North Pacific Fishery Management Council

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SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
December 7-9, 2009

The SSC met during December 7-9, 2009 at the Hilton Hotel, Anchorage, Alaska. Members present were:

Pat Livingston, Chair
NOAA Fisheries—AFSC
Robert Clark
Alaska Department of Fish and Game
George Hunt
University of Washington
Seth Macinko
University of Rhode Island
Farron Wallace
Washington Dept of Fish and Wildlife
Keith Criddle, Vice Chair
University of Alaska Fairbanks
Sue Hills
University of Alaska Fairbanks
Gordon Kruse
University of Alaska Fairbanks
Franz Mueter
University of Alaska Fairbanks
Doug Woodby
Alaska Department of Fish and Game
Milo Adkison (for Terry Quinn)
University of Alaska Fairbanks
Anne Hollowed
NOAA Fisheries—AFSC
Kathy Kuletz
US Fish and Wildlife Service
Lew Queirolo
NOAA Fisheries—Alaska Region

Members absent were:

Troy Buell
Oregon Department of Fish and Wildlife
Ray Webster
International Pacific Halibut Commission

B-1(a) Plan Team Nomination

The SSC considered the nomination of Dr. Tom Gelatt to the Aleutian Islands Fishery Ecosystem Plan Team. The SSC supports this nomination. Dr. Gelatt is very well qualified and his expertise will fill an important gap on the AIFEP Team.

C-3 Groundfish Catch Specifications

GOA & BSAI Pacific cod

Grant Thompson (NMFS-AFSC) presented the GOA and BSAI stock assessments for Pacific cod. Mark Maunder and Kenny Down (Freezer Longliner Coalition) provided public testimony on concerns with the current model and recommended a number of alternative model configurations. Gerry Merrigan (Prowler Fisheries) suggested a rollover of the 2009 ABC in view of the projected sharp increase in biomass in 2011.

The stock assessments for Pacific cod in both the BSAI and GOA continue to go through a number of changes to improve model fit to survey abundance and size and age composition information. Changes to model structure, additions of data to the model, and comparisons of model sensitivity were well presented and documented. The SSC commends the authors of this assessment for responding to requests from the SSC, plan teams, and the public for numerous model runs.

A revised reference model B1 was developed for both BSAI and GOA stocks. Model B1 incorporated a number of changes based on recommendations from the Plan team and SSC. This is the first time cohort-specific growth and an adjustment for an apparent ageing bias was included in the model to address a potential bias in the age data. Because it is not currently possible to estimate bias within the model, the bias adjustment was estimated iteratively and incorporated into the ageing error matrix. Although there are concerns over how this was accomplished (based upon best fit of the model), the bias adjustment did improve model fit to the age data. At the September 2009 team meeting Tom Helser (NMFS-AFSC) presented information regarding the age reading data, but there remain a number of questions that will require additional analyses to fully understand the uncertainty concerning the age readings. Hypotheses about the existence of ageing bias include: 1) age samples and length samples are taken from survey hauls with spatially distinct growth characteristics; 2) growth is highly variable and changes rapidly, particularly for younger ages showing pronounced ontogenetic structure; and 3) the age determination methods introduce a bias. The SSC encourages studies to evaluate the causes for the mismatch between survey length modes and estimated mean length at age of younger fish in the Bering Sea and difficulty of fitting age compositions in the Gulf of Alaska.

The SSC recommends that proposals for model configurations be submitted to the assessment author in April. These proposals will be reviewed the Plan Team(s) and recommendations for future model runs will be vetted by the SSC in June. During the summer months, the stock assessment authors will run the selected models and will present preliminary results to the Plan Team(s) in September. The Plan Teams will then select their preferred suite of models for October SSC review based on model performance. The authors can reserve the right to bring forward additional models for the final SAFE as needed.

SSC Recommendations to the assessment author:

- Evaluate incorporating age conditioned on length rather than age composition and mean size-at-age.
- Evaluate the use of informative priors on selectivities to alleviate convergence problems and constrain selectivity parameters to preserve a reasonable shape
- Exclude fishery age composition data unless a reasonable spatial distribution of samples becomes available.
- The IPHC survey does not appear to inform the model and should be removed.
- Evaluate spatial temporal variation in Fishery CPUE trends for next year (time permitting).

The SSC has identified the following research priorities for Pacific cod:

1. Catchability estimation, including a comparison of net efficiencies between the Bering Sea and Gulf of Alaska survey gear.
2. Estimation of natural mortality independent of the model
3. Recruitment dynamics to better understand the factors that result in strong recruitment events.

BSAI Pacific Cod

There were a number of new data added to inform the BSAI Pacific cod model including: 1) revised catch data for 1991-2008, preliminary catch data for 2009 and accompanying commercial fishery size composition data; 2) 2009 EBS shelf bottom trawl survey numeric abundance estimate with accompanying size composition data, 2008 EBS shelf bottom trawl survey age composition data and 1994-2008 EBS shelf bottom trawl survey mean length at age data; 3) 2008 January-May longline fishery age composition data and mean length at age data; 4) updated variances in the ageing error matrix; 5) updated 2008 seasonal catch per unit effort (CPUE) data for the trawl, longline, and pot fisheries, and preliminary 2009 catch rates for the trawl, longline, and pot fisheries; 6) 2008 International Pacific Halibut Commission (IPHC) longline survey Pacific cod catch rate; and 2009 IPHC longline survey size composition data.

The overall population trend in the near future appears positive. The 2009 EBS shelf-bottom trawl survey biomass estimate was 421,000 t, up 4% from 403,000 t and the numeric abundance estimate of 717 million fish was up about 50%. The 2006 year class, which appeared exceptionally strong in the 2008 survey, still appears to be above average, but survey estimates of this year class are 30% lower than last year's model predictions. The 2008 year class appears to be very large, though it has been observed only once.

The SSC was presented with a suite of fourteen alternative models for the BSAI that were stepwise modifications of the reference model adopted for last year's specifications. The models were classified into three groups. Models without mean size-at-age include three versions (A1, A2, and A3) of the 2008 model accepted for use by the Plan Team and SSC last year, differing only with respect to the amount of age composition data included. Models that incorporate mean size-at-age and age composition data include five models (B1, C1, D1, E1 and G1) with model configurations and features requested by the Plan Team, SSC, and the public. The last group of models (B2, D2, E2, and G2) was fitted to the length composition data only; however, models in this group included mean size-at-age. The revised reference model (B1 and its variants) estimated cohort specific growth and included a bias adjustment term of 0.4 years at all ages added to the internal ageing error matrix. Other features include: 1) the product of survey catchability and selectivity averaged over the 60-81 cm length range was required to equal 0.47, based on archival tag data on vertical distribution; 2) no selectivity deviations were estimated for the last two surveys, so those schedules used the expected values 3) the standard deviation of size at age was estimated externally. The author selected a final model based on these criteria: 1) inclusion of age composition data as requested by the Plan Team and the SSC; 2) the response to various requests such as the correction of age reading bias and cohort-specific growth; and 3) statistical fit to the data. Using these criteria, model B1 (from group 2) was selected as the preferred model, primarily because it included age data and had the best fit.

The SSC agrees with the Plan Team choice of model B1 for assessment of the BSAI Pacific cod stock. The BSAI stock qualifies for management under Tier 3b, because projected biomass for 2010 is below $B_{40\%}$. **The SSC agrees with this Tier designation and recommends setting the 2010 BSAI ABC at 174,000 t, which is the maximum permissible. ABC is projected to increase to 214,000 t in 2011. The corresponding BSAI OFL levels under Tier 3b for 2010 and 2011 (FOFL=0.29) are 205,000 t and 251,000 t, respectively.**

GOA Pacific Cod

A considerable amount of new data was added to inform the GOA Pacific cod model including: 1) catch data for 1991-2008 were updated, and preliminary catch data for 2009 were incorporated; 2) commercial fishery size composition data for 2008 were updated, and preliminary size composition data from the 2009 commercial fisheries were incorporated; 3) age composition and mean-size-at-age data from the 2007 bottom trawl survey were incorporated into some models; 4) age composition data and mean size at age data from the 2008 January-May longline fishery were incorporated into some of the models; 5) size composition data from the 2009 bottom trawl survey and the numeric abundance estimate from the 2009 GOA bottom trawl survey was incorporated; 6) the variances in the ageing error matrix were updated in all of the models that use age data, and possible biases in age data were corrected for in some of the models that use age data; 7) seasonal catch per unit effort (CPUE) data for the trawl, longline, and pot fisheries from 2008 were updated, and preliminary catch rates for the trawl, longline, and pot fisheries from 2009 were incorporated.

Similar to the BS Pacific cod stock, projections of the population trend in the near future appears positive. The 2009 trawl survey estimate of 574 million fish was up about 199% from the 2007 estimate. Spawning biomass was projected to increase dramatically in subsequent years due to a number of young year classes in the population.

The SSC was presented a suite of ten alternative models for the GOA that were stepwise modifications of the reference model adopted for last year's specifications. The models were classified into three groups. The first group of models was the same as the 2008 model configuration, differing only with respect to treatment of age composition data (Models A1-A4). The second group of models incorporated mean size-at-age and age composition data include three models (B1, D1, and E1). This group of models includes model configurations and features requested by the Plan Team, SSC and the public. The last group of models (B2, D2, and E2) were fitted to the size composition data only, however included mean size-at-age. The revised reference model (B1 and its variants) estimated cohort specific growth and included a bias term of 0.4 years at all ages added to the internal ageing error matrix. Other features include: 1) the product of survey catchability and selectivity averaged over the 60-81 cm length range was required to equal 0.47, based on archival tag data on vertical distribution; 2) no selectivity deviations were estimated for the last two surveys, so those schedules used the expected values 3) the standard deviation of size at age was estimated externally. The author selected a final model based on these criteria: 1) inclusion of age composition data as requested by the Plan Team and the SSC; 2) the response to various requests such as the correction of age reading bias and cohort-specific growth; and 3) statistical fit to the data. Using these criteria, model B1 (from group 2) was selected as the preferred model, primarily because it included age data and had the best fit.

The model (B1) estimate of GOA spawning biomass is projected to be above $B_{40\%}$, which indicates that this stock qualifies for management under Tier 3a. This is a change from the 2008 assessment when the Tier designation was 3b. **The SSC agrees with revised Tier designation, the Plan Team choice of model B1, and recommendations setting the 2010 ABC at 79,100 t, which is the maximum permissible. ABC is projected to increase to 97,900 t in 2011. The corresponding OFL levels under Tier 3a (F_{OFL}=0.60) are 94,100 t and 116,700 t, respectively. The SSC agrees with the area apportionment of the ABC to the west, central, and eastern management areas of the Gulf as follows:**

Year		Western	Central	Eastern	Total
2010	ABC	27,685	49,042	2,373	79,100
2011	ABC	34,265	60,698	2,937	97,900

Sablefish

Diana Stram (NPFMC) and Jim Ianelli (NMFS-AFSC) presented the GOA plan team report and recommendations for sablefish. Public testimony from Mark Maunder (Quantitative Resource Assessment) provided a written review of the sablefish assessment and requested that his comments and suggestions be considered during the workshop planned for 2010. Gerry Merrigan (Prowler Fisheries) commented that he believes sperm whale depredation is affecting the survey catch. He also requested that the authors consider treating the incidence of whale depredation differently between the survey and the fishery. The survey does not have the ability to actively avoid whales while the fishers can alter their grounds to reduce encounters with whales. He also commented that whale depredation may be underestimated in the fishery because observers only record killer whale depredation and sperm whale depredation is currently not recorded. Paul MacGregor (representing himself), commented that whale depredation has been an issue for many years. He noted that the Japanese longline association tried to reduce depredation using electricity and found that this method had many safety issues that prohibited its use. Rhonda and Jim Hubbard (Marketer and Fisherman), commented that historical quotas may have been set artificially low to limit the transfer of unused quota to foreign fleets (Japanese). Ms. Hubbard noted that sablefish fishers are hoping to preserve the resource for future generations as evidenced by their recent application for MSC certification. She noted that she is not opposed to lowering quotas when necessary because managers are doing their job. She would like to see more outreach and encouraged the author to have open meetings. She also noted that the fleet doesn't like to fish in spring because of high

numbers of small fish and confirmed that whale depredation definitely occurs, but the fishery tries to avoid them and recommends that the Council considers allowing avoidance measures.

This year's model was unchanged from the model used last year and was updated with information from surveys and fishery. **The SSC agrees with the author's recommendation for Tier 3b management for sablefish. The SSC accepted the author's and the Plan Team's recommendations for ABC and OFL for 2010/11 for sablefish and the recommended apportionments below.** Specific SSC comments on the assessment follow.

SSC recommended ABC and OFL for sablefish (tons)

Area	2010 OFL	2010 ABC	2011OFL	2011 ABC
BS	3,310	2,790	2,970	2,500
AI	2,450	2,070	2,200	1,860
GOA	12,270	10,370	11,008	9,300
W		1,660		1,488
C		4,510		4,042
WYAK		1,620		1,450
SEO		2,580		2,320
Total	18,030	15,230	16,176	13,658

The SSC agrees with the authors' recommendation to use last year's model configuration updated with recent data. The model was updated with relative abundance and length data from the 2009 longline survey, relative abundance and length data from the 2008 longline and trawl fisheries, age data from the 2008 longline survey and longline fishery, and biomass and length data from the 2009 NMFS GOA bottom trawl survey.

SSC recommendations to the Sablefish assessment author

In 2009, evidence of killer whale depredation was recorded for 10 out of 16 Bering Sea stations of the NMFS longline survey. The authors explored several methods to correct for this high level of depredation and none worked to his satisfaction. Therefore, they treated 2009 as if no survey had occurred in the region and estimated the Bering Sea portion of the stock by multiplying the survey estimate from the last year the Bering Sea was sampled (2007) by the ratio of change from the Gulf of Alaska survey (2007-2009). The SSC agrees with this approach for this year's assessment. However, they note that this is not a long-term solution to the problem of depredation in the Bering Sea. The SSC encourages the authors to continue to explore statistical and modeling approaches that will take advantage of the full data set to interpolate depredated stations. The SSC recommends that the authors explore alternative survey methods and evaluate if these methods may be less susceptible to whale depredation.

The SSC realizes that developing a reliable index of sperm whale depredation may be difficult, but this remains an important concern for this assessment because it could influence the reliability of longline survey catch rates as an index of abundance trends.

While gully stations are sampled during the survey, the catch rates used in the model do not include gully stations. Gully stations may provide information on juvenile sablefish. The authors examined the trends in gully stations and the slope stations to see if the gully stations portrayed a different pattern than the RPNs used in the assessment. The trends were similar in both datasets; however, the correlation was not high. The authors found some evidence that the gully stations may provide information on incoming year classes of sablefish. The SSC encourages the authors to continue to explore the information content of the gully stations especially with respect to estimating incoming year classes.

