


MEMORANDUM

TO: Council, SSC and AP Members  
FROM: Chris Oliver   
Executive Director  
DATE: September 30, 2004  
SUBJECT: Crab Management

ESTIMATED TIME 1 HOUR
--------------------------

**ACTION REQUIRED**

Receive Crab Plan Team Report and approve SAFE report

**BACKGROUND**

The Crab Plan Team met from September 20-22, 2004 to review the status Bering Sea and Aleutian Island crab stocks and to compile the annual Stock Assessment and Fishery Evaluation (SAFE) report. The report was mailed to you on September 27<sup>th</sup>, 2004. Minutes of the Crab Plan Team meeting are attached as Item D-2(1).

The SAFE report summarizes the current biological and economic status of fisheries, 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 the State of Alaska, Department of Fish and Game (ADF&G) and the National Marine Fisheries Service (NMFS). Of the six annually surveyed stocks, four are below their minimum stock size threshold (MSST). These stocks, which are all currently under federally approved rebuilding plans, are Pribilof Islands blue king crab, Saint Matthew blue king crab, EBS Tanner crab, and EBS snow crab. Of the two remaining surveyed stocks, biomass of Bristol Bay red king crab is well above the approved harvest threshold and thus is open for a directed fishery. Although at apparently high abundance levels, the Pribilof Islands red king crab remains closed due to imprecision of estimates and concerns about potential bycatch of blue king crab. For the remaining crab stocks with no annual survey, only the Aleutian Islands red king crab (Petrel Bank), and Aleutian Islands golden king crab were open to a directed fishery in 2003/04.

Dr. Bob Otto, the chairman of the Crab Plan Team, will be available to present the status of stocks.

## Draft BSAI King and Tanner Crab Plan Team minutes September 20-22, 2004 Juneau, AK

The Crab Plan Team convened their meeting at 10:30am on Monday September, 2004 in the Sustainable Fisheries Conference Room of NMFS, Federal Building, in Juneau Alaska.

Crab Plan Team members present:

Gretchen Harrington (NMFS AKR), Wayne Donaldson(ADF&G Kodiak), Shareef Siddeek(ADF&G Juneau), Bob Otto (NMFS AFSC Kodiak), Lou Rugolo (NMFS AFSC Kodiak), Jack Turnock (NMFS AFSC Seattle), Doug Pengilly (ADF&G Kodiak), Josh Greenberg (UAF), Forrest Bowers(ADF&G Dutch Harbor), Diana Stram (NPFMC)

Members absent:

Tom Shirley (UAF), Herman Savikko (ADF&G Juneau)

Additional public and agency personnel: Doug Woodby, Arni Thompson, Ken Tippet, Brent Pristas, Rob Rogers, Steve Minor

Public and agency personnel participating via teleconference(various times throughout meeting): Jack Tagart, Garry Loncon, Kevin Kaldestaad, Frank Kelty, Phil Hanson, Edward Polsen, Gary Stauffer, Doug Wells

### Introduction

The following agenda was agreed upon to start the meeting:

#### Monday September 20:

Introduction:

- Review agenda
- Election of officers & any additional membership issues
- Summary assignments for CPT minutes sections

Stock Assessment Fishery Evaluation Report:

- Review status of stocks, annual management reports
- Review results of snow crab stock assessment
- Review State GHs
- Compile SAFE report
- Discussion of contents of future SAFE reports

#### Tuesday September 21:

Continue SAFE Report issues

Progress report on revising crab overfishing definitions

- Review progress and provide guidance to work group

#### Wednesday September 22:

Summer research issues (carried over from May 2004 discussion):

- Trawl performance issues update
- Industry-funded augmented summer research: discuss long-range research priorities

Update on Crab Rationalization: schedule and additional issues pertinent to CPT

Review issues and timing for May 2005 CPT meeting

New business

In addition to the approved agenda, the following items were added to the pertinent sections of the agenda:

- 1- Discussion of apportionment of opilio GHL by area (SAFE review of stock assessment section)
- 2- Annual review of terms of reference
- 3- Discussion of utility and feasibility of teleconferencing

The Team then discussed rules for public input and decided that in the future the agenda will contain placeholders for when public comments will be solicited pertinent to each agenda item.

### **Election of Officers**

The plan team unanimously moved to revise their terms of reference such that the officers include both a chair and a vice chair and the time period for terms of office is 2 years. The revised Terms of Reference are attached. The Plan Team further moved unanimously to elect chair and vice-chair on a 2 yr basis whereby the vice chair will succeed the chair and the following election would be for the vice chair position. Noting that the team membership is drawn primarily from three groups (ADF&G, NMFS and academic institutions), the Plan Team also specifically recommended that “it is desirable that the chair and vice chair should not be from the same group”.

The Plan Team elected Bob Otto as the Chair and Forrest Bowers as the Vice Chair.

The Plan Team gratefully acknowledges the time and effort provided by Gretchen Harrington and Doug Pengilly as Plan Team co-chairs during the last six years.

The plan team discussed the review and approval process for official plan team minutes. It was decided that in as much as is possible, the minutes will be reviewed during the course of the meeting for appropriate content. The completed draft minutes will be reviewed by all plan team members in the time period following the meeting and prior to inclusion in the Council notebooks. The minutes will remain in draft format until they are officially approved by the plan team at the following plan team meeting. Once meeting minutes have been finalized they will be posted on the Council website.

### **Additional membership issues**

The team again discussed the timing of the Fall meeting, both with respect to scheduling difficulties of some team members as well as the timing of GHL/TAC announcements in future years. When Crab Rationalization is implemented, ADF&G plans to announce TACs for Bering Sea king and Tanner crab on October 1 to allow for increased time for review of survey data and status of stocks information and to accommodate issuance of IFQs by 15 October. It is the team’s understanding that scheduling a CPT meeting in late September would alleviate some of the members’ scheduling concerns while also allowing for the ability to conduct a review of the status of stocks prior to the announcement of TACs October 1 (for all but golden king crab which must by necessity be announced by August 1 for the season to open August 15).

