

Minutes of the Gulf of Alaska Groundfish Plan Team

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501

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Diana Stram	NPFMC (GOA co-chair)	Jim Ianelli	AFSC REFM (GOA co-chair)
Sandra Lowe	AFSC REFM	Paul Spencer	AFSC REFM
Chris Lunsford	AFSC ABL	Leslie Slater	USFWS
Jon Heifetz	AFSC ABL	Nancy Friday	AFSC NMML
Mike Dalton	AFSC REFM	Yuk. W. Cheng	WDFW
Kristen Green	ADF&G	Ken Goldman*	ADF&G
Tom Pearson	NMFS AKRO Kodiak	Craig Faunce**	AFSC FMA
Nick Sagalkin	ADF&G	Steven Hare*	IPHC

*absent **provisional, pending SSC appointment

Pollock

Martin Dorn presented an overview of the pollock assessment. There were three main topics discussed in relation to the pollock assessment. The first issue discussed was potential future changes to the model and research activities. The Team noted that the Stock Structure Group has prioritized to conduct an evaluation of GOA pollock prior to the CIE review. Results from applying the template could inform alternative area-specific approaches for the GOA as well as alternative temporal (seasonal) resolutions. The Team and the assessment author noted that there appears to be sufficient information available to conduct a separate stock assessment on the SE stock. Other recommendations to the author in preparation of CIE review include the inclusion of more ages, including age 1 and > 15 years, estimate q and evaluate M .

The second issue discussed was Prince William Sound GHL allocations. The ADF&G proposes to take 10.6% of the Central GOA ABC. One proposal was to take historical allocations and adjust by the annual change in assessment biomass (e.g. $1,650 \text{ t} \times 1.22$). The Team suggests that the State consider a fixed percentage of the ABC of the Western stock in setting the GHL annually. Team decided to go with their proposed percent allocation and to deduct 2,770t from Western stock and then reapportion available quota (to avoid disproportionately impacting 630 quotas). The Team requests that in the future the State make a more formal presentation of how they determine their required quota (GHL) and add that as an appendix to the pollock section to ensure that the GHL deduction is specified appropriately.

The last issue related to Experimental Fishing Permits (EFP) and pollock research quotas. It was noted that since a Chinook salmon hard cap for the GOA is expected in mid-2012, there is an immediate need to have some salmon and pollock allocation as part of an EFP to effectively reduce the potential of avoiding the cap. An increase in pollock ABC by 1000t is envisioned and was proposed to the Team to facilitate the anticipated EFP. Since the ABC is in excess of 125k and the authors' recommendation is 108t, the argument was made that there should be enough fish to facilitate this type of need. Council staff noted

that based on ACL amendments and discussions with NMFS, EFP and fish caught for research would be accounted for prior ABC determinations. This structure avoids the possibility of accounting battles that would result from negotiating EFP and other research requests after ABC determinations are made. Catches during the course of conducting research have been presented in assessments in general and are incorporated within the model. **The Team encouraged assessment authors to anticipate potentially increased allowances for EFP catches prior to projecting future years ABCs and OFLs.** It was noted that this may be difficult for Tier 5 species and impossible for Tier 6 species. For Tier 5 species where $ABC=0.75 \times M \times B$, it may be possible to simply subtract anticipated EFP and research catches from “B” prior to making the calculation. The Team indicated that this will likely be addressed further during developments of ACL amendments to the FMP that are underway.

Pacific cod

Grant Thompson provided an overview of the Pacific cod model considered in this year’s assessment in the Joint Plan Team meeting. The various candidate models for this year’s harvest specifications were discussed by the joint Teams (see JPT minutes). In the GOA, Model 3 and 3b were chosen for further consideration by the Plan Team based on the criteria adopted by the author. The authors’ preferred model was Model 3. Although model Model 3b had better diagnostics for some of the model fits, estimates of the product of survey catchability and selectivity was lower than that observed by Nichol et al.(2007) which resulted in Model 3b having stock size estimates that were much higher than Model 3. The Team noted that retrospective analyses indicated that when data were added the revised abundance estimates in the most recent years tended to be lower. The Team agreed with the author and selected model 3 and also noted that since the retrospective patterns seemed to indicate an upward bias, a more conservative and consistent approach is warranted.

The Team discussed ideas for field work that could help with some of the uncertainties in the stock assessment. The model estimates that age-2 cod have a lower selectivity than age-1 cod. Field work to identify locations of age-2 Pacific cod may help support this model result. Also discussed were studies to directly estimate ageing bias using methods such as samples from known-aged tagged fish similar to what has been done for sablefish.

The Team pointed out that the ageing error bias is estimated to be different between the GOA and Bering Sea. They **encouraged exploration of this phenomenon and in particular, how estimates of ageing bias affect model results.**

The Team discussed the Kalman filter approach for areal apportionment of ABC. Similar to sablefish, the Team reasoned that variations between apportionment schemes are unlikely to have biological consequences in terms of stock conservation. The Kalman filter approach and past methods using unweighted proportions give similar results and both were acceptable to the Team.

Shallow water flatfish

Jack Turnock provided an overview of the Tier 4 stock assessment for shallow water flatfish while Teresa A’Mar presented the Tier 3 model-based assessment for northern and southern rock sole. For Tier 4 stocks the biomass is based on trawl survey biomass. There was an overall decline in the survey abundances for these stocks.

