**Minutes of the**
**Bering Sea Aleutian Islands Groundfish Plan Team**
**North Pacific Fishery Management Council**
**605 W 4th Avenue, Suite 306**
**Anchorage, AK 99501**

**November 14 - 18, 2011**

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| Jane DiCosimo | NPFMC (Coordinator) | Lowell Fritz | AFSC NMML |
| Kerim Aydin | AFSC REFM | Alan Haynie | AFSC REFM |
| David Carlile | ADF&G | Dana Hanselman | AFSC ABL |
| Brenda Norcross | UAF | Mary Furuness | NMFS AKRO |
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| Bill Clark | IPHC | | |

The BSAI Groundfish Plan Team first convened on Monday, November 14, 2011, at 3:25 pm.

**Octopuses** Liz Conners presented the octopus assessment. The 2011 catch was the highest recorded and exceeded 2011 catch limits. The Plan Team supported the author's predation-based estimate of octopus mortality from 1984-2008 survey data of Pacific cod diets as an alternate Tier 6 estimate, which results in a 2012 OFL and ABC higher than in 2011. This new approach was first applied in the Bering Sea because this area has the most diet data available. The author will apply this approach to the AI and GOA next year but those results may have poorer estimates because of lower sample sizes. Also, the GOA calculation may be more elaborate and potential uncertainty may be greater since octopus are consumed in similar amounts by Pacific cod, arrowtooth flounder, and halibut (all three will be included in the GOA estimate).

The Team discussed several points pertaining to the appropriateness of this approach. Theoretically, using natural mortality (in biomass units) from young (preyed-upon) ages as a proxy for natural mortality at older (fished or mature) ages could result in either an under- or over-estimate, depending on parameter values. Team members analyzed several likely combinations of parameter values and concluded that, in the case of BSAI octopus, the estimate resulting from the predation-based approach should be conservative.

Tier 5 estimates were reviewed, but not considered acceptable since they are minimum estimates of biomass. The consumption estimate is a generally independent check on survey biomass. The Tier 5 and predation-based estimates are similar and could be considered to support each other. The Pacific cod diet appears to be a better sampling method for octopus than the trawl survey. They have a similar size bias, but the consumption estimate is slightly lower (3,450 t versus the Tier 5 estimate of 4,020 t listed in the chapter) and more conservative, especially as other species eat octopus (in the Bering Sea, most other consumers of octopus are marine mammals for which quantitative estimates of consumption are not possible).

The Plan Team requested that next year, the authors examine: 1) a test for time trend of consumption; 2) analysis of the AI Pacific cod diet; 3) discussion of the data needed for a discard mortality rate analysis.

The Team supports additional research to estimate rates of non-spawning mortality and discard mortality.

**Squids** Olav Ormseth presented the squid assessment. This is an off-year for the squid assessment and therefore only an executive summary was prepared.

Catch dropped during 2009-2011 from historical levels but this drop is not mirrored in survey biomass estimates.

Dana Hanselman asked whether groundfish consumption estimates could be used to estimate squid harvest specifications similar to this year's recommendation for octopus harvest specifications. Kerim Aydin noted that prey species may not be the same species or size as those in the fishery. For next year the author plans to look at the overlap between squid in predator diets and squid in bycatch (species, size, and location comparisons).

**Sharks** Cindy Tribuzio presented the shark assessment. This is an off-year for the BSAI shark assessment and therefore only an executive summary was prepared.

The authors' recommendations for 2012 and 2013 ABC and OFL values were identical to last year's values. The team accepted the authors' recommendations under Tier 6 for based on average catch. Cindy reported that, as in past years, non-commercial removals and halibut fishery incidental catch estimates (HFICE) results were not considered in the specifications, but they would be in the future. Because of overlap in the estimates for some species, differentiating catch from the NMFS Catch Accounting System and incidental catch in the halibut fishery (HFICE) is difficult. In the case of shark species, however, the overlap appears minimal. **Thus the Team requests that the authors and Regional Office staff review whether the incidental catch estimates should be included in the official time series of historic catch for Tier 6 stock complexes**. In general, for all species, it would be good to understand the unaccounted-for catches and the degree of overlap between the CAS and HFICE estimates and to discuss this at the Plan Team next September.

**Sculpins** Olav Ormseth presented the sculpin assessment. This is an off-year for the BSAI sculpins assessment and therefore only an executive summary was prepared. The ABC and OFL recommendations are identical to last year's assessment.

