



New England Fishery Management Council

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To: Tom Nies, Executive Director
From: Scientific and Statistical Committee
Date: September 3, 2013

Subject: Review of red crab interim acceptable biological catch (ABC) control rule and development of 2014-2016 ABC recommendations

The SSC met on August 21, 2013 to address the following terms of reference (TORs):

- 1) Review red crab landings, discard and discard data and analyses provided by the Red Crab Plan Development Team (PDT).
- 2) Review interim acceptable biological catch (ABC) control rule for and develop ABC recommendations for fishing years 2014-2016.

The SSC considered the following documents in its deliberations:

1. Red Crab PDT Memo to SSC Chair - SSC Meeting August 21, 2013
2. Red Crab Presentation - SSC Meeting August 21, 2013
3. Red Crab Landings Information - SSC Meeting August 21, 2013
4. Red Crab Discard Information - SSC Meeting August 21, 2013
5. PDT Meeting Summary July 23, 2013
6. SSC Report April 2010 - Memo from the SSC to the Paul Howard re MSY Proxy Reevaluation and Development of ABC Recommendations
7. SSC Report June 2010 - Memo from the SSC to the Paul Howard re Acceptable Biological Catch of Red Crab, including Discards and Females

The current ABC for the red crab fishery is based on the outputs of a depletion-corrected average catch (DCAC) model employed during the 2008 data-poor assessments workshop. DCAC estimates a sustainable yield based on the average catch in a fishery (average landings used for red crab), adjusted by fishery-independent estimates of the degree of stock depletion since inception of the fishery. For red crab, the depletion estimate is based on two surveys showing comparable biomass, meaning minimal stock depletion seems to have occurred. Therefore, the output of the DCAC model to this stock simply results in the average landings of 1775mt. DCAC cannot, however, estimate MSY or another OFL proxy, so OFL was determined to be unknown.

Information provided by the Red Crab PDT to the SSC when the existing ABC was set in 2010 suggested that the DCAC output likely produces a figure that is lower than the OFL, even though it is unknown. That likelihood, combined with the evidence of minimal depletion from the fishery-independent surveys, gave the SSC confidence that the DCAC output of 1775mt would meet management objectives, and recommended that value as the ABC for 2011-2013. In the absence of a new stock assessment or other information, the SSC recommends that the ABC remain at 1775mt for 2014-2016. OFL remains unknown.

When the ABC was first set in 2010, both the PDT and red crab industry noted that landings in the fishery are constrained by market demand and not biology, and offered that attribute as further basis to maintain status quo landings. This factor was reiterated to the SSC during its recent deliberations. The SSC responded that if such economic factors are going to be a primary rationale for future catch advice, then those will need to be described and analyzed more quantitatively and less anecdotally. Concern was raised, however, that the small size of the fleet might present proprietary constraints on such an analysis. In any case, the SSC recommends that economic analyses of catch trends play a greater role in development of management advice, especially for data-poor stocks for which biological insights are fewer.

A concern raised in 2010 that was revisited during recent deliberations is that discards in the fishery are poorly estimated, and therefore the relationship between catch and landings is somewhat uncertain. The fishery is restricted to harvest of males, with a small allowance for incidental take of females, and catch of females is the primary reason for discards. Males and females segregate to some degree by depth, allowing targeting of males. However, discard rates reported by the fishery in recent years show an increasing trend. This trend might have a biological basis, such as truncated size structure of the male population causing greater overlap with females. Or, the trend might simply be due increased reporting rates by the fleet providing more accurate data. Given that the trend is only evident over a three-year period, it might not be maintained and might simply be normal inter-annual variability. The SSC urges the industry to maintain its efforts to improve discard reporting, and for increased efforts to verify the data