

**Summary Minutes**  
**Joint Red Crab Plan Development Team and Advisory Panel Meeting**  
**Starboard Galley Restaurant**  
**Newburyport, MA**  
**January 20, 2010**

PDT members present were Richard Allen, Chairman; Barbara Rountree, NEFSC; Moira Kelly, NERO SFD; Allison Guinan, NERO; Antonie Chute, NEFSC; and Richard Wahle, Bigelow Laboratory for Ocean Sciences. PDT member Joseph DeAlteris was not present.

Members of the public included Frank Wetmore, Chairman of the Red Crab Advisory Panel and Jon Williams, New England Red Crab Harvesters' Association.

Chris Kellogg, New England Fishery Management Council (NEFMC) staff was present.

Documents relevant to the MSY reevaluation and the range of alternatives to be included in the draft Amendment 3 for consideration at the January 26-28 NEFMC were distributed.

Moira Kelly asked whether the Scientific and Statistical Committee (SSC) would be looking at the interim allowable biological catch (ABC) in March, as directed by the Council. She raised the question of whether the SSC would want to reconsider the buffer between the overfishing level (OFL) and ABC if the OFL were already conservative. Rather than focusing on problems with the Data Poor Stocks Working Group report, Moira recommended that the PDT simply demonstrate the conservative nature of the DPSWG recommendations, without presenting any new peer-reviewed information if such information is not yet available.

The PDT discussed the Depletion Corrected Average Catch (DCAC) model with particular reference to the use of the zero depletion assumption compared to running the model with the calculated difference in abundance from the 1974 survey and the 2003-2005 survey.

The PDT also discussed the input parameters for the DCAC model, particularly the standard deviation of natural mortality and the possibility that unreasonably low values for  $M$  might be used by the Monte Carlo procedure in the model, including negative values if the model is not constrained to positive values for  $M$ . Toni Chute was asked to determine whether the DCAC model is constrained to positive values for  $M$ . Rick Wahle pointed out that a 0.25 value for the standard deviation of  $M$  would have quite a different impact on the confidence intervals for model runs with  $M=0.15$  compared to  $M=0.05$ . He suggested that the standard deviation of  $M$  might more appropriately have a defined relationship to  $M$ , rather than being constant across all values for  $M$ .

The PDT also discussed the fact that the DCAC model provides confidence intervals around the estimates of sustainable yield that could be used to provide an indication of risk associated with different sustainable yield estimates.

The PDT discussed additional information on the size distribution of the stock because that was a concern that was expressed both in the DPSWG and by the SSC. The 2006 stock assessment indicated that there was no decline in mean size landed by individual strata during 2001-2005. There was an explanation in the stock assessment as to why there was an apparent change in size distribution over the entire range of the stock, relating primarily to differences in sample numbers from different strata. Modeling results using growth parameters for the Namibian red crab indicate that the observed changes in the size distribution of the Northwest Atlantic red crab are within the range expected for the fishing mortality rates that have been estimated for the population.

The PDT reviewed deterministic and stochastic modeling results using age to carapace width relationship for the Namibian red crab and the carapace width to weight relationship for the Northwest Atlantic red crab. The models used known abundance and size distribution data points for the red crab resource and attempted to find stock-recruitment relationships and natural mortality rates that could produce the abundance seen in the surveys and the size distribution that was seen at the origination of the fishery. The model results indicated that a Ricker type stock-recruitment relationship appeared to be necessary to support the recorded landings with the resulting abundance. The modeling exercises were initiated in response to a suggestion by an SSC member who suggested that the expected size distribution could be modeled using growth parameters for a closely-related species.

Lessons from the models include the possibility that the history of widely fluctuating landings and the population dynamics may combine to produce widely variable stock abundance in the future. This high variability will complicate management if it proves true.