## Status of Stocks

The format for the review of the status of stocks was determined to be the following, going through each managed stock and taking public comment following each specific stock:

- 1- Survey results in standard survey area
- 2- Model results (as applicable)
- 3- Fishery overview (as applicable)
- 4- Review of GHLS

Bob Otto presented results of the 2004 Bering Sea survey and the status of stocks relative to overfishing definitions, Forrest Bowers provided an overview of last year's fisheries, Doug Pengilly explained derivation of the 2004/2005 season GHLS for the surveyed stocks in the Bering Sea. These presentations are incorporated in the 2004 SAFE. There were also extended discussions on the snow crab stock assessment modeling work, the distribution of catch recent snow crab fisheries relative to the distribution of the stock and related conservation concerns, and the Bristol Bay red king crab stock assessment model.

### Snow Crab:

#### 1-Survey Results:

Bob Otto discussed the results of the current survey. He noted that this year's results were very similar to last year and in fact showed little to no change in recent years. Some favorable recruitment appeared in the data but appeared to have limited impact on standing biomass.

As for the current distribution of the stock, the harvestable portion was grouped to the north and west in the survey area, with some higher portions of stock concentrated between the Pribilofs and St. Matthew as compared to last year. The fishery was also concentrated in this area, leading to some concern with respect to the potential for localized depletion concerns.

Some graphs presented from survey results showed the clutch size categories in mature females caught in the survey and indicated a possible increase in the percentage of mature females from last year to this year.

#### 2- Snow crab stock assessment model:

##### *Overview of snow crab stock assessment modeling work:*

Jack Turnock presented the current results and status of the EBS snow crab stock assessment model included as an appendix to the 2004 SAFE report. Results indicated a similar male abundance to last year, and a continued decline from early 90s. The model estimated recruitment appeared similar to last year's recruitment estimates. In the past 11 years, recruitments have been low compared to past recruitment. There is no expectation of abundance increase in the near future based on model results.

The Plan Team discussed the difference between the survey results indicating a possible increase in small immature crab and the modeling results which did not indicate this. It was explained

that under the model formulation recruitment of small immature crab would be estimated if observed more than the terminal year, due to uncertainty in the survey estimates of small crab.

There was considerable discussion of Figure 48 in the stock assessment model report showing the trend in the 5 year lag in recruitment as compared to abundance of females with eggs and that the two stopped trending together around 1988. Questions were posed as to hypotheses for this change and that it was an important figure for raising questions for future study. Other comments from team members included a discussion of the trends in recruitment which were higher in the 70s than in the 80-90s, then recruitment dropped off noticeably in the 90s. The area of opilio grounds is now thought to be rock sole grounds. Other complicating factors include the increase in the late 1980s of Pacific cod and halibut populations which could have an impact as predators upon juvenile snow crab. It was also noted that temperature trends are an important consideration for correlation with snow crab reproduction and distribution trends.

*Specific suggestions by CPT members on model formulation and the assessment:*

- Label points by year in Figure 38 to look at patterns of recruitment by year
- Discussion of how to split recruitment to new regime and fit to that? How to split, by what time frame? Could lead to very different spawner recruit curves.
- Need to know the correlation matrix of estimated parameters

*Additional questions from members of the public included:*

- Why does selectivity vary so much in the groundfish trawl fishery when it does not vary by male, female or in the model?

It was discussed in response to this that the selectivity should be less for the survey due to footrope issues.

- Other variables to consider are what is fishable stock not just what is targeted (due to market considerations).
- Questions were raised by the public regarding the assumption of the discard mortality rate as there seems to be no effect on expected yield (this was the observation by the public, the author noted the model results show higher 2005 GH<sub>L</sub>, and lower B<sub>MSY</sub> and MSY) but the choice of discard mortality rate has impacts on the perception of population dynamics. Need to know what the consequences of that assumption are. The CPT chairman suggested this discussion could be continued with the stock assessment author at a later date.

*Spatial distribution of snow crab population and fishery:*

The Plan Team had an extended discussion regarding the spatial distribution of the snow crab stock. A discussion of population percentages and catch north and south of 58.5 degrees indicated that 26% of the legal male survey abundance in summer in 2003 was located south of this latitude while 66% of the catch in winter came from here. In 2004, 78% of the catch came from the southern region (south of 58.5 degrees) inhabited by 24% of the legal male abundance based on the survey. Since the GH<sub>L</sub> is calculated based on the mature male biomass measured throughout the geographic range of the stock and not on the legal male abundance exploited by the fishery, discussion focused on the idea that the exploitation rate on crabs in the southern portion of the range may be exceeding the target harvest rate. It was noted that the catch has become more concentrated in fewer statistical areas; in 2004, 40% of the harvest came from a single statistical area. Additionally, data were provided showing that incidence of empty clutches and poor clutch fullness was higher among mature females south of 58.5 degrees than

north of 58.5 degrees in the 2003, and especially 2004 surveys. It was also noted that if differential exploitation in the southern range of the stock results in the reproductive stock being concentrated in colder, more northern waters where females exhibit a biennial reproductive cycle, this could further contribute to low recruitment to the stock. It was noted that any discussion of harvest location by year should also necessarily consider the degree of ice cover in each year.

Some members of the team expressed that the trend in catch and population concentration should lead to either a split in the GHL north and south, or that some methodology should be employed in order to ensure that the target harvest rate for the population which is being primarily exploited (in the south) is not exceeded. There was discussion of the potential for migration over time north and south over the species life span, and between the timing of the summer survey and the start of the fishery.

After much discussion, the CPT passed the following motion (9-1):

The CPT recognizes that the target harvest rate for opilio crab is being exceeded in certain portions of the range of the stock as discussed in Turnock's "Stock Assessment of eastern Bering Sea Snow Crab" September 2004, pgs 14-15 and 22. Based on this information and additional discussion by the CPT, the CPT recommends that an immediate analysis of the issues surrounding the differential harvest rates be developed to address the conservation issues and to also develop appropriate alternatives to protect the viability and reproductive strength of this stock. This analysis should be directed towards ensuring that the distribution of fishing effort be managed to ensure the equalization of exploitation rates over the range of the exploitable stock.