The authors also compared sablefish catch rates from the IPHC longline survey to the catch rates from the sablefish longline survey. The two time series were comparable although the IPHC survey was more variable. The SSC encourages the authors to continue to explore whether sablefish catch rates from the IPHC survey could be used to provide additional information to the assessment. In particular, the SSC

recommends that the authors work with the IPHC to determine whether the IPHC survey data could be used to fill in CPUE in areas missed by the NMFS sablefish survey.

The time trend in the domestic longline fishery CPUE continues to be different from the surveys. The SSC continues to be concerned that inclusion of the longline fishery CPUE as an index of population status may not be appropriate. It is possible that this index does not reflect population trends because the fleet targets high density regions that would exhibit relatively constant CPUE rates across time. The authors indicated that they will examine the implications of dropping this index and the SSC supports that analysis.

Results of the assessment show that there have been no strong year classes of sablefish since 2000. This is the longest period without a strong year class in the time series. The 2000 year class will represent a large portion of the spawning biomass in the near future. The retrospective pattern that previously showed the assessment was overestimating sablefish abundance appears to have been improved in recent years. The SSC recommends that this retrospective pattern continue to be examined in the future.

The Authors noted that several model changes that were recommended by the CIE will be considered at a workshop in the spring of 2010. The SSC supports this approach to addressing model changes and recommends that a SSC member attend this meeting (Franz Mueter has volunteered to represent the SSC). The SSC reviewed the CIE comments and the author's responses that were contained in an Appendix to the SAFE. The SSC encourages work on each of the issues identified. In particular, the SSC highlights the need to address the following issues:

The authors should justify why both RPNs and RPWs are necessary in the model and why this does not constitute double weighting.

The SSC continues to encourage the development of a sablefish migration model. This model would provide improved estimates of exploitation by cohort and would provide a useful tool for area apportionments. They support the authors' plan to review the available tagging data to assess sablefish movement and to model apportionment.

The SSC noted that the report submitted by the public included a recommendation to consider shortening the time series. The SSC does not recommend dropping the early part of the time series but they do recommend exploring the use of temporal partitions to adjust for changes in the survey, exploitation, or biology of the stock.

GOA SAFE and Harvest Specifications for 2010/11

The SSC reviewed the information presented below in Table 1 and determined that none of these species were subjected to overfishing in 2008. Also, in reviewing the status of stocks with reliable biomass reference points (all Tier 3 and above stocks and rex sole) and the 2010/2011 ABC/OFL recommendations for these species, the SSC determined that these species are not considered overfished or approaching an overfished condition.

Table 1. GOA Groundfish Catch and OFL amounts (t) for 2008 for overfishing determinations.

Stock/assemblage	Area/District	OFL	Catch	Percent of Catch/ OFL
Pollock	W/C/WYK	72,110	51,721	72%
	SEO (650)	11,040	0	0%
Pacific cod*	GOA	88,660	58,712	66%
Flatfish (deep-water)	GOA	11,343	574	5%
Rex sole	GOA	11,933	2,706	23%
Flathead sole	GOA	55,787	3,446	6%
Flatfish (shallow-water)	GOA	74,364	9,727	13%
Arrowtooth flounder	GOA	266,914	29,293	11%
Sablefish	GOA	15,040	12,635	84%
Pacific ocean perch	Western	4,376	3,682	84%
	Central	9,717	7,678	79%
	Eastern	3,714	1,100	30%
	GOA Total	17,807	12,460	70%
Shortraker rockfish	GOA	1,197	662	55%
Rougheye rockfish	GOA	1,548	410	26%
Other rockfish	GOA	5,624	834	15%
Northern rockfish	GOA	5,430	4,060	75%
Pelagic shelf rockfish	GOA	6,400	3,648	57%
Thornyhead rockfish	GOA	2,540	747	29%
Big skates	GOA	4,439	1,424	32%
Longnose skates	GOA	3,849	1,156	30%
Other skates	GOA	2,806	1,550	55%
Demersal shelf rockfish	SEO	611	149	24%
Atka mackerel	GOA	6,200	2,113	34%
Total		665,642	198,027	

*Includes State managed Pacific cod fisheries

Table 2. SSC recommendations for GOA Groundfish 2010- 2011 OFLs and ABCs shown with the 2009 OFL, ABC, TAC, and Catch amounts (catches reported through November 7th, 2009 from AKR Catch accounting). Numbers in bold indicates where SSC recommendations differ from the Plan team recommendations.

Stock/ Assemblage	Area	2009 OFL	ABC	TAC	Catch	2010 OFL	ABC	2011 OFL	ABC
Pollock	W (61)		15,249	15,249	14,935		26,256		34,728
	C (62)		14,098	14,098	14,006		28,095		37,159
	C (63)		11,058	11,058	12,135		19,118		25,287
	WYAK		1,215	1,215	1,221		2,031		2,686
	Subtotal	58,590	41,620	41,620	42,297	103,210	75,500	135,010	99,860
	EYAK/ SEO	11,040	8,280	8,280		12,326	9,245	12,326	9,245
	Total	69,630	49,900	49,900	42,297	115,536	84,745	147,336	109,105
Pacific Cod	W		21,567	16,175	14,243		27,685		34,265
	C		31,521	23,641	23,380		49,042		60,698
	E		2,212	1,991	778		2,373		2,937
	Total	66,600	55,300	41,807	38,401	94,100	79,100	116,700	97,900
Sablefish	W		1,640	1,640	1,341		1,660		1,488
	C		4,990	4,990	4,780		4,510		4,042
	WYAK		1,784	1,784	1,774		1,620		1,450
	SEO		2,746	2,746	2,803		2,580		2,320
	Total	13,190	11,160	11,160	10,698	12,270	10,370	11,008	9,300
Deep-water Flatfish	W		706	706	8		521		530
	C		6,927	6,927	428		2,865		2,928
	WYAK		997	997	4		2,044		2,089
	EYAK/SEO		538	538	2		760		778
	Total	11,578	9,168	9,168	442	7,680	6,190	7,847	6,325
Shallow-water flatfish	W		26,360	4,500	96		23,681		23,681
	C		29,873	13,000	8,195		29,999		29,999
	WYAK		3,333	3333	1		1,228		1,228
	EYAK/SEO		1,423	1,423			1,334		1,334
	Total	74,364	60,989	22,256	8,292	67,768	56,242	67,768	56,242
Rex sole	W		1,007	1,007	342		1,543		1,521
	C		6,630	6,630	4,162		6,403		6,312
	WYAK		513	513	1		883		871
	EYAK/SEO		846	846			900		888
	Total	11,756	8,996	8,996	4,505	12,714	9,729	12,534	9,592
Arrowtooth Flounder	W		30,148	8,000	1,517		34,773		34,263
	C		164,251	30,000	22,813		146,407		144,262
	WYAK		14,908	2,500	56		22,835		22,501
	EYAK/SEO		12,205	2,500	52		11,867		11,693
	Total	261,022	221,512	43,000	24,438	254,271	215,882	250,559	212,719
Flathead Sole	W		13,010	2,000	303		16,857		17,520
	C		29,273	5,000	3,115		27,124		28,190
	WYAK		3,531	3,531			1,990		2,068
	EYAK/SEO		650	650			1,451		1,508
	Total	57,911	46,464	11,181	3,418	59,295	47,422	61,601	49,286
Pacific ocean perch	W	4,409	3,713	3,713	3,805	3,332	2,895	3,220	2,797
	C	9,790	8,246	8,246	8,027	12,361	10,737	11,944	10,377
	WYAK		1,108	1,108	1,147		2,004		1,937
	SEO		2,044	2,044	1		1,948		1,882
	E(subtotal)	3,741	3,152	3,152	1,148	4,550		4,396	
	Total	17,940	15,111	15,111	12,980	20,243	17,584	19,560	16,993
Northern	W		2,054	2,054	1,946		2,703		2,549

Stock/ Assemblage	Area	2009 OFL	ABC	TAC	Catch	2010 OFL	ABC	2011 OFL	ABC
rockfish[3]	C		2,308	2,308	1,942		2,395		2,259
	E								
	Total	5,204	4,362	4,362	3,888	6,070	5,098	5,730	4,808
Rougheye	W		125	125	80		80		81
	C		833	833	100		862		869
	E		326	326	100		360		363
	Total	1,545	1,284	1,284	280	1,568	1,302	1,581	1,313
Shortraker	W		120	120	151		134		134
	C		315	315	192		325		325
	E		463	463	207		455		455
	Total	1,197	898	898	550	1,219	914	1,219	914
Other slope[3]	W		357	357	401		212		212
	C		569	569	385		507		507
	WYAK		604	604	82		273		273
	EYAK/SEO		2,767	200	11		2,757		2,757
	Total	5,624	4,297	1,730	879	4,881	3,749	4,881	3,749
Pelagic Shelf rockfish	W		819	819	716		650		607
	C		3,404	3,404	2,143		3,249		3,035
	WYAK		234	234	177		434		405
	EYAK/SEO		324	324	1		726		680
	Total	5,803	4,781	4,781	3,037	6,142	5,059	5,739	4,727
Demersal rockfish	Total	580	362	362	137	472	295	472	295
Thornyhead Rockfish	W		267	267	230		425		425
	C		860	860	275		637		637
	E		783	783	152		708		708
	Total	2,540	1,910	1,910	657	2,360	1,770	2,360	1,770
Atka mackerel	Total	6,200	4,700	2,000	2,221	6,200	4,700	6,200	4,700
Big Skate	W		632	632	68		598		598
	C		2,065	2,065	1,656		2,049		2,049
	E		633	633	87		681		681
	Total	4,439	3,330	3,330	1,811	4,438	3,328	4,438	3,328
Longnose Skate	W		78	78	62		81		81
	C		2,041	2,041	880		2,009		2,009
	E		768	768	175		762		762
	Total	3,849	2,887	2,887	1117	3,803	2,852	3,803	2,852
Other skates	Total	2,806	2,104	2,104	1,007	2,791	2,093	2,791	2,093
Other Species	Total	8720	6,540	4,500	2,327	9,432	7,075	9,432	7,075
Total		632,498	516,055	242,727	163,382	693,253	565,499	743,559	605,086

GOA General Comments

The methods for area apportionment of the ABC that are used in the specific chapters are different from those given in the general introductory material to the SAFE on page 4. The SSC suggests that the table be updated. Also, a different number of years are used for various species (e.g., 5 years for sablefish, 4 years for pollock, 3 surveys, most recent survey). SSC members recall extensive discussions about these issues but the rationale for the decision is not given in the SAFE chapters. The SSC suggests that description of the apportionment rationale in each SAFE chapter of area-apportioned species would be helpful to the reader.

GOA Pollock

This assessment is a straightforward update of last year's assessment with new fisheries and survey data from 2008 and 2009. The estimate of biomass from the 2009 NMFS bottom trawl survey more than doubled from the 2007 estimate, and the 2009 ADFG survey biomass increased by 43% over the 2008 estimate. Winter spawning surveys in Shelikof Strait, the Shumagin Islands, and near Sanak also increased but remained near historically low levels. Large increases in trawl survey biomass estimates were evident at most size classes, suggesting increased availability of pollock to the surveys in 2009. This increase was not reproduced in the best model, which substantially underestimated the 2009 survey biomasses. The projected age 3+ biomass in 2010 increased to 756,550 t (female spawning biomass: 184,567 t) with a negligible probability that spawning biomass will fall below $B_{20\%}$.

The GOA pollock model has undergone extensive review and its performance has been assessed in a Management Strategy Evaluation (Dr. T. Amar's PhD dissertation). The SSC believes that the model continues to provide an appropriate basis for determining reference points for management. As in previous assessments, catchability for the NMFS bottom trawl survey was fixed at 1 as a precautionary measure. For added precaution, the SSC has previously endorsed the constant buffer approach recommended by the authors and Plan Team, which reduces ABC from the maximum permissible. As a further precautionary measure, the author and Plan Team recommend fixing the recruitment of the 2007 year class at the average recruitment for this year's projections, in spite of early indications (from one year of survey data) that the 2007 year class is 1.7 times the average. In this instance, because of previous instances where a large year class was initially estimated but failed to materialize (presumably as a consequence of predation by arrowtooth flounder), and because of the low biomass estimates from EIT surveys the SSC concurs with the proposed approach.

As in past years, the SSC recommends that this stock be managed under Tier 3. Spawning biomass is below $B_{40\%}$, placing the stock in Tier 3b. Therefore the SSC agrees with the projected ABC and OFL levels by area as summarized below (after subtracting 1,650t pollock GHL in Prince William Sound). For area EYAK/SEO, the calculations are done using Tier 5 methodology using natural mortality and survey biomass from the last available bottom trawl survey in 2009.

SSC recommendations for 2010 and 2011 GOA walleye pollock ABC and OFL (t)

	2010		2011	
Area	**OFL**	**ABC**	**OFL**	**ABC**
W (610)		26,256		34,728
C (620)		28,095		37,159
C (630)		19,118		25,287
WYAK		2,031		2,686
Subtotal	103,210	84,745	135,010	109,105
EYAK/SEO	12,326	9,245	12,326	9,245
Total	115,536	93,990	147,336	118,350

The SSC notes that there are numerous precautionary measures built into the assessment that, when taken together, reduce the recommended ABC to approximately half of the model point estimate. When ACL measures are revised for groundfish stocks, these elements of precaution need to be re-evaluated to develop a consistent approach to dealing with uncertainty across stocks.

The GOA Plan Team requested SSC input on the value of the FOCI work to the management of the GOA pollock stock. The SSC believes that the enormous amount of knowledge that has been gained from the FOCI work is currently underutilized. It can and should be incorporated more fully into the stock assessment. The SSC urges the FOCI group to work with the assessment authors to incorporate suitable predictors of recruitment into the assessment model to evaluate their performance retrospectively and to eventually provide future recruitment trajectories for management strategy evaluations, and assessments of the possible impacts of future climate variability on GOA walleye pollock.

Recommendations to assessment authors:

The SSC concurs with the GOA plan team recommendations for the next assessment (see GOA PT minutes). In particular, the SSC encourages the author to (1) re-evaluate data input sample sizes for the multinomial and other likelihood components and (2) model age-1 abundances to potentially improve recruitment estimates. In addition, the SSC requests that the authors address the following concerns in next year's assessment:

- The authors should re-evaluate survey catchability. The catchability coefficient appears to be well estimated in the model and a 95% confidence interval for q based on the likelihood profile (Fig. 1.20) does not include 1. Therefore, we request that the authors bring forward results from a model that estimates q for next year's assessment. Indications from this year's survey that fish may have been more available to the survey due to environmental conditions suggests that including an environmental covariate in the estimation of q may prove useful, similar to the flatfish assessments and previous pollock assessments in the EBS.
- Changes in condition or weight-at-age of walleye pollock over time should be evaluated to help identify the relative importance of bottom-up vs. top-down forcing on walleye pollock.