Mike Sigler pointed out that since sculpins are managed under Tier 5, the biomass estimates from the 2011 EBS shelf survey could be included to update the ABC and OFL values rather than rollover the same values from last year. Olav commented that the new BS slope and AI bottom trawl survey data are more important to include in order to update these values and the BS shelf bottom trawl survey data, less so. Dana Hanselman suggested that, with the catch so far below the ABC, it was reasonable to leave it to the author's discretion whether the new survey showed any trends that justified an assessment update, versus a rollover. The Plan Team accepted the authors' recommended rollover of 2011 harvest specifications for 2012 and 2013.

**Skates** Olav Ormseth presented the skate assessment. The skate assessment was a full update of the 2010 assessment. The shelf survey biomass for Alaska skates increased slightly, but decreased slightly for the remaining skate species. Overall, the skate ABC and OFL values for 2012 and 2013 increased slightly. Next year's assessment will use a newer version of Stock Synthesis software in response to a long-standing SSC request regarding lack of fit to the size-at-age data. Olav noted that species identification in the survey has been good since 1999, but skate species often is not identified by observers, especially for the hook-and-line Pacific cod fishery; skates often drop off the gear before species can be identified by observers.

**Greenland turbot** Jim Ianelli presented the Greenland turbot assessment. Jim highlighted recent trends in Greenland turbot abundance indices, with abundance from the EBS shelf survey for 2011 slightly higher

than in 2010. In 2010 and 2011 the proportion of small Greenland turbot (i.e., < 27 cm) has increased markedly and signal increased recruitment.

Jim attempted to allow natural mortality of males to be freely estimated within the model, but ultimately concluded that a non-sex-specific natural mortality was appropriate. The Plan Team discussed the fixed catchability coefficients used in the model. Previous attempts to estimate catchability resulted in very small estimates of catchability and large biomass estimates. Jim stated that a constant survey catchability of 0.75 has been applied to the EBS slope trawl survey. The combined shelf and slope BS and AI trawl survey biomass estimates approximately equal estimated spawning biomass, which raises questions about the catchability estimate, particularly as might be affected by differing sex-specific selectivities. **The Plan Team suggests that alternative selectivities for the longline survey be explored.** Conducting a slope survey in 2012 is unlikely due to limited funding. **Nevertheless, the Plan Team recommends that the slope survey be conducted to monitor the Greenland turbot population which appears to be increasing**.

The Plan Team supports the author's ABC and OFL recommendations.

**Pacific cod**

*Eastern Bering Sea*

Grant Thompson presented the Pacific cod assessment. The various candidate models for this year's harvest specifications were discussed by the joint teams (see JPT minutes). In the EBS, Model 3b was the clear choice by the standards adopted by the author and the teams. The BSAI team agrees with the specifications based on Model 3b recommended by the author.

In addition to the joint teams' recommendations, **the BSAI team recommends that the author check for any poor fits to commercial length frequencies that might indicate a change in selectivity resulting from the implementation of Amendment 80 in 2008 and the creation of longline cooperatives in 2010.**

*Aleutian Islands*

The team discussed two alternatives for accounting for the Aleutians in the ABC: a Tier 5 calculation based on Kalman filtering of the Aleutian survey biomass estimate, or a simple expansion of the ABC from the EBS assessment by the ratio of AI and EBS survey estimates (presently 9%). The team preferred the second method, which has been the standard. The combined BS/AI specifications were calculated this way.

**Pollock**

*Eastern Bering Sea*

Jim Ianelli presented the eastern Bering Sea walleye pollock assessment. The Team noted the "acoustic vessels of opportunity" (AVO) index was reviewed last year, but its use in the model is new this year. It appears to have a relatively small impact on the results (Figure 1.33). This was the only substantive change in methodology relative to last year's assessment. The Team agreed that the EBS pollock stock continues to be assessed exceptionally well.

