Final Joint Groundfish Plan Team Minutes

September 15-19, 2009
Alaska Fisheries Science Center
Seattle, WA

The Joint meeting of the BSAI and GOA groundfish Plan Teams convened Tuesday, September 15, 2009 at 1 pm at the Alaska Fisheries Science Center in Seattle, Washington. Members of the Plan Teams present for all or part of the meeting included:

Bering Sea/Aleutian Islands Groundfish Plan Team		**Gulf of Alaska Groundfish Plan Team**	
Loh-Lee Low	NMFS AFSC REFM (Chair)	Jim Ianelli	NMFS AFSC REFM (Co-chair)
Mike Sigler	NMFS AFSC (Vice chair)	Diana Stram	NPFMC (Co-chair)
Kerim Aydin	NMFS AFSC REFM	Sandra Lowe	NMFS AFSC REFM
Lowell Fritz	NMFS AFSC MML	Jeff Fujioka	NMFS AFSC ABL
David Carlile	ADF&G	Jon Heifetz	NMFS AFSC ABL
Bill Clark	IPHC	Robert Foy	NMFS AFSC
Jane DiCosimo	NPFMC (Coordinator)	Cleo Brylinsky	ADF&G
Yuk W. (Henry) Cheng	WDFW	Tom Pearson	NMFS AKRO
Brenda Norcross	UAF	Nick Sagalkin	ADF&G
Mary Furuness	NMFS AKRO	Steven Hare	IPHC
Grant Thompson	NMFS AFSC REFM (SSC Liaison)	Leslie Slater	USFWS
Dave Barnard	ADF&G	Sarah Gaichas	NMFS AFSC
Leslie Slater	USFWS	Nancy Friday	NMFS MML
Dana Hanselman	NMFS AFSC ABL	Paul Spencer	NMFS AFSC REFM
Alan Haynie	NMFS AFSC	Michael Dalton	NMFS AFSC

Ken Goldman (GOA Plan Team ADF&G) was absent. About 50 members of the public and NMFS staff attended parts of the meeting. The teams reviewed changes to the draft agenda.

Stock Structure Paul Spencer summarized the conclusions of a Council working group report on proposed guidelines for how the Plan Teams should determine species and spatial management units for setting annual catch limits. The workgroup discussed management considerations related to both evolutionary and ecological paradigms for stock structure. Paul asked the Plan Teams to consider how to apply a precautionary rationale to stock structure decisions for management. Tony Gharrett and Mike Canino presented several BSAI case studies. Bill Clark and Sarah Gaichas asked the teams to consider how to distribute harvest spatially relative to the biomass, regardless of genetic or other evidence of stock structure. Jim Ianelli requested that the Plan Teams prepare a summary of the separations by area and species that have been implemented over the years for future consideration. Paul offered to provide that information for BSAI and GOA rockfishes.

Tony Gharrett summarized the materials and methods of marine fishery genetics, and genetic information for BSAI blackspotted rockfish. Mike Canino summarized genetics studies of Pacific cod, walleye pollock, and Atka mackerel. The main questions for genetics are 1) where are population centers located? and 2) how much dispersal occurs? Fishery managers may find it useful to think of genes as tags; however temporal and spatial scales are different than our usual management scales. There is a thousand plus year frame of reference for genetics, but only annual to decadal time scales for fishery management. The question is how to reconcile potential for populations to maintain/replenish genetic structure in space over generation times with temporal and spatial scale of fishing in the North Pacific. Measuring the dispersal potential of the genes within the population range is difficult, but getting that rate is essential to determining possible fishery impacts. We want to avoid "holes" in the population where genetic structure is separated by fishery removals. Genetic migration rates are per generation, and are not annual rates. Generation time is defined as a population average, and takes into account not just first age at spawning but also the number of years of reproductive activity.

Paul led a discussion of what the next steps would be in forming a Plan Team policy, including the ICES model of a separate stock structure committee, the ESA status review process determining evolutionarily significant units, and an alternative approach proposed by the working group on stock structure. The working group proposed a framework where consistent information types would be examined for each stock in question, including fishery harvest and spatial information, barriers and phenotypic characters, behavior and movement, and genetic information.

The teams agreed that a consistent process for examining stock structure issues would be helpful for setting ACLs. The teams proposed a three step process for evaluating stock structure within the management context.

