North Pacific Fishery Management Council

Dan Hull, Chairman
Chris Oliver, Executive Director

Telephone (907) 271-2809

605 W. 4th Avenue, Suite 306
Anchorage, AK 99501-2252

Fax (907) 271-2817

Visit our website: http://www.npfmc.org

Certified: Dan Benda
Date: 11/14/14

REPORT
of the
SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
October 6th – 8th, 2014

The SSC met from October 6th through 8th at the Hilton Hotel, Anchorage, AK.

Members present were:

Pat Livingston, Chair
NOAA Fisheries—AFSC

Chris Anderson
University of Washington

Brad Harris
Alaska Pacific University

Seth Macinko
University of Rhode Island

Terry Quinn
University of Alaska Fairbanks

Farron Wallace
NOAA Fisheries—AFSC

Robert Clark, Vice Chair
Alaska Department of Fish and Game

Alison Dauble
Oregon Dept. of Fish and Wildlife

Anne Hollowed
NOAA Fisheries—AFSC

Steve Martell
Intl. Pacific Halibut Commission

Kate Reedy
Idaho State University Pocatello

Milo Adkison
University of Alaska Fairbanks

Sherri Dressel
Alaska Department of Fish and Game

George Hunt
University of Washington

Lew Queirolo
NOAA Fisheries—Alaska Region

Matt Reimer
University of Alaska Anchorage

Members absent were:

Jennifer Burns
University of Alaska Anchorage

C-1 Observer Program 2015 Deployment Plan

Craig Faunce (NMFS-AFSC) presented the draft 2015 Annual Deployment Plan (ADP) for Observers in the North Pacific Groundfish and Halibut Fisheries off Alaska. Linda Behnken and Dan Falvey (Alaska Longline Fisherman's Association), Gerry Merrigan (Freezer Longline Coalition), David Poluchkin (K-Bay Fisheries Association), and Paul MacGregor (At-Sea Processor's Association) provided public testimony.

The 2015 ADP details proposed efforts to obtain at-sea and dockside observations suitable for estimating groundfish and halibut fishery catches and discards in the Gulf of Alaska (GOA) and Bering Sea/Aleutian

Islands (BSAI) while not exceeding the program budget. The draft 2015 ADP also provides a review of plan modifications based on the successes and challenges of previous seasons. As the SSC has noted previously, this will be an ongoing process to improve the program.

Three major changes were made to the 2014 ADP in developing the 2015 draft plan. These changes address issues that arose during the 2013 fishery and those previously identified by the SSC and Council:

1. Vessels that were in the vessel-selection stratum during 2013 and 2014 will be moved to a separate trip-selection stratum for 2015. The vessel-selection stratum was biased due to the reliance on vessel activities from the prior year. When combined with a liberal conditional release policy, this resulted in nearly 100% of vessels having to be selected to place sufficient observer days on these vessels. Moving these vessels to trip-selection will greatly improve the chances of a random sample of trips being observed.
2. Selection rates for the two categories of vessel size were updated to 12% for small (greater than or equal to 40' but less than 57.5' length overall (LOA)) vessels and approximately 24% for larger vessels. This addresses the Council intent of a higher rate of observing for larger vessels and provides for a reasonable level of coverage for both of the vessel size categories. This will also provide a high potential for observing the largest catches. However, simulations indicated that there will be a moderate level of unobserved trips in particular areas and with particular gear types that represent a small number of trips.
3. The conditional release policy was limited to situations of the capacity of the life raft on board a vessel.

While the SSC appreciates and approves of the major changes made to the ADP to improve the representativeness of data collected from observed trips, we have the following recommendations for improving the observing system into the future:

- We endorse the simulation approach used to determine where and when the probability of not being selected for an observed trip is highest and to examine budgetary constraints and tradeoffs in sampling rates of the two strata. This same approach can and should be used to investigate other measures of performance such as examining sampling rates for newly defined strata, expected precision of catch in specific fisheries, and the probability of meeting or missing catch targets (e.g., overfishing) given a fixed rate of observed trips.
- We urge the development of additional sampling strata that use covariates other than vessel size (e.g., by gear type or target fishery) to address times and areas that are likely to be inadequately sampled with a simple random sampling approach and fiscally realistic sampling rates. This could potentially address some of the coverage issues identified in simulations.
- The SSC considers the probability of no observed trips as a valid and appropriate measure of coverage. However, a standard set of performance measures should be developed for the purpose of evaluating how well the observer program is meeting its objectives. This would be based on precision and accuracy of estimating catch, bycatch, and catch of prohibited species, collection of biological information including length, age, and sex composition, and ability to fulfill assigned tasks, including special projects.
- There should be an evaluation of the tradeoffs from the loss of observing days due to weather, especially in ports with very few fishing trips, against the cost of reassigning these observed trips elsewhere.
- There should be an evaluation of the social and economic burden of the revised conditional release policy on fishing communities that have predominantly small-boat fleets with limited space on board for an observer. Consideration of safety issues other than life raft capacity should be given when replacing a crewmember with an observer.
- The potential use of electronic monitoring (EM) to increase coverage and reduce burden on smaller vessels with bunk and life raft constraints is promising, but the SSC noted that what

constitutes EM is not clearly stated (e.g., VMS could be a valuable supplement to camera systems) and that EM-generated data products will differ substantially from observer data. These issues should be discussed and clarified.

- The SSC encourages the continued effort to resolve sampling issues caused by tendering that can create the potential for bias in observed trips.

C-3 BSAI Crab Management

Bob Foy (NMFS-AFSC), Jack Turnock (NMFS-AFSC), and Diana Stram (NPFMC) presented the Crab Plan Team (CPT) report and sections of the Crab SAFE. Public testimony was provided by Leonard Herzog (Bering Sea Fisheries Research Foundation). The SSC reviewed the SAFE chapters and information provided by the Plan Team with respect to the stock status information from 2013/2014 relative to total catch in that time period (Table 1). The SSC notes that no stock was subject to overfishing in 2013/2014 and that Pribilof Islands blue king crab remains in an overfished status. In addition, Tables 2 and 3 contain the SSC recommendations for 2014/2015 catch specifications.

Table 1. Stock status of BSAI crab stocks in relation to status determination criteria for 2013/14. Values are in thousand metric tons (kt). Note diagonal fill indicates parameters not applicable for that tier level.

Chapter	Stock	Tier	MSST	B_{MSY} or $B_{MSYproxy}$	2013/14 MMB[1]	2013/14 MMB / MMB_{MSY}	2013/14 OFL	2013/14 Total catch	Rebuilding Status
1	EBS snow crab	3	71.50	143.00	126.50	0.88	78.1	28.1	
2	BB red king crab	3	12.85	25.70	27.12	1.06	7.07	4.56	
3	EBS tanner crab	3	16.98	33.96	72.70	2.14	25.35	2.78	
4	Pribilof Islands red king crab	4	2.58	5.16	4.68	0.91	0.90	0.0023	
5	Pribilof Islands blue king crab	4	2.00	4.00	0.28	0.07	0.00116	0.00003	overfished
6	St. Matthew Island blue king crab	4	1.55	3.10	3.04	0.98	0.56 [total male catch]	0.27 [total male catch]	
7	Norton Sound red king crab	4	1.00	2.00	2.16	1.08	0.18	0.16	
8	AI golden king crab	5					5.69	3.19	
9	Pribilof Islands golden king crab	5					0.09	Conf.	
10	Adak red king crab	5					0.054	0.001	

[1] MMB as estimated during this assessment for 2013/14 as of 2/15/2014.

Table 2. Maximum permissible ABCs for 2014/15 and SSC recommended ABCs for those stocks where the SSC recommendation is below the maximum permissible ABC, as defined by Amendment 38 to the Crab FMP. Bold indicates where SSC recommendations differ from Crab Plan Team recommendations. Values are in thousand metric tons (kt).

Stock	Tier	2014/15 *Max*ABC	2014/15 ABC
EBS Snow Crab	3b	68.8	62.1
Bristol Bay RKC	3b	6.82	6.14
Tanner Crab	3a	31.43	25.18
Pribilof Island RKC	**4a**	**1.34**	**1.02**
Pribilof Island BKC	4c	0.00116	0.00087
Saint Matthew BKC	4b	0.43	0.34
Aleutian Islands GKC	5	5.12	**4.26**
Pribilof Island GKC[1]	5	0.08	0.07
Norton Sound RKC	4b	0.21	0.19
Adak RKC	5	0.05	0.03

[1] For Pribilof Islands golden king crab, this is for the 2015 calendar year instead of the 2014-2015 crab fishing year.

Table 3. SSC recommendations for 2014/15 (stocks 1-6 and 9). Values for stocks 7, 8, and 10 were set by the SSC in June 2014. Bold indicates SSC recommendations differ from Crab Plan Team. Diagonal fill indicates parameters not applicable for that tier. Values are in thousand metric tons (kt).

Chapter	Stock	Tier	Status (a,b,c)	F_{OFL}	B_{MSY} or $B_{MSYproxy}$	Years[1] (biomass or catch)	2014/15[2 3] MMB	2014 MMB / MMB_{MSY}	γ	Mortality (M)	2014/15 OFL	2014/15 ABC	ABC Buffer
1	EBS snow crab	3	b	1.34	142.9	1979-current [recruitment]	137.6	0.96		0.23(females) 0.386 (imm) 0.2613 (mat males)	69.0	62.1	10%
2	BB red king crab	3	b	0.28	25.7	1984-current [recruitment]	24.69	0.96		0.18 default Estimated[4]	6.82	6.14	10%
3	EBS Tanner crab	3	a	0.61	29.82	1982-current [recruitment]	63.8	2.14		0.34 (females), 0.25 (mat males), 0.247 (imm males and females)	31.48	25.18	20%
4	Pribilof Islands red king crab	4	**a**	0.18	**5.74**	1991-current	**8.89**	**1.55**	1.0	0.18	**1.36**	**1.02**	**25%**
5	Pribilof Islands blue king crab	4	c	0	4.00	1980-1984 1990-1997	0.22	0.05	1.0	0.18	0.00116	0.00087	25%
6	St. Matthew Island blue king crab	4	b	0.18	3.53	1978-current	3.04	0.86	1.0	0.18	0.43 [total male catch]	0.34 [total male catch]	20%
7	Norton Sound red king crab	4	b	0.157	1.9	1980-current [model estimate]	1.68	0.88	1.0	0.18 0.68 (>123 mm)	0.21 [total male]	0.19 [total male]	10%
8	AI golden king crab	5				See intro chapter					5.69	**4.26**	25%
9	Pribilof Island golden king crab	5				See intro chapter					0.09	0.07	25%
10	Adak red king crab	5				1995/96–2007/08					0.05	0.03	40%

[1] For Tiers 3 and 4 where B_{MSY} or $B_{MSYproxy}$ is estimable, the years refer to the time period over which the estimate is made. For Tier 5 stocks it is the years upon which the catch average for OFL is obtained.

[2] MMB as projected for 2/15/2015 at time of mating.

