

## **Crab Plan Team Report**

The Crab Plan Team convened their Fall meeting from September 12-14th, 2007 at the Alaska Fisheries Science Center in Seattle, WA.

Members present included the following:

***Forrest Bowers (ADF&G-Dutch Harbor), Chair***

***Ginny Eckert (UAF/UAS), Vice-Chair***

***Diana Stram (NPFMC)***

***Doug Pengilly (ADF&G-Kodiak)***

***Gretchen Harrington (NOAA Fisheries –Juneau)***

***Wayne Donaldson(ADF&G-Kodiak)***

***Jack Turnock (NOAA Fisheries/AFSC-Seattle)***

***Shareef Siddeek (ADF&G-Juneau)***

***Herman Savikko (ADF&G-Juneau)***

***Lou Rugolo NOAA Fisheries /AFSC-Kodiak)***

***André Punt (Univ. Of Washington)***

***Bill Bechtol (UAF)***

***Bob Foy (NOAA Fisheries /AFSC-Kodiak)***

CPT member Josh Greenberg (UAF) was absent.

Members of the public (and state and agency staff) present for all or part of the meeting included: Brett Reasor, Doug Wells, Paul Duffy, John Jorgensen, Claire Armistead (NOAA), Liz Chilton (NOAA), Ivan Vining (ADF&G), James Murphy (UW/NOAA), Brian Garber-Younts (NOAA), Anne Vanderhoeven, Dick Powell, Linda Kozak, Florence Colburn, Jack Tagart, Doug Woodby (ADF&G), Jay Anderson, Leonard Herzog, Jorn Kvinge, Keith Nelson, Jeff Kaufman, Phil Hanson, Margo Posten, Arni Thomson, Dave Hambleton, Vic Scheibert, Rob Rogers, Ken Tippett, Keith Colburn, Kevin Kaldestad, Jie Zheng (ADF&G), John Boggs, Steve Hughes, Scott Goodman, Bob Lauth (NOAA), Anne Hollowed (NOAA).

### ***Administration***

*Agenda:* The attached agenda was adopted for the meeting. Some items were noted to be taken out of order later in the meeting due to timing constraints but no items on the agenda were omitted.

*New membership:* The Team welcomed the addition of Bob Foy from NOAA Fisheries as a new member of the Crab Plan Team. Dr. Foy replaced Dr. Bob Otto as the director of the Kodiak RACE lab. The Team looks forward to Dr. Foy's participation.

*September 2008 meeting location:* The Team discussed the location of the September 2008 CPT meeting. Team members noted that this is difficult time period for travel, particularly for plan team members from Kodiak and Dutch Harbor. Team members requested consideration that next year's September meeting be held in Anchorage. The Team passed a motion to meet next September in Anchorage with the intent of reevaluating the 2009 meeting location.

The Team further discussed its intent to hold the Fall 2008 meeting during the week of September 15<sup>th</sup>, possibly the 16<sup>th</sup>-18<sup>th</sup>, noting that having the meeting earlier than that week results in difficulty for state and agency staff to compile requisite stock status information in time, not including the possibility of additional work under forthcoming revised overfishing definitions.

*Plan Team minutes:* The Team discussed the presentation of CPT minutes. The Team agreed that to the extent possible, the minutes should reflect all discussions that occurred during the course of the meeting, including rebuttals by assessment authors as communicated during the meeting. However, comments made outside of the meeting, although in reference to points raised during the meeting itself, should not be reflected in the minutes. The Team notes that each stock assessment should include a “Response to Comments” section whereby the assessment author may specifically address comments from the Plan Team, the SSC, and other reviewers. The May 2007 minutes were approved by the Team.

*Meeting conduct:* The Team discussed meeting conduct and the relative protocol for Plan Team discussion and public testimony. The CPT chair, Forrest Bowers noted that public testimony is generally taken to the extent possible following discussions by team members. With respect to specific direction for reviewing the overfishing definitions analysis however, he noted that comments from the public should relate solely to analytical clarifications, presentation clarity, and other issues related to the analysis itself. An opportunity for comments on the political impacts or implications of revised overfishing definitions exists for the public in conjunction with the Council meeting itself in October.

*New Business/Arctic FMP:* Diana Stram provided an overview of a proposed Council action to draft a new Arctic FMP, noting that this has implications in redefining the northern extent of the Crab FMP to the Bering Strait. There is anecdotal evidence of a Chukchi Sea red king crab fishery which would fall under the jurisdiction of the new Arctic FMP; analysts are trying to obtain information on the spatial and commercial extent of this fishery. Forrest noted that there have been exploratory, subsistence fisheries for RKC in this area, but likely very limited. Wayne Donaldson noted that in the 1990s the Nome ADF&G office issued two permits for exploratory commercial fishing, but no commercial landings were ever recorded.

The Team discussed the Council’s intent to close the area to all commercial fishing. Bob Foy noted that if waters continue to warm in the Bering Sea and north, and crab stocks move further north, this would preclude fisheries from continuing into this area. The CPT requested that it be kept informed of continuing actions on the Arctic FMP and involved in any further actions taken by the Council as it relates to crab stocks in the Arctic.

### **Review of 2007 Surveys**

*NMFS 2007 survey:* Lou Rugolo provided an overview of results of the 2007 EBS trawl survey as well as changes in the annual survey abundance based estimates of stock status for the 6 annually surveyed crab stocks. He noted that EBS Tanner is above Bmsy for the second year in a row and, thus, considered to be officially rebuilt. St. Matthew blue king crab are above MSST and in a rebuilding phase rather than being considered overfished. However, for the second year in a row the cold water in the Bristol Bay region at the start of the survey appeared to limit molting of female red king crab; thus, 32 stations in the region were resampled at the end of the survey.

These 32 stations comprised the majority of the female biomass. The Team discussed the relative criteria for resampling. Lou noted that while there is no specific criteria, nearly 99% of the sampled females have undergone the molt cycle by the beginning of the survey in a normal year. In contrast, approximately 50-80% had not molted by the start of the surveys in 2006 and 2007, making the decision to resample straightforward.

Lenny Herzog commented that there seems to be spatial differences in the resampled females. Lou noted that female abundance does seem to change between sampling periods; in this instance, a higher female abundance was observed when resampling. Ginny Eckert noted that the proportion of old and very old also seems to change in the resample. Doug Pengilly asked if it is typical to see large catches of females

and large males in nearshore stations to the northwest of Unimak. Lou responded that this has occurred in the past, and that the NMFS survey tends to get close to shore.