GOA Atka mackerel

Atka mackerel in the Gulf of Alaska have been managed as a Tier 6 stock since 1996 because the biomass estimates are considered unreliable for Tier 5 management. In fact, the coefficient of variation of the Gulf-wide assessment for Atka mackerel was 83% in 2009. This is due in large part to a patchy distribution, with the greatest concentrations in the Shumagin Island area.

The SSC appreciates the information provided in the stock assessment on potential stock structure in relation to the BSAI stock, based on our request for exploration of this issue in 2008. Given the significant differences in population size, distribution, recruitment patterns, and resilience noted by the stock assessment authors, we support the continued separation of assessment and management of GOA and BSAI stocks as prudent.

The SSC agrees with the Plan Team and stock assessment authors for continued management of GOA Atka mackerel in Tier 6, as well as their recommendations for ABC = 4,700 t and OFL = 6,200 t for both 2010 and 2011.

GOA Flatfishes

All of the flatfish stocks in the GOA were given full assessments, updated with trawl survey data from 2009 and age and size composition data that were available. **The SSC concurs with assessment authors' and Plan Teams' recommendations for 2010/2011 OFL and ABC and area apportionments for GOA flatfishes as noted in Table 2.** Details of assessments by stock and recommendations to assessment authors follow.

The deep water flatfishes were assessed under the same tiers as used in the 2007 assessment, with Dover sole in Tier 3a and Greenland turbot and deepsea sole in Tier 6. Selectivity scaling functions for males were attempted for the Dover sole model, although the base model from 2007 was selected by the assessment authors and Plan Team for managing this stock. The SSC concurs with the Plan Team recommendation to investigate survey biomass estimates and natural mortality rates for Greenland turbot and deepsea sole with hopes of moving these species into Tier 5 during the next assessment. The SSC would also like to see ADF&G trawl survey data incorporated into the Dover sole assessment during the next assessment cycle.

Assessments of the shallow water flatfishes and arrowtooth flounder were similar to those from 2007, with data updated through 2009. Northern and southern rock sole are assessed at Tier 4 and other shallow water flatfish at Tier 5. Arrowtooth flounder are assessed at Tier 3a.

Although scaling parameters for male fishery and survey selectivity were attempted in the assessment model for rex sole in 2009, this feature was not utilized in the final preferred model. The base model from 2007 was used for the 2009 assessment. The estimation of fishery selectivity continues to be problematic in determining reference points for this stock. The assessment authors took prior SSC advice and applied the maturity schedule for females as the fishery selectivity in the model and calculated what appear to be reasonable estimates of OFL and ABC using Tier 3a. However, the Plan Team noted and the SSC concurred that the estimate of $F_{40\%}$ and $F_{35\%}$ were not reliable and therefore recommended using the Tier 5 calculations for OFL and ABC using the model estimate of biomass. The $F_{40\%}$ estimate derived from the model had an extremely large standard error due to the fishery taking primarily large fish and sensitivity of the model to the estimate of the age at 50% selection by the fishery. The SSC notes that the estimate of $B_{40\%}$ from the model was reliably estimated and could be used to determine the status of this stock.

Scaling parameters for male fishery and survey selectivity were utilized by the authors in the assessment model in 2009 for flathead sole, but this feature was not accepted by the Plan Team in the final preferred model. The base model from 2007 was used for the 2009 assessment. Flathead sole are assessed at Tier 3a.

SSC recommendations for GOA flatfish OFL and ABC for 2010 and 2011 (t)

Stock	Tier	2010 OFL	2010 ABC	2011 OFL	2011 ABC
Deep water flatfish	3a,6	7,680	6,190	7,847	6,325
Shallow water flatfish	4,5	67,768	56,242	67,768	56,242
Rex sole	5	12,714	9,729	12,534	9,592
Arrowtooth flounder	3a	254,271	215,882	250,559	212,719
Flathead sole	3a	59,295	47,422	61,601	49,286

SSC recommendations for flathead sole assessment authors:

- The SSC concurs with the Plan Team recommendations for further analysis of the selectivity functions and for an additional review of the new assessment model during the next year.
- It was not clear to the SSC that the new model fitted the survey biomass data very well based on Table 8.15 of the SAFE document. In addition to such a table, the SSC would like to see a graph of the biomass estimates from the new and base model with confidence intervals (or SE's) plotted along with the survey biomass to allow better visual assessment of the model fits.

GOA Pacific ocean perch

The Pacific ocean perch stock assessment is based on the same base model as in the previous assessment cycle (2007, 2008), but with alternative configurations designed primarily to test the effect of modifications to selectivity functions. Changes to input data include new biomass estimates from the 2009 survey, new survey and fishery age compositions, new catch estimates, and updated historic data.

The stock assessment authors have been troubled by model estimates of catchability that have been drifting upwards from 1.7 beginning in 2003 when the model was first implemented to over 2 in recent years. They have also been concerned with poor fit to fishery age composition data. In response, the authors have investigated the effect of modeling selectivity separately for 3 periods that reflect operational differences in the fishing industry:

1. 1961-1976, during the foreign fishery when the age composition was likely to be more pristine with a larger proportion of older fish,
2. 1977-1995, during the conversion to a domestic fleet, but still dominated by large factory trawlers that towed deep and farther from port, and

3. 1996-present, a period with smaller catcher boats, semi-pelagic trawling, and fishing cooperatives.

The new selectivity functions for these periods are logistic, averaged logistic-gamma, and gamma, respectively, to model a trend towards dome-shaped selectivity through time. This approach provided a more parsimonious model (fewer parameters) with improved fit, especially for the age composition data, while also providing a lower, more realistic estimate of catchability slightly below 2. While the new model results double the F35% and F40% levels, the authors note that the increased mortality is expected to occur in the middle of the age distribution, with lower mortality of older age classes.

The SSC supports the Plan team's recommendations to accept these changes, and we note that the approach taken is a nice blend of common sense and investigative modeling. **The SSC accepts the recommendations of the Plan team and the assessment authors that the stock is to be managed in Tier 3a with the current female spawning biomass level greater than B40%. The SSC agrees with the recommendation for OFL = 20,243 t in 2010 and 19,560 t in 2011, with ABC = 17,584 t in 2010 and 16,993 t in 2011. The SSC agrees with the area apportionments of ABC and OFL for both years to the western, central and eastern areas, as well as the eastern GOA split of the ABCs to the West Yakutat and Southeast Outside areas as given in the table below (amounts are metric tons).**

SSC recommendations for GOA POP ABC and OFL for 2010 and 2011 (t)

Year		Western	Central	Eastern	WYAK	SEO	Total
2010	ABC	2,895	10,737	--	2,004	1,948	17,584
2011	ABC	2,797	10,376	--	1,937	1,882	16,993
2010	OFL	3,332	12,361	4,550	--	--	20,243
2011	OFL	3,220	11,944	4,396	--	--	19,560

GOA Northern Rockfish

Two configurations of the model used in 2007 were evaluated for use in 2009. The first of these (model 1) simply used updated data, including new data from the biennial survey conducted in 2009. The second model configuration (model 2) used a more consistent method of assigning year-specific likelihood weights to the data components for fishery and survey age and size data. Model 2 provides a better balance to the fits of the size and age data than model 1 as well as a better fit to the survey biomass index time series.

The SSC appreciates the SAFE authors' efforts to improve the assessment by way of a more consistent method of assigning likelihood weights. While we continue to be concerned with the poor fit to the survey biomass data, particularly the high estimates obtained in many of the recent years (1999, 2001, 2005, and 2007), we recognize the good fit to data from survey years with low survey biomass.

The SSC accepts the Plan Team and authors' estimate of spawning biomass = 34,790 t in 2010, above $B_{40\%}$ = 24,550 t, and therefore agree with the recommendation to continue with Tier 3a management. The SSC agrees with the recommendation for OFL = 6,070 t in 2010 and 5,730 t in 2011, with ABC = 5,100 t in 2010 and 4,810 t in 2011. The SSC agrees with the geographic apportionment of the ABC for 2010 as 2,703 t to the Western Gulf and 2,395 t to the Central Gulf, and for 2011 as 2,549 t to the Western Gulf and 2,259 t to the Central Gulf.

SSC recommendations for GOA Northern Rockfish ABC and OFL for 2010 and 2011 (t)

Year		Western	Central	Eastern	WYAK	E. Yak/SE	Total
2010	ABC	2,703	2,395	2	--	--	5,100
2011	ABC	2,549	2,259	2	--	--	4,810
2010	OFL	--	--	--	--	--	6,070
2011	OFL	--	--	--	--	--	5,730

SSC Comments to the GOA Northern rockfish stock assessment authors

The SSC looks forward to seeing the new maturity data that has recently become available for this species and the impact on incorporation of those data into the assessment model next year. The SSC agrees with the authors' suggestion to expand the plus group age category from 23 years to at least 30 years, noting that a substantial proportion of the assessed stock appears to be in the current plus age group.

GOA Shortraker/Other slope rockfish

New information in the Shortraker and Other Slope rockfish assessments includes the biomass estimates from the 2009 trawl survey. The authors used the same assessment methodology as in past assessments for shortraker rockfish and "other slope rockfish".

Shortraker rockfish are managed as a Tier 5 species. Shortraker could be managed as a Tier 4 species but due to uncertainty in obtaining reliable ages, the authors recommend that this stock be managed as a Tier 5 species.

The other slope rockfish complex is composed of 15 rockfish species. As in previous years, a Tier 4 designation is used for sharpchin, and a Tier 5 designation is recommended for redstripe, harlequin, silvergray, redbanded, and other minor rockfish species.

The SSC accepts the proposed Tier designations for shortraker rockfish and other slope rockfish harvest specifications. The SSC also accepts the authors and Plan Team recommendation for managing shortraker rockfish separately from the remaining other slope rockfish complex. The SSC accepts the authors' and Plan Team recommendations for ABC and OFL, and the associated area apportionments of the ABC for shortraker rockfish and other slope rockfish for 2010 and 2011 (Table 2).

Since 2003, the biomass of silvergray rockfish has declined from 51,916 t to 9,851 t. The silvergray rockfish population resident in waters off the state of Alaska is at the northern end of the range for this species. Therefore, biomass fluctuations may represent shifting proportions of the stock available in waters off southeast Alaska. It does not appear that the fluctuations are due to fishing mortality because the catch of silvergray rockfish has been well below the ABC.

The trawl survey biomass estimates of harlequin rockfish have varied widely. Since 2005, the NMFS trawl survey biomass estimates of harlequin rockfish dropped from 33,125 in 2005 t to 2,686 t in 2009. The biomass estimate used to estimate the ABC and OFL is computed by weighting the most recent 3 surveys giving a progressively heavier weight to the more recent surveys using factors of 4, 6, and 9. In 2011, the high 2005 biomass estimate will drop out of the time series. The SSC notes that the recent catches of harlequin rockfish would have approached the single species ABC if the stock had not been managed in a complex. In addition, the authors commented that the estimate of M for harlequin remains uncertain.

SSC recommendations to shortraker/Other slope rockfish assessment authors

The SSC requests that the authors review the time trends for silvergray rockfish to assess whether recent declines are a conservation concern. The age data for silvergray rockfish ends in 1999. The SSC encourages the authors to request age determinations for silvergray rockfish collected in recent years to assess whether declines are due to recruitment failure or shifting spatial distributions.

The SSC requests that the author reviews the current harvest of harlequin rockfish to determine whether the current harvest strategy is sustainable for this species.

GOA Rougheye Rockfish

The rougheye rockfish complex consists of rougheye rockfish and blackspotted rockfish, which are assessed in aggregate using a single age-structured stock assessment model. The new data added to this model included: the updated estimates of 2007-2009 fishery catch, 2004 and 2006 fishery ages, 2007 fishery length compositions, 2009 trawl survey biomass estimate, 1987 and 2007 trawl survey age compositions, 2008-2009 longline survey relative population weights, and 2008-2009 longline survey size compositions. The assessment authors considered different methods to estimate the proportion of rougheye rockfish and blackspotted rockfish caught in the years 1993-2004. They concluded that estimation based on observer data may provide a more accurate estimate of the true proportion of RE/BS catch than the proportion based on the blend estimates. The SSC agrees that it was reasonable to use of the observer data to reconstruct the rougheye and blackspotted catch.

The assessment methodology is very similar to the 2007 model. This year the authors considered two model configurations: Model 1 was identical to last year's model updated with new data, Model 2 was identical to Model 1 except a CV of approximately 30% is implemented for the earlier part of the catch time series (1977-1992) where catches are not as well known, while a CV of 5% was used for the rest of the time series. As determined in the 2007 SAFE appendix analysis, the increased weight on the catch time series allows for increased robustness of the model to weighting sensitivity. The author's preferred model was Model 2. The SSC agrees with the authors and recommends using Model 2 for estimating 2010 and 2011 harvest specifications.

The SSC accepts the authors and Plan Teams proposed 2010/2011 ABC and OFL specifications for the rougheye complex and their proposed area apportionments for the ABC (Table 2).

SSC Comments to the rougheye rockfish stock assessment authors and Plan Team:
The SSC repeats its earlier request that the assessment authors bring forward separate models for the two rockfish species. The SSC recognizes that a key step towards the development of a split species model is the improvement in the accuracy of species identification by NMFS survey scientists and observers. A high priority should be placed on improving species identifications for rougheye and blackspotted rockfish through improvements in observer training and field identification guides (e.g., continued refinement of the species ID pamphlet that came out of Orr and Hawkins 2008 work).

The SSC agrees that currently using a mixed species model does not pose a conservation concern because directed fisheries are prohibited, and the incidental catch of rougheye and blackspotted rockfish remains well below the recommended ABC. However, the catch should be monitored to prevent overfishing. In particular, the authors should monitor the bycatch trends in the sablefish, halibut longline fisheries, and look for evidence of "topping off" in the POP fishery.

The SSC notes that the MCMC estimate of trawl survey q for the rougheye complex (0.381 Model 2) is considerably different than the q for dusky rockfish (0.911 Model 2). It would be useful to compare the model estimates of q for different species of rockfish and consider whether the estimates are reasonable.

As noted in the assessment, the rockfish pilot project may allow improved utilization of the rockfish quotas. The authors should continue to consider the impact of the rockfish pilot program on catch.

