


MEMORANDUM

TO: Council, SSC and AP Members

FROM: Chris Oliver   
Executive Director

DATE: September 25, 2006

SUBJECT: BSAI Crab Management

ESTIMATED TIME 4 HOURS ALL D-3 Items
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**ACTION REQUIRED**

- (b) Receive Crab Plan Team report and approve Crab SAFE report.
- (c) Update on crab overfishing definitions analysis (SSC only).

**BACKGROUND**

- (b) Receive Crab Plan Team report, Review and approve Crab SAFE report

The Crab Plan Team met September 13-15<sup>th</sup>, 2006 in Anchorage, Alaska, to review the status of stocks and to compile the annual Stock Assessment and Fishery Evaluation (SAFE) report. The Crab SAFE report was mailed to you September 19<sup>th</sup>. The SAFE report summarizes the current biological and economic status of fisheries, total allowable catch (TAC), guideline harvest levels (GHL), and analytical information used for management decisions or changes in harvest strategies. The report is assembled by the Crab Plan Team with contributions from plan team members as well as from additional personnel from the State of Alaska, Department of Fish and Game (ADF&G), and the National Marine Fisheries Service (NMFS). The minutes of the Crab Plan Team meeting are attached as Item D-3(b)(1). A revised version of the graph of snow crab stock status in relation to overfishing is attached at Item D-3(b)(2).

A problem statement, draft suite of alternatives and comparison of alternatives for the forthcoming BSAI Crab FMP amendment to revise the overfishing levels and status determination criteria for all BSAI crab species are attached as Item D-3(b)(3) and Item D-3(b)(4). The Council may wish to review and approve the problem statement and alternatives at this meeting. Initial Review of this EA is scheduled for December 2006. Periodic updates on the progress of the analysis have been provided to the SSC. The final SSC update on the analytical framework for the analysis is scheduled for this meeting.

- (c) Update on crab overfishing definitions analysis (SSC only)

Progress continues on refining alternative overfishing definitions for the BSAI crab stocks. An inter-agency working group has been providing updates to the SSC on a periodic basis to solicit their advice on the direction of the analysis. Refinements were made to the analytical framework to address comments received from the Crab Workshop, the Crab Plan Team, the SSC and the recent Center for Independent Experts review. The Crab Plan Team has approved a draft problem statement and suite of alternatives for the analysis and a timeline for completion of the EA (see D-3b above). An update the analytical framework for the analysis will be provided at this meeting. Refinements have been made to the eastern Bering Sea Snow Crab assessment report (appendix B to the 2006 Crab SAFE report) to address input from the SSC in June 2006. Jack Turnock (NMFS) will be available to present these changes to the assessment.

## Crab Plan Team Report

The Crab Plan Team convened their Fall meeting from September 13-15<sup>th</sup>, 2006, at the Captain Cook Hotel in Anchorage, AK.

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)*  
*Greichen Harrington (NMFS-Juneau)*  
*Wayne Donaldson (ADF&G-Kodiak)*  
*Jack Turnock (NMFS/AFSC-Seattle)*  
*Joshua Greenberg (UAF)*  
*Shareef Siddeek (ADF&G-Juneau)*  
*Herman Savikko (ADF&G-Juneau)*  
*Lou Rugolo (NMFS/AFSC-Kodiak)*

Members of the public (and state and agency staff) present for all or part of the meeting included: Leonard Herzog, Jack Tagart, Jenna Koenig, Steven Lee, Arni Thomson, Jie Zheng (ADF&G), Kevin Kaldestad, Ivan Vining (ADF&G), Keith Colburn, John Boggs, Jeff Steele and Frank Kelty

### Introduction

Changes to the agenda (attached) were made to reorganize the NMFS survey presentation to Thursday morning. Doug Pengilly clarified that his presentation was going to focus on the tag return data from the 2006 season (not a review of all ADF&G survey activities).

Revised minutes from the May 2006 CPT meeting were approved.

### Overfishing definitions

The team was given the CIE review documents from the April 2006 crab overfishing CIE review. These represent the final product of the CIE review. The team had received a verbal report on the CIE recommendations in May 2006 from Mike Bell, the lead reviewer.

Siddeek reviewed the July 24<sup>th</sup> planning meeting convened by the workgroup and the agreements made within the workgroup based on this meeting for spawning stock biomass and stock recruitment relationships. The workgroup will reconvene in Kodiak to continue working following the CPT meeting. Jack noted that agreeing to use mature male biomass eliminated many of the complications with mating ratios from previous workgroup discussions. The workgroup now believes that a unified report and analysis is possible based on these agreements and a final report from the workgroup will be forthcoming.

Doug Pengilly requested clarification on the analytical agreements made at the July 24th meeting. Some of the agreements were made in direct response to CIE suggestions; others were crafted

(e.g. mature male biomass) as short-term solutions for analytical purposes while longer-term research is conducted.

Jack Tagart asked for additional details on the simulations to be run at the September workgroup meeting. Jack Turnock noted the work group would be reviewing min/max scenarios that have been run. Jack Tagart requested if there would be simulations for comparison on the default harvest rules. It was clarified that these simulations would be included in the EA.

Lenny Herzog requested clarification regarding how correlated snow crab (*C. opilio*) recruitment and mature male biomass are as a predictor for the stock. Jack Turnock noted that this relationship is difficult to predict and similar problems are seen for groundfish stocks with respect to recruitment relationships. Crab stock recruitment is highly variable.

Siddeek provided an overview of the work group's progress to date on red king crab simulations. Jack Tagart questioned the rationale behind the 100 year simulation for analytical purposes and the use of the 30<sup>th</sup> year for determining the success of rebuilding. Jie Zheng commented that 30 years allows the simulation to come to equilibrium.

The team discussed the stock recruitment relationship shown by Siddeek's simulation. Lenny Herzog requested to what extent there is any statistical relationship between a biomass level and increased recruitment. Is there a threshold beyond which there is an excess number of male crabs on the grounds which decreases the overall recruitment? Jack Turnock clarified that cyclical recruitment patterns are being considered within the simulation. Jack Tagart commented that there is no statistically significant regression for the stock recruit relationship for snow crab. Jie Zheng noted that it is not possible to fit the snow crab data.

Jack Turnock provided an overview of workgroup results for snow crab simulations. Jack provided results of simulations for proposed tier levels using the current snow crab biomass as a starting point. This is notably different from Siddeek's simulations which started at an overfished biomass. Simulations for all species will eventually be consistent and have three different starting points for initial biomass (e.g., 100%Bmsy, 50%Bmsy/MSST, and 10%Bmsy). Simulations reviewed at this meeting (for red king crab and snow crab) are not yet equivalent for comparative purposes but will be in the final report.