The assessment model for northern and southern rock sole was reviewed by the Team in 2010 for possible inclusion in the assessment for specifications purposes in this cycle. Changes to the model include additional fishery and survey data, changes to the size composition and mortality specifications.

Natural mortality and growth are estimated in the model, as well as three 3 periods of survey selectivity. Catch species composition is also estimated in the model. The model fits the southern rock sole survey biomass estimates poorly since there was a large decline in survey estimates between 2009 and 2011.

Plan Team recommendations include the following:

- **If available, include variance in the time series on catch composition.**
- **Reevaluate the break points for survey q and selectivity. This could include collapsing some breakpoints and fixing q in the early time period and estimating for the later time period.**
- **Examine error bars on observed males for some indication of the magnitude of the difference in distribution between observed and predicted.**
- **Look at observer data for target fisheries other than “shallow flats” to see if there is species identification for N and S. Good examples might be in arrowtooth and Pacific cod fisheries.**
- **Consider requesting survey to take tissue samples for genetic analysis to evaluate how well speciation is occurring.**
- **Look at fishtickets rather than observer data given low % of observations. It may be possible to get rock sole total catch from fishtickets and use observer data to estimate proportions to species.**
- **Given issues with the lack of fit in weighted average survey and fishery age and length comps, alternative sample size assumptions may be appropriate.**

The Team received clarification that the main fishery occurs in the central GOA because shallow flats are unprofitable for CPs and CVs are mainly concentrated around Kodiak. Additional discussion centered around whether northern and southern rock sole could be managed separately. Currently they are only recorded as rock sole not as northern and southern.

The Team recommends considering setting specifications for rock sole separately from remaining SWF complex in the next assessment cycle. The Team would like to revisit this in September 2012, and requests additional information at that time on catch and ABC by species, in order to reevaluate the complex as a whole. **The Team also recommends additional information to evaluate apportionments based on survey biomass % in each area by species for comparison against catch by species in each area.**

The Team recommends going forward with the model for specifications purposes in this cycle noting that a CIE review is forthcoming in the spring as well. The Team commends the assessment author on moving forward quickly with this new model as well as her responses to the Team’s suggestions from last year.

Deep water flatfish

The deepwater flatfish complex consists of three species: Dover sole, Greenland turbot and deepsea sole. Dover sole accounts for most (>98%) of the biomass in terms of both fishery catch and survey abundance. Tier 6 considerations are used to calculate contributions to the total harvest limits (i.e., OFL and ABC) for Greenland turbot and deepsea sole. For several years, a Tier 3 approach based on an age-structured model has been used for Dover sole. Catch is primarily from non-pelagic trawl gear and incidental since there is a limited market for Dover sole. The catch was projected to the end of the year for the Dover sole model. The survey estimates for these three species varies over time and each estimates are highly uncertain.

The current Tier 3 model for Dover sole is an age-structured, two sex model. Survey age data variability between sexes within years was also high. The Dover sole model uses age 40 as a “plus group”. **The Team recommended examining whether the model would perform better if the maximum age was extended to older ages since the maximum observed age is 57.** The model fits survey biomass relatively well, but somewhat underestimates large catches in the early 1990s. Although the model used this year was identical to that used in 2009, the model converged to a much different parameters. Due to model convergence issues, the author recommended that Tier 5 calculations for Dover sole-specific contributions to the harvest limits for the complex would most appropriate at this time. The Team concurred and **recommended that the model be refined and evaluated by the CIE for the 2012 assessment cycle.** Additional suggestions included possibly re-parameterizing selectivity curves, using sex-specific natural mortality to improve model fits (*M* is currently fixed) and evaluating the spatial patterns of Dover sole in eastern and northern GOA.

Rex sole

Fishery catch of rex sole occurs primarily in the Central Gulf and has been consistent over recent years and is less than the TAC. The spatial patterns of the fishery are similar to the survey except little fishery effort occurs in the Eastern GOA. Survey biomass decreased 24% in 2011 relative to 2009. Despite the decrease, the 2011 estimate compares to the 2003-2011 mean due to an exceptionally high 2009 biomass estimate.

The model is identical to the model accepted in 2009. The 1999 and 2009 survey age comps have been added this year as well as updated catch, 2011 survey biomass, and 2010/2011 fishery lengths. Selectivity curves are similar to what was estimated in the 2009 model. Age data from the fishery are unavailable. Estimated spawning biomass is increasing since 2001. Retrospective analyses show similar tracks between this and previous assessments. Estimates of recruitment are different among assessment models but there is a pattern among models that that indicates recent recruitments are being artificially inflated.

Model results are consistent with previous assessments. As before, an alternative Tier 5 approach was selected. Supplemental research and halibut fishery catches are very minor.

Arrowtooth flounder

Jack Turnock presented an overview of the arrowtooth flounder assessment. The 2011 survey biomass estimate was similar to the 2009 estimate and all indications are that the biomass has reached its peak and is leveling off.

Males are younger at size. Previous investigations on survey selectivity did not indicate that this was a selectivity issue but rather that this is actually an age-related issue. Growth is not currently estimated in the model but in the future the model could be modified to allow for that. Age data is available for 2007 and 2009 but the growth matrix has not yet been updated. The mean length at age however is very similar with the new data to that used in the model currently.