GOA Pelagic Shelf Rockfish

Pelagic shelf rockfish includes widow, yellowtail, and dusky rockfish. As in previous years, an age structured assessment was used to assess dusky rockfish. The authors and the Plan Team recommend that these species continue to be managed as a complex for 2010/2011. The authors estimate the reference points for the complex as the sum of species specific ABCs and OFLs for the members of the complex. Using this practice, ABCs for widow rockfish and yellowtail rockfish were estimated using a Tier 5

approach while a Tier 3 approach was used to for dusky rockfish. For the pelagic shelf rockfish assemblage, ABC and OFL for dusky rockfish are combined with ABC and OFL for widow and yellowtail rockfish. The SSC agrees with this approach to management of the Pelagic shelf rockfish complex.

This year the authors considered two model configurations for the dusky rockfish stock assessment: Model 1 was identical to last year's model updated with new data, Model 2 was identical to Model 1 except the catch time series was split into 2 time periods and different weighting schemes were applied to the two time periods. The author's preferred model was Model 2. New data for 2009 included updated 2008 fishery catch, estimated 2009 fishery catch, three new years of fishery ages (2003, 2005, 2006), 2007 survey ages, and 2009 survey biomass. As a result of the passage of GOA groundfish FMP Amendment 77, dark rockfish is no longer considered in the Pelagic Shelf Rockfish assessment. The SSC agrees with the determination of Tier 3a management for dusky rockfish. The SSC agrees with the author and recommends using Model 2 for estimating 2010 and 2011 harvest specifications for dusky rockfish.

The SSC supports the Plan Team and SAFE authors' recommendation for OFL and ABC levels for Pelagic shelf rockfish, as well as the area apportionments of ABC and OFL for both years (Table 2).

SSC Comments to the pelagic shelf rockfish stock assessment authors and Plan Team

The SSC notes that the MCMC estimate of trawl survey q for the rougheye complex (0.381) is considerably different from the q for dusky rockfish (0.911). It would be useful to compare the model estimates of q for different species of rockfish and consider whether the estimates are reasonable.

The Plan Team recommended reorganizing the complex to managing dusky rockfish as a single species group. They considered the implications of this action on management of widow and yellowtail rockfish and noted that one option would be to manage widow and yellowtail rockfish as part of the Other Slope rockfish complex. The SSC agreed that reorganization of the complex should be considered and noted that the option to manage widow and yellowtail rockfish as part of the other slope complex should be considered. The SSC notes that these changes could be assessed as part of consideration of assemblage membership that will occur in FMP amendments to implement the ACL requirements.

SSC recommendations to stock assessment authors

The authors continue to use the 1996 length weight data in the dusky rockfish assessment. The SSC requests that the authors examine length weight from more recent surveys to determine whether additional information could be added to the assessment.

GOA Demersal shelf rockfish

Demersal shelf rockfish biomass is estimated from a habitat-based stock assessment focused on yelloweye rockfish densities derived from visual line transects conducted from submersibles. A new density survey was conducted in the Eastern Yakutat area in 2009. New information for the biomass projections are average weights for 2009, reported by area from directed commercial landings and from incidental catch in the halibut fishery. Age data were added from Central Southeast Outside (2004) and Eastern Yakutat (2005). Exploitable biomass for 2010 (14,321 t) decreased 18% from 2009 (17,390 t).

As in previous assessments, the SSC agrees with authors and Plan Team to apply precautionary measures in establishing allowable harvests, including: 1) using the 90% lower confidence bound, and 2) using a harvest rate lower than maximum under Tier 4 by applying F=M=0.02 to survey biomass. The SSC agrees with the resulting OFL = 472 t and ABC = 295 t for both 2010 and 2011.

SSC recommendations to stock assessment authors

The SSC noted that the large decrease in biomass estimated for 2009 appears inconsistent with the life history and population dynamics of these long-lived rockfish species. The SSC urges the assessment authors to consider an age-structured model in the future, from which to conduct a comparison of biomass

estimation methods. A study of survey timing would also help to determine if density surveys conducted early in the summer are representative of those conducted later in the year. The SSC also looks forward to seeing confidence intervals for recreational removals, which the authors expect to provide next year. The authors should also consider reviewing and possibly improving upon estimates of recreational removals by private anglers in outside waters, since these data are likely to differ markedly from charter anglers.

GOA Thornyhead Rockfish

Assessment of this stock continued as described in 2007 with an update in biomass from the 2009 survey. Results of a recent age study confirmed that reliable aging of thornyheads is indeed difficult. Maximum age from the study was similar to past studies (85-100 years). **The SSC agrees with the Plan Team recommendations and continues to support the Tier 5 calculations. The SSC also concurs with the Plan Team recommendations for 2010/11 ABCs, OFLs, and area apportionments (Table 2)**

SSC recommendations to stock assessment authors

Despite the difficulties in aging these animals, the SSC continues to encourage development of an age structured assessment for shortspine thornyhead. The SSC also noted a minor typo on page 1118, paragraph 3 of the SAFE document where estimates of natural mortality rate do not have a leading zero (e.g., M = 0.7 where it should be M=0.07).

GOA Skates

The stock assessment for GOA skates was updated with 2009 bottom trawl survey data and catch data. The major change this year was a new method of estimating skate bycatch in the IFQ halibut fishery.

The SSC agrees with the Plan team recommendation to continue management of GOA skates under Tier 5 with the biomass estimated using the average of the 4 recent AFSC trawl surveys, and the assumption of M = 0.1 for the two major species, big and longnose skates, as well as the composite group of other skates in the genus *Bathyraja*.

The SSC agrees with the Plan Team's recommended 2010 and 2011 OFL = 4,438 t and ABC = 3,328 t for big skate and OFL = 3,803 t and ABC = 2,852 t for longnose skate based on Tier 5 calculations. The SSC also agrees with the recommended OFL = 2,791 t and ABC = 2,093 t for other skates in this complex. The SSC agrees with the distinct area apportionment of individual ABCs for Big Skates to the Western, Central, and Eastern Gulf of Alaska equal to 598 t, 2,049 t, and 681 t for both years. For longnose skates the ABC apportionments for the W, C and E GOA are 81 t, 2,009 t, and 762 t, respectively. The SSC accepts the rationale that a single OFL provides adequate precaution given the bycatch-only status of the current catches.

The new method of bycatch estimation used the IPHC halibut survey bycatch data to estimate skate bycatch in the commercial fishery and used only those survey stations with the highest one-third of halibut catch rates. The rationale for this approach is the expectation that most of the commercial effort in the halibut fishery is likely to be in the high CPUE areas. The plan team was uncomfortable with this new approach, noting that the impact on the estimate of skate bycatch, which is primarily taken in the halibut fishery, is to reduce that estimate by an order of magnitude.

In regards to the state waters directed fishery for skates, given the potential for localized harvests exceeding guideline catch limits, we encourage the implementation of effort control rules, such as trip limits.

SSC Comments to the GOA skate stock assessment authors

The SSC concurs with the plan team's request for an investigation of alternative methods of estimating skate bycatch in the commercial halibut fishery, to include stratification based on the geographic distribution of the commercial fishery, as well as depth and area stratification.

GOA Other Species

Aggregate OFL and ABC levels are set for the GOA Other Species management category, which include sharks, sculpins, squid, and octopus. Individual assessments need to be developed for each member of the Other Species category to contribute to a group total OFL and ABC. **The SSC agrees with the Plan Team to set the aggregate ABC and OFL for this category to 7,075 t and 9,432 t, respectively for both 2010 and 2011.** SSC comments on the individual assessments of the group members follow.

GOA Sharks

The shark assessment was updated with catch and survey data through 2009. Owing to changes in the Catch Accounting System, there were relatively minor changes in the estimated shark catches over 2003-2008. Also, this year's assessment included preliminary estimates of shark bycatch in IFQ halibut fisheries. The SSC concurs with the plan team and author that sharks should again be managed using Tier 6 criteria. However, Tier 5 may apply in the future, especially for spiny dogfish. As pending Annual Catch Limit (ACL) analyses will lead to separate specifications for shark species, Tier 5 should be considered at that time. The SSC accepts the Plan Team's recommendation of OFL = 1,276 t and ABC = 957 t for both 2010 and 2011 using the 1997-2007 base period. The modest increase in OFL and ABC from last year is due to the revised catch estimates in the Catch Accounting System.

SSC recommendations to stock assessment authors

First, the SSC supports the four plan team recommendations on p. 16 of the November 2009 Plan Team minutes concerning sport fish catches, halibut bycatch, observer data, and Tier 5, as well as the team's research recommendation on shark population structure on p. 16 of the GOA SAFE introduction. The SSC also recommends adding a research priority on the development of aging methods for Pacific sleeper sharks so that M and other life history parameters can be estimated for future assessments. The results of Rice's (2008) master's thesis on spiny dogfish, such as biomass estimates relative to virgin biomass, should be referenced in the chapter. His findings may be relevant to discussions about the difficulty using the NMFS biannual trawl survey to estimate dogfish biomass.

The SSC supports further development of both proposed methods to estimate shark bycatch in halibut fisheries reported in the Appendix. When completed, reconstructed historical estimates of shark catch should be added to the historical catch time series for sharks. There appears to be an error in Table AA2. The catch weight estimates for sleeper sharks do not fall within their reported confidence intervals. Based on comparisons with Table AA7, it appears that it is the catch weight estimates (not the confidence intervals) that are in error.

Finally, the SAFE chapter authors should consider shark bycatch in state-managed fisheries, such as salmon gillnets and groundfish longline fisheries for cod and sablefish. The authors should explore ways to extend bycatch estimates to the state-managed longline fisheries. For instance, the same approach used to extend halibut survey bycatches of sharks to the halibut fishery could perhaps be applied to ADF&G longline surveys for sablefish in Southeast Alaska. Regarding salmon fisheries, such an approach may be unlikely, but shark bycatch could at least be characterized by ADF&G area managers.

GOA Sculpins

The stock assessment for sculpins in the GOA indicates an increase in biomass in 2009. In general, the trawl survey estimates for the 7 most common species found in the Gulf have a relatively low CV (< 0.3 for each) such that the biomass estimates are considered reliable and appropriate for Tier 5 management. The SSC agrees with continuing Tier 5 management for this group and accepts the recommendation to base the biomass estimate on the average of the last 4 surveys. The plan team and stock assessment authors have recommended choosing the most conservative estimate of M as 0.19. The SSC agrees with this approach, recognizing that an alternative approach will be needed when ACLs are revised, and agrees with the determination of OFL = 6,328 t and ABC = 4,476 t in both 2010 and 2011.

GOA Squid

The stock assessment for GOA squid provided updated information based on new survey data; however, the stock assessment authors recognize that biomass estimates are unreliable for squids in the Gulf. For this reason, the SSC agrees with continuation of Tier 6 management based on the maximum catch in the 1997 to 2007 period. The 2010 and 2011 OFLs based on this period equates to 1,530 t with an ABC = 1,148 t for both 2010 and 2011.

SSC Comments to the GOA squid stock assessment authors:

In response to SSC requests to include seabirds in the assessment, the authors added a paragraph on seabirds under their Ecosystem Considerations section, but did not integrate seabirds into other sections. For example, the authors make a good argument for approaching squid bycatch from the aspect of potential impact to apex predators, and that a potential management priority may be to maximize prey availability during certain seasons for protected resources. In this context, the authors suggest that management of squid bycatch could be focused on pinniped and cetacean foraging areas, and we suggest this section could add protected seabirds such as albatross. A similar addition could be made under 'data gaps and research priorities'.

The graph of seabird diets is a good addition, and it highlights that for several groups of birds, squid comprise >50% of their diets. The authors could combine these seabird groups for general reference, since they are all in the family Procelaridae (tubenoses). Collectively, the Procelarids number approximately 30 million birds during summer, and thus constitute a large consumer group dependent on this resource. Note that jaegers should be dropped from this group, and additionally should be removed from the figures on diet composition (Fig. 8 in the GOA assessment).

GOA Octopus

Recognizing that biomass estimates are unreliable for octopuses in the GOA, the authors and plan team have recommended a continuation of Tier 6 management, based on a maximum catch in the base years of 1997 to 2007. The SSC agrees with this approach and recommend the 2010 and 2011 OFL = 298 t with the ABC for each year = 224 t.

SSC Comments for NOAA General Counsel

The SSC requests clarification on the level of economic activity that would exceed the threshold, defined as a "*minimal amount of sale*," for octopus to be considered an Ecological Component species.

The SSC reviewed the information presented in Table 3 and determined that none of these species were subjected to overfishing in 2008. Also, in reviewing the status of stocks with reliable biomass reference points (all Tier 3 and above stocks) and the 2010/2011 ABC and OFL recommendations for those stocks, the SSC determined that these stocks are not considered overfished and are not approaching an overfished condition.

Table 3. BSAI Groundfish Catch and OFL amounts (t) for 2008 for overfishing determinations.

Stock/Assemblage	Area	OFL	Catch	Percent of Catch/OFL
Pollock	Bering Sea	1,440,000	990,562	69%
	Aleutian Islands	34,000	1,278	4%
	Bogoslof	58,400	9	0%
Pacific cod*	BSAI	207,000	170,615	82%
Sablefish	Bering Sea	3,380	1,125	33%
	Aleutian Islands	2,890	894	31%
Atka mackerel	BSAI	71,400	58,088	81%
Yellowfin sole	BSAI	265,000	148,894	56%
Rock sole	BSAI	304,000	51,278	17%
Greenland turbot	BSAI	15,600	2,751	18%
Arrowtooth flounder	BSAI	297,000	21,884	7%
Flathead sole	BSAI	86,000	24,542	29%
Other flatfish	BSAI	28,800	3,624	13%
Alaska plaice	BSAI	248,000	17,376	7%
Pacific ocean perch	BSAI	25,700	17,436	68%
Northern rockfish	BSAI	9,740	3,287	34%
Shortraker rockfish	BSAI	564	166	29%
Rougheye rockfish	BSAI	269	213	79%
Other rockfish	BSAI	1,330	598	45%
Squid	BSAI	2,620	1,542	59%
Other species	BSAI	104,000	29,376	28%
TOTAL		3,205,693	1,545,537	48%

*Includes State managed Pacific cod fisheries

Table 4. SSC recommendations for BSAI Groundfish 2010-2011 OFLs and ABCs shown with the 2009 OFL, ABC, TAC, and Catch amounts (t) (2009 catches through November 7 from AKR Catch Accounting including CDQ). Numbers in bold indicate where SSC recommendations differ from the plan team recommendations.

