Crab Plan Team Report

The North Pacific Fishery Management Council's Crab Plan Team (CPT) met September 17-20, 2013 at the Alaska Fisheries Science Center, Seattle, WA

Crab Plan Team members present:

Bob Foy, Chair (NOAA Fisheries /AFSC – Kodiak)
Ginny Eckert, Vice-Chair (Univ. of Alaska – Juneau)
Diana Stram (NPFMC)
Doug Pengilly (ADF&G – Kodiak)
Jason Gasper (NOAA Fisheries – Juneau)
Wayne Donaldson (ADF&G – Kodiak)
Jack Turnock (NOAA Fisheries/AFSC – Seattle)
Shareef Siddeek (ADF&G – Juneau)
Karla Bush (ADF&G – Juneau)
Martin Dorn (NOAA Fisheries /AFSC)
William Stockhausen (NOAA Fisheries /AFSC)
André Punt (Univ. of Washington)
Heather Fitch (ADF&G – Dutch Harbor)
Brian Garber-Yonts (NOAA Fisheries – AFSC Seattle)

CPT members absent: Josh Greenberg (Univ. of Alaska – Fairbanks), Bill Bechtol ((Univ. of Alaska – Fairbanks)

Members of the public and State of Alaska (ADF&G), Federal Agency (AFSC, NMFS), and Council (NPFMC) staff present for all or part of the meeting included: Gary Stauffer, Doug Wells, Darcy Webber, Wesley Jones, Leah Sloane, Kathy Swiney, Anne Vanderhoeven, Ray Nomura, Lance Farr, Steve Hughes, Scott Goodman, Matt Baker, Guy Fleischer, Paul Duffy, Brett Reasor, Ruth Christiansen, Jie Zheng, Dick Tremaine, ~~Dan Urban~~, Denby Lloyd, , Bill Gaeuman, Paul Starr, Cody Szuwalski, Linda Kozak, Edward Poulson, Toshihide Hamazaki, and Leonard Herzog.

1. Administration

The Team approved the attached agenda with some modifications. The Spatial Management Report was taken up as a separate agenda item later in the week. SAFE assignments were distributed. Karla Bush was elected as Vice-Chair. The Team appreciates the service of Ginny Eckert previously as Vice-Chair.

2. 2013 survey results

EBS survey: Bob Foy (AFSC) summarized results from 2013 NMFS survey. The standard 376 survey stations were sampled on the eastern Bering Sea shelf. Unlike the previous seven years, warmer water temperatures in 2013 did not delay the molting and mating cycle in mature female red king crab, therefore resampling did not occur in Bristol Bay. The average bottom temperature of Bristol Bay stations in June with mature female red king crab was 2.9 °C in 2013 compared to 0.9 °C in 2012. Average water temperatures during the first survey leg (9 to 26 June 2013) were warmer in 2013 than the same time of the year from 2007-2012.

Additional data and sample collection occurred for five special projects: individual crab weights; bitter crab syndrome; pathological specimen collection; snow crab growth and habitat associations; and data to directly determine age for snow, red king, and Tanner crab.

Abundance estimates, spatial distributions by sex and size, and centers of distribution for each stock were presented. It was noted that abundance estimates of St. Matthew Island blue king crab were not dominated by catch at a single station, which in the recent past had increased the population estimates. In addition, there were more old and very old shell Bristol Bay red king, evidence of an aging cohort, with no signs of new recruitment.

BSFRF survey: Scott Goodman from the Bering Sea Research Foundation (BSFRF) presented preliminary results from their 2013 surveys focused on Bristol Bay red king crab. The first survey was a selectivity survey, where side-by-side tows by two chartered vessels were performed with a nephrops trawl alongside the NMFS trawl survey (30-minute NMFS tows and 5-minute BSFRF tows). Side-by-side tows occurred over a 7-day period and covered 60 of the Bristol Bay standard survey stations. Estimates of crab per square nautical mile were higher for the nephrops trawl than the NMFS trawl, with the greatest differences for the smaller size classes, especially females. This survey will be repeated in 2014 to increase the sample size across the size classes.

The second survey employed the same two charter vessels and was focused on the pre-recruit portion of the population, again using the nephrops trawl. The survey was conducted over 8 days following the completion of the side-by-side survey and a total of 139 tows were completed, both in the standard survey area and further inshore. BSFRF plans to continue this work for the next several years.

3. Assessment reviews: (note the order of the report is rearranged from the order in which these assessments were reviewed to better match the organization of the SAFE Introduction)

3.1 Eastern Bering Sea snow crab

Jack Turnock presented four model scenarios for the 2013 eastern Bering Sea snow crab assessment, the base model recommended by the CPT in May 2013 and three scenarios which were variants of this base model for comparison:

- Base model: uses 30% mortality rate for discards in the directed fishery and fits the new growth increment data collected during 2011
- Scenario 2: the same as the base model, except using 50% mortality rate for discards in the directed fishery (the default in previous assessments)
- Scenario 3: the same as the 2012 assessment base model (i.e., does not fit the 2011 growth study data), except using 30% mortality rate for discards in the directed fishery
- Scenario 4: the 2012 assessment base model (i.e., uses 50% mortality rate for discards in the directed fishery and does not fit the new growth increment data collected in 2011)

The CPT recommended use of a 30% discard mortality rate in the base model (as opposed the 50% discard mortality rate used in previous assessment) following presentation of a study on handling mortality at the May 2013 meeting. The CPT noted (see Table 13 in the assessment) that the30% discard mortality rate improves the model fit relative to scenarios that use a 50% discard mortality rate. Use of the 30% discard mortality rate has only a slight, positive effect on the estimated mature male biomass and $B_{35\%}$ relative to scenarios using a 50% discard mortality rate, but has a larger effect in increasing estimated $F_{35\%}$ and OFL.

The base model and scenario 2 model fit the 2011 growth data using a linear function, although the CPT had suggested a "2-connected-lines" (or "kinked line") model for the growth data. The assessment author reported that the model would converge only when a simple linear growth function was used. The model fits the 2011 growth data for males reasonably well for pre-molt sizes >30 mm CW, but underestimates

growth of females with pre-molt sizes >30 mm CW; the linear function fit by the model overestimates growth for males and females with pre-molt size <30 mm CW. The CPT suggested alternative approaches to the linear function fit to the growth data (see below), and noted the important need for more growth data on snow crab (samples size from the 2011 growth study were only 17 males and 18 females).

The CPT recommended use of the base model for the 2013 assessment, justified on the base model's incorporation of data from the recent handling mortality and growth studies. The CPT recommended that the ABC be set lower than the maximum allowable (P*=0.49) ABC and recommended a 10% buffer on the ABC, as recommended by the assessment author and as has been recommended for previous assessments. However the CPT noted that uncertainty in the OFL estimate for 2013 may be higher than in 2012 due to some disparities between observed survey trends and model estimates that are noted for this assessment in the Introduction chapter of the SAFE.

The following model runs were identified by the CPT. They should be provided to the May 2014 CPT meeting.

- A variant of the base model in which the growth increment is a piecewise linear function of pre-molt length, but the length at which growth changes is pre-specified.
- A variant of the base model in which the discard mortality rate is 50%.
- As suggested by the SSC in June 2013, develop a discard mortality rate that involves summing each individual component to discard mortality and conduct a model run based on that mortality rate. The CPT notes that the 30% figure is based roughly on an approach similar to the one just described, but the exact method used to derive 30% is not documented thoroughly.
- A variant of the base model in which an extra component of variance for the survey estimates of abundance is estimated; this run addresses the observation that the estimated biomass trajectory does not intersect as many of the 95% confidence intervals as expected given nominal significance level.
- A variant in which the parameter that determines the extent of variance in growth increment (β) is estimated; this parameter has been pre-specified based on data for Tanner crab owing to lack of data for snow crab, but the availability of more growth data may permit this parameter to be estimated
- A variant in which recruitment is sex-specific (with a penalty on the extent to which recruitment can differ from 50:50 male:female).

Other recommendations for the May 2014 assessment

1. Construct a likelihood profile in which the weight assigned to the growth data is changed. This may help to understand why the model does not fit the female growth increment data well.
2. Conduct deterministic projections of the model (i.e. no process or assessment error) in which fishing mortality in the directed fishery is set to $F_{35\%}$ to check that the model equilibrates at $B_{35\%}$. The results of a run like this should help the CPT understand why projection results lead to biomasses in excess of $B_{35\%}$ when the catch equals the OFL.

There are several areas where the assessment document can be improved.

- Report the likelihood component related to the fit to growth data for the base model / scenario 2 as a separate rows from the priors on a and b in Table 13.
- Be clear in figure captions which confidence intervals relate to model predictions and which to data.
- Report the exploitation rate on mature males and on males 101mm and larger in the projection table.

3.2 Bristol Bay red king crab

Jie Zheng (ADF&G) provided a summary of the 2013 Bristol Bay red king crab assessment, which was based on six alternative model scenarios. The base model for the alternatives, Scenario 0, was identical to the "Scenario 7ac" model used in the 2012 assessment, except that it was updated using the 2013 survey and 2012/13 fishery data, and used NMFS length-weight relationships. Scenario 0 was fit to data from the annual NMFS trawl survey from 1968-2013, mature male abundance from the 2007 and 2008 BSFRF trawl surveys, and fishery catch data from 1968 to 2012/13. Scenario 0 assumed natural mortality varied from a fixed M=0.18yr^{-1} for males in 1980-1984 and for females in 1980-1984 and in 1976-1979 and 1985-1993. NMFS survey catchability for males and females was estimated in the model for 1970-1972 and was otherwise assumed to be 0.896 (based on Weinberg [2004]); survey selectivity curves were estimated separately for males and females in each of two time periods, 1973-1981 and 1982-2012. Three levels of molting probability were assumed to have existed for males over the modeled time period. Data on females from post-survey re-tows were used; only the standard survey data was used for males. The alternative scenarios "01", "02", "1" and "4" represented incremental and cumulative changes to the base model. The final alternative model scenario, "7", represented a diagnostic model based on Scenario 1 (and so didn't include the additional changes included in Scenario 4) which modeled natural mortality as an autoregressive process to evaluate the choice of time periods assumed for changes in natural mortality in the other models.

Response to CPT/SSC comments:
Jie addressed comments on the assessment model from recent CPT and SSC meetings. In particular, he addressed issues regarding difficulty in incorporating early NMFS survey data (1968-1974) into the model. Jie noted that changes were made to the survey gear in 1973, and that the surveys were conducted at different times for 1968-1969 vs. 1970-1972. He also noted that there may have been issues in spatial coverage among the early surveys, based on large changes in survey abundance over the early years of the survey time-series. He suggested that prior efforts to deal with these inconsistencies were ineffective (e.g., handling Q differently for different surveys in this time period) and recommended dropping the pre-1975 surveys from the model. In addition, he addressed comments regarding creating model scenarios using incremental changes to model differences, retrospective analyses, and plots of effective sample sizes, among others.

