



New England Fishery Management Council

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John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

To: Paul J. Howard, Executive Director
From: Dr. Steve Cadrin, Chairman, Scientific and Statistical Committee
Date: April 28, 2010

Subject: Review of Red Crab PDT MSY Proxy Reevaluation and Development of ABC Recommendations to Council

The Scientific and Statistical Committee (SSC) was asked to: 1) Review the Plan Development Team's (PDT) MSY Proxy Reevaluation; 2) Provide the Council with the overfishing limit (OFL) and Acceptable Biological Catch (ABC) alternatives for red crab, together with guidance on the risk associated with each ABC alternative; and 3) Recommend an ABC control rule for inclusion in Amendment 3 to the Fishery Management Plan for Red Crab.

On September 23, 2009 the SSC provided the following recommendations to the Council:

1. *The overfishing limit (OFL) for red crab is approximated as 1,700-1,900 mt based on long-term average landings and depletion-adjusted average catch analyses from the 2008 Data Poor Stocks Working Group; however, both approaches to deriving OFL have technical problems that should be addressed to improve the basis of catch advice;*
2. *The interim Acceptable Biological Catch (ABC) for red crab for 2010 is 1,284 mt based on 2007 landings until the OFL estimate is reevaluated; and*
3. *The improvement of fishery and resource monitoring information is needed to derive estimates of MSY reference points and an ABC control rule.*

On March 16, 2010 the SSC reviewed information and associated presentations developed by the Red Crab PDT:

1. PDT MSY Reevaluation;
2. Report on Deep Sea Red Crab prepared for the Northeast Data Poor Stocks Working Group Meeting, Woods Hole, MA, December 8-12, 2008. (Chute A., Jacobson L. and Rago P.); and
3. Report by the Peer Review Panel for the Northeast Data Poor Stocks Working Group, Woods Hole, MA, January 20, 2009. (Thomas Miller, Chair, Robert Muller, Bob O'Boyle and Andrew Rosenberg)

The PDT demonstrated that the Depletion-Adjusted Average Catch model developed by the Data Poor Stocks Working Group provides an estimate of sustainable yield that underestimates maximum sustainable yield (MSY). Therefore, the information available for red crab is insufficient to estimate MSY or OFL. In lieu of an estimate of OFL, the SSC recommendation for an interim ABC is based on the long-term average landings of males, which is the same result as provided by Depletion Adjusted Average Catch model that assumes no depletion. The two survey estimates of abundance and their variance do not provide evidence of significant depletion from 1974 to 2003-2005. The SSC concludes that an interim ABC based on long-term average landings is safely below an overfishing threshold and adequately accounts for scientific uncertainty.

Historical landings of male red crab and historical discarding practices appear to be sustainable. Sustainability of future catches at or below the recommended ABC is conditional on not exceeding past discard rates. Estimates of discards would be needed to provide advice on total catch. If the ABC is intended to include total catch, it would have to be increased to include discards.

A research plan is needed to improve the scientific basis of management. Specifically, estimates of MSY and OFL are needed to replace the interim ABC recommendation so that an ABC control rule can be based on OFL, its uncertainty and the Council's desired risk tolerance.

The SSC's response to each Term of Reference is as follows:

- 1) *Review the PDT MSY Proxy Reevaluation* - The SSC agrees with the PDT that Depletion-Adjusted Average Catch model underestimates Maximum Sustainable Yield (MSY), and MSY is unknown.
- 2) *Provide the Council with the overfishing limit (OFL) and Acceptable Biological Catch (ABC) alternatives for red crab together with guidance on the risk that is associated with each ABC alternative* – In lieu of an OFL estimate, the interim ABC recommendation is based on a data-poor approximation of sustainable catch. There is no apparent depletion from the observed exploitation history and long-term average landings.
- 3) *Recommend an ABC control rule for inclusion in Amendment 3 to the Fishery Management Plan for Red Crab* – The best scientific information available for red crab is insufficient to advise on an ABC control rule.
- 4) *Advise the Council on an appropriate way to include female red crabs in the calculation of ABC* – No information was provided to the SSC on the female red crab catch.

The SSC recommends that:

- 1. Given the data-poor condition of the assessment of the red crab fishery, OFL cannot be estimated;**
- 2. Landings of male red crabs should be limited to an interim ABC of 1775 mt;**
- 3. Sustainability of future landings at or below the recommended ABC is conditional on not exceeding past discard rates; and**
- 4. Estimates of discards will be needed to provide advice on total catch.**