Jie Zheng provided a report on the appropriate bycatch handling mortality rates in the pot fishery. His report summarized what rates have been used in models or assumed for management, results of the lab and field studies that have been performed to estimate handling mortality in Alaska crab fisheries, and from which studies the currently-used rates originated. In his review of handling mortality studies, handling mortality estimates are generally lower than the rates currently in use by the Council to estimate the population impacts on crab populations (e.g. the annual estimates of mortality based on bycatch numbers in the Crab SAFE); estimated handling mortality rates were generally <6% for king crabs, <12% for Tanner crabs, and <20% for snow crabs. Jie Zheng noted that the estimates from studies should be considered as minimum values; the important question is "How much of a buffer above the minimum values is needed?" Jack Turnock asked about the results of Bob Otto's crab dropping experiment. Lou Rugolo noted this was a lab experiment but that the results were not yet published.

The team discussed to what extent the base rates should be modified. Team members felt that these values should be revisited based upon the fact that those default values were based on reports from the late 1990s and new studies have been done since this time. The team discussed how much of a buffer is necessary, noting that these studies are generally based upon laboratory

studies and tagging studies might be more meaningful. However tagging studies are also complicated in that the control is subject to handling mortality by virtue of the tagging study itself.

In revisiting this, the CPT recommends looking at the current numbers, the values used by ADF&G, and more recent studies. Jack Turnock noted that recent studies are not comprehensive across all species and there is no single study to guide new numbers. A single study should be designed to simulate fishing scenarios to better estimate bycatch mortality. Siddeek noted that perhaps agreement could be reached by species on handling mortalities (eg 20% for red king crab). Doug Pengilly commented that it is still worthwhile to have different rates by different fisheries as observer data still seems to indicate that this is a valid approach and that injury rates do differ according to the fishery.

Bristol Bay red king crab rates for handling mortality used by ADF&G assume 20%, while Tanner crab (*C. bairdi*) are 20% and snow crab 25%. The team discussed adopting the ADF&G handling mortality rates for use in the analysis for standardization purposes. These values are being used currently in stock assessment and for TAC-setting purposes. Doug Pengilly noted that the size-frequency distributions of Tanner crab stocks when declining show a substantial drop (cliff) in the size frequency distribution at legal sizes, therefore indicating that sub-legal males may not be dying due to handling mortality. Doug Pengilly noted that while 100% for snow crab may be too high, while 25% may be too low for snow crab however. Currently Jack is using a 50% mortality rate for snow crab.

Jack Tagart requested why deadloss numbers are not used as a reasonable proxy. Doug Pengilly replied that there is variability from boat to boat, particularly with respect to timing of discards overboard compared to legal crabs placed in the hold. Forrest reiterated that retained crab are often treated differently from discards. Mortality frequently occurs after the discards fail to molt. Acute and chronic mortality are different (studies reporting on acute not chronic). Members of the public noted that no one has higher than 1% mortality in deadloss and 5% is a very conservative number. Doug Pengilly commented that there are many additional complicating factors in why deadloss would not be a good proxy.

Lou Rugolo commented that using deadloss as a proxy would not be appropriate given that long-term synergistic effects which will not be adequately captured. Mortality on females may also not be apparent until the following mating season. The reference point for handling mortality should not be based on deadloss (or some multiple thereof).

The team discussed the difficulty in modeling populations to build in precaution and by what means you do so. Model parameters should be based on the best available information while management decisions should be based on appropriate precaution. The models should not add in additional conservation and risk aversion as these are management decisions. Thus higher rates should not be chosen over the best estimate if the sole rationale for doing so is only to build in added precaution.

The team requested clarification on the rationale for using 50% for snow crab. Lou commented that they chose to use 50% due to assumptions that the published studies were not comprehensive and that estimated mortality rates for snow crabs should be higher than the estimates of 25% (but lower than 100).

Members of the public suggested that changes to handling mortality for snow crab be delayed at present due to indications that practices are improving at present. It would be premature to increase these rates at this point.

The work group discussed using 50% discard mortality rates as the base for snow crab simulations but with some sensitivity analyses done around this range. Jie Zheng felt that 50% value came arbitrarily out of a midway between using 25% and using 100%. Ginny Eckert noted that in light of imperfect information, there should be some scientific justification for modification. Jie Zheng's review indicated that there is not overwhelming evidence that it should be higher. If additional information exists it should be cited in order to change the current values. Wayne noted that under crab rationalization soak times are increasing and then subjected to aerial exposure and these new practices may impact previous rates. The question emerges as to what extent rationalization is increasing or decreasing handling mortality rates, but there has not been sufficient time under the rationalized fishery to determine this.

The team discussed the fact that it is likely that published rates represent a minimum due to the nature of laboratory experiments. Thus actual rates are likely considerably higher but there is limited information to determine the magnitude of difference.

Jack Tagart noted that changing the handling mortality in models would impact all model outputs and that it would be prudent to evaluate a sensitivity analysis on whichever rates are chosen for purpose of analysis.

Doug Pengilly reviewed a 1998-1999 study of observer data from the CDQ and open access fisheries describing injuries due to handling mortality.

The team felt that the base value currently in use should be recommended for consistency but that the analysis should also consider a range of value for sensitivity analysis. The analysis would then show various runs with different handling mortality rates for consideration at the time the analysis is reviewed.

The team agreed that the base value for red king crab would be 0.2 with a sensitivity analysis included surrounding this (e.g., 0.1, 0.3). For snow crab, a range of 0.25, 0.4, 0.5, 0.6 values should be used for analytical purposes. For Tanner crab a range of 0.2, 0.4, 0.5, 0.6 values should be used for analytical purposes.

Diana Stram reviewed the description of alternatives for the EA under consideration at present. The team felt that these 3 alternatives represent the best conceivable range for the analysis at this point and recommends that this range be brought forward for Council consideration at the October meeting. The team crafted a problem statement based upon recommendation from the February crab workshop.

The Crab Plan Team recommends the following draft problem statement for use in framing the analysis of revising the current overfishing definitions:

*New overfishing definitions are necessary to reflect current scientific information and accomplish the following:*

- *Provide an FMP framework for definition values to facilitate use of the best available scientific information as it evolves.*
- *Provide a new tier system that accommodates varying levels of uncertainty of information and takes advantage of alternative biological reference points.*

- *Define the status determination criteria and their application to the appropriate component of the population.*

The team discussed the timeline for having an initial review draft of the EA for the December 2006 Council meeting. The EA would need to be submitted to the SSC, AP and Council the week of November 20<sup>th</sup>. Team members commented that having the full plan team review the document prior to the SSC and Council receiving it would be preferable.

