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## New England Fishery Management Council

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

### MEMORANDUM

**DATE:** March 10, 2010  
**TO:** Scientific and Statistical Committee (SSC)  
**FROM:** Council  
**SUBJECT:** Terms of Reference - Review of Red Crab PDT MSY Proxy Reevaluation and Development of ABC Recommendations to Council

Amendment 3 to the Fishery Management Plan for Deep-Sea Red Crab will incorporate an annual catch limit (ACL) and accountability measures (AMs). The Amendment will include specifications for 2011-2013.

On August 11, 2009 the SSC reviewed the report of the 2008 Data Poor Stocks Working Group (DPSWG) and the Peer Review Panel. On September 16, 2009 the SSC reviewed several sources of information and presentations. Following that meeting, the SSC endorsed the range of Maximum Sustainable Yield proxies from the DPSWG as the best science available for the overfishing limit (OFL). The SSC quoted from the DPSWG Peer Review Report that "The panel found no reason to change the overfishing definition of catch>MSY" and "The review panel concluded that, using the best available scientific information, estimates of MSY for male crabs only was in the range of 1700-1900 mt." The SSC noted that "the OFL recommendation by the Peer Review Panel [sic] was based on long-term average landings and depletion-adjusted average catch (DCAC), both of which had technical problems associated with inaccurate catch statistics, low catches influenced by market conditions, assuming constant stock biomass despite evidence of an increase, or assumed stock-recruit relationship." The SSC concluded that: "The MSY proxy is highly uncertain and should be reevaluated." The SSC also concluded that: "There is insufficient information to derive an ABC control rule."

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. **Interim Acceptable Biological Catch (ABC) of red crab for 2010 is 1,284 mt based on 2007 landings until the OFL estimate is reevaluated.**
3. **Improvement of fishery and resource monitoring information is needed to derive estimates of MSY reference points and an ABC control rule.**

Also on September 23, 2009, the Council responded to the SSC report with a unanimous vote in favor of a motion "that the Council send the red crab ABC back to the SSC for further analysis after new peer review information is available and that a quorum is present throughout SSC deliberations."

On November 19, 2009 the Council adopted a motion "that the red crab specs for 2010 be the status quo alternative which would be an ABC target TAC of 1,615 mt with 582 DAS." The Council also adopted a motion "to direct the PDT and the SSC to review the SSC recommended interim ABC for red crab to determine if it should be revised."

Based on these motions, the Council requests the SSC to respond to the following terms of reference and provide feedback to the Council during the April 2010 meeting.

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**Term of Reference for SSC review of the Red Crab PDT Reevaluation of MSY Proxies:**

1. Review the PDT MSY Proxy Reevaluation.
2. Provide the Council with OFL and ABC alternatives for red crab together with guidance on the risk that is associated with each ABC alternative.
3. Recommend an ABC control rule for inclusion in Amendment 3 to the Fishery Management Plan for Red Crab.
4. Advise the Council on an appropriate way to include female red crabs in the calculation of ABC.

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The PDT reevaluation of the MSY proxies that were developed by the DPSWG contains the following new information and analysis:

1. Alternative approaches to calculating long-term average landings.
2. DCAC model sustainable yield estimates using a depletion DELTA calculated from the estimated abundance from both the 1974 and 2003-2005 surveys, along with the assumed "zero DELTA" model results.
3. Confidence intervals associated with the DCAC sustainable yield estimates.
4. Two analyses of the relationship between DCAC sustainable yield estimates and MSY.
5. Yield per recruit analysis based on analogy with the Namibian red crab, *Geryon maritae*.
6. Additional information on the population dynamics of crab and other crustacean and fish populations that further informs the discussion concerning the likelihood of a population increase with harvesting.
7. Additional information on the mating behavior of other crab species that relates to the concerns about the reduction in biomass of large males.
8. Information demonstrating that there has not been any apparent shift in the geographical distribution of fishing effort.
9. Alternative methods of estimating sustainable yield.
10. Deterministic and stochastic yield estimates using simulation models.

Documents:

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1. Red Crab TOR memo
2. PDT MSY Reevaluation
3. Report 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.)
4. 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
5. September 23, 2009 Report from SSC Chair Dr. Steve Cadrin to Council Executive Director Paul J. Howard