General review of data and results:
Jie's review of survey size frequency distributions from late 1960s through 2011/12 highlighted the low representation of smaller (<90 mm CL) crab in the 2008-2013 NMFS surveys. There has been no sign in the survey of small crab since 2008 except for the 2011 survey, which showed a very high catch of crab <60 mm CL at a single station. However, the high catch of <60 mm CL in 2011 did not track into the 2012 or 2013 surveys. The 2008-2013 NMFS survey size distribution of males and females has gradually shifted to more mature- and large-size crab and shows little recruitment to the mature-sized crab and legal-sized males.

Jie presented results from six alternative model scenarios, building on a base model derived from the accepted 2012 assessment model ("Scenario 7ac" in the 2012 assessment, Scenario 0 here). The only differences between Scenario 0 and the 2012 assessment model were the inclusion of new trawl survey and fishery data for 2012/13 and the use of new NMFS length-weight relationships. Scenarios 01, 02, 1, and 4 represented incremental and cumulative changes to the base model. Scenario 01 was the same as Scenario 0, except that effective sample sizes were calculated in a simpler fashion. Scenario 02 was the same as Scenario 01 except that new shell and old shell males were combined in the likelihood and parameters for molting probabilities were estimated for two rather three time periods. Scenario 1 differed from Scenario 02 by starting the model in 1975 rather than in 1968. Scenario 4 differed from Scenario 1 by incorporating the length/sex compositions and survey biomass estimates from the BSFRF surveys

instead of estimates of only mature male abundance (assumed to be fully-selected). The final alternative scenario, 7, was intended as a diagnostic model for evaluating the time periods selected for evaluating natural mortality in the model. It was an incremental change on Scenario 1 (not Scenario 4).

The outcomes (survey biomass, mature male abundance, mature female abundance) from Scenario 0 and the 2012 assessment model were very similar, with just the difference in the length-weight relationship affecting the results (and observations). Jie noted that the simpler approach to calculating effective sample sizes (in Scenarios 01 and above) improved model convergence. He also noted the poor ability to mimic data on proportions of new shell and old shell crab separately (2012 assessment model, Scenarios 0 and 01) and that, while combining new shell and old shell males (Scenarios 02 and above) led to some loss of information, this allowed model for model simplification by estimating molting probabilities for only two rather than three time periods, and improved model fit. Jie noted that the selectivity estimates for females in the BSFRF surveys were somewhat problematic in Scenario 4 (rising to 1 at max length) and speculated that it was related to an apparent lack of growth by females in the BSFRF survey data. Scott Goodman (BSFRF) noted the occurrence of a hotspot tow in the 2008 survey in which many females were caught that may bias the resulting survey proportions.

The results of Scenario 7, the diagnostic model for time-varying natural mortality, supported the current time periods of enhanced natural mortality in the late 1970s-early 1980s (the time period might be extended a year for males given the results of this model). The results also indicated a potential period of higher natural mortality in the mid-2000's that was not included in the other scenarios.

Jie recommended selecting either Scenario 1 or Scenario 4 as the preferred model for status determination and OFL setting. This recommendation was based primarily on the exclusion of the problematic pre-1975 NMFS trawl survey data. The CPT concurred with this rationale, and selected Scenario 4 as its recommended model on the further basis that it also included more information from the BSFRF trawl surveys (length/sex compositions and survey biomass).

Choice of period of recruitment to use for $B_{35\%}$:
Jie briefly summarized the rationale for the choice of period for recruitment to use for the calculation of $B_{35\%}$. This topic was discussed in detail for the 2012 assessment. Jie noted that the CPT and SSC had endorsed a recruitment time period starting at the 1976/77 regime shift in the EBS, which leads to using 1984-2013 as the set of years for calculating recruitment for estimation of $B_{35\%}$.

Recommended OFL and ABC for 2013/14:
The 2013 assessment model estimates related to determining status are:

- $F_{35\%} = 0.29 yr^{-1}$
- $B_{35\%}$ = 58.2 million lb (26.4 thousand t)
    - MSST = 29.1 million lb (13.19 thousand t)
- Current MMB (2012/13) = 64.0 million lb (29.05 thousand t)
- OFL = 15.58 mill lb (7.07 thousand t) for total catch

The recommended ABC is based on a 10% buffer, the status quo approach established by the SSC in 2011 for dealing with additional uncertainty. The recommended ABC is consequently 14.02 million lb (6.36 thousand t).

Recommendations for future assessments and research:
For future assessments, the CPT ***recommends*** that the authors:

- Estimate catchability for the NMFS surveys while fixing it to 1 for the BSFRF surveys.

- Explore the implications in the new base model (Scenario 4) of an additional period of higher natural mortality in the mid-2000s as suggested by the Scenario 7 model results.

3.3 Eastern Bering Sea Tanner crab

William Stockhausen (NMFS) presented the draft Tanner crab assessment to the team. Since the directed fishery was closed last year, 2012/13 fishery data included only bycatch in the snow crab pot fishery, bycatch in the BBRKC pot fishery, and bycatch in the groundfish fishery. While these fisheries are likely to represent the bulk of Tanner crab bycatch, the CPT recommended that bycatch in other fisheries, such as the scallop fishery, be evaluated to determine whether it is of sufficient magnitude to be accounted for in the assessment. New input data also included the results of the 2013 NMFS bottom trawl surveys (abundance and size composition), which showed a modest increase in both female and male mature biomass.

The current model is unchanged from the model that was used last year, except for correction of several minor coding errors. These errors had relatively minor impact on assessment results. The team adopted the model with the corrected code (model 01) for use in status determination and setting the OFL. Assessment results indicated that the stock is not overfished nor is overfishing occurring.

Some of the size composition plots showed old and new shell length-frequency data when data on shell condition are not available. The model should be fitted to the size data for old and new shell animals combined for the years without data on shell conditions combined in situations where shell condition data should be available. The CPT **recommends** that the assessment author extract these data afresh from databases and recompile the size composition. This usually a good practice when a new analyst takes over the assessment model.

In the current model configuration, all fisheries are modeled as pulse fisheries occurring in February of each year. Since the timing of the fishery has varied from year to year, the CPT recommends that fisheries be modeled as a pulse at the midpoint of the fishery with the pulse based on the midpoint of the actual fishery. This is primarily a concern for the directed fishery, but should also be considered for bycatch fisheries.

Fishery selectivity parameters are modeled as a random walk with a first-difference penalty. Depending how the random walk and the difference penalty is parameterized, this could lead to odd behavior when the fishery is closed for a number of years. Selectivity in a re-opened fishery is likely to have a similar selectivity pattern to when it was last open, though the possibility of a completely different selectivity pattern cannot be entirely excluded. The CPT recommendation here is that these considerations should be taken into account when setting up the random walk in the parameters.

Male Tanner crab maturity can be reliably determined by measuring chela height, but historically these measurements have not been recorded, and even when they were recorded, they were not always collected consistently throughout the survey area. Currently the model is fit to mature biomass. Mature biomass is inferred in early years by applying an assumed maturity curve, which involves processing of the raw survey data. A better approach is to fit the model to the data that are available. The CPT **recommends** that the model be fit to total biomass when that is all that is available, and fit to mature and immature biomass with separate likelihood components when both are available.

The team discussed the unexpected decline in the maturation probability for the largest size class of males. The maturation curve (conditional probability of maturing given a crab is immature) is parameterized with individual maturation probabilities with an added smoothness penalty. Some of the parameters are hitting their bounds at 1.0, which is not ideal in a fitting procedure. The CPT recommended that the maturation parameters be estimated on a logit scale, and that the smoothing penalties be set up so that the curves are non-decreasing. Alternatively, the maturation probabilities could

be modeled using a parametric curve. The CPT noted that would be useful to see the annual estimates of the percent mature at length in the assessment, since these would vary annually depending on the fishing mortality and year-class strength changes. It was difficult for CPT members to intuit what they would look like based on the conditional maturation curve.

The CPT discussed the lack of growth data specific to the Tanner crab stock in the EBS. Borrowing a growth increment curve for Tanner crab in the GOA should be considered an interim measure at best until suitable data are available for EBS stock. Growth patterns are likely to be different in the Bering Sea, and there could be inter-annual and/or density-dependent variation in growth. This data need was also identified in the stock assessment.

The estimate of the $F_{35\%}$ proxy from the 2013 assessment, 0.73 yr^{-1}, is substantially higher than the 0.61 yr^{-1} from last year's assessment. Analysis by the assessment author indicated that this increase was primarily due a change to the fishery selectivity pattern, and not from changes in growth, natural mortality, or maturation. There was discussion about whether $F_{35\%}$ was an appropriate proxy for F_{MSY} for Tanner crab and other crab with a terminal molt. The assessment author noted that fishing mortalities as high as $F_{35\%}$ tended to be associated with declines in stock abundance. The CPT noted that it would be possible to estimate F_{MSY} (and B_{MSY}) for the stock using the estimates of recruitment and MMB during the post-1982 period recommended by the SSC.

The NMFS bottom trawl survey consistently shows regions of higher Tanner crab abundance east and west of 166° W longitude separated by an area where Tanner crab are relatively rare. The assessment author noted that flathead sole show a similar distribution pattern, suggesting that benthic habitat may play a role in causing this pattern. The team sees considerable merit in exploring this phenomenon further, both with spatial analysis of potential environmental factors, and population modeling approaches. The team suggested that application of the groundfish plan team's stock structure template to Tanner crab would be a useful exercise to synthesize the available information.

The team recommends the OFL for this stock be based on the Tier 3 control rule. Application of the Tier 3 control rule requires a set of years for defining the mean recruitment corresponding to B_{MSY} ($\bar{R}_{MSY}$), which should reflect mean recruitment under prevailing environmental conditions. Last year, the CPT recommended that $\bar{R}_{MSY}$ be set to the mean recruitment from 1990 onwards based on an analysis of the relationship between log(R/MMB) and MMB that identified a change in this relationship in 1985 (1990 year of recruitment to the model). The SSC subsequently recommended that the years from 1982 onwards be used, corresponding to a change in mean in 1977. This recommendation was based on various considerations, including the reliability of the earlier recruitment estimates, and the identification of the late 1970s as a period of rapid ecological change in the EBS.

