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 16 - 20th, 2015

Administrative

The BSAI Groundfish Plan Team convened on Monday, November 16, 2015, at 2:15 pm.

EBS pollock

Jim Ianelli presented the EBS pollock assessment.

New data in this year's assessment include the following:

- A "corrected index" (formerly known as the Kotwicki index) for the summer bottom trawl survey (BTS) biomass and abundance at age time series (1982-2015) was included for the first time, after having been tested for several years
- 2014 and 2015 acoustic vessels-of-opportunity (AVO) data
- Age compositions from the 2014 NMFS summer acoustic-trawl survey (ATS) were updated
- Catch at age and average weight at age from the 2014 fishery
- Updated total catch, including a preliminary estimate for 2015

The only methodological change was the use of a new random effects model for projecting future weight at age.

Spawning biomass in 2008 was at the lowest level since 1980, but has increased by 114% since then, with a 3% decrease projected for next year. The 2008 low was the result of extremely poor recruitments from the 2002-2005 year classes. Recent and projected increases are fueled by recruitment from the very strong 2008 year class and the above average 2012 year class, along with reductions in average fishing mortality (ages 3-8) from 2009-2010 and 2013-2015. Spawning biomass is projected to be 78% above B_{MSY} in 2016.

The SSC has determined that EBS pollock qualifies for management under Tier 1 because there are reliable estimates of B_{MSY} and the probability density function for F_{MSY}. The Team concurred with the SSC's conclusion that the Tier 1 reference points continue to be reliably estimated. The updated estimate of B_{MSY} from the present assessment is 1.984 million t, up 2% from last year's estimate of 1.948 million t. Projected spawning biomass for 2016 is 3.540 million t, placing EBS walleye pollock in sub-tier "a" of Tier 1. As in recent assessments, the maximum permissible ABC harvest rate was based on the ratio between MSY and the equilibrium biomass corresponding to MSY. The harmonic mean of this ratio from the present assessment is 0.401, down 22% from last year's value of 0.512. The harvest ratio of 0.401 is multiplied by the geometric mean of the projected fishable biomass for 2016 (7.610 million t) to obtain the maximum permissible ABC for 2016, which is 3.050 million t, up 5% and almost identical to the maximum permissible ABCs for 2015 and 2016 projected in last year's assessment, respectively. However, as with other recent EBS pollock assessments, the authors recommend setting ABCs well below the maximum permissible levels. They list two reasons for doing so in the SAFE chapter, based on this year's experience with an ABC well below the maximum permissible level:

- The fleet was able to operate with reasonably good catch rates
- The fleet was able to maintain salmon bycatch at relatively low levels.

During the period 2010-2013, the Team and SSC based ABC recommendations on the most recent 5-year average fishing mortality rate. Last year, the Team and SSC felt that stock conditions had improved sufficiently so that an increase in the ABC harvest rate was appropriate. Specifically, the Team and SSC recommended basing the 2015 and 2016 ABCs on the harvest rate associated with Tier 3, the stock's Tier 1 classification notwithstanding. The Team recommends the same approach for setting the 2016 and 2017 ABCs, giving values of 2.090 million t and 2.019 million t, respectively.

The OFL harvest ratio under Tier 1a is 0.514, the arithmetic mean of the ratio between MSY and the equilibrium fishable biomass corresponding to MSY. The product of this ratio and the geometric mean of the projected fishable biomass for 2016 determines the OFL for 2016, which is 3.910 million t. The current projection for OFL in 2017 given a projected 2016 catch of 1.350 million t is 3.540 million t.

The walleye pollock stock in the EBS is not being subjected to overfishing, is not overfished, and is not approaching an overfished condition.

Bogoslof pollock

Jim Ianelli presented the Bogoslof Island pollock stock assessment. This year, a random effects model was used to calculate the survey biomass estimates, and an age-structured model was used to provide estimates of M for Tier 5 calculations. The 2014 survey age composition was also added. The Team enquired on whether the stock could be moved into Tier 3 in the future, but this possibility is limited as there is only one year of fishery age data for calculating selectivity.