[3] Model mature biomass on 7/1/2014

[4] Additional mortality males, two periods: 1980-1985; 1968-1979 and 1986-2013. Females, three periods: 1980-1984; 1976-1979; 1985-1993 and 1968-1975; 1994-2013. See assessment mortality rates associated with these time periods.

Snow Crab

Jack Turnock (NMFS-AFSC) presented the results of the stock assessment for the eastern Bering Sea (EBS) snow crab assessment. There was no public testimony for EBS snow crab, but there was a letter submitted during the SSC meeting from Scott Goodman (Bering Sea Fisheries Research Foundation). Retained catch in 2013/14 fishery (24.5 kt) was lower than the 2012/13 fishery (30.1 kt), and was below the 2013/14 OFL of 78.1 kt. The MMB in 2013/14 (126.5 kt) was above the MSST of 71.5 kt.

Changes to the model structure this year included a new growth model with a differentiable transition between two linear models (based on a recommendation from a CIE review). An alternative model with two linear segments was also explored. **The SSC accepts the use of the growth model with a differentiable transition for the current assessment, but recommends that a non-parametric function for growth might be more suitable than the five-parameter growth model for each sex suggested by the CIE reviewer.** The model included new biomass and length frequency data from the 2014 NMFS EBS trawl survey, retained and discarded catch and size composition from the 2013/14 directed fishery, and discarded catch and length-composition data from groundfish fisheries. A sensitivity analysis explored the penalties on the mean fishing mortality rates; model results were relatively insensitive, except in cases where the penalties were extremely small or zero.

The author recommended using model scenario 2b for OFL and ABC recommendations. Scenario 2b incorporates the new CIE-suggested two-segment growth model with a smooth transition and a weight of two on the likelihood to fit the growth data. Average recruitment was based on estimated values between 1978 and 2014. **The CPT agreed with the author's recommendation of using scenario 2b for 2014/15 specification purposes and the SSC supports this recommendation. Results from the assessment place the EBS snow crab stock in Tier 3b. Projected 2014/15 mature male biomass at mating is 137.6 kt, and the B_{MSY} proxy ($B_{35\%}$) is 142.9 kt.** For the above reasons regarding sensitivity and model structure, **the SSC supports the Crab Plan Team recommendation to use a 10% buffer to set the ABC below the maximum permissible. Based on the $F_{35\%}$ control rule, the resultant OFL for 2014/15 is 69.0 kt (152.1 million lbs.) and the ABC is 62.1 kt (137.0 million lbs.).**

The SSC has some additional suggestions for future work. There is an unfortunate residual pattern in the fits to the growth increment data, where the new model tended to under-estimate the molt increment. The CPT had some discussions regarding small crabs possibly molting two times per year, which could partially explain the poor fits to a linear growth model. **The SSC supports the CPT suggestion to investigate the possibility of small crabs molting two times per year.** Reducing the penalty on the mean fishing mortality rate results in increased estimates of fishing mortality rates and decreased estimates of mature male biomass. The overall global scaling of the model is, therefore, a result of the penalized likelihood, which is somewhat subjective. The SSC is also concerned about the *ad hoc* weighting assigned to the different data sources. It is difficult to infer what the relative weighting values are in terms of assumed variances. **The SSC recommends that an inverse variance weighting be developed for this relatively data-rich assessment. The SSC supports the CPT recommendation to investigate different weighting for fishing mortality, by time period, in place of the overall component weight. The SSC also recommends a within-model retrospective analysis be conducted.** In the development of the new generalized modeling software for Alaska crab stocks, new likelihood options for composition data have been developed where these functions estimate the effective sample size. The SSC encourages exploration of these new likelihood formulations to increase objectivity in data weighting and, potentially, solve the sensitivity of model results to the penalized likelihood. The SSC notes that the titles of Tables 13 and 14 should clarify that the tables present the negative log likelihood. Also, Tables 13 and 14 would benefit from using unweighted components, so models can be compared. **The SSC supports the CPT recommendation to include tagging data and an examination of the spatial distribution of catch and abundance as research priorities, since it appears that the mature population is shifting geographically**.

Bristol Bay Red King Crab

The author was responsive to many of the SSC and CPT requests. In response to the request for additional information on the potential cause of the southwest to northeast shift in distribution of mature female red king crab within the Bristol Bay area that occurred during the late 1970s to early 1980s, the author compared temporal trends in distribution. These trends were then compared to fishing patterns and trends in environmental variables (summer survey near-bottom temperature and the winter PDO index). The author concluded that the time trends in shifts in distribution were consistent with the hypothesis that environmental conditions were an important factor. The SSC recommends that the author extend this analysis to incorporate a statistical analysis, similar to that conducted by Kotwicki and Lauth (2012). In addition to the PDO, the SSC recommends that the authors consider including the Arctic Oscillation as a potential climate driver. **Given the results of this study, the SSC suggests that the author consider incorporating bottom temperature as a covariate on survey Q, using the method in Wilderbuer et al. (2013).**

Relative to 2013, several changes to the input data were incorporated into the 2014 assessment, including: the trawl survey time series through 2014, per revised NMFS estimates; updated catch, PSC, and bycatch data through 2013/14; new trawl PSC length frequency data for 1986 through 2012; revised groundfish PSC estimates for 2009/10 through 2013/14; and re-estimated direct and indirect crab fishery bycatch and effort estimates.

The author examined three model scenarios:

- 4na – the model scenario that was accepted for the 2013 assessment (the base model). This scenario assumes survey Q = 0.896, based on the Somerton and Otto under-bag experiment.
- 4nb – similar to 4na, except trawl survey selectivity, Q, is estimated within the model. This scenario is the author's recommendation for the 2014 assessment.
- 4n7 – the same as 4nb, except two additional M parameters during 2006 through 2010 for males and females are estimated to allow for higher natural mortality during that period. This scenario was presented to satisfy a June 2014 request from the SSC.

The SSC agrees with the author and the CPT that Model 4nb should be used for estimates of 2014/15 biological reference points. The SSC also agrees with the author and the CPT that the recruitment time period should be 1984 through 2014 to determine the biological reference points. Based on these decisions and the associated reference points, the SSC concludes that the BBRKC is currently in Tier 3b. The SSC considers estimation of survey Q within the model as an improvement to the base model.

The SSC notes that, as expected, Model 4n7 fits the 2002 through 2013 survey values well with the exception of the most recent data point. The improvements in fit were due, in part, to a substantial increase in natural mortality from the assumed M = 0.18 to an estimate of M = 0.27 during the period 2006 through 2010.

The SSC shares the CPT's concern that improvement in model fit by increasing M is not a sufficient condition for accepting Model 4n7. The SSC reiterates its previous recommendation that the author test the hypothesis that natural mortality varies annually due to environmental change, by running a research model with a random walk on M and then statistically evaluating relationships between time trends in estimated M relative to plausible mechanisms influencing M. An alternative exploratory model would be to explore no additional mortality, but time-varying or temperature-dependent survey Q.

The SSC supports the OFL of 6.82 thousand tons and ABC of 6.14 thousand t, recommended by the author and CPT. The SSC recommends using the status quo 10% buffer on OFL for setting the ABC, the buffer for a stock with relatively low uncertainty.

The SSC recommends that if Model 4n7 is brought forward in 2015 as an alternative model, that reference points for Model 4n7 be recalculated with the higher M = 0.27 estimated for 2006 through 2010. The SSC looks forward to the additional work planned by the author: implementing a random walk for natural mortality, investigation of recruitment dynamics, and investigation of survey weighting.

Tanner Crab

The directed fishery for Tanner crab was reopened in 2013/14 for the first time since 2009/10, meeting State of Alaska criteria for opening the fishery. This stock qualifies for Tier 3, and the current model structure is the same as that used in the 2013 assessment, based on crab size, sex, shell condition, and maturity.

At the request of the SSC and CPT, many of the previous input data were recompiled and corrected. These include retained size frequencies in the directed fishery, recalculated for 1990/91through 2009/10 and updated for 2013/14. Effort data in the crab fisheries were recalculated for 1990/91through 2012/13 to improve apportionment among fisheries and updated for 2013/14. The bycatch time series from crab fisheries observer data were recalculated for 1992/93 through 2012/13, as were annual total at-sea size compositions. The time series of Tanner crab PSC in the groundfish fisheries were recalculated for 2009/10 through 2012/13, updated to 2013/14, using State of Alaska statistical reporting areas to expand groundfish observer data to unobserved catch. Prohibited species catch size frequencies in the groundfish fisheries were recalculated for 1973/74 through 2012/13, based on the crab fishing year (July 1 through June 30), rather than the groundfish year (Jan. 1 through Dec. 1). Abundance, biomass, and size frequency estimates from the 2014 NMFS EBS bottom trawl survey were also added to the assessment. The 2014 survey showed an increase in mature male biomass and a decrease in female biomass in 2014.

The revised inputs are a much improved version of historical data and did not substantially change the results. This assessment cycle, the author considered three basic suites of models; 1) Alt0 models used the base model from the previous assessment (including previous data errors) updated only with new 2013/14 survey and fishery data; 2) Alt1 models used corrected and recalculated data; and 3) Alt2 and Alt3 models are based on an alternative version (TSCSAM-FRev) of the Tanner Crab Stock Assessment Model, which implements the GMACS catch equations. These models use a revised handling mortality rate of 0.321 compared to the default value of 0.500, and represent a major change to the assessment methodology. This revised rate was recommended at the May 2014 CPT meeting, based on results of a short-term handling mortality study using Reflex Action Mortality Predictor (RAMP) scores.

Initially, the model scenario that incorporated the discard mortality rate was unable to estimate selectivity during the 1997 through 2004 time period for male bycatch in the snow crab fishery (Model Alt1b). A new model, based on a re-parameterization of selectivity in the snow crab fishery, was developed by the author during the CPT meeting (Model Alt4b).

This model addressed issues of estimating selectivity, and Model Alt4b was subsequently forwarded by the CPT as the preferred model. **The SSC agrees with the author's and CPT recommendations to use the revised Model Alt4b and revised data inputs for 2014/2015 specifications.** The OFL for this stock is based on the Tier 3 control rule. The stock was not overfished and overfishing did not occur in the past year. The Team considered it appropriate to make the final incremental step to the ABC, but expressed concern about the uncertainty in this stock assessment model, and recommended a 20% buffer in ABC. **The SSC concurs with this buffer.**

The Plan Team provided a number of recommendations to the stock assessment authors, which the SSC supports. The SSC looks forward to improved assessment software that will permit simulations and retrospective analyses to uncover any hidden deficiencies in the assessments. The SSC encourages authors to explore alternative models, such as time-varying growth, to help address retrospective bias and patterns in other residuals. The SSC also encourages the authors to explore model alternatives without time varying selectivity for the groundfish fishery and, if time allows, use of MSE to explore the effect of alternative harvest rates on stock status and yield under various sources of uncertainty. The SSC appreciates the substantial effort made to improve the quality of the existing data series, which has improved confidence in the assessment. The SSC encourages efforts to obtain better and more representative growth data.