An appendix to the Tanner crab assessment includes a more extensive change point analysis of the relationship between log(R/MMB) and MMB (note that this analysis is equivalent to fitting a Ricker stock-recruit relationship). Two candidate periods for a change in the relationship of log(R/MMB) and MMB were identified, 1974-75 and 1983-87. The 1974-75 change point models indicate that primary difference between the two periods is a decrease in overall productivity at all stock sizes (i.e., a change in the intercept parameter of the stock-recruitment relationship), whereas the 1983-87 models indicate an increase in density-dependent mortality (i.e., a change in the slope parameter of the stock-recruitment relationshiop). The CPT considered the 1974-75 change point models to be more consistent with what is generally understood as a change in stock productivity. An increase in density-dependent mortality was considered less plausible by the CPT, though the assessment author suggested a scenario in which reductions in habitat available for settlement due to changes in the cold pool could lead to greater competition at the early life history stages of Tanner crab. A change point in 1974 implies use of recruitments from 1979 onwards to estimate $\bar{R}_{MSY}$. However, this is reasonably close to the SSC

recommendation to use recruitments from 1982 onwards, and the CPT found no compelling reason to deviate from the SSC's recommendation.

Based on the estimated biomass at 15 February 2014, the stock is at Tier 3 level a. The F_{MSY} proxy ($F_{35\%}$) is 0.73 yr^{-1}, and the 2013/14 is F_{OFL}=0.73 yr^{-1} under the Tier 3 OFL control rule, which results in a total male and female catch of 25.35 thousand t.

Last year, the team recommended that the ABC be increased over three year period due to the major change in stock status, and concern about the stability of assessment model and the uncertainty of the OFL estimate. This year, the assessment model was updated with the most recent data and showed stable performance. The NMFS bottom trawl survey showed a modest increase in both female and male mature biomass in 2013. Therefore, the team considered it appropriate to make the next incremental adjustment to the ABC. The calculation of the ABC is as follows:

2011/12 OFL = 2.75 thousand t
2013/14 OFL = 25.35 thousand t
2013/14 ABC = (2/3) X (25.35 thousand t– 2.75 thousand t) + 2.75 thousand t = 17.82 thousand t.

The CPT remains concerned about the uncertainty of the assessment and the estimates of stock status, and will re-evaluate its ABC recommendations next year, rather than automatically making the final adjustment to the ABC recommendation.

Based on the above discussion, the CPT has the following **recommendations** for the May 2014 assessment:

1. Evaluate bycatch in other fisheries, such as the scallop fishery, to determine whether it is of sufficient magnitude to be accounted for in the assessment.
2. All questionable size composition data should be extracted afresh from databases and the size compositions recompiled.
3. Fisheries should be modeled as a pulse at the midpoint of the fishery with the pulse based on the midpoint of the actual fishery.
4. Examine how random walks in fishery selectivity parameters are handled during periods when the fishery is closed to ensure that reasonable assumptions are being made.
5. The model should be fit to total biomass when that is all that is available from the survey, and fit to mature and immature biomass with separate likelihood components when both are available.
6. Maturation probabilities should be estimated on a logit scale, and the smoothing penalties should be set up so that the curves are non-decreasing. A parametric curve should also be considered.
7. Collection of growth data specific to the Tanner crab stock in the EBS should be given a high research priority.
8. Evaluate the feasibility of estimating F_{MSY} (and B_{MSY}) for the stock using the estimates of recruitment and MMB during the post-1982 period, and compare to the $F_{35\%}$ MSY proxy..
9. If time permits, apply the groundfish plan team's stock structure template to Tanner crab to synthesize the available information on stock structure.

3.4 Pribilof Island red king crab

Bob Foy presented the 2013 Pribilof Islands red king crab assessment. No major management changes occurred for this stock in 2013/14. The assessment is based on the same method as previous assessments, but incorporated new data on bycatch in observed groundfish fisheries. The assessment incorporated

recommendations made by the SSC, with the exception of not testing use of a Kalman filter to average survey data. There was a discussion of the Groundfish Plan Team survey averaging working group recommendations, and Bob indicated that he will implement a random effects model to average survey data per working group recommendations. Bob reviewed the survey data, noting the high variability of males in all years (CV's>60%). The stock has shifted toward old shell crab over the period 2011-13, raising concern that there may be no increase in young matures to replace the old shell component. The model uses a 3-yr centered weighted average summary of the survey data.

The assessment recommends a σ_b of 0.4 due to insufficient data and high CVs. Bob presented the table of historical status and catch specifications, with information for 2012/13 reported as pre-season projections in the previous year's assessment updated to reflect post-season data.

Martin Dorn asked about the rationale for increased uncertainty expressed as σ_b, and the team discussed the procedure as determined in the ACL EA: ABCmax is estimated with P*=.49, reflecting within model uncertainty only, The author recommended ABC includes an additional uncertainty incorporated as $\sqrt{\sigma_a^2 + \sigma_b^2}$, which increased the CV for the ABC from 0.62 to ~0.7, and increased the size of the recommended buffer (decreased the multiplier from 0.84 to 0.8).

3.5 Pribilof Island blue king crab

Bob Foy presented the 2013 Pribilof Islands blue king crab assessment. This assessment includes waters 20 nm east of the Pribilof District given the change to the stock boundary. Bob Foy showed survey biomass estimates, noting that biomass declined by more than 50% from 2012 to 2013. However, uncertainty is extremely high because the catch of mature males in the 2013 survey was only 6 crab. Bob Foy noted that the stock was somewhat shifted south from the past few years. However, the CPT noted that this may be attributed to a warmer temperature during the 2013 survey. MMB was estimated with an average centered on the current year and weighted by the inverse variance. The projected MMB decreased substantially in this assessment, from 579 t in 2012/13 to 278 t in 2013/14, and remained well below the MSST.

The directed fishery was closed during 2013/14 and no major management changes occurred. A new method was used to estimate groundfish discards for 2009/10-2012/13. The previous estimates assessed bycatch at the federal reporting area and the at-sea observer information was not specific to the Pribilof Island stock area. The new estimation method uses observer data specific to the stock area to estimate crab bycatch and provides estimates of crab bycatch in the groundfish fishery at the State of Alaska statistical area.. However, a coding issue in the new method resulted in a small amount of observer data from the St. Matthew Island area being used to estimate crab bycatch in the Pribilof Islands area. This issue is especially apparent in 2009/10 when a large amount of bycatch from the groundfish fishery was estimated. The coding issue will be resolved so catch estimates are specific to a stock and are not derived from observer information from outside the stock area. The CPT also expressed interest in seeing information about whether the amount of observer coverage has changed since the new groundfish observer program was implemented in 2013. . While bycatch data from the new method changed individual year estimates, the overall effect was minimal. The CPT would like to see the spatial distribution of bycatch by State statistical area. Total catch mortality in 2012/13 was 0.61 t.

The OFL was calculated using a modified Tier 5 (average catch mortality) approach as has been used since 2008 due to the stock being in stock status 'c'. The CPT recommended a 2013/14 OFL of 1.16 t. The CPT discussed using a 20% buffer for the ABC as has been recommended for other stocks with high uncertainty. However, the CPT did not see strong justification to leave the status quo for this stock. The CPT recommends an ABC using a 10% buffer from the OFL. The CPT recommended ABC is 1.04 t.

3.6 Saint Matthew blue king crab

Bill Gaeuman presented the St. Matthew blue king crab stock assessment. As requested by the Plan Team during its fall 2012 meeting, the author presented two hybrid models (B1:C and B2:C) that fix Q and allow M to vary by year around a geometric mean of 0.18 yr^{-1}. The author also evaluated an alternative configuration of the base model and model C using a more biologically plausible growth transition matrix. In addition, the author presented detailed trawl survey results and updated information on the 2012/13 fishery.

In 2012/13, harvesters landed 99% of a reduced TAC of 1.630 million pounds (739.4 t). Fishery efficiency, at about 10 crab per pot, was little changed from what it had been in each of the previous three years. Area-swept estimates for the trawl survey continued a downward trend, with male mature biomass declining precipitously between 2012 and 2013. The author highlighted that there was an overall decline across the entire survey grid and the decline was not constrained to the station on the northwest side of St. Mathews Islands that typically has high catches. The trawl survey estimate of mature male biomass in 2013 declined by approximately one-third from the 2012 estimate. In reviewing the trawl survey time series, the author noted a pattern of high trawl survey abundance estimates in the early 1980s, mid 1990s, and in the mid-2000s. These periods were all followed by sharp declines in abundance estimates which then remained at low levels for an extended period of time.

Model discussion

The author evaluated 11 alternative model configurations. The alternative model configurations differed in their treatment of M (fixed at 0.18 yr^{-1} or estimated for some or all years); weighting of trawl survey and pot survey size-compositions; and treatment of trawl survey selectivity by crab stage. The author also included two models (Tbase and TC) that provided a preliminary evaluation of a stage-transition matrix based on the work of Otto and Cumminiskey (1990) on Pribilof and St. Matthew Island blue king crab molting and growth.

The author recommended the same base model as was used to provide harvest specifications in 2012. The CPT concurred with the author's recommendation, noting that the new model scenarios do not provide a compelling reason to change the base model. In particular, the two closest candidate models (B1 and C) still had the same issues observed in 2012: Model B did not fit the trawl survey data well and model C had selectivity values >1. Both the hybrid models, B1:C and B2:C, showed a stable M until the late 1990s, which may suggest a change population dynamics in recent years. The new work on a more biologically-plausible transition matrix may improve the model in the future and address issues with estimating Q (models Tbase and TC). The Team recommends the author continue to develop a biologically plausible transition matrix.

The Team also discussed the large retrospective pattern in the base model fit to the trawl data as shown in Figure 20 of the SAFE. While retrospective issues occurred throughout the time series, the last decade shows a pattern of the model retrospectively indicating lower biomass than the assessment during the year in which the estimate is made. This period also corresponds to natural mortality having increased variation around its mean for both hybrid models presented in this assessment. The Team noted that the retrospective patterns indicates a large amount of uncertainty in model projections that should be considered in setting the ABC.

ABC Setting Discussion

The Team recommended base model results in an OFL of 1.24 million pounds (562 tons). The Team was concerned about high uncertainty in model outcomes as illustrated by the retrospective pattern showing overly optimistic projections during the last decade. These concerns, coupled with the sharp decline in trawl survey abundance and a historical "boom and bust" cycle, promoted the Team to consider an additional buffer for the ABC beyond maxABC (1.23 million pounds). The author recommended a 10%

ABC buffer on the OFL that is consistent with buffer recommended by the Team and the SSC in 2012. However, given concerns about stock abundance and uncertainty, the Team recommended additional precaution and doubled the ABC buffer to be 20% of the OFL, which results in a recommended ABC of 0.99 million pounds (454 t).