3-Fishery Report: The Bering Sea snow crab fishery opened on January 15. Catch rates for the last 2 years were high relative to earlier in the decade. The fishery was short in duration, with the location shifted to north and west and the harvest concentrated. No catch essentially occurred east of the Pribilofs.

4-GHLs: There was a problem with the tracking of the distance fished calculation and therefore was be readjusted per % error.

### Bristol Bay Red King Crab:

#### 1- 2004 Survey results:

Abundance of mature females remains high. The biomass relative to overfishing definitions is well above the MSST. Overall seems to be a general trend of improvement

#### 2-Bristol Bay Red king crab LBA stock assessment model:

In comparison to the survey, model estimates of females is slightly higher, while males are slightly lower (Figure 10)

There was a discussion on the effects of "hot spot" tows on the model results and the ability of the model to adequately account for the uncertainty in population estimation that they can cause. (Hot spots are tows with high catches; under survey protocols four additional tows are performed in the station if the initial tow meets the hot spot criteria). Last year one station accounted for about 24% of the area-swept estimate of total legal males. In 2004 2 stations accounted for 39%

of the area-swept estimate of total legal males. One station (H09) contained a hot spot tow in both 2003 and 2004. It was noted that the LBA estimates for mature-sized and legal males were lower than the area-swept estimates in 2003 and 2004.

Discussion of model scenarios by plan team members focused on estimation of natural mortality within the model, allowing natural mortality to vary over time to achieve a better fit with survey trends, and the lack of separation of discard mortality from natural mortality. Therefore natural mortality being estimated in the model actually includes bycatch and discard mortalities and sampling variability, and includes all losses to the stock not attributed to removals by the directed fishery. Thus  $M$  was noted to be a catch-all variable in the model. It was also noted by one member that  $M$  in the model is not representative of what is meant by the instantaneous rate of natural mortality. Some members commented that there is an inherent inconsistency between the population dynamics model that generates the spawner-recruit curve and the harvest strategy model used to estimate the GHL, due to natural mortality representing fishing mortality as well as natural mortality. Some members commented that the estimates of natural mortality are also inconsistent with life history parameters.

Suggestions included identifying  $M$  as a specific catch-all variable when varying from a constant thus the catch-all variable would become some form of transfer function. One CPT member noted that non-directed mortalities are customarily expressed in terms of  $F$ , such as  $F'$  which account for all losses to the stock not attributed to directed  $F$  or  $M$ . The choice to express these losses as  $F'$  or some function is immaterial since it's the total annual losses to the stock [ $Z$ ] which determines threshold and target reference points for management. Instantaneous total annual mortality  $Z$  would represent  $M$  + directed  $F$  (full selection) + all total non-directed / background losses as  $F'$  or some function.

The modeler's response to these model critiques were the following:

- (1) The model was developed in 1993, and at that time, limited bycatch information was available. Alternative models have been developed to separate bycatch mortality and natural mortality in 2003/2004.
- (2) There are limitations of single species model to model population dynamics. Population parameters are somewhat confounded in a model and estimated parameters are affected by the assumption of sampling error structures. Variable natural mortality over time is needed to reduce the systematical errors for Bristol Bay red king crabs. There are hardly any estimated parameters in any fishery model not affected by sampling variation.
- (3) Estimates of recruitment in the model are constrained by the assumption of survey catchability/selectivity and mean carapace length and variation of the recruits, and natural mortality does not play a very important role in estimating recruitment.
- (4) A variety of life history approaches can be used to estimate  $M$ , and different approaches can result very different estimates of  $M$ . To say that "The values of  $M$  used in the population dynamics model are also inconsistent with the basic life-history of the species" is a gross overstatement.

The team noted that it would be a better forum to possibly reconsider some of these issues that are raised on model structure (both snow crab and red king crab) at the inter-agency meeting in December.

Arni Thompson from the public commented that the level of sophistication and detail of modeling has increased in recent years and it is difficult for public to understand and interpret results. He noted that the executive summary of the whole survey is very useful and helpful to industry personnel and that, in general, the industry hopes to have this summary and report continue as it's understandable to and very useful for members of the industry.

3-2003 commercial fishery: The fishery opened Oct 15, and closed in 5 days. 252 vessels, an increase of 10 from the 2002 effort. Catch shifted one statistical area west but remains concentrated in 4 statistical areas. Catch rates increased in the last several years. Poor weather throughout the fishery possibly contributed to the high observed deadloss rates (approximately 7 times higher than the previous year). Catch showed an average weight and carapace length decreasing in recent years concurrent with increased recruitment. No females in the areas where fishery occurring, contrasting with last year's increased bycatch of females

4- GHL: The current exploitation rate on mature males is 15%, however it was noted that when examining the data, if the observed trough in the mature size of legal males persists, the effective spawning biomass estimates from this year could decline and result in lower step harvest strategy from 15% to 12.5% in the future.

#### Pribilof Red King Crab:

There is a continued high uncertainty on this stock status. It has been closed since 1999 and remains closed due to concerns of bycatch of blue king crab as well as poor precision of estimates for red king crab biomass. MSST definitions have been previously questioned as to their appropriateness. There has also been a declining trend in mature size males based on both CSA and area swept estimates.

#### Blue King Crab: Pribilofs and St. Matthew

##### 1-Survey:

Pribilof blue king crab: Biomass was the lowest in the history of the survey. There has been ten years of decline in the effective spawning biomass in survey. Water temperatures were noted to be very warm over several years. In last year's pot survey ADF&G found no blue king crab in the vicinity of the Pribilof islands, all had apparently retreated to colder water. This presents a problem given the dependence of juveniles on the shellhash substrate near the islands. Red king crab fishery in the area remains closed out of concern for blue king crab.