Aleutian Islands pollock

Steve Barbeaux presented the Aleutian Islands pollock assessment. The model was identical to the model used in 2014, and the only additional data was 2015 catch. Reference levels calculated were very similar to the previous year. The Plan Team noted that as long as the fishery remains low in proportion to the ABC, biennial assessments may be sufficient for this stock. There was considerable discussion about the actual values of selectivity used in the model, because the values of selectivity reported in the chapter have been re-scaled to a maximum of 1, which makes the "realized" catchability (i.e., the product of catchability and selectivity as actually used in the model) impossible to compute.

The Team recommends examining alternative models with higher *M* (compared to the low *M* coming out of the estimation procedure), and further recommends exploring the unscaled estimates of selectivity with respect to the survey's low apparent catchability.

Ecosystem

Stephani Zador presented the Bering Sea and Aleutian Islands Ecosystem Assessments and Report Cards. This year, 51 indicators were updated and 7 new indicators were presented; key assessment trends are summarized in the introduction. The Aleutian Islands update was limited as it was a non-survey year. For the BSAI, new indicators included a Spring EBS Zooplankton Rapid Assessment, large zooplankton abundance as an indicator of pollock recruitment to age-3 in the southeastern Bering Sea, and multispecies model estimates of time-varying natural mortality, and early warning indicators for regime shifts. A new indicator of bottom trawl disturbance is under development for next year. The authors do not recommend any adjustments to this year's groundfish recommended ABCs based on ecosystem-level concerns, and the Team concurs.

BSAI Pacific cod

Eastern Bering Sea Pacific cod

Grant Thompson presented the two candidate models, which are the same as last year. Model 11.5 (new numbering) has been the reference mode since 2011. Important distinguishing features include externally fixed natural mortality (0.34) and trawl survey catchability (0.77); double normal fishery and survey selectivities; age-based survey selectivity; left limb of survey selectivity allowed to vary over time; fishery length-based fishery selectivity estimated by gear, season, and blocks of years. The *dev* vectors in the assessment (for recruitment and left limb of survey selectivity) were tuned in 2009 so that input and output standard deviations were equal. The tuning has not been updated since then. The fixed survey catchability (0.77) has become increasingly suspect in recent years. It was initially derived from the record of vertical (off-bottom) distribution of 11 fish with archival tags and the supposition that fish would not respond (e.g., by diving) to the approach of the survey trawl. Field experiments with a high-opening trawl and analysis of acoustic records by RACE scientists have since produced no evidence that any cod are passing above the headrope of the standard survey trawl. When survey catchability was estimated freely in the 2013 preliminary assessment, the estimate of survey catchability increased substantially and the estimate of current spawning biomass dropped by 56%.

The other candidate model, numbered 14.2, has been in development for the last couple of years, and has a number of features viewed by all parties as improvements on the base model, including: a single fishery and season each year, with changes in composite fishery selectivity accommodated by annual variation; a nonparametric formulation of age-specific fishery and survey selectivity (Stock Synthesis pattern 17), also with potential annual variation; internally estimated natural mortality and average survey catchability; and annual deviations in survey catchability. The tuning of Model 14.2 is more complicated than 11.5 as it involves tuned prior distributions on the age-specific selectivities and application of the Thompson-Lauth algorithm to obtain the standard deviations of year-to-year changes in selectivities.

The two models produce almost equal estimates of historical mean recruitment level and year-class strengths, but quite different estimates of present abundance and ABC/OFL. For Model 11.5 the 2016 ABC/OFL are 332,000/390,000 t, and for Model 14.2 184,000/215,000 t. The divergence in abundance estimates occurs in the last few years; for 2010 they are equal. Grant also reported a fit of Model 11.5 with survey catchability fixed at 1.0, which was requested before the meeting by a Team member. The 2016 ABC/OFL values from this fit are 210,000/248,000 mt, increasing to 230,000/262,000 mt for 2017.