3. 7 Norton Sound red king crab

Toshide Hamazaki presented the revised assessment of Norton Sound red king crab based on commercial and subsistence catch, historical NMFS trawl survey, and standardized CPUE data. The assessment incorporated fishery and observer data up to 2012/13. The CPT noted that the authors have incorporated most of the short term recommendations made during the May 2013 CPT meeting and made the following **recommendations** for assessment and presentation improvement:

1. For the next CPT meeting
   - 1.1 The model incorporating 2013 observer length frequency data led to an unusually high terminal year mature male abundance whereas the model that disregarded the 2013 observer data led to a reasonable estimate of terminal stock abundance. Therefore, the OFL estimate based on the biomass determined by the model that excluded the 2013 observer data should be considered for developing harvest specifications for 2014.
   - 1.2 The authors assumed a constant M value of $0.18yr^{-1}$ to exclude the possibility of confounding with molting. Show the likelihood profile of M.
   - 1.3 Calculate the non retained OFL as well as the total OFL.
   - 1.4 Report the estimate of the additional variance that is added to the variance assumed for the CPUE data.
   - 1.5 Estimate separate selectivity patterns for the NMFS and ADFG trawl surveys and evaluate whether the assumption that they are the same can be justified.
   - 1.6 Increase weight of recruit penalty from 0.01 to 0.5.
2. For the document:
   - The total catch column in Table 2 has a lot of NAs. Describe how the NAs were treated in the assessment model.
   - Delete the reference to Appendix E
   - In Appendix A, there should be a selectivity term in the denominator of equations 7-9.

3.8 Aleutian Island golden king crab

Siddeek presented results of the observer CPUE (number of crabs per pot) standardization that will be used in the stock assessment model to be presented to CPT in May 2014. The analysis had the goal to provide a method to standardize CPUE observer data for Eastern Aleutian golden king crab (EAG) and Western Aleutian golden king crab (WAG) and evaluated using a negative binomial and a delta-lognormal (combination of two models: lognormal and binomial) GLM. The analysis addressed comments from previous CPT meetings (including the January 2013 model workshop) on overdispersion, Q-Q plots, use of deviance residuals, influence plots, and adding new observer data from 2011/12 and 2012/13. A challenge to stock assessment is that the fishery CPUE changed with rationalization, and fewer pots have no crabs post-rationalization, but this varies spatially and there are more zero catches in the WAG than in the EAG. The CPUE analysis removed data with soak times in the lower and upper 5th percentile and with depths in the lower and upper 1st percentile to remove data points which may be unreliable. The number of vessels dropped dramatically in 2005/06, post-rationalization. The CPUE has changed over time, even when trends are based on data from the same set of vessels.

Siddeek noted that he preferred the negative binomial model. The final negative binomial model for 1995/96-2004/05 includes year, gear and captain and for 2005/06-2012/13 includes year, captain, soak and gear. The post-rationalization data were trimmed (in addition to the first trim) to exclude records where residuals exceeded two standard deviations for both the lognormal and negative binomial models.

The negative binomial model fits the proportion of positive catch data best. Influence plots for the lognormal model suggest that gear and month have a large influence that varies over time in the pre-rationalization period whereas soak time and captain do not. Post-rationalization, captain, soak time, and gear have smaller and less variable influence over time than pre-rationalization. The influence of gear is large and varies over time for the negative binomial for the pre-rationalization period, while captain and soak time do not. Post-rationalization, captain, soak time and gear have small and less variable influence over time. This analysis suggests that parameters are settling down in the post-rationalization period.

Other discussion addressed whether the CPUE data are independent once account is taken of covariates – as more than one pot may be selected from each string, this is not a random design. The CPT noted that the early data (pre-rationalization) are more dispersed than the later data. The CPT then discussed that the CPUE is not a useful index of abundance for stock assessment, as the CPUE is hyperstable because the fishery has figured out how to maximize catch post-rationalization. The CPT encourages ADFG/NMFS and industry to further the discussion on how to make a survey happen. A new survey design is needed; the intent is not to resurrect the previous triennial survey. The ADFG has not been able to afford to hire a boat for the last seven years, so the triennial survey has not occurred. The data from this survey were not used as an index of abundance for stock abundance because of limitations with the data. Industry expressed interest to continue the discussion on how to design a survey in which the industry could participate. The industry is now organized as a foundation that has the ability to work effectively with NMFS and ADFG and provide funding. Canada has government-industry cooperatives that conduct surveys and are an excellent example of what could be done.

The CPT discussed the analysis and recommended that

1. The negative binomial approach without trimming (based on residuals) should be used to construct a CPUE index for the May 2014 meeting. The negative binomial model is appropriate since the data are counts.
2. A survey is needed to provide a better index of abundance and information on recruitment for stock assessment.

3. 9 Pribilof Island golden king crab

Bill Gaeuman presented an alternative Tier 5 approach for setting the OFL for the Pribilof District golden king crab. The alternative approach utilizes data from the National Marine Fisheries Service slope survey. The slope survey is performed biennially and involves 6 subareas along the Bering Sea slope extending from Bering Canyon in the south to Navarin Canyon in the north.

The commercial fishery occurs primarily in the Pribilof Canyon. Survey years 2008, 2010 and 2012 for subareas 2 – 5 were utilized by the author in the OFL calculation. Subareas 1 and 6 were excluded as they fall either wholly outside or mostly outside the fishing district. Subarea 2, which includes Pribilof Canyon, contained an average 71% of the mature male biomass in the area considered. Only survey tows from the Pribilof fishing district was considered. However, the subareas were not subdivided further because each survey subarea is based on a stratified random sample design. The assumption of survey Q=1 was questioned. However, the difficulty of conducting additional research in this remote area, and cost constraint, for a relatively small stock will likely preclude additional effort to quantify Q.

Utilizing slope survey data, the computed Pribilof District golden king crab total catch OFL with a10% buffer is 203,000 pounds (92 mt).

The CPT agreed this alternative approach is worth continuing as it provides a relative measure of recent mature male stock abundance and may allow the CPT to track stock trends. The CPT noted that the abundance of mature male declined from 2008 – 2012. The CPT recommends that the author include an

update of this alternative approach in the spring 2014 assessment as an option to the average catch OFL procedure for consideration by the team prior to setting the 2014 OFL.

4. Economic SAFE overview

Brian Garber-Yonts provided a summary of his economic status report for the BSAI crab fisheries and the outlook for 2013. Note that the economic and production data are reported in calendar years, as opposed to "crab fishery years." Hence, for example, economic and production data for 2012 for Bristol Bay red king crab would pertain mainly to the 2012/13 season, whereas the 2012 data for eastern Bering Sea snow crab would pertain mainly to the 2011/12 season; 2012 data for the Aleutian Islands golden king crab fishery would pertain to both the 2011/12 and the 2012/13 seasons. Brian also noted that there is something of a mismatch between the cycle of data availability/analysis for data sources used for economic assessment and the cycle of Crab Plan Team meetings. In particular, the change of annual deadline for Economic Data Reports from June 30 to July 31 that went into effect this year makes completion of the full Economic Status Report for inclusion with the Crab SAFE infeasible if it is to include the most recent data available. The full report for 2013 will be completed for the November Groundfish Plan Team meeting and will be accompany the Groundfish Economic Status Report when it is delivered to the Council.

Price and revenue estimates and forecasts for 2013 use the 1991-2012 data series on wholesale prices of Alaska crab from the ADF&G Commercial Operators Annual Reports (COAR) and data on the US import-export volume and price series for king and Tanner crab from the US Merchandise Trade Statistics.

Key points for calendar year 2012 were:

- Total volume of ex-vessel landings = 104 million lbs (+48% relative to 2011)
- Finished product volume = 67 mill pounds
- Total gross exvessel = $253 million (-2% relative to 2011)
- 1st wholesale total = $392 million (+8% relative to 2011)
- 2012 prices are estimated to have returned to 2010 levels
- 2013 prices are forecasted to return to 2011 levels
- Income and employment results await analysis of the data in the NMFS-AFSC BSAI CRAB Economic Data Report (EDR) database

Trends in production and economic value during 2008–2012 show that the value of most fisheries peaked in 2011 and remained relatively flat into 2012, whereas highest production volume occurred in 2012. The EBS snow crab fishery and Bristol Bay red king crab fisheries account for the largest portion of the annual economic value (total gross exvessel and wholesale) of the BSAI crab fisheries; the EBS snow crab fishery accounts for a large majority of the annual production volume.

Current forecasts for wholesale prices in 2013 are:

- Aleutian Islands golden king crab = $10.24/lb (an increase over $8.37/lb in 2012)
- Bristol Bay red king crab = $18.28/lb (an increase over $15.09/lb in 2012)
- EBS snow crab = $5.48/lb (an increase over $4.72/lb in 2012)

Garber-Yonts stated that he would include 5-year forecasts in the full BSAI crab economics report that he is preparing.

5. Model workshop 2014

André Punt provided the team with an overview of the development of a generic crab model using ADMB. Athol Whitten is the post-doc working on developing generic routines (the Cstar library) which

will be included in a generic crab assessment model. The code will be made publically available as will the final product. One product will be developed within the generalized framework (gmacs), a Stock Synthesis-like program with a generic interface for data input and output. Norton Sound and Bristol Bay red king crab stocks will be the initial stocks used to test the generic framework . The team requests that the file share system established is usable to everyone involved, understanding that some file share systems are not available to federal employees. The timeframe for development includes the following:

- End Oct: fully simplified BBRKC model available as demonstration
- End Nov: first prototype Gmacs model released
- End Dec: first attempt at reproducing current BBRKC and NSRKC model using Gmacs (potential developers workshop).
- Jan: crab modeling workshop, which André will chair.

The team asked the following questions for clarification on the process after the completion of the current project: What will the process for revising the code be? How will version control be addressed? These are issues that are being discussed and will be addressed in conjunction with this project. Jack expressed concern regarding the time frame between the availability of survey results and the timing for finalizing assessments if code can only be vetted through a third party. This is a challenge that will need to be addressed in the development of the process. Realistically, model specifications for runs should come out of the May meeting and thus in theory there should not be massive coding changes within two weeks of finalizing assessments. Ideally, the CPT will be presented with the current assessments as well as alternative models at the May meeting. Any changes needed to cstar or gmacs should be made soon after the May CPT and SSC meetings.

6. Spatial Management Workshop report

Diana Stram provided the team an overview of the report from the April 2013 Spatial Management Workshop. The Team raised several issues related to spatial management for crab stocks that are not discussed in conjunction with that report yet should be elevated for Council discussion as it relates to recommendations for crab management. Specifically does the Crab FMP allow for an ABC to be divided within a stock area? Is it possible to apportion across areas?