St Matthew blue king crab: Some were caught south and west of St Matthew but were not in high abundance. The spawning biomass calculation remains low and below MSST. Recruitment from size frequency showed no small crabs caught in the survey. The ADF&G survey over the summer showed the worst results for St Matthew blue king crab since 1995.

##### 2-GHL: Both fisheries have been closed since 1998

Pribilof Blue king crab: 0.5 million lbs was this year's estimate of total mature biomass, indicating a very low biomass and is far below MSST. The stock was declared overfished in 2002 and under the state harvest strategy and rebuilding plan requires a TMB of 13.2 mill lbs to open. There are no signs of recruitment and the stock is currently at the lowest historical levels



St Matthew blue king crab: The current TMB is 7.3 million lbs, the stock is not rebuilt and is still below MSST. The stock is above fishery threshold to open but GHL computation below the minimum therefore fishery remains closed. Immature animals outnumbered mature animals in the survey. The decline in mature size remains problematic but hopeful signs of recovery were seen in that at least some immature animals were found (in contrast to the Pribilof stock).

*Questions from the public on blue king crab stocks:*

There is no harvest strategy for Pribilof Red king crab, does this need to be done prior to rationalization in case it could someday open?

It was explained that while a harvest strategy does exist for Pribilof blue king crab, none exists for Pribilof red king crab due to concerns on the precision of population estimates. Any developed harvest strategy would need to consider the impacts on Pribilof blue king crab. However, a harvest strategy is not required to open the fishery provided the state can establish and justify a GHL for the stock.

Tanner crab:

1-Survey:

The stock remains widespread across the Bering Sea. It was noted that occasionally there is discussion regarding changing the size limits in the fishery. The spawning biomass remains just around MSST. Little sign of change this year in the stock. The number of legal size animals decreased slightly, as well as large females. Mature stock looks similar to last year.

2-GHL: TMB is just below the MSST, and the stock is below the harvest strategy threshold to open. This stock has been closed since 1997. It was noted that the modes of females seen in previous surveys did not show up in the survey this year. This raises some questions as these size modes did not seem molt to maturity. Commentary followed that possibly excessive bycatch of females in the pot fishery could explain this observed lack of females. It was noted that the decline of king and Tanner crab in the fully-protected region surrounding the Pribilofs is alarming.

*Other Items discussed during status of stocks review:*

Wayne Donaldson informed the Plan Team of the proposal for revising the area split for the Tanner crab GHL to be along the 166 longitude line. This represents a better historic boundary as the eastern Tanner crab TAC could be harvested along with BBRKC while western could be harvested with snow crab. He noted that this specific issue will come up to Council at their October meeting and would then go to BOF to change the harvest strategy.

The Team discussed the rationale for the change in the boundary and noted that careful consideration should be given to background information for the change in boundaries. It was explained that the boundary was initially drawn at 168 due to concurrence with BBRKC, but that recent fishery performance and evidence shows that a better alignment with the snow crab fishery would be at 166. While the purpose of the original split in GHL was biologically based, the movement of the line from 168 to 166 would be for management reasons and would have no biological implications for the stock.

Discussion ensued regarding why the split in GHL itself requires Council action. It was noted that this has to do with allocative issues involved in somehow instituting a race for fish amongst the two area splits.

Public comment from Steve Minor and Arni Thompson further elucidated that there are going to be requirements for portions of the TACs to be landed in specific ports and that the current Council motion does not recognize the boundary, nor give consideration to incidental harvest. Furthermore they noted that the industry has had numerous discussions with the BOF, Crab Rationalization Task Force and the department, and that the department worked with industry to draft the appropriate line. Ed Polson raised the question as to whether or not there was a differential size at maturity by region and should there be a different size limit potential between regions?

The CPT unanimously approved a motion to endorse the movement of the line as suggested by ADF&G staff and noted that this issue has undergone extensive review by the BOF, the Crab Rationalization Task Force, and the industry and that this proposal would improve the ability to manage concurrent fisheries.

#### Aleutian Islands Golden king crab:

Siddeek provided the team with an update on progress in developing a Golden king crab model for the eastern portion of the AI. The model is currently CLA for GKC in eastern portion of AI (Dutch area) using observer data and catch and effort area from 1996-2001. The model would be improved by the use of additional observer data and he would like to include additional years in the data set to encompass at least 10 years. The model will also include the pot survey data. The model should be ready to present in a draft format to the CPT by September of 2005 at the regularly scheduled Fall plan team meeting.

Fishery update: The catch rates for legal males significantly increased this year, which was surprising based on recent data on legal males. Thus the fishery appeared to show a healthier stock than data would have indicated. The legal male portion of the stock appears healthy based on fishery data.

The fishery for the Western AI stock is currently in progress and will likely close after the first of the year.

#### **Progress Report on Review of Crab Overfishing Definitions**

Lou Rugolo, Jack Turnock and Shareef Siddeek presented the written Progress Report to the team on their on-going work with revising the overfishing definitions for BSAI crab stocks.

Members of the CPT questioned how the limit reference point system would be incorporated and it was explained that this was intended by the workgroup to provide additional guidance in evaluating the status of stocks and to guide decisions on the stock that year. Questions were posed regarding what are the consequences of being in a certain level? Are these just warning signs or is adjustment to the GHL intended? If so, how will be incorporated? The Work Group members explained that the Limit Reference Point system would "score" stocks based on

quantitative or semi-quantitative criteria, and then a determination of the status of stocks is produced. It was noted that there exists already language in the State harvest strategy which, given the ability to examine the reliability of estimates, data etc, the State is allowed to make alternate decisions under the State's existing authority. Thus while the limit reference point system has no regulatory implementation, it would be a means to advise the Council, the Crab Plan Team, and the State on stock status. However, a member of the public questioned how it would be possible to define thresholds while avoiding arbitrary and capricious decisions in establishing them?