Pribilof red king crab showed an increase in survey biomass from 2006, but the uncertainty on the estimates remains extremely high. Pribilof Island blue king crab survey biomass remains low, with no evidence of significant recruitment again this year and extremely low catches; this stock remains overfished and well below MSST.

St. Matthew blue king crab showed a survey biomass increase of nearly 40% and remains above MSST, but is still under a rebuilding plan. It was noted that this stock remains difficult to survey due to a habitat preference for nearshore, untrawlable grounds, particularly for females. As a result, population estimates for females have low precision.

For EBS Tanner crab survey abundance, all population categories except pre recruit crab decreased from the 2006 estimates. However, the substantial increase in pre recruit males was enough to keep the stock above Bmsy for second year in a row. This stock by definition can now be considered rebuilt. Survey data indicated a large percentage of old shell males and old shell females.

For EBS snow crab abundance, there was a decline in the small female category, with all other size/sex categories within 19% of last years. The stock remains above MSST, but below Bmsy and still in a rebuilding phase.

Lou discussed the difficulty in ascertaining why female distribution is so different in leg 1 versus the resample. He showed results comparing male and female distribution patterns from one leg to the other, with the intent of finding spatial patterns where increases occur. He indicated that while catches of the large female category in the eastern most stations show large increases in the retow, analysts are still evaluating this pattern of movement, given that there are no obvious inshore/offshore patterns.

Questions were posed regarding the comparison of old shell percentages against the previous 3 years of data. Lou indicated that there are more old shells comprising the samples since 2006. A member of the public questioned to what extent the observed barnacle problem of 2005 was apparent. Liz Chilton noted that some crabs with barnacles were observed in the survey, but not in a high proportion. Forrest noted that barnacles can be found in both new shell and old shell crabs and are not a fundamental aspect of shell condition; thus, this tends to be more of a market issue than a crab shell health issue.

A member of the public questioned the observed indications of good intermediate recruitment but a lack of small males in the data. Lou noted that the survey gear tends to sample the pre recruit category more effectively than for smaller crabs.

*ADF&G Survey:* Doug Pengilly summarized the November 2006 survey for Petrel Bank red king crab. Noting that this is the first fully systematic pot survey of the Petrel Bank area, Doug compared the 2006 results to the 2001 industry survey. The 2001 survey was not statistically designed but was instead intended to provide relative indices of crab catch from known fishable locations. The 2006 effort employed a standard survey design. A comparison between results of the two surveys indicate that density declined substantially since 2001, and the geographic area where crab are located also declined.

Team members questioned to what extent the survey will be continued on a regular basis. Doug indicated there are plans to repeat the survey this fall, with the goal to see if the 2006 results are reproducible, thus long term plans to continue the survey beyond this year are dependant on results of this upcoming survey. If survey results indicate a similar population decline, then survey effort will likely be deployed elsewhere given that the area is closed to fishing and the population needs additional time for recruitment.

prior to an increase in population density. However, if a different result is indicated, the department will consider expending additional effort for near-term surveys of this area. Doug reiterated the necessity of prioritizing pot surveys by area. He indicated that a Pribilof pot survey would be a priority.

Bob Foy requested additional information on the fishery catches in the area. Doug noted that CPUE in the 2002/03 fishery was roughly 18 crabs per pot, close to the fishery threshold, but observer data showed limited recruitment. In 2003/04 the overall CPUE declined to 10crab/pot under a very short fishery and thus the fishery was closed and has remained closed.

Doug Pengilly provided an overview of the 2007 pot survey for Saint Matthew blue king crab. He noted that results are very preliminary as the survey was recently concluded. This is the 5<sup>th</sup> triennial survey in this region. He provided an overview of the survey methodology and the higher density stations closer to St. Matthew, noting that these nearshore high-density stations are included to cover areas where the NMFS trawl survey does not sample. Female crab tend to be caught nearshore and southwest of the island. The overall trend in survey catch declined beginning in 1998, with a dramatic increase since 2004. Although survey stations have changed among years due to the relative importance of certain stations, comparison of similar stations from 2004 and 2007 surveys seems to concur with NMFS trawl survey trends in suggesting an increasing population trend. Jack Turnock questioned the potential for a separate St. Matthew stock assessment. Ivan Vining indicated that he is working on modeling the pot survey data at present and a separate stock assessment for this stock may be possible in the future.

Lenny Herzog questioned if there was a possibility of resurveying the area next year. Doug commented that from a feasibility standpoint it would be difficult to staff at this point. Comments from the public indicated that if federal surveys do not provide sufficient CVs to open the fishery, then time and resources should be directed at pot survey and data efforts. Keith Colburn further noted that there is a desire to allocate additional resources for determination of stock status given the apparent increase in recent years and the desire by the public to reopen the fishery.

### ***Review model and assessment results***

*Bristol Bay red king crab:* Jie Zheng presented an approach for combining standard and resurvey data in the stock assessment model for use of area-swept estimates. Jack Turnock noted that not every year is resurveyed as this depends on temperature and its effect on crab molting. Thus, it would be reasonable to utilize what is most consistent in the rest of the data rather than arbitrarily selecting which data points to use in combining the initial and resurveyed data sets. Jie noted that temperature could explain some but not all of the variation. The resurvey always resulted in higher mature female abundance than the standard survey when the large proportion of females have not molted e.g. in 1999, 2000, 2006, 2007. Jie reiterated that there is no agreement yet on what causes these differences and adjusting for the different years is difficult.

Jie reviewed the different approaches employed by ADF&G and NMFS for use of the resurvey data. ADF&G uses the resurvey for 32 stations and the regular survey data outside of those stations. In contrast, NMFS uses male data only from the standard survey with female data averaged between the standard and resample surveys.

The assessment results indicate an increase in abundance since 2006, with the highest levels of stock abundance since 1982.

The team continued to discuss the issue of how to treat survey and resurvey data. Discussion noted that the relationship to temperature, molting, and survey availability differs. Changes in survey abundance over time may be due to survey availability issues. The important aspect is what is most consistent with the current time series.

Jack reiterated comments submitted to the team in advance by André regarding the suggestion to include F35 and B35 in the projections for the stock. Jie responded that these estimates are available and that results are similar to the EA results. Future assessments could provide these estimates.

Jack Tagart suggested comparing the use of only the standard survey in the model with using only the resurvey stations in the model and evaluating how these trends differ. Jie replied that the model estimates selectivity and thus he would need a separate survey selectivity for the resample, but he will explore that option.