Pribilof Islands Red King Crab

The fishery for Pribilof Islands red king crab has been closed since 1999. Fishing mortality is limited to incidental catches in the directed crab fisheries and PSC in groundfish fisheries. Recent catches range from 2.25 tons to 13.1 tons (0.005 to 0.029 million pounds; 2010/2011 through 2013/2014) and are well below the annual OFL/ABCs. The stock was above the MSST in 2013/2014, and is not overfished. Overfishing did not occur in the 2013/2014 year.

Two alternative models were presented this year. The status quo model calculated an index of MMB as a three-year running average, weighted by the inverse variance. A new length-based integrated assessment model was also presented. The integrated assessment model incorporates multiple sources of data for this stock, and uses MCMC to account for uncertainty. The CPT and SSC reviewed the new model in June 2014. As requested by the SSC, the author presented both Tier 3 and Tier 4 harvest specifications based on the integrated assessment, and Tier 4 harvest specifications based on the running average model (status quo).

The SSC acknowledges the responsiveness of the stock assessment author to both CPT and SSC comments and the substantial effort to develop the new model. The SSC supports further development of this model that incorporates multiple data sources.

The SSC discussion focused on whether to use the new model or continue with the status quo for the purpose of setting harvest specifications for 2014/15. The SSC agrees with the CPT that the new integrated model represented a significant step forward, but is concerned about: 1) relatively poor fits to mature male numbers from the survey data from 1990 forward, and 2) opposite trends in recent MMB estimates between the running average method and the new integrated model. The SSC asks the author to investigate the factors influencing the poor fit to the male survey numbers, and to consider truncating the time series if the fit to the numbers in the 1990s is overly influenced by the low abundances in the 1970s and 1980s. Given these concerns, the SSC recommends not using the integrated model for setting 2014/15 harvest specifications. **As a result, the SSC recommends continuing with the running average assessment method for estimating MMB, and continuing with Tier 4 harvest control rules. This results in an OFL of 1,359 t (3.00 million lbs.) and a maximum ABC of 1,338 t (2.95 million lbs.)**. The SSC also notes that by using the running average methodology for 2014/15, the B/B_{MSY} ratio is >1, placing PIRKC in Tier 4a.

The SSC further recommends reduction in the maximum permissible ABC by a buffer of 25% to address the large uncertainties associated with the survey biomass point estimates. This buffer is an increase from the buffers used in recent years. This makes the buffer consistent with other Tier 4 crab stocks, particularly the Pribilof Islands blue king crab stock. **Application of the 25% buffer results in a recommended ABC of 1,019 t.**

Finally, the SSC looks forward to seeing a revised integrated model in the future. In addition to investigating the poor model fit, as requested above, the SSC supports the author's suggestions outlined in section 7 of the SAFE chapter, particularly the suggestion to further investigate model sensitivity of different size bins on growth and management specifications. Also, the SSC concurs with the CPT recommendations for model improvement.

Pribilof Islands Blue King Crab

The Pribilof Islands blue king crab fishery began in 1973, and has been closed with no retained catches since 1998/99. The Pribilof Islands blue king crab stock was declared overfished in 2002. Improved estimates of discarded catch were calculated for 2009/10 through 2012/13 based on a new methodology using State of Alaska reporting areas, and have been recalculated for 2009/10 through 2013/14 to correct an error in the estimation method. PSC and discards have been steady or decreasing in recent years, with a total catch mortality in 2013/14 of 0.03 t.

As in last year's assessment, survey biomass and catch analyses included an additional 20 nm strip on the eastern portion of the Pribilof District, due to the change in the stock boundary. Mature male biomass at the time of the survey decreased slightly, but the uncertainty in biomass estimates is extremely high due to low survey catches. Following the approach in the 2012 assessment, biomass estimates were based on a 3-year weighted average, centered on the current year, and weighted by the inverse of the variance. The projected MMB decreased from 0.28 kt in 2013/14, to 0.22 kt in 2014/15, and remained well below the minimum stock size threshold.

The SSC supports the CPT's and authors' recommendations for management of Pribilof Islands blue king crab under Tier 4c, to reflect the conservation concerns with this stock, and to acknowledge the existing non-directed bycatch/PSC mortality. Following the advice of the CPT, **the SSC recommends a modified Tier 5 calculation of average catch mortalities between 1999/2000 and 2005/06, resulting in a total catch OFL of 0.00116 kt. Similarly, the SSC supports using a 25% buffer for the ABC calculation, resulting in an ABC of 0.00087 kt. The Pribilof Islands blue king crab stock is overfished; however, overfishing did not occur during the 2013/14 season.**

The MSY stock size (B_{MSY}) is based on mature male biomass at the time of mating (MMB_{mating}), which serves as an approximation for egg production. The MMB_{mating} for 2014/15 was estimated at 0.22 kt. For 2014/15, $B_{MSYproxy}$ = 4.00 kt of MMB_{mating} derived as the mean MMB_{mating} from 1980 – 1984 and 1990 – 1997. Compared to other BSAI crab stocks, the uncertainty associated with the biomass estimates for Pribilof Islands blue king crab is very high due to insufficient data and the restricted distribution of the stock relative to the survey sampling density. As a result, the stock demonstrated highly variable levels of MMB during both of these time periods, likely leading to uncertain approximation of B_{MSY}.

Proposed Crab FMP and regulatory amendments were submitted for review in early 2013, because NMFS determined that the stock was not rebuilding in a timely manner and would not meet the rebuilding horizon of 2014. The amendments are still under review.

Saint Matthew Island Blue King Crab

The directed fishery was closed in 2013/14 due to declining trawl survey estimates of abundance and concerns about the health of the stock. The 2014 assessment estimates that the stock is currently below the proxy for B_{MSY}, as it was in the previous year. This stock assessment model is a 3-stage length-based catch-survey analysis (CSA), assessing the male crab ≥90 mm CL. The author reviewed input data that include the most recent fishery and survey data, including the 2013 pot survey, and groundfish PSC estimates.

The author explored four model configurations: 1) Model O - the base model used previously; 2) Model S - the base model with time-varying trawl-survey selectivity; 3) Model T - the base model with an alternative stage-transition matrix; and 4) Model ST - the base model with both modifications above. The model formulations addressed concerns previously raised by the CPT and SSC. The author recommended use of Model ST that has both time-varying trawl survey selectivity and the revised stage-transition matrix. However, the CPT noted concerns with time-varying selectivity as no clear mechanism was apparent.

The CPT chose Model T, which does not have time-varying selectivity, but does have the alternative stage-transition matrix. While Model T fits the data better than the base model, it still has poor fits to stage composition data and a retrospective pattern. The author recommended, and the CPT concurred, a 20% buffer on the OFL for the ABC, because of additional uncertainty in the model. **The SSC concurs with CPT selection of Model T and a 20% buffer to determine OFL and ABC.**

The CPT had a number of recommendations for future model explorations, and the SSC agrees with these recommendations. The SSC appreciates the author providing a likelihood profile on the natural mortality rate and recommends further model explorations on model fit to each data component as natural mortality rate changes. The SSC also requests the author explore the inclusion of potential environmental variables, such as nearshore temperature data, as an explanation for the temporally patterned residuals in the survey composition data. The mechanism might be environmentally-driven changes in biological factors, such as growth or mortality, or simply changes in the availability of different life stages to the survey. Any available data that might distinguish these phenomena should be examined.

Norton Sound Red King Crab

A new annual cycle will occur for NSRKC in the next year to better accommodate winter and summer fisheries. The new schedule is:

September/October: Model progress report and review at CPT and SSC meetings.

January: Half-day CPT meeting to propose final specifications of ABC and OFL. This will occur after the 3-day Crab Modeling Workshop; after 2015, the situation is fluid because having funding for the crab workshop is what motivates this time period.

February: The SSC sets final ABC and OFL.

Hamachan Hamazaki (ADF&G) presented an overview of model developments. The author developed an improved length-based model that addresses several of the previous CPT and SSC comments. Of six model configurations considered, both the author and CPT recommended use of Model 2io, which had separate selectivities for NMFS and ADF&G trawl surveys, included winter survey data as a means of informing the winter fishery harvest, and estimation of a growth matrix inside the model and separated for newshell and oldshell crab. The SSC concurs with this recommendation. In the assessment, the metric for biomass will be mature male biomass (MMB) on February 1.

The CPT had two recommendations for improvements to the model for January. First, the model has separate mortality parameters for the last length class and for all other length classes; this is viewed as biologically implausible. The CPT recommended further exploration of a model with constant natural mortality, which is biologically plausible, but has problems with model fit and effects on estimates of other parameters. Secondly, the CPT requested a sensitivity study of the tag-recovery weights, which have an effect on selectivity parameter estimates. In addition, the author plans to examine model parsimony in more detail because ADF&G and NMFS survey selectivities are similar and some survey selectivity values can probably be set to 1.

The SSC concurs with these recommendations. It also recommends comparing the standard deviation of residuals to the input standard deviation, to develop a more objective weighting of the various likelihood components in the model.

Pribilof Island Golden King Crab

Pribilof Island golden king crab is managed as a Tier 5 stock. Thus, it is not possible to determine stock status and, consequently, it is unknown if the stock is overfished. Due to the limited number of participants in this fishery, catch information is confidential. However, the author indicates that the total catch in 2013, the most recently completed fishing year, did not exceed the OFL of 0.20 million lbs.

The 2015 OFL of 91 t was recommended by both the assessment author and the CPT. **The SSC concurs with this OFL recommendation.** While the SSC has raised concerns about the relatively short time period for the OFL estimation in the past, using the 1993 through 1998 time period is consistent with recent assessments.

The author and CPT recommended an ABC reduced by 25% from the maximum permissible. The rationale is to be consistent with the uncertainty of other golden king crab assessments (e.g., Aleutian Islands GKC) and increased concern because of the cancellation of the 2014 EBS slope survey and the dramatic decrease in the estimated biomass in the Pribilof Islands area from 2010 – 2012 (the most recent data). **The SSC agrees with the 25% buffer recommendation, resulting in an ABC of 68 t.** The SSC notes the difficulty in setting harvest specifications with so much of the recent fishery dependent data being confidential, especially in this situation where a large buffer is considered and recommended.

Additionally, the SSC recommends revisiting alternative Tier 4 calculations, as suggested by the SSC and CPT in 2013. However, the cancellation of the EBS biennial slope survey in 2014 means that this recommendation is moot until a survey can be completed.