The team discussed the need for a single report from the workgroup detailing the simulations for all species and their evaluation under the new tier system and comparison under the current OFL system. The availability of this report for review by the CPT will determine the analytical timeline for the remainder of the analysis. The team recommends the following timeline for completion of the analysis:

- Workgroup to finalize their report by October 31<sup>st</sup> and report made available to the CPT on November 1st
- One day CPT meeting to review the analysis tentatively scheduled for November 8<sup>th</sup>.
- The official timing for submission of an initial review draft for Council consideration will be determined following the CPT review of the analysis, however the target is for the EA to be completed by November 20<sup>th</sup> and thus available for initial review at the December Council meeting (and final action at the February meeting).

Gretchen Harrington noted that if the Council were to take final action at the February 2007 Council meeting, it is possible that the new status determination criteria for crab stocks would be in place for the 2007-2008 fishing year (i.e. by the next iteration of SDC for BSAI crab stocks).

## **Review of 2006 Surveys**

Doug Pengilly reviewed preliminary 2006 results from a snow crab tagging study conducted by ADF&G. The main goal of the study was to resolve the dichotomy between the pre-season (summer) survey distribution of large legal males and the distribution of fishery effort and catch during the subsequent winter fishery. The objectives of the study were to determine tag-recovery rates during the commercial fishery as a function of the pre-season tag release locations and to determine recovery rate by statistical area during the fishery as a function the pre-season tag release location. Preliminary results were presented that showed a spatial clustering of the tag release locations with the highest recovery rates during the fishery. The results also showed that large legal males occupying one statistical area during the summer contribute to the commercial catch in another statistical area during the winter fishery. Further analyses and data checking and editing are needed.

Jack Turnock noted that conclusions will be difficult to determine based upon the study design. Doug acknowledged that conclusions would be limited by the limited area that tag releases were conducted in; also, the tagging area, which was based on the previous 5 years of survey and fishery data, was not the best for 2005/2006. Lou Rugolo suggested normalizing the data based upon the weighted distribution of effort in order to resolve this. None of the crabs were recovered in the summer survey, though Doug noted this was to be expected given the differential fishing power between the survey and fishery.

Lou Rugolo provided an overview of results from the 2006 Bering Sea summer survey. Preliminary results for Bristol Bay red king crab showed a positive increase in 2006 as compared

to 2005 for the legal male component of the population only. Thirty stations in Bristol Bay were resurveyed due to results from the standard survey indicating a large component of the mature females had not completed molting and mating. The 30 resurveyed stations were in only the subset of the total surveyed area that is important for estimating mature female red king crab abundance and biomass. The area was originally surveyed in early June with the resurvey of the 30 stations occurring in late July. Data from the resurveyed stations showed that mature females had molted and extruded new clutches of eggs by the time of the resurvey. Mature stock biomass is above MSST and  $B_{MSY}$  with an observed increasing trend in abundance.

Preliminary results for Pribilof Island blue king crab showed a positive increase in the large female stock component for 2006 as compared to 2005. No other components of the stock showed any increase from 2005. The stock remains in an overfished condition. The length frequency distributions remain uninformative due to the sampling variability.

St. Matthew blue king crab preliminary results showed positive increases for nearly all components of the population in 2006 as compared with 2005. The current population estimate is slightly above MSST, but the stock is still well below  $B_{MSY}$  and remains in an overfished condition. There remains a very high degree of survey variability.

EBS Tanner crab preliminary results show positive increases as compared to 2005 for nearly all components of the population with the exception of the small female component. Large male and female distribution continue to appear patchy west and east of 166 degrees. Females were observed much further west than was anticipated based on previous year's survey results. Positive signs are seen in population increase. However an increase in very old and old shell crabs in the older females has been observed.

The stock is above MSST (and  $B_{msy}$ ) with a trend that continues to increase from 2005. The CPT noticed a difference in the 2005 Tanner crab abundance estimates reported in the 2005 SAFE and the NMFS 2005 Report to Industry. At this meeting, Jack Turnock recalculated 2005 survey results for Tanner crab and found that the original 2005 biomass estimate number of 162.00 as reported in the 2005 SAFE report is correct, thus the number included in the Report to Industry is incorrect. The stock in 2006 is above  $B_{msy}$  for the first time since the rebuilding plan, however to be rebuilt it needs to be above  $B_{msy}$  two years in a row.

Ivan Vining requested clarification that the observed increase from 2004 to 2005 in mature animals appears to be dominated by increases in the female portion of the population. The majority of legal males are observed east of 166 degrees. The public noted that for comparative purposes it would be useful to have stock status information for Tanner crabs east and west of 166 degrees to more adequately evaluate population trends for each management area.

Gretchen suggested that CPT discuss whether the overfishing definitions should be separated for the eastern and western portion of this stock to coincide with the management of EBS Tanner crab as two stocks. Forrest noted that this would be complicated by the BOF ability to alter the harvest strategy on the entire stock given that the management boundaries are under State jurisdiction.

During discussion on this, the reasons for separate TACs east and west of 166 degrees were reviewed. The separate TACs reflect a discontinuity in the distribution of fishery effort and catch at 166 degrees, not in the distribution of EBS Tanner crab population. Although the distribution of EBS Tanner crab (including females and sublegal-sized males) is continuous, legal sized males tend to be absent or at low densities between 166 and 168 degrees longitude. The fishery has

mainly been prosecuted within Bristol Bay or in the Pribilof Islands area with little effort and catch in between. Also, the nature of the fishery in Bristol Bay and in the Pribilof area have been different; the Tanner crab fishery to the west was prosecuted in conjunction with the snow crab fishery and the Tanner crab fishery in the east was prosecuted in conjunction with the Bristol Bay red king crab fishery. Finally, establishment of separate TACs for the areas east and west of 166 degrees longitude was a precautionary measure to assure that the harvest towards a TAC for the entire Bering Sea District could not be concentrated in either the Bristol Bay or Pribilof Islands areas. The team felt that for the reasons detailed during discussion that a single overfishing definition is still appropriate at this time for the combined Tanner crab stock east and west of 166.

EBS snow crab preliminary survey results show a near doubling in the legal male component of the population from 2005 while all other components of the population declined. Precision of area-swept estimate of abundance of males 4' CW was very poor in 2006 (+/- 76.4% about the point estimate). The poor precision in the 2006 estimated abundance for males 4" CW may be due partially to the high contribution from a single survey station and haul that accounted for approximately 35% of the total area-swept estimate. Additionally, the doubling of the abundance of males 4" CW from 2005 was not expected based on past years surveys. No discernable trends in recruitment are observed from the data. The short-term outlook appears positive but there are concerns regarding the outlook for recruitment in future years. There was a high proportion of newly molted soft shell crabs among the mature-sized and legal-sized males captured in the 2006 survey.