Model 11.5 has a number of unattractive features. One is the less likely low fixed value of survey catchability. It also has a strong retrospective pattern, with each year's estimate of abundance being revised downward substantially as additional years of data are added. Both features suggest that the model's estimate of present abundance and hence ABC/OFL are too high. Model 14.2 fits the data better, has no retrospective pattern, and estimates survey catchability freely (at 1.06), but has its own problems. Selectivity pattern 17 appears to be causing numerical difficulties (large values in the final gradient vector), and the Thompson-Lauth algorithm has proved difficult to apply to multivariate problems.

Grant set out five criteria for choosing a model and chose Model 11.5 mainly because Model 14.2 was still a work in progress and the assessment is likely to change in a number of ways following a CIE review scheduled for February 2016. In recognition of the likely high bias of Model 11.5, Grant recommended that ABC be held at the 2013 level of 255,000 mt as it was last year.

The Team had a fairly lengthy discussion of the merits of the two models. Representatives of industry argued that the low fixed survey catchability was still credible because the longline fishery caught substantial numbers of large cod on the shelf during the summer when the trawl survey caught almost none, so clearly the survey was missing some fish present in the area despite the failure of the RACE

work to detect them. They also stated their belief that the stock was large and increasing so there was no reason to reduce the ABC. Some team members argued for more caution, on the grounds that the low fixed survey catchability was at best doubtful, Model 14.2 was the more credible model in a number of respects, and hence there was a good chance that even an ABC of 255,000 mt was above the true OFL.

In the end, the Team concurred in the author's recommendation, i.e., to base the 2016 status determination on Model 11.5 despite our long-held reservations about this model, but to hold ABC at 255,000 t. An important consideration for some Team members was that the recommended ABC of 255,000 t does not much exceed the OFL value obtained from the fit of Model 11.5 with survey catchability set to 1.0. We look forward to the development of an improved model after next year's CIE review, incorporating desirable features of Model 14.2 and shedding undesirable features of Model 11.5, including the low fixed survey catchability.

Aleutian Islands Pacific cod

Grant Thompson reviewed the candidate models. This stock has been in Tier 5 since being split from the Bering Sea stock for assessment and management. The present assessment model, now numbered 13.4, is a simple random effects model of the trawl survey biomass trajectory, with process variance the only estimated parameter. Another random effects model, requested by the Team in September and designated 15.6, included the IPHC longline survey CPUE series as well (assumed to have the same process variance as the trawl survey), and estimated an additional parameter to rescale the IPHC series to the same units as the trawl survey. A third candidate, designated 15.7, was an age-structured model similar to Model 14.2 in the Bering Sea but with additional constraints on survey selectivity intended to iron out some odd features of a preliminary fit reported in September.

All models fitted the relevant survey series reasonably well, which in the case of the random effects models was a given. Grant realized that there were some technical questions about the nature of the state variable in Model 15.6 and therefore the meaning of the results. The age-structured model 15.7 again produced peculiar selectivity estimates and displayed a dreadful retrospective pattern. In view of these difficulties Grant recommended sticking with the present model 13.4 for 2016, and the Team agreed. This assessment will get a CIE review along with the Bering Sea in February 2016.

BSAI Atka mackerel

Sandra Lowe presented the BSAI Atka mackerel assessment. The model was identical to the model used in 2014. Changes to the assessment inputs included updated 2014 and projected 2015 catches, 2014 fishery and survey age compositions, and updated fishery selectivity used for projections (based on the mean from the 2011-2015 fisheries). The author also replaced the 4-survey weighted average method with a random effects model for area apportionment of ABC. Reference fishing mortality rates for ABC and OFL were lower than those estimated in 2014 because of increased selectivity of young fish (primarily age 3 years) in the 2014 fishery. Lower fishing rates resulted in lower ABC and OFL values for 2016 than those projected for 2016 last year. It was noted that some very large catches can rupture the net during the bottom trawl survey and that these tows are not used in computing biomass estimates. However, it might be informative to plot the location of these large catches to see if they occur in areas where the survey also found high abundance of Atka mackerel in previous surveys. As for future research directions, the author noted that she will be implementing the recommendations of the CIE review (conducted in 2014) as well as exploring alternative formulations of M, including the estimation of M and survey q within the model.