The Team recommends that the author project ahead to end of year catch for inclusion in the model. This is what is done consistently in rockfish assessments and has been requested by the SSC for all assessments. **The Team also recommended that since age data are available for two recent years, they should be included in the assessment.**

Flathead sole

Fishery catch of flathead sole have historically been below TAC but have increased since 1999. The 2011 catch is projected to decrease based on current data. The majority of catch occurs in the Central Gulf near Kodiak Island and Shelikof Strait with a minor portion occurring in the Western Gulf. Flathead sole are primarily harvested by non-pelagic trawls (91% in 2010). In recent years more catch has been taken in Unimak Pass and Davidson Bank. Very little catch of flathead sole occurs east of Prince William Sound.

Survey biomass increased 4.5% in 2011 relative to 2009 with a relatively flat trend over the time series. Survey length compositions are different between males and females due to sex-specific growth differences. Age samples are available from most surveys but the progression of year classes through time is not evident when age compositions were examined. The author noted this may be due to ageing error (unaccounted for in the model). Spatial comparison of survey and fishery catches show survey catches in areas outside of the observed fishery concentrations, notably near Prince William Sound and in the Western Gulf.

The model presented here is the same as the preferred model in 2009. M is fixed at 0.2 and is the same for both sexes. Fishery and survey selectivities are age based and sex-specific, and are estimated using a 2-parameter logistic function. Model fit to fishery catch is good. Fit to survey biomass underestimates the exceptionally large 2007 biomass estimate but otherwise fits the relatively stable trend over time. Fit to survey age compositions are relatively good. Survey lengths aren't used in the model if survey ages are available. Fishery ages are not incorporated into the model. There are otolith collections from the fishery but many of them haven't been aged. Additionally, the current model is not configured to accept age information from the fishery. Retrospective patterns indicate slightly lower total biomass and spawning biomass in this year's model throughout the time series in comparison to previous models. Recruitments are similar among models in the early part of the time series but deviates from previous models starting in 2005.

Removals estimated from the total catch accounting and estimated halibut fishery catches presented in the Appendix are minor in comparison to ABC. The Team noted the model starts in 1984 rather than 1977. Since catches prior to 1984 are presented in the assessment, **the Team recommends the author attempt to start the model in 1977** to be consistent with other stock assessments. **The Team also recommends the author work to incorporate an ageing error matrix for flathead sole for use in the model.** Finally, **the Team recommends the model be configured to accept fishery ages and that the author evaluate available sample sizes and work with the ageing lab to get additional ages processed.**

Rockfish

Dana Hanselman presented some comments general to all of the rockfish assessments. The SSC suggested some examination of bycatch pre- and post- RPP program. Most bycatch is lower post RPP except that bycatch of Atka mackerel and pollock is higher post-RPP. To estimate total catch for 2011 all rockfish assessments use a 3-year ratio of full year catch divided by 9 month catch for estimating 2011. To project catch forward, assessments use the ratio of catch/TAC. Estimates of incidental catch of rockfish in halibut IFQ fishery, obtained from the Halibut Fishery Incidental Catch Estimation (HFICE) dataset, and non-commercial removals were presented in appendices to rockfish assessments.

Dana also presented some simulation runs relating to the current practice in ABL rockfish models of omitting the most recent survey size composition when the age composition is unavailable. Model runs either with or without the most recent survey length composition were compared with respect to the variability in ABC and recruitment, with inconsistent results across several GOA rockfish species (POP,

northern rockfish, and dusky rockfish). It is unclear from these simulations whether the results reflect errors in the use of the most recent survey length composition as a proxy for the age composition, or the influence of demographic information from the most recent survey. Length compositions are used as a proxy for age compositions (by application of a fixed age-length conversion matrix within the model). Errors could occur if the conversion matrix was incorrect. However, use of the conversion matrix for years in which fishery length composition data are available implies credibility of the conversion matrix that is inconsistent with omitting length composition data for the most recent survey. **The Team asks the authors to investigate whether the conversion matrix has changed over time.** Additionally, **the Team requests that the criteria for omitting data in stock assessment models be based upon the quality of the data (e.g. bias, sampling methods, information content, redundancy with other data, etc.) rather than the effect of the data on modeled quantities.**

Pacific ocean perch

The POP assessment was presented by Dana Hanselman. The assessment is on a biennial cycle corresponding to the trawl survey. The model structure was unchanged from that presented in 2009, but updated with new trawl survey data.

POP are a Tier 3A species. The 2011 trawl survey biomass was similar to past the few surveys and relatively precise; not much biomass in the western gulf. Catch has been increasing over time although down from last year. The author also noted that depth of harvest has been decreasing over the time series.

Observer coverage has improved in recent years with the adoption of the Rockfish Pilot Program (RPP). The author noted that observer coverage in the Southwest of Kodiak and along the Alaska Peninsula has increased from previous years. Catch per unit of effort has been increasing since 1991. Similarly exploitation rates have increased, and since 2003 have been approximately 5%. The author presented several analyses on age composition in the fishery: (1) vessel length is not a huge factor in age composition; (2) harvested fish tend to be older in the western Central Gulf; and (3) the average age in the fishery has been decreasing although the average age in the survey has been increasing. Total biomass estimate in the model is steadily increasing, although recruitment is uncertain. The stock is well above $B_{40\%}$. The future stock trend looks stable.