Other Items

Uncertainty and ABC buffers - The SSC appreciates the CPT review, discussion, and recommendations with respect to treatment of uncertainty and consistency in ABC buffers, as requested by the SSC in June 2014. The relative groupings in assessment uncertainty from the 2010 ACL analysis, together with a review of tier levels and buffer amounts employed historically since the ABC rule, was a good starting point to look at consistency. The CPT recommendations for more buffer consistency within and across tier levels and the rationale provided for those changes seem appropriate for going forward. However, it should be noted that because the SSC did not accept the CPT recommendations this year for Pribilof Island red king crab tier level, our decision on an uncertainty buffer for this stock was changed to be consistent with other similar Tier 4 stocks (25%). The SSC encourages the CPT to move forward with the proposed scorecard for assessments to include in the SAFE that would provide a suite of metrics for evaluating uncertainty in various factors that would be considered each year in estimating uncertainty. It was recognized in the discussion that there is still difficulty in translating relative levels of uncertainty into actual changes in the recommended buffers. The SSC supports the idea of an uncertainty workshop to be held in the fall of 2015. This workshop would be informed by the upcoming Lowell Wakefield symposium, to be held in May 2015, that will focus on methods for data limited stocks. A paper by Carruthers et al. (2014) was mentioned as one to consider when reviewing methods for setting limits for such stocks.

GMACS – The SSC had some discussion about the content and structure of the proposed January modeling workshop. It was suggested that the highest priority for the workshop would be to get stock assessment authors together for a workshop, where the format would be hands on applications of GMACS on their own computers. In addition, some preparatory work would be needed in identifying

unique features needed to convert their assessment into the GMACS framework. If this is not feasible, then the other items mentioned by the CPT would also be important as topics for the workshop.

Ecosystem Considerations chapter – The SSC agreed with the CPT that incorporating crab-specific indicators into the Ecosystem Considerations chapter for the Groundfish SAFE would be the most effective way to move forward. The Ecosystem Considerations chapter would then serve as a stand-alone document that would serve the Groundfish and Crab Plan Teams, the SSC, and Council.

C-4 Groundfish Plan Team Report and Harvest Specifications

The SSC received a series of presentations from Grant Thompson (NMFS-AFSC) and Diana Stram (NPFMC) that included all items from the September 2014 Joint, BSAI, and GOA Groundfish Plan Team meeting. The presentation from the Joint Groundfish Plan Team included recommendations regarding the Recruitment Working Group, Survey Averaging Working Group, stock-specific ecosystem considerations, research on groundfish recruitment indices, arrowtooth flounder model development, catch projections, EFH 5-year review and fishing effects, research priorities, and squid harvest specification methods. The BSAI Team presentation contained information on the Bering Sea shelf bottom trawl and acoustic-trawl survey results, recommendations on eastern Bering Sea Pacific cod, Aleutian Islands Pacific cod, blackspotted/rougheye rockfish spatial analysis, shortraker rockfish biomass estimation, POP models with spline-based selectivity, arrowtooth flounder stock structure, "Other rockfish" stock structure, Alaska skate assessment, and BSAI harvest specifications. The GOA Team presentation contained recommendations on N/S rocksole assessment, POP assessment, Pacific cod assessment, shark assessment, demersal shelf rockfish assessment and ASA model update, RE/BS rockfish assessment, GOA pollock apportionment, and GOA harvest specifications.

Public testimony was received from Gerry Merrigan (Freezer Longline Coalition), Jason Anderson (Alaska Seafood Cooperative), and Julie Bonney (Alaska Groundfish Data Bank). Items where the SSC had comments or recommendations in addition to or different from the Plan Teams are listed below.

GOA Pollock Apportionment

The GOA Plan Team considered the following two proposals for changing the terminology for the area splits for GOA pollock:

"Alternative 1. The SSC clarifies that an overage of the area ABCs is not a conservation issue for GOA pollock, and any reapportionment of the TAC between the areas 610, 620, 630, and 640 would not be considered exceeding an area ABC."

"Alternative 2. Change the name of area ABCs to apportionment of the ABC or subarea-ABCs. In the harvest specifications, the apportionments of the ABC are called ABC. If they were called an apportionment of the ABC in the harvest specifications, this would help clarify the Alaska Region's definition of the ACL as the ABC area apportionments summed to the area to which the OFL is specified."

Under these alternatives the SSC would still set a combined Western/Central/West Yakutat (W/C/WYAK) ABC and area apportionments. The Council would continue to set the overall TAC and area TACs less than or equal to the overall ABC and ABC apportionments. NMFS would still manage catch to not exceed the area TACs, except where allowed under the GOA pollock reapportionment regulations.

The Plan Team recommended a combination of Alternatives 1 and 2, and requested clarification from the SSC that an overage of the area ABCs is not a conservation issue, and that the names are changed to "apportionment of the ABC" or "subarea-ABCs". **In discussion, it was then clarified that**

"apportionment of the subarea ACL" should be the term employed to allow regulatory reapportionment.

The SSC notes that the proposed change in terminology is acceptable for W/C/WYAK GOA pollock only. The Eastern GOA region was split based on stock structure considerations. Within the W/C/WYAK, the Steller Sea Lion Reasonable and Prudent Alternatives (SSL RPAs) provide a spatial and seasonal apportionment procedure for GOA pollock. The SSC expects that the SSL RPAs, together with sub-area ACL apportionments, would be an effective tool for limiting localized depletion in the W/C/WYAK. The SSC agrees with the GOA Plan Team that the small departures from the subarea ACLs allowed within the SSL RPAs are not a conservation issue for GOA pollock.

With the change in terminology noted above for GOA pollock, the SSC recommends approval of the 2015 and 2016 preliminary specifications for the BSAI and GOA groundfish.

For the most part, the SSC supports the GPT recommendations, but also had comments and additional recommendations on some of the items presented that are provided below.

BSAI and GOA Pacific Cod Models

BS cod - Grant Thompson (NMFS-AFSC) noted that the BS survey for Pacific cod was up 35% from the 2013 survey results. The Plan Team reviewed 6 models (5 requested models and 1 suggested by the author). Model 1 was chosen for specifications in 2011 through 2013. Models 2 through 5 were exploratory models based on model 4 from the 2012 assessment cycle. The main differences between exploratory Model 2 and Model 1 are: (1) annual length-weight relationships, (2) 10 initial age-classes estimated, (3) 4 parameter growth model, (4) freely estimate recruitment standard deviation, (5) length-based survey selectivity, (6) double-normal fishery selectivities for 5 seasons with one season forced to be asymptotic, (7) 2 survey selectivity parameters with annual deviations, and (8) survey catchability Q re-estimated iteratively (not treated as a latent variable). Model 3 is the same as Model 2, but with Q = 1. Model 4 estimates an additional survey variance scalar for the estimated sample variance in each survey CPUE. Model 5 fixes Q = 1 and freely estimates natural mortality. Model 6 is the new exploratory model brought forward by the author. Major new features of Model 6 include a single fishery with time varying age-specific selectivity and Q estimated internally. Model 6 requires a laborious process of iterative re-weighting and tuning due to the large number of time-varying parameters involved. Statistically, Models 4 and 6 explained the data the best; however, Model 4 inflates the variance of the survey CPUE estimates and is the basis for the improved fit. However, the two models differ qualitatively in the trends over the terminal years of the assessment. Models 2 through 5 were deemed to be poor and the Plan Team recommends that Models 1 and 6 be brought forward in November. **The SSC agrees with the Plan Team and also notes that the re-weighting procedure does not need to be repeated for Model 6. The SSC also agrees with the Plan Team regarding estimation of a single L1 parameter for growth, instead of the annual estimates.**

Selectivity of the survey trawl gear is still a great source of uncertainty. Vertical experiments based on archival tag data from 11 fish suggested that a large fraction of fish may be above the height of the head rope. Recent acoustic field work conducted by AFSC/RACE indicates that the bulk of the cod biomass is very near the bottom when the survey trawl passes, which is in contradiction to the archival tag data. The acoustic data suggests that catchability is near 1, as estimated by Model 6. Additional analysis will be forthcoming in the next assessment cycle that may help resolve this issue.

AI cod - The major change from the previous years' model was changing the initial start year of the model data from 1977 to 1991. The justification was the large changes in the size composition data pre- and post-1990. The model is based on a single fishery and a single fishing season, with age-specific selectivity modeled as a random walk process with priors on the parameters that would force asymptotic

selectivity in the absences of composition data. Several variants of this model were presented: Model 1, with recruitment offset set to zero; Model 2, with recruitment offset estimated freely; Model 3, same as 2, but with survey selectivity forced to be asymptotic. Estimates of survey catchability Q were approximately 0.63 for all 3 models and were not influenced by the prior on Q centered at 1. The exclusion of the pre-1991 data eliminated many of the model convergence issues experienced in previous years.

The SSC agrees with the Plan Team recommendations, including limiting the data to post-1990, and bringing three candidate models forward to the November plan team meeting. The three models are: Model 1, with no recruitment offset; Model 2, a variant of Model 1 with a more informative prior on survey selectivity that better approaches a logistic curve; and a Tier 5 assessment based on the random effects model.

GOA cod - The assessment author presented 5 alternative models, and the Plan Team recommended that Models P1, S1a, and S1b be brought forward to the November plan team meeting. Model P1 is the model from last year. The S1 models differ in that they use conditional age at length for survey data and include a recruitment variability multiplier. Model S1b uses non-parametric selectivity functions (cubic splines). The Plan Team recommends that the starting values for composition sample weights be based on the number of hauls or trips, rather than the number of samples. The Plan Team also recommends the author explore the use of the IPHC setline survey data as an index for adult Pacific cod. **The SSC agrees with all the recommendations made by the Plan Team.**

Arrowtooth Flounder Models

Ingrid Spies (AFSC) is undertaking the task of modifying the arrowtooth flounder models in the Bering Sea/ Aleutian Islands (BSAI) and Gulf of Alaska (GOA) to be more similar and consistent. There are differences in modeling catchability and selectivity, and in binning length compositions into age classes. Survey selectivity has been modeled in two ways: (1) as a logistic function in the GOA, BSAI slope, and AI; and (2) as individual selectivity-at-age values with smoothing penalties in the BS shelf. Investigations have included the effect of temperature on survey catchability in the BSAI and GOA, the use of empirical information (Somerton et al. 2007), the choice of a starting age, and comparing the two different selectivity models in both areas. Because this is an off-cycle year in the GOA, the arrowtooth model will only be brought forward in November to the BSAI Team. The Plan Teams recommended additional work and comparison of both selectivity models. For the selectivity-by-age model, the sensitivity to the weightings for the smoothing penalties should also be explored. **The SSC concurs with the Plan Team recommendations.**

BSAI Rockfish

The SSC received a presentation on two BSAI rockfish species. The first compared alternative Tier 5 biomass estimators for BSAI shortraker rockfish that include a random effects model (recommended by the Survey Averaging Work Group), and a surplus production model (Kalman filter implementation of the Gompertz-Fox model) that has been used in several previous assessments. The random effects model and the surplus production model gave very similar results, and appeared to provide effective methods for smoothing the survey time series appropriately. **The Plan Team recommended, and the SSC agrees, that the random effects model be included in the November assessment, anticipating that this will be the preferred model for use in setting ABC and OFL.**

The second presentation was the Pacific ocean perch (POP) assessment authors' responses to CIE and SSC comments on the assessment addressing concerns on selectivity and the age-plus group. The Team recommended that the authors include at least one model with spline-based fishery selectivity in the November POP assessment, and encouraged the authors to include a spline-based model for other age-structured BSAI rockfish assessments, to the extent that time permits. In the event that the model with

spline-based selectivity proves to be unsatisfactory, then the Team recommends further exploration of alternative models. **The SSC agrees with Plan Team recommendations**.