The Team recommends that the author explore different methods of estimating the fishery selectivity at age vector used to make projections and computing ABC, such as including more

years in the average, dropping the current year from the average (given that age data for the current year are typically unavailable), or using random effects models.

BSAI Greenland turbot

Steve Barbeaux presented the Greenland Turbot stock assessment. From the turbot SAFE chapter: "Analyses of new data (namely size and age composition data for 2013 – 2015) made available in September 2015 exacerbated a data conflict with the NMFS EBS Shelf and Slope trawl surveys necessitating unexpected model configuration changes to resolve what are clear structural misspecifications." Therefore, in addition to the accepted model from last year (Model 14.0), three alternative models (Model 14.1, 15.1, 15.3) were presented. Model 14.1 was developed to address the fact that the slope survey occurs infrequently and thus gets a lower weight than the shelf survey. Models 15.X utilize a domed selectivity curve, and Model 15.3 utilizes a random walk in the selectivity parameters, which markedly increases the number of parameters. The Team discussed the relative merits of the models. Model 15.1 was ultimately selected by process of elimination: 1) Model 14.1 is preferred over Model 14.0 because the data weightings are better justified and because the retrospective pattern in Model 14.1 is slightly better (Mohn's rho decreases from 0.211 to 0.196). 2) Model 15.1 is preferred over Model 14.1 because the increase of 112.6 points in the log likelihood outweighs the addition of the 12 new parameters and because the retrospective pattern in Model 15.1 is slightly better (Mohn's rho decreases from 0.196 to 0.171). 3) Model 15.3 is *not* preferred over Model 15.1 because the authors and the Team feel that the specifications of the constraints on the 1,037 new parameter deviations need further exploration (specifically, the constraints in Model 15.3 seem too loose) and because the retrospective pattern in Model 15.3 is substantially worse (Mohn's rho increases from 0.171 to 0.354). Although Model 15.1 was ultimately accepted by the Plan Team, the length and detail of the discussion suggests that this model is not yet ready to be the new standard model for this stock. There was some discussion of the authors' choice to dispense with the age composition data in favor of the length composition data. This concern, coupled with the stock being at the all-time historic low only two years ago, should prompt further model explorations in 2016.

BSAI Yellowfin sole

Tom Wilderbuer presented the yellowfin sole assessment. Two minor changes were made to the stock assessment this year, which had little effect on the biomass estimates compared with the 24% decline in survey biomass from 2014. Changes to the input data included: 1) a slight change in the maturity schedule, and 2) the weight-at-age data values from ages 11 to 20 were smoothed. Additionally, the model was updated with the most current survey and fishery data available. In general, the model fits the survey biomass estimates quite well. Yellowfin sole female spawning biomass is ~1.5 times above Bmsy, but declining since the 1980s. Total biomass dropped compared to 2014, but has been relatively stable over the last number of years. Additionally, the average exploitation rate (1978 – 2015) is only 0.05 and the catch is only, on average, 75% of the ABC. There was some discussion about the new maturity schedule, which was simply the average of the 1991 and the 2012 maturity estimates. This method differed slightly with the Team and SSC recommendation to test for significance between curves and to pool the data if no differences were found. The two methods ultimately weight the data slightly differently, but realistically have no significant impact as the two curves are extremely similar. With respect to the alternative weight-at-age models presented in the chapter, there was some discussion regarding whether (and if so, why) Models 2 and 3 were conditioned on Model 0. No recommendations came of this discussion, but it was noted as something to examine further. The authors are preparing a paper on the alternative weight-at-age models.