Stock/ Assemblage	Area	2009				2010		2011	
		OFL	ABC	TAC	Catch	OFL	ABC	OFL	ABC
Pollock	EBS	977,000	815,000	815,000	810,052	918,000	813,000	1,220,000	1,110,000
	AI	34,000	28,200	19,000	1,282	40,000	33,100	39,100	32,200
	Bogoslof	58,400	7,970	10	9	22,000	156	22,000	156
Pacific cod	BSAI	212,000	182,000	176,540	163,587	205,000	174,000	251,000	214,000
Sablefish	BS	3,210	2,720	2,720	876	3,310	2,790	2,970	2,500
	AI	2,600	2,200	2,200	1,055	2,450	2,070	2,200	1,860
Atka mackerel	Total	99,400	83,800	76,400	72,274	88,200	74,000	76,200	65,000
	EAI/BS		27,000	27,000	26,433		23,800		20,900
	CAI		33,500	32,500	29,541		29,600		26,000
	WAI		23,300	16,900	16,300		20,600		18,100
Yellowfin sole	BSAI	224,000	210,000	210,000	103,808	234,000	219,000	227,000	213,000
Northern rock sole	BSAI	301,000	296,000	90,000	48,593	243,000	240,000	245,000	242,000
Greenland turbot	Total	14,900	7,380	7,380	4,284	7,460	6,120	6,860	5,370
	BS		5,090	5,090	2,074		4,220		3,700
	AI		2,290	2,290	2,210		1,900		1,670
Arrowtooth	BSAI	190,000	156,000	75,000	28,931	191,000	156,000	191,000	157,000

Stock/ Assemblage	Area	2009				2010		2011	
		OFL	ABC	TAC	Catch	OFL	ABC	OFL	ABC
flounder									
Flathead sole	BSAI	83,800	71,400	60,000	19,424	83,100	69,200	81,800	68,100
Other flatfish	BSAI	23,100	17,400	17,400	2,155	23,000	17,300	23,000	17,300
Alaska plaice	BSAI	298,000	232,000	50,000	13,698	278,000	224,000	314,000	248,000
Pacific Ocean perch	BSAI	22,300	18,800	18,800	14,780	22,400	18,860	22,200	18,680
	BS		3,820	3,820	623		3,830		3,790
	EAI		4,200	4,200	3,867		4,220		4,180
	CAI		4,260	4,260	3,879		4,270		4,230
	WAI		6,520	6,520	6,411		6,540		6,480
Northern rockfish	BSAI	8,540	7,160	7,160	3,087	8,640	7,240	8,700	7,290
Shortraker	BSAI	516	387	387	198	516	387	516	387
Blackspotted/ Rougheye	BSAI	660	539	539	194	669	547	650	531
Other rockfish	BSAI	1,380	1,040	1,040	586	1,380	1,040	1,380	1,040
	BS		485	485	193		485		485
	AI		555	555	393		555		555
Squid	BSAI	2,620	1,970	1,970	353	2,620	1,970	2,620	1,970
Other species	BSAI	80,800	66,700	50,000	26,653	88,200	61,100	88,100	60,900
Total	BSAI	2,638,226	2,208,666	1,681,546	1,315,879	2,462,945	2,121,880	2,826,296	2,457,284

General comment for Aleutian Islands stock assessments

The SSC notes that the Aleutian Island bottom trawl survey was last conducted in 2006. Several stocks in the Aleutian Islands are in Tier 5 and above. However, reliable biomass estimates are required in order to maintain Tier 5 and higher status. If the Aleutian Island bottom trawl survey is not conducted in 2010, this may jeopardize the current tier status of these stocks. Additionally, the bottom trawl survey is an important source of ecosystem information for this important region. Thus, the SSC places a high priority on conducting a survey in 2010.

EBS Pollock

Jim Ianelli (NMFS-AFSC) summarized the 2009 EBS pollock assessment. Grant Thompson (NMFS-AFSC) summarized the Plan Team deliberations on the pollock specifications. The SSC appreciates the concise presentations, which addressed all of the key issues important to the decision-making process.

Public testimony was received from the following individuals and groups (in order of appearance):

- George Pletnikoff (Greenpeace) highlighted the uncertainty in the current assessment and suggested that the ABC may be biased high, based on a review of the pollock stock assessment model by Dr. Steven Martell (UBC). He provided a written review document from Dr. Martell to the SSC. His recommendation was to manage the stock under Tier 3 with an ABC of 433,000 t.
- Ed Richardson (Pollock Conservation Cooperative) supported the author's model and the author and Plan Team recommended ABC under Tier 1b (813,000 t), suggesting that it was sufficiently conservative. He also cited anecdotal evidence that pollock moved onto the shelf much later in the year in 2009, which would affect their availability to both the EIT and bottom trawl surveys.
- Tim Thomas (American Seafood Company, on behalf of PCC) provided observations from the fishing fleet that fish showed up on the fishing grounds much later than usual (by about one month) and that very large numbers of young fish were present on the shelf during the B season.
- Dan Hanson (Arctic Storm Management Group) supported the Plan Team's recommendation to set ABC at the maximum permissible level. As captain of the Arctic Storm, he reported seeing large numbers of young pollock on the shelf during the 2009 B season.

- Jon Warrenchuk (Oceana) expressed concern about a declining trend in the B_0 reference point due to decreasing recruitment over time. He also stressed the importance of $B_{20\%}$ as an ecosystem reference point to provide a sufficient prey base for Steller sea lions throughout the year. He requested that a more complete evaluation of the chance of the stock falling below $B_{20\%}$ be included in stock assessments, preferably based on average recruitment. Specific suggestions were provided in written comments.
- Brent Paine (United Catcher Boats) recommended accepting the Plan Team recommendation for maximum permissible ABC under Tier 1 using the best estimate of recruitment for projections. He re-iterated the rationale that the Plan Team provided in favor of using the best estimate of recruitment rather than average recruitment for the 2006 year class.
- Donna Parker (Arctic Storm) also supported the recommendations of the Plan Team for maximum permissible ABC. She suggested that there is no scientific basis for reducing recruitment of the 2006 year class to average recruitment.

The assessment is an update of last year's assessment with the exception of allowing fishery age selectivity to change annually instead of biennially. New data included 2009 catch data and survey biomass from both the summer bottom trawl (BT) and hydroacoustic (EIT) data. The authors explored several new features in this year's model:

- Several alternatives were evaluated for the weight-at-age vector used in projections of future biomass. A three-year running average of weight-at-age had been used in previous assessments. Using retrospective analyses, the authors explored the use of covariates to predict weight-at-age anomalies (temperature, abundance, average date/location of catch), but found that a 10-year running average was the best predictor of future weight-at-age. Given that density-dependent and environmental influences on weight-at-age are likely to be present, this issue should be revisited when longer time series or better information on the factors controlling growth are available. The SSC concurs with the author and the plan team recommendation to use a 10-year running average of weight-at-age in projections of future biomass.
- The authors explored two alternatives for estimating the probability that future biomass drops below $B_{20\%}$ in 2010, noting that a more appropriate reference point for Tier 1 stocks would be the probability that the stock falls below 20% of B_0. Based on estimation uncertainty alone, the probability that the stock is below $B_{20\%}$ in 2010 is 18% and decreases thereafter. The authors suggested an alternative approach that evaluates the probability that the stock will be perceived as being below 20% of B_0 in future years. The SSC believes that this MSE-type approach, which calculates the probability that management measures will be triggered, is also useful information and encourages further development of this approach. Under a reasonable range of future catch levels, the results suggest a very low probability that spawning biomass will be below 20% of B_0 in 2011.
- The authors explored an alternative mortality schedule that scales natural mortality to body size based on ecological theory. Preliminary results of estimating M in this manner seem very promising and suggest that the currently used schedule is conservative by using a relatively low fixed mortality of M=0.3 for fish age-3 and older. The SSC encourages further explorations of this approach. However, for the current assessment, we concur with the author and Plan Team to use the same fixed mortality schedule used in previous assessments.
- Age selectivity in the fishery was previously estimated in 2-year blocks, but is allowed to change each year in this year's assessment. This resulted in an improved fit to fishery mean age data, which appear to be well estimated, at least in recent years, based on bootstrap confidence intervals. The SSC concurs with this change to the assessment model.

T**he SSC agrees with the author and Plan Team that the model is appropriate for recommending harvest specifications**. Because of concerns over low biomass levels, the Plan Team discussed whether EBS pollock should be managed under Tier 1 or Tier 3. The SSC determined in 1998 that EBS pollock qualify for management as a Tier 1 species, recognizing the quality of the data that are available to inform the assessment and the apparent stock-recruitment relationship that seems to be reasonably well approximated by a Ricker model. No new information was brought forward in the assessment or in the Plan Team minutes that would suggest that a Tier 1 designation is no longer appropriate. The SSC notes

that recent recruitments are well within the pattern of the current stock-recruitment relationship. **Therefore, we support continued management of EBS pollock under Tier 1.**

In response to concerns over the tier designations, the Plan Team made a general recommendation (i.e., not specific to the EBS pollock assessment) that a workshop be held, or a working group be formed, to develop guidance regarding how to decide when a stock qualifies for management under Tier 1. **The SSC suggests that the scope of such a workshop could be broadened beyond the narrow focus on Tier 1 designations.** In particular, such a workshop should be held in the context of revising ACL measures for groundfish and could help to further develop approaches on how to appropriately quantify and incorporate uncertainty in stock assessments that estimate recruitment. We also note that the upcoming CIE review provides an opportunity to assess the reliability of the stock-recruitment relationship for walleye pollock and the associated reference points, which could serve as a basis for further discussions.

For setting an appropriate ABC level for 2010, the Plan Team focused on uncertainty in the strength of the 2006 year class. In the current assessment, this year class is estimated to be weaker than last year's estimate, resulting in lower biomass estimates and a lower maximum ABC than projected last year. The Plan Team discussed two alternatives for setting the 2010 ABC. One alternative uses the best estimate of recruitment through the 2008 year class, while a second alternative would replace the model estimate of recruitment for the 2006 year class with the average recruitment from 1978-2008. A summary of the arguments in favor and against these two options is contained in the Plan Team minutes.

The approach that the SSC prefers when dealing with conservation concerns is to make adjustments in the harvest control rule, rather than in the assessment model. **The SSC concurs with the Plan Team and believes that an additional adjustment is not necessary at this time because the estimated uncertainty in the 2006 year class is reasonable given that there are now numerous observations of this year class from three bottom trawl surveys and three EIT surveys.** Therefore, we believe that the best available estimate of the 2006 year class strength is from the assessment model, and that this best estimate should be used in the harvest rule calculation. **Thus the SSC recommends a 2010 ABC of 813,000 t**, **and the corresponding 2010 OFL of 918,000 t using the Tier 1b formulae. Using the standard projection methodology, the 2011 ABC is 1,110,000 t, and the 2011 OFL is 1,220,000 t.** It is important to realize that the 2011 values are provisional and will be affected strongly by next year's data collection and analysis.

There are legitimate concerns over the status of the EBS pollock stock as expressed by the Plan Team and in public comments. In particular, the fishery is highly dependent on young fish, although the degree of this dependence on a single age class is not unprecedented. The large decrease in the estimated strength of the 2006 year class was particularly troubling, although a similar pattern was evident in the 1992 year class, which was underestimated in a number of assessments. Because of these concerns, and in support of our decision to accept the maximum permissible ABC for 2010, we point to the following precautionary aspects of the current assessment:

- Mortality in the model is fixed at a conservative rate of M = 0.3 for ages 3+, which tends to underestimate stock biomass. Natural mortality is likely higher than the assumed rate, particularly at intermediate ages, as was evident in the exploration of an alternative mortality schedule (see above).
- Younger pollock than currently assumed are likely to contribute to the spawning stock based on a recent study by Stahl and Kruse (2008); therefore spawning biomass may be higher than estimated.
- The total catchability (combined across BTS and EIT) is considerably larger than 1. If total catchability were fixed at 1, the estimated biomass would increase considerably. An argument could be made for fixing total catchability at 1 because there is no evidence of herding, double counting or other effects that would lead to a higher q. The stock assessment authors continue to explore this issue, including the relative distribution between the bottom and mid-water components.

- Steepness (i.e. productivity) in the stock-recruit relationship is constrained to avoid high estimates. As noted in the assessment, unconstrained estimates would result in considerably higher F_{MSY} estimates (near $F_{18\%}$).

We further note that preliminary fishery age data from 2009 produced results consistent with the preferred model with slightly larger recent recruitments and a slightly higher maximum permissible ABC.

Finally, we point to several encouraging signs based on preliminary or anecdotal evidence:

- Initial estimates from the model, based on one observation of the 2008 year class in the bottom trawl survey suggest a strong 2008 year class.
- Public testimony suggests that there may have been a delay in the movement of pollock onto the shelf due to the extent of the cold pool in the summer of 2009, which could have resulted in an underestimate of the 2006 year class. Previous assessments found some evidence for a relationship between bottom temperatures and survey catchability. This effect was not included in the current assessment because it was not found to be significant in previous assessments.

The 2009 assessment clearly indicated the importance of the EIT survey to adequately assessing both the mid-water and bottom component of the pollock stock. We note that the annual surveys will no longer take place after the BSIERP field work ends in 2010 and the AFSC will return to a biennial schedule for their summer EBS pollock acoustic surveys. Under this schedule, acoustic surveys will be conducted in the eastern Bering Sea in even years and in the GOA in odd years. We note that scientists at the AFSC have conducted an exploratory assessment of the relationship between acoustic biomass estimates derived from the NOAA ships and biomass estimates derived from acoustic data collected from boats chartered for the bottom trawl survey. This exploratory study showed promising results that suggest that an index of pelagic pollock abundance could be derived from the charter boats to augment the EBS pollock stock assessment when the NOAA ships are conducting the acoustic survey in the GOA. To obtain improved estimates of the mid-water component of pollock the SSC encourages efforts to further develop under-way acoustics in conjunction with the bottom trawl survey. The SSC would appreciate a presentation on the status of these efforts.

Aleutian Islands Walleye Pollock

The current assessment includes an update of the same model that was approved for last year's assessment (preferred model), as well as a model that excludes fisheries data from the area east of 174°W (which may represent catches from the eastern Bering Sea stock). The author and Plan team recommended use of the former model, which was developed following a CIE review in 2007. **The SSC concurs with the Plan Team to use this model for setting ABC. The SSC previously placed this stock in Tier 3 and concurs with the recommended maximum permissible ABC under Tier 3b. The projections result in a maximum permissible ABC of 33,100 t and an OFL of 40,000 t in 2010 and an ABC of 32,200 t and an OFL of 39,100 t in 2011 (assuming catch of 19,000t in 2010).**

Although the SSC accepts the 2010 maximum permissible ABC under Tier 3, we are very concerned about the lack of recent surveys in the Aleutian Islands. Without a new survey, we do not believe that a reliable estimate of biomass can be obtained from the current model. Without such an estimate, the stock would no longer qualify for management under Tier 3.