Some examples of current spatial management issues for crab are:

1. AIGKC: managed east and west of 174° W longitude for catch purposes yet assessed as a single stock
2. Adak-rationalized and non-rationalized portion and indications that a directed fishery may be prosecuted
3. Snow crab: catch issues (spatial mismatch between summer survey distribution and winter fishery catch distribution) and the potential for localized depletion north and south
4. Tanner crab: managed east and west of 166° W for catch purposes yet assessed as a single stock
5. Pribilof golden king crab stock definitions compared with actual fisheries

The Team requests clarification on why crab and groundfish stocks are being treated differently. Why aren't stock structure templates and spatial management considerations being equally discussed and applied to crab? The CPT should be involved in the discussion and process of spatial management. Notably stock definitions for crab are somewhat arbitrary and relate back to the drafting of the original FMP.

The team notes that spatial management issues are not dissimilar from groundfish and the focus should be equivalent across both. Crab stock assessment authors should begin to address the stock structure issues biologically by applying the template. Additionally we need to list out the issues for discussion and begin to identify the mismatch between how stocks are managed and how they are assessed. It is important understand which tools are available to the team given impending changes to management of Adak red

king crab. For example, the stock boundaries could be implemented at the OFL level, and the ABC set spatially. What are the criteria for developing this spatial management discussion? The CPT need to consider where these fit in with the FMP framework

The CPT is concerned about how to fit crab into the groundfish plan teamdocument on spatial planning (management). The Council wants to set a policy for public and Council input into decisions about spatial issues. The CPT discussed that there is no reason for crab not to be considered on the same level as groundfish in the document. There are more complexities to be considered in that the State of Alaska sets the TAC/GHL level, but spatial considerations tend to be taken at the ABC level for groundfish so the tools should be the same. There was some discussion about the need to look at the definition of the ABC in the FMP to go forward with any spatial tools. There is a need for criteria for defining stock boundaries and whether to have different ABCs or different OFLs. **CPT recommends that crab authors apply the criteria for considering spatial issues in stocks.** Having stock structure guidance from the Council may lead to more coherence between the federal and State management, but consideration of the differences between these processes should be made. The CPT also expressed concern that the biological specifics of crab were not considered in depth at this workshop and thus it was notably lacking in some aspects that would be useful to the general topic.

7. Board of Fisheries Proposals

Karla Bush reviewed the BOF proposals (attached) for input from the CPT on the categorization of the proposals. The CPT agreed with the FMP categories as listed but had comments and concerns regarding some of the proposals. The team discussed the rationale for the proposal to increase the AIGKC TAC. The team discussed that there would be downstream impacts to the assessment cycle timing should the proposal to change the AIGKC season be adopted. The team discussed the proposal to establish separate districts for Adak and Petrel red king crab and the accompanying proposals to allow for a fishery for red king crab in the Aleutian Islands. The team noted that there may be assessment issues and this change could be addressed by separate harvest specifications for the two districts whether at the OFL or ABC level. The team reiterated concerns regarding the potential for localized depletion should the entire GHL be taken in a single area. The team remains concerned regarding biological issues of stock structure, biomass and catch within state and federal waters and the data limitations for this stock. The team refers the Council to their report from May 2013 (excerpted below) when they were asked to comment on a proposal to remove Adak red king crab from the FMP. The team notes that many of the issues related to that should also be considered by the Council in commenting on the pending BOF actions.

Excerpt from the May 2013 CPT report on Adak red king crab concerns:

> *Biological Concerns*
>
> The Area O red king crab stock west of 171° W longitude is managed under a single OFL and ABC. Information about stock structure is highly uncertain in the Aleutian Islands. Genetic information suggests a break in stock structure somewhere in the Aleutians Islands between Bristol Bay and Aleutian Islands/Russian stocks. However, CPT members were not aware of any definitive information that would delineate stock structure in the Aleutians. Genetic information is limited and based on samples collected from 1988 labeled as “Adak” in Grant and Cheng (2012) without specification of the sample location(s). The CPT discussed the potential of localized populations in the Aleutians, but information about stock structure on a fine scale is lacking. The CPT also discussed the large historical catch, the likelihood that the stock is now at much lower abundance than historically, and the role that small localized populations could play in the population dynamics of red king crab at larger scales, The CPT also noted that a limited incidental or exploratory fishery is now being proposed.

Management Issues

Twelve of the original 22 FMP stocks were removed from the FMP by Amendment 24 because federal management of those stocks was no longer necessary. The majority of the catch of those stocks occurred in State waters or the State had either closed the directed fisheries or managed the fisheries as limited incidental or exploratory fisheries. The Council and NMFS found that the State had a legitimate interest in the conservation and management of those stocks. It was not immediately clear to the CPT that the Aleutian Islands red king crab stock between 171° and 179° W longitude could be removed from the FMP under the criteria described in Amendment 24. No record of CPT discussions on Amendment 24 pertaining to removal of stocks from the FMP could be found and made available as a reference. The CPT noted that, although possible, no information or data had been presented as evidence that the red king crab east of 179° W longitude are a distinct stock from the red king crab west of 179° W longitude (see Section 7.2.1 of this report). In addition, a summary of fish ticket landing data that was presented during the meeting showed that of the total 1.95 million lb harvested during the 1985/86–2011/12 seasons (seasons with only confidential data were excluded), 62% of the harvest between 171° W longitude and 179° W longitude occurred in federal waters.

The CPT also discussed the process associated with removing the crab from the FMP and specifically that National Standard 1 would no longer apply. There was concern about the coordination of management between the State and NMFS due to fishery mortality occurring in both State and Federal waters (e.g., groundfish PSC). Thus, the management issues are wedded to biological issues that involve coordination, which is not fully addressed in the proposal.

Should the Council wish to go forward, the CPT recommends the following considerations prior to initiating an amendment analysis that would remove the eastern portion of Area O red king crab from the FMP:

- develop a clear rationale as to when a stock should be removed from an FMP. This rationale should be consistent with the rationale associated the removal of the crab stocks not currently included in the FMP and, if possible, provide a discussion about why the proposed area was not rationalized;
- characterize the current level of knowledge on stock structure and whether this information supports dividing the stock as proposed;
- describe management scenarios and complexities between State of Alaska and Federal management. In particular, analyze the complexity associated with managing State and Federal fisheries east versus west of the dividing line, including an explanation about how groundfish PSC mortality could be handled;
- investigate whether this type of small scale fishery can be accommodated under the current Tier 5 ABC setting process;
- characterize groundfish bycatch by reporting area and/or at a smaller spatial scale if possible;
- provide the ratio of total catch for the eastern and western portion of Area O as defined by the proposed dividing line; and
- where possible, provide the ratio of catch in Federal versus State waters for BSAI King and Tanner Crab FMP stocks and stocks removed from the FMP under Amendment 24.

The team understands that the series of proposals for the BOF would pave the way for opening a directed fishery on this stock and has a number of concerns regarding that. The team has concerns regarding the ability to establish a meaningful OFL or ABC on a sub-area basis. The team further notes that the ABC-setting process has explicitly accommodated a test fishery per request of industry, but there has not been any industry interest in prosecuting the test fishery since that time.

The team discussed the proposal for the St Matthew blue king crab harvest strategy. Doug Pengilly noted the rationale for this, noting that there have been difficulties in the mis-alignment between the OFL setting and TAC-setting processes, and that the State would like to consider revisions to the harvest strategy to address these. .

8. New Business

The Team set the following dates for 2014 meetings (and notes that the May 2014 meeting timing has been modified and location changed):

- Modeling Workshop: January 14-17, 2014 Anchorage (TBD)
- May CPT meeting: May 5-7, 2014 Anchorage (TBD)
- September CPT meeting: September 15-18, 2014 AFSC, Seattle

The meeting adjourned at 1pm on Friday September 20th.

North Pacific Fishery Management Council Crab Plan Team Meeting

September 17-20, 2013

AFSC, Seattle, WA

DRAFT AGENDA 9/12/2013 version

Tuesday, September 17		
9:00	**Administration**	Introductions, approve agenda, SAFE assignments, elect Vice-Chair, stock structure report
9:30	**2013 EBS Survey results**	NMFS bottom trawl results, AFSC/BSFRF nearshore survey results,
10:30	**NSRKC**	Draft assessment, plans for finalization by Thursday
11:30	**Tanner crab**	Final assessment, OFL and ABC recommendation.
Noon		Lunch
1:00	**Tanner crab (cont)**	Continue discussion
2:00	**Snow Crab**	Final assessment, OFL and ABC recommendation
Wednesday September 18		
9:00	**BBRKC**	Final assessment, OFL and ABC recommendation.
11:00	**St. Matthew BKC**	Final assessment, OFL and ABC recommendation
Noon		Lunch
1:00	**St. Matthew BKC (cont)**	Final assessment, OFL and ABC recommendation
2:00	**PIRKC**	Final assessment, OFL and ABC recommendation
2:30	**PIBKC**	Final assessment, OFL and ABC recommendation
3:00	**AIGKC**	CPUE standardization
Thursday September 19		
9:00	**PIGKC**	Modified Tier 5 approach
10:00	**NSRKC**	Final assessment, OFL and ABC recommendation
Noon		Lunch
1:00	**Model workshop 2014**	Plans for comparison of BBRKC and NSRKC with generic model framework
1:30	**New business**	BOF proposals for March 2014 meeting
2:00	**Report review**	Final revisions 2013 SAFE introduction, specifications, tables, minutes
Friday September 20		
9:00	**Report review**	Final revisions 2013 SAFE introduction, specifications, tables
1:00pm	**Adjourn**	

Board of Fisheries proposals for September 2013 Crab Plan Team review. A description of all proposals for the 2013/14 cycle can be found at:
http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

Mgmt Area	Proposal number	Description	FMP category
Norton Sound	346	Adjust harvest rates and trigger points to NS red king crab harvest strategy	2 - TAC/GHL
Aleutian Islands	348	Increase AI golden king TAC by 15%	2 - TAC/GHL
	349	Change AI golden king season dates	2 - Fishing Seasons
	350	Establish "Adak" and "Petrel" Districts for AI red king	2 - Districts/ Subdistricts/Sections
	351	Mgmt measures for Adak District red king (fishing hours, logbooks, reporting)	3 - Gear placement, Reporting
	352	Close federal waters when Adak red king GHL is <250,000	2 - Closed waters
	353	Registration deadline for Adak red king	3 - Observers
	354	Change AI red king season dates (open July 1 by EO rather than Oct. 15)	2 - Fishing Seasons
	355	Exempt persons and vessels participating in Adak red king from participation in other fisheries	3 - Other
	356	Add Adak to registration Area O tank inspection points - allow Enforcement Officer to conduct inspection	3 - Vessel Tank Inspections
	357	Amend description of Area O	2 - Districts/ Subdistricts/Sections
Bering Sea	358	Revise St. Matthew blue king harvest strategy	2 - TAC/GHL
	359	Allow groundfish pots during St. Matthew blue king fishery	3 - Other
	360	Eliminate king crab pot marking requirements in Area Q	2- Pot Limits
	361	Gear marking requirements for longline pots in Area Q	3 - Gear modifications
	362	Specify vertical placement of escape rings for BS Tanner and snow crab	3 - Gear modifications
	363	Clarify vessel check-out provisions for rationalized crab fisheries	3 - Reporting

ALASKA BOARD OF FISHERIES
MARCH 17–21, 2014
STATEWIDE KING AND TANNER CRAB AND SUPPLEMENTAL ISSUES

PROPOSAL 346 - 5 AAC 34.915. Norton Sound Section red king crab harvest strategy. Adjust harvest rates and trigger points based on changes in abundance model, as follows:
If the abundance model is changed by the Crab Plan Team in 2013, we would like the board to adjust harvest rates and trigger points to continue current practices.

