

Gulf of Alaska Plan Team Minutes

The meeting of the Gulf of Alaska groundfish Plan Team convened on November 15th at 1pm at the Alaska Fishery Science Center, Seattle, WA.

Members of the GOA plan team in attendance included:

Jim Ianelli	AFSC REFM (GOA co-chair)
Diana Stram	NPFMC (GOA co-chair)
Sandra Lowe	AFSC REFM
Jeff Fujioka	AFSC ABL
Jon Heifetz	AFSC ABL
Robert Foy	UAF
Nick Sagalkin	ADF&G
Tory O'Connell	ADF&G
Tom Pearson	NMFS AKRO
Ken Goldman	ADF&G
Sarah Gaichas	AFSC REFM
Bill Clark	IPHC
Theresa Tsou	WDFW

Plan team members that were not able to attend the meeting were Ward Testa (NMML) and Kathy Kuletz (USF&W). Approximately 15 state and agency staff and members of the public also attended. Names of attendees are included in the Joint Plan Team minutes.

The Team discussed the contents of the GOA SAFE report introduction. Two new sections were added to the introduction this year, a summary section on Ecosystem Considerations, and a section on other species. The Team discussed what to include in the ecosystem section for this year, understanding that it will be expanded upon in future years. The general trends for the GOA region as noted in the ecosystem considerations chapter will be summarized as well as a table showing the treatment of ecosystem effects by stock assessment chapter. In the future more specific information by assessments may be summarized and included in this section.

GOA Pollock

Martin Dorn presented an overview of the pollock assessment.

Kerim Aydin presented details on the ecosystem considerations section for the assessment. Food habits data from the NMFS bottom trawl surveys from 1984-2005 was used but the bulk of the data are from 1990-2005 (with the exception of 2003 data which has not yet been processed). Martin Dorn inquired about the quality of shipboard sampling (done for the first time in 2005). Kerim responded that the quality control on shipboard stomach-content processing has been as good as those processed in the lab (which is excellent). He noted they are also moving toward genetic identification when they are not positive about identification of the collected samples.

Ecosystem modeling results indicated that arrowtooth flounder are a major predator of juvenile and adult pollock, but pollock is not a major component of the arrowtooth flounder diet (representing approximately 14% of their diverse diet). Halibut have a large component of pollock in their diets. Arrowtooth consume juvenile pollock (<30cm) but larger pollock represent an important component by weight. Halibut and Pacific cod eat larger sizes of pollock. Results for Steller sea lions were similar to halibut. These data are important in considering reasons that pollock abundances have declined more

than expected in recent years. Catch by the fishery appears to be a minor component of pollock compared to the combined effects of predation.

Trends in consumption of small pollock (<30 cm) indicate that years of low abundance correlate to low consumption, while high biomass shows a leveling off in consumption, possibly indicating some sort of satiation. Martin Dorn noted that the only survey independent variables are the estimates of ration and that ration is the biggest unknown in the analysis. Kerim noted that this may be a problem in the assumptions for the analysis and this could possibly be resolved in an iterative analysis.

Plan Team members questioned the use of trawl survey biomass for predators rather than biomass estimates from stock assessments. The authors commented that they could refine the analysis by using stock assessments estimates. This could be an issue particularly for Pacific cod where model estimates have been very different from the survey biomass estimates in previous years. Other predators (e.g., salmon) which are caught in the trawl survey are incorporated in an "other" category in the current modeling framework. The authors also noted a potential problem with the arrowtooth flounder assumption in the model that $q=1$

Pacific cod and halibut results show a steady declining trend in consumption by year. The authors speculate that there could be some constant effective rate of predation regardless of the stock decline until it reaches some critical threshold then it dramatic drops (for all but arrowtooth flounder where it increases). This needs further investigation.

Perturbation analysis results showed that a 10% decline in natural mortality variation caused a larger perturbation than a 10% change in fishing mortality. Changes due to fishing effort related primarily to trawl bycatch species while the impact on Steller sea lion abundance was negligible. This gives further indication that Steller sea lion response may be more related to small scale (localized) effects and not broad scale food availability. Perturbations to the pollock population do not have a strong effect on the arrowtooth flounder population.

Martin Dorn mentioned the possibility of further analyses to compare empirical correlations between species abundance trends to correlations produced by ecosystem model runs. The Team discussed the inverse relationship/negative correlation between Steller sea lions and arrowtooth flounder and suggested that smaller scale modeling (looking at localized effects) might be appropriate. Bob Foy commented on work they are doing with a bioenergetics model in the Kodiak region. This model is designed to evaluate spatial effects of diet composition and impacts of migration on diet. He noted the importance of capelin moving through the Kodiak region and hence the model duration of the capelin presence in the area could be an important factor.

Team members suggested the possibility of looking at co-occurring perturbation (i.e., two perturbations in combination) and investigate how this impacts the trends. Kerim noted that specific hypotheses could be incorporated and tested in the model.

Diet data was noted to be seasonal in that there is more diet data from the summer data thus the ration data is more dependant on results of the summer data.

Bob Foy commented as to whether the energy content of species is related to decreases in consumption in order to incorporate seasonal components. Kerim noted that the wet weight consumption component could be decreased and evaluated to investigate that aspect.

The authors solicited feedback and comments from Plan Team on the scope of the analysis included and the utility of incorporating this information into the assessment.

The Team discussed the timing of the availability of this type of information for useful integration into assessment. Martin Dorn noted that there is no explicit connection between this type of information and the assessment itself at this point. However if this type of information is to be included into the assessment model then the timing of availability of that information becomes much more important, similar to the availability of survey data. It was not clear at this point whether or not this is to be

explicitly included in assessment model. The Team discussed how this type of information would be included in the assessment. Ideas included an MSE context for development of hypotheses to test control rules in relation to potential ecosystem effects. If for example, natural mortality was specified to be variable over time, this could imply incorporation into the harvest policy and therefore an adjustment to the harvest policy over time. This could represent a major change to NPFMC harvest policies which are not now explicitly based upon ecosystem assessment information.

The Team discussed information included in the assessment including the reported bycatch of other species such as squid and sharks. Prohibited species are not currently included in the ecosystem model. No information is included currently on salmon bycatch in the GOA by the pollock fleet. Observer coverage in the fleet was noted to be variable by area, with less than two percent of the fleet below 60ft in the central GOA but nearly 70% of the western GOA harvest taken by vessels below 60ft.