1) data on stock structure would be reviewed using the working group's proposed framework (with any modifications suggested by the Teams or SSC).
2) relative risks to the stock would be weighed for status quo versus altered spatial management to address stock structure.
3) management issues would be considered (such as the feasibility of managing smaller areas, smaller TACs, costs of possible fishery closures, or cryptic species with available data).

The teams agreed with the working group that the scientific data on stock structure should be evaluated at the September Plan Team meeting rather than in November so that resultant ACLs would not constrain management decisions. If management constraints prevented scientific advice from being fully implemented (such as quotas that are too small to manage), alternative management strategies to address stock structure concerns could be considered in the future.

The Teams suggested that stock assessment authors include the data necessary to make consistent evaluations of stock structure in the introductory section on stock structure. Only authors who plan to suggest spatial or stock splits in their current assessments are required to provide the necessary information to the teams each September, and include that information in their November SAFE Report chapter. In the future, this information may be requested for all chapters. The framework (see table in the working group report) should be provided in the stock assessment template going out to authors to notify them that this information will be required if stock splits are recommended, and may eventually be required in all assessments. Case studies will be selected by the Plan Teams in November 2009 for the November 2010 assessments. Instructions to stock assessment authors will include a consistent set of potential area splits for catch and exploitation rate calculation where possible (e.g., include an EBS vs. AI split in BSAI assessments, except that smaller scale splits may be requested; analyses by 3-digit INPFC management areas was suggested for specific cases). Otherwise, hypothesized stock structure should drive areal analysis. Missing information for the framework should be listed as *research priorities* for that stock. Finally, if stock identification information shows that very small management scales might be required that are beyond current capabilities for monitoring and enforcement, this information should still be included in the assessment so that steps can be taken to mitigate any risks the current management might pose to the stock.

Pacific cod as bait Tom Pearson presented an approach that would constitute a step forward in achieving total catch accounting for Pacific cod, which is allowed to be taken as bait in the BSAI for use in the BS crab fisheries. There is no requirement for a catcher vessel to report the amount of Pacific cod caught with crab pot gear for use as bait. NMFS In-Season Management staff is recommending the use of the 2005 to 2009 average Pacific cod weight (i.e., 3 kg Pacific cod/pot) divided by the harvest weight of crab as a percentage to estimate a time series of removals of Pacific cod used as bait. Grant Thompson reported that In-Season Management's estimates of historic removals will likely be counted in the BS cod model as pot catch. An industry member suggested that the Council recommend that an amendment to the regulations be considered to require reporting of cod taken as bait for the crab fisheries to address this data reporting gap. Tom noted that observer program data could also be used to estimate removals. Mary Furuness reported that vessels taking cod as bait generally hold cod endorsements on their limited entry permits and are limited by the 20% cod MRA.

Pacific cod aging accuracy Tom Helser, AFSC, evaluated possible causes of the observed inconsistency between Bering Sea Pacific cod mean length at age and the modal length in survey length frequency data. He posed three hypotheses why such an inconsistency may exist: 1) if age samples and length samples are taken from survey hauls in spatially distinct areas of the Bering Sea that show difference growth characteristics; 2) if growth is

highly variable and changes rapidly, particularly for younger ages, showing pronounced ontogenetic structure; and 3) ageing bias where determination criteria assign a fish of unknown true age to greater or lesser ages. Each theory may not be mutually exclusive, but may act synergistically. Results include:

- Pacific cod growth is rapid and spatially variable (as function of bottom depth and latitude). A generalized additive model (GAM) using a thin plate spline smoothing function revealed a significant functional relationship between mean length and mean age with both bottom depth and latitude. Specifically, average length and average age increase with bottom depth while decreasing with higher latitudes. In addition, the rate of change in mean size and age is significantly influenced by age.
- The spatial distribution of age samples and length samples taken in the survey, as shown by a comparison of median and inter-quartiles (25th and 75th percentile) of catch-weighted bottom depth and latitude, can differ substantially. For those survey years where the catch-weighted distributions of age samples were at deeper depths and lower latitudes than the length samples, the mean length at age 1 from the age data was greater than the mean length in the length database for the corresponding age. However, mean lengths at age 2 from length samples (obtained by slicing the length composition) were in general consistently greater than mean lengths from age samples regardless of the spatial variation in hauls from which age and length samples were taken. It is quite possible that greater mean length at age 2 from length samples are contaminated by lengths from age 3 from the process of slicing length distributions for age.
- Pacific cod growth is temporally dynamic and can vary between cohorts. A hierarchical growth model incorporating cohort specific growth parameters as random components (common distribution as defined by hyper-parameters for the mean and variance-covariance) and environmental covariates as fixed effects revealed that the cohort specific growth coefficient K and t_0 can vary substantially over time and that bottom temperature exerts a significant effect on these parameters. Further, modal lengths for presumptive ages 1-4 from length data from the three most dominant cohorts (1992, 1996, and 1999) are generally consistent with posterior predictive distributions at age generated from the cohort specific hierarchical growth model and in only one case lie outside the inter-quartile range. However, in cases where there is an inconsistency in predicted mean length at age and the modal length (ages 2 and 3 in 1999) the maximum posterior density is always less than the modal length.
- Interpreting ages from Pacific cod otoliths can be problematic before age 4 with difficulty stemming from discriminating annual marks from other growth checks. This is largely confirmed by computation of standard age reading statistics (1992-2008) that indicate percent agreement drops from over 90% at age 1 to about 60% at ages 2 through 6, after which agreement declines roughly linearly until age 12. Variability associated with agreement (as expressed by CV of agreement) increases abruptly at ages 2 and 3, but declines until age 6 and then gradually increases. The use of edge-type criteria (ages 2 – 4) was also evaluated. Edge-type is an ordinal variable (0-5) that may be recorded by the reader (not all readers enter values in this field of the database) and used to assign a final age based on time of collection and amount of calcification laid down at the edge after last annulus formation. Comparison of length frequency distributions from ages that reversed the use of edge type criteria were shifted to substantially larger sizes for ages 2 and 3 than the same set of age samples that did used edge type assignments, while for age 4 the length distribution was shifter to smaller sizes. This generally produced consistency between the mean size at age and the modal size from length samples for ages 3 and 4, but shifted the mean length at age 2 to slightly greater lengths than the modal length from the length samples.

Additional research is needed to reconcile inconsistencies between mean length at age and modal length in the survey length frequency data. These results indicate that pursuing alternatives in modeling Pacific cod growth specifically by cohort may improve the fit to the data, however, other time varying features such as selectivity in the assessment model may be confounded with cohort-specific growth. Also, age samples and length samples appear to be collected differently in the survey, and depending on the spatial distribution of the hauls from which these samples are taken, mismatches between mean length at age and modal length may occur. Finally, it is unclear whether the use of edge type in assisting age readers in interpreting final age based on marginal patterns is appropriate. Research on the use of marginal increment analysis of other species has validated the use of this procedure but it remains uncertain if such a technique should be applied to Pacific cod. Future research to address

potential aging bias and to confirm age determination criteria used for Pacific cod is needed. The list below indentifies specific research intended to be conducted by the Age and Growth Program as well as suggestions that may aid understanding of factors contributing to potential bias. In particular, *research priorities* include:

- Stock assessment model incorporating bias into the existing aging error matrix for ages 2-3 could be employed in the short term to evaluate a process-oriented approach to assessing inconsistency in these data sources.
- The AFSC in collaboration with the IPHC is planning a Pacific cod bomb radiocarbon 14C study using otolith specimens collected in 1962-1963 from the GOA. Pacific cod aging has not been scientifically validated and recovery of these samples would provide the first validation using bomb 14C, which is considered the gold standard of age validation. This is intended to be a study focused specifically on potential aging bias of ages 2-4 using these early samples, but will be augmented with AFSC collections to evaluate older ages.
- To factor out sampling artifacts, ages could be sampled randomly rather than using a length stratified sampling framework from hauls in the 2010 survey. This would ensure spatial consistency of samples for these two types of data and allow direct comparison of size without effects caused by spatial variability in growth.
- Work will continue and efforts will be made to compare GOA and EBS Pacific cod age data.