BSAI Flathead sole

Carey McGilliard presented the flathead sole assessment. This this is an off-cycle year and only a projection model was run. Changes to input data in this analysis include updated 2014 fishery catch, and estimated 2015 and 2016 fishery catch. Age 3+ biomass is projected to continue to increase through 2017, although spawning biomass is projected to decline. The 2015 survey biomass estimate was 25% below the 2014 estimate (22% below 2013 estimate). Correlations of biomass with surface and bottom temperatures were inconsistent this year. Future research and model improvements will examine growth estimates, assumptions about selectivity, and the estimation of an ageing error matrix.

BSAI Arrowtooth Flounder

Ingrid Spies presented the arrowtooth flounder assessment. This is an off-year for this stock, so a projection model was run rather than a full assessment. The updated catch for 2014 and the catch estimates for 2015 and 2016 were used to project values for the 2016 and 2017 OFLs and ABCs. Relative to last year's estimates, the OFL increased from 91,663 t to 94,035 t and the ABC increased from 78,661 t to 80,701 t. For next year, the authors will present a new model for both the Gulf of Alaska and the BSAI, where each assessment will use the same model. The Team accepted the authors' OFL and ABC recommendations.

BSAI Northern Rock sole

Tom Wilderbuer presented the Northern Rock Sole assessment. There were no changes in methodology. The survey biomass was down 24%, the same percentage as yellowfin sole. This was the lowest survey biomass estimate since 1980; the model does not fit this low point. Most catch of Northern Rock Sole is in the roe fishery in February and March; 96% are retained. Catches are mostly age 9+. The length at age from the survey age comp was smaller in the 1990s; length at age varies with time. Using survey age comps, strong year classes can be watched through time. Weight displays a sexual divergence, therefore a split-sex model is used based on the survey, where sexes are about evenly split.

The author tested a number of models of which three fit the survey sex ratio, Models 1a, 2 and 3. Model 1 was used last year and uses Q=1.5. Model 1a changes the estimate of Q from 1.5 to 1.4, based on a result obtained by Somerton and Munro (2001, *Fishery Bulletin* 99:641-652), which lowers the estimate of population size. This year, the author recommended Model 1a (with the lower Q). Grant reminded us that we went through this same exercise last year, when the author and the Team both recommended Model 1. Last year, the Team reported the following reasons for choosing Model 1: 1) the Somerton and Munro study was confined to a one-week experiment conducted in a relatively small area; 2) the Somerton and Munro study considered bridle efficiency only, not net efficiency; 3) in the 2002-2007 assessments, where Q was estimated with a prior based on the results of the Somerton and Munro study, the estimates ranged from 1.45 to 1.82, with a median of 1.52; and 4) Q has been fixed at a value of 1.5 in this assessment since 2008, and there does not seem to be any good reason to change at this point. Having been presented with no new information to the contrary this year, the Team again recommends use of Model 1.

BSAI Alaska Plaice

This year is an off-cycle assessment, thus only a projection model was run, with updated catch information. The 2015 survey biomass of 355,640 t, the lowest ever seen, was a 21% decrease from 2014. The population has been decreasing for the last four years. However, this is no cause for concern, as Alaska Plaice is still at a high, stable level and is lightly exploited. For 2016, the average catch from 2011-2015 was used to estimate the 2016 total catch at 16,250 t. The authors' recommendation for the

ABC in 2016 is 41,000 t, a decrease of 14% from the 2015 ABC, and similar to the value projected last year for 2016. Projections are slowly going down, but above $B_{40\%}$.

BSAI Other flatfish

The survey biomass is down slightly from last year. The 2014 surveys estimate of 157,400 t was the highest level since 2007, but declined in 2015 by 35% to 102,300 t. The butter sole exploitation rate (computed as catch divided by survey biomass) appears to be high, but this is not a point of concern because it is likely an artifact of survey sampling, as butter sole always has high a CV due to the fact that it is in the periphery of its range in the BSAI. The author explored the influence of temperature: rex sole, longhead dab, and butter sole are negatively correlated with annual bottom water temperature. Sakhalin sole is present in larger numbers when cold water is present; however the largest historical biomass estimated for Sakhalin sole occurred in 2015, an anomalously warm year. The Team accepted the authors' recommendation from the random effects model.