The assessment author provided an overview of survey results, noting that the first sign of an upcoming year class was observed in the 2005 EIT survey, representing the first indication in several years. The Team discussed the sampling protocol of the 2005 summer bottom-trawl survey and the impact of the additional stations done near Kodiak at the end of the survey. The size compositions shown in Figure 1.5 showing a change in length frequency mode (age 1) apparently represents growth through the season.

Julie Bonney inquired about the extent that the EIT survey covers the range of one-year old fish. Chris Wilson commented that in the GOA they tend to observe them in the water column and not on bottom. The summer acoustic survey could track them in the water column and there is the possibility of investigating further in future surveys. The new sampling gear (multiple-opening mid-water trawl) will allow for discrete samples to be taken throughout the water column enabling samples from different depths.

The author noted that the extent of fishery observer sampling seems to be declining. This may be due to observer coverage issues or a change in the prioritization by observers. Members noted that this could be a result of the trend towards harvest by the under 60ft fleet in the western GOA. It was noted that port samplers are collecting data in Sand Point so the fishery is partially sampled, i.e., samples are obtained upon delivery. Beth Stewart commented that they have offered to subsidize additional plant observers because of the data problems and the short fishery. This appears to be a problem overall in the GOA with declining observer coverage. The Team requested that NMFS endeavor to ensure adequate sampling continues for this species.

The Team discussed aspects of the models presented. A key result is that the magnitude of the 2000 year class has increased compared to previous assessments and that the magnitude of the 1999 year class estimate has declined slightly. Recent patterns in fishery selectivity reflect a shift towards younger fish. The previous cautionary treatment of the 1999 year class estimates (in projections) appears to have been warranted. While the early data indicated that the 1999 year class was quite abundant, it is likely that some sort of unaccounted process error (e.g., predation) actually affected the current abundance of this year class.

The author showed figures (not included in the document) of fishery length at age data indicating the same size fish from 1999 and 2000 year classes. The 2000 year class appears to be growing faster than the 1999 year class. Jim Ianelli commented that this was also observed (for the same year classes) in the Bering Sea. It was determined not to be an artifact of reader error.

ABC recommendations

The author recommendation is based on the use of the constant buffer control rule resulting in an ABC less than the max permissible. Plan Team members suggested that the assessment should distinguish between the use of “adjusted” as one indicates an adjustment for Tier 3b while the other is the author’s constant buffer adjustment.

The Team agreed with the author's recommendation to establish ABC below the maximum permissible given that the stock remains below $B_{40\%}$, and in fact is slightly below $B_{35\%}$, and that the stock is projected to decline in the next few years.

The Plan Team recommends the ABC be reduced by 910mt to account for the deduction for the Prince William Sound portion of the stock that is assessed (consistent with previous years action). Ken Goldman noted that the state may update the PWS assessment soon which may affect this value. The Plan Team continues to recommend that area apportionment be based on percentages provided by the author using the methods developed in previous assessments.

An appendix for the southeast pollock assessment reports a slightly smaller ABC and OFL for 2006 (based on a Tier 5 calculation using 2005 survey bottom-trawl survey results).

The author noted that the F recommended this year would be lower than last year. Plan Team members expressed reservations with the projections that the ABC could decline to 65,000 in 2007 under these recommendations. The author commented that the indications are that the stock will decline in next few years and the 2007 results are consistent with this estimated trend. The 2007 ABC assumed that the 2006 ABC would be taken.

The Team questioned the potential impact on model projections if arrowtooth predation were included. The author commented that the model currently assumed constant natural mortality rates. If the mortality rates were closer to the indications of including increased predation mortality the resulting biomass would be lower. He noted that it is also possible that the model is already in some way compensating for some predation mortality by maintaining a consistent natural mortality for ABC recommendations.

The Team noted that a number of factors included in model provide extra precaution for assessment and ABC recommendations. These include:

- Bottom-trawl survey q is estimated at 0.77 but a value of 1.0 was adopted (~15% more conservative)
- The ABC value is ~10% below the maximum permissible using author's recommendation
- Ecosystem concerns: fishing mortality appears to be a small component of the total mortality compared to predation mortality estimates.

Based on the concerns noted and the precautions built into model, the Plan Team approves the author's recommendation for ABCs and OFLs for 2006 and 2007.

The Team notes that ecosystem concerns are being evaluated in an upcoming MSE for GOA Pollock by Teresa A'mar). Additional multi-species modeling work for the GOA ecosystem is on-going by Sarah Gaichas and Terry Quinn's graduate student, Kray Van Kirk. The Team is encouraged by the developments of these projects and look forward to evaluating these results relative to future ABC recommendations.

The Shelikof EIT survey report is now available as an AFSC Process Report. This report used to be included as an appendix to the SAFE report and is now available as a stand-alone document.

Pacific cod

(see Joint Plan Team minutes for assessment discussion)

The Team discussed the author's rationale for choosing an ABC recommendation based on 50% of max permissible under model 3. The Teams preferred model 2 (see Joint Plan Team minutes for rationale). The Team was very concerned about the relative increase and subsequent decline in the ABC under both models. The Team discussed other options including either dropping the stock down a Tier level, or choosing model 2 for the assessment but recommending a rollover from the 2005 ABC given the concerns raised with yield stability.

Julie Bonney commented that it would be useful to see information for model 2 which is similar to that presented in Table 2.26. The model projection indicates a continued decline in 2006, but the survey appears to show increases. She noted that the TAC in the central GOA was taken by late January and it seems that the biomass levels there are higher than estimated. She requested that the authors evaluate state survey results for cod in that area, understanding that there may be difficulties comparing results from different survey areas (state and federal).

The Team noted that while there are concerns regarding the model and the potential for the stock assessment authors to elect a different model next year, the differences in model estimated biomass relative to last year (regardless of model choice) are predominantly due to the new maturity schedule.

The Team accepts the model (model 2) as an improvement over last year's model (i.e., model 1). The Team recommends the maximum permissible ABC from the model but notes that this ABC is considerably higher than the 2005 ABC. The Team strongly recommends that the Council consider a TAC adjustment downwards from this ABC in order to provide yield stability. The Plan Team did not feel that it was biologically justified to use a stair-step approach on incremental changes to the cod ABC this year (as per the GOA pollock ABC in 2005) given that the changes are largely driven by improved maturity information. However, the Team has reservations over the potential for a lack of stability in the catch.