Pacific cod assessments Grant Thompson presented a suite of alternative models for the EBS and GOA, based on the model preferred and recommendations for various new model elements by each team and SSC in 2008. For the GOA, the key features of the base Model A are: low emphasis (0.12) on age data, because it was not possible to fit both the age data and the trawl survey trend well; asymptotic selectivity in the January-May trawl fishery; age-based trawl survey selectivity; all selectivities double normal. The alternative models, with features based on 2008 suggestions, are stepwise modifications of Model A, as follows:

Model B. Add some new size-at-age data.
Model C. Set emphasis on age data to 1.0.
Models D. Set survey catchability to 1.0 for all years.
Models D1-D6. A factorial array with factors
(i) double normal or exponential-logistic selectivity
(ii) January-May trawl fishery selectivity asymptotic or free
(iii) trawl survey selectivity for 27+ cm fish asymptotic or free
Models E. Size-based trawl survey selectivity.
Model E1. Double normal selectivity.
Model E2. Exponential-logistic selectivity.

Fits of the alternative models were all similar to Model A in that the model predictions of the trawl survey abundance tend to be low (all or most of the residuals are positive). A serious conflict between the survey trend and the age/size composition data continues.

For the Bering Sea, the key features of the base Model A are: all fishery and survey selectivities are asymptotic except for a few seasonal longline and pot fisheries; trawl survey catchability estimated (not fixed); trawl survey selectivity age-based and all others size-based; ascending limb of trawl survey selectivity allowed to vary annually; all selectivities double normal. The alternative models B-H are a factorial array with factors:

(i) double normal or exponential-logistic selectivity
(ii) trawl survey catchability free or fixed (at 1.0)
(iii) trawl survey selectivity asymptotic or free

The exponential-logistic selectivity function was suggested in 2008 because some of the fitted double normal selectivities in Model A showed questionable abrupt turns among older age groups. But this year's fits with the exponential-logistic function were far inferior to those with double normal selectivity, as measured by likelihood and AIC values. All of the models with double normal selectivities fitted the survey data quite well.

Grant posed three questions about alternative models in both regions: 1) whether to retain double normal or exponential-logistic selectivities or both; 2) whether to set priors on some selectivity parameters; and 3) whether to change any of the allowed annual selectivity deviations (intended to account for the year-to year variation in the vulnerability of younger fish). The Stock Synthesis package contains an option for removing the user's control over selectivity at the smallest (youngest) or largest (oldest) size (age) in the double normal selectivity function, resulting in fewer parameters to be estimated. The BSAI Team recommended that Grant use that feature as needed, rather than retaining the exponential-logistic function. The team did not recommend a return to setting priors on selectivities, or any change in the selectivity deviations. (Dropping the exponential-logistic function will remove a complication related to implementing selectivity deviations for that function.)

There are still questions about the cod age data, due to the mismatch between survey length modes and estimated mean length at age of younger fish in the Bering Sea, and by the difficulty of fitting the age compositions in the Gulf. The teams welcomed the work done by Tom Helser (and by Grant) on the estimates of mean length at age, but recommended more work be undertaken as a *research priority*. The teams were also impressed by the large influence of applying or not applying edge type criteria in determining age, first reported by Tom Helser at this meeting. This issue also is a *research priority*. In the meantime, the teams requested that Grant report some model fits that do not attempt to fit the age data in both regions.

Sablefish Dana Hanselman presented an update on the sablefish assessment. A Center for Independent Experts (CIE) review occurred in March 2009. Overall, the CIE panel found that the current assessment approach was acceptable. The Panel also recommended several areas for exploration or improvement. The Panel suggested some approaches regarding abundance estimates from longline and trawl surveys. The Panel concluded that the assessment should continue using fishery catch rate data in the assessment. Other comments related to foreign fishery length data, sex-ratio data, halibut survey data, and State of Alaska sablefish surveys. The Panel also recommended more work on sablefish recruitment dynamics, which in part, will occur through the recently awarded Gulf of Alaska Integrated Ecosystem Research Program. The Panel also commented on model structure, methods for apportioning the ABC among management areas, movement (tagging) data, methods for treating abundance data affected by whale depredation, selectivity (size vs. age-based), growth estimation (inside vs. outside the model). Substantial discussion occurred regarding whether a spatially disaggregated model was appropriate, but the assessment authors, at this time, will continue with a pooled (Alaska-wide) model.

In response to the CIE Panel report, the assessment authors presented progress on several alternate model configurations at this meeting. For example, the likelihood weights on the model data sources were iteratively re-weighted, however, this work will not be complete until 2010. The authors plan to convene a group of modelers to assist with this work this winter. Also, an industry review of the assessment has been requested. Thus, the assessment will not be revised until the September 2010 Plan Team meeting, and the base model from last year will continue to be used for the 2009 assessment. The Plan Teams agree with the authors' recommendation to continue with the base model for 2009.