Arni Thomson requested clarification that the increase in "legal" size was in fact in the greater than 4" CW not the true legal size category of 3.1". The source of the increased abundance of the large legal size component (e.g., over 4") between 2005 and 2006 is not obvious from the observed survey results in 2005. However, it is possible that the 2005 survey did not observe the increase in the larger size category. Females were observed with eggs in the northern stations, however these are likely biennial spawners due to cold temperature prevalent in these northern stations. Information remains limited regarding the reproductive success and metabolic requirements of spawning females at colder temperatures.

The mature biomass for EBS snow crab has been oscillating around MSST for several years. It is currently above MSST but remains below Bmsy.

## **Model and Assessment Results**

**Bristol Bay Red King Crab:** Jie Zheng presented a review of the Bristol Bay red king crab assessment. This assessment is appendix B to the 2006 Crab SAFE report. Jie reviewed the differences between the standard survey area-swept estimates and the resurveyed estimates in 2006. Two different scenarios were run on Model A, the stock assessment model (A1 and A2) using different levels of natural mortality for each. Model B is the research model which assumes constant natural mortality and estimates trawl survey selectivities.

Questions from the public requested clarification of figure 11 and the possible indication that there may be less old shell crabs on the grounds this year. Jie indicated that this appears to be so based upon the data.

**Snow Crab:** Jack Turnock reviewed the EBS snow crab assessment, appendix A to the 2006 Crab SAFE report. He noted changes that have been made to the model in response to SSC comments following the June 2006 Council meeting as well as additional recommendations from



the Crab Workshop and CIE review in the Spring of 2006. A summary of these changes is included at the beginning of the stock assessment document.

The team discussed TMB results as shown in figure 55. The team suggests that some confusion in results could be alleviated by labeling changes to graphs, for example "target biomass" should be changed to reflect its actual intent (i.e. the mean biomass as projected by year in the 2000 rebuilding plan). Assessment results appear to indicate that all three control rules converge in 2010 at the same value for total catch

Jack Tagart noted issues prevalent with the choice of survey selectivities used in the model and the change in selectivity as used in different time periods. Choice of survey selectivity values were noted to be problematic and unknown. The fit to female growth rate was noted to have improved in the new model iteration.

Ginny Eckert questioned the role of the plan team in reviewing the model at this stage. Forrest Bowers requested that the discussion of model approval from the May 2006 CPT meeting be reopened in light of the revised model brought forward for CPT review at this point. The team had previously expressed concerns regarding the use of the model for more than biomass estimates (e.g. for biological reference point estimation). Team members commented that the model has been substantially improved per SSC comments, however some comments from the SSC remain to be addressed, for example sensitivity analyses. Siddeek suggested that only the biomass aspect of the model be reviewed at this point for the SSC. Gretchen Harrington felt that the large confidence intervals on the survey abundance estimates this year leads to a decreased confidence in the area-swept estimate in reflecting the best available information. In contrast, the model is more precautionary and seems to smooth out the excess variability observed in the survey biomass estimates. Doug Pengilly reiterated that the model is a vast improvement over previous iterations and shows improved fits to survey estimates from previous years and that the figures showing residuals to fit of size-frequency distributions were very useful additions (although those figures did continue to show some sizes tend to be consistently over or underestimated); the model this year appears to represent a viable alternative to this year's area-swept estimate given the large variability in the observed survey estimate for large legal males.

Recommendations were made by the team members that out dated material from the assessment be updated or removed and revisions made to reflect the updated information in the assessment. Consistency throughout the assessment document is necessary and updates to the model have not yet been consistently carried through in all figures and tables. The literature citations should also be updated.

Jack Tagart noted that key selectivity parameters have shown dramatic changes in order to result in improved fits to the same data. There should be some stability in parameter estimates from one model iteration to the next. Jie Zheng also reiterated that vast improvements have been made in the model, however it appeared that results shown in figure 34 indicate some model revision may be necessary on the projected fraction of old shell to new shell crab. Jie further noted that figure 22 is also problematic in the use of the selectivity curve for catch and shell condition on old shell crabs. He felt that the survey shell condition was a better reflection of the fishery shell condition than the model's estimate. Jack Turnock acknowledged that additional research on shell condition and shell aging would improve the input data to the model which would also improve the model prediction in this. Doug Pengilly commented that there was a substantial change in the shell condition fractions used as model inputs. Differential natural mortality rates for males and females should also be considered.

A spatial model (as recommended by the SSC) would be very informative for this stock. The team recommends that this be brought forward as a research priority.

The CPT agreed that, while the snow crab model still needs work, the model more accurately represents the estimate for 2006 snow crab abundance and biomass compared to the area-swept estimate because of the issues with this year's area-swept estimate described above. The team acknowledged that improvements made to the model have substantially improved the assessment and commends the assessment author on his responsiveness to commentary in improving the assessment. The team recommends the addition of a table to the assessment between tables 2 and 3 which shows the model estimates of the survey biomass as this would aid in understanding the model results in comparison to survey estimates. The team recommended that the method for computing observed area-swept estimates for the model produce the same results as are reported in the annual NMFS Reports to Industry and as are reported in NMFS determination of status relative to overfishing; Jack Turnock noted that that is in the plans for the upcoming year. The team also recommends that a thorough editorial review of the assessment be completed (as noted previously in the minutes) as well to improve table and figure formats and allow for greater readability.

## **Stock Assessment Fishery Evaluation**

**Stock status relative to overfishing:** Stock status in relation to overfishing was previously discussed by Lou Rugolo in conjunction with the 2006 Survey Review. The team commends the author on a detailed review of the survey and a concise and informative overview presentation of stock status. The CPT discussed the need for a report on the performance of the stocks under rebuilding plans relative to their rebuilding plans and agreed to further discuss this at the May 2007 meeting.

**Alaskan Crab Markets/Economic SAFE information:** Josh Greenberg presented an overview of an on-going study on Alaska crab markets. This presentation is a follow-up of a previous presentation given to the Crab Plan Team in September 2005. Conclusions from the study indicate that Alaska is a price taker in world markets for both snow and king crab. Markets appear to be unresponsive to changes in Alaskan landings. Supplies from Russia and Canada are the major market drivers for both crab species.

The team discussed worldwide markets and where crab are exported to from the US. One distinction between US and Canadian product seems to be that meat extraction is occurring in Canada prior to export whereas in Alaska problems with "dirty" crab have limited markets. Canada is dominating the snow crab market yet do not seem to be impacted by the same considerations affecting Alaskan snow crab markets. Russian crab are being imported in the US and provide a better market substitute for Alaskan king crab in US consumption.

Arni Thompson noted that Russian production of king crab has been an on-going concern for the Alaska Crab Coalition. He says they believe that there are large amounts of illegal king crab sold on world markets. Standards in the US are far superior with respect to fisheries management and conservation than those in Russia. This is becoming the subject of multi-national concern. Efforts are being made to increase consumer awareness of Russian fisheries practices, through processes similar to MSC certification which serves to increase consumer education. Members of the public further noted that cooked crab are not subject to the same 'country of origin'

requirements as other products. While boxes must be appropriately labeled according to regulations, retailers may nonetheless advertise these imported products as Alaskan crab as regulations do not apply to retail advertising.