Bogoslof Walleye Pollock

This is a straightforward update of last year's assessment. The 2009 Bogoslof pollock echo integration-trawl (EIT) survey was the lowest estimate of biomass (110,000 t) in the region since the EIT survey began in 1988.

The SSC recommends that this stock be placed in Tier 5. **The recommended ABC comes from a formula similar to a Tier 3 calculation, substituting a reference biomass level of 2 million t for $B_{40\%}$, and is below the maximum permissible. The recommended ABC is 156 t and OFL is 22,000 t for both 2010 and 2011.**

SSC recommendations to the assessment authors

If the stock declines further, the ABC under the current approach will go to zero, which may prompt concerns over bycatch of Bogoslof pollock in other fisheries. Because changes to the management of this stock relate to the Central Bering Sea (Donut Hole) Pollock Convention, the SSC requests that the author include a historical perspective on the impacts of the Donut Hole Convention on this assessment and on how and why the current SSC rule was adopted.

BSAI Atka mackerel

The stock assessment model for Aleutian Islands Atka mackerel is the same as the model presented last year, which had undergone several improvements following a review by the Council of Independent Experts in June of 2008. Input data to the model was updated with recent year fishery data, 2008 fishery age composition data, and catch- and weight-at-age data from the 2008 fishery. The biennial bottom trawl survey in the Aleutian Islands was not conducted in 2008. Hence, the most recent survey data were collected in 2006.

The current model estimates that spawning biomass has been declining since 2005 (with suggestions of an approximate 10 year cycle: Figure 16.15), and that recent estimates are lower than those estimated last year, due in part to a downward revision in the recruitment estimate for the 2004 year class. Despite this, the outlook appears good with 4 strong year classes appearing in the 2008 fishery.

The SSC remains concerned with the lack of new survey data to confirm the strength of recent recruitment. However, we agree with the Plan Team to designate the BSAI stock in tier 3a for 2010 and 2011. **We support the recommendations made by the Plan Team and the stock assessment authors for the OFL and ABC levels in 2010 and 2011, including the apportionment of ABC to each of the three management areas as shown below.**

SSC recommended 2010 and 2011 ABC and OFL for Atka mackerel (tons)

Year		EAI/EBS	CAI	WAI	Total
2010	ABC	23,800	29,600	20,600	74,000
2011	ABC	20,900	26,000	18,100	65,000
2010	OFL				88,200
2011	OFL				76,200

The SSC appreciates the authors' efforts to provide us with a very clear and well written stock assessment. We especially appreciate the recounting of prior stock assessment issues and how these were resolved. Also, we appreciate the authors' response to our request for an estimate of the likelihood of biomass dropping below $B_{20\%}$, which was estimated to be near zero for 2010 and 2011.

The current area apportionment of Atka mackerel in the AI is based on a weighted average of the biomass from surveys conducted in 2000, 2002, 2004 and 2006 (page 1002 of the SAFE chapter). With the upcoming release of the status quo Biological Opinion for Steller Sea Lions and consequent renewed interest in Atka mackerel, up-to-date biomass and distribution data for one of their major prey items would seem prudent, even given the known issues of survey adequacy for Atka mackerel. Thus, we reiterate the importance of conducting an Aleutian Islands bottom trawl survey in 2010.

SSC Comments to the BSAI Atka Mackerel stock assessment authors:
The SSC asks that the diet data in Figure 16.25 be updated with data more recent than 1995. We also note that the two pie charts in that figure are reversed (predator pie chart should be chart B).

BSAI Flatfishes

The SSC received testimony from John Gauvin (Best Use Cooperative) about the yellowfin sole and flathead sole assessments. He indicated that more fishing effort has been required to catch smaller fish, indicating that fishermen are seeing a steeper decline than evident in the assessment. He speculated that differences could be attributable to halibut avoidance or catches of the smaller Bering Sea sole. He invited the assessment authors to the captains meeting to help resolve the observations and model results.

SSC recommendations to flatfish stock assessment authors
The SSC discussed Tier 1 stocks in which certainty in F_{msy} leads to little difference between the arithmetic and harmonic means and therefore very similar estimates of ABC and OFL. From a practical standpoint, the closeness of ABC to OFL would create potential overfishing, if the TAC is set equal to ABC and if actual catch slightly exceeds ABC. A pragmatic approach may be to set catch limits lower based on estimated implementation error such that the probability of realized catch exceeding OFL is low. However, an analytical approach may be to reexamine the apparent certainty in F_{msy} estimates and other sources of uncertainty that are not accounted for in current estimation procedures. The SSC recommends conducting a workshop to address this and related issues (see also EBS pollock) when ACL revisions to groundfish are being considered.

The SSC also recommends a research topic to flatfish assessment scientists. A meta-analysis of stock-recruit relationships for flatfish stocks may be very useful to evaluate productivity of these stocks, similar to one previously conducted for rockfish. This could help inform decisions about when a flatfish assessment using Tier 3 may qualify for Tier 1. In this year's SAFE, this question was raised in discussions about the Alaska plaice assessment, for which a new model and a stock-recruit relationship were presented.

Yellowfin sole

Survey and fishery data were updated, but there were no changes in the model. The SSC agrees with the Plan team's and author's recommended ABCs and OFLs based on tier 1 calculations. **For 2010, ABC = 219,000 t and OFL = 234,000 t and for 2011, ABC = 213,000 t and OFL = 227,000 t.**

SSC requests to the yellowfin sole assessment authors
In future assessments, the SSC requests that the table heading for Table 4-24 clarify that PSC catches (shown on p. 567) are not included. The SSC also noted that exploitation rates are estimated back to 1964 (Table 4.15) while catches are presented only back to 1977 (Table 4.1). If catches are sufficiently accurate to allow for estimation of exploitation rates in these early years, then the SSC requests reporting these older catches, as well.

Greenland turbot

Greenland turbot is a difficult stock to assess. In the 2008 assessment, there was much uncertainty in stock trends and differences existed between model and survey estimates. These led the Plan Team last year to recommend a stair-step approach for increasing ABC to the maximum permissible. Given the lack of fit issues, the SSC recommended evaluation of selectivity. In response, the assessment authors switched this year from the Stock Synthesis 2 (SS2) to the SS3 model. Even with the new model, selectivity parameters are difficult to estimate because sex ratio varies by gear type and fishery. These problems are exacerbated because the catch proportions vary widely among fisheries.

The SSC agrees with the Plan Team to abandon last year's stair-step procedure and instead to use this year's SS3 model under Tier 3a as follows: ABC = 6,120 t (area apportionment: 4,220 t for BS and 1,900 t for AI) and OFL = 7,460 t for 2010 and ABC = 5,370 t (3,700 t for BS and 1,670 t for AI) and OFL = 6,860 t for 2011.

The SSC commends the assessment authors for their efforts to improve this assessment model and address SSC and Plan team concerns. The SSC looks forward to additional improvements in next year's assessment.

Arrowtooth flounder

The arrowtooth flounder assessment was a straightforward update of last year's assessment. The SSC agrees with the Team's and authors' recommendations under Tier 3a representing combined specifications for *Atheresthes* spp. (arrowtooth and Kamchatka flounder). **For 2010, ABC = 156,000 t and OFL = 191,000 t and for 2011, ABC = 157,000 t and OFL = 191,000 t.**

Northern rock sole

This year's assessment model incorporated new maturity schedules, weight at age, and updated catch and survey data. **The SSC endorses the Team's and authors' recommended specifications under Tier 1. For 2010, ABC = 240,000 t and OFL = 243,000 t and for 2011, ABC = 242,000 t and OFL = 245,000 t.**

The SSC shares the Plan Team's concerns about the small separation of ABC from OFL. Over the long term, as mentioned under the SSC's general comments about flatfish assessments, a workshop should be convened to explore formal procedures to address such situations. The SSC commends the authors' analysis of northern rock sole under IPCC model scenarios in the appendix and looks forward to the possibility of a full research paper on this topic.

Flathead sole

This year's flathead sole assessment includes updated catch and survey data, as well as sex-specific size compositions. Otherwise, the model is unchanged from last year. **The SSC endorses the Team's and authors' recommended specifications using Tier 3a. For 2010, ABC = 69,200 and OFL = 81,800 and for 2011, ABC = 68,100 and OFL = 72,500 t.**

The SSC continues to appreciate the authors' ongoing examination of an apparent 1-year lag effect of temperature on survey catchability. Presuming that recent cold bottom temperatures will soon be replaced by warm temperatures, this new inflection point may provide additional evidence whether the 1-year lag is causative or spurious.

Alaska plaice

The year's Alaska plaice assessment represents the first split-sex model for this species. The SSC appreciates the authors' efforts to develop this new model. The resultant biomass estimates are quite different from last year's assessment, reportedly owing to the new model, the use of female weight at age (which is higher than combined sex weight at age) and recent good year classes. However, the catch specifications have not changed much, reportedly due to differences in survey catchability.

The SSC supports the author's and Plan Team's recommended specifications under Tier 3a. **For 2010, ABC = 224,000 and OFL = 278,000 t, and for 2011, ABC = 248,000 t and OFL = 314,000 t.**

SSC recommendations to the Alaska plaice assessment authors

Given the new assessment model, the SSC requests that the authors explore the possibility of estimating sex-specific M in the new model. As reported in the assessment, Zhang (1987) estimated M = 0.195 for males and M = 0.27 for females. The current assessment uses M = 0.25 for both sexes based on an analysis in the 1997 assessment. Given changes in the model, this warrants reassessing M used in the analysis, including sex-specific estimates.

Finally, the SSC recommends that the authors include maturity schedules in the SAFE document.

Other flatfish

The assessment of other flatfish (mostly starry flounder, longhead dab and rex sole) represents a straightforward update of last year's assessment. **The SSC agrees with the author's and Team's recommended catch specifications under Tier 5, in which ABC = 17,300 t and OFL = 23,000 t for both 2010 and 2011.**

SSC recommendations to other flatfish assessment authors

The SSC requests adding the biomass estimate for the 2006 Aleutian Islands survey to Table 10.4.

BSAI Rockfishes

There has not been an AI bottom trawl survey since 2006. This results in revised ABC and OFL specifications that have much greater uncertainty, because new estimates are based on update catch alone. Assessment authors for each rockfish species or species complex simply updated catch data and re-ran the projection model using results from the 2008 assessment model as the starting point.

Pacific Ocean Perch (POP)

SSC recommended 2010 and 2011 ABC and OFL for POP (tons)

Area	2010 OFL	2010 ABC	2011 OFL	2011 ABC
EBS		3,830		3,790
Eastern AI		4,220		4,180
Central AI		4,270		4,230
Western AI		6,540		6,480
Total	22,400	18,860	22,200	18,680

The SSC supports the continued application of Tier 3a harvest control rules for this stock and agrees with the Plan Team's recommendations for area-wide OFL and regional apportionment of ABC. Model projections indicate that this stock is neither overfished nor approaching an overfished condition.

Northern Rockfish

SSC recommended 2010 and 2011 ABC and OFL for northern rockfish (tons)

Area	2010 OFL	2010 ABC	2011 OFL	2011 ABC
	8,640	7,240	8,700	7,290

The SSC supports the continued application of Tier 3a harvest control rule for this stock and agrees with the Plan Team's recommendations for area-wide OFL's and ABC's. Model projections indicate that this stock is neither overfished nor approaching an overfished condition.

Shortraker Rockfish

SSC recommended 2010 and 2011 ABC and OFL for shortraker rockfish (tons)

Area	2010 OFL	2010 ABC	2011 OFL	2011 ABC
	516	387	516	387

The SSC agrees with the Plan Team recommendation to retain area-wide Tier 5 calculations of ABC and OFL for shortraker rockfish, and concurs with the ABC and OFL levels proposed by the Plan Team.

Blackspotted and Rougheye Rockfish Complex

SSC recommended 2010 and 2011 ABC and OFL for blackspotted and rougheye (tons)

Area	2010 OFL	2010 ABC	2011 OFL	2011 ABC
	669	547	650	531

This complex formerly known as the "rougheye rockfish" complex consists of two species that include rougheye rockfish (*Sebastes aleutianus*) and the recently described blackspotted rockfish (*Sebastes melanostictus*). Field identification between these two species is very difficult. However, identification criteria have been developed by State and Federal biologists to aid species identification. The SSC recommends expanded training for the trawl survey group and observer program so that these two species will be separated in future surveys and catch observations. This will be critical to understand the relative abundance and catch of these species within the AI and BS.

The SSC agrees with the Plan Team recommendation to use Tier 3b calculations for the AI portion of the stock and Tier 5 calculations for the BS portion, and to sum these values to produce area-wide ABC and OFL levels.

Other Rockfish Complex

SSC recommended 2010 and 2011 ABC and OFL for Other rockfish (tons)

Area	**2010 OFL**	**2010 ABC**	**2011 OFL**	**2011 ABC**
EBS		**485**		**485**
AI		**555**		**555**
Total	**1,380**	**1,0400**	**1,380**	**1,040**

As of 2009, dark rockfish are no longer included in the other rockfish complex. Catch in 2008 has been revised and the estimated 2009 catch has been included.

The SSC agrees with Plan Team and authors for setting F_{ABC} at the maximum allowable under Tier 5 by applying separate values of M for shortspine thornyhead and "other rockfish". The SSC rolls over its last year's recommendation for an area-wide OFL for this group and the recommended apportionments of the ABC to the AI and EBS for 2010 and for 2011.

BSAI Squid

The stock assessment for BSAI squids includes updated catch data, including length composition data, as well as new biomass estimates. Biomass estimates for squid are unreliable, and for this reason **the SSC agrees with the authors and plan team to continue with Tier 6 management based on average catch for the 1978 to 1995 period. The 2010 and 2011 OFLs based on this period equate to 2,620 t with an ABC = 1,970 t for both 2010 and 2011.**

SSC requests of the BSAI squid stock assessment authors:
The SSC comments for the GOA squid assessment generally apply to the BSAI assessment in that seabirds could be more completely integrated into the assessment. The SSC requests that the ecosystem consideration section of the stock assessment include a map of the squid catch distribution in relation to the distribution of the 3 albatross species (short-tailed, Laysan, and black-footed). Also, the SSC requests that the data displayed in Figure 14 be disaggregated so as to display dietary data for albatrosses independent of jaegers.

Note that the seabird diet graph (Fig 14) appears to be mislabeled as GOA data. It would be easier to compare Bering Sea and GOA diets if the same color codes were used for prey species in both the BS and GOA accounts (Fig. 8 in GOA, Fig. 14 in BS).