Chris Lunsford presented an update on the 2009 AFSC longline survey, 2009 survey database, and research on sperm whale depredation. A survey of the Bering Sea and Gulf of Alaska was completed. Survey catches (not the abundance index, which hasn't been computed yet) for sablefish are very similar between 2008 and 2009, up for giant grenadier, down for shortspine thornyhead and rougheye/shortraker rockfishes, and up substantially for Pacific cod. Killer whale depredation affected about 60% of Bering Sea stations. Sperm whale depredation was substantial in 2008, but fell in 2009 to near the average value. Interactions between the survey vessel and fishing vessels were few this year (1-2 vessels) and have been low in recent years. Tagging of sablefish and shortspine thornyhead continued in 2009 and archival tagging of lingcod was new this year. Survey database development is nearly complete, in part due to special effort by Cara Rodgveller. These improvements will allow web access to summarized longline survey data. Other data requests can be accommodated by ABL staff.

Depredation research focused on sperm whales by Jan Straley, Aaron Thode and the Alaska Longline Fisherman's Association, which included photo identification, satellite tagging (some long-distance movements), updated analysis of survey depredation rates and using passive acoustics to measure depredation. Joe Liddle will update the statistical analysis of depredation rates to include data through 2009. Passive acoustics will attempt to determine whether depredation events can be detected. If initial efforts are successful, this method could be used

to quantify depredation rates. The method tentatively has identified "creaks" followed by silence as indicating a successful prey capture. Another acoustic technique permits animal range and depth to be derived from their echoes and hydrophones. Future work plans include completing the acoustic analysis, triangulation of "creak" data to identify when depredation occurs, development of software to automatically detect creaks and matching acoustic data to a boat event logger. Finally, funding from the cooperative research pool will be requested to continue this work. As *research priorities*, the Plan Teams recommend that the depredation research continue and that funding be found to update the sperm whale assessment with an updated abundance estimate. At this time there is no abundance estimate available, which means the potential biological removal for sperm whales cannot be defined. This is important as there are apparent increases in sperm whale depredation/fishery interactions. Therefore, the Teams recommend a sperm whale abundance survey be conducted and included in the sablefish stock assessment also as a *research priority*.

Ecosystem Effects Stephani Zador presented the Ecosystem Considerations chapter and Sarah Gaichas presented the Ecosystem Assessment. Stephani replaced Jennifer Boldt. Jennifer recently took a new job and has done a great job improving the Ecosystem Considerations chapter. The September draft includes 22 updated contributions and 2 new contributions. The Ecosystem Assessment presented was the same version that was reviewed by the SSC in December 2008; it will be updated for the November 2009 SAFE Report. Among the updates:

- 2009 sea surface temperature anomalies were cool; very cold conditions and extensive sea ice in Jan-Mar 2009 in the Bering Sea. March-May 2009 showed favorable conditions for upwelling along the west coast. The effects of the currently developing El Nino may be enhanced in the north due to the current state of the Arctic Oscillation (AO). Lower eddy kinetic energy in the GOA and AI which may mean phytoplankton confined to the shelf and lower cross-shelf transport in the GOA and low heat and salt transport from N. Pacific through Aleutian passes into the Bering Sea. OSCURS models runs suggest 5 of the 8 most recent years (2002-2009) have drift conditions associated with more favorable flatfish recruitment. Continuous plankton recorder time series show high GOA biomass and bloom length in 2008.
- There was a drop in the relative area disturbed by trawling gear in the EBS between the 1990s (10-15% disturbed area) and the 2000s (9-11%), with a slight increase from the lows in 2007-2008. The Plan Team recommended that this should be calculated as percentage of trawlable shelf (shallower than 1000m) in addition to percentage of the entire region.
- There has been a general shift in distribution to the north and shallower over time in the spatial distribution of Bering Sea groundfish. This existed even after adjusting for temperature.
- Most of the nontarget catch is of non-specified species. In the Bering Sea there has been a general decrease in non-specified catch; recent increases are driven by jellyfish. BSAI HAPC catch has decreased. Closure of the Arctic to bottom trawling added 148,000km^2 to the area closed to bottom trawling; overall almost 65% of U.S. EEZ off Alaska is closed to bottom trawling year round. Fishing effort is currently at or below long-term averages. Production levels of groundfish from surplus production curves in BSAI are low relative to their biomass (compared to higher production at same biomass in the early 1980s).
- The Ecosystem Assessment showed a selection of indices in a common format and reported on trophic guilds within the food web. The teams recommended: 1) combined and by-guild surplus production be provided, 2) clarify small issues (errors?) in displaying types of species by data availability, 3) distill the ecosystem information further - highlight the most important information in the SAFE Report summary. The teams recommended that AFSC staff circulate a shortlist of graphical summaries among Plan Team members to hone the information, as requested, 4) clarify one of the summary graphs identified as 'trawl gear' to be trawling effort by pelagic gear, 5) include the legend on every page; 6) incorporate a visual display of uncertainty by changing the physical width of the green band (or place it off to the right).