ISSUE: This proposal is a place holder to allow changes to be made to the Norton Sound Red King Crab harvest strategy if necessary. The Norton Sound Red King Crab model is currently under review by the NPFMC Crab Plan team and significant changes to the model may be made. The model review will take place April 30 to May 3, 2013 and may also be included in generic model workshop in September 2013. Results of the modeling workshops should be finalized in time for harvest strategy changes to be acted on at the March 2014 meeting. There is the concern that the same type of models change that took place in 2011 may take place again. An ACR was submitted in 2011 to adjust the harvest rates.

WHAT WILL HAPPEN IF NOTHING IS DONE? If the model is changed, no action may result in a significant reduction in commercial harvest.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? The proposal seeks to provide a sustained yield and to reduce unwarranted changes in harvest rate which destabilize the commercial fishery. The Norton Sound Fishery is arguably the most stable king crab fishery in the state. Harvest has tended slightly upward over a 25 year period. This trend could not be sustained for this period if the harvest rate were excessive. Stability in the fishery is important in keeping the region's most valuable commercial fishery healthy.

WHO IS LIKELY TO BENEFIT? Commercial fisherman will be allowed to continue at levels that have been sustainable in the past.

WHO IS LIKELY TO SUFFER? No one.

OTHER SOLUTIONS CONSIDERED? N/A.

PROPOSED BY: Norton Sound Economic Development Corporation (HQ-F13-124)

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PROPOSAL 348 - 5 AAC 34.612. Harvest levels for golden king crab in Registration O. Increase harvest limit for Aleutian Islands golden king crab, as follows:
5 AAC 34.612. Harvest levels for golden king crab in Registration Area O. 3 (a) [UNTIL THE ALEUTIAN ISLANDS GOLDEN KING CRAB STOCK ASSESSMENT MODEL IS ESTABLISHED BY THE DEPARTMENT AND A HARVEST STRATEGY IS ADOPTED BY THE BOARD OF FISHERES,] The harvest levels for the Registration Area O golden king crab fishery are as follows:
(1) east of 174 degrees W. long.: **3.81** [3.31]million pounds;
and
(2) west of 174 degrees W. long.: **3.43** [2.98]million pounds.
(b) In implementing these harvest levels, the department shall use the best scientific information available and consider the reliability of estimates and performance measures, sources of uncertainty as necessary to avoid overfishing, and other factors necessary to be consistent with sustained yield principles.

ISSUE: The Aleutian Islands golden king crab fishery is underutilized and has been for many years. The loss to harvesters, processors and over 60 Alaskan communities has been estimated to be over $70 million in the past six years. This fishery is classified as Category 5 by the National Marine Fisheries Service and there is no stock assessment model or harvest strategy currently being utilized. A model has been under development by the department for years, but has not been finalized or approved. In 2012 the board adopted a 5% increase for this fishery with the expectation that a model and harvest strategy would be in place in a relatively short period of time. There is uncertainty about whether a model will ever be acceptable as a stock assessment tool. The golden king crab harvesters are requesting a conservative harvest limit increase of 10-15%.

WHAT WILL HAPPEN IF NOTHING IS DONE? It is clear from fishery performance and research project results that this crab fishery is in a robust condition and is underutilized. The financial loss to

harvesters, processors and communities has been significant for years. This will continue without action by the board to increase the harvest levels.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? While the quality of the resource being harvested would not change, it is likely that new markets and product forms would be developed under an increased harvest limit. This would give the harvesters and processors flexibility in developing new markets and allow for increased opportunities to work with live crab shipments and other innovative ways to provide the public with buying options.

WHO IS LIKELY TO BENEFIT? All crab harvesters, processors and communities for the Aleutian Islands golden king crab fishery would benefit. The department would also benefit by having more flexibility when designing and implementing research projects.

WHO IS LIKELY TO SUFFER? No one will suffer. Due to the small increase in actual pounds harvested, as well as the near 100% domestic marketing for this product, no other crab fishery markets would be impacted.

OTHER SOLUTIONS CONSIDERED? There is no other solution. The Aleutian Islands golden king crab assessment model has not been adopted after years of development and it is unlikely that it will be implemented soon. Even if it were, the development and approval of a harvest strategy could take several more years. The responsibility for setting harvest limits for this fishery is under the jurisdiction of the board.

PROPOSED BY: Golden King Crab Coalition (HQ-F13-059)

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PROPOSAL 349 - 5 AAC 34.610. Fishing seasons for Registration Area O. Modify Aleutian Islands golden king crab season, as follows:

5 AAC 34.610(b). Fishing Seasons for Registration Area O.

(b) Male golden king crab may be taken only from 12:00 noon **May 15** [AUGUST 15] through 11:59 p.m. **February 15** [MAY 15]

ISSUE:

a. The season opening date for golden king crab in Registration Area O is too late in the year to enable the harvesters to execute the harvest when the weather conditions are optimal for safety and efficiency.

b. The Registration Area Processors, Alyeska Seafoods, Westward Seafoods, Icicle Seafoods, and Unisea Seafoods were all closed for maintenance by the first or second week of November 2012. The processors listed were unavailable to receive deliveries until the first week of January 2013. This situation greatly reduces the delivery options for catcher vessels whom have not completely harvested their golden king crab quota by the early part of November.

WHAT WILL HAPPEN IF NOTHING IS DONE? The harvesters will be unable to fish in the summer months when the safest weather conditions exist. Some harvesters will continue to struggle with limited options for offloading deliveries to processors late in the year.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR THE PRODUCTS PRODUCED BE IMPROVED? Yes. Crab handling is improved in the mild weather conditions that are present in the summer months. Mortality rates are lower for the juvenile and female crabs that are returned to the sea when mild sea and weather conditions exist.

WHO IS LIKELY TO BENEFIT? Fishermen and processors will both benefit from this proposal. The working conditions will be safer for the fishermen working on the decks of the vessels engaged in this fishery. For the processors, the market timing for the majority of the harvest will be improved because it will be available for the distribution earlier in the year, when very little king crab is available. They would also be able to close for annual maintenance earlier, before Thanksgiving, to let their crews off for the holidays.

WHO IS LIKELY TO SUFFER? None that I am aware of.

OTHER SOLUTIONS CONSIDERED? Season opening date of February 15 and closing date of November 15. These dates are a solution to the issue of lack of options for deliveries made late in the year. These season dates do not encourage harvesters to make the majority of their deliveries when