The authors recommend setting the ABCs for 2012 and 2013 below their respective maximum permissible levels; specifically, at values corresponding to the average harvest rate over the most recent five complete years (0.30), with the strength of the 2008 year class set equal to the long-term average. Projected harvesting under this scenario results in ABCs for 2012 and 2013 equal to 1.09 million t and 1.14 million t, respectively. Last year, the Plan Team agreed with the authors that ABC should be set well below the maximum permissible level, the primary reason being the large hole in the age structure created by poor recruitments from the 2002-2005 year classes, which was expected to result in half of the 2011 catch coming from a single (2006) year class. As of this year, the 2008 year class has been observed by multiple surveys over three years and its above-average strength has been substantially confirmed, one

result of which is that the 2012 catch is projected to be much less dependent upon a single year class, so the Plan Team's concerns from last year are somewhat lessened. Nevertheless, the Plan Team agreed that the authors, who listed 14 reasons in support of their recommendation to set ABC well below the maximum permissible level, have made a compelling case. At the same time, the Plan Team disagreed with the authors' recommendation to set the strength of the 2008 year class equal to the long-term average, concluding instead that the strength estimated by the model should be used in making projections. When the strength of the 2008 year class is set equal to the model estimate, harvesting at the recent average fishing mortality rate is projected to result in 2012 and 2013 catches of 1.22 million t and 1.36 million t, respectively, which are the Plan Team's recommended ABCs. Other points raised during the Team's discussion of the 2012-2013 ABCs included the following (note that these do not necessarily represent Team consensus):

1. We are not anticipating the ocean to be on the "very warm" end of the spectrum for the next few years, so maybe we are a little less worried about returning to conditions that led to the poor 2002-2005 cohorts.
2. It is easier to predict biomass declines than increases.
3. It seems odd that we cut the ABC in half for the stock with one of the best assessment models in the region (and perhaps the world), but go with maxABC for virtually all other stocks.
4. Maybe point #3 is explained by the fact that this stock has been so extensively studied that areas where we lack information are spotlighted more clearly.
5. Last year's strategy for setting ABC seems to be achieving reasonable results; note that catch will be less than TAC for 2011 by about 5%.

In recent years, the ABCs for EBS pollock have sometimes been set at the maximum permissible level under Tier 1, while at other times they have been set at levels lower than the maximum permissible, where these lower levels have been developed using a number of different methodologies and rationales. To make the process of setting ABCs for this stock more coherent, **the Plan Team recommends that the authors or the AFSC analyze the consequences of adopting a target harvest rate lower than the MSY level**, which is now estimated to be 0.6, well above recent actual harvest rates of 0.3-0.4. The alternative maximum targets could be, for example, 0.2, 0.3, 0.4, 0.5, and 0.6, with a B35 or B40 control rule. Possible performance measures could include the mean, variance, and example trajectories of: 1) ABC, 2) spawning biomass, 3) largest proportion of the catch contributed by a single cohort, 4) largest proportion of the spawning biomass contributed by a single cohort, 5) probability of falling below $B_{20\%}$, 6) amount of salmon bycatch, 7) total numbers of age 1-5 fish, 8) probability of falling below the long-term average number of age 1-5 fish (about 40 billion), and 9) other ecosystem metrics. The alternatives could be tested in simple simulations that assume the 2011 model parameter estimates are correct and impose an appropriate level of recruitment autocorrelation. The aim would be to show the main differences among cases in a straightforward way.

*Bogoslof*

Jim Ianelli presented the Bogoslof pollock assessment. There was no Bogoslof survey in 2011. The last Bogoslof survey was conducted in 2009 and the biomass estimate was 110,000 t. The stock status evaluation is the same as last year. The main new information in the assessment was three new strategies for setting ABC in addition to the status quo strategy.

The status quo strategy has been routinely applied in the past and has led to the small 2011 ABC of 156 t. Grant Thompson suggested using $B_{40\%}$ rather than $B_{35\%}$ as reference points for the first and second new strategies. The third new strategy is a Tier 5 approach, which leads to a larger ABC of 16,500 t. Mary Furuness noted that sticking with the first strategy and the 156 t ABC may impact approval decisions on experimental fishing permits and research survey permits. The Team accepted the authors' recommendation to adopt the third new strategy for setting ABC and OFL values.

*Aleutian Islands*
Steve Barbeaux presented the Aleutian Islands pollock assessment. No new data were available for the assessment except updates of recent catch values. This year Steve focused on estimating weight-at-age values in years when otolith samples were not collected. This analysis implies that fish are heavier at given age in recent years. The addition of the estimated values had minimal effect on the assessment model results. The Team accepted the authors' recommendation for ABC and OFL values.

**POP**, **Northern rockfish, Rougheye/blackspotted rockfishes, Shortraker rockfish, and Other rockfish** This is an off-year for rockfish assessments. For all of these species, the Plan Team received a straightforward update of the assessments from Paul Spencer, with updated catch. The Team supports the authors recommended ABCs and OFLs for 2012 and 2013.