Future research will take another look at growth data, and similar to other rockfish assessments, another examination of the age and length bins – particularly in the plus age group. The author also intends to look at fishery spatial patterns. The Team supported these activities.

Northern rockfish

The northern rockfish assessment was presented by Peter Hulson. The assessment corresponds to the timing of the trawl survey and is on a biennial cycle. The assessment indicated that the stock qualifies under Tier 3A.

The trawl survey biomass estimates for northern rockfish are characterized by large variability and low precision; the 2011 biomass estimate was 93% larger than the 2009 biomass estimate. Fishery catch has been below the TAC in recent years. Both the age and length compositions indicate that a large portion of the population is contained within the plus age and length bins.

Updates to the model include incorporation of new maturity-at-age data and extension of the plus age group within the age composition datasets for the fishery and trawl survey. Three models were presented: 1) Model 1 is the 2009 model, 2) Model 2 incorporates the new maturity-at-age data and includes an intermediate maturity curve with logistic parameters for maturity-at-age estimated within the model, and

3) Model 3 is the same as Model 2 but extends the plus age group in the fishery and trawl survey age compositions from 23+ to 33+. The author's recommended Model 3 due to the incorporation of new maturity data that allows for uncertainty in management quantities to be related to the uncertainty in maturity parameters and the improvement of model fit to the fishery and trawl survey age compositions with the extension of the plus age group to 33+. Note that 33+ group contains a relatively large share of the stock that has increased since 1990s. The authors will continue to evaluate the plus age group.

In the future the authors intend to update the weight-at-age, size-age transition matrices, and ageing error matrices. The author's will also examine the bins considered in the fishery length compositions.

Shortraker rockfish

The shortraker assessment was presented by Jon Heifetz with Dave Clausen on the phone. While shortraker has been managed as a separate species, the assessment had previously been part of the "Other Slope Rockfish" assessment.

The only new data for the 2012 assessment is the 2011 trawl survey biomass estimate. The trawl survey biomass estimate is the highest in the time series. This year's estimate also has the highest observed CV and wide confidence intervals, mainly as a result of two large hauls in Chirikof and between Yakutat and Prince William Sound.

Authors recommended a Tier 5 approach using $F_{OFL} = M = 0.03$. Exploitable biomass is 48,048 t which is approximately an 18% increase from the 2009 assessment. Authors recommend ABC apportionment to the Western, Central, and Eastern Gulf of Alaska using a 4:6:9 weighting, resulting in 104 t in the Western Gulf, 452 t in the Central Gulf, and 525 t in the Eastern Gulf. This is slightly lower in the Western Gulf from past years and higher in the other areas. The ABC was not exceeded last year. Most of the commercial fishing occurs in the Yakutat area.

Authors noted that age reading is still on hold. Ages are available now from 3 different surveys. Research on C_{14} age validation is ongoing but the otoliths had insufficient material. Radiometric aging may be attempted. The Plan Team supported author recommendation for ABC and OFL and that shortraker remain on bycatch status year-round. In addition **the Plan Team recommends this species be included in the review of area apportionments that Jon and Paul will present in September 2012.**

Dusky rockfish (PSR)

Chris Lunsford presented a summary of the dusky rockfish assessment. Dusky rockfish had been previously managed as part of the pelagic-shelf rockfish complex, along with widow rockfish and yellowtail rockfish. The latter two species will be moved to the new "other rockfish" complex beginning in 2012, resulting in single-species management for dusky rockfish.

Updates for the model include incorporation of new maturity-at-age data, and evaluation of the functional form of the fishery and survey selectivity curves. Three models were considered: 1) Model 1 is the 2009 model; 2) Model 2 estimates the maturity curve within the model based upon data from two field studies; and 3) Model 3 is identical to Model 2 except that it estimates logistic fishery and survey selectivity curves rather than separate selectivity parameters for each age. The length-weight relationship and size-age transition matrix were updated to include data through 2007. The authors also evaluated the ages included in the "plus group", but their analysis did not suggest a change in the plus group was necessary. The authors recommended Model 3 due to the similar fits to the data as Models 1 and 2, but with internal estimation of the maturity curve and fewer selectivity parameters. The age at 50% maturity from Model 3

was approximately 10 years, a decline from the value of approximately 11 years used in previous assessments.

As with many rockfish species, catch data in the early part of the time-series are obtained by reconstructing catch records from observer data. Given the perceived uncertainty of the earlier catch records, the coefficient of variation for catches was set higher for these earlier years.

The Team discussed a recommendation in the 2010 GOA Plan Team minutes to apply a productivity-susceptibility analysis, and clarified that **this analysis is to be applied to the newly-formed other rockfish complex** to evaluate the degree to which the species within the complex have similar life-history parameters and vulnerabilities to fishing pressure.

Plan Team recommendations for the next assessment

The Team noted the low recruitment estimates (with high uncertainty) for recent year classes, and **requests a retrospective analysis to evaluate how changes in available data affect estimated year-class strength.**

Rougheye and blackspotted rockfish

The Rougheye/Blackspotted (RE/BS) rockfish assessment was presented by Kalei Shotwell. The assessment is on a biennial cycle corresponding to the trawl survey. The model structure was unchanged from last year, but updated with new trawl survey data. The RE/BS are in Tier 3A.