The SSC notes that the transition from dome-shaped to asymptotic fishery selectivity appears to correspond with a period of change in the percent of observed catch, by depth and by region (Fig 1). **The SSC recommends the authors examine the potential interaction of these processes.** The SSC cautions the assessment author that while cubic splines are an effective tool for interpolation, they are not appropriate for extrapolation. Great care should be taken in cases where the time-varying nonparametric spline function is being used to extrapolate beyond years for which there is composition information. The POP assessment model starts in 1960, but length-composition data do not start until 1964. **The SSC recommends that the author implements the time-varying bicubic spline with the first year node, starting at the first year of available composition data.**

GOA Rockfish

The SSC received a presentation on two GOA rockfish species that included Pacific ocean perch (POP) and demersal shelf rockfish (DSR). In 2013, the POP authors conducted a full assessment, but were unable to include updated POP maturity data. At the request of the SSC, the authors will provide a full assessment in 2014, evaluating the effects of new maturity data, survey length data on recruitment estimates, and sample size specified for age data. The assessment author also provided an evaluation of an alternative approach using a random-effects model for area apportionment. The Plan Team recommended using the random effects model, rather than the weighted survey average approach, to the extent practicable, for POP and for rockfish in general. **The SSC agrees with this advice.**

The Plan Team also recommended: 1) an evaluation of how the data weights given to the various fishery and survey age and length composition data affect the estimates of recruitment and age composition; 2) evaluate the value of information contained in the survey length data and the transition matrix; and 3) that the author consult with the Age and Growth Lab about the possibility of obtaining additional recent POP age information to incorporate into the model. **The SSC agrees with Plan Team recommendations and looks forward to the revised POP assessment in November.**

The SSC received an overview of the annual SE demersal shelf rockfish (DSR) stock assessment and an initial development of an age structured assessment for 2015. The age structured assessment included annual catch data from the directed commercial fishery and bycatch in the commercial halibut longline fishery, as well as annual catch-per-unit effort from the directed DSR fishery and the IPHC longline survey. Model estimates of abundance were scaled by fitting density estimates from ROV and submarine surveys, and the area of rocky habitat for each management area. Indices of abundance and the initial population assessment model indicate a substantial decadal decline in biomass. **The SSC is concerned that this may signal a considerable conservation concern for this species group and recommends that assessment development be fast-tracked.**

The current model estimates the population dynamics of each management area, separately. However, current genetic and isotopic information does not support fine scale stock structure for yelloweye rockfish. **The SSC recommends that authors complete the stock structure template for yelloweye/DSR coastwide for the September 2015 Plan Team meeting**. For the next iteration of the stock assessment in 2015, the SSC recommends that two yelloweye/DSR models be developed: (1) southeast Alaska yelloweye/DSR age structured model, and (2) GOA yelloweye/DSR age structured model that includes (at a minimum) southeast Alaska data sources, International Pacific Halibut Commission survey data, and coastwide catch. This second model would treat yelloweye/DSR as a single stock throughout the GOA including all sources of mortality.

Because DSR species are currently included within the "other rockfish" assessment for NMFS areas north of area 650, there will have to be reconsideration of current species groupings in the GOA. **The SSC recommends that respective assessment authors work together with AKR to provide detailed examination of fishery catch and survey data by subarea and season for DSR and "other" rockfish species.** Catch data from all sources (retained, discarded, State waters) should be included and, where data are lacking, this should be noted and included in the revised assessment(s). Assessment authors should also attempt to derive a plausible range of historical catch trends where catch data may not be available. The goal of this work is to fully account for rockfish catches and align potential rockfish groupings to improve our ability to monitor and identify conservation issues. This may include species groupings that are biologically similar (i.e., with similar life history attributes) or potentially grouped as Tier 6 species where reliable estimates of biomass are unavailable.

The SSC notes that the estimates of rockfish species bycatch are highly dependent on the quality of data used for catch estimation. Low rates and/or biased observer coverage will result in a poor understanding of the bycatch of rockfish in fisheries operating on the shelf. The SSC commends the assessment authors for their work on the assessment and agree with Plan Team recommendations for this assessment.

The SSC recommends that a model development team be formed, following the November Plan Team review, with the goal to have the assessment complete enough for consideration for setting OFL and ABC at the September 2015 PT meeting.

Stock Structure Templates

Guidelines were developed by the Stock Structure Working Group several years ago to promote a rigorous and consistent procedure for evaluating the appropriateness of existing stock categorizations and providing advice to guide spatial management decisions on stock structure for Alaska stocks. Information on stock structure is gathered by authors and evaluated by the Plan Teams and SSC at their September/October 2014 meetings for a number of species in the GOA and BSAI. These examinations were part of the first step of the process adopted by the Council in December 2013, where the Plan Teams and SSC are to consider scientific information on stock structure and advise the Council on any potential changes to spatial division of OFLs and ABCs. The Plan Team created three levels of concern to help provide advice and for each particular species or species group: 1) monitor, 2) alert, or 3) concern. **For species where a stock structure template has been completed and a level of concern has not been specified, the SSC requests Plan Teams do so for the December SSC meeting.**

Arrowtooth flounder

In November 2013, the Groundfish Plan Team recommended application of the template to the GOA and BSAI arrowtooth flounder stocks to evaluate the appropriateness of existing stock categorizations and management boundaries. Very little research has been done pertaining to stock structure in arrowtooth flounder. Exploitation rates, spatial concentration of fisheries relative to abundance, and pairwise genetic differences/isolation by distance were examined for GOA and BSAI arrowtooth flounder.

Within the BSAI, the highest abundance of arrowtooth is in the Bering Sea, with lower abundances in the Aleutian Islands and Bering Sea slope. BSAI exploitation rates have been low and generally proportional to abundance, with one exception. In 2010, the Eastern AI had a higher exploitation rate of 0.546, more than twice the F_{ABC} value of 0.235, as a result of targeting for Kamchatka flounder.

In the GOA, the biomass of arrowtooth flounder is concentrated in the Central region. Catch is proportional to abundance in all areas but is significantly less than the ABC. Exploitation rates are low and are an order of magnitude lower on average than the ABC specified in the GOA. There is no evidence that disproportionate fishing is occurring in any of the three regions of the GOA. Within the GOA, there is very little difference in age or size structure among areas, although there is some evidence of

differences in size structure between the GOA and EBS. To date, there have been no genetic studies on arrowtooth flounder. **The SSC supports including genetic population structure studies on North Pacific flatfishes as a research priority.**

Based on this information, and particularly in light of the generally low exploitation rates, the Plan Team and **SSC do not currently have a concern regarding arrowtooth flounder stock structure for management, and recommend area specific biomass and exploitation rates continue to be *monitored*.**

BSAI Blackspotted/rougheye rockfish

Stock structure for blackspotted/rougheye rockfish species complex was investigated and presented to the SSC in December 2013. Seven reasons for concern about fishing pressure on the Western Aleutian Island (WAI) component of the population were presented at that time (one genetic reason and six non-genetic reasons):

1) Genetic information shows spatial structure at scales < 500 km;
2) High catch levels in the 1990s in the WAI, followed by a sharp decline in WAI survey biomass estimates beginning in 2000;
3) High estimated exploitation in the WAI, where the $U_{F40\%}$ reference exploitation rate has been exceeded in every year from 2004 through 2012, except 2011;
4) An overall decline in survey biomass estimates in the WAI from 1991 through 2012;
5) An increase in the proportion of survey tows that have not caught blackspotted/rougheye over all survey strata in the WAI;
6) A large percentage of the total harvest occurring in the WAI; and
7) A decline in mean size in the WAI, but not other BSAI subareas.

Public testimony indicates that bycatch avoidance measures have been voluntarily implemented in the 2014 trawl fishery to reduce bycatch of the blackspotted and rougheye rockfish complex. Despite the bycatch avoidance measures in the trawl fishery, bycatch in other fisheries has resulted in preliminary 2014 exploitation rates that exceed $U_{F40\%}$.

In December 2013, the SSC agreed with the Plan Team's concern about the WAI component of the stock and asked the authors to update the seven reasons for concern and bring the updated information back in 2014 for consideration of separating the WAI ABC from the other sub-areas.

The Plan Team presented an update for the genetic and catch data. The Plan Team reported that additional genetic samples were collected since the last analysis in 2010, primarily from the BS slope, AI surveys, and commercial fisheries. This increase in samples (n ~1,000) resulted in the relationship between genetic distance and geographic distance being no longer statistically significant (P = 0.113). However, genetic information describes population processes on an evolutionary scale and often has limited power to identify population migration rates that result in spatial structure of interest to fisheries management. The high rates of exploitation of blackspotted rockfish in the Western AI that occurred in the 1990s, followed by decreasing abundance of blackspotted rockfish from neighboring areas, suggest that there is population structure on temporal scales important to fisheries management.

Updated information on area-specific catch rates and spatial distribution of harvest show the same patterns as those presented in 2013. There continues to be spatially disproportionate harvest of blackspotted/rougheye rockfish in the WAI. From 2004 – 2013, 40% of the harvest in the AI management area occurred in the WAI, whereas the percent of survey abundance for the WAI is only 8%. In 2013, the catch in the western AI was the second largest since 2006.

High rates of exploitation continue to occur for blackspotted/rougheye rockfish in the WAI. Exploitation rates in the WAI have exceeded $U_{F40\%}$ reference exploitation every year between 2004 and 2013, except 2011. Preliminary exploitation rates have also exceeded the $U_{F40\%}$ reference exploitation for 2014. In 2013, the exploitation rate was the highest since 2004, and was 2.07 times $U_{F40\%}$. The 2014 preliminary exploitation rate is 1.29 times $U_{F40\%}$.

The SSC agrees with the Plan Team that the blackspotted/rougheye rockfish remain at the *concern* level in the WAI, and notes that concern is now heightened, given the high catch and exploitation in 2013 and 2014. The SSC requests to review this issue in December and asks that authors address information requested in the December 2013 SSC minutes, to the extent practicable. In addition, the SSC also requests spatial catch information by fishery.

The SSC recommends that the current stock structure policy include a requirement for a recommended maximum area specific catch level when a stock or stock complex is elevated to the level of "concern". This would provide a clear guide to industry regarding what reductions in catch would be needed to alleviate the "concern". This area specific catch level would likely be estimated by the assessment author with review and comment by the Plan Teams and SSC.