BSAI Kamchatka Flounder

Tom Wilderbuer presented the Kamchatka flounder assessment. This is an off-cycle year, so there was not a full assessment; instead a projection based on the Tier 3 model using catch estimates for the current year was used to provide estimates of OFL and ABC for 2016 and 2017. There has been an upward trend in abundance the last few years, in three different surveys. The 2016 OFL increased slightly from 11,000 t to 11,100 t and the 2016 ABC remained the same at 9,500 t. The author recommends that a 2016 slope survey be conducted as this will be important for the full assessment next year. The Team accepted the authors' OFL and ABC recommendations.

BSAI Shortraker rockfish

This was a routine off-year update of a Tier 5 assessment. Specifications did not change.

BSAI Sculpins

This was a routine off-year update of a Tier 5 assessment. Specifications did not change.

BSAI Sharks

Cindy Tribuzio presented the shark executive summary, incorporating the most recent catch data. The catch does not change the OFL and ABC since sharks are assessed as a Tier 6 complex with the OFL based on maximum historical catch from 1997 – 2007 (ABC is 75% of OFL). There was a steep decline in the IPHC longline survey and incidental catch rates of sleeper sharks beginning around 2000 and continuing for several years, but in recent years catch rates have been low and stable in both the surveys and bycatch fisheries. In the case of sleeper sharks it is unknown if there is a conservation concern, because mature animals have not been reported in survey or incidental catch. It is unknown whether the past appearance of higher abundance was the result of one reproductively successful period with lots of juveniles, or an actual decline in abundance of all sleeper sharks. Swept area biomass estimates are calculated for the BSAI surveys, but are not reliable for the shark species. For the 2016 full assessment, the authors plan to investigate catch of Pacific sleeper shark by numbers and compare to catch weight estimates. The Team accepted the authors' recommendation to continue OFL and ABC at the current levels (1,363 t and 1,022 t).

BSAI Octopus

Liz Conners presented the octopus executive summary. There were no changes to the 2012 predation-based estimate of octopus mortality from 1984-2008 survey data on Pacific cod diets, which is used as an alternative Tier 6 estimate. The authors plan to revisit this calculation for the 2016 full assessment. The consumption methodology is based on extensive diet data and includes estimation of uncertainty. The 2014 and 2015 catches are low and well under the ABC. The author continues to examine a size-based assessment model to use as a simulation model for identifying monitoring and management metrics, and for possible fitting to habitat pot data. Research on discard mortality rates was completed and reports should be available prior to the September 2016 plan team meeting.

BSAI Skates

Olav Ormseth presented an update of the skate complex stock assessment. This was a scheduled "off-year" assessment. New data in the 2015 assessment included updated 2014 catch (27,511 t) and 2015 catch (22,864 t, as of October 18, 2015). BSAI skates are in Tier 3a (Alaska skate) and Tier 5 (all other skates). There were no changes to the assessment methodology. The projection model for Alaska skate was re-run with the most recent catch data and estimated 2016 catch. Results from the 2015 EBS shelf survey were presented and the random effects biomass estimates for the other skates were updated. The 2016 recommended OFL and ABC have slightly increased from last year's projected values. The Team accepts the authors' recommendations for the 2016 fishery of OFL = 50,215 t and ABC = 42,134 t. There is no apportionment of the ABC.