weather conditions are the safest, because February is a winter fishing month, and the weather doesn't calm down until around the month of May.
PROPOSED BY: Chad Hoefer (HQ-F13-016)
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PROPOSAL 350 - 5 AAC 34.60X. Description of districts. Establish districts for western Aleutian Islands red king crab, as follows:
Amend the repealed provision "5 AAC 34.605. Description of districts" and add the following language: "The portion of Area O between 171 and 179 degrees west longitude shall be defined as the "Adak District" and the portion of Area O west of 179 degrees west longitude shall be defined as the "Petrel District".
ISSUE: The portion of Area O between 171 and 179 degrees west longitude needs to be managed as a defined district independently of the portion west of 179 degrees which is managed under the federal crab rationalization program.
WHAT WILL HAPPEN IF NOTHING IS DONE? The regulations targeted as a state managed small boat RKC fishery between 171 and 179 degrees west longitude need to be applied to a defined district.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? It is neutral.
WHO IS LIKELY TO BENEFIT? Vessels 60' or less who participate in a RKC fishery in the portion of area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? None.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-245)
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PROPOSAL 351 - 5 AAC 34.6XX. Adak District Red King Crab Management Plan. Establish management measures for Adak red king crab fishery, as follows:
In "5 AAC 34.6XX add provisions stating: "In the Adak District (between 171 to 179 degrees west longitude):
A – pots may be operated to take Red King crab only from 8:00 a.m. to 5:59 p.m., with a soak time of 14 hours, from 6:00 p.m. to 7:59 a.m., during the season"
B – during the red king crab season, an operator of a vessel registered to fish in the commercial red king crab fishery shall complete logbooks provided by the department.
C – during the red king crab season, an operator of a vessel registered to fish in the commercial red king crab fishery must report each day to the department (1) the number of pot lifts; (2) the number of crab retained for the 24 hour fishing period preceding the report; (3) any other information the commissioner determines is necessary for the management and conservation of the fishery as specified in 5 AAC 34.606."
ISSUE: Small GHL crab fisheries require careful management, but observer coverage is costly. In other small GHL fisheries the department has used a combination of logbooks, daily reporting and 'daylight' fishing restriction.
WHAT WILL HAPPEN IF NOTHING IS DONE? Without daily reporting requirements a small GHL fishery is difficult to manage.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? It is neutral.
WHO IS LIKELY TO BENEFIT? Vessels 60' and under who participate in a RKC fishery in the portion of Area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? Full observer coverage could be required, but it would be prohibitively expensive.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-250)
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PROPOSAL 352 - 5 AAC 34.6XX. Closed waters. Close federal waters between 171° W. long. and 179° W. long. to fishing when red king crab guideline harvest level (GHL) in state-waters is less than 250,000 pounds, as follows:
Add a "close waters" provision "5 AAC 34.6XX" with the following language:
"When the GHL for red king crab in the Adak district (between 171 and 179 degrees west longitude) is less than 250,000 lbs., all waters between 171 and 179 degrees west longitude outside state waters shall be closed to fishing for red king crab."
ISSUE: The vessel size limits and pot limits only apply in state waters in the portion of Area O between 171 and 179 degrees west longitude.
WHAT WILL HAPPEN IF NOTHING IS DONE? The ability to manage a small GHL RKC fishery between 171 and 179 degrees west longitude will be constrained with no limits outside state waters.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? It is neutral.
WHO IS LIKELY TO BENEFIT? Vessels 60' and under who participate in a RKC fishery in the portion of Area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? Extend the vessel size limits and pot limits to the portion of the Adak district outside state waters.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-251)
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PROPOSAL 353 - 5 AAC 34.606. Area O registration. Establish registration deadline for Adak red king crab, as follows:
In 5 AAC 34.606(b) at the end of the first sentence after the clause"…21 days before that vessel begins fishing operations" add a provision stating:
Except that in the Adak District (between 171 to 179 degrees west longitude) for the red king crab fishery, the deadline is seven days before that vessel begins fishing operations.
ISSUE: 5 AAC 34.606. requires 21 days advance registration in all Area O king crab fisheries.
WHAT WILL HAPPEN IF NOTHING IS DONE? The long lead time reduces flexibility for vessels 60' or less to move in and out of cod or IFQ fisheries.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? It is neutral.
WHO IS LIKELY TO BENEFIT? Vessels 60' or less who participate in a RKC fishery in the portion of Area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? A vessel 60' or less could be allowed to be registered for Adak district RKC while also registered for AI state water cod, but this could complicate monitoring pot limits.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-246)
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PROPOSAL 354 - 5 AAC 34.610. Fishing seasons for Registration Area O. Open Adak red king crab fishery by emergency order July 1, as follows:
Amend the provision "5 AAC 34.610(a)" with the following additional language:
Except that at the commissioner's discretion, in the Adak district (between 171 and 179 west longitude) the commissioner may open and close, by emergency order, a season for male red king crab beginning 12:00 noon, July 1st and ending no later than 11:59 p.m. February 15. ISSUE: The current season opening date for Area O is October 15th. That date forces fishing into a time of year that is unsafe for vessels 60' or less in portion of Area O between 171 and 179 degrees west longitude.
WHAT WILL HAPPEN IF NOTHING IS DONE? Small boats in RKC fishery between 171 and 179 degrees west longitude will be forced to fish in bad weather and their product will enter the market at the same time as the large scale Bristol Bay fishery.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? Yes. An earlier opening date creates the opportunity to serve a live crab market at a different time of year than the large scale Bristol Bay RKC fishery.
WHO IS LIKELY TO BENEFIT? Vessels 60' and under who participate in a RKC fishery in the portion of Area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? None.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-247)
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PROPOSAL 355 - 5 AAC 34.628. Operation of other gear in Registration Area O. Exempt persons and vessels participating in Adak District red king crab fishery from participation in certain other fisheries, as follows:
Add a paragraph (b) to "5 AAC 34.628" with the following additional language:
Persons and vessels participating in the Adak district (between 171 and 179 west longitude) red king crab fisheries are exempt from the requirements of 5 AAC 34.053(1), 5 AAC 35.053(1) and 5 AAC 34.628(a), but vessels registered for the fishery are prohibited from the use of other pot, trawl, or longline gear seven days prior to the scheduled opening of the fishery.
ISSUE: Existing regulations for all of Area O prohibit the use of other pot, trawl, or longline gear 30 days prior to the scheduled opening of the fishery. However the federal fishery west of 179 degrees west longitude is exempted from the restriction on the use of other gear under 5 AAC 39.685.
WHAT WILL HAPPEN IF NOTHING IS DONE? Small boats in the RKC fishery between 171 and 179 degrees west longitude would be unable to participate in other fisheries, such as Aleutian state water Pacific cod, for a month prior to the opening of the RKC fishery, making it un-economical for local vessels.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? It is neutral.
WHO IS LIKELY TO BENEFIT? Vessels under 60' who participate in a RKC fishery in the portion of Area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? None.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-248)
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PROPOSAL 356 - 5 AAC 34.640. Registration Area O inspections and inspection points. Add Adak as tank inspection location for red king crab, as follows:
In paragraph (b) to "5 AAC 34.640." the phrase: "inspected by a local representative of the department at Dutch Harbor, Akutan, or King Cove" add the following language:
"or in Adak by a Law Enforcement Officer certified by the Alaska Police Standards Council"
ISSUE: Existing regulations for Area O require tank inspections by "local representation of the department". There are generally no ADF&G personnel in Adak, and the nearest port with ADF&G staff in Dutch Harbor, which is 400 miles away.
WHAT WILL HAPPEN IF NOTHING IS DONE? Small boats based in Adak would have to undertake an 800 mile roundtrip to be able to fish RKC in the Adak district (between 171 and 179 degrees west longitude), which is unduly burdensome.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? It is neutral.
WHO IS LIKELY TO BENEFIT? Vessels under 60' who participate in a RKC fishery in the portion of Area O between 171 and 179 degrees west longitude.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED? The commissioner could be given discretion to waive tank inspections in Adak if a department representative was not available.
PROPOSED BY: Adak Community Development Corporation (HQ-F13-249)

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PROPOSAL 357 - 5 AAC 34.600. Description of Registration Area O. Amend description of Aleutian Islands king crab registration area, as follows:

5 AAC 34.600. Description of Registration Area O. Registration Area O has as its eastern boundary the longitude of Scotch Cap Light **(164° 44.72' W. long.)** [(164° 44' W. LONG.)], its western boundary the Maritime Boundary Agreement Line as that line is described in the text of and depicted in the annex to the Maritime Boundary Agreement between the United States and the Union of Soviet Socialist Republics signed in Washington, June 1, 1990, and as that Maritime Boundary Agreement Line is depicted on *NOAA Chart #513* (6th Edition, February 23, 1991) and *NOAA Chart #514* (6th Edition, February 16, 1991), adopted by reference, and its northern boundary a line from the latitude of Cape Sarichef (54° 36' N. lat.) to 171° W. long., north to 55° 30' N. lat., and west to the Maritime Boundary Agreement Line.

ISSUE: As commercial shellfish regulations developed, demarcation lines within and between management areas sometimes changed independently of each other. The intent of this proposal is to standardize demarcation lines across commercial fisheries, as well as update specific demarcation coordinates to reflect the best precision afforded by current technology.

WHAT WILL HAPPEN IF NOTHING IS DONE? There will be continued use of ambiguous demarcation lines.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BY IMPROVED? No.

WHO IS LIKELY TO BENEFIT? Commercial fishermen, fishery managers, and law enforcement will benefit from clear and consistent regulations.

WHO IS LIKELY TO SUFFER? No one.

OTHER SOLUTIONS CONSIDERED? None.

PROPOSED BY: Alaska Department of Fish and Game (HQ-F13-189)

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PROPOSAL 358 - 5 AAC 34.917. Saint Matthew Island Section Blue King Crab Harvest Strategy. Revise the St. Matthew Island blue king crab fishery harvest strategy, as follows:

Change the regulatory threshold for opening the Saint Matthew Island Section blue king crab fishery from a threshold based on biomass of mature males (currently 2.9 million pounds) to a threshold of 1.609 million mature-sized males at the time of survey. The new threshold is one-half of the average of the estimated survey-equivalent number of mature-sized males present at the time of survey during 1978–2012 (3.217 million mature-sized males).

Change the fishery harvest rate on the number of mature-sized males estimated at the time of survey to vary linearly from 5 percent when the estimated survey-equivalent number of mature-sized males at the time of survey is at threshold (1.609 million mature-sized males) to a maximum of 10 percent when the estimated survey-equivalent number of mature-sized males at the time of survey is equal to or greater than two times the threshold (3.217 million mature-sized males), with the restriction that no more than 25 percent of legal males estimated at the time of survey will be harvested.

The current harvest rate on the number of mature-sized males estimated at the time of survey varies linearly from 10 percent when the estimated abundance of mature-sized males at the time of survey is at threshold (2.9 million pounds) to a maximum of 20 percent when the estimated biomass of mature-sized males at the time of survey is four times the threshold (11.6 million pounds) or greater, with the restriction that no more than 40 percent of legal males estimated to be present at the time of survey will be harvested.

ISSUE: The existing regulatory harvest strategy is not compatible with federal overfishing levels. When setting the annual total allowable catch (TAC) during the last three Saint Matthew Island blue king crab fisheries, the TAC was lowered from the value calculated from the existing harvest strategy to comply with federal overfishing limits.

The existing regulatory harvest strategy allows high mature male and legal harvest rates when compared to the Pribilof blue king crab stock.

WHAT WILL HAPPEN IF NOTHING IS DONE? The Saint Matthew Island blue king crab harvest strategy will not reflect actual TAC-setting process.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? No.
WHO IS LIKELY TO BENEFIT? Participants in the Saint Matthew Island blue king crab fishery.
WHO IS LIKELY TO SUFFER? Unknown.
OTHER SOLUTIONS CONSIDERED? None.
PROPOSED BY: Alaska Department of Fish and Game (HQ-F13-179)
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PROPOSAL 359 - 5 AAC 34.925. Lawful gear for Registration Area Q. Allow groundfish pots in St. Matthew Island blue king crab fishery, as follows:
5 AAC 34.925 (2)(a). In Registration Area Q, the operator of a vessel that is registered for the blue king crab fishery may have on board no more than 10 groundfish pots as defined in 5AAC 28.050(e). Notwithstanding 5AAC 34.050(1), blue king crab taken from these pots may be legally retained.
ISSUE: The crab fleet in St. Matthew's blue king crab fishery wants to be able to use cod pots during the crab fishery.
WHAT WILL HAPPEN IF NOTHING IS DONE? We catch more crab if we have fresh cod available to use as bait. That means the fishery will be over faster, if we can use hanging bait. Which means the gear will get off the grounds faster. We become more efficient with less impact.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? No, not really, except for the fact that we will get pots off the grounds sooner. That is better for the resource.
WHO IS LIKELY TO BENEFIT? Fishermen will benefit because they will catch quota sooner. Resource will benefit because the gear will get off grounds sooner.
WHO IS LIKELY TO SUFFER? No one.
OTHER SOLUTIONS CONSIDERED?
PROPOSED BY: Peter Uske (HQ-F13-024)
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PROPOSAL 360 - 5 AAC 34.051. King crab gear marking requirements and 5 AAC 34.926. King crab pot marking requirements for Registration Area Q. Eliminate king crab pot marking for Registration Area Q (Bering Sea), as follows:
5 AAC 34.05. King crab gear marking requirements. (b)(1) except in Area Q where the pot limit will remain in effect, but pot tags will not be required.
ISSUE: The logistical problem of tagging pots in storage 380 miles away from Dutch Harbor. Many boats store gear in northern pot storage area before St. Matthew's blue king crab season. In 2012 we didn't get tags until three or four days before fishery, making it almost impossible to store the gear and get back in time for gear inspection.
WHAT WILL HAPPEN IF NOTHING IS DONE? All of those who want to store gear in Northern District will not be able to execute a safe and orderly start to the season.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? No.
WHO IS LIKELY TO BENEFIT? No/None. All Area Q fishermen who choose to store pots in northern pot storage area.
WHO IS LIKELY TO SUFFER? All Area Q fishermen who want to store gear in Northern District.
OTHER SOLUTIONS CONSIDERED?
PROPOSED BY: Peter Liske (HQ-F13-025)
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PROPOSAL 361 - 5 AAC 34.925. Lawful gear for Registration Area Q. Modify gear marking requirements for longline pots in the Bering Sea golden king crab fishery, as follows: (f) In Registration Area Q, pots used to take golden king crab may be longlined. Notwithstanding 5 AAC 34.051, a buoy is not required for each pot, but each end of the longline must be marked by a cluster of four buoys [, AS