Harvest of RE/BS occurs as bycatch in other fisheries. The author examined bycatch at the request of the SSC and found that most catches were part of normal operations, no evidence of topping off in the POP fishery. The authors did find that bycatch was related to tow depth, with deeper hauls catching more shortraker rockfish and sablefish than RE/BS.

The estimates of catchability (RE/BS $q=1.42$) are higher than estimated for northern rockfish, but lower than POP, which corresponds with observations. Summary of the stock structure appendix has been incorporated into the SAFE. Authors updated the model with 2010 catch, and an estimate of 2011 catch (using standardized approach presented by Dana), age data (2009), 2011 trawl survey biomass, longline survey 2010-2011 RPW, and 2010-2011 length composition.

Fishery catch increased 60% but still remains only 40% of TAC. Surveys are showing different trajectories. Trawl survey estimates are going down while longline RPW are increasing. The authors noted that the trawl survey tends to survey more of the shelf-population whereas the longline survey surveys more of the slope population. The longline survey also tends to capture more of the east and west populations. These two populations likely have different age structures. There is some evidence of a strong 2000 year-class.

Authors highlighted that there are still problems with misclassification of RE and BS – rougheye mostly eastern, blackspotted more western; lots of overlap around Kodiak. This misclassification is part of the rationale to assess the two species as a complex. There were no changes in assessment methods, and parameters were similar to last year's model. Model fit similar to 2009. The model still has poor fit to the plus-age-group. The model also tends to flatten peaks in the size composition. The model results indicate slight increasing trend in biomass. Recruitment remains highly variable. RE/BS is above $B_{40\%}$ and projected to be stable. The Team supported the author's recommended ABC, which is a 7% decrease from last year's ABC. Removals of RE/BS are modest and not believed to be conservation concern as catch remains well below ABC.

The Team supports the author's suggestion to conduct sensitivity analysis on optimum plus group for age comps. The Team also supports the author's interest to explore selectivity patterns. Some PT members suggested that life history characteristics, particularly depth, between RE and BS could be important. **The Team also encouraged the author to continue to investigate difference in the longline and trawl survey to help understand the different trends.**

Demersal shelf rockfish

Kristen Green provided an overview of the DSR assessment. This year due to a lack of new data the assessment is an executive summary only. The Team recommends a September agenda item to review the submersible/ROV comparison study if data are available in time to do so.

The Team also discussed the issue of halibut catch limits increasing which could lead to an overfishing determination on DSR. **The Team requests clarification on the process of ensuring that higher bycatch limits of yelloweye rockfish in the halibut fishery will avoid an overfishing determination.** I.e., should bycatch in the halibut fishery result in an overfishing determination, would that require additional Council action in conjunction with halibut fishery to prevent a re-occurrence?

Yelloweye age structured model

Dave Carlile (ADFG) updated the Team on the development of an age based stock assessment model for yelloweye rockfish. The motivation for development of this model is based on uncertainty about future funding and availability of the Delta submersible that has been used for habitat based assessment of the yelloweye population which is the current basis for management of the demersal shelf rockfish complex. The Team appreciates the opportunity to review and comment on development of this model. The Team had a few comments and **recommendations on the model and input data:**

1. Survey biomass estimates for each year consist of the most recent survey estimate for each area. Therefore, the same survey data for each area are used in multiple consecutive years until that area is resurveyed which means the survey estimates for each year are not independent. **The Team recommended only including survey "super years" after an entire cycle of area specific survey estimates becomes available. Another possibility would be to formulate a separate model for each area.**
2. The "plus" age group was previously set to 47+. Because yelloweye are long lived, the 47+ group contained a relatively large number of fish. An apparent anomaly in the model predicts many more 46 year olds than are observed. Increasing the age of the plus group to 67+ did not resolve the problem, the model predicted too many 66 year olds relative to observed, and the 67+ still contained a relatively large number of fish. The Team suspects there is a problem in the model specification of aging error. In this case, an age error transition matrix smoothes errors out over age groups and complications can occur with a plus age group. **For diagnostic purposes, the Team recommended not using the aging error process in the model and check if this eliminates the anomaly.**
3. **It may be useful to move the "plus" group out beyond 67 to allow a more complete expression of population dynamics.**
4. **An analysis should be conducted to reconcile area survey estimates biomass estimates with data from IPHC long line survey for the entire area.**

Thornyhead rockfish

James Murphy (phone) provided an overview of the thornyhead rockfish assessment. Team members requested clarification on why a point estimate is used for this species? Jim Ianelli explained that they are randomly distributed in their habitat but not aggregated. The WGOA likely disproportionately affected by

the lack of surveying >700m in the 2011 survey. Biomass estimates are inflated by percentages based on 05-09 surveys.

The Team made an additional request to Paul and Jon (for September discussion of consistency or lack thereof between assessment treatment of biomass and other issues) to also look at how individual assessments expand biomass to account for unsurveyed areas and depths.