GOA Skate Stock Structure

The limited data available suggest that the GOA big skate population has a gulf-wide stock structure, with ontogenetic movement from the east, where few mature animals exist, to central and western GOA where big skates are mostly mature. This differs from research on big skates in British Columbia, where big skates exhibit limited movement and separate stocks are expected across small spatial scales. Estimated biomass of GOA big skates is highest in the CGOA and population trends vary by area. Fishing mortality also varies by area, but is highest in the CGOA and is especially concentrated around Kodiak Island. The spatial distribution of landings is fairly similar to the spatial patterns in survey CPUE. In 2013, the Gulf wide catch was 70% of the ABC, but the catch in the CGOA has exceeded the area apportionment from 2010 to 2013. Even if the discard mortality of big skates is assumed to be only 50% or 70% (lower than the 100% currently assumed), the mortality would still exceed the CGOA area apportionment in 2012 and 2013. Since 2003, dramatic declines in biomass have been observed in the CGOA representing a potential conservation concern (directed fishing ended in 2005).

Given the stock structure information presented, the SSC agrees with the Plan Team that the current area apportionments appear to be necessary. **The SSC asks the Plan Team to evaluate whether GOA big skate stock structure falls in the monitor, alert, or concern category, and report back to the SSC at its December 2014 meeting.**

<u>Longnose skates</u>

The biomass of longnose skates has increased in all GOA areas, especially between 1990 and 2000, but the increase in the CGOA has been much greater than in the other areas. Fishing mortality of longnose skate differs by area. The pattern of landings is centered on Kodiak, disproportionate to the survey CPUEs, which are distributed more evenly throughout the GOA. Catch of longnose exceeded the WGOA area apportionment in 2009-2010 and 2013. The high concentration of fishery removals and the vulnerable life history (female A50 is 12.3 years) is of concern. Data are insufficient to conclude that separate populations of longnose skate exist in the GOA, but different abundance trends and different size structures among areas are consistent with some degree of separation.

The SSC agrees with the Plan Team that the current area apportionments appear to be needed, given the stock structure information. The SSC also agrees that stock structure of longnose skate should be a research priority. **The SSC asks the Plan Team to evaluate whether GOA longnose skate stock**

structure falls in the monitor, alert, or concern category, and report back to the SSC at its December 2014 meeting.

Recruitment Working Group
Grant Thompson (NMFS-AFSC) summarized the recruitment working group phase III interim report. Two aspects of this working group were presented: item B-1, the criterion for excluding within-regime year class estimates; and item B-7, determining the preferred measure of central tendency for recruitment.

Item B-1. A method for defining the first age of recruitment was developed based on examining the vectors of recruitment from several groundfish assessments, along with estimates of survey selectivity in the terminal year and natural mortality rates. Several alternative models were explored using $A_{50\%}$ and $A_{10\%}$ as cut-off ages to determine the terminal year of recruitment that should be used for determining reference points. For example, if age-1 is the youngest age-class in the model and survey selectivity for ages 1 and 2 are 0.05 and 0.15, respectively, then age-2 would be considered "first age". If age-2 is the first age, then the terminal year for the recruitment estimate would be T-1, where T is the terminal year of the assessment. The PT recommended postponing this research to a later date. The SSC will comment on this approach after PT completes their evaluation.

Item B-7. The Plan Team recommended the use of the mean over the median, as a measure of central tendency. The measure of central tendency is important for calculating biomass reference points ($B_{100\%}$ and $B_{40\%}$). This recommendation was based on a Monte Carlo simulation where only recruitment was treated as the random variable. All other model parameters were held constant, and there was no sensitivity analysis looking at non-stationary distributions or alternative values of recruitment variation. The GPT recommended folding this research into the AFSC's MSE work on harvest control rules. **The SSC highlighted the importance of defining objectives, *a priori,* and that alternative values of recruitment variation and non-stationary distributions be explored in future work on this subject.**

Survey Averaging Working Group
This Working Group has been exploring random effects models as an alternative for determining average biomass for Tier 5 calculations. The SSC appreciates the update on these efforts. Life history-based approaches to constraining survey fluctuations (large interannual fluctuations in stock biomass are less likely for lightly-harvested long-lived species) seem to be a fruitful approach.

Stock-Specific Ecosystem Considerations
The Groundfish Plan Team suggests that it would be valuable to begin development of stock-specific ecosystem consideration sections that would have ecosystem indicators that were specific to particular stocks. The SSC concurs that development of stock-specific ecosystem indicators would be helpful in moving toward the incorporation of indicators in the assessment process. The SSC agrees that it would be valuable to move forward with this initiative.

Research on Groundfish Recruitment Indices
The SSC encourages the search for assessment-model-independent predictors of recruitment. However, statistically significant relationships can exist and still have little predictive ability. **The SSC recommends assessing the predictive ability of these relationships.**

Catch Projections
An overview was provided on different strategies for estimating future catch remaining in the terminal year of the stock assessment and future catch projections. Methods varied by author, and future year catch projections are based variously on the full ABC, past ratios of catch to maxABC, average fishery mortality rates, or expert judgment. Most authors estimate only one year ahead in projections.

The Teams recommend that authors choose a method that appears to be appropriate for their stock and this method be clearly documented. The Teams also recommend authors establish their best available estimate of catch in the current year and, in the next two years, also document how those projected catches were determined in the Harvest Recommendations section. **The SSC supports these recommendations.**

Research Priorities

The JPT reviewed the four-category research prioritization system that was developed by a sub-group of SSC and Council members during the summer of 2014. The four categories are:

- Critical ongoing monitoring
- Urgent
- Important
- Useful

Definitions and examples were provided for each category.

The JPT made two recommendations at their September 2014 meeting. The first was to revise the category titles to replace "Important" with "Essential" and "Useful" with "Important." Their second recommendation was to form a sub-group of JPT members to provide revised language for the examples in each category.

The SSC appreciates the JPT review of the research categories, but disagrees with their recommendation to change the names of the last two categories. The SSC felt that the JPT recommended changes wouldn't clearly differentiate the two higher priority categories. The SSC looks forward to the revised examples for each of the categories that would be provided by the proposed JPT sub-group.

GOA Northern and Southern Rock Sole

The assessment author responded to all of the recommendations from previous Plan Team meetings and comments from the SSC were addressed in some form. Progress on the stock structure template is underway. Notable changes to the assessment model include the use of conditional age-at-length (AAL) data to jointly estimate growth of male and female northern and southern rock sole. The Plan Team recommends using the AAL approach for models to be considered this November. The Plan Team also recommends down weighting the sample sizes for composition data using the number of hauls as the initial starting values for the iterative re-weighting procedures. Estimating natural mortality for males improved over all fits, and the Plan Team recommends estimating male natural mortality rates for November. The Plan Team also suggests exploring the use of length-based selectivity to investigate if the current age-based selectivity is a source of the low CVs in the estimated length-at-age for age-3 rock sole. **The SSC supports all of the above Plan Team recommendations.**

The major axis of uncertainty in this assessment is partitioning catches into species-specific (northern and southern rock sole) values. Catch data in the model date back to 1977, but ratios of northern and southern rock sole are only available from 1988 onwards, with no clear trends in the ratios. The Plan Team recommends a 50:50 ratio for splitting the catch in the base model and, if time permits, performing a sensitivity analysis exploring 40:60 ratios in the historical period where ratio information is not available. **The SSC also supports this Plan Team recommendation.**

The ADF&G survey data for rock sole do not include sex-specific information and, therefore, are unlikely to be used in model fitting using the Stock Synthesis framework. However the Plan Team is interested in the relative trends provided by those data and recommends evaluating those data if time permits. The SSC did not discuss the use of these additional data.

BSAI Skates

Revised population models were presented for Alaska skate in the Bering Sea and Aleutian Islands management area (BSAI). This revision was motivated in part by CIE review comments. The most important of the CIE recommendations was to include the full eastern Bering Sea (EBS) shelf bottom trawl survey time series, which shows a dramatic increase in skate biomass during the 1980s. The reviewers felt that inclusion of the entire time series was necessary for proper modeling of skate population dynamics and might resolve some of the long-standing problems with the model (e.g., fits to unusual patterns in the length compositions). In response to the CIE comments, the EBS shelf survey data from 1982 to present are included in all models considered. In addition, the author lengthened the model time period to start in 1950, and a reconstruction of historical catches extends the catch time series back to 1954.

The author presented four alternative models. All of the models considered for the 2014 revision used catch data from 1954 through 2013. All data regarding skate catches rely to some degree on assumptions regarding the proportion of Alaska skates in the total skate catch. Additionally, the earlier data also rely on assumptions regarding removals by gear type. Ultimately, the author preferred Model 1 for setting harvest specifications in 2014/15, as it had the best overall fit and produced results consistent with suspected determinate growth in skates, the large recruitment event in the 1980s, and a greatly simplified model.

The reconstructed catch data used in the models were heavily influenced by the assumptions regarding the proportion of skates in the "Other Species" catch. To explore this assumption and how different catch histories influenced the model, two catch datasets were created. One dataset ("high catch") used the assumption described above, that the proportion of Alaska skates during the entire catch history was equal to the average proportion from 2003 through 2013. An alternative dataset ("low catch") modified the proportion of skates, using the ratio of estimated skate biomass in 1982, to the estimated skate biomass during 2003 through 2013. The author's preferred model, Model 1, was run using both of these datasets. Results were similar between the runs, and the "high catch" model provided slightly better fits to the data. Therefore, only the "high catch" dataset was used in developing and evaluating the alternative models. **The SSC expressed concern about using the model to select data that would subsequently be used for model runs, and asked that the author instead find a rationale outside the model to determine what datasets would be used for model runs.**

By examining the spatial distribution by age, the author found that skates move shoreward from ages 0-9 and once mature, spread out and most return to the outer shelf. Of the four models presented, three models used dome-shaped selectivity curves and one model used selectivity that was forced to be asymptotic. The dome-shaped selectivities for the trawl and longline fisheries are consistent with Alaska skates being taken as bycatch, and with the fact that the shelf trawl survey does not sample the slope where bigger skates might be found (although it was noted that few Alaska skates are caught in the slope survey). **The SSC expressed some concern about using selectivity and catchability to account for conducting an assessment with data from only part of the species range,** although the SSC recognizes this has been done for other assessments. **The SSC encourages the author to use any data available to explore size composition and biomass information for skates that extend outside the trawl survey area, and to continue to provide justification for the values of catchability and form of selectivity chosen (e.g., are small skates expected to be outside the survey area, as well as large skates).**

The SSC supports the Plan Team recommendation that the last accepted version of the model (2012) be included in November as a base model for comparison with the author's preferred model from among the new four alternative models. The SSC requested that the author also include two other models in November: (1) Model 3 (the model with logistic selectivity); and (2) a model with a

more recent start date, but prior to 1989 (e.g., one possibility is starting around the regime shift in 1977). The SSC noted that AIC cannot be used to compare models with different data or different weighting in the objective function.

BSAI/GOA Squid Harvest Specification Methods

Assessments of BSAI and GOA squid were reviewed by the CIE in 2013. Squid in both the BSAI and GOA are Tier 6 assessments, with OFLs established by using a representative time period. The BSAI squid OFL is established by the average of 1978 through 1995 catch and the GOA squid OFL is based on the 1997 through 2007 maximum catch. Recent squid catch in the BSAI is above average and exceeded the BSAI TAC in 2014. The preliminary 2014 GOA squid catch is well below the TAC.