The PDT reviewed analyses of the relationship between DCAC sustainable yield estimates and known maximum sustainable yield values. For fisheries that develop smoothly, the DCAC model produced estimates of sustainable yield from approximately 50% of MSY to 72% of MSY over a 35 year period of development. For a fishery that has fluctuated widely, with stock size that may have recovered to larger than the initial biomass at some point in history, the DCAC model has no consistent relationship between estimated sustainable yield and MSY.

The PDT discussed the use of a Ricker stock-recruitment relationship compared to a Beverton-Holt relationship for red crabs. Rick Wahle pointed out that a Ricker model has produced a good fit to data from other crustacean species. Rick pointed to evidence of cannibalism in similar species that would provide a mechanism for reduced recruitment at high stock levels. No direct evidence of cannibalism is available for red crabs, but similar species are known to be cannibalistic.

The PDT discussed the ongoing evaluation of bias in the 1974 survey, which will allow a better comparison with the 2003-2005 survey. PDT members are also conducting an ongoing analysis of landings per unit of effort as another index of abundance.

The PDT discussed an ongoing effort to update the landings per unit of effort analysis that was done by Andy Applegate for the 2006 stock assessment. Toni Chute expected to have results from that effort by March.

The PDT discussed the potential for comparing commercial LPUE data with survey abundance data to establish a catchability quotient. Rick and Toni will try to match VTR records with survey data from stations that are close in space and time.

The question of port-sampling records prior to 2001 was raised again.

On the subject of the MSY Reevaluation, the PDT expects the SSC to appoint a subcommittee to work with the PDT. No subcommittee has been established as yet.

On the subject of Amendment 3, the PDT reviewed a decision table that would guide the Council discussion on January 26-28. The Council will approve the range of alternatives to be considered

Moira raised the question of removing the specifications from the body of the Amendment and creating a separate section (section 5) in Amendment 3 for specifications.

Moira raised a question about the ABC control rule and alternatives. Chris Kellogg pointed out that the document does not need alternatives for ABC because the ABC is prescriptive. Moira suggested a hierarchical approach under which the ABC control rule would depend on the data available. The ABC would therefore evolve over time as additional information became available.

On the subject of management measure alternatives, Moira suggested separating the discussion of trip limits from the section headed "hard TAC." Trip limits were intended to maintain the capacity of the fleet, not the distribution among vessels. Trip limits may or may not be maintained even if hard TAC is adopted, and should be treated separately.

Dick Allen pointed out that, as used in the FMP, DAS do not provide a conservation measure because DAS are adjusted to allow the fleet to catch the target TAC. Effort controls could be used to provide a backup to a hard TAC. Recognizing the problems with DAS, the industry and the PDT might want to consider an alternative effort measure that would either hold the catch in check when abundance and catch rates were low, or at least provide a warning signal.

The PDT discussed accountability measures. The discussion focused on terminology and the inclusion of females or not at the various levels of prescribed values from OFL to total allowable landings (TAL) or annual catch target (ACT). Moira suggested using the skate amendment as a model. In season closure should be based on TAC or ACT. The following questions were raised and discussed: Would there be a buffer between the ACL and the TAL in addition to a provision for discards? Will there be a target below the ACL? How quickly can the fishery be closed? What is management uncertainty in this fishery? An ACT may be desirable if we consider what happens if we go over the ACL.

The draft Amendment 3 includes a provision for a carry-over of TAC underages in addition to a pay back of overages. Moira stated that a carry-over of TAC is a non-starter and has never happened in a quota-managed fishery to her knowledge. The PDT can put a carry-over proposal in the alternatives but it will have to be a separate measure, not an accountability measure. Carry-overs may be allowed for individual allocations in programs that include individual allocations, but not for the total TAC. Moira pointed out that DAS carry-overs were intended to avoid safety concerns.

Moira suggested that there should be two tiers under reactive accountability measures: pound for pound if the landings go over the TAL; then something more severe if the fleet goes over the ACL. The question was raised whether there would be any penalty for exceeding the ACL if the ACL were less than ABC and the catch did not exceed the ABC. Overfishing does not occur until the catch exceeds the ABC, as a conservative substitute for OFL.