*EBS Snow Crab assessment review:* Jack Turnock presented an overview of the EBS snow crab assessment update. He reviewed the SSC comments, noting that the assessment model is similar to what is employed in the EA analysis. Jack reviewed changes to the model assumptions and structure, indicating that many changes to assumptions were done in order to be consistent with the approach utilized in the EA.

Jack noted difficulty in getting the model to fit the observed increase in pot fishery CPUE in recent years, possibly due to CPUE changes from rationalization. It may be necessary to split the time series to improve the model fit to fishery CPUE.

Wayne Donaldson suggested that a universal glossary of terms for the annual SAFE report would be useful to assist the reading and understanding of various tables, figures, etc.; comprehension is complicated by the fact that different assessment authors define terms differently. Consistency in presentation between assessments would vastly improve the understanding of what is being measured and compared.

Doug Pengilly commented that in previous assessment iterations the model estimated total biomass and survey biomass were further apart than that presented in this iteration. Jack responded that this could relate to model changes in survey selectivity and parameterization.

The team noted that unlike last year, there was no single dominance of snow crab biomass this year from a single tow and, hence, survey variability was lower than the previous year. The team discussed the use of the assessment model and last year's decision to utilize the model estimate (vs. area-swept estimate) as the best estimate of population biomass in 2006 due to concerns with the variability in the area-swept estimate due to a single large tow in 2006, coupled with improved model formulation. Discussion focused on the fact that the model and area-swept estimates are similar this year and that the model appears to be tracking closer to the observed estimates in 2007 of >101mm males while still providing a poor fit to the 2006 observed data. Lou Rugolo noted that the model seems more robust to trends in survey biomass. Bob Foy commented that the model seems to fit the data well and provides a buffer against the variability inherent in the survey.

The team expressed consensus that the model would provide an excellent tool for buffering against survey variability and recommends the model estimate of population biomass as the best estimate. The team noted that while this year we are not faced with the same issues of survey variability as in 2006, it still seems appropriate to use the model as best representing the stock trend. The team stated its intent to revisit this annually based upon model performance and survey variability. The team noted that model formulation is to be annually addressed in May. Team members also noted that we should annually evaluate the comparison of model results with the area-swept estimates, but the onus should be on the assessment author to evaluate large-scale differences.

Jack Tagart commented that it would be also be useful to include a retrospective analysis of survey estimates from the previous year with the model estimate from the previous year. The team discussed the change in selectivity resulting from the net change pre-1982, 1982-88, followed by the area-change in the surveyed region in 1989 when an area to the north was included.

### **Crab Economic Review**

Brian Garber-Younts presented an overview of the current status of the Economic Data Review (EDR), including the information that is included in the EDR and the data years collected thus far. Brian reviewed the necessary level of aggregation for confidentiality of economic data and that the ‘rule of 3’ aggregate may be insufficient. Thus, it may be necessary to move to a greater level of aggregation (e.g. rule of 5) to better protect the data, although this aggregation standard would only apply to the crab EDR data. The agency is currently reviewing and updating its standard for data reporting and confidentiality.

The team questioned how this related to issues of data quality requirements under the DQA. Brian noted that any release is as a synthesized product and not raw data. Brian reviewed the recent validation audit and discussed the validity issues with using annual days at sea and total crew share payment data. Results indicated that annual “days at sea” seems to be biased down for historical data. A review of metadata is proposed for the SSC/Council to meet DQA requirements for validity. Herman Savikko noted that the EDR is intended to assess how well the program is working compared to the intent.

Brian noted that the intent was for the data to be available for use in annual and 18 month review reports, but this has not yet been possible due to data validation requirements. He noted that, thus far, the majority of the data appears to be well supported although some specific issues are not well supported. The SSC will need to be the peer review body for the accuracy of all of these data and must therefore be able to have sufficient time to review all of the reports and specifics of the inputs to the datasets and problems with the accuracy of specific variables.

Gretchen Harrington questioned the usefulness of the blind EDR data for conducting the economic analysis required under applicable Federal law, and specifically whether it can be used in the estimation of small entities. Brian responded that waivers to blind data may necessary to use the data for the economic analysis required under the RFA. Ron Felthoven will be presenting a discussion paper on comprehensive economic data collection to the Council in October.

Lou Rugolo noted that there is a lack of economic data in analytical modeling for impacts of FMP changes and asked if anyone in the economic group at AFSC is planning on doing economic analysis of various issues? Brian replied that staff economists plan to do these analyses but have generally been constrained by the absence of cost information and the difficulty in assessing cost impacts.

The Team decided to agenda time at the May meeting for further discussion of overarching economic questions and studies and plans for the future. The team requested the participation of AFSC economists, and possibly Council economists, in this larger discussion to help the team structure the economic SAFE chapter, as well as to allow the team the opportunity to discuss and provide input to economists on plans for future analyses and studies.

### **SAFE Report**

The Team reviewed assignments for the Crab SAFE report and timing for compilation of the report. The team reviewed the executive summary and chose to delete Table 4 as being largely uninformative. Further revisions to the executive summary were made individually by contributors. The Team then met in a work session to compile the SAFE report for the remainder of the day. The Team noted their intent to revisit SAFE report issues on Friday.

## Review of draft Crab Overfishing Definitions Assessment

The Team spent considerable time reviewing the revised initial review draft of amendment 24 EA. The Team observed that this was a much improved version compared to the previous versions. Comments represented here are organized according to general comments on the document and chapter by chapter suggestions. Following the comprehensive review of the analysis, the team then discussed implementation issues and commented on their preferred alternative. Discussion of these latter issues is included following the specific review comments on the analysis itself. Specific editorial comments have been internally noted and are not repeated within this report.

### General comments on the document:

- The list of acronyms should be expanded to include a more explicit glossary of terms
- Remove all statements regarding the discussion of fishing mortality as a benchmark against which comparison of overfishing is made
- Check for consistency in how the term “biomass” is defined and used throughout document.
- Request that all figures, tables, and sections are labeled correctly and included in the table of contents.
- Formatting issues to be resolved in next version including table headers and labels.
- Consistency is needed in labeling of stocks (WAI, western Aleutians,...)
- Too much use of subjective language: remove words such as “worst” and “best”, unless specific criteria are included.
- Suggestion that maps be added to each chapter (or overall) which show areas that are being discussed and or provides context to text.
- Remove ‘death catch’ references
- Page 77: 5.2.2 how is  $F_{35}$  justified when  $F_x$  ranged from  $F_{38}$  to  $F_{39}$ ? Why was 35 used and by what justification? If the justification is that the  $F_{MSY}$  proxy is  $F_{33}$  for RKC and  $F_{38} - F_{39}$  for snow crab then average of the two is roughly  $F_{35}$ . Need to move this up to general methodology section and provide additional justification for the common metric single value approach. (noting both the concept and the value chosen).