The CIE made several primary observations, including: 1) that harvest approaches should be consistent between the BSAI and the GOA; 2) the BSAI time period for setting the OFL is inappropriate, given that it straddles time periods of foreign and domestic fisheries; and 3) general skepticism regarding the use of catch to establish harvest specifications. The SSC noted that squid population levels are highly variable and influenced by multiple factors, including climate and fishing pressure. This document provides responses to CIE comments and provides suggestions for alternative assessment methodologies based on these recommendations. The author provided multiple catch-based Tier 6 alternatives, including various time periods for both the BSAI and GOA, and also provided some modified Tier 5 options with various values for fishing mortality. There were also two options for estimating biomass, including the bottom trawl survey and ecosystem models. New approaches were also presented, including moving squid to be an Ecosystem Component (EC) species.

In general, the SSC feels that selecting a time period appropriate for the area is a more important consideration than consistency between the BSAI and the GOA. **With this in mind, the SSC is in agreement with the PT recommendations.** First, that consideration is given to moving squid to an EC species. While this option should be considered, the SSC noted that keeping squid in Tier 6 would allow for limiting catches, if necessary. The second PT recommendation is that the status quo approaches for each of BSAI and GOA be brought forward in December. The status quo sets the BSAI OFL equal to the average of the catch from 1978 through 1995, and the GOA OFL equal to the maximum of the catch from 1997 through 2007. In addition, an option should be brought forward for a Tier 6 method with a time period for the BSAI that does not include years during the foreign fishing era (see CIE reviewer appendix).

C-5 GOA Skate MRA

A presentation on this agenda item was given by Steve MacLean (NPFMC). Public testimony was provided by Gerry Merrigan (Freezer Longline Coalition), Bob Krueger (Alaska Whitefish Trawlers Association), and Julie Bonney (Alaska Groundfish Databank).

Recent catches of longnose skate in the WGOA and big skate in CGOA have exceeded the area apportioned ABCs, leading to those species being put on prohibited retention status early in the year. This analysis evaluates the effectiveness of reducing the maximum retainable amount (MRA) in order to reduce overall skate catch. The general matter evaluated in this analysis is to balance allowing vessels to retain marketable incidental catch of skates, while discouraging topping off on skates under the MRA at the end of groundfish trips.

The analysis is cleanly and consistently written, with an easy-to-follow structure. **With the following changes and additions addressed as much as is feasible, the SSC recommends this document be released for public review.**

The SSC believes the information provided in the EA is credible and sensible, though sparse. In general,

this reflects the limited biological information available regarding skates. Though referenced through the SAFE documents, additional detail on how the area apportioned ABCs are developed for big and longnose skates would be helpful for public understanding of the central issue. Specifically, survey biomass estimates with CVs for longnose skate should be included, equivalent to the information on big skates presented in Table 3-2 and Table 3-3 (pg. 19).

The SSC interpreted the primary policy comparison in the RIR as being summarized in Figure 4-7, which shows the incremental reduction in retained catch achieved by setting the MRA at different levels predicted with a simple simulation. The simulation predicts the effect of hypothetical MRA rates on each trip reported in 2013, and Figure 4-7 aggregates effects from all trips. The predicted retention on each trip is calculated by comparing the ratio of retained skates to basis species with the hypothetical MRA. If the retained percentage is lower than the hypothetical MRA, the model predicts the retained amount does not change; if the retained percent is higher than the hypothetical MRA, the model predicts the retained amount is equal to the hypothetical MRA.

This approach does not attempt to distinguish incidental encounters from top-off retention. Therefore, it omits potential effects when lower hypothetical MRAs eliminate top-off hauls that were observed under the 20% MRA, but were initiated after the trip surpassed the hypothetical MRA. Specifically, if the model evaluates a trip that was topped-up, it will treat observed retention beyond the hypothetical MRA as discarded catch, although it may not have been caught at all had the hypothetical MRA been in place. This amount of avoided catch could lengthen the time before skates are put on prohibited retention status, but the model here proceeds with observed behavior under the actual prohibited retention dates. This potentially results in an overestimate of retained catch and discards, and could underestimate the effect lower MRAs have on retention.

Nevertheless, the broad conclusion of the analysis is that a relatively small portion of the catch is from trips with retention ratios approaching the current MRA, and therefore, modest reductions in the MRA will affect only a small number of trips and result in only small reductions in removals. This is the key conclusion for evaluating the broad range of alternatives requested by the Council and is unlikely to change based on a more refined analysis.

The analysis expresses the concern that vessels not currently topping up may begin doing so under lower MRAs, because an overall reduced quantity of retained skates may lead to price increases that make skate a more attractive product. This strikes the SSC as unlikely and, thus, the claim should be modified or supported with estimates of the price flexibility of skate. This claim seems to be the basis for the conclusion that a lower MRA yields increased net benefits to the nation, as seen in Table 4-7. This is counterintuitive. The table should be explicit about the assumptions of the baseline, and whether net benefits arise because more retention is expected under lower MRAs or because some retention is allowed because the fishery is not on prohibited retention status.

Because MRA programs involve a slightly different terminology than other management programs, the SSC suggests moving definitions of terms widely used in the document to a terminology section in the introduction. Many of these are currently defined in Section 4.4. In addition, the analysis sensibly distinguishes between those who are topping off and would find a reduced MRA newly binding, and those on whom the current MRA is not binding using the framework of intensive and extensive margins. In the production literature, the intensive margin refers to increasing variable inputs to use fixed capital more intensively, and the extensive margin refers to increasing fixed capital. In this application, the extensive margin would most naturally be interpreted as expanding the number of vessels. Since the number of vessels is not changing, alternative language to discuss behavior of vessels, or vessels on trips, where the MRA is or is not binding would be preferred.

C-7 GOA Trawl Bycatch Management

The SSC received a presentation from Sam Cunningham (NPFMC) on the development of the GOA Trawl Bycatch Management discussion papers. Public testimony was offered by Rachel Donkersloot (Alaska Marine Conservation Council). The presentation provided an overview of the discussion paper contents and an update on new analyses being conducted by the author. The SSC also received an update on the development of two additional discussion papers concerning GOA trawl PSC management: the first concerning Community Fishing Associations, and the second concerning Adaptive Management Quota.

The SSC mentioned that it would be useful if the CFA discussion paper included a summary of community protection measures that have been implemented in other catch share programs—both within and outside of Alaska—and whether they have been successful in meeting their socioeconomic objectives. Such a summary could inform the current discussion on the community protection measures being considered by the Council for GOA PSC trawl management, and whether they are likely to accomplish their objectives. If the Council would like more input with respect to the CFA analysis, the SSC is willing to review it.

Salmon Genetics - Jeff Guyon (NMFS-AFSC) and Bill Templin (ADF&G) gave an update on stock composition of genetic samples taken from Chinook salmon PSC (referred to as bycatch in the presentation) in pollock trawl fisheries in the GOA during 2012. They also presented preliminary results of genetic stock composition samples taken from Chinook salmon PSC during 2013 from pollock trawl, and industry-provided samples from rockfish trawl, arrowtooth flounder trawl, and from a single haul taken during salmon excluder EFP experiments. The SSC appreciates the aid of industry in taking a first look at the stock composition of Chinook PSC in the various GOA fisheries.

The SSC last saw the 2012 results in April 2014, and had requested that the analysts reanalyze the 2012 genetic samples so that they could be attributed to the entire Chinook salmon PSC, instead of to the sample. This was necessary because the sample of genetic tissues was taken opportunistically in 2012, and it seemed logical to reanalyze these samples and weight them by PSC taken by time and area, so that they better represent the overall Chinook salmon PSC taken that year. The SSC had also requested that genetic samples taken in 2013 be analyzed and reported on more quickly so that results would be available to the Council as they are formulating potential actions to manage for PSC caps.

The SSC commends the analysts for their expeditious work to reanalyze the 2012 samples and provide a preliminary look at the 2013 samples that provide insights into spatial and temporal (seasonal and annual) stock compositions of Chinook salmon PSC in the GOA trawl fisheries. All of these samples reveal a relatively consistent composition of Chinook salmon stock groupings, with Coastal southeast Alaska, British Columbia, and West Coast U.S. making up the majority of the PSC, along with smaller contributions from the Northwest Gulf of Alaska stock group. **The SSC looks forward in the coming year to seeing the final report of genetic samples taken during 2013, and results of samples taken during 2014.** We would also greatly appreciate it if future reports of this information included maps depicting the spatial distribution of PSC for major stock groupings in the GOA.

AFSC Social Survey - The SSC received a presentation by Stephen Kasperski (NMFS-AFSC) on the preliminary results from the Gulf of Alaska (GOA) Groundfish Trawl Fishery Social Survey. This voluntary survey gathered baseline data on social dimensions of the GOA groundfish fishery in advance of the proposed GOA Trawl Bycatch Management Plan. The development of this survey indicates the importance of understanding social and community dimensions of these fisheries, and potentially sets a new welcomed standard for more comprehensive program evaluation. The presentation, and the main C-7 discussion paper, examined plans to repeat this survey at specific intervals; however, the report notes that repeating the survey is contingent upon available funding. **The SSC strongly supports plans to repeat**

the survey after the PSC management plan is fully developed, after the implementation of the GOA trawl PSC plan, and at regular intervals thereafter with dedicated funding to do so.

Without a firm GOA catch share plan to evaluate specifically, the survey casts a wide net and does an excellent job of broadly capturing a complex group of participants in a multifaceted environment. The survey achieved an excellent response rate, and managed to reach nine different sectors of participants across seven geographic areas. The survey gathers information on the social structure of the GOA trawl fisheries, the current state of participation, engagement in other fisheries and jobs, and fishery interconnections, with the goal of better understanding social impacts, distributional impacts, and place- and sector-based communities. While the SSC recognizes that this report is not a social impact assessment, many of the reported findings require more context to be meaningful. For instance, some significant findings, such as the average age of vessel owners and crew members, are reflecting something larger and the report could make some suppositions about those results.

Previously the SSC had requested that the researchers try to include trawl fishermen who have already left the fleet, in anticipation of the new structure, but that goal was not realized. The analysts will be faced with tracking new behavioral changes and participants leaving the fishery in the future and, thus, maintaining the list of respondents will be useful in future implementations of the survey to understand that population. The Office of Management and Budget (OMB) prevented researchers from approaching certain respondents, such as spouses and those holding inactive licenses, resulting in a missed segment of the affected population.