Economic SAFE Report Ron Felthoven presented key results from the Economic SAFE Report for the 2008 fisheries. Ron summarized the primary recent contributions of the AFSC Economic and Social Science Research Group and listed several research topics to be investigated during the coming year. The format of the report is unchanged, with the following topics included (among others): catch, value, prices, effort, discards, gross

measures of fishing capacity, crew weeks for CPS, and estimated observer costs. The market data report contained in recent reports is being updated by AFSC this year. Ron also summarized papers and projects that addressed a variety of topics: 1) markets and trade, 2) data collection projects, 3) recreational fishing, 4) models of fisher behavior, 5) economic performance, 7) regional economic models, and 8) socioeconomic, cultural, and community analyses. Ron provided an overview of trends in value and catch, noting that while catch was down in 2008, value was up. Plan team members expressed interest in knowing more about how the Alaska fish output compares to the national output and how the value of different species contributes to changes in total value. In response, a new table is being added this year that compares Alaska fisheries value to national value.

Vulnerability Analysis Olav Ormseth presented the results of a vulnerability analysis applied to non-target and selected target species in the GOA and BSAI. Vulnerability is defined as the likelihood of overfishing in the absence of conservation measures. The vulnerability analysis measured the vulnerability as a function of stock productivity and susceptibility to the fishery. The vulnerability analysis provides information pertinent to classifying stocks in the new annual catch limit (ACL) categories of "fishery" stocks or the optional "ecosystem component" stocks. The Joint Plan Teams recommended that the Council's ACL analysis consider listing all target[1] stocks, sharks, skates, squids, sculpins, octopods, and giant grenadier be considered for inclusion "in the fishery" and be subject to ACLs and status determination criteria. An alternative should be included of whether to list squid and octopus complexes as candidates for the Council analysis to evaluate whether they could be included in a new ecosystem component (EC) category. Some members favored managing octopus in the fishery. The analysis would include consideration of moving forage fish and prohibited species into the EC category only.

Octopus Liz Conners gave a brief presentation on a new octopus field study beginning in 2010 that has been funded by NPRB. The study includes an outreach program to collect information on locations and seasonality of octopus dens from local divers, a life-history study aimed at documenting reproductive seasons in Alaskan waters, a trial of longlined habitat pot gear, and a pilot tagging study. Liz also reviewed other research initiatives underway for octopus.

The plan team was asked for direction on the period of incidental catch data to be used for Tier 6 OFL and ABC calculations for sharks and octopus. These two groups do not have any data available from the historical period specified for Tier 6, only for the most recent 12 years (1997-2008). The team agreed that a fixed period is more acceptable than one that is continually updated with recent annual data. There was some discussion as to what constituted a "reasonable time period" to include in the calculations. The teams recommended that a 12 year period be fixed for these groups and used into the future.

Sharks Two issues for the shark complex stock assessment were presented to the September groundfish plan team meeting. The first issue is that the estimated catches previously reported by the Regional Office for the years 2003-2008 were incorrect, owing to a database problem. This problem has been corrected and the correct catches will be reflected in the 2009 stock assessment. The changes in the catch will result in the average catch from 1997-2007 (which is used to assign the ABC and OFL) increasing by 46%. The second issue is trying to estimate shark (and other non-target species) bycatch in the halibut IFQ fisheries.