### Chapter 1: Introduction/Purpose and Need

- Page 10: Some of the statements implying requirements under the National Guidelines should be replaced with requirement under BSAI FMP.

### Chapter 2: Description of Alternatives

- Need to clarify that the timing process as described in table 2-2 only covers the annually surveyed stocks.
- Need to add explicit information that the current timeframe under alternative 1 allows for a lengthy time to evaluate the non-surveyed stocks at present (i.e. GHs are established throughout the year) while the proposed changes to the process would potentially impact this. *Note that this issue is discussed further under the discussion of implementation issues.*
- Page 11: need to be consistent in notation and definition of beta (should be a ratio not a biomass)
- The control rule should be better explained for clarity: possibly add a flow chart describing process (if Beta = X then...), move figure 2-1 forward in description section, cross reference to discussion of values in 3.2.5.2.
- Footnote to be added re MMB on page 11
- Page 12: strike sentence “Biomass...”, add “fertilized egg production” in place of “biomass” in last sentence 1<sup>st</sup> paragraph (and through the document as appropriate).
- Tier 4 page 12: clarify statement that simulation modeling borrows information [from other stocks] to estimate  $\gamma$  third sentence. Revise sentence to clarify this.
- Figure 2-1: Y axis needs to be modified to be  $F_{OFL}/F_{MSY}$  or  $F_{MSY\_proxy}$

- Clarify in paragraph 3 (section 2.3.2) that there is no retention; suggestion to add additional language here to make it explicitly clear that OFL is set to a default value of 0 when stock status is unknown (note not to imply that information indicated the stocks is in trouble and needs extreme protection).
- Discussion of 1<sup>st</sup> sentence second paragraph (section 2.3.2): Add information that additional effort would need to be expended to establish a non-zero OFL for these stocks based on best available information.
- Table 2-6: suggestion to annotate table to indicate where stock status is in relation to  $B_{msy}$  (\* for above  $B_{msy}$  or some other indication)
- Need significant digits consistency (3 significant places)
- Table 2-7: comments on information presentation and placement, and suggestions for revised based on draft “super table” presented by Siddeek
  - Split the table by Tier levels: e.g. (a) tier 3-4 and (b) 5-6 stocks
  - For tiers 3/4 include the ratio of  $B/B_{msy}$
  - For tiers 5/6 add information for years utilized and delete superfluous columns. Footnote stocks where no years are available.
  - Note need total catch for EBS Tanner crab to be included in the table and footnote Tier determination appropriately (i.e., for the EBS Tanner stock analysis of both Tiers 3 and 4 are presented but the Table assumes Tier 4).
  - Note that it has not been determined how total catch OFL will be determined for stocks by Tier, thought it was based on availability of reliable bycatch information not on tier level. Add this information prior to Table 2-7
  - Add information prior to Table 2-7 to explain what is included in total catch, retained catch, etc (explained later in document, but not preceding this table)

Jie Zheng commented about the inapplicability of the inclusion of female bycatch in estimates for Bristol Bay red king crab (BBRKC). The team discussed the fact that these estimates take on increased importance when the OFL is for total catch. The team discussed whether or not the total catch should include females, noting that this is a more of a policy decision. The fits to female bycatch in BBRKC model are not good. Further discussion concerned the fact that aspects such as the relative fit to female discard catch is a stock assessment issue that should be annually reviewed and how bycatch is modeled perhaps revised. This was noted as another reason why incorporation of a buffer would be appropriate in order to avoid inadvertently overfishing.

Figure 2-1: The team discussed that while directed fishing may go to zero when  $B/B_{MSY} < \beta$ , this does not imply that catch equals zero when  $B/B_{MSY}$  given the incidental catch in other fisheries. Currently  $F_{OFL}$  as listed is only for the directed fishery. Siddeek clarified that in the simulations the  $F_{OFL}$  estimated the directed fishery catch and the total catch (i.e., retained plus bycatch removal) simultaneously. André commented that currently there are systematic patterns in the residuals about the fits to early bycatch estimates for non-directed sources in the assessments. The impact of such residual patterns becomes more important as stock biomass declines and bycatch is a large fraction of total removals. The team discussed how mortality is specified in the simulation and assessment models so that even when fishing mortality for the directed fishery is zero there is still fishing mortality from discards due to trawl bycatch. The team suggested incorporating a model flow chart to indicate how the model approximates all aspects of catch.

Doug Pengilly volunteered to put together a clarifying figure and text (text box, definitions) to complement the existing Tier system and control rule descriptions.

## Section 2.5

- add additional information in this section regarding comments on the non-surveyed stocks.

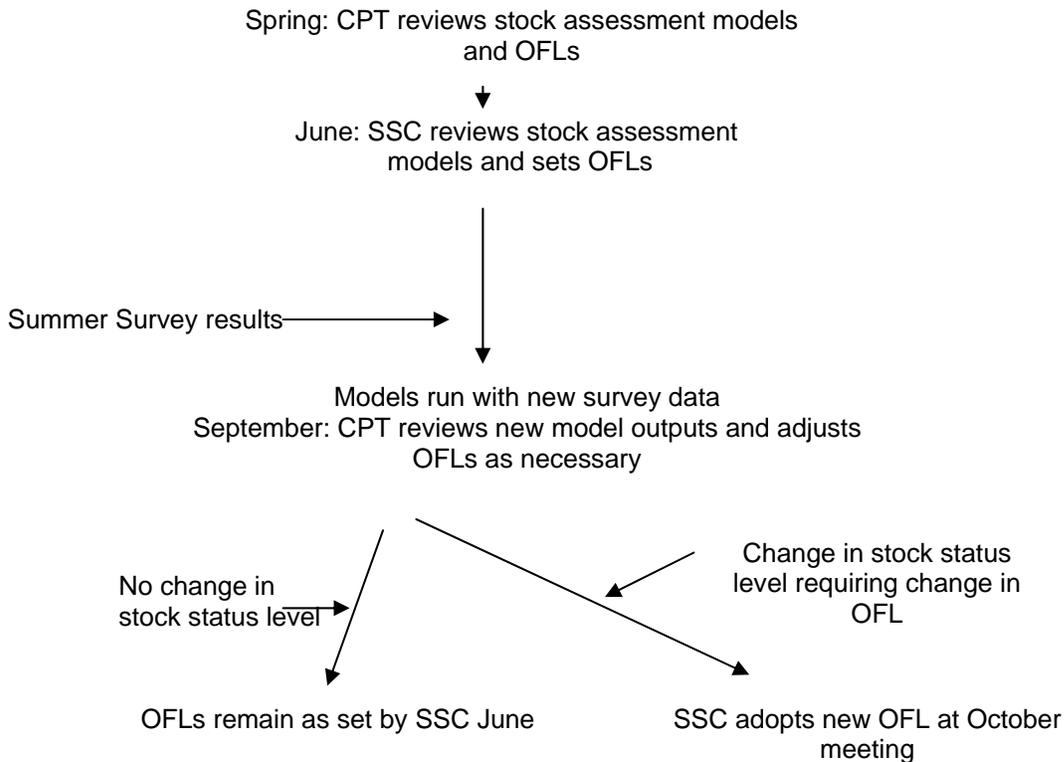
- Section 2.5.4: need to add information regarding previous discussion of stock status determination and the potential fishery constraints due to a stock status determination based on old data
- Tier 5 retained catch information: discussion of insufficient data available to have total catch OFL, but retained catch only used in the current analysis. Bycatch information is available. Need to revise page 29 language so that the process of Tier 5 determination does not force a retained catch OFL rather than “for purposes of analysis” or “at present”...
- Tables 2-11 and 2-12: if possible, add information (figures and text) to reorganize this section and clarify the purpose of its inclusion. If staff timing does not allow for revisions of this section, the tables and text should be stripped as they are not informing the analysis in the manner intended (perhaps included as an appendix).