Moira suggested that the PDT put a diagram of the catch limit hierarchy required by the National Standard 1 guidelines in Amendment 3.

Moira pointed out that the interactive voice reports (IVR) would be eliminated if DAS are eliminated. Whereas the IVR requirement is in the FMP, the elimination of IVR should be included in Amendment 3.

The PDT discussed the established procedures for monitoring TAC fisheries through dealer reports that are tabulated on a weekly basis by the NMFS Regional Office.

The PDT discussed the inclusion of females in the OFL and ABC and the possibility that the current experimental fishery permit could lead to a fishery for females. Options for modifying the FMP to allow the landing of females were discussed. The prohibition on females could be changed through a frame-work measure. Regardless of the current status of the prohibition on landing more than one tote of females, it will be necessary to include females in OFL and ABC. The prohibition on taking females could be removed from the FMP in Amendment 3 and the SSC could determine whether and how many females could be taken through the specification setting process. There would be a TAL for males and a TAL for females that would be adjusted separately based on the SSC recommendation.

The PDT discussed discard mortality. Dead discards will be included in ABC and then subtracted out to determine TAL.

The PDT reviewed questions that have been raised about the red crab fishery, resource, science, and management. Moira asked when the processors started taking smaller crab compared to the 114 mm market minimum in the 1970s. The Advisory Panel offered their opinions that the market eliminated the split pricing for large and small crabs in 2001. That led to more small crabs being landed. Moira requested more information on the size distribution in the catch rather than the change in the minimum size. The important question is whether the larger crabs continued to decline rather than whether

the mean size declined as the number of smaller crabs retained increased. A discussion of size selectivity on the boats ensued.

Rick Wahle will attempt to determine the mean size of crabs landed that are larger than the fully selected size. He will use survey data to truncate the size distribution and calculate the mean size in the fully exploited population at a point in time. This could be done for both the 1974 and 2003-2005 surveys.

The question has been raised whether total landings include the incidental catch? Moira pointed out that the FMP can include a provision that incidental catch would not be included in TAL. The National Standard 1 guidelines make reference to the treatment of incidental landings and should be referred to regarding this issue.

Barbara Rountree provided data on the incidental landings.

The question of ongoing changes in size selectivity was discussed. It was pointed out that selectivity can only be calculated at the same time that a survey is done so that the portion of the catch that is retained can be compared to the population on the sea bottom.

The PDT discussed the discrepancy between recorded landings and landings that were known to have occurred, particularly in 1995 and 1996. Moira raised the question of whether 1995 and 1996 should be eliminated from the calculation of average landings. Jon Williams also raised the question of whether all of the landings for the fishing vessel Mr. B were included in the reported landings in 2001. There were two large boats that fished in 2001. Toni Chute pointed out that the DCAC model requires the best estimate of landings because the model attempts to determine the impact of the landings on the biomass. If certain years are removed from the landings, the impact on the resource would appear to have been caused by lower landings than actually occurred, reducing the sustainable yield estimate from the model. Moira made the point that for the purpose of calculating the long-term average catch as a basis for the OFL, the elimination of years that were known to be erroneous would result in a more representative average.

Dick reviewed industry data from the early years of the fishery onward that do not show any significant trend in trip weights for the Fall River fleet of boats that partially processed crab. The boats that were partially processing crab had a maximum trip length, meaning that trip lengths probably did not lengthen appreciably over time. Trip weight data for one boat with the same captain and traps from 1978 through 2004 do not show any dramatic change over time.

The PDT discussed quality control on the VTRs and the sources of errors on the VTRs regarding trip locations as presented on the maps that Moira and Toni had prepared.

The PDT discussed the discard mortality table that was included in the peer-reviewed report from the DPSWG and the appropriate discard mortality rate to use.

The PDT discussed data from observed trips and experiences with observers on red crab trips.

The PDT discussed the technicalities of scanning the photo images from the 1974 survey for the purpose of determining the relative bias in the two surveys.