**Atka mackerel** Sandra Lowe presented a straightforward update of last year's assessment with updated fishery catch, age composition, and weight-at-age data. There were no changes in the assessment methodology, and implementation of the Steller sea lion protective measures continued to be reflected in catch projections. In 2011, the areas used by the directed Atka mackerel fishery were Petrel Bank and Tanaga Pass in 542 and south of Seguam Pass in 541. Atka mackerel catches in the eastern Bering Sea were largely due to bycatch in the pollock fisheries. Fish were smaller in 542 than in 541 in 2011 (perhaps due to large catches on Petrel Bank), and Sandra indicated she will investigate whether fish were younger or smaller at age. Inclusion of new information increased the estimated sizes of the 2006 and 2007 year-classes. Model fits to the survey biomass are poor in 2002-2010; this may be due to inclusion of SE Bering Sea survey data which are highly variable (within and between years), and can add considerable biomass. Survey catchability estimates were discussed but this did not help explain the lack of fit to recent survey biomass estimates. The Team accepted the authors' ABC, OFL, and apportionment recommendations.

**Yellowfin sole** Tom Wilderbuer presented the yellowfin sole assessment. Tom highlighted a strong 2003 year class and noted that good recruitment has occurred about every fourth year. The Plan Team supports the authors recommended ABCs and OFLs for 2012 and 2013. The author noted a 9% buffer between ABC and OFL.

Based on new growth studies - relying partly on application of dendrochonology techniques and evaluation of alternative growth models - the time invariant growth applied previously for the model was abandoned in favor of an approach that incorporates time-varying and temperature-influenced growth. Incorporation of these newly identified growth influences contributed to a slight decline in this year's ABC and OFL compared to last year.

A Plan Team member suggested that Tom explore the use of non-parametric smoothing methods to reduce occasional large variances in empirically estimated weights at age. For evaluation of alternative growth models, a Plan Team member suggested further consideration regarding the use of the observed weight at age as the standard (i.e., "truth") against which to evaluate the performance of alternative growth models because of potential influence of sampling error associated with the empirical data.

**Northern rock sole** Tom Wilderbuer presented the northern rock sole assessment. This is a straightforward update from last year. The ABC is lower than last year. The Plan Team supports the author's recommended ABCs and OFLs for 2012 and 2013. The buffer between ABC and OFL is 9%. Seven models were examined. The preferred model (#1) is the same as last year's model and gives the best fit to the observed sex ratio while maintaining catchability close to the value estimated by trawl gear experiments.

**Flathead sole** Buck Stockhausen presented the stock assessment for the flathead sole/Bering flounder complex. Changes to the assessment include the addition of survey and fishery data from 2009, 2010, and 2011. The assessment model this year was identical to the 2010 model. The author examined an

alternative model with a Ricker stock-recruitment relationship versus having recruitment independent of stock size, and chose to have recruitment remain independent. The Plan Team agreed with this choice.

Retention has been high since the implementation of Amendment 80. Seasonal progression in the catch has been slower for 2011 and is projected to total about 15,000 t. Similar to 2010, most of the catch was in the bottom trawl fishery, mostly east and west of the Pribilof Islands. Bering flounder make up a small proportion of the flathead sole/Bering flounder complex catch, mostly coming from north and west of the Pribilof Islands.

Survey spatial abundance patterns for flathead sole were similar to the catch patterns with concentrations north and west of the Pribilof Islands. Bering flounder survey distribution was different from the catch and was much farther to the north. According to the 2010 bottom trawl survey, which included the northern Bering Sea only in 2010, approximately 50% of the total abundance of Bering flounder is in the northern Bering Sea area. As an exercise the author conducted a Tier 5 calculation based on the standard survey and the northwest extension, which resulted in an OFL of 1,850 t and an ABC of 1,390 t.

A Plan Team member asked whether forcing mean catchability to equal 1.0 was appropriate given what is known about flathead sole herding behavior. Buck answered that he would like to estimate catchability within the model, but based on other assessments, this estimation usually results in a trade-off between estimating catchability or M. A Plan Team member asked why catch usually was lower than TAC. An industry representative answered that flathead sole catch is limited by the catch of other species such as Pacific cod and Pacific halibut.