A great weakness of the document is the problem of lumping geographic areas and masking results. Smaller communities are lumped into "other Alaskan communities", to maintain confidentiality because they each have a single processing plant. However, that lumping is maintained in places that have nothing to do with the processing plants. The SSC also suggests that the researchers try to obtain confidentiality waivers to report their findings in these smaller places, particularly in the Western Gulf. Under the current aggregation strategy, these data are buried in the results and, thus, important differences among these communities are missed. The SSC also suggests mapping the findings over existing management areas of these fisheries, which are unlikely to change, rather than the current geographic divisions in order to make them more useful to informing management issues. Survey respondents put their time and energy into this project and would likely want to see more refinement in the results. As it stands, the report contains a great deal about Kodiak and Seattle, but other communities' results are buried. Further, these fisheries are dominated by hired skippers; the presentation lumps skippers and crewmen together when each will likely have different experiences and interests within these fisheries. These results should be separated out and made visible.

Future implementations of the survey will likely reflect lessons learned and evolve accordingly. At this stage, the report is predominantly a summary of preliminary analyses, and the conclusion is just a few pages on survey implementation issues and lessons learned. The report would be strengthened by a discussion of methods and questions to be added and discarded in the future, for example, program element questions that may be discarded following the creation of the program. The SSC suggests adding questions about the experiences and capacities of operators responding to the Observer Program requirements. The SSC has received public testimony about the effects of these new requirements on small vessels, such as costs, crew replacement, and changing social dynamics aboard vessels, and this data collection effort could be expanded to include those issues.

Organizationally, the SSC suggests that the authors break out major findings at the start of the report for the reader. This is a large document with tables and figures separated into their own sections, necessitating a lot of jumping around. Bulleted findings, highlighting places of significance, could strengthen the document.

C-11 AI Pacific cod allocations

The SSC received a presentation of the Initial Draft RIR/EA/IRFA from Jon McCracken (NPFMC). Public testimony was offered by Gerry Merrigan and Doug Wells (Freezer Longline Coalition), Clem Tillion (AEC), and Dave Fraser (ACDC).

While this is an "Initial Review" draft, this particular action has a long history before the Council. The record appears to suggest an initial date of 2007-2008. Through a series of working papers and earlier draft analyses, the proposed action to structurally realign access to the early portion of the Federal AI Pacific cod fishery has evolved. This action is designed as a community protection measure that, if implemented, could increase access for Aleutian Island communities to the economic base most available to them.

While this Pacific cod allocation amendment is not ideal, its long-delayed development history suggests that soliciting public comment at this time could provide missing data and "refreshed" information on the crucial status of the harvesting and processing capacity in the AI onshore sector. **Thus, the SSC recommends that this initial draft be released for public review.** The authors should attempt to address the most critical comments below, as time allows, before release.

The draft analysis provides contextually important empirical data describing the recent historical catch and processing in the Federal waters AI and BS Pacific cod fisheries. It does a good job describing the shifting structural elements influencing the prosecution (and management) of the BSAI Federal cod fisheries. However, as we heard from public testimony, the effects of the state GHL on Pacific cod fishing effort distribution are missing. Furthermore, analysis that could provide confidence intervals around the likelihood that the desired outcome of the proposed action (i.e., AI community protection) will emerge is not offered.

It would be desirable to have economic models that could predict future supply, demand, and market behavior for Pacific cod and its close substitutes. In general, we do not have such tools. Likewise, it would be desirable to have 'behavioral models' that might provide insights into the probability that CV capacity would support the proposed apportionment and delivery requirements. In general, we do not. What we do have reflected in this draft, is a clear narrative of what could come to pass, in a general way, if several critical assumptions are realized.

By assumption, the Adak processing facility and the supporting port and community infrastructure will be consistently operational, sustainable, and economically viable in supporting the mandatory shoreside delivery of early season AI Pacific cod. The historical performance data for the Adak processing facility does not provide empirical evidence that this is a foregone outcome.

It is also assumed that deliveries of Pacific cod to AI onshore plants will be of sufficient quantity and quality, and made over a suitable periodicity and duration, for efficient use of Adak's processing capacity (and for CV deliveries to Atka, when it comes online). No empirical evidence is provided that would corroborate these expectations. It would be extremely valuable if the draft could provide supporting information that would improve confidence that realization of this important CV participation assumption is likely.

By assumption, there will be significant shoreside processing capacity at Atka, capable of receiving and processing commercial quantities of CV AI Pacific cod that will be available, economically viable, and sustainable, as part of the action. As the draft reveals, historically, the Atka facility has not processed commercially significant quantities of Pacific cod. Anecdotal information is presented that APICDA has plans to invest in Atka Pacific cod processing capacity, but details are elusive. It is not unreasonable to

expect that significant investment in Pacific cod processing capacity in Atka awaits some evidence of Council movement on this proposed action.

By assumption, sufficient CV capacity will be made available with which to fully exploit the proposed AI Pacific cod onshore set-aside, if such an allocation is made. Analysis of the "probability" that this outcome will be realized is not demonstrated, although it should be possible to do so, based upon available catch data. For example, "Where has this CV capacity been deployed historically during the period it is anticipated to fish the AI shoreside set-aside?" "Is it likely sufficient CV capacity can be attracted to support the shoreside delivery requirement?" "Is it reasonable to assume that the AI on-shore market can obtain and offer prices that sustain CV participation?"

By assumption, CVs will find the regulatory action economically appealing enough to incur the implicit costs associated with shore-based deliveries during the early A-season in the AI. It would be useful (and presumably feasible, given previous work done on comparative sector operating cost performance), for the analysis to examine the operational differences between "onshore" and "over-the-side" CV delivery modes. While it will almost always be more operationally efficient to co-locate harvesting with processing,, the analysis should still identify the costs (e.g., transiting time and associated loss of fishing time, extra fuel, impacts on product quality) and efficiency impacts of altering the authorized fishing mode, especially on CVs. There is treatment of the CP gross revenue effects, but without interpretive detail, or an explanation of how those impacts to CPs might be mitigated by engaging in alternative fisheries (see page 10).

The analysis implies that requiring onshore delivery of AI Pacific cod risks monopsonistic (i.e., one buyer, many sellers) market manipulation. A counter argument might be offered suggesting Adak (and Atka when operational) will be extremely dependent for their economic viability on CV deliveries. Particularly for Adak, economies of scale were reportedly critical in the early failures of that facility. With the benefit of hindsight, the 50% delivery escape valve, and potential Atka capacity, the Adak plant's opportunities to engage in monopsonistic behavior seem quite limited.

Shoreside delivering CVs are much less mobile than CPs. Comparison of Figures 11 and 17 with Figure 13 indicates the trawl CVs fish in a more circumscribed area than the CP vessels that would be displaced by this action. Are there any implications for the proposed action from "concentrating" Pacific cod harvesting nearshore and in close proximity to Adak and/or Atka for the SSL WDPS, for the local stock aggregation, or for the ability to attract additional CVs from competitive fishing areas? No evidence is offered, only a simple declaration.

It should be noted that there is no regionalized landing requirement, nor authority to create one, in the state GHL fishery. The analysis would be improved by a more complete treatment of the vessels, both CVs and CPs, operating in the state GHL fishery and the Federal AI fishery for Pacific cod, by describing homeports for these vessels, their harvest and landing activities in the AI and state waters, and any information on the relationship between these two fisheries.

For some figures in the analysis (e.g., Figures 7-9), the analyst decomposes average weekly Pacific cod retention into two year-groups: 2009 through 2011 and 2012 through 2014. The former group spans the implementation of SSL protection measures in 2011, which could be an important determinant of participation patterns in the Aleutian Islands Pacific cod fishery. The SSC recommends that the analyst separate the two year-groups at 2010 (i.e., pre- and post-SSL measure implementation) to take this potential confounding factor into account when presenting annual patterns of Pacific cod retention.

Finally, there are several topics that may require revision or elaboration. For example,

- There are several places referencing catch data for Pacific halibut landings by "pot" gear, which is not an authorized gear-type for this species (see p. 33).
- Without a formal and precise definition of 'shore plant' in Federal law, attainment of the Council's objectives for the proposed action may be elusive.
- In Table 21, are the CP AI performance data inclusive of both 'over-the-side' catches and CP directed catches? That should be clarified.
- The analysis makes reference to the price differential paid between EBS and AI for Pacific cod. In earlier assessments of the BSAI Pacific cod fisheries, statistical analyses have not shown this price differential to exist.
- The very substantial disparity between halibut PSC rates in the AI and EBS, suggest that displacing effort from AI to EBS could have undesirable economic repercussions for earlier PSC driven groundfish fishery closures.
- The entity size thresholds that are cited in the draft IRFA have been changed by SBA. The analysis must employ the current mandates.
- There is need to compare and contrast the numbers of SSLs in the rookeries and haulouts that are in the areas presently fished by the CP fleet, as compared to those present in the areas in which we expect the CV fleet to fish when delivering to the onshore plants.
- If the Atka plant comes on-line, what are the expected impacts on the Adak plant and its economic viability?
- Table 32 provides only the most general idea of which species of marine mammals are found in the North Pacific. There is much more specific information on the marine mammals of the Aleutian Islands and where they are concentrated. This information needs to be incorporated.

D-4 Bering Sea FEP

Diana Evans (NPFMC) provided a report to the SSC on the public comments provided to the Council during meetings held in Nome and Seattle, and through mailed in comments. Public testimony was provided by Stephanie Madsen (APA).

The comments to the Council, mostly from representatives of subsistence users and NGOs, were uniformly supportive of the development of a Bering Sea FEP, though there were different visions of what a FEP might be and might accomplish. There was relatively little comment from the commercial fishing industry, and it would be valuable to have their input on what a FEP might accomplish.

There was general agreement among those commenting that the Council will need to put great thought into defining the objectives and purpose of an FEP and what value it will add to the already strong base that has been developed for managing the Bering Sea fisheries in an ecosystem-based context. Emphasis in the comments was placed on the FEP being approached as developing a process for improving management, rather than as an encyclopedic report on all that is known about the Bering Sea. Within the comments, there was interest in how to incorporate non-traditional sources of knowledge.

The SSC encourages the Council to consider an option where the FEP provides a framework for strategic planning that would guide and prioritize research and modeling. The research and modeling conducted in response to the FEP would inform decisions regarding the selection of tactical management measures by the Council. The tactical actions would still be vetted through the existing Council process and incorporated into the FMPs. The SSC noted that several research and modeling activities are already underway at the AFSC that would support an FEP, including development of a multispecies technical interaction model that will simulate trade-offs between different fishing sectors, under different harvest controls (Punt, Hollowed, Ianelli, McGilliard, and Ono), and multispecies stock assessments that will

address how species interactions influence biological reference points for management (Punt, Ianelli, Aydin, and Holsman).

The SSC was supportive of the effort to develop a Bering Sea FEP. The SSC emphasizes the need to identify goals, and the value added by having an FEP. It was also agreed that the FEP should not be a major review of knowledge of the Bering Sea and should focus on developing the processes to meet whatever goals are identified. For the development of the FEP, the SSC suggested that the Council take note of the Pacific Region's report on the use of the Atlantis model as an approach for developing an FEP process, the papers from the ICES 2014 Annual Science Conference theme session on ecosystem based management, and the output of the NMFS Working Group on Climate Change and the Vulnerability of Fisheries Assessments.