BSAI Pacific ocean perch

Paul Spencer presented the off-year executive summary for Pacific ocean perch. In off years only catches are updated and the projection model is run. The change in estimated 2015 catch were small and within 10% of last year's estimate for 2015. A Joint Plan Team policy (from September 2006) states that it is unnecessary to re-run the projection model if estimated catches are within 10%. Paul said that he may use this guidance in future off-year assessments. A ratio of 0.72 was used to estimate current year catches from the October data. The new ABCs and OFLs are very close to projected values. ABCs were apportioned by using the standard random effects survey averaging model. These values were approximately equal for each area. The Team concurred with the authors' recommended ABCs and apportionment.

BSAI Northern rockfish

Paul Spencer presented the off-year executive summary for northern rockfish. In off years only catches are updated and the projection model is run. For northern rockfish, the year-to-date catch for 2015 was about 3 times higher than last year's estimate for the year-end 2015 catch. This caused the projections of ABC in 2015 to be a little high (about 3%). He used a different method for estimating the remainder of the 2015 catch because catch to date was so different than expected this year, and estimated 2016 using the fishing rate at the end of the year in 2014. Recommended ABCs are generally decreasing.

Paul showed some information on where the catch was taken since 2010. The catches were much higher in the Eastern AI and Western AI in 2015. He showed the observed catch by species-specific targets. Most of the recent catch was from Atka mackerel and northern rockfish targets. Most of the fish are retained in each fishery. Most of the survey biomass is in the Western Aleutians and very little of the biomass is in the Eastern Aleutians (7-12%). He showed the random effects model fits to the individual areas. It showed the large increase in the WAI and a moderate increase in the EAI. The previously used weighted average method and random effects models both show about the same biomass distribution. The

area-specific exploitation rates were shown and he said the 2015 exploitation would be much higher than the catch that would be expected exploiting at F40% in the Eastern Aleutian Islands. It was mentioned that this is the first year where it was becoming more of a target fishery, because it has a substantial area-wide ABC. The Team concurred with the authors' recommended ABC and apportionments for 2016 and 2017.

The Team recommends that the authors examine the catch data in August 2016. If it appears that the catch in the Eastern AI will be much higher than what would be expected under an area-specific ABC for 2016, the Team would ask the authors to present a stock structure template update at the September meeting.

BSAI Other Rockfish

Ingrid Spies presented an update of the other rockfish complex stock assessment. This was a scheduled "off-year" assessment. New data in the 2015 assessment included updated 2014 catch (905 t) and 2015 catch (614 t, as of October 19, 2015). BSAI other rockfish are in Tier 5, with OFL and ABC set on product of biomass and natural mortality (with ABC being 75% of OFL). **The recommended values for ABC (1,251 t) and OFL (1,667 t) in 2016 and 2017 are carried over from the 2014 assessment, with the ABC apportioned between the Bering Sea (695 t) and the Aleutian Islands (556 t).**

BSAI Blackspotted/rougheye rockfish

Paul Spencer provided the overview of the executive summary assessment for 2016-2017 specifications. He noted that catch rates have been declining due to increased awareness of the fleet, however the MSSC estimated for WAI was nonetheless exceeded for the second year in a row.

He provided an overview of some analyses of depth of fishing in recent years that indicated a decline in fishing depth as well as an overview of the catch of BS/RE by target fishery by area. Graphs of bycatch rates by target fishing rate were shown. The BSAI trawl limited access sector (non-Amendment 80 fleet) has had increased catch rates in the Pacific ocean perch fishery in recent years.

Members of the public suggested additional analyses on the relative size at age in recent years, as well as extending the analysis of fishery bycatch rates to pre-2014 years in order to better characterize historical bycatch rates.

The Team recommends that next year's assessment include separate tables of historical bycatch rates of BS/RE by fishery and area.

The Team discussed the role of the BSAI Team relative to that of the spatial/stock structure working group in recommending catch levels. The Team will forward a recommendation for the maximum subarea species catch (MSSC) for 2016, but defers to the workgroup to develop new tools and potential management actions for consideration next year.

The Team recommends that the 2016 MSSC in the WAI be set at a value of 58 t, as calculated in this year's assessment. If the MSSC is exceeded again next year, the Team anticipates evaluating alternative management tools for use in 2017 (e.g., subarea TACs, ABCs, or OFLs).