The Team discussed Options 1 and 2 and then were provided a “modified option 1” for potential incorporation in the analysis as an option. The team discussed the differences between Options 1 and 2 and the relative pros and cons of each. Both appear to require similar analytical workloads. There was a suggestion that Option 2 did not provide for adequate peer review by the team and SSC. This needs clarification by the SSC as one purpose of creating Option 2 was to specifically provide for a review of the models and assessments on an annual basis. The objectives of peer review seem to be twofold: (1) assessment model review and (2) review of the exact OFL numbers.

Option 1 is clearly problematic in that it does not allow for a change in OFL should the new survey information indicate a potential change in stock status. The stock status determination under Option 1 should be moved to the spring to be internally consistent (the same assessment is used for stock status and OLF determination). Further text should be added to the impact of Option 1 discussion regarding the potential to constrain the ability to open a fishery (which might, under a different schedule for timing, be opened).

Modified Option 1 discussion: the following figure was discussed as a schematic for a modification to Option 1 to provide for SSC peer review of OFLs while allowing for flexibility in modifying the OFL between June and September.

### Option 1 - modified Determination of OFL for upcoming fishing season



The Team discussed the pros and cons of the modified option, particularly the goal of allowing flexibility in the June establishment of OFLs to accommodate change in stock status after survey data are available. A suggestion was made to modify the definition of “a change stock stats” (which would lead to a new OFL) to be a “change in stock status level (e.g. a, b, c) by Tier”. However, discussion noted many problems in the potential implementation of this option. Option 1, as modified, would effectively imply that the SSC approves provisional OFLs in the spring. One particular issue was noted with respect to the problem with running the model to obtain a biomass estimate for TAC setting and stock status determination without estimating a new OFL. Once an OFL is estimated within the model at that time, it becomes the best available science. CPT does not recommend the inclusion of modified Option 1 for this reason. While this was suggested as a means of amending the OFL after June, this intent appears to be covered under Option 2 and Option 1 seems to create more problems than it solves.

#### Chapter 3 Methodology:

- 3.1: Re title the section so that it is consistent with the previously use terms ( “fertilized egg production” or “effective spawning biomass”). There is a need for consistency in how “biomass” is described throughout the document.
- Question regarding  $B < 0.25 B_{MSY}$ . Was fishery closed or only when below  $0.25 B_{MSY}$ ? (the is only a concern for the analyses which vary  $\alpha$  and  $\beta$ ).

The team commends the authors on making the suggested changes to the methodology section from the previous draft. It was noted that it would be good to cross-reference these tables with the plots in the later sections. André noted that there is an inconsistency between the use of  $h=0.68$  in the simulations and the values for Beverton-Holt steepness in table Table 3-4. It was explained that  $h=0.68$  accounted for the

Ricker as well as the Beverton-Holt results. Additional text making the relationship between  $h=0.68$  and the values in Table 3-4 is therefore needed. Questions were also posed regarding why the steepness parameter was adjusted from the May version of analysis.

- Add justification why the value of steepness in the tables in Section 3 are considered unreliable, but are nevertheless used in the simulation analyses.
- Need more information to justify lower end of range indicated for  $h$  range (the lower end of the range in the simulation is very close to the best estimates, but this is not the case for the upper end of the range on which the simulations). Jie Zheng commented that the range was selected based on 2005 data while Lou Rugolo noted that much discussion focused on these issues during the workgroup meetings. However, since documentation on the WG meetings is lacking as a reference more explanation is necessary here.
- 3.2.5.2: Move Figure 5-3 into methodology section and revise with panels that show each control rule combination
- 3.2.5.3 gamma The 3rd sentence from the end of the section indicates that this was “somewhat high” so a lower number was chosen. However, this choice is a policy call and might not represent the best available science. It was clarified that 3.0 was used not 3.5. Further investigation using  $\gamma = 3.5$  is desirable although it was emphasized that this is a highly uncertain value, so this aspect to the assessment should not be lost in re-analysis.
- 3.4 Tabulation of the annual catches: Note that the intent is to add additional information per groundfish tabulations based on estimation of the weight of groundfish and scallop bycatch (a section is needed on scallop bycatch). Further discussion of the use of proxies for moving from bycatch in numbers (as recorded in the SAFE reports) to bycatch in weight is needed. This can be achieved as noted in the analyses, but this would need to be revisited when this is done annually.

#### Chapter 4: red king crab

- 4.3.2 need to clarify last sentence on page 55 (or move it forward to description of alt 1) as it becomes confusing whether this is to reflect realities of management or the analytical framework only.
- Page 56: Suggestion to shade table values based on some threshold of change (e.g. above 1.2 or below 0.8) to show which Tier level assumptions have the greatest impact on the final results.
- Basing the summary of the simulation analyses on relative values was an improvement over listing the absolute values. Suggestion to re-scale Tables 4-3 and 4-4 according to the  $\alpha = 0$ ,  $\beta = 0$ .
- change Norton Sound  $B_{MMB}$  from 2.87 to 4.88 on page 68
- Page 70 Dutch Harbor RKC: delete reference that “any future fishery” as it is not clear that any future fishery would be exclusively in state waters.