**Alaska plaice** Tom Wilderbuer presented the Alaska plaice assessment. The authors explored Tier 1 as requested by the SSC. They determined that Tier 1 was not appropriate because of the lack of data near and to the left of the peak of the estimated stock-recruitment relationship. The Plan Team agrees with this determination.

The standard shelf bottom trawl survey was extended into the northern Bering Sea (NBS) in 2010. About 38% of the biomass of Alaska plaice was found inside the NBS. The authors examined ways to account for the northward distribution of Alaska plaice in the Bering Sea. In assessments prior to 2010, catchability had been fixed at 1.2 on the assumption that Alaska plaice are herded like yellowfin sole and rock sole, although Alaska plaice were not included in that experiment. To account for the biomass in the NBS, catchability was fixed at 1.0 in last year's assessment and in the authors' preferred model from this year's assessment. The Plan Team discussed and dismissed this option because the author indicated that there was no basis for choosing the catchability value of 1.0. Another option considered by the authors was to return to q = 1.2 and multiply the estimate of biomass by the ratio (=1.62) of NBS+EBS biomass to EBS biomass as estimated by the surveys in 2010. After discussion it was agreed that this type of adjustment should not be used with only one year of survey data in the northern Bering Sea. **The team concurred with a December 2010 SSC recommendation that the assessment authors consider how best to handle biomass data for species that have a substantial percentage of biomass in the northern Bering Sea, particularly if future northern Bering Sea surveys are planned.**

**Arrowtooth flounder** Ingrid Spies presented the arrowtooth flounder assessment. Input data for the present assessment includes arrowtooth flounder only, as this assessment no longer applies to the former *Atheresthes* complex. Ingrid presented the same model as last year. The current model includes the Aleutian Islands, Bering Sea slope and Bering Sea shelf. The biomass is modeled with 76% of the stock on the shelf, 14% in the Aleutian Islands and 10% on the Bering Sea slope. The Plan Team accepted the (Tier 3a) OFL and ABC values recommended by the authors.

More female arrowtooth flounder are caught than males in the surveys, resulting in estimates of differential mortality for males and females. With fixed female M=0.2, the profile likelihood run with male M=0.35 provides a reasonable fit to all the data components and is consistent with observations of

differences in sex ratios observed from trawl surveys. The maximum shelf survey selectivity for males occurs at 0.93 for age 8 fish and the estimated value of survey catchability is 1.12. **The Plan Team recommended that the authors consider estimating the female natural mortality coefficient internally with male selectivity constrained to reach a maximum of 1.0 instead of using the profile likelihood method.** This would allow estimation of the standard errors of the female natural mortality coefficient.

A simulation analysis was conducted assuming arrowtooth flounder survival decreased by 10%, and allowing the rest of the ecosystem to adjust to this decrease for 30 years. This simulation indicates that positive changes in biomass for affected species were only minimal, with flathead sole showing the largest increase (~3%), probably due to competition for a variety of shared prey resources such as shrimp, and produced a negligible effect on pollock.

**Kamchatka flounder** Tom Wilderbuer presented the stock assessment model of Kamchatka flounder. The assessment was a straightforward update and Kamchatka flounder are managed under Tier 5. The Plan Team accepted the ABC and OFL values recommended by the authors. The authors apply a 7-yr running average of biomass estimates from trawl surveys for determination of ABC and OFL values. The authors did not explore the option of apportionment between the EBS and AI because catch rates were similar in both areas.

Prior to 2011, this species was a constituent of the arrowtooth flounder/Kamchatka flounder complex. In the eastern part of their range, Kamchatka flounder overlap with arrowtooth flounder, which are very similar in appearance and were not routinely distinguished in the commercial catches until 2007. Observers can distinguish between arrowtooth and Kamchatka flounder when they have the fish in hand. However, managing the two species as a complex became undesirable in 2010 due to the emergence of a directed fishery for Kamchatka flounder in the BSAI management area.

**Other flatfish** Tom Wilderbuer presented the other flatfish assessment. This is a straightforward update of last year's assessment. The decrease in the ABC estimate appears to be due to the decrease in biomass of starry flounder in the survey, which is the single most abundant species. Some other species are at the periphery of their ranges. Exploitation of "other flatfish" species is low.

**Items suggested for September Plan Team meeting discussion**

1. Alternate year assessments for flatfish species (BSAI)
2. Stock-recruitment workshop (joint)

Attendance: Attendance fluctuated by assessment, but peaked at 60 (public and agency) during the EBS pollock assessment review.