BSAI Squid

Olav Ormseth provided an overview of the squid assessment, including a range of requested (and additional) approaches for establishing harvest recommendations in this assessment cycle. The author and Team discussed the relative size and depth differences amongst squid species in the complex. Olav

indicated that the species composition of the survey and fishery are dissimilar. Thus, estimates from ecosystem modeling are not recommended as an approach for estimating the biomass of the squid complex.

The Team discussed additional survey indices for squid. The author provided the random effects model for survey biomass estimates in the EBS shelf, slope, and AI but noted that information is limited, encounters are sporadic, and, given the short life-history of squid, these surveys tend to provide a poor estimate for squid biomass. Furthermore, for the slope and AI surveys, the data points are largely independent of each other and not representative of a trend; thus, use of a random effects model may be inappropriate. Therefore, for survey estimates, the use of the long-term average may be preferable to a random effects model or other methods of smoothing survey data. The author also included methods for using spawning escapement to set harvest recommendations. He noted that in Argentina and California, squid are managed similar to management of salmon based on spawning escapement.

The Team discussed relative timing of squid catch in the horseshoe and across the B-season pollock fishery. While fishing is fairly extensive in the horseshoe in the A-season, squid are not prevalent at that time, thus catches tend to be low during the A-season. For the second year in a row the industry voluntarily closed a portion of the horseshoe to the fleet in the B-season to prevent high squid catches. This was at the expense however of efforts to reduce salmon bycatch as chum salmon bycatch rates were lower within the squid closure.

The Team discussed the likely impact of environmental and oceanographic conditions on squid abundance, noting the variability of inter-annual catch levels. Olav noted that it is likely that squid are more abundant in warm years. Squid have a very short (< 2 year) lifespan. The Team again reiterated that despite catches well above the ABC, there are no conservation concerns for the stock and the actual risk of overfishing is very low. The Council will take up an analysis to move squid into the Ecosystem Component in 2016; however, no changes are expected within the next 2 assessment cycles.

The author recommended continuing to use average catch, but over a different time period than in previous years. The Team noted that, while the authors did not explicitly present the suggested F=M=1 OFL Tier 5 alternative, several similar alternatives were developed. The Team discussed the rationale for use of average catch to define a period of sustainability of the stock and suggested that a shorter historical time period, prior to the observed decline in catch, may be more appropriate, as the decline is believed to be representative of a decline in effort upon the departure of the foreign fleet, not a decline in squid biomass.

The Team recommends that average catch over the period 1977-1981 be used to calculate the OFL, with 75% of the OFL as the recommended ABC.

The Team also recommends that, in the next full assessment, the author examine historical data to verify that the decline in catch beginning in 1982 represents a decline in effort rather than a decline in biomass this in the next full assessment.

The Team also recommends that, in the next full assessment, the author consider whether certain environmental conditions may be correlated with squid catch and abundance in the surveys.

BSAI Forage fish

Olav Ormseth provided an overview of the forage fish assessment including SSC comments on the previous version of the report provided in September/October. The author has begun exploring how best to utilize data from the BASIS survey for the next full report. The next assessment will also explore

alternatives to the temperature regime per SSC request and look at M2 SST anomalies as well as regimes based on trawl survey data.

The revised report includes an investigation of the relationship between herring bycatch in groundfish fisheries and the Togiak survey biomass. Additional information compares the capelin distribution from the bottom trawl survey as compared to the BASIS survey using acoustic backscatter. The acoustic backscatter indicates a different spatial distribution than using only the bottom trawl survey data and corroborates the hypothesis that capelin are present closer to the surface in areas where they are absent from the bottom trawl data. Additional information from BASIS will be included to enhance the next forage fish report.

The next assessment will be in 2017, following the biennial schedule. The Team had no additional recommendations, but commends the author on the investigations considered in the current assessment and the direction for the next assessment.

Adjourn