#### Chapter 5: snow crab

- Page 73: Need clarification of how the percentage of old shell legal males used was determined and what value was utilized for the simulation
- Discussion of units: need to have tables in similar units - Table 5-1 should be revised to show pounds not 1,000 tons.
- 5.2.3: Clarify that comparison of  $F_{MSY}$  control rule here is the Tier 2 CR
- As per previous discussion, for clarity Figure 5-3 should to be replaced with multiple figures showing each individual curve.
- The analysis should more clearly state the rationale for the recommended  $\alpha$  and  $\beta$  values
- 5.2.4.2: Question on results indicated at top of page 80 regarding 50% discard rates. It should be clarified that these results are not directly comparable given the modification necessary to the model (and parameters) in order to re-specify discard mortality.
- First sentence needs to delete its reference to years and replace with “of the Tier 2 result” given the change in tabular presentation whereby results are scaled to Tier 2 results and presented accordingly.

- In Tables 5-4 through 5-9 the  $F_{35\%}$  and  $F_{40\%}$  need to be updated given the results of the revised simulations (depending upon to what extent there is a change in the results).
- Table 5-2 Need to add to caption that Tier 2 control rule is for  $F_{MSY}$ . Similar comments for scaling this relative to 0,0 column and shading major results accordingly for clarity.
- Need consistency in Tier 5 simulation approaches: for snow crab the Tier 5 catch is 0.5 MSY, whereas for BBRKC Tier 5 it is the average catch over a specified time period. It is inappropriate to use a constant catch of 0.5 MSY as this would not be known in practice. The Tier 5 results for snow crab should be redone to use the average catch over a specified time period for consistency with approach used for RKC and the intent of Tier 5.
- Page 89/90: Table 5-11 text has not been revised in accordance with the revised table.

Chapter 6: Tanner crab:

- Second paragraph page 93: need additional information to describe what is going on for the Tier 2 simulations and that the parameterization comes from analysis of the Bristol Bay portion of the stock applied to entire population for Tier 2 and 3 analyses. This extrapolation impacts both the simulation itself as well as the implementation of Tiers 2 and 3.
- 6.2.1 Maturity probabilities for Tanner crab. It is unclear why this section was included here: move to Appendix C.
- 6.2.2.2 Following questions, Siddeek clarified that 1.43 is the  $\gamma$  value for the Tier 4 estimate. Further explanation is necessary to clarify that the middle of the range rather than the best estimate is utilized here. Siddeek indicated that similar steepness values could be used for both Tier 3 and 4 (e.g. either 1.43 or 2.03) and he will re-run for consistency with 1.43. The team endorsed this proposal.
- The reference to “modified  $F_{MSY}$ ” needs explanation. Siddeek note that the selectivity of old shell and new shell with old shell was not appropriate so he utilized the newshell selectivity for both shell ages. The team noted that the methodology appears fine but further explanation needs to be provided.
- Recommendation to run analyses for Tanner crab based on a Tier 5 control rule to allow further inference about how this rule performance for less well known stocks.
- Reference to “rebuilding times were shorter” is a misnomer and should be deleted since the stock is initially at  $B_{MSY}$  anyway.
- Last sentence (page 103) should clarify that the  $F=0$  scenario provides trawl fishery yields. This description should be provided in Chapter 3 methodology as it applies to all simulation studies for Tier 3 stocks.
- Table 6-5: delete the “rebuilding” row for scenarios that begin at  $B_{MSY}$ , the results are, by definition, uninformative.
- Question regarding the bycatch as listed in Table 6-11 (yield under  $F=0$  implies that bycatch high). The authors noted that bycatch in this fishery is high, which causes concern for setting a retained catch only OFL.
- 6.4 EAI Tanner Strike 75% OFL comment page 115.
- Note that a BOF proposal to establish a formal harvest strategy for this stock would be based on the informal harvest strategy currently utilized to set the GHL.

Chapter 7: BKC

- Discussion of potential change in F rate due to proposed biological parameters. This paragraph needs further editing.

Chapter 8 GKC

The Team discussed the years utilized for the OFL for GKC and, while not hard-wired why the years from 2000-2005 were excluded. Jie responded that CPUE was dropping in years prior to 1996 CPUE. Note that further clarification and justification should be added on the years used in the analysis; further discussion will also occur at the time of implementation.

Chapter 9: other crab stocks

- Table 9-2 added for retained catch. In response to questioning, it was clarified that catch data for years prior to 1992 may be available for AI scarlet king crab, but not for the other stocks. Note that sentence should be added to indicate that the values in table 9-2 represent known catch data for these stocks.
- Need to revise/check tables 9-1 and 9-2 for consistency.

Chapter 10:PSC limits

- 10.2 Need to use terminology consistent with the remainder of the draft for ESB.
- Suggestion to modify wording so that directed crab fisheries are not mandated to be closed for exceeding an OFL.

The team discussed that the forthcoming accountability Measures (AMs) under MSRA create potential issues whereby it might be necessary to account for overages in OFL determination for the following year. The team emphasized that other fisheries that take crab bycatch should also bear the burden of conservation concerns. Note that if impacts are perceived these might be brought to Council attention. This contrasts somewhat with current practices in which changes in the OFLs would only affect the crab fisheries.

Chapter 11: Economic Effects

The team discussed the revision of the economic analysis and noted that Table 11-11 represents the best estimate of impacts at this time for those stocks. Additional information is needed regarding the comparison and rationale for this comparison.

- The OFL for EAI Tanner is incorrect and needs to be revised.
- PI GKC: paragraph on avoiding overfishing here should be stuck from all stock specific sections and move to intro of impacts on 11.7
- Page 157. Amend statement to read "...equal to or below OFL"

This completed the technical review portion of the meeting and the team then discussed issues with implementation and the selection of a preferred alternative.

*Implementation Discussion:*

The team noted that any new OFL definitions would need to be implemented by June 2008 to be in place for the 2008/2009 crab fishing year. This would only be possible if the Council took final action in December. The Team reiterated the need for more rigorous review of the stock assessments themselves prior to the adoption of their results for use in calculation of OFL, noting that, for example, issues such as residual patterns should be reexamined.

Furthermore, there is an explicit need to have a more rigorous review of models annually, which would, for example, allow time to delve into the specifics of model formulation. This could be via an internal workgroup meeting, with the results then presented to the CPT and discussed at the May meeting. Another option would be to choose a single model each year for in-depth review at the CPT meeting and move forward with a review of other models in subsequent years.