Work Group members explained that limit reference points represent meaningful indicators of stock and fishery health which are routinely used in status of stock determinations of exploited fishery resources. The public member's choice of the terms arbitrary and capricious was rejected by some members of the CPT. Rather, the choice of metrics of stock and fishery health, their numerical or categorical values, and assessment will rely on informed biological judgment and best information available as required under the National Standards.

*Questions on the Tier system included the following:*

What is the measure of B supposed to be in Tiers? This was not yet determined for these Tiers, should it be effective spawning biomass, or total spawning biomass because of the need to include males in the measure of biomass given that it is the exploitable population in the fishery?

The question was raised of what to do with stocks where we have no information at all? All current Tier 1 stocks move to Tier 6, however, this still raises the fundamental issue of often discontinuous time series of catch history for some of these stocks, thus what to do then? For Tier 6, further analysis will also be necessary to determine if 0.75 is an appropriate reduction value for crab stocks.

An overview of the proposed alternatives for the EA was presented to the Team. It was noted that a full description of the alternatives would be included in the revised report following the meeting. There was no additional discussion of the alternatives by the Team.

There was a discussion of the SSC comments on the Tier system at the June 2004 Council meeting following the presentation of the Work Plan. The SSC comments noted that they are generally pleased with the proposed Tier system and liked that it was modeled after the groundfish system. There were other specific comments on the modeling that are noted in progress report to the CPT.

The importance of tracking the on-going revisions to the National Standard Guidelines in defining these terms and values was reiterated. It was noted that again there are different considerations in groundfish than for crab, as mobility and mixing are notably different, and some portions of crab stocks may never be exploitable and are non-fishable, thus should these be outside of the assessment of the exploitable stock and/or how should these be dealt with within the Tier system? The current FMP describes the unit stock for each species subject to the Plan. No change in the current unit stock definitions will be proposed by the Working Group.

AYK region needs to be involved in this meeting as well, as some of these stocks are outside of the westward region and that region should be apprised of what is happening with respect to changing definitions.

*Other comments on workgroup progress report:*

Question on setting selectivity values: how to set selectivity and then associated mortality? E.g size based. One methodology would be to set the selectivity as estimated in model based on total catch plus discard as with the snow crab model.

Should the same handling mortality be utilized for males and females? What if females were allowed to be harvested? I.e. is the analysis only looking at bycatch and handling mortality to males? Handling mortality (in relation to fishing mortality) on females was presently explained to be incorporated into the per recruit analysis, as well as with bycatch mortality. The present formulation of the analysis attempts to capture realities of the fishery. It was noted to be problematic in the crab fishery when  $F$  pertains to males only, therefore the analysis is constrained by necessity of specific  $F$  rates on size limits of males, however some consideration must be given to consider handling mortality on females as well, as is being done in the working group models. Currently, there is consideration given in analysis to  $F$  rates from other fisheries as well.

Ideas were discussed as to how best to include effort in other fisheries and the impact on bycatch of species in formulation? Ideas included a variable  $F$  based on patterns of effort, to possibly look at both linear and non-linear models for impact on handling mortality, i.e. if  $F$  increases, handling mortality also increases, but it is not a linear function, thus handling mortality would increase in a non-linear relationship to  $F$ . The current model formulation links the fishing mortality rate for bycatch in the pot fishery to the  $F$  on legal males, however, the fraction of bycatch that dies due to handling is constant. The Working Group will consider such relationships in its analysis where data exist, and it asked the CPT to provide data or information that could support construction of such bycatch relationships.

CPT members commented on the stock-recruitment relationship, and encourage the analysis to evaluate forms of S-R relationships used in groundfish as well as to consider the issue of depensation. There was additional discussion of finding a means to describe the parameter beta, suggestions included looking at empirical data and conducting a meta analysis. The Working Group explained that it will consider a variety of stock-recruitment relationships in its work, but that the base configuration will be of the Beverton-Holt form with depensation. Depensatory responses of Alaskan crab stocks were discussed. The GOA red king crab and Tanner crab stocks, as well as the BS Tanner crab stock have collapsed and failed to recover despite fishery closures for significant time periods of the species' life spans. The WG noted that no empirical evidence exists that would support the finding of compensatory stock responses at low stock biomass. It noted that modeling crab stock-recruitment with the expectation of an increased reproductive rate (i.e., recruits/spawner) as parent stock size declines toward zero is an extremely risk prone assumption. The WG discussed that the precautionary principle of management underlying the National Standards and their Guidelines which requires fishery and conservation measures to be explicitly risk averse.

Questions from the public included a discussion of how to model exploitable biomass as a moving target in determining reference points. It was explained that since Bering Sea crab are

managed under a set size at entry (unlike finfish) exploitable stock abundance is not a moving target. Handling mortality on sub-legal or non-target crabs is not a component of the estimated exploitable stock abundance. There was a question as to what degree rationalization affects the fishery reference points? Bycatch should theoretically decrease but high-grading could increase. Thus there is a need to look at changes in selectivity based on changes in abundance as well as market concerns.

The Crab Plan Team commends the careful and thoughtful progress to date by the workgroup and anticipates an internal review of the work product in the spring of 2005. The team discussed the timeline for an internal review of the EA by the Crab Plan Team members. The work is still being tentatively targeted for initial review by the Council at the June 2005 meeting. Given that timing, the team discussed a possible work session review of the EA by the team sometime in late March with a final determination to be made at that time as to whether or not the EA will be ready for initial review by the Council in June or if timing is such that initial review would need to be shifted to the October 2005 Council meeting.

## **Summer Research Issues**

### Trawl performance issues update

Bob Otto updated the team on progress in addressing issues with respect to trawl performance and the related impact on crab as was initially discussed at the May 2004 CPT meeting regarding an internal draft circulating of a paper by P. Von Szalay and D. Sommerton. Their initial work included no analysis of crab data. Work over the summer examined the data on catch rates for snow crab, and a determination was made that this particular issue does not have that impact on catch rates for snow crab. There is thought to be no loss in catchability of the net with depth. Clarification was made that this analysis only looked at legal male crab, thus no juveniles or females. There were additional conceptual problems with the approach utilized by the authors as well as the conclusions of their analysis which questions their findings even for the fish species examined. It was also noted that Von Szalay and Sommerton's work was a data mining activity, and not the results of an experiment whose design could be evaluated and results tested. Gary Stauffer clarified that a second draft of the paper is currently out in internal review and that this draft includes the aforementioned analysis as it relates to snow crab.