BSAI Other Species

Aggregate OFL and ABC levels are set for the BSAI Other Species management category, which include sharks, skates, sculpins, and octopus. **The SSC agrees with the Plan Team to set the aggregate ABC and OFL for this category to 61,100 t and 88,200 t, respectively for 2010 and 60,900 t and 88,100 t, respectively for 2011.** SSC comments on the individual assessments of the group members are as follows.

BSAI Sharks

The 2009 shark assessment represents a straightforward update from last year's assessment with catch and survey data from 2009. Catch estimates for 2003-2008 were revised owing to changes in the Catch Accounting System. These revisions resulted in negligible changes in the estimates. The SSC appreciates the additional biological information added to this year's assessment. The SSC agrees with the Plan Team recommendations of OFL = 598 t and ABC = 449 t for both 2010 and 2011 using catches from 1997-2007 as base years.

SSC request of the shark assessment author**s**
The SSC refers the authors to applicable SSC comments on the GOA shark assessment.

BSAI Skates

The stock assessment for BSAI skates is partitioned into a Tier 3 assessment for Alaska skates and Tier 5 assessment for all other skates. No changes were made to the assessment for Alaska skates in 2009, which used the same SS2 model as in 2008.

The SSC provided extensive comments regarding the lack of fit to survey size-at-age data for the Alaska skate, and requested presentation of a revised model with more realistic representation of growth. Due to time constraints, this was not possible, but the authors expect to be able to provide this next year.

Recognizing that there have been no substantive changes in the assessment, the SSC accepts the Plan team and authors' recommendation for Tier 3a analysis of Alaska skates based on the estimate of spawning biomass as 48% greater than $B_{40\%}$ with F_{OFL} = 0.08 and F_{ABC} = 0.069, and Tier 5 analysis of other skates combined with M = 0.10. The SSC accepts the determination of total OFL = 27,800 t and ABC = 24,000 for Alaska skates and an OFL = 8,220 t and ABC = 6,170 t for all other skates for both 2010 and 2011. These combine to total OFLs for all skates equal to 36,000 t and 35,900 t for 2010 and 2011, respectively, and total ABCs for all skates equal to 30,200 t and 30,000 t for 2010 and 2011, respectively.

BSAI Sculpins

The stock assessment for sculpins in the BSAI was updated with new biomass estimates as well as catch data. The plan team and authors recommend a new method of estimating harvest specifications where the OFL is based on a best estimate of M, and with the ABC estimated based on a precautionary estimate of M.

The SSC agrees with the recommendation to continue with Tier 5 management for BSAI sculpins, with individual specifications estimated separately for the most common species in the eastern Bering Sea and Aleutian Islands. We appreciate the authors' response to our request for a review of methods to estimate M, and we agree with the decision to use Hoenig's method based on maximum ages. We also accept the recommendation to use a best estimate of M to estimate the OFLs and a precautionary estimate of M to determine the ABCs. For the BSAI as a whole, the SSC agrees with the recommendation to set the OFL = 51,300 t and the ABC = 30,200 t for both 2010 and 2011.

BSAI Octopus

The SSC agrees with the authors and plan team that biomass estimates are unreliable for octopuses in the BSAI. We agree with continuation of Tier 6 management, based on a maximum catch in the base years of 1997 to 2007, resulting in an OFL = 311 t and ABC = 233 t for both 2010 and 2011.

Groundfish SAFE Appendices

GOA/BSAI Forage fish

The Forage Fish appendix to the GOA SAFE is not a full report during this 'off survey' year. No public testimony was given on this topic.

This appendix refers to species categorized as forage fish under the FMP. Because this category is outside of the specification process and stock assessments are not performed, the report departs from the typical SAFE format. The first full report on forage fish was done in 2008, which included data through 2007. This year's report is only an executive summary for GOA with updated catch and survey data through 2009. Some of the same information from the 2008 report, with 2009 updates for both the GOA and Bering Sea (BS), was also presented in the Ecosystem Considerations Chapter (EC). Because the NPRB BSIERP project has surveys in the BS from 2008 through 2010, and a new GOA IERP will conduct surveys in the GOA between 2010 and 2013, it is not clear when the next full report will be provided. **The SSC recommends a full forage fish report for both BS and GOA be provided in 2010.** The author notes that the NPRB-funded GOA IERP includes a forage fish component, and the SSC looks forward to receiving improved data and assessments.

In October 2009, the SSC recommended that the forage fish category be moved into the 'Ecosystem Components' as part of the groundfish ACL amendment package.

The chapter reports that forage fish species in the GOA (with over 60 species) are similar to those in the Bering Sea, and thus this summary for GOA suffices for both regions. However, the SSC notes that species composition is not the same between regions, and requests that future reports and executive summaries provide results for both BS and GOA. Graphs of relative CPUE of forage fish by regions are in the EC for both GOA and BS; in addition to these, SSC requests that forage fish sections include distribution maps from trawl surveys and acoustical survey indices of abundance.

The report notes that forage fish species are poorly sampled due to their small size, resulting in poor biomass estimates and even unknown numbers of species. Therefore, their status is difficult to determine, with the possible exception of eulachon. However, SSC notes that acoustic backscatter has been used by

AFSC to provide indices for some species such as capelin and euphausiids, and development of these efforts should continue, along with more small-mesh sampling. With regards to new indices of abundance for euphausiids, it is worth noting that this important forage group has increased three-fold between 2004 and 2009 in the EBS surveys.

The SSC discussed the possibility of incorporating key forage species comprised of juvenile age classes of species in the groundfish fishery (i.e., juveniles of pollock, cod, rockfish, flatfish) into this report. The SSC recognizes that the forage fish designation should be restricted to species officially in the forage fish management category. **The SSC suggests that a more complete assessment of forage species that includes not only the species in the managed forage fish category but also other common forage such as juvenile fish of target groundfish might be addressed within the Ecosystem Considerations section.** Also, to describe fully the prey field for apex predators, the Ecosystem Considerations section should include discussion about and distribution maps for juveniles of stocks in the groundfish fishery that are important prey. Additionally, the SSC recommends that under the forage fish Ecosystem Considerations section, the authors address the role of spatial segregation among forage species, predation on forage fish, and potential competition for zooplankton. Prey selection by apex predators will depend on distribution and relative availability of all prey species, not solely the absolute abundance of specific groups. It would therefore be useful to put both the abundance estimates and mapped distributions of forage fish species in the context of the entire prey field. Recent AFSC mapping of age-1 pollock based on acoustic backscatter is an example of how these new methods can be applied.

Editorial comments:

- Table 2 (p. 1402) does not seem to include all forage fish groups.
- Indicate if the black smelt species are included with 'unidentified smelts'.
- Include biomass estimates for the remaining families.
- In the table caption, indicate whether Table 3 refers to forage fish catches in AFSC trawl surveys, or as bycatch in commercial fisheries.

Grenadier

This was a brief update of the more detailed 2008 assessment. Jon Warrenchuck (Oceana) expressed a general (not specific to grenadiers) concern that categorization as an ecosystem component might have unforeseen implications; it might not allow sufficient harvest control if necessary. George Pletnikoff (Greenpeace) emphasized that species might have a value due to their ecosystem function even if there was no commercial value.

The authors have recommended that a grenadier management assemblage be formed that would include giant, Pacific, and popeye grenadiers. The authors recommend that this assemblage be managed as a non-target assemblage in the fishery. Four other grenadier species that are rarely caught because of their deep depth distribution would not be included in this assemblage.

The SSC felt that sufficient information was available to perform a Tier 5 assessment. However, there is an absence of deep trawl surveys from the Aleutian Islands region, and few surveys from the EBS and GOA. Additionally, these trawls may not encompass the full depth distribution of the species. Despite these uncertainties, **the SCC supports the proposed groundfish ACL amendment package consider an option for the grenadier complex of three species (giant, Pacific, and popeye) to be categorized as "in the fishery" with a Tier 5 assessment of giant grenadier.**

Ecosystem SAFE

This chapter and associated analyses continues to provide useful insight into the status and trends of BSAI and GOA ecosystems. The chapter has gone from collecting some of the early papers on ecosystem-based management and a collection of time series data to analyses of which indices are meaningful and how indicators can inform fishery management. The new format and associated models and projections are interesting and appear sufficiently developed to be brought before the SSC in detail. As noted in the Plan Team minutes, the goal is to develop an ecosystem report card that concisely represents the state of the ecosystem and provides key information that sets an ecosystem context for ABC recommendations discussed at the December council meetings. **A workshop on this topic has been proposed for the February 2010 SSC meeting and the SSC agreed that this was a priority topic to cover if there is sufficient time in the SSC agenda.**

In response to an SSC comment, authors described the importance of an index to groundfish management, implications of index trends on the ecosystem or ecosystem components, and how the information can be used to inform management decisions. The SSC suggests three next steps aimed at more directly using the information in management decisions. First, many of the indices are monitored for trends but no thresholds have been identified when the changes become worrisome and what change in management might be advised. For example, if evidence indicates a regime shift, biological indicators may need to be revised. The second suggestion is that there should be more interaction between the authors of the SAFE chapters and ecosystem chapter so that ideas brought forward in the Ecosystem Considerations section could be tested in stock assessments. Finally, explanations of observations, such as the lack of strong year classes, should be investigated in light of Ecosystem Considerations indices and data.

Overall, this chapter has improved greatly over the years. However, it would be useful to link the various and disparate sections. Although there was some improvement in this, it remains unclear how the various sections are integrated. Perhaps a flow chart illustrating all sections showing main links would give the reader a visual template of what is available and how sections are related. Sections that need more recent information include pinnipeds, seabirds, and seabird bycatch.

This year, the Ecosystem Considerations Chapter focused on the development and listing of indices, with the result that at times the big picture seemed obscured. It is important that not only the most recent environmental data be provided, but that its importance be emphasized by the synthesis of disparate fragments of data into interpretive reports. These connections should enhance understanding of processes that are of management importance or which have predictive power. Just because a phenomenon is measurable doesn't mean it is important. Five examples of reports that are lost in the indices and individual accounts are:

1) Flatfish recruitment hypothesis. Earlier work by Wilderbuer et al. pointed toward the possibility that winter wind patterns might be used to predict the recruitment success of certain flatfish species. The Ecosystem Considerations Chapter provides an update of this work and shows that the new data support the original hypotheses for some species, but perhaps not for others. These are important findings and need to be highlighted in the Executive Summary.

2) Impact of Climate on Fish Distributions. This subject is mentioned in two separate sections of the appendix but the two are widely separated and are not cross-linked or summarized in the Executive Summary. What are the implications of these findings? How does density-dependence and/or failure to shift southward influence species interactions? What are the management implications of these findings? These should be brought out as important and articulated clearly.

3) Importance of predation on pollock by arrowtooth flounder. Could the failure of some year classes of pollock to materialize as fully as expected on the basis of age-0 or age-1 observations be the result of

predation? Is the Bering Sea heading toward a situation like that in the Gulf of Alaska where arrowtooth dominate the fish biomass?

4) What is the status of the crustacean zooplankton on the shelf, and what are the implications of recent changes? One of the findings in recent years is that the abundance and distribution of the large copepods and euphausiids on the shelf have changed markedly, with declines in the warm years and returns in the recent cold years. These recent data need to be included in the chapter, and interpreted in light of their potential importance for affecting year class strength. Zooplankton data are vital for understanding ecosystem responses to climate variability and must be updated as quickly as possible.

5) The interaction of zooplankton abundance and cannibalism. The recent findings of the BASIS program need to be integrated with the zooplankton story. Their work suggests that when the abundance of euphausiids and large calanoid copepods is down, cannibalism and predation on small age-0 pollock increases. A similar story may hold in Prince William Sound and in the Barents Sea. The importance of these links and their impact on pollock recruitment need to be emphasized.

The importance of the focus on stories of this sort are at least two-fold: in the first place, they help assessment authors put their assessments in an ecosystem context- are the age-0 pollock seen this year likely to show up next year, and secondly, when the importance of certain data types is linked directly to fisheries management issues, there is an increased likelihood that further research effort will de devoted toward determining if the apparent relationships can be relied upon for predictive purposes.

Specific requests/comments:
The maximum disturbed area information is interesting but the SSC suggests that data on the amount of newly disturbed area would also be of interest.

In the GOA, the SSC recommends comparing survey bottom temperatures with temperature data from moorings. We know that wind events can affect bottom temperatures temporarily and mooring data could help with interpretation of the survey snapshot of bottom temperatures.

The Ecosystem Considerations appendix was originally envisioned to include tracking of regime shifts. An explicit statement about what indices are involved and what they mean relative to regime shifts would be helpful.

The indices are useful and an especially important part of the display of data is the pie graphs that show sources of data. The SSC recommends including these pie charts with all of the indices (i.e., the Pribilof Island top predators and regional trends graphs).

Although there is an apparent relationship between pollock year class strength and summer stratification, other factors may be involved. This index may be misleading if events earlier in the year determine the distribution and abundance of critical food resources for the pollock.

The five year spans of the projection windows represent different proportions of the life span depending on species, making it difficult to interpret the importance of the projections.

Many of the editor's responses to SSC comments were inadequate. Does 'okay' or 'comments were passed on to authors' mean that the authors agree, or that the requests were addressed in the respective sections? If they were or weren't addressed, a brief explanation would help the SSC review the progress of those sections.

It is not always clear what population or species group is being addressed (e.g., Page iv, bullet on seabird reproductive success at Pribilofs – '…half of the populations are within 1sd of their long-term mean…' Were the authors referring to different species on the Pribilofs?

Table 2 (p.8) is difficult to read or compare EBS to GOA biomass components. It may be necessary to split this into several tables and organize them to allow direct comparisons between EBS and GOA. In Table 2 /apex predators, it might be useful to combine seabird species by forage guild (i.e., piscivorous, planktivorous, or diver, surface-feeder) or families with similar diets and foraging behaviors (i.e., tubenoses, alcids, larids, seaducks). Individual seabird species contribute little biomass, so lumping certain groups for the biomass presentation would be more useful; a separate list of species that occur in EBS and GOA could be provided. Also in Table 2, Benthic Foragers should include seaducks (eiders, scoters, long-tailed ducks). In particular, eiders should be included here because two species are listed under ESA, and scoter species are of concern.

Pages 11-12: It appears that the final paragraphs in these first two sections have been exchanged.

Under 'Status and Trends' for seabirds (p.15), it is unclear what the source is for categorizing these as species of concern. The authors should re-check the current status for these species in Alaska (as opposed to other regions).

Page 19: these 2 items do not have all the sections of the previous ones such as factors causing trends and implications. Section 2, Fishing Effort, is a confusing mix of observations, effort, and HAPC.