Two methods are being examined, both using the IPHC annual longline survey as an index for extrapolation to total commercial effort or landings. Concerns with both methods are: 1) extrapolating from the 20% hook count to total catch in the survey may be biased; 2) survey behavior and commercial behavior may not be the same; and 3) biological data, such as average size and sex ratio may not be known for all species (i.e. sleeper sharks). The plan team supported the author's plan to use Monte Carlo methods to incorporate uncertainty around the biological data and the survey extrapolated shark catch. Further, they suggested a filter of the survey data to make it more similar to commercial fishing behavior, and they suggested working with the Regional Office to ensure that bycatch isn't double-counted in the catch accounting system and these estimates of bycatch.

[1] those for which catch specifications are currently set

Bering Sea Project Mike Sigler presented an update on the Bering Sea Project (Bering Sea Ecosystem Study (BEST)-Bering Sea Integrated Ecosystem Research Program (BSIERP)). This project is funded by the North Pacific Research Board and the National Science Foundation. Mike provided an overview of the research program and a summary of major findings of 2008 results.

Marine Mammals Lowell Fritz briefed the teams on results of 2009 marine mammal summer surveys.

Steller sea lions – NMFS conducted an aerial survey throughout the AK range from 24 June -16 July 2009. The two objectives for this survey were to 1) estimate pup production in AK and 2) conduct a non-pup survey in SE AK, Prince William Sound (PWS), Kenai and Kodiak approximately 2.5 weeks later than last year to investigate further the effect of survey timing and movement of sea lion counts and distribution. Pup production estimates will be available in November. Preliminary results of non-pup counts indicate that there were ~1,000 fewer in PWS in 2009 than in 2008, suggesting that part of the increase in the eastern GOA observed last year was due to movement of sea lions into this area from elsewhere (likely SE AK and/or Central GOA). Preliminary estimates of juvenile and early adult sea lion vital rates (from brand resighting) suggest high survival (>90% age 4+). Using best estimates of survival at age (from Ugamak and Marmot/Sugarloaf) and non-pup trends in the eastern Aleutians and central GOA from 2000-2008, NMML estimated that natality (ratio of total live births to total female population in a specified community or area over a specified period of time) in the central GOA is 31% lower in the 2000s than in the late 1970s, and 18% lower in the eastern Aleutians. The central GOA estimate is similar to that estimated by Holmes et al (2007) using different data.

Northern fur seals – Pup production on the Pribilof Islands was assessed in 2008. The number of pups born on St Paul in 2008 was ~6% lower than in 2006 and continued the average 5.7%/year decline observed since 1998. Pup production on St George is about 5 times less than on St Paul, and has remained relatively constant since 2002. Pup production on Bogoslof Island, last assessed in 2007, increased at a rate of 13%/year between 1997 and 2007. Female fur seals with pups on St Paul forage predominantly on the Bering Sea shelf, while those on Bogoslof use pelagic habitats north of the eastern Aleutian Islands; females on St George use both shelf and pelagic habitats. St Paul female fur seal summer foraging patterns reflect changes in age-related pollock distribution and year-class strengths. Also, foraging trips are shorter, pollock are consumed more often and pup weights are greater as pollock abundance increases (Sterling 2008). These data suggest a recent deterioration in the quality of on-shelf foraging habitats for female fur seals in the Bering Sea, which is likely related to recent decreases in pollock abundance.

Biological Opinion - Lisa Rotterman, The NPFMC requested that NMFS delay release of the groundfish fishery biological opinion to permit consideration of 2009 pup survey data, non-pup timing-related survey data, and a report by John Maniscalco regarding natality of Steller sea lions on Chiswell Island. After considering the request, NMFS decided that the incorporation of the 2009 data would improve the opinion and agreed to delay the opinion to permit incorporation of these data. The opinion is now scheduled for a CIE review and availability in March 2010, in time for full consideration by the NPFMC and the public at the Council's April 2010 meeting. Because of the delay, NMFS also will be able to incorporate some of the 2008 commercial fisheries data.

Trawl Surveys - GOA Mark Wilkins provided an overview of preliminary results from the GOA bottom trawl survey. Data will be finalized and made available to stock assessment authors shortly. A full survey was conducted this year (fortunately) despite uncertainty in funding throughout the planning process. The survey used three vessels and included all depth strata to 1000m. No stations were dropped and depth strata were all sampled.