### Industry-funded augmented summer research: discuss long-range research priorities

Gary Stauffer updated the team on the on-going initiative between the Agency and the industry – funded research foundation whereby an Agency and Industry MOU was drawn up for 2004. In the summer of 2004, the Sea Wolf was chartered for 21 days and carried out 5 successful projects as planned. The agency and the Foundation are now looking at co-sponsoring a workshop this fall (data tba) to put together research plan for the next 5 years, plus a specific plan for what the cooperative program can accomplish in 2005. They are looking for CPT ideas on research as well as CPT participation in the workshop. The goal of the workshop will be to discuss research projects in various categories and then establish priorities within them. The Foundation and NMFS will then update the MOU to explicitly carry out those priority projects for 2005.

Ideas for additional research include: alternative survey designs, feasibility studies, biological parameters used in assessment models (to better estimate parameters), expanded focus on all stocks (this year the focus was on opilio).

The 5 projects identified this year were focused upon opilio. These projects included:

- 1- Valuation of northern survey area changes since 2001(last survey there);
- 2- Examination of the northern and eastern boundaries of opilio stock to identify those outer boundaries;
- 3- Examination of precision of estimates, whereby 10 stations were expanded and combined with existing stations and variograms constructed to examine a potential reduction in variance to obtain precision within that specific area;
- 4- Examination of to what extent random tows would reduce overall variance whereby random points were added throughout the traditional survey areas to reduce the variance in the overall population density in that region. Results were uncertain but possible a 1% reduction;
- 5- Examination of catchability issues utilizing 6 tows some with the tickler chain. The initial idea was to have 6 side-by-side tows, paired with standard tows with the chain attached to the bottom of the net to see how it performs. This was in order to evaluate the effect of daylight tows with no chain when snow crab are presumed to be less active compared to fishing in the winter during non-daylight hours when they are considered to be more active. Results for one tow with the chain were approximately 4 times the standard tow and therefore processing difficulties made conducting all remaining tows difficult.

The Plan Team discussed the comparison of northern stations with possibly other historical stations besides 2001. It was noted that while it would be difficult to compare all of the historical ones but some viable stations exist. It would be important to clarify whether there has been a truncation of the stock or a migration to different area. Questions were posed regarding whether 5 years of data would answer questions of shift versus truncation? Could it be a recruitment event in 2004 that did not happen in 2001(rather than migration of population)? Perhaps the survey needs to be expanded to cover the entire population (east and north into Norton Sound)?

Arni Thompson questioned the status of the interagency list of long-term research priorities for crab. It was clarified that the updated interagency list is being published as a Fish and Game leaflet with the original list published in 1995. Currently the State is working on a revised plan prior to the inter-agency research meeting in December to finalize for publication next year.

A crab research workshop sponsored by the Bering Sea Fisheries Research Foundation and the AFSC will take place in Seattle this fall. Crab Plan Team members were requested to assemble a list of research priorities in advance of the meeting in order to facilitate research discussions. Assessment authors were specifically requested to summarize the research priorities in their individual assessments and send to Gary Stauffer.

Some CPT ideas for additional research priorities that were noted at this meeting include:

- 1- Net selectivity: to specify net selection characteristics of the 83-112 for the principal Bering Sea crab stocks for the purpose of improved abundance estimates using extant data
- 2- Research in survey design: net efficiency, net configurations, survey sampling protocol and design for the purpose of developing an improved survey design that provides more consistently reliable estimates of abundance particularly for smaller recruit-size cohorts.
- 3- Coordination of collection of biological samples (for experiments/studies to better estimate life history parameters) in conjunction with research studies on net design and selectivity
- 4- Better estimation of natural mortality (for inputs to models) could also be done by some additional tagging studies/program, looks at migration, seasonal movements, longevity. It was noted that there are numerous problems associated with tagging programs, specifically design problems with tagging of mature animals being problematic and that recovery and bias is a constant problem with tagging studies.
- 5- Estimation of shell age relative to shell condition (new/old). This is important in stock assessment models as shell condition is currently used as a proxy for age, however, tagging data indicates there may be substantial errors. Durometers may be useful in separating newly molted animals from those that did not molt in the last year.
- 6- Seasonal studies: additional seasonal studies might elucidate migrations and population density as well as seasonal mortality changes.

#### **Update on Crab Rationalization: schedule and additional issues pertinent to CPT**

Gretchen Harrington and Wayne Donaldson updated the team on State and federal regulations on Crab Rationalization Program implementation. October 22nd is the estimated date for publication of the proposed rule, with the final rule published in March 2005. NMFS estimates fishing under the Program will begin in the late summer and fall of 2005.

Wayne Donaldson discussed some of the list of issues for the BOF task force. The task force is currently looking at pot limits and other management measures for the crab fisheries. No decisions have been made on this yet nor will any decisions be made prior to the BOF meeting in March. At that meeting, the BOF will consider changes to improve state crab fisheries management under the Program.

#### **Review issues and timing for May 2005 CPT meeting**

##### *Teleconferencing ability at CPT meetings*

Previously it was noted that this has been left at the discretion of chair, though the team decided at their May 2004 meeting to attempt to provide teleconferencing at every meeting in as much as it was possible and did not detract from the meeting itself. While the Team welcomes public participation at Plan Team meetings and attempted to offer the widest access to the meeting via the teleconferencing ability, the Team tried for 2 meetings but felt that the teleconferencing was becoming a hindrance to the ability to conduct the Plan Team meeting discussions effectively.