The team commended Josh on his informative presentation and on-going work on Alaskan crab markets. This issue continues to be of interest to the industry and the presentation of this work was much appreciated by both the team and the public at this meeting.

The team discussed timing for completing the SAFE report at this meeting, understanding that the timing of the SAFE report must be completed in time for submission to the SSC on Monday, September 18<sup>th</sup>. The team reviewed assignments and remaining work by section for compiling the report.

The team discussed what information should be included in the Economic Chapter in future SAFE reports. The team made recommendation regarding compiling information on fleet behavior into one chapter of the SAFE report despite the fact that some of this information exists elsewhere but may be more informative to summarize in the context of economic considerations, particularly in light of changes in fishing practices due to rationalization. Some information that could be incorporated into future SAFE reports include: number of participants, spatial and temporal distribution of harvests, number of pots, estimated soak times, changes in participation, number of coops, number of quota holders and number of boats (and the differences between the two), gear changes (qualitative description of fleet behavior changes), fishing effort (expressed in terms of pots lifted, days fished, time spent fishing, lbs harvested per day), home port fleet composition, pricing and price formation, interplay between processors and harvesters, number of binding arbitration cases.

The NMFS annual report (a reporting requirement of the new Crab Rationalization Program) will contain some of this information and will be made available for the December Council meeting. The team felt that this document should be reviewed by the team for available information with a subsequent discussion to be had by the team in May 2007 to lay out a specific listing of the contents for the Economic chapter in the future. The team would like to request an updated report to the team by AFSC scientists (e.g. Ron Felthoven) in May 2007 on data collected under the Crab Rationalization Program.

In April there will be the 18-month review of the Crab Rationalization Program and a subsequent review in 3 years. The team discussed the importance of including information in the SAFE report that may be useful for updating these reports for the Council. Wayne Donaldson suggested reviewing the problem statement and preamble for the Crab EIS as a means to review to what extent these problems are being addressed by the current program.

The team decided for the current SAFE report to include an overview of the market study that Josh presented to the team in lieu of the "Economic Chapter". A detailed Economic chapter will be included in future years following a plan to be laid out at the May 2007 meeting and dependant upon data availability from the Crab Rationalization Program.

### **Crab bycatch/EFH considerations**

Cathy Coon (Council staff) presented an overview of Crab bycatch and EFH considerations for St. Matthew blue king crab and EBS snow crab. This presentation is a follow up of a presentation to the CPT in May 2006 of a discussion paper prepared for the Council's June 2006 meeting. In

June, the Council requested that the CPT consider additional crab protection areas for these two species and to make recommendations to the Council for the October Council meeting. Cathy reviewed the bycatch information by sex and size category of crab for various trawl fisheries.

Lou Rugolo noted that it would be useful to be able to extrapolate the observed bycatch proportional to the total (actual) bycatch by fishery to see to what extent it is representative of the reported extrapolated numbers.

The team discussed the bycatch numbers by species and to what extent the numbers of bycatch represent a conservation concern to the species. Forrest Bowers noted that these two species do not seem to represent a bycatch problem but other species (eg AI red king crab, Tanner crab) might have a larger problem with bycatch. Cathy explained that for the Council's consideration this is a habitat-related concern rather than specifically a bycatch concern.

In evaluating the sampled hauls for the yellowfin sole fishery the majority of the sampled PSC catch in the St. Matthew area did not show a larger concentration of snow crab than for other regions. It was discussed that the concern for snow crab stocks would not likely be concentrated around the St. Matthew area thus any habitat considerations for bycatch should be broadened to examine a larger area. Gretchen Harrington commented that nothing in the analysis presented thus far indicates that additional measures are necessary for crab habitat at this time. Wayne Donaldson noted that despite the potential bycatch concern by the northern extension of the trawl fleet this region is still captured in the COBLZ and thus managed under existing bycatch measures.

The team made several suggestions for evaluation if further study is initiated. Forrest Bowers suggested evaluating the mature females overlaid with bycatch by fishery in the northern region. Doug Pengilly noted that, from the maps that were shown, where the bycatch of blue king crab was occurring did not appear to be from the component of the St. Matthew stock that is believed to be important for mature females and hence does not appear to represent a reproductive concern. Jack Turnock agreed that if the fishery were shifting further north and bycatch of large males increased as a result of the change in fishery location that would be of concern but this does not appear to be the case at this point. Ginny Eckert noted that evaluating information on an annual basis would be more informative to evaluating trends than aggregating several years together in the figures as displayed currently. More information would also be necessary to interpret the population impact of the bycatch.

Siddeek commented that the length frequency tables in the bycatch are very informative for evaluating size distribution of the population in the bycatch. More information spatially and temporally is necessary to evaluate seasonal movement of different sex and size categories. Doug Pengilly commented that the relative percentage of bycatch by size category might indicate that certain size categories are preferentially impacted above the overall intent of the bycatch limit (0.1133% of the total population estimate). Ginny Eckert suggested that any further spatial evaluation should differentiate between warm years and cold years. Further spatial evaluations should also overlay of trawl intensity in a given year with population information. The team discussed that there may be hot spots in need of further protection, but current evidence does not show this at this point.

Gretchen noted that the rebuilding plan for snow crab did consider this but found that the hot spots moved from year to year and thus further protecting them were not feasible.

Doug suggested that for the snow crab stock, further evaluating the data prior to and following the 1999 stock crash would be informative.

The rock sole fishery results might be more informative if the data could be split to better represent the portion of blue king crab for the St. Matthew population. Blue king crab figures would be more informative if they focused upon the time period following the rebuilding plans.

The team discussed that the area around the Pribilofs might be important to evaluate for blue king crab for the P. cod pot fishery which seems to show signs of expanding. Juvenile blue king crabs are very vulnerable to groundfish pot gear given the lack of escape mechanisms on this gear. It also would be useful to determine if Pribilof Islands blue king crab are being caught outside of the trawl closure area presently or in recent years.

The team discussed that other species such as AI red king crab (specifically for Atka mackerel fishery impacts) would benefit from further bycatch considerations as well as Pribilof Islands blue king crab given their patchy distribution and the potential for isolated bycatch incidences to severely impact the stock. EBS Tanner crab may also be of concern given the increase in recent Tanner crab bycatch by the trawl fishery.

Given the presentation of information to the team at this meeting, the team did not see any indications that bycatch of snow crab or St. Matthew blue king crab raised any concerns at this point for additional crab habitat protection measures.