There were observed increases in pollock and Pacific cod, particularly high age-1 estimates for both stocks. Most rockfish species show flat trends or minor increases except for northern rockfish which demonstrated a sharp decline. Trends in rougheye and blackspotted rockfish are complicated by species identification issues. Jim asked about expert testing for species identification. Mark reported that staff can clearly identify some of the fish as blackspotted rockfish and some as rougheye rockfishes, while some are not clearly distinguishable to species. Those latter fish will be tested for species identification through tissue and otolith samples. Eulachon trends were presented but given the pelagic nature of the species are highly uncertain.

The teams discussed the consideration of net performance between tows. Mark indicated that each individual tow is monitored although differences in net performance tend to occur primarily in more shallow waters. Net

performance is estimated by monitoring speed over ground. Members of the public commented that water flow through the net would be a more appropriate measure of net performance. Mark indicated that the standard for consistency in evaluating performance is the speed over ground and consideration would need to be given with respect to previous years in order to modify this standard.

The teams commended NMFS HQ and AFSC for completing the GOA survey on short notice after full funding was made available.

Trawl Surveys - BSAI The twenty-eighth annual bottom trawl surveys of the EBS continental shelf was completed in August 2009. Standardized biological sampling of groundfish resources was conducted successfully at 376 stations, and abundance and biomass estimates and analyses of size and age composition were generated for selected commercial groundfish species for use in the annual stock assessments. Data collections included more than 149,000 length measurements of 45 fish taxa and more than 9,200 age structures of 13 fish taxa. Numerous special research projects also were conducted including the fourth year for two projects: collecting acoustic data on midwater walleye pollock to augment the EIT time series, and collecting summer samples to monitor distribution and abundance of zooplankton on the EBS shelf. A second year of collecting a synoptic environmental dataset for BSIERP also was completed. Bottom shelf temperatures were slightly higher in 2009 (0.1°C) compared to 2008 with the southward extension of the cold pool (<2°C) similar to 2008. A majority of trawl catches contained pollock, although the estimated total biomass decreased from 3.03 million t in 2008 to 2.28 million t in 2009. The largest catches of pollock were concentrated along the northwest outer shelf and near the Pribilof Islands, where bottom temperatures were above 0°C; large catches of pollock were also observed north of the Alaska Peninsula near Unimak Island. Similar to pollock, Pacific cod were broadly distributed across the EBS shelf and caught at nearly all stations. There was a marginal increase in Pacific cod total biomass from 0.40 to 0.42 million t and a much higher proportional increase in population due to higher numbers of 15-20 cm and 40-50 cm Pacific cod. Estimates of total biomass of yellowfin sole, rock sole, flathead sole, arrowtooth flounder, and Greenland turbot declined 13-25% from levels estimated for 2008. A 4% increase in biomass was observed for Alaska plaice and a 21% increase, in Pacific halibut.

Sculpins Todd TenBrink presented a brief summary on the recently completed life history project on the five most abundant sculpins in the BSAI. Parameters such as age, growth, reproduction, and diet were investigated. Natural mortality (M) estimates presented in the 2008 BSAI sculpin assessment were the direct result of using new life history information to calculate M based on several indirect methods. The teams briefly discussed what methods were best to use for the sculpin complex or individual species within the complex. If indirect methods are to be used, the teams recommended those associated with Beverton and Holt life history invariants. These methods included Jensen (1996), Charnov (1993), and Roff (1986) among those used to calculate M for sculpins. The teams also recommended catch-curve analysis for unexploited stocks such as sculpins.

Skates Olav Ormseth presented a review of the BSAI skate assessment and management. The SSC adopted an age-structured model for Alaska skate (*Bathyraja parmifera*) in 2008. The model presented at the November 2008 Plan Team meetings fit the data well with one exception: length at age was consistently underestimated. The Tier 3 estimates of OFL and ABC are lower than the Tier 5 estimates, likely the result of a delayed maturation of Alaska skate. Currently, age and length at 50% maturity for Alaska skate is 10 years and 93 cm, respectively. The Plan Teams will consider whether to reduce Tier 5 OFLs and ABCs for other skates with similar lengths and ages at maturation. New maturity data for other skate species (e.g. *Bathyraja interrupta* and *B. aleutica*) may be available soon based on research conducted at Moss Landing.

Adjourn The joint team meeting adjourned at approximately 11:30 am.