Therefore, the Plan Team voted (9 for and one abstention) not to offer teleconferencing at the regular Plan Team meetings.

### *Issues and agenda for CPT May meeting*

With respect to agenda items for the May 2005 meeting, the Team had a discussion of the timing of the current process for the survey, and for establishing GHGs. Some team members reiterated a concern that the CPT is not meeting its responsibilities as specified in the existing FMP requiring the review of annual stock assessments and the status of the stocks prior to GHGs being established. A team member expressed that the FMP states that the FMP defines the CPT's role in the GHG-setting process, and some team members maintain that this is not occurring. One Team member read into the record the pertinent section from the Plan on this matter as: "The purpose of the Plan Team review will be to formally incorporate its input in the GHG process. The Plan Team will meet annually to review GHGs in a session that is open to the public." (FMP for BSAI King and Tanner Crab, July 1998, p.49). Some team members expressed that unlike the process followed by the groundfish Plan Team under this Council, the CPT does not make an annual status of stocks determination nor review the stock assessment model prior to announcement of the GHG. It was noted by some members that the CPT has no opportunity to advise the assessment author on changes to the model configuration deemed necessary by the Team, and that GHGs are set and routinely announced before the fall meeting of the CPT.

There was a proposal to have projections of both the status of stocks and the GHGs at the May meeting, and subsequently a great deal of discussion on the pros and cons of attempting to project preseason GHGs in May and the possible ramifications that such a projection could cause. Questions were raised regarding what are the potential benefits of this economically? The problems and potential negative impacts were discussed. It was discussed that projecting GHGs could sway market considerations (overestimation, underestimation) and decision-making based on this.

It was noted by several Team members that projecting stock status and preliminary yield estimates in the spring would provide a means to test model performance and veracity in representing the dynamics of the stock and the fishery. It was argued that these models should be able to project the status of stocks one year forward (i.e., to year  $t+1$ ) from the previous model estimate of pre-recruit abundance and the catch removals in year  $t$ . It was noted that if model performance was poor in this regard, it would call into question its utility in formulating harvest strategies and estimating catch quotas. A team member noted that such a process is pursued by the groundfish Plan Team without the negative benefits noted and expected to occur for crab. Groundfish stock assessments contain at least 5 year projected yield and biomass estimates. Another team member clarified that in groundfish only ABCs and OFLs are projected, not TACs (as with projecting GHGs). One plan team member suggested that moving the whole process of stock assessment review and GHG setting to spring, with provision for revision of the GHG if warranted by the summer survey is needed.

Arni Thompson commented that from the industry's perspective he felt that a projection of trends of status of stocks alone (ie not GHGs resulting from that) could be very useful to industry.

After substantial debate, it was decided that the May meeting would be a review of stock assessment models and that there would be a projection of the status of individual stocks which would be updated and modified the following fall. This would allow for the opportunity to test



the validity of model performance and assess underlying model assumptions. GHGs would not be projected.

Further discussion focused on the timing of the Fall meeting relative to the GHG setting process, and the September 2003 meeting minutes were reviewed at to the intent to hold a meeting prior to the GHGs being set in as much as is possible. At the September 2003 CPT meeting, significant discussion occurred on this issue resulting in the Team amending its Terms of Reference. Council staff was requested to read the revised TOR (Section (b) Meetings) and background discussion in the 09/03 Crab Plan Team minutes (p.1-2). (The revised TOR s are attached). It was noted that in 2004, conducting a CPT meeting prior to GHGs being established was problematic for a variety of reasons, and the Team intends that in 2005 the CPT meeting be held prior to the announcement of TACs for all but the golden king crab fishery. It was noted that this should be easier timing-wise given the timing of implementing IFQs for the fishery in 2005. A Team member noted that it was the clear intent of the CPT to provide input in the GHG process and annual status of stocks determination as required in the Plan. It was noted that in May 2004, when the CPT scheduled this September 2004 meeting at a time following the GHG setting process, the Team had no new information (e.g, on timing of survey results) which would have justified this conclusion that it would not be "practicable" other than those same arguments advanced at the September 2003 meeting in opposition to revising the TOR. This Team member expressed that the May 2004 scheduling of the fall meeting failed to meet the intent of the CPT to revise the process as agreed in September 2003, and that he found the justification to the contrary unconvincing

## **New Business**

Josh Greenberg noted that additional economic information would be available following the implementation of crab rationalization in 2005, thus he will hopefully be able to provide additional information to expand upon the economic chapter of the SAFE Report. It was agreed to add a discussion of CPT members ideas and issues of concerns with respect to economic aspects of the crab fishery to the May meeting agenda.

Gretchen Harrington and Wayne Donaldson updated the team briefly on the list of proposals relating to crab which will be before the BOF at their March 2005 meeting.

The CPT reviewed the proposals to determine under which FMP category each proposal belonged. All proposals fit under FMP category two or three, and thus are under the discretion of the State. The CPT did highlight a few Category 3 'other' measures which require Council consideration and therefore should go before the Joint Council-Board meeting in February. A list of the proposal numbers and their categories is attached.

The meeting adjourned 11:45am on September 22nd.