Flatfish

Jack Turnock provided an overview of the Flatfish Chapter. The Team notes that the structure of the flatfish chapters could be better organized in the future and recommends separate chapters for deep water flatfish and shallow water flatfish, with Dover sole contained within the deep water flatfish chapter (similar to the current organizational structure for pelagic shelf rockfish and dusky rockfish).

The Team suggested that in addition to the Tier 5 calculations for the remaining members of the deep water flatfish complex, it would be useful to include a table showing the overall ABCs and OFLs for the complex (which includes Dover sole). The Team also reiterated previous comments regarding the necessity of cross-checking the numbers included in the draft assessment prior to distribution to the Plan Teams, in order to facilitate better understanding by the Plan Team of the assessment results.

The author noted that the majority of the catch in the shallow water flatfish complex is made up of northern and southern rock sole.

The Team suggested the author check for the availability of additional age data for updating mortality rates per December 2004 SSC comments.

The Team approved the author's recommended ABCs and OFLs for both complexes for 2006 and 2007.

Sarah Gaichas noted that complex management such as for shallow and deep water flatfish is pertinent to non-target management discussions (and analyses) currently underway. Consideration should be given to the species in the assemblage and to what extent they are appropriately grouped together. She noted that this becomes particularly important should a species within the complex be broken out as a target species. Tom Pearson noted that if a species in the complex were broken out, it would most likely be rock sole as separate target fishery.

Rex sole

Jack Turnock presented a review of the rex sole assessment. The age-structured model for rex sole was first used in 2004. The Team noted the continued problems with a large $F_{40\%}$ calculated by the model, and the difference in selectivity between the survey and the fishery. The Team questioned to what extent the fishery is selecting specifically for size. Julie Bonney commented that it is a trawl gear fishery primarily targeting arrowtooth flounder but also catching some rex sole. The fishery tends to be prosecuted by catcher processors. Market conditions were favorable for rex sole this year.

The Team appreciated the author's inclusion of depth-related information from both the survey and fishery, noting that larger fish in the survey are not present in deeper water.

The Team noted that table 4.11 should be updated for 2005 data.

The Team discussed the SSC comments on rex sole from both the October 2004 meeting and the December 2004 meeting and encouraged the author to address these comments in the assessment.

The Team discussed modeling results which project a large decrease in the 2007 ABC. The Team suggested using expected catch instead of the ABC to avoid such large fluctuations. This was implemented and presented in a separate table.

The Team discussed the effect of selectivity on model projections and the unresolved issues inherent in using the model for ABC estimation. The author was commended for providing several alternative scenarios of selectivity and the related effects on projected biomass and catch. The Team was uncomfortable with the Tier 3 for this species, acknowledging that $F_{40\%}$ was reliable for the purposes of the analysis but not for projecting ABCs. The Team approved of the author's recommended approach of using the model for projecting the biomass and applying a Tier 5 approach to that biomass for calculating ABCs and OFLs. Other options considered were to use a simple Tier 5 approach on survey biomass estimates, or to use the model for both projected biomass and projected ABC (Tier 3). The Team was comfortable that the model projected biomass captured the fishery selectivity (and preferential targeting of adults) better than use of the survey biomass estimate alone. The Team felt that this modified approach was justified given the difference between the survey and fishery selectivity.

Julie Bonney commented on the area apportionments based on the 2005 survey. The fishery occurs in the western and central GOA and if 2006 and 2007 apportionments are based upon the 2005 survey this could constrain the fishery in these areas. She commented that it would be productive to have a dialog with the catcher processors to see if they agree with the observed selectivity in the fishery. The Team also questioned to what extent rex sole is predominant in the mixed flat fishery. The Team encourages the author to investigate these issues further.

The Team questioned if there are any plans to increase data on maturity, noting the need for better sampling for maturity. This should be highlighted for observer program priorities. The Team notes that the ability to move forward with the use of this model (as opposed to defaulting to a Tier 5 calculation) depends upon the availability of additional maturity information and a clear understanding that selectivity estimates are reliably estimated.

The Plan Team agrees with the author's recommended ABCs and OFLs for 2006 and 2007.

Dover sole

Buck Stockhausen presented an overview of the Dover sole assessment. An age-structured model has been developed for Dover sole. It is managed as part of the deep water flatfish complex.

The author noted a high discard rate in 2003 and 2004, with 2003 at approximately 50%.

There are continuing problems with assessing the biomass of Dover sole deeper than 500m given that not all surveys have sampled to these depths. This is a problem both for calculating biomass as well as for obtaining age and length composition data. Older, larger fish are missing from the shallow water surveys. The author also noted some apparent discrepancies in the 2003 survey age data and did not include these data in the model. This discrepancy appears limited to Dover sole age readings only and did not affect other species.

The Team questioned why length composition data were limited to 1991-2004. The co-author agreed to look into why additional data were not included.

The author compared the 2003 and 2005 SAFE assessment results. Total biomass is higher in the 2005 model. There is an apparent disconnect between the 2004 and 2005 survey length data, with the resulting

large uncertainty likely a result of trying to fit an apparent recruitment event in 2002. The author noted that additional survey length data and age composition data in the future may help resolve this.

The Team commended the author on investigating the constrained versus the unconstrained models but given that the results were similar, the Team recommended continuing to use the unconstrained model for assessment purposes.

The Team encouraged the author to continue to explore unresolved selectivity issues regarding why the curve is asymptotic given the difference between shallow and deep water selectivity in the survey. The author noted that a dome-shaped selectivity was attempted but that different selectivity curves are being investigated further. The author is considering the development of a multi-area model to evaluate potential problems with survey coverage. Also, the possibility of using different selectivity curves for deep and shallow water may be useful. Team members cautioned that the author would need to account for migration and the degree of stock mobility.

Collection of Dover sole age composition data and additional fishery length data should be prioritized.

The Team commended the author on the improvements to the assessments this year. The Team notes that the structure of the flatfish chapters could be better organized in the future and recommends separate chapters for deep water flatfish and shallow water flatfish, with Dover sole contained within the deep water flatfish chapter (similar to the current organizational structure for pelagic shelf rockfish and dusky rockfish).

Arrowtooth flounder

Jack Turnock presented an overview of the assessment.

Plan Team members asked about the catch of arrowtooth flounder and market status. It was noted that some are sold as frozen fillets to Asian markets as well as blended with pollock in surimi. Members of the public commented that there would be more interest in catching arrowtooth but they are currently constrained by the halibut bycatch limits. Asian markets are presently strong and with the apparent declines in Kamchatka flounder production, the demand for arrowtooth flounder has improved.

