in the next iteration, the analysis should reflect the then-prevailing thresholds.

Finally, there are the unavoidable shortcomings of an initial draft that should be resolved, to the extent time allows; for example, there are tables without associated units identified. A number of minor editorial recommendations have been noted in a mark-up of the document that will be provided to the analysts.

Despite the preceding comments, the SSC observes that the document is a well-designed EA/RIR/IRFA initial package. It is thorough in identifying and documenting the important data sources, interpreting and applying them effectively, and building descriptions of the likely nature of attributable costs and benefits, as well as distributional impacts. The draft identifies information shortfalls and critical data gaps, as well as highlights many of the questions remaining to be addressed by the Council.

As a final note, the SSC notes the possible option of initially applying the proposed management measure to just a few management areas, as opposed to the entire GOA. Including more information on experiences in multiple gear usage in sablefish fisheries off the west coast might also be informative to the analysis. The document could also benefit from the inclusion of a table of alternatives and options that describes the key concerns and tradeoffs of each.