**Proposal numbers and FMP categories for consideration by the Board of Fisheries at the March 2005 meeting:**

- Proposal 390, Category 3, State Observer program
- Proposal 391, housekeeping
- Proposal 420, Category 3 Reporting requirements
- Proposal 421, Categories 2 & 3 (multiple management measures to implement rationalization)
- Proposal 422, Category 2 Pot Limits
- Proposal 423, Category 2 Pot Limits
- Proposal 424, Category 2 Pot Limits
- Proposal 425, Category 2 Fishing Seasons
- Proposal 426, Category 3 Other
- Proposal 427, Category 3 Other
- Proposal 428, Category 2 Districts, Subdistricts and Sections
- Proposal 429, Category 3 Other
- Proposal 430, Category 2 Fishing Seasons

PLAN TEAM FOR THE KING AND TANNER CRAB FISHERIES  
OF THE BERING SEA/ALEUTIAN ISLANDS

**TERMS OF REFERENCE**

(as revised by the Plan Team 9/22/04, 9/24/03, changes from 12/95 draft are in **bold**)

1. Establishment. The North Pacific Fishery Management Council (Council) shall establish a Plan Team for the king and Tanner crab fisheries of the Bering Sea/Aleutian Islands (BS/AI) area. The Plan Team will provide the Council with advice in the areas of regulatory management, natural and social science, mathematics, and statistics as they relate to the king and Tanner crab fisheries of the BS/AI area.
2. Membership. Plan Team members will be appointed from government agencies, academic institutions, and organizations having expertise relating to the crab fisheries of the BS/AI. Normally, the Plan Team will consist of at least one member from the Council staff, the National Marine Fisheries Service (NMFS), the Alaska Department of Fish & Game, the University of Alaska, and other universities and institutions. Alternate members may be assigned to participate in case a member cannot attend a meeting. With the consent of the sponsoring agency or institution, nominations may be made by the Council, the Scientific and Statistical Committee (SSC), the Advisory Panel (AP), or the Plan Team. All nominations will be subject to approval by the SSC, with the Council retaining final appointment authority. Appointments should reflect the Plan Teams' responsibility to evaluate and make recommendations on management, biological, economic and social conditions of the fisheries.
3. Organization. The Plan Team will be directed by a chairperson, and may divide some of its responsibilities among work groups organized according to subject matter. A work group may also include members from the BS/AI groundfish Plan Team. Each work group will be directed by a work group leader.
  - (a) Rules of order. In general, rules of order will be informal. Plan Team decisions will be reached by consensus, whenever possible. If a decision is required and consensus cannot be reached, the opinion of the majority will prevail. In representing the Plan Team publicly, the spokesperson will take care to relate Plan Team opinions accurately, noting points of concern where consensus cannot be reached.
  - (b) Meetings. **A minimum of two Plan Team meetings will be held annually in so far as practicable to discuss guideline harvest levels, status and management of the BSAI crab stocks. The timing and scope of meetings, in so far as practicable, will be as follows; a spring meeting will be held with the intention of reviewing the previous year's fishery catch data, the methodology for stock assessment modeling, preliminary stock assessment and any additional issues pertinent to the summer research schedule. A following summer/fall meeting will be held with the intention to discuss the status of stocks. This meeting would be intended to occur prior to the GHIL determinations by the state. It is understood that this status of stocks meeting does not preclude additional Inter-agency meetings prior to GHIL setting.** The Plan Team chairperson may call other meetings as necessary. The Crab Plan Team may meet separately or jointly with the BSAI Groundfish Plan Team to discuss areas of joint concern. A draft agenda will be prepared in advance of each meeting by the Council staff in consultation with the chairperson, and may be revised by the Plan Team during the meeting. Minutes of each meeting will be prepared by the Council staff, distributed to Plan Team members, and revised as necessary at or before the subsequent Plan Team meeting. The Chairperson (or designee) will report the Team's finding to the Council.

(c) Selection of officers. Officers (**Plan Team Chair, Vice Chair** and workgroup leaders) will be selected at the meeting preceding the annual Plan Team meeting or as vacancies arise. The **Plan Team Chairperson** and **Vice Chair** will be selected at the annual meeting for two-year terms. **It is the intent of the Team that after two years the Vice Chair will succeed as Chair and the following election will be for the position of Vice Chair. This process will continue on a two-year cycle.** Work group leaders will be selected for one-year terms. There will be no limit on the number of consecutive terms that officers may serve.

4. Functions. The Plan Teams' primary function is to provide the Council with the best available scientific information, including scientifically based recommendations regarding appropriate measures for the conservation and management of the BS/AI king and Tanner crab fisheries. All recommendations must be designed to prevent overfishing while achieving optimum yield (National Standard 1). All recommendations must also be scientifically based (National Standard 2), drawing upon the Plan Teams' expertise in the areas of regulatory management, natural and social science, mathematics, and statistics. Finally, uncertainty must be taken into account wherever possible (National Standard 6).

(a) SAFE report. The Plan Team compiles a SAFE report for the BS/AI king and Tanner crab fisheries on an annual basis. The SAFE report provides the Council with a summary of the most recent biological condition of the crab stocks and the social and economic condition of the fishing and processing industries. The SAFE report summarizes the best available scientific information concerning the past, present, and possible future condition of the crab stocks and fisheries, along with ecosystem concerns.

(b) Plan amendments. The Plan Team may also play a role in the development and evaluation of amendments to the BS/AI king and Tanner crab fishery management plan, as well as evaluate amendments to the groundfish fishery management plan that may affect the conservation and management of BS/AI crab resources.

(i) The Plan Team may evaluate amendment proposals and forward their recommendations to the Council.

(ii) In addition, the Plan Team may develop their own amendment proposals.

(iii) Once an amendment proposal has been accepted for consideration by the Council, an analytical team may be assembled by the responsible agencies. Every analytical team should include at least one member from the Plan Team, drawn from the appropriate working group(s), whenever possible.

(iv) Once an amendment analysis has been completed, it may be reviewed by the Plan Team. The Plan Team's comments, if any, are then forwarded to the SSC, AP, and Council.

**PUBLIC TESTIMONY SIGN-UP SHEET FOR**

**AGENDA ITEM** D-2 CRAB MGMT.

	NAME (PLEASE PRINT)	AFFILIATION
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

*None*

NOTE to persons providing oral or written testimony to the Council: Section 307(1)(I) of the Magnuson-Stevens Fishery Conservation and Management Act prohibits any person "to knowingly and willfully submit to a Council, the Secretary, or the Governor of a State false information (including, but not limited to, false information regarding the capacity and extent to which a United State fish processor, on an annual basis, will process a portion of the optimum yield of a fishery that will be harvested by fishing vessels of the United States) regarding any matter that the Council, Secretary, or Governor is considering in the course of carrying out this Act.