The Team discussed the potential changes in fishing practices if comprehensive GOA groundfish rationalization were to occur. Presumably any rationalization program would result in a savings of halibut and/or a lifting of the existing halibut constraints. This would likely result in increased targeting of arrowtooth. There are areas where it is possible to fish cleanly for arrowtooth (without catching halibut) but these areas tend to be further away and travel time may preclude economic viability. Under rationalization this would likely change.

The Plan Team suggested that there be some economic analysis of the arrowtooth flounder fishery given that it is developing into a target fishery and is no longer simply discarded. In the GOA retention rates are approximately 50%. The Team noted a number of discrepancies in the percent retained table and requested that the author correct these for the version presented to the Council.

The Team discussed the merits of including abundance estimates from earlier periods in the model. The author noted that it may be useful to include for reference points but is unlikely to influence recent abundance estimates. The Team requested that the author look at how the trend changes with and without data from the early years.

Plan Team members questioned the potential herding component leading to the catchability coefficient of 1.3. Bill Clark noted that this appears to be based on triennial survey gear estimates. The author commented that additional information for the survey gear is lacking. The Team requested that the author review the numbers included in this section to see if they still represent an unresolved issue.

The Team requested clarification on the availability of any updated information on age composition. The author noted that growth over time appears to be unchanged or possibly slightly increased and referred to the GOA pollock assessment for additional information (e.g. treatment of arrowtooth flounder in the

pollock ecosystem considerations section). A suggestion from Team members was to look at selectivity by size to see if those were similar for males and females. Males appear smaller at age than females but the model is forcing the selectivity to be the same around age 12 due to the fixed catchability value of 1.0.

Other suggestions for the author on the assessment:

- References included (especially in the Maturity section) should have the updated citations (e.g., Zimmerman in review has now been published)
- The assessment should explicitly state that the values utilized for maturity are from the Zimmerman study
- Information presented in some sections seems dated and more recent information should be included.
- Numbers should be cross-checked prior to distribution to the Plan Team
- The presentation (esp. OFLs and ABCs) should be improved to conform with the the format specified in the guidelines. This would improve the Plan Team's ability to review the assessment results

Flathead Sole

Buck Stockhausen presented an overview of the flathead sole assessment. He noted that catch has been historically below the TAC and well below the ABC.

Team members inquired about the availability of age data from the survey. The author noted that the quantity of available data is marginal.

Catch history in the model is included though 1984, and prior to that it was assumed that there was no catch. The maturity parameters have been updated based on Stark (2004). The author summarized the differences in maturity schedule from the 2003 assessment, noting that in general the fish are maturing later. This maturity study was not based on new data but a reanalysis of the old data.

Results were compared with the 2003 assessment results. The 2005 biomass assessment results were lower than the 2003 estimates for biomass. Some changes in recruitment were noted, as well as the additional factors of the added age data as well as the change in maturity schedule.

For projections of catch in the assessment, the author assumed the 2005 catch was taken. The 2005 catch was the largest in several years (but still well below the TAC). For 2006 the author assumed the same level of catch as in 2005 in order to project the model forward and obtain 2007 OFL and ABC estimates. The fact that the projection was not based on fishing at ABC in 2006 was considered most appropriate given recent catch levels and trends.

The ABC apportionment was based on the relative proportion of biomass in each area from the most recent survey. The flatfish apportionment policy has been to use the most recent survey estimate. The rationale for this scheme is that flatfish are thought to be relatively stationary with little large-scale movements. They are also considered to be well surveyed with relatively precise survey estimates.

Julie Bonney also noted that there is a socio-economic aspect to the apportionment in that ABCs are not widely varying from one year to the next, however for flatfish the TAC is set below the TAC and the fleet does not usually take even the TAC so variations are not considered a problem.

As for arrowtooth, under proposed rationalization, more flexibility in halibut bycatch constraints would allow the fleet to take more of the allowed TAC for flatfish and confer economic benefits to the fleet

Bob Foy questioned to what extent it would be possible to evaluate the changes in halibut bycatch on a year-to-year basis. Tom Pearson commented that for flatfish this tends to be more opportunistic fishing effort depending upon what species the vessel comes upon. He noted that bycatch rates included in the

assessment would need to be aggregated for the entire flatfish fishery in order for those numbers to be meaningful given the opportunistic nature of the fishery.

Julie Bonney noted that there has been some experimental work on halibut excluders in the flatfish fleet with some limited success. This experimental work is continuing.

Other Plan Team comments on the assessment:

- Questions were raised on the reference for the natural mortality rate (reference to the 2003 assessment but no reference to where it came from before that)

Bill Clark commented on a recent paper by Lester et al on predicting natural mortality rates. He offered to send this to Plan Team members and the assessment author.

The Plan Team commends the assessment author on an excellent and very readable assessment.

Pacific Ocean Perch

Dana Hanselman provided an overview of the Pacific ocean perch assessment. The survey biomass estimates increased in 2005 and was also more precise than previous estimates. The biomass of Pacific ocean perch was apparently more uniformly distributed among hauls, also the 2005 survey included more stations than in the past.

The author recommended the maximum permissible ABC for the stock, noting that it is above $B_{40\%}$ and indications are for increases in spawning biomass through 2007. The projected ABC will increase in 2006 and 2007 and then level off. The Team discussed precautionary elements in the assessment which would support the choice of the maximum permissible ABC for this stock. The total biomass estimate appears conservative and is less than the survey biomass estimate. The stock is above $B_{40\%}$ with survey biomass and model projected biomass both increasing. The TAC for this stock is not reached due to the trawl restriction in the EGOA.

The magnitude of incoming year classes is uncertain but biomass remains high. The authors noted concerns that a single tow in the Shumagins may have too much influence on the age composition estimates. The Team discussed that situations in which increasing survey biomass trends cannot be reconciled with the observed level of recruitment. This may be an artifact of the patchy distribution of this species. This conflict between data may result in survey catchability estimates being greater than 1.0 (as is the case here). The author noted that he is interested in addressing more spatial aspects in the future given the difficulty in assessing stocks with patchy distributions. The author noted that an external review on rockfish stock assessments may occur in the coming year.

The Plan Team agreed with the author's recommendation for OFLs and ABCs in 2006 and 2007.