Other rockfish

Jon Heifetz and Dave Clausen (via Webex) presented the assessment of other rockfish complex. The other rockfish complex was created in 2011 for harvest specifications beginning in 2012, and is formed by adding widow and yellowtail rockfish to the former “other slope rockfish” complex. The catch levels for species in the complex are obtained by Tier 5 methods with the exception of sharpchin rockfish, for which Tier 4 methods are applied. The catch levels for the various species are summed to obtain the complex-level ABC and OFL. A new estimate of natural mortality was used for harlequin rockfish, increasing from 0.06 in previous assessments to 0.09.

Many species in the other rockfish complex have highly variable estimates of survey abundance. For example, the 2011 survey biomass estimate for silvergrey rockfish is a 10-fold increase over the 2009 estimate. The Team discussed the survey variability in the context of the practice of partitioning the ABC among subareas, which is done to account for a lack of knowledge on stock structure. The current method of partitioning ABCs among subareas would result in an ABC of 44 t in the western GOA, a decline from the current ABC of 212 t for the other slope rockfish complex for this area. Given the high variability of survey biomass estimates, it is difficult to assign a high degree of confidence in the area apportionments based on the most recent three surveys. For 2012, the Team recommended combining the area ABC for the western and central areas (totaling 650 t) to provide some measure of spatial apportionment yet not restrict target fisheries based upon relatively uncertain recent survey estimates of spatial distributions.

Plan Team recommendations for the next assessment

The Plan Team has requested a productivity-susceptibility analysis for the other rockfish complex. As part of this analysis, the Team requests information on which target fisheries catch other rockfish, and how this may differ between GOA subareas.

Atka mackerel

Atka mackerel are in Tier 6. Most of the catch in the GOA occurs in the Shumagin region of the Western Gulf during the second half of the year. Survey catches are highly variable and it has been determined in the past that the GOA bottom trawl surveys do not provide a reliable estimate of biomass. In 2011 two large hauls occurred in the Shumagin area in the 1-100 m depth strata, which were then extrapolated over the entire strata and responsible for 90% of the total biomass estimate. Consistent with past recommendations, the author does not believe the survey provides an accurate estimate of biomass due to the marginal distribution and the influence large hauls have on the total estimates. Size distribution and age distribution from the survey don't show any major changes from previous years. The survey age distribution continues to reflect large back to back year classes in 1999-2001.

The recommendation for Atka mackerel is still Tier 6 which uses average catch history from 1978-1995 which equates to an ABC of 4700 t and OFL of 6200 t. The Plan Team agrees with the author to continue to recommend placing Atka mackerel on bycatch only status. Previously, the TAC has been set at 2,000 t to discourage directed fishing and accommodate Atka mackere bycatch in other fisheries that occur in the

Western Gulf. The Team agrees with the author that this conservative approach to setting TAC should be considered.

Skates

Olav Ormseth presented the overview of the skate assessment. The 2011 survey estimate for most skates was down relative to 2009, except for big skates. He noted the observed increase in survey biomass estimate for big skates was all in the eastern GOA and most likely due to a single large haul. The two main skates are big and longnose skates which are generally stratified by depth, with big skates dominating the shallower areas and longnose in the deeper areas. Also, diversity of skates increases with depth. The Plan Team requested clarification on the relative distribution by depth and the likelihood of encounters below 700m which were not surveyed in 2011. Olav noted that while some skates are sampled at those depths, it represents an extremely small fraction of the population. He further noted that the CV on biomass estimate for big skates is very high due to a single large haul.

Olav provided an overview of bycatch in the different fisheries. The Team noted that arrowtooth catch is higher this year, potentially due to a better market in the GOA than the BSAI, and the resulting bycatch of skates in that fishery is higher. The state waters fishery for skates was discontinued. It was noted that the State fishery started due to dedicated money for the fishery for 2 years and once that money was used up and no additional funds allocated, the fishery has been discontinued. There is remaining interest in pursuing the fishery should additional funds be re-allocated. Olav noted future plans for satellite tagging of skates in conjunction with UAF. The tag records depth, temperature, and light and provides fishery independent start and end locations and geo-statistical data.

The Plan Team concurs with the assessment author in using the straight biomass average over the last three surveys and a Tier 5 control rule. The ABC apportionment among areas also uses a 3 survey average. The Team discussed the HFICE IFQ fishery catch data. The trends in relative catch of longnose skates are higher than big skates in the halibut fishery and reverses in the groundfish fishery. The author noted that this could be due to the spatial relationship of those fisheries. The Team notes that while these catches are not currently included, that their inclusion would lead to a catch of longnose approaching the ABC. The Team recommended in 2009 to consider the IPHC and longline survey trends and look at the spatial distribution of big skates which may be more nearshore. No State water catches are currently included.

The Team recommends that a three-year average biomass could be inversely weighted by uncertainty and should be considered in conjunction with the broader September discussion of consistency in survey weighting and apportionments among assessments.

Sculpins

Ingrid Spies provided an overview of the Tier 5 sculpin complex. Main species include plain, yellow Irish lord, great, and bigmouth sculpin. New data for this year are the 2011 trawl survey biomass estimates. There are slightly higher ABCs and OFLs because the biomass estimates increased this year. ABC and OFL recommendations are based on the last four survey biomass estimates and using the mortality rate of 0.22. The survey biomass trend is stable and catches well below ABC. Survey length frequencies appear similar to the last several years.