## **Membership Issues and Planning**

Diana Stram updated the team on the membership subcommittee's (Pengilly, Eckert and Stram) work since the May CPT meeting in soliciting additional members to enhance the expertise on the plan team. The team feels that it is important to add expertise equally in terms of crab biology and stock assessment modeling. In that respect the group devised a list of names of biologists and stock assessment scientists to potentially contact.

In additional to the biologists suggested on the list, team members suggested adding Lobo Orensantz. The team understands that his participation might be complicated by living in Argentina, however, and discussed the utility of reduced participation and/or an advisory role. After discussion, the team felt that any additional members to the team should be able to be able to fully participate (i.e. two meetings per year) in order to be beneficial.

It was further suggested to look to northeast stock assessment scientists particularly invertebrate stock assessment scientists. Lou Rugolo recommended pursuing expertise from the northeast center. Suggested personnel to contact included Larry Jacobson, Joe Idoine (lobster stock assessment), Paul Rago, Wendy Gabriel, Bill Overholtz, and Mike Fogarty. It would seem given the limited number of shellfish stock assessment scientists that if the team is able to solicit expertise on the team from outside of the North Pacific region this would be useful. Scientists from the Pacific Island Center population dynamics group (Gerard DiNardo) were also put forward as suggestions.

The team agreed upon the following next steps for the membership solicitation: Diana Stram will find out if it is possible to solicit plan team membership from outside of the North Pacific region. If this is possible for membership, then contact will be made with personnel at the Northeast and

Pacific Islands Centers as well as with Lobo Orensantz to solicit interest in team membership. Full participation on an annual basis is an important consideration in soliciting new members.

The team discussed the possibility of having all Crab Plan Team meetings convene at the Alaska Fisheries Science Center in Seattle. The team did not feel that meeting in Juneau was convenient. The team felt that meetings should alternate between Anchorage and Seattle. The team decided to further discuss this with the interested public at the May CPT meeting (to be held in Seattle) in order to ascertain what is the best meeting location for both the public as well as the plan team.

The team discussed the timing of the meeting on the 8<sup>th</sup> of November and the amount of time and material necessary for this meeting to be effective, as well as the timing for an initial review of the EA for December. Gretchen Harrington and Diana Stram will work on producing a rough draft of the impact analysis and other pertinent sections of the draft EA for the November CPT meeting. The team discussed the nature of this forthcoming meeting and the amount of time necessary to review and comment on the workgroup's analysis. The team felt that if the agenda was streamlined and materials distributed in a timely manner in advance as planned, that one day would be sufficient. The workgroup report will be distributed to the team on November 1. It will be necessary for team members to be fully prepared in advance of the meeting due to the condensed timing of the meeting and the need for this meeting to be productive.

The team established tentative timing for the May CPT meeting to be held at the AFSC for the 22<sup>nd</sup>-24<sup>th</sup> of May 2007.

The team further discussed the timing of the September meeting for 2007 and the continual difficulties with the timing of the survey, TAC-setting and the SAFE report for the October Council meeting. The team tentatively set aside the week of September 10<sup>th</sup> for the Fall 2007 CPT meeting. However, the team may choose to change the overall timing of the SAFE report production (i.e. to the May CPT meeting) and the Crab Management report to the Council (June) depending upon action take by the Council under the overfishing definitions amendment which may change the timing of the process by which status determination criteria are established. The team will revisit this discussion at a future meeting and may change the timing of the Fall meeting accordingly. No location was established at this time for the September 2007 meeting.

Ginny Eckert request that all materials to be distributed to the CPT for consideration at a plan team meeting, to the extent possible, be made available no later than one week before the CPT meeting. Web postings are noted to be an efficient manner of making the information available to all CPT members on a streamlined basis. To the extent possible materials will be posted on the Council's plan team (or other) website prior to the plan team meeting.

The meeting adjourned at 12:20pm with some members remaining in a work session to continue work on the 2006 SAFE report.

# NPFMC CRAB PLAN TEAM

## AGENDA

### September 13th-15th, 2006

#### Captain Cook Hotel, Anchorage

#### Wednesday Sept 13<sup>th</sup>

09:00 *Introduction*

- Review and approve agenda

09:30 *Overfishing definitions*

- Approve minutes from May meeting
- Review progress made at July 24 workgroup meeting (*Workgroup rep*)
- Discussion of appropriate bycatch handling mortality rates (pot fishery)
- Adopt workgroup conclusions and Proposed problem statement and suite of alternatives for Council consideration

10:45 *Break*

11:00 *Overfishing definitions*

- Continue as needed

12:00 *Lunch*

13:00 *Overfishing definitions*

- Continue as needed

15:00 *Break*

15:15 *Review 2006 surveys*

- Review NMFS survey (*Lou Rugolo*)
- Review ADF&G survey activities (*Doug Pengilly*)

#### Thursday Sept 14<sup>th</sup>

9:00 *Model and assessment results*

- BB Red King Crab (*Jie Zheng*)
- BS Snow Crab (*Jack Turnock*)

10:30 *Break*

10:45 *Model and assessment results*

- Continue as needed

12:00 *Lunch*

13:00 *Stock Assessment Fishery Evaluation report*

- Review status of stocks relative to overfishing and current harvest strategies (*Lou Rugolo*)
- State annual management report (*Forrest Bowers*)
- Economic section of SAFE (*Josh Greenberg*)
- Review and revise Executive Summary and compile SAFE (*Forrest Bowers, Diana Stram, Ginny Eckert*)
- Fishery performance/harvest relative to GHIL and TAC (*Doug Pengilly, Forrest Bowers*)