Staffing issues that have yet to be resolved with respect to implementation of the new overfishing definitions. While annual status determination for all stocks is the responsibility of NMFS, it has yet to be determined who will do the actual stock assessment work on an annual basis for each stock. Assessments for BBRKC, Tanner crab, and AIGKC are currently authored by the State. Staff assessment authors would need to be tasked for annual OFL determinations, likely placing an additional workload on assessment authors in the spring for the proposed review process. The Team discussed the fact that neither State nor Federal staffing have this added work burden built into existing job descriptions. Additional work is also being added to catch accounting staff (NMFS) to annually compile observer data in the crab fishing year for use in compiling total catch information to compare against the OFL.

Additionally, all of the applicable information generated would need to be tabulated, described, and presented to the SSC and Council in June and October (Option 1 or 2 would prescribe which specific information would be presented, however, both options would require this step). The CPT recommends that NMFS and the State have a discussion of implementation needs and the divisions of responsibilities for annually assessing OFLs.

Additional implementation issues exist for Tiers 5 and 6 stocks. Annual review and documentation of an OFL determination including justification and rationale for the choice of years must be provided. Guidelines are needed regarding the documentation and information needs for all stocks on an annual basis. The availability of adequate information may also impact the timeliness of implementation. Additional consideration should also be given to what the review process itself will entail (by the CPT and SSC).

The Team discussed possibilities for delayed implementation or phased-in implementation for some stocks. For major stocks with existing assessments, much of the groundwork to annually establish the OFLs has been accomplished. However, additional information and work is likely needed for Tiers 5 and 6 stocks. A concern is that the amendment process is implemented prior to these issues being adequately resolved. The CPT suggests that consideration be given to adding specific implementation options to the existing suite of alternatives to address these issues.

The Team discussed several options for addressing the implementation issues. The team has no preference for any one option over the other, but is rather proposing several that might be considered by the Council to address this problem.

These options are:

1. Implement new overfishing definitions for all stocks as soon as possible.
2. Delay implementation for a set time period (to be determined by Council)
3. Phase-in implementation by stock
4. Delay final action by Council for one year to evaluate ability to work within the process

The Team discussed the selection of a preferred alternative. The Team did not reach consensus on the recommendation to remove some stocks from the FMP under option A although some members felt strongly individually about the choice of this option. The Team discussed to what extent there was an additional conservation concern to be addressed by removal of these stocks from the FMP (which then by default confers full management authority to the State), noting that normally species are removed from the Federal FMP when the presumption is that improved management would be conveyed through the State (an example includes recent action to remove dark rockfish from groundfish FMPs due to the potential for overfishing in the larger pelagic shelf complex under federal management). The Team was unable to determine an appropriate rationale based on conservation of the stocks and notes that the primary rationale for removal is to reduce the administrative burden on the federal government in managing these stocks under the FMP whereby OFLs (and soon ACLs and AMs) will need to be established. While the Team noted that this might be adequate rationale for removal of the stocks, the Team felt that such a choice was primarily a policy. The Team notes that management of these stocks will not differ greatly under either option.

The Team felt that in the future, documents submitted for CPT review need to be more carefully edited for typographical errors prior to distribution. This is needed because the present review process (as performed for this EA) has been bogged down by typographical errors and lack of standardization. Perhaps more thorough internal review (by individual agencies) needs to occur prior to CPT distribution in order to minimize editorial review comments and to focus the review on substantive issues. This will become increasingly important as the CPT annually reviews assessments on limited timeframes.

*Discussion of alternatives:*

The CPT recommends Alternative 3, the six-tier system, noting that if the Council decides to select Option A to remove stocks then the team would recommend Alternative 2, the five-tier system, noting that without the Option A stocks there would be no need for a Tier 6.

*Timing options:*

The Team notes the following issues need to be considered in selecting a timing option: a) peer review process, b) use of best available data, c) implications of using the next recent data, and d) the practical timing problems inherent with OFLs determined in the fall.

From a purely scientific standpoint, the Team notes that a preference of using the most recent data, but understands that logistical issues may preclude this. The Team discussed the possibility of a modified option 1 as a compromised intended to address some of the timing issues, but this approach was not deemed feasible. Given the volatility of crab stocks, the Team recognizes that timing and data availability issues are particularly important. The Team recommends Option 2 as a preferred alternative, understanding that there are timing and implementation issues to be addressed with respect to this option. The Team further requests clarification on the issues related to peer review under this option (as opposed to peer review under Option 1). Implementation should also consider the issues raised with respect to additional data analysis for analysts involved as well as the additional burden of substantially increased review time required by the CPT in conjunction with these new alternatives.

***Bering Sea Fishery Research Foundation (BSFRF) Presentation***

Steve Hughes and Scott Goodman presented an overview presentation of preliminary results from the Foundation's 2007 survey for BBRKC. Data were collected primarily for red king crab, but were also recorded for other crab species during the survey. In addition, very small crabs (~ the size of a quarter) were caught in survey nets. A summary was provided of the operational aspects of the survey and preliminary biological results were compared with BSFRF analysis of NMFS survey results from the same season and a similar survey area; the surveys occurred within approximately 3 weeks of each other, although the foundation survey extends further inshore than the NMFS survey. The BSFRF survey found RKC to be distributed further south than in previous years. Results from geostatistical analyses will be available later in the year. Future plans would ideally include a snow crab survey (both a pilot survey over a limited area and a full scale resource assessment survey) and a follow up RKC survey, although the timing of these proposed studies is as yet undecided.

***Board of Fisheries (BOF) proposals***

Wayne Donaldson provided the team with an overview of king and Tanner crab proposals being considered at the upcoming Board of Fisheries meeting. Gretchen Harrington reminded the team that one function of the CPT is to categorize BOF proposals according to FMP categories. Wayne provided an overview of each proposal and the team discussed and reached consensus on the FMP category for each. The proposal numbers and the team's recommended FMP categories are listed below:

- 369: category 3 state observer requirements
- 370/371 category 3 vessel tank inspections
- 372: category 2 registration areas
- 373: category 3 gear modifications plus cat 2 registration areas
- 374: category 3 gear placement and removal
- 375: category 3 gear placement and removal
- 376/377: category 2 pot limits
- 378/379: category 2 pot limits and category 3 gear modifications
- 380: category 2 GHL, inseason adjustments and closed waters.