The Team discussed how to determine the number of years to use for averaging survey biomass since there are many different approaches across species. The Team discussed that 4 surveys may be too far into the past for averaging. Rockfish species use most recent year for biomass but a 3-survey weighted average for apportionment. Paul Spencer asked why rockfish use weighted average for apportionments

but not for biomass estimate. The apportionment weighting is related to how much the species move. The Team commented that an evaluation should be completed looking across different species to determine whether differences between species is appropriate and related to their life-history characteristics and variability in the biomass estimates from the survey. The Team intends to address this at the September meeting next year. For this year, the Team will use what has been done previously with each stock with the intent to modify this as necessary next year. Jon Heifetz and Paul Spencer will provide a summary of how each stock is averaged or weighted for consideration by the Team next year.

Sharks

Cindy Tribuzio presented the update on GOA sharks. Spiny dogfish have been moved to Tier 5 while all other sharks are in Tier 6. In response to SSC comments, the authors included a detailed description of the demographic model, developed methods for estimating shark bycatch in halibut fisheries, developing similar methods for bycatch in state managed fisheries, initiated tagging study for estimating off bottom fraction of spiny dogfish population, and added research priorities to assessment.. New data for the assessment included updated catch through 2011 with updates from the 2011 bottom trawl survey, longline survey, and IPHC survey estimates. Spiny dogfish catch went up slightly with cumulative catch throughout the year showing two phases of catch. Rest of shark catch decreased. Spatial distribution of shark catch showed dogfish caught across the GOA and sleeper sharks rarely caught. Author considered trends in observed fishery CPUE. Male and female length frequencies in observed fishery data were slightly different. Bottom trawl survey biomass for dogfish increased, sleeper shark decreased, and salmon shark increased. Author presented IPHC longline survey data this year. Survey catches largest dogfish of all surveys. RPN values for IPHC do not have much of a trend while sleeper sharks RPN have decreased over time. Author will look at longline survey data when shallow strata estimates are developed. Bottom trawl survey catches dogfish mostly in the Kodiak and Fairweather areas. IPHC catches dogfish in nearly all stations while dogfish caught sporadically on the longline survey. Similar distribution with sleeper sharks just much less.

Author plans to revisit demographic model along with several other models for model comparison in the next full assessment. Catches are well below recommended ABC and OFL. Author presented supplemental catch data as appendix to SAFE. Research catches are small for AFSC and ADFG surveys, but near 400 t for IPHC survey. IPHC personnel have stated that the fish are treated well on the line when released. HFICE estimates were presented and are fairly substantial. The author stated that these estimates could not simply be added to the CAS estimates due to potential for double counting between the reporting within the two systems, and because the two catch estimates are based on different estimation procedures. While these catches are not currently included in the assessment, if they were included, the catch of spiny and sleeper sharks would approach the ABC. The HFICE estimates do not reflect the seasonality differences between the survey timing and the fishery. This may take some time to determine but anecdotally the fishery catches more dogfish in the fall than the summer. However, there is less effort during this time of year and may not reflect true differences in the distribution. Industry asked how sleeper sharks could be avoided. Plan Team agrees with author's recommendation and **recommends that trends in sleeper sharks should be considered**. The Plan Team looks forward to model comparison for spiny dogfish. **The Plan Team recommends sharks be placed on by-catch status based largely on the uncertainty in the IFQ catch**. Tom Pearson noted there is not currently any interest in targeting dogfish.

Squid

Olav Ormseth presented an overview of the GOA assessment. Last year the Team and SSC recommended a modified Tier 6 approach. Catch of squids is primarily in area 620 and catch remains low since the large

catch spike in 2006. There is no trend in catch which does not seem to be strongly related to biomass. The biomass estimate is assumed to be more representative of a minimum biomass estimate than a true estimate of the population. The author plans to include an evaluation of the overlap of the prey and bycatch of squid species in next year's assessment. Specifically, he plans to concentrate on bird predation on squid species in response to an SSC request. Data is currently insufficient to evaluate this given that squid are generally recorded as squid unidentified. Size may be used to differentiate species.

Harvest recommendations are the same as last year given the modified Tier 6 approach recommended. There does not seem to be an interest in directed fishing for squid at this time. Currently squid are considered to be 'in the fishery' not in the 'ecosystem component' but are also very much a forage species. There is still a difficulty in considering them as an ecosystem component due to the observed retention of squid. The highest bycatch event in 2006 occurred in the pollock fishery during a year of a lower pollock quota. This suggests that with higher pollock quotas and higher observer coverage there is potential for higher squid catches in the future. The Team discussed current management measures for squid and MRA amounts and that these could be adjusted as needed to confer greater protection.