Page 24, Implications section of North Pacific climate and SST indices is more of a forecast for what to expect for El Nino and the PDO – not implications for groundfish management. The sentence "This could have a broad range of effects on Alaska marine ecosystems" is not adequate.

The SSC suggests providing distribution maps in the Forage Fish section (p.66-67), including forage species with indices available from acoustic surveys (i.e., euphausiids, capelin, juvenile pollock). Some mention, and distribution maps, should be made here or elsewhere for commercial species that are important prey as juveniles (i.e., pollock).

Economic SAFE

An overview was presented of a new revenue decomposition analysis, included in the Introduction sections of the BSAI and GOA groundfish SAFEs. Although the SSC did not receive a presentation on the full Economics SAFE, committee members had an opportunity to review the document and to prepare comments. There was no public testimony.

The decomposition of revenues into price and quantity effects is helpful and facilitates determination of the extent to which price changes are attributable to variations in exchange rates or changes in demand parameters. This type of analysis should be very useful in preparation of RIR/IRFA documents that explore the likely economic consequences of contemplated management actions.

The 2009 Economics SAFE continues to evolve into a more inclusive and comprehensive reference document. This maturation of the presentation is a very important step in characterizing the economic, social, and cultural aspects of fisheries. The SSC supports and encourages continued investment in improving the Economic SAFE, recognizing the significant contribution this information makes to effective, equitable, and efficient marine resource management in the North Pacific, Bering Sea, and Arctic Ocean.

The Economic SAFE contains summary tables, brief overviews of market conditions, short descriptions of ongoing research, and a list of recent publications authored by AFSC Economic and Social Sciences Research Program staff. The SSC notes that the introduction now includes a somewhat expanded discussion of data sources and limitations. What is missing, however, are interpretations of what the data signify. For example, while the market summaries provide a helpful characterization of the past, they

need to be accompanied by structural and time series models that can be used to explore the likely economic consequences of contemplated management actions or to anticipate price and revenue trajectories. While there may not be sufficient information to devise sophisticated models, it would be useful to consider the approach adopted for stock assessments, wherein even poorly understood stocks are modeled and prospective and retrospective model forecasts are reported, to provide information about model uncertainty and to stimulate efforts to refine the models. The use of graphic displays is effective in conveying information suggesting or demonstrating market trends. However, the profile narratives could benefit from a careful technical edit to reduce redundancies and enhance the SAFE's accessibility and usefulness.

While the document acknowledges the increasing statutory emphasis on social and economic impacts of management policies on communities (*e.g.,* National Standard 8), there are no tabular summaries of community or regional indicators, nor analyses of what is happening in the relevant fishing communities. Tabulation of social and economic time series is valuable and should be continued, but needs to be accompanied by analyses, *i.e.*, informed interpretations of what the raw data signifies in terms of statutory emphases. The SSC realizes that these kinds of assessments will necessarily be initial efforts, but encourages the plunge into analytic efforts that directly respond to the emphasis on understanding impacts on communities.

While the Economic SAFE now correctly identifies the nature of Prohibited Species Catch "allowances," as a clearly distinct management principle from groundfish bycatch "allocations", the document does not yet reflect the same care in use of other important terminology. As noted in the December 2008 SSC Report, the Economics SAFE is replete with references to "PSC bycatch". The term PSC should not be used as a synonym for "the bycatch of prohibited species", unless the reference pertains to a groundfish species for which the MRA has been exceeded. Similar grammatical laxity pertains to the generic misuse of the attribution "Alaska" or "Alaskan" in the SAFE. While a brief disclaimer is provided in a footnote, this is insufficient justification for continuing to use incorrect terminology.

Halibut discard mortality rates

Jim Ianelli (NMFS-AFSC) and Jane DiCosimo (NPFMC) briefly presented estimates of 2008 CDQ and non-CDQ halibut bycatch discard mortalities in groundfish fisheries. For the first time, 10 years of data were available, so a 10-year average could be used for CDQ fisheries.

The SSC still supports the methodology used to estimate these mortality rates. The SSC accepts the recommended halibut discard mortality rates for 2010-2012 CDQ and non-CDQ groundfish.

C-4(a) Salmon Bycatch Data

Mark Fina (NPFMC) and Marcus Hartley (Northern Economics) summarized revisions to the draft RIR/IRFA. No public testimony was provided. **The SSC commends the analysts for addressing our primary concerns with the initial review draft RIR/IRFA and concludes that the document is suitable as a basis for decision-making.**

The revised analysis includes a clear statement of the purpose and need for action. The primary purposes of the proposed actions are: (1) evaluating the effectiveness of the IPA incentives in times of high and low levels of salmon bycatch abundance, the hard cap, and the performance standard in terms of reducing salmon bycatch, and (2) evaluating how the Council's action affects where, when, and how pollock fishing and salmon bycatch occur.

While the additional information to be collected under Alternative 2 and Alternative 3 would allow for more detailed understanding of the effects of Amendment 91, it is unlikely that analyses based on this information will unambiguously and comprehensively address the primary purposes of the proposed

action. This is because, in addition to varying in response to Amendment 91, the observable and reportable actions of fishermen will also depend on variations in pollock abundance, length-frequencies and spatial-temporal distribution, Chinook salmon abundance and distribution, and variations in the demand for different pollock product forms, etc. Some of these factors are unobservable and all of them will vary through time, partially or completely masking the influence of observations to be collected under the three alternatives. While the analysis alludes to this limitation, it is unduly optimistic about the extent to which data collected under Alternative 1 will address the Council's primary purposes. The incremental gains attributable to Alternatives 2 and 3 are appropriately described, but the potential benefits of self-reported estimates of the value of compensated transfers are understated. The analysis could benefit from a clear distinction between outcomes and impacts of the proposed alternatives—while the Council's primary purposes are stated in terms of impacts, the RIR/IRFA emphasizes outcomes and largely ignores causality.

The analysts continue to confront the fact that, as they report on page 10, "… this analysis is being completed before any actual IPA proposals are submitted…" Clearly, the final form and precise details of an actual IPA *will* influence the specific data the Council, NMFS, and the public will need to evaluate program performance. Recognizing this potentiality, the SSC notes that it should not surprise anyone that this data collection program may be required to adapt and evolve in response to terms and structures of IPA submissions. Acknowledging this, the analysts observe, and the SSC recommends, use of "More general regulations for a data collection program (that would) allow a more flexible, adaptable program…" (page 5, RIR/IRFA). This would be in accord with the choice-set under Section 1.3 Development of data collection regulations, "option" **1 – More general regulations** … in combination with the procedural suboption 2, described on page 6. This reduces the "undesirable" rigidity of the data collection program, while "safe-guarding" the Council's prerogative to comment on any changes, prior to a recommended modification being submitted to OMB.

C-5 Initial Review Modify Amendment 80 Co-op Formation

Glenn Merrill (NMFS-AKR) provided an overview of the draft analysis. Public testimony was provided by Mike Symanski (FCA).

The draft analysis addresses concerns raised in the February 2009 SSC Report. The additional option added for analysis also appears to address SSC concerns about potential barriers to entry into co-ops. **The SSC concludes that this EA/RIR/IRFA is suitable to release for public review.** The SSC notes that alternative 6 does not entirely preclude a coalition of co-op members from creating onerous entry conditions designed to prevent realization of the Council's objective to assure access to the benefits of co-op membership to all seeking it. The SSC recommends release of the draft analysis, following an elaboration of the full spectrum of impacts that may emerge from Alternative 6. The SSC notes that a simple IFQ, without the issues associated with co-ops, would eliminate these problems of coercive and strategic behavior.

C-6(c) ACL and rebuilding plans for crab

The SSC received a report from Diana Stram (NPFMC) and presentations by Jack Turnock (NMFS-AFSC) on the ACL analysis for crab and rebuilding plans for snow crab and Tanner crab.

Public testimony was provided by Edward Poulsen (ICEPAC), Steve Minor (North Pacific Crab Association), Mateo Paz-Soldan (City of St. Paul), Arni Thompson (Alaska Crab Coalition), and Leonard Herzog (Homer Crab Cooperative), Frank Kelty (City of Unalaska), and Linda Kozak (Crab Group of Independent Harvesters).

The SSC reviewed a draft outline of the combined ACL analysis and rebuilding plans, which will be part of a single document such that rebuilding alternatives for snow and Tanner crab (but not Pribilof Island blue king crab, which have a separate rebuilding plan) will be examined under each ACL alternative.

ACL considerations

An analysis was presented about a potential approach to evaluating scientific uncertainty in assessment results associated with determining OFL. This approach could be used in the P^* method for determining appropriate buffers between ABC and OFL for crab stocks. The SSC believes that some approach to incorporating additional uncertainty in OFL beyond within-model uncertainty is warranted but had serious concerns about the proposed approach. In particular, the approach is sensitive to the particular stock assessment history and the estimated variance component is likely to fluctuate widely due to numerous factors that are not related to "true" model uncertainty.

The SSC recommends that analysts consider other approaches to incorporating additional uncertainty, specifically:

- Assuming that stock assessment models improve over time and ideally converge on a model that is at least approximately "correct" and accounts for the major (known) sources of uncertainty, we recommend that analysts consider an approach based on standard retrospective analyses. That is, the current model could be assumed to be the "correct" model and its performance in predicting future reference points is evaluated retrospectively. While not accounting for full model uncertainty, it would avoid the dependence of the estimated uncertainty on somewhat arbitrary assessment histories. We note that this approach would also avoid ambiguities about the best way to calculate variability in biomass estimates because the estimates from the most up-to-date model would serve as a natural reference level for computing the log-ratio of past estimates of biomass to the reference biomass.
- To limit large differences in the estimated level of uncertainty among stocks, an appropriate level of uncertainty across all stocks, or across groups of stocks that have a similar levels of complexity, could be determined through a meta-analysis and the resulting level of uncertainty could be applied to all stocks (within a group, if appropriate). This would limit the large differences in the perceived level of uncertainty across stocks and their effects on the size of the resulting buffers between ABC and OFL.

Stock rebuilding

The snow crab projection model is based on the current assessment model and uses estimated average recruitment with first-order autocorrelated residuals to generate future recruitments. The SSC had some discussion about appropriate time frames to use for average recruitment and concerns about the apparent decadal-scale patterns in past recruitments. Nevertheless, given the relatively short time frame considered in the rebuilding analysis, combined with the long lag between fertilization and recruitment to the fishery, **the SSC believes that the proposed approach adequately captures past recruitment variability and offers a reasonable approach to capturing future recruitment uncertainty for the purposes of the rebuilding analysis.** However, the SSC requests that the analysis describe the use of autocorrelated recruitment deviations and include discussion about the apparent pattern of decadal variability of recruitment.

For Tanner crab, the analysts plan to use the snow crab projection model with appropriate modifications to account for differences in snow crab and Tanner crab dynamics. As a fallback, a simpler model (e.g., delay-difference model) may be used to complete the analyses by the next crab plan team meeting in March. There may not be sufficient time for a full review of the model by the Plan Team and SSC.

The SSC has recommendations for both the snow crab and Tanner crab models and projections. However, given the short time frame for the rebuilding analyses, we realize that it may not be possible to satisfactorily address these recommendations in these analyses. However, at a minimum, we request that these points be addressed in the context of the annual assessments:

- For snow crab, we reiterate our request from the October meeting that the rebuilding analysis consider spatial dynamics of the stock, particularly the potential importance of southern versus northern areas occupied by the stock in terms of source of recruits, regional harvest rates, etc. Specifically, the environmental ratchet hypothesis of Orensanz, Armstrong, and colleagues suggests that densities of spawning stocks at the southern end of the range are disproportionately important. However, owing to the distributions of sea ice and operational costs, the southern portion of the stock experiences the highest harvest rates.
- For Tanner crab, there is ample evidence for biological differences in Tanner crab between the eastern and western portions of the stock. When developing the new assessment model for Tanner crab, consideration should be given to incorporating such differences into the model. As a minimum, the assessment model should ultimately include differences in maturity-at-size parameters, which differ substantially between areas.
- The appropriate base years over which to estimate average recruitment for all crab stock projections, not just those for snow and Tanner crab, should be reviewed. As indicated above, the rebuilding analyses may not be very sensitive to alternative recruitment scenarios, but the choice of appropriate recruitment estimates needs to be evaluated in the stock assessment process. As was pointed out in public testimony, there is some evidence for a shift in average recruitment associated with the 1988/89 regime shift.
- To the extent possible, results from the net efficiency study should be incorporated into the rebuilding plan.

Alternatives for the snow and Tanner crab analysis are structured around different time frames for rebuilding. For snow crab, these range from T_{min}, the minimum number of years in which rebuilding to the B_{MSY} proxy could occur with 50% probability under no fishing, to T_{end}, the year in which rebuilding to the B_{MSY} proxy would occur with 50% probability if fishing at the maximum permissible rate (75% of F_{OFL}). The rebuilding plan will go into effect in 2011/12 (Year 1) and assumes that catches in 2009/10 and 2010/11 will be at 75% F_{OFL}.

The SSC concurs with the alternatives as outlined in the document but requests the following modifications:

- Because of the relatively short rebuilding time frame estimated by the model, concerns were expressed about the possibility of having to develop another revision to the rebuilding plans if environmental conditions result in a few more years of poor recruitment. The SSC requests that the analysis include an alternative for an 8-year rebuilding horizon. Given the current estimates of the probability of rebuilding (Table 1 in the snow crab rebuilding alternatives), this would correspond to a probability of approximately 70% in the example provided. The SSC recognizes the scenario in the final model may result in a different required probability of rebuilding. Therefore, the alternatives should be frameworked to describe that the probability of rebuilding for the 8 year option would be determined from a scenario based on a fishing mortality rate no greater than 0.75 F_{msy}.
- We recommend that all of the alternatives include a performance measure to evaluate the probability that the stock does <u>not</u> rebuild by a certain year (for example after 10 years), similar to the $B_{20\%}$ threshold for some groundfish. This would provide a stronger incentive to avoid a potential stock collapse.

Finally, the SSC requests that Council staff explore the possibility of placing additional harvest measures directly into the BSAI crab FMP for crab stocks that experience repeated "overfished" and "not overfished" designations owing to environmental changes despite conservative harvest control rules. These measures could include fishery closure below specified thresholds and would be designed in such a way as to avoid repeated overfished designations. In the case of Tanner crab, the fishery fell below the state's harvest threshold and was closed during 1997 to 2004. Once a Tanner crab stock assessment model is built, an informative modeling exercise would be to examine the effects of the directed Tanner crab fishery during 2005-2009, as well as Tanner crab bycatch during 1997-2009, on the current status of this stock approaching the overfished condition.