#### Friday Sept 15<sup>th</sup>

09:00 *SAFE report*

- Continue as needed

10:30 *Break*

10:45 *Safe report*

- Finalize

12:00 *Lunch*

13:00 *Crab bycatch/EFH considerations*

- Council staff presentation (*Cathy Coon*)
- CPT recommendations

15:00 *Break*

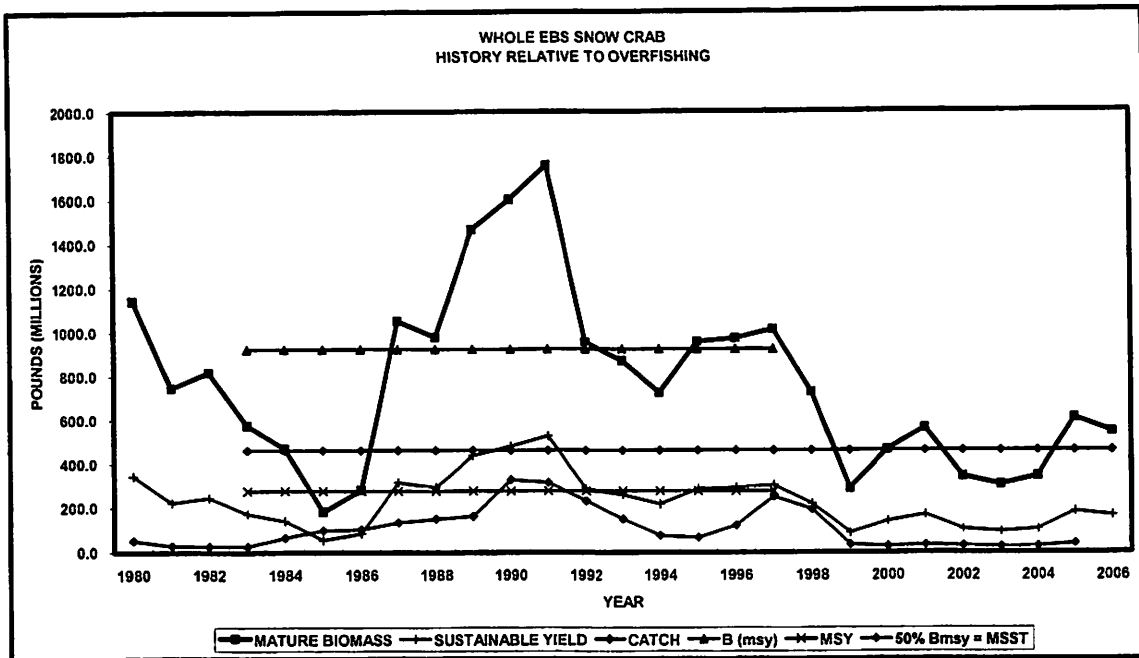
15:15 *Issues and Timing for May 2007 meetings*

- Membership, timing, issues, etc.

16:30 *Adjourn*

Errata to Crab SAFE report: page 2-4 bottom figure:  
"Whole EBS Snow Crab History Relative to Overfishing"

AGENDA D-3(b)(2)  
OCTOBER 2006





## **Problem Statement**

The Crab Plan Team recommends the following draft problem statement for use in framing the analysis of revising the current status determination criteria for crab stocks:

*New overfishing definitions are necessary to reflect current scientific information and accomplish the following:*

- *Provide an FMP framework for definition values to facilitate use of the best available scientific information as it evolves.*
- *Provide a new tier system that accommodates varying levels of uncertainty of information and takes advantage of alternative biological reference points.*
- *Define the status determination criteria and their application to the appropriate component of the population.*

The following represent the draft suite of 3 alternatives under consideration:

### **Alternative 1: status quo**

Alternative 1 utilizes the status determination criteria established in Amendment 7 to the FMP. Amendment 7 provided fixed values for the minimum stock size threshold (MSST), maximum sustainable yield (MSY), optimum yield (OY), and MSY control rule for the BSAI king and Tanner crab stocks. Under the existing system, NMFS annually determines the whether a crab stock is overfished or approaching an overfished status by comparing the survey abundance estimate to the MSST for each surveyed stock. NMFS determines the harvest rate that would constitute overfishing for the upcoming season by applying the MSY control rule to the survey abundance. If NMFS determined that a stock is overfished or if overfishing is occurring, NMFS notifies the Council and the Council has one year in which to develop a rebuilding plan.

### **Alternative 2: new tier system and Council annually adopts OFLs**

Alternative 2 would amend the FMP to include the new tier system in Table 1 and a framework for assigning each crab stock into a tier and for setting the overfishing levels (OFLs). The amendment specifies the process by which stocks are assigned to tier levels and OFLs are established, as well as the timing of the annual review process by the Crab Plan Team, SSC, and Council. The OFL setting and review process will be as follows. Annually, each stock will be assigned a tier based on availability of information. Tier levels (and resulting OFLs) would be suggested by the stock assessment author, presented to the Crab Plan Team for comments and suggestions as to stock status, and then reviewed by the SSC. In June, the Council would then adopt the final tier levels and OFLs for each stock. OFLs would be determined based upon model estimates prior to the summer survey because the Council would adopt the OFLs before the survey.

The annual NMFS trawl survey data will be used in the models to estimate the stock abundance in the late summer. Status of stocks will be derived from comparing the recent abundance estimates to the adopted OFLs. The State will set TACs based on the recent abundance estimates, constrained by the adopted OFLs.

### ***Alternative 3: new tier system and Council annually review OFLs***

Alternative 3 would amend the FMP to include the tier system in Table 1 and framework for assigning each crab stock into a tier and for setting the OFLs. The amendment specifies the process by which stocks are assigned to tier levels and OFLs are established, as well as the timing of the annual review process by the Crab Plan Team, SSC, and Council. The OFL setting and review process will be as follows. Annually, each stock will be assigned a tier based on availability of information. In the spring, stocks assessment authors would present tier levels and models to the Crab Plan Team for review. Final determination of model parameters and tier levels would be established by the SSC and reviewed by the Council at the June meeting. OFLs would be calculated after the survey results are available in late August. Model parameters would not be changed in the interim. Following the incorporation of survey results, assessment authors would calculate the OFLs and NMFS would determine the status of the stocks relative to the OFLs. The State will set TACs based on the recent abundance estimates, constrained by these OFLs. The Council would then review the status of the stocks, the OFLs and the TACs in October.

Table 1. Proposed tier system for crab overfishing definitions.

Information available	Tier	Stock status	$F_{OFL}$
$B, B_{msy}, F_{msy}$ , and pdf of $F_{msy}$	1a	$\frac{B}{B_{msy}} > 1$	$F_{OFL} = \mu_A$ = arithmetic mean of the pdf
	1b	$\beta < \frac{B}{B_{msy}} \leq 1$	$F_{OFL} = \mu_A \frac{B/B_{msy}^{-\alpha}}{1-\alpha}$
	1c	$\frac{B}{B_{msy}} \leq \beta$	$F_{OFL} = 0$
$B, B_{msy}, F_{msy}$ ,	2a	$\frac{B}{B_{msy}} > 1$	$F_{OFL} = F_{msy}$
	2b	$\beta < \frac{B}{B_{msy}} \leq 1$	$F_{OFL} = F_{msy} \frac{B/B_{msy}^{-\alpha}}{1-\alpha}$
	2c	$\frac{B}{B_{msy}} \leq \beta$	$F_{OFL} = 0$
$B, F_{msy}, B_{msy,prox}$	3a	$\frac{B}{B_{msy,prox}} > 1$	$F_{OFL} = F_{msy}$
	3b	$\beta < \frac{B}{B_{msy,prox}} \leq 1$	$F_{OFL} = F_{msy} \frac{B/B_{msy,prox}^{-\alpha}}{1-\alpha}$
	3c	$\frac{B}{B_{msy,prox}} \leq \beta$	$F_{OFL} = 0$
$B, M, B_{msy,prox}$	4a	$\frac{B}{B_{msy,prox}} > 1$	$F_{OFL} = \gamma M$
	4b	$\beta < \frac{B}{B_{msy,prox}} \leq 1$	$F_{OFL} = \gamma M \frac{B/B_{msy,prox}^{-\alpha}}{1-\alpha}$
	4c	$\frac{B}{B_{msy,prox}} \leq \beta$	$F_{OFL} = 0$
Reliable catch history from a time period to be determined (groundfish uses 1978 through 1995).	5		OFL = the average catch from a time period to be determined, unless an alternative value is established by the SSC on the basis of the best available scientific information

## Comparison of Alternatives

Three alternatives are considered in this analysis.