For proposal 380, there was some discussion of what this would entail if approved by the BOF. It was noted that the CPT's role in commenting on BOF proposals is limited to comment to the Council on the utility of proposals, not to the BOF on the potential impacts of implementation. There was discussion, however, that in developing a harvest strategy for Pribilof Island red king crab, the BOF should be apprised of the stock status of both Pribilof red and blue king crab stocks.

- 381: category 2 GHL.

The Team noted that this action still needs to comply with the rebuilding plan for this stock. This proposal might be a topic for the next joint BOF/Council meeting.

- 382: category 3 gear modifications
- 383: category 2 GHL
- 384: category 3 gear placement and removal
- 385: category 2 GHL
- 386: category 2 registration areas
- 387: category 2 fishing seasons
- 388: category 2 fishing seasons
- 389: category 2 minimum size limits
- 390: category 3 gear modifications
- 391: category 3 gear modifications

***Other issues/new business:***

*Crab Rationalization Program (Program) changes:* Gretchen Harrington updated the team on possible Program changes to come before the Council in October. These include the following:

- Initial review to remove the requirement that C-shares be subject to regional delivery requirements, the A/B split, and arbitration;
- Initial Review of changes to allow custom processing for north region snow crab and Bristol Bay red king crab, and minor species (St. Matthews blue king crab, Pribilof Islands red and blue king crabs, and Aleutian Islands golden king crab) so that processors could consolidate fishing operations at a single facility to achieve better returns;
- Initial Review of a provision to allow post delivery transfers to "settle up" IFQ accounts after delivery (note this is also being evaluated for Amendment 80 fisheries, rockfish, and other CDQ fisheries).

These analysis documents will be available on the web prior to the Council meeting. The CPT was concerned that the post deliver transfer issue could have biological implications in that there is the potential for the TAC to be exceeded while the other two issues are primarily economic. However, it was noted that the post delivery transfer provision would not change the existing overage provisions and that the fleet would still be subject to the same, or greater, penalties for overages, thereby reducing the potential for exceeding the TAC and any potential biological implications. The Council might also consider additional Program changes during the three year review of the Program.

The CPT has been on the periphery Program issues, but could be involved in reviewing analysis documents. Team members noted that they would like to hear periodic updates of pending actions to allow the team to decide if there is a need for further CPT participation. The team also felt that it would be useful to understand more about the Program and process (members have different levels of familiarity with the program) and expressed an interest in receiving copies of the reports. The team felt the May meeting would be an appropriate time to receive additional information on the Program. At its May meeting, the team plans on discussing economic issues, including crab EDR issues and the economic section of the SAFE. The team requested an overview presentation (a primer) on the Program itself, as well as additional information on proposed changes. Additionally, NMFS intends to start releasing the

Program annual report prior to the September CPT meeting, which could be reviewed by the team at that time.

*Habitat:* Herman Savikko provided an overview of habitat protection changes resulting from Council actions in June. Actions by the Council are intended to freeze the footprint of trawl effort in the Bering Sea, establish gear modification requirements to keep gear off of the bottom, and to establish the Northern Bering Sea Research Area (NBSRA) (north of St Matthew) which will be closed to bottom trawling until additional research is completed evaluating experimental gear. Additional protection measures may also be considered. The CPT requests additional information on the development of the research area and the appropriate means to provide the Team's input into the development process.

### ***AI FEP overview***

Forrest Bowers provided an overview of the AI FEP that has been developed and adopted by the Council. He noted that this is a policy and planning document without any implementing regulations. He provided an overview of the background behind the development of the document and an overview of the general content of the FEP. The members requested clarification on the list of indicators, and what will done with these. Forrest thought they will likely need to be evaluated annually and updated periodically. The team discussed the food web information and the relative utility of the usage of these models. The Team continues to support the use of the models as a tool for understanding and highlighting data gaps, but expressed caution at any expanded application noting that stomach data is limited in years and spatial extent.

The Team discussed the utility of incorporating expanded ecosystem information in the Crab SAFE report. The Team intends to work with Jennifer Boldt to summarize some of this information in the Crab SAFE as is currently done in the groundfish SAFE report introductions. The Team agreed to include time during the May PLAN meeting to discuss how to incorporate ecosystem information into the Crab SAFE and how to identify who is responsible for this.

The meeting adjourned at 4:30pm.

## **NPFMC Crab Plan Team meeting**

**September 12-14, 2007**

**AFSC Observer Training Room, Seattle, WA**

**Draft Agenda revised 9/4/07**

### **September 12**

9:00 am -12:00 pm:

#### **Administration**

- Introductions,
- Additions to agenda and approval of agenda,
- Discussion of September 2008 meeting location
- Review and approval of May 2007 minutes
- Discussion of meeting conduct, protocol and public testimony
- New business: overview of new Arctic FMP in relation to Crab FMP

#### **Review 2007 survey results:**

- NMFS survey results;
- ADF&G survey results;
- Public comments/questions

12:00 pm – 1:00 pm

#### **Lunch break**

1:00 pm - 5:00 pm:

#### **Review model and assessment results**

- Bristol Bay red king crab; [material to be posted on-line 9/7/07]
- Bering Sea snow crab; [material to be posted on-line 9/7/07]
- Public comments/questions

#### **Update on Economic review and data analysis of Crab Rationalization Program**

#### **Stock assessment and fishery evaluation report**

- Review status of stocks relative to overfishing and current harvest strategies;
- State annual management report
- Review and revise Executive Summary and compile SAFE
- Fishery performance/harvest relative to GHM and TAC

## **September 13**

**8:00 am** -12:00 pm:

### **Review of draft Crab Overfishing Definitions Assessment (time certain):**

- Review workgroup progress on draft amendment based on CPT and SSC recommendations from May and June
- Finalize FMP amendment
- Considerations for October council meeting
- Public comments/questions

12:00 – 1:00

### **Lunch break**

1:00 pm - 5:00 pm:

**Continue review of draft Crab Overfishing Definitions Assessment**

## **September 14**

**8:00 am** -12:00 pm:

**Continue review of draft Crab Overfishing Definitions Assessment**

12:00 pm – 1:00 pm

### **Lunch break**

1:00 pm - 5:00 pm:

**Bering Sea Fishery Research Foundation presentation**

**Continue and finalize work on SAFE**

**Review Board of Fisheries proposals for March 2008 meeting**

**AI FEP overview**

### **Other issues/new business**

- **Update on new Bering Sea Habitat measures by NPFMC**
- **Changes under consideration in the Crab Rationalization Program**

**Adjourn** - (5:00 pm)

CPT members please schedule your travel so that you are able to attend the entire meeting.