Rougheye Rockfish

Dana Hanselman presented the overview of the rougheye rockfish assessment. The model was first presented to the Team in 2004 and used this year for ABC recommendations.

The Team agreed with the authors' recommendation for use of model 3 which includes a new ageing error structure and methodology for estimating catch data. The Team discussed the more realistic catch estimation in the projections given that recent catches have apparently been low. Tom Pearson noted that while catch was unusually low in 2005 it is expected to increase. The low catches in 2005 could be an artifact of splitting out rougheye from the shortraker/rougheye complex for the first time. The Team recommended the use of the maximum permissible ABC to generate the resulting projection for 2007. The Team inquired about the different trends between the longline survey and the trawl survey. The authors noted that the model trend may stabilize if the longline survey pattern continues, but that the model currently tends to follow the increases in trawl survey estimates (even though the two surveys are equally weighted).

The Plan Team approves the author-recommended OFLs and ABCs for 2006 and 2007.

Shortraker and other slope

Dana Hanselman presented an overview of the shortraker and other slope rockfish assessment.

Bottom-trawl survey estimates from 2003 and 2005 indicate an increase in abundance while the longline survey suggests a decrease in the abundance of shortraker rockfish. The abundance of silvergrey rockfish and harlequin rockfish is apparently increasing based on bottom-trawl survey data. However, relative changes to the overall ABC were minor.

The Team discussed to what extent minor species in the other slope rockfish complex are caught. Tom Pearson commented that there has been a problem with harlequin rockfish being misidentified as POP and northerns when delivered to Kodiak. Whole haul sampling in comparison to plant reporting indicated that other slope rockfish catch may be underreported. Alan Kinsolving has been working on this project and will likely have a report released next year that details the extent of these problems.

An industry group, ALFA (represented by Dan Falvey), presented a discussion paper at the September Plan Team meeting on the idea of developing a target silvergrey rockfish fishery. This presentation reported on preliminary results of an EFP to use shrimp fly troll gear to target silvergrey rockfish. The Team encouraged an additional EFP rather than endorsing a request to allow for directed fishing on the complex at this time.

Tom Pearson commented that the quotas for other-slope rockfish are very low and thus the complex is on bycatch only status from the beginning of the year. Even so, the “other-slope rockfish” TAC in the western and central GOA is often exceeded. As a Tier 5 complex, the ABC is specified based upon survey estimates which are highly uncertain. The Team is concerned with the perception that exceeding the TAC is a potential conservation concern where in this instance it may actually be more related to survey variability. The stocks within this assemblage are not well surveyed. The Team is concerned however with anecdotal reports of the underreporting of catch which may be exacerbating the problem of exceeding the TAC in these areas. However, the Team notes that the complex does not appear to be targeted at this time and catch is incidental to other fisheries. The Team suggested that the assessment author reevaluate the weighting scheme utilized in the assessment to further investigate what is driving the observed changes.

The Plan Team approves the author-recommended OFLs and ABCs for 2006 and 2007.

Northern rockfish

Dean Courtney presented an overview of the northern rockfish assessment. New data was available this year and the authors presented 5 different model configurations. The 2005 survey results showed the highest biomass on record for northern rockfish. The 2005 estimate was more precise than previous high biomass estimates (albeit still fairly uncertain). The author reviewed the models included in the assessment noting that he was willing to present the models again in September 2006 for further Plan Team review given that these numerous models were being presented for initial review in November 2005 and were not available for the September Plan Team meeting.

Team members questioned the location of sampling for length and age data relative to where catch was taken. The fishery characteristics appear to be changing with more deliveries to Kodiak. In 2004 there were 942 fish aged from 308 hauls but the author did not have a breakdown of the number of fish from each of these hauls, thus there could be a disproportionate amount from certain hauls which could bias the data in the model.

Additional age data were available for this year’s analysis. Natural mortality is estimated within some of the models. Models 1-3 fit the overall recent biomass trend poorly. The authors developed some alternative hypotheses about why the fit was poor. One of these was to include an historical fishing

mortality term (Model 4). Model 5 also includes this parameter and allows natural mortality to be estimated. Also new this year (facilitated by the additional age data), separate selectivities were estimated for the survey and the fishery.

The Plan Team discussed the M values used in the models. Bill Clark questioned the impacts of freeing M under this model. The Team was concerned that the model trend is still showing decreasing biomass with strong recruitment and is thus not scaling the biomass estimate upwards as anticipated. Jon Heifetz noted that the precision in earlier biomass estimates is weighting the trend downward. Team members questioned whether the author had ever put additional weight on recent survey estimates. The author commented that he tried this in a sensitivity analysis and while it fits the biomass estimates better the relative fits to other data were much worse. The lead author has more confidence in the available age data than in the survey biomass estimates.

The author reviewed his approach to estimating an historical F rate noting that it only applies to first year numbers-at-age. There is some historical information available in the observer data base but for earlier years the observer database does not have northern rockfish catch broken out so the author used an estimated ratio. Other possible approaches include either starting the model back further with an estimate of catch from those years or using two time series of catch (one estimated historical with less data, one more recent with better data).

The author initially recommended model 5 but was not firmly committed. Results from the model showed an increase in abundance although the fit to the overall biomass doesn't improve due to changes in q . However, the trend in biomass starts to respond to the higher 2005 biomass estimate. With the inclusion of the historical F , the model started out at a more fished state (possibly depleted) and then increased which tends to be more consistent with survey, age composition and the history of the fishery given the historical prevalence of foreign fishing.

The Team had an extended discussion of the inclusion of the historical F parameter and resulting model formulations. Some technical issues related to the model (e.g., that recruitment likelihoods are negative in models 4 and 5, Table 9.8) led the Plan Team to concur with the authors that further explorations are needed. The author will look at different scenarios for addressing historical fishing and alternative model formulations for next assessment. Other items to be addressed in the next assessment include estimates of maximum age and selectivity patterns. The author noted a number of sensitivity analyses he would like to pursue (e.g., changing selectivity) for next year.

The Plan Team discussed the relative merits of the different model formulations. Model 1 was rejected due to substantive improvements of the other models (e.g., separate survey and fishery selectivity curves). The Team appreciates the efforts the author has made to explore freely estimating natural mortality. However, Model 4 was more consistent with previous results and overall trends in abundance and was most suited for ABC and OFL recommendations. The Plan Team encourages the author to further investigate model development. The Team recommends the use of model 4 with a strong recommendation that an updated assessment be done for next year (a non-survey year). There was some concern that the stock could be at lower levels than the survey biomass indicates. Members of the public commented that in some areas fishermen are finding it difficult to locate northern rockfish.