### Alternative 1

The Council adopted Amendment 7 in 1998 and the Secretary approved Amendment 7 on March 3, 1999 (64 FR 11390). Amendment 7 specified that the Crab Plan Team will reevaluate the status determination criteria every five years or when environmental conditions indicate a regime shift. The Crab Plan Team recognized that the status quo overfishing definitions as specified in the FMP were in need of re-examination for the following reasons. First, the definitions have specified and locked-in values for natural mortality (0.2 for king, 0.3 for Tanner and snow crabs), MSY biomass, and MSST. These specified values are problematic as there is no way to change these values without a plan amendment. Second, the current 3-tier system has flaws. It does not have greater precaution as information becomes less certain. The current system does not take advantage of alternative biological reference points that may be useful. Further, using natural mortality ( $M$ ) as a proxy value for  $F_{msy}$  may be inappropriate. Finally, the current overfishing definitions use total mature biomass of males and females while exploitation occurs only on legal males.

#### Timing of status quo process under Alternative 1.

by April	Assessment authors update assessment models.
May	CPT reviews models, assumptions, parameters, fishery data from prior year, etc.
June	SSC review of models, etc.
June-August	NMFS annual trawl survey.
August	Abundance estimates available from models and area-swept method using survey data.
September	NMFS determines status of stocks relative to OFDs. CPT review of survey results, abundance estimates, and status of the stocks-information compiled for SAFE.
October 1	State sets the TAC for the fall fisheries based on the abundance estimates from models or area-swept estimates of survey data. TACs are set using an established harvest strategy.
October	The Council and SSC review the survey results, status of the stocks relative to OFDs, and the TACs (and SAFE report....).

### Alternatives 2 and 3

Alternatives 2 and 3 present a framework for the OFLs to facilitate use of the best available scientific information as information improves. Alternatives 2 and 3 provide the same tier system that accommodates varying levels of uncertainty of information and takes advantage of alternative biological reference points in setting the OFLs. The OFLs established under these alternatives would be specified for the appropriate component of the population.

Alternatives 2 and 3 establish different processes for tier and OFL setting and review. This review process includes the SSC and the Council process for determining appropriate tier levels and resulting OFLs on an annual basis. OFL setting and review process establishes (1) the placement of stocks into tiers; (2) the information utilized in the projection models for OFL determination; (3) the setting of the OFLs; and (4) the determinations of the status of the stocks relative to the OFLs.

#### Alternative 2 tier and OFL setting and review process.

Spring	Assessment authors prepare OFLs, including parameterization and tier assignments, using data from the previous year's survey.
May	Crab Plan Team reviews OFLs and recommends a set of OFLs to the Council.
June	Council and SSC review and adopt OFLs.
June-August	NMFS annual trawl survey.
late August	Assessment authors incorporate survey data into models to produce abundance estimates. NMFS prepares a report of the status of the crab stocks relative to the adopted OFLs.
October 1	State sets TACs for the fall fisheries based on the recent abundance estimates and constrained by the adopted OFLs.
late October	The CPT reviews the status of the stocks report and survey results and compiles the SAFE report.
December	The Council and SSC review the TACs and the status of the stocks relative to the adopted OFLs (and SAFE report...).

Alternative 2 would involve assigning stocks to tiers and setting the OFLs in the spring, prior to the NMFS trawl survey. The SSC and the Council would adopt the annual OFLs in June prior to their application in the fall. The annual NMFS trawl survey data would be incorporated in the models used to estimate the stock abundance. Status of stocks will be derived from comparing the recent abundance estimates to the adopted OFLs. The State will also set TACs based on the recent abundance estimates, constrained by the adopted OFLs.

Alternative 2 would use the previous year's data in OFL determination when the best available (i.e. recent survey year) data are available within months of the OFL determination. This can be particularly problematic for crab stocks because abundance can fluctuate dramatically with no predictability. Therefore, the OFL could either be too constraining if stock abundance increases dramatically or too liberal if stock abundance decreases dramatically. There is also the potential for market impacts to occur by virtue of establishing an OFL (and effectively a ceiling on the possible catch level) in June while actual TAC determination will not occur until October 1. A mechanism for adjusting the OFLs in the fall may be necessary, however, then Council approval

would be of draft OFLs in June. And, since the draft OFLs would be subject to change, they would also have the potential for market impacts.

**Alternative 3 tier and OFL setting and review process.**

Spring	Assessment authors prepare models, including parameterization and tier assignments.
May	CPT reviews models, assumptions, parameters, etc.
June	SSC review of models, determination of tier levels for stocks
June-August	NMFS annual trawl survey.
August	Models would be run using new survey data to produce abundance estimates and OFLs, and NMFS determines the status of the stocks relative to the OFLs.
September	CPT review of OFLs, survey results, status of the stocks, compile SAFE.
October 1	State sets the TAC for the fall fisheries based on the recent survey and OFLs based on same survey.
October	The Council and SSC review the status of the stocks relative to the OFLs and the TACs (and SAFE report....).

Alternative 3 would involve a review of the models and tier system framework, tier levels, and model parameterization in the spring. Model formulation (including parameters and tier levels) would be established in the spring and the OFL determination would simply involve incorporating the new survey data when available. This review would begin with the Crab Plan Team. The plan team would review model parameter choices and resultant tier levels and make recommendations to the SSC regarding the models. Each June, the Council and SSC would subsequently review the choice of parameters by the stock assessment authors and recommend which parameters and tier levels should be utilized in the final OFL calculation simulations.

These simulations however would not be possible prior to obtaining the most recent survey results. The OFLs and abundance estimates used to set the TACs would both be estimated using the same survey data. Therefore, while parameters and tier levels will be established following the June SSC review, OFLs will not be calculated until the survey results are available in late August. Model parameters would not be changed in the interim. Following the incorporation of survey results, assessment authors would calculate the OFLs and NMFS would determine the status of the stocks relative to the OFLs. The CPT would review the survey data, the OFLs, and the status of the stocks at its September meeting when it prepares the SAFE. The State would set the TACs on October 1. The CPT would then report the OFLs and TACs to the Council at the October Council meeting in conjunction with the presentation to the Council on the status of stocks.