The Team requested a Tier 5 calculation last year which was not included in the assessment this year. The author noted that the data is not available for a true Tier 5 approach, but that the estimate could be potentially considered a minimum biomass estimate. The Team discussed the location of the high catches in 2006 near Kodiak. **The Team recommended to 1) look at ADFG surveys to see if other squid are identified, 2) consider the ecosystem model for an estimate of squid, and 3) clarify identification of other squid species. The Team recommends that the species be managed on bycatch-only status.**

Octopus

Liz Conners provided an overview of the octopus assessment. New survey biomass estimate increased but this could be due to a few very large individuals. This year there were more octopus caught than ever before which could be a result from concern over the species and support for reporting. Liz introduced a new method for estimating M by using the consumption data of Pacific cod from the ecopath models. The geometric mean of the time series of consumption provides a conservative estimate of natural mortality because it does not include all sources of mortality for octopus. This estimate was available and accepted for the Bering Sea Plan Team. The estimate of M based on this approach is not available for the GOA yet because the method is complicated for the GOA. Consumption of octopus is not dominated by one predator (i.e. Pacific cod) in the GOA and would likely have to include other predators such as arrowtooth flounder, and halibut. There is also limited diet data available for the GOA. The Plan Team discussed issues with consumption estimated from the food web models being used in the stock assessment. The Plan Team discussed the usefulness of looking at a species with good estimates such as pollock and determining if this method produced similar estimates of M as reported in the SAFE (e.g. pollock stock assessment). The Plan Team agrees with the author recommendation and recommends going forward with a similar consumption approach for the September meeting for the GOA PT to review.

The Plan Team asked how the 0.53 M estimate was derived for last year. Liz commented that this is from the Baranof equation which assumed M was constant over the life span. She did not have confidence in this estimate because octopus have a different life history than fish and likely age-specific differences in mortality. Biomass estimation used a similar procedure to last year by averaging the three most recent surveys. The Team asked why the catches were higher this year. Liz suspects this has something to do with improved reporting and potential for higher biomass of octopus. This species is managed conservatively as a bycatch-only species. The Team discussed discard mortality and why this is probably

overestimated since octopus are alive when discarded. However, estimates on delayed mortality for this species are lacking (proposals for further study have been submitted). **The Plan Team encouraged the discard mortality studies. Also, the Team suggested considering studies during different seasons to evaluate the impact of temperature on mortality estimates.**

Forage fish

Olav Ormseth provided an overview of the forage fish assessment. New data and results were not available this cycle to provide a full assessment this year. Next year it is anticipated that both the retrospective work as well as data from recent field work will be available to allow for a full assessment for forage fish. New data this year in the executive summary included GOA trawl survey estimates of eulachon. The 2011 survey estimate is down slightly from the 2009 estimate, there was a decrease in biomass in the CGOA and an increase in EGOA. Incidental catches of eulachon have remained low since the high catch in 2008.

Olav provided an overview of recent NMFS management measures to designate critical habitat for threatened eulachon DPS. The GOAIERP is looking at forage fish and specifically eulachon. The first field season was completed and analyses will be forthcoming in 2012.

The Team discussed to what extent the 2% MRA is effective at reducing incidental catch. The catch following 2008 gives an indication that 2% is effective as a deterrent when the fleet encounters high catches. Enforcement increased after 2008 catches and fleet behavior changed when high catches were encountered. Eulachon incidental catch occurs at background levels year-round, however catch can get as high as 10% in the Shelikof pollock fishery. The MRA applies to CPs at sea but not to shoreside processors.

The Team discussed the possibility that 2 yr old Pacific cod are in nearshore areas based on preliminary GOAIERP results presented. Team members suggested aging Pacific cod caught nearshore. Olav indicated that they tended to see young of year or adults. He noted that they are trying to do some tagging in the fall but have not yet. **The Team continues to recommend tagging study of Pacific cod as a research priority.**

The MACE acoustic study in 2011 found limited capelin. Compared to previous MACE surveys in 2003, and 2005 there was much less capelin in 2011. However it was noted that those surveys (2003, 2005) occurred east of the 2011 survey.

Halibut PSC limits discussion

The Team received an update on the halibut PSC action for the GOA being considered by the Council currently. Options are centered around percentage reductions in halibut bycatch.

The Council requested input from the Plan Team on this action. It was noted that there are issues with slow growth of halibut in recent years. **The Team recommends that the EA have reference points which are directly comparable to groundfish reference points in the North Pacific.** Discussion by the Team noted that currently no mechanism is in place to reduce bycatch by the fleet as there are no incentives in terms of rolling over bycatch or reductions in bycatch. Jane updated the Team on a forthcoming workshop by the IPHC on halibut bycatch estimation from observer program, halibut growth hypotheses and migration and impacts on harvest strategies. She noted that the workshop will explicitly not address the stock assessment modeling. The workshop is scheduled to occur in June, which is after final action by Council on this analysis.

The Team strongly recommends evaluating a rate-based cap under the suite of alternatives for consideration. The Team notes that information is sufficient to establish some form of floating, biomass-based cap and this should be an option evaluated in this analysis.

Members of the public expressed frustration that the IPHC is resistant to looking at the stock assessment model or modifications to the minimum size limit relative to the size at age. The size at age issue is fundamental component of the PSC limit issue. Jane noted that the commission is trying to direct the Council's attention to issues that are related to the Council's actions, and that migration and growth are outside of the stock assessment model.

The Team recommended that there should be some inclusion of incentives for bycatch reduction, citing possible examples amongst the Amendment 80 fleet for incentivizing bycatch reduction.

Ideally there should be consideration of a rationalized, IBQ-type regime. Jane noted that the Council discussed this at October meeting and may pursue this in the future.

The Team requests a presentation to the joint Teams from IPHC staff on the halibut assessment model and consideration/rationale for retaining or modifying the 32 inch size limit in September. A presentation by IPHC staff in September would also be timely for consideration of discard mortality rates for halibut.