The Plan Team recommended model 4, but was uncomfortable with such a large increase in ABC resulting from the model. The Team thus accepts the model for the maximum permissible ABC level but chose the ABC from the past year as the ABC recommendation for 2006. The biological concerns noted above with respect to the actual status of the stock and model fits led the Team to recommend a lower ABC than the maximum permissible. The Plan Team and the stock assessment authors were concerned that Models 2-5 need additional validation to insure that results are reliable. In particular the effect of including historic fishing mortality on model results needs to be more fully explored. Thus, the Plan Team recommends that the ABC from 2005 be used for 2006. Since the model 4 maximum permissible values were accepted (but not recommended) the Team was comfortable with the OFLs for 2006 and

2007 as specified from model 4. The apportionments were recommended based on the accepted rockfish weighting scheme with percentages listed on page 21.

The Team notes the problems with new survey biomass estimates trending upwards while model results predict a decline. The assessment author was commended for examining these various models in an attempt to further evaluate this dichotomy in model versus survey trends. It was noted that next year there may be a new maturity schedule available for use in the assessment. This model should be presented again in September with new formulations and new information included.

Sandra Lowe commented that the model fit to survey data is problematic due to the high variability in survey biomass estimates and artificially forcing the model to fit the high points may be inappropriate. One problem is in the confidence intervals associated with the biomass estimates which is why the models have trouble fitting these survey estimates. The variance in the early surveys may also be artificially low.

The author noted further difficulties in assessing this stock is that northern rockfish are associated with hard to trawl areas. The Team discussed the issue of trawlable versus untrawlable grounds. It was noted that areas that are classified once as untrawlable for the survey are never sampled again. This clearly biases the estimates of certain fish on untrawlable grounds.

Members of the rockfish working group provided an update on some submersible work last year on the snakehead area. Using the submersible they evaluated an area that was thought to be trawlable and was then established as untrawlable for the survey. The Team discussed requesting the rockfish working group to report on survey issues related to rockfish possibly at the September 2006 meeting.

Kalei Shotwell presented an overview of the map grid of trawlable versus untrawlable grounds from the GOA survey. She noted that this grid is used to pick stations in the survey design. The Team discussed the methodology of picking stations and excluding those marked in red areas as untrawlable. It was noted that this methodology usually results in more trawling occurring in known areas than unknown due to efficiency requirements during the survey.

Pelagic Shelf Rockfish

Chris Lunsford presented an overview of the pelagic shelf rockfish assessment. The Council initiated an analysis to remove dark rockfish from FMP and transfer management to the state. Analysis for this amendment was delayed until the 2005 survey and stock assessment were available for incorporation into the analysis. The amendment analysis is currently scheduled for initial review by the Council in February 2006.

The 2005 survey showed a large increase in biomass for dusky rockfish and dark rockfish. The observed increase in dark rockfish however was due primarily to one tow off Kodiak. All of the other tows had much lower relative biomass of dark rockfish.

An age-structured model is used for ABC and OFL recommendations for dusky rockfish while remaining members of the pelagic shelf complex are assessed at Tier 5 for ABC and OFL. Dusky and the remaining Tier 5 species are added together to form the complex-level ABC and OFLs.

New information on the maximum age for dusky rockfish was incorporated into the model this year. A poster was presented at AFS by Liz Chilton which indicated that natural mortality for dark rockfish may be 0.07. Using this revised estimate the natural mortality was changed for both dusky rockfish in the model as well as for the remaining Tier 5 species in the complex.

The team suggested that next year the assessment chapter include more summary tables in the executive summary section so that all information utilized in the assessment including catch and projections for both dusky and Tier 5 species are more obvious.

Jon Heifetz noted that the incorporation of historic catch is problematic with this stock as with northern rockfish. The team encourages the authors to explore a model formulation which incorporates historic catch.

The Plan Team approves of the ABC and OFL recommended from the authors.

The team further notes that the format of the chapter (as a model for complex-level chapter including an age-structured stock together with Tier 5 species) is well laid out and readable. This chapter should be used as a template for the shallow water flatfish chapter which incorporated age structured modeling of Dover sole together with the remaining Tier 5 species in the SWF complex.

The assessment author noted that the data collection (in number of samples per haul) in 2004 was better than previous data from 2000. He commented that in 2004 they obtained 458 ages out of 84 hauls and averaged 2-19 samples per haul. Sarah Gaichas suggested that similar information be requested of all stock assessment authors regarding the trend in data collection for their species given that the relative trend in data collection has been varied depending upon the species assessed.

Thornyheads

Sarah Gaichas presented an overview of the thornyhead rockfish assessment. The authors recommend removing broadfin thornyhead from the GOA assemblage.

Bycatch of thornyheads is primarily in the rockfish and sablefish fisheries with some incidental catch in the flatfish fisheries (there is no directed fishery for thornyheads). There were more discards in the flatfish fishery in 2003 than 2004. Shortspine thornyhead dominate the assemblage with longspine located at deeper depths representing a minor species for biomass.

A new section on ecosystem considerations was added this year. Food habits data show that greatest proportion of juvenile mortality is predation by adult thornyheads. There is limited thornyheads food habits data. Thornyheads consume primarily shrimp.

Catch has been decreasing recently possibly due to early trawl gear closures from halibut bycatch in the trawl fishery. The Plan Team approved the Tier 5 recommendation for 2006 and 2007 for ABCs and OFLs. The Team noted that adequate age data is still lacking to support the use of the age-structured model presented in previous years. The stock remains in Tier 5 until additional data supports the use of an age-structured model in the future.

Demersal Shelf Rockfish

Tory O'Connell presented an overview of the demersal shelf rockfish assessment.

The author reviewed species composition for adjusting yelloweye density to the overall DSR complex. Using the last 5 years of commercial landings from the SEO, yelloweye represents approximately 96% of the overall catch.

The author also evaluated sportfish and subsistence mortality. Based on 2004 sportfish data and the large increases noted in the sportfish sector, there was more than a 54% increase in landed yelloweye rockfish in the Sitka area from 2002-2004. The author noted that this could begin to start constraining fisheries as the sportfish numbers are rapidly increasing.

Subsistence harvest estimates were difficult to obtain and extrapolations were made from the halibut survey data. Thus, the quality of data used to estimate subsistence harvest was poor.

The assessment author noted that total mortality will never be fully captured given the amounts taken by the sportfish fishery as well as unknown bycatch in the halibut fishery. The mortality associated with the halibut fishery is estimated. It appears as though only 50% of the TAC is taken, but this is an underestimate because it only captures landed catch and not at-sea discards or sport fish catch. Team

members reiterated that unaccounted bycatch in the commercial halibut fisheries is a problem for many species, especially skates.

The author noted an increase in landed overages of DSR in recent years because of full retention policies. There is a difference in the ability to sell overages depending on whether it is caught in state versus federal waters. If the fish is caught in state waters, overages can be sold with proceeds going to the state if it is over the 10% level. If the fish is caught in federal waters however commercial sales are not allowed. The full retention requirement in federal waters was implemented mid-season and some fishermen are not yet aware of it. Because of the differences in state and federal full retention regulations, catch may be reported as landed in state waters when it was actually taken in federal waters.

The directed fishery will not open in 2006 in SEO because it is estimated that the combined mortality in the halibut fishery and the sport fishery will be over the ABC. While ADF&G is not supposed to enter into allocation, by closing the directed fishery but not the sport fishery for DSR, it is effectively allocating the quota to sport fishing. This issue will be raised at the BOF in February 2006.

The Team discussed the bag limits used to restrict the fishery. However reaching the bag limit does not stop fishing but rather dictates that DSR must be released which does not reduce mortality. There are several proposals before the BOF in February discussing this issue. A query was raised as to the extent observed CPUE trends in the fishery are a true indication of the catch. The author noted that she did a catch curve analysis and results indicated that total mortality estimates were as twice as high as would be expected in CSEO. CPUE has been level in that area, but logbook data is limited as the directed quota has been small and fishery very short in duration. Given that the fishery is managed on an area-wide (SEO) basis, the potential exists for localized depletion of the stock. Additionally, unaccounted catch may have a severe impact on the stock.

Team members questioned the reliability of the available age data. The author confirmed that there appears to be a considerable degree of aging error in these data and that the data are not used in an age-structured model.

This stock is in Tier 4. The Team agreed with the author's recommendation of an ABC below the maximum permissible ($F_{ABC} = M$), noting that the author has consistently recommended this harvest strategy for the reasons laid out in the assessment.

Atka mackerel

Sandra Lowe presented an overview of the Atka mackerel assessment. Changes include updated catches, and the bottom trawl survey estimates from 2003 and 2005. The 2003 and 2005 biomass estimates were relatively high, and the 2004 and 2005 catches exceeded TACs (which were set to be sufficient for bycatch needs). The Team discussed Tier 5 recommendations and noted that biomass estimates are highly variable. The author recommended Tier 6 which would give a maximum permissible ABC=4,700mt and OFL=6,200mt. If Tier 5 were adopted, the maximum permissible ABC=22,700 mt and OFL=30,270 mt. The Team felt that prudent management was warranted and that a target Atka mackerel fishery should be limited.

Tom Pearson noted that most bycatch occurs in the western GOA. Increased rockfish ABCs in western GOA may lead to higher incidental catch of Atka mackerel. POP, northerns and PSR fisheries have the highest bycatch of Atka mackerel. Tom suggested that an alternate ABC of 1500 mt would be sufficient. This amounts to about 20% of rockfish fishery ABCs for the western GOA.

Mike Szymanski commented that catch reports by vessels indicate Atka mackerel in western GOA are favorable (abundant). He thinks the survey coverage for Atka mackerel is spotty and suggests that a small directed fishery for Atka mackerel in western GOA could provide age structure data and better indicate stock status. If the TAC is set to bycatch levels, then observer sampling protocol would need to change to increase Atka mackerel data collection.

The Team recognizes that Atka mackerel are an important prey species for Steller sea lions so that warrants additional caution in raising ABC. Also, there are concerns that localized depletions could occur under directed fishing. The possibility of an EFP was raised to address the issue of uncertainty and the need for more data. It was noted that the AFSC vessel of opportunity program could get scientists on board fishing vessels and that this would be more expedient than working within the constraints of the observer program (for EFP purposes). The Team encouraged the development of an EFP.

The Team discussed the need to provide enough for realistic incidental catch levels which appear to be around 1,500 mt. For an EFP to be considered, the ABC must allow for both incidental catch and an EFP. Therefore the Plan Team recommends the maximum permissible Tier 6 ABC of 4,700 tons with an associated TAC recommendation of 1,500 mt to meet increased incidental catch needs. The Team recommended this TAC for a bycatch only fishery but noted that the max ABC would allow for the opportunity for an experimental fishery for purposes of data collection. The ABC and OFL levels are the same for 2006 and 2007.

Skates

Sarah Gaichas presented an overview of the skate assessment. A major change in the assessment is the incorporation of corrected data indicating that skate bycatch in the directed halibut fishery exceeds the catch of skates in the directed groundfish fishery.

The survey biomass decreased for big skates in 2005 but remained stable for longnose skates and the Bathyrja complex. Big skates in Alaska may be potentially more productive than previously thought based on preliminary age and growth information from AFSC. The natural mortality estimate may increase slightly when age data become available (possibly as early as next year). More fishery samples will be useful for determining the maximum age. Currently this is estimated using the oldest observed age. There are on-going reproductive and aging studies and more data will be available soon.

The author noted problems with previous estimates of skates caught as bycatch in the halibut fisheries. A mathematical error in the calculation for 2003 was corrected this year, with the result that the bycatch of skates in the halibut fishery was roughly five times the amount estimated in the previous assessment. Estimates of skate bycatch in halibut fisheries are extrapolated from the species composition in the halibut surveys but it was noted that the methodology for determining this species composition was flawed in that the survey only samples the first 20 hooks without randomization. Tory O'Connell noted that commercial catch data is available in smaller areas which allows for improved extrapolation to federal areas. In the directed fishery, the skate catch is approximately 70-90% big skates which based on size are likely predominantly female. Larger big skates are predominant in shallower waters which is coincident with the fishery. The author does not recommend any targeting of skates in GOA. This is due primarily to the corrected estimate of the magnitude of halibut fishery bycatch of skates. In the assessment the author retrospectively analyzed 2003 data, and depending upon the bycatch level in the 2003 halibut fishery, established that the OFL for big skates may have been exceeded. The authors noted that the vital rate estimates for the skate species are going to change in the coming year and indications are that they may be less conservative than those currently used for ABC and OFL determinations.

The Plan Team recognizes the continuing problems associated with extrapolating information on bycatch from the halibut survey and fishery. The Team recommends that a request be made to the Halibut Commission to reevaluate their protocol for collecting bycatch information on their surveys and in the fisheries. The Team recognizes that the halibut fishery may have substantial impacts on other groundfish stocks and that data collection programs should be improved.

The author noted continued problems in the directed skate fishery in that there is still no standard observer coverage. Additionally port sampling is declining due to lack of funding.

An ecosystem section was added to the analysis. The author noted that diet data needs to be updated. Bob Foy commented on evidence that skates appear to be consuming Tanner crabs in Kodiak area.

The Team discussed the actual mortality of skates in fisheries. The author noted that if carefully released skate survival could be high, but currently in the longline fisheries skates are generally gaffed through the body cavity. Trawl fisheries probably have higher survival of skates.

The Team discussed constraints on the halibut fishery to mitigate skate bycatch and other incidentally caught species. Tom Pearson noted that it would be very difficult to close the halibut fishery for skate bycatch. While exceeding the ABC for a species leads to moving the species to PSC status, in-season management cannot take realistic action on the halibut fishery for exceeding the OFL. There is a 20% MRA for skates on the halibut fishery. The author-extrapolated estimates from the halibut fishery alone could put longnose skates over the OFL but those estimates are highly uncertain. The Team noted that the halibut fishery has also increased in recent years. The author further noted that skate mortality has likely been constant in the halibut fishery (in relative terms). The main difference in recent years has been the target fishery on large big skates which will require close monitoring.

The Team inquired about genetic stock structure studies on skates. Ken Goldman provided an overview of studies on Atlantic skates and noted that some additional work is being done on species from the Bering Sea shelf. The assumption is that skates are not highly migratory and exhibit limited movement.

The author recommended area-specific ABCs and OFLs, citing the importance of maintaining specified measures for big and longnose and combined bathyrja skates.

The Team discussed the merits of continuing a GOA wide OFL for Big and longnose skates, noting that it will not unnecessarily shut down other target fisheries based upon dubious stock structure and catch information. The Team recommended the similar structure for ABCs by areas and species and maintained the recommendation from the previous year for a gulfwide OFL by species. The ABCs and OFLs recommended by the author (using the sum of the OFLs by area for each species) were approved by the Team for 2006 and 2007.

The Team discussed a weighting scheme for skates but after discussion felt that an unweighted average represented the reasonable apportionment scheme for this species and was consistent with the authors' recommendation.

Other species

Tom Pearson and Diana Stram provided an overview to the team of the amendment 69 action by the Council to set TAC for the other species complex at or below 5% of the sum of the target TACs. Tom provided tables to the team from the amendment 69 EA showing incidental catch through 2004. The aggregate catch for the complex so far in 2005 has been approximately 2,232 mt. There have been anecdotal reports of large amounts of spiny dogfish harvested in the halibut fishery this year which could represent a significant amount. These have not been landed but caught and discarded.

Recognizing that the Council will have the ability to establish TAC for the other species complex below the 5% sum, and in the absence of a stock assessment for this complex, the team decided to add a short summary section to the SAFE report introduction which conveys available information on the incidental catch needs in other groundfish fisheries for 2006. The estimated level of incidental catch in other groundfish fisheries would establish a threshold for meeting incidental catch needs. The Team notes that because there is only a TAC and not an ABC for the complex, if the TAC is exceeded there is no other species OFL that constrains other fisheries.

Tom Pearson noted that limited markets exist for sharks but there is the potential for a market to develop. Ken Goldman noted that a state opened directed fishery is under an application process right now. There was limited directed fishing for octopus in 2005, with a small amount of directed catch. It primarily represented an exploratory effort. Multiple markets in several ports in the GOA exist for octopus and interest in this fishery appears to be increasing. Liz Connors noted that regulatory changes have led to an excess of cod and crab pots that are no longer in use, but which could be converted for targeting octopus. There has been increased retention of octopus in both the BS and GOA.

There has also been some directed fishing on grenadiers this year. Grenadiers are a non-specified species and not contained in the other species complex. Approximately 70-80 tons were harvested in this exploratory fishery. A limited market for grenadiers exists.

A federal fishery for sharks has not yet been pursued.

Ken Goldman provided an overview of the BOF proposals for directed fishing for dogfish to be considered by the state. These will be considered at the Valdez BOF meeting in December.

An estimate of the incidental catch needs in other groundfish fisheries in 2006 is approximately 4000mt. If the TAC were set at 4000mt then NMFS would put the complex on bycatch status from the beginning of the year. Some exploratory fishing opportunities would still be provided under the existing MRAs. Any TAC level set above 4000mt may allow for directed fishing within the complex. The Plan Team reiterates their concerns over the possibility for directed fishing up to the TAC for the complex to be taken on a single species within the complex.

Forage Fish

Liz Conners provided an overview of an updated forage fish assessment. This assessment is included as an appendix to the GOA SAFE similar to the treatment of it in 2003 when it was first included as an assessment. The author noted that data from the EIT survey may provide biomass estimates for capelin in the near future. She noted that the majority of the incidental catch of forage fish in the GOA is eulachon. However, the ability to use EIT surveys to evaluate the biomass of eulachon is unlikely in the near future.

The Council has already prohibited the catch of forage fish under the FMP thus neither ABC nor OFLs are established for these species. Catch estimates do not seem to indicate that catch of forage fish is approaching the allowed 20%. Estimates of exploitation rates are roughly 2% of the total biomass estimates and could be much less depending upon improved biomass estimates for these species. There is continued interest in the ecological importance of these species which is why the assessment for these species is being updated.

The Plan Team commends the author on the work and the importance of highlighting the assessment information for forage fish. The Team notes that it is also important to try to assess the overall importance of these species to managed species in the GOA as well as to marine mammals and seabirds.

The Team notes that it should set priorities for which appendix-type assessments should be updated and on what schedule.

The author noted that as these species become elevated in importance for assessing their biomass, the timing of the survey is increasingly important for accurate assessments of biomass. There are times of the year when the majority of the biomass is in state versus federal waters, thus ascertaining the appropriate timing for the survey in relation to spawning will greatly impact the ability to accurately assess the biomass of these species.