WELL AS A POLE AND A FLAG]. One buoy in the cluster must be marked in accordance with the specifications of **5 AAC 34.051 and have the initials "SL" to identify that the pots are on a shellfish longline. For the purposes of this subsection, "shellfish longline" is a stationary, buoyed, and anchored line with more than one shellfish pot attached** [5 AAC 34.051(a)].
ISSUE: Portions of the gear-marking requirements for longlined pots in Registration Area Q (Bering Sea) are not used by fishermen. Golden king crab fishermen in the Bering Sea use marking requirements described for Registration Area O (Aleutian Islands; 5 AAC 34.625). This proposed modification of gear marking requirements would align regulations for Area Q with Area O, thereby reducing confusion among fishermen, fishery managers, and enforcement.
WHAT WILL HAPPEN IF NOTHING IS DONE? The regulation will not reflect current practices.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? No.
WHO IS LIKELY TO BENEFIT? Fishermen, fishery managers, and enforcement personnel.
WHO IS LIKELY TO SUFFER? Unknown.
OTHER SOLUTIONS CONSIDERED? None.
PROPOSED BY: Alaska Department of Fish and Game (HQ-F13-184)
****

PROPOSAL 362 - 5 AAC 35.525. Lawful gear for Registration Area J. Specify vertical placement of escape rings and update definition of escape ring placement in Bering Seas Tanner and snow crab fisheries, as follows:
(b) The following Tanner crab pot requirements are in effect in Registration Area J:
(1) **to permit escapement of undersize *C. bairdi* Tanner crab,** pots used to take *Chionoecetes bairdi* Tanner crab must have at least one-third of one vertical surface of the pot composed of not less than **seven and one-quarter** [7 ¼] inch stretched mesh webbing or have no less than four circular escape rings of no less than five inches inside diameter installed on the vertical **surface of the pot. The escape rings shall be placed so the bottom of a ring is no higher on the vertical surface than the first full mesh from the bottom of the pot** [PLANE TO PERMIT ESCAPEMENT OF UNDERSIZE C. BAIRDI TANNER CRAB]; and
(2) **to permit escapement of undersize *C. opilio* Tanner crab,** pots used to take *Chionoecetes opilio* Tanner crab must have at least eight escape rings with an inside diameter measure of no less than four inches **installed on the vertical surface of the pot so the bottom of a ring is no higher on the vertical surface than the first full mesh from the bottom of the pot** [PLACED WITHIN ONE MESH MEASUREMENT FROM THE BOTTOM OF THE POT], with four escape rings on each of two sides of a four-sided pot, or if the pot has no escape rings as specified in this paragraph, one-half of one side of a four-sided pot must have a side panel composed of not less than five and one-quarter inch stretched mesh webbing [TO PERMIT ESCAPEMENT OF UNDERSIZE C. OPILIO TANNER CRAB].
ISSUE: Regulations for lawful gear in Registration Area J do not specify where escape rings must be vertically located on pots targeting *Chionoecetes bairdi* Tanner crab. Escape rings are ineffective at reducing bycatch of female and sublegal crab when not placed near the bottom of a pot. Regulations for *C. opilio* Tanner crab in Registration Area J require escape rings to be located within one mesh measurement from the bottom of the pot (5 AAC 35.525(b)(2)). This proposal would require the same vertical placement of escape rings on *C. bairdi* Tanner crab pots, and update the description of ring placement for *C. oplilio* pots.
WHAT WILL HAPPEN IF NOTHING IS DONE? Regulations would continue to allow Tanner crab pots in Registration Area J to be configured in a manner that does not best facilitate escapement of sublegal and female crab.
WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? No.
WHO IS LIKELY TO BENEFIT? The crab fishing industry.
WHO IS LIKELY TO SUFFER? Unknown.
OTHER SOLUTIONS CONSIDERED? None.

PROPOSED BY: Alaska Department of Fish and Game (HQ-F13-185)
****

PROPOSAL 363 - 5 AAC 39.670. Bering Sea/Aleutian Islands Individual Fishing Quota (IFQ) Crab Fisheries Management Plan. Clarify vessel check-out provisions in rationalized crab fisheries, as follows:

(c) The following provisions apply to the fisheries specified in this section.

…

(3) …

(G) a vessel operator who is registered for one of the fisheries listed in (b) of this section must check out with the department in Dutch Harbor or Kodiak by telephone, facsimile transmission, or electronic mail within 72 hours of operating the vessel's last pot in the registration area.

ISSUE: This additional regulatory language would require a vessel to check out within 72 hours after operating its last pot in the registration area, signaling the completion of fishing operations. Short-term gear storage is permitted on the fishing grounds for up to 14 days after completing fishing operations. Vessel check-out regulations for individual fishing quota crab fisheries have been modified over time and, with these changes, the intent of the regulation is no longer reflected in regulatory language. Fishermen may participate in a rationalized fishery at any time during the regulatory season, and commonly do not participate throughout the entire season; check-out provisions enable fishery managers to track participation during the entire season.

WHAT WILL HAPPEN IF NOTHING IS DONE? Fishery managers, enforcement agencies, and the U. S. Coast Guard will continue to have inaccurate records of fishery participants.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR PRODUCTS PRODUCED BE IMPROVED? No.

WHO IS LIKELY TO BENEFIT? Fishery managers and enforcement.

WHO IS LIKELY TO SUFFER? Unknown.

OTHER SOLUTIONS CONSIDERED? None.

PROPOSED BY: Alaska Department of Fish and Game (HQ-F13-186)
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Table 3 Crab Plan Team recommendations for September 2013 (stocks 1-7). Note that recommendations for stocks 6-10 represent those final values recommended by the SSC in June 2013. Note diagonal fill indicates parameters are not applicable for that tier level. Values in thousand metric tons (t).

Chapter	Stock	Tier	Status (a,b,c)	F_{OFL}	B_{MSY} or $B_{MSYproxy}$	Years[1] (biomass or catch)	2013/14[2 3] MMB	2013 MMB / MMB_{MSY}	γ	Mortality (M)	2013/14 OFL	2013/14 ABC
1	EBS snow crab	3	a	1.58	154.2	1979-current [recruitment]	157.6	1.02		0.23(females) 0.386 (imm) 0.2613 (mat males)	78.1	70.3
2	BB red king crab	3	b	0.29	26.4	1984-current [recruitment]	25.0	0.95		0.18 default Estimated[4]	7.07	6.36
3	EBS Tanner crab	3	a	0.73	33.54	1982-current [recruitment]	59.4	1.77		0.34 (females), 0.25 (mat male), 0.247 (imm males and females)	25.35	17.82
4	Pribilof Islands red king crab	4	b	0.16	5.16	1991-current	4.68	0.91	1.0	0.18	0.90	0.72
5	Pribilof Islands blue king crab	4	c	0	3.99	1980-1984 1990-1997	0.28	0.07	1.0	0.18	0.00116	0.00104
6	St. Matthew Island blue king crab	4	b	0.18	3.1	1978-current	3.01	0.98	1.0	0.18	0.56 [total male catch]	0.45 [total male catch]
7	Norton Sound red king crab	4	a	0.15	2.00	1980-current [model estimate]	1.69	0.9	1.0	0.18 0.68 (>123 mm)	0.18 [total male]	0.16 [total male]
8	AI golden king crab	5				See intro chapter					5.69	5.12
9	Pribilof Island golden king crab	5				See intro chapter					0.09	0.08
10	Adak red king crab	5				1995/96–2007/08					0.05	0.03

1 For Tiers 3 and 4 where B_{MSY} or $B_{MSYproxy}$ is estimable, the years refer to the time period over which the estimate is made. For Tier 5 stocks it is the years upon which the catch average for OFL is obtained.
2 MMB as projected for 2/15/2014 at time of mating.
3 Model mature biomass on 7/1/2013
4 Additional mortality males: two periods-1980-1985; 1968-1979 and 1986-2013. Females three periods: 1980-1984; 1976-1979; 1985 to 1993 and 1968-1975; 1994-2013. See assessment for mortality rates associated with these time periods.

Table 4 Maximum permissible ABCs for 2013/14 and Crab Plan Team recommended ABCs for those stocks where the Plan Team recommendation is below the maximum permissible ABC as defined by Amendment 38 to the Crab FMP. Note that the rationale is provided in the individual introduction chapters for recommending an ABC less than the maximum permissible for these stocks. Values are in 1000 t. Note that recommendations for Adak red king crab represent the final values recommended by the SSC in June 2013.

Stock	Tier	2013/14 *Max*ABC	2013/14 ABC
EBS Snow Crab	3a	78.03	70.30
BBRKC	3b	7.07	6.36
Tanner Crab	3a	25.31	17.82
PIRKC	4b	0.759	0.718
PIBKC	4c	0.00116	0.00104
SMBKC	4b	1.23	0.45
Norton Sound RKC	4a	0.18	0.16
Adak red king crab	5	0.05	0.03

Table 5. Stock status in relation to status determination criteria 2012/13
(Note diagonal fill indicates parameters not applicable for this tier level

Chapter	Stock	Tier	MSST	B_{MSY} or $B_{MSYproxy}$	2012/13[4] MMB	2012/13 MMB / MMB_{MSY}	2012/13 OFL 1000 t	2012/13 Total catch	Rebuilding Status
1	EBS snow crab	3	77.1	154.2	170.1	1.10	67.8	32.4	
2	BB red king crab	3	13.19	26.4	29.05	1.10	7.96	3.90	
3	EBS Tanner crab	3	16.77	33.54	59.35	1.77	19.02	0.71	
4	Pribilof Islands red king crab	4	2.61	5.22	4.03	0.77	0.90	0.013	
5	Pribilof Islands blue king crab	4	1.99	3.98	0.58	0.15	0.00116	0.00061	overfished
6	St. Matthew Island blue king crab	4	1.8	3.6	2.85	0.79	1.02 [total male catch]	0.82 [total male catch]	
7	Norton Sound red king crab	4	0.80	1.6	2.08	1.30	0.24	0.21	
8	AI golden king crab	5					5.69	3.12	
9	Pribilof Island golden king crab	5					0.09	Conf.	
10	Adak red king crab	5					0.054	0.001	

4 MMB as estimated during this assessment for 2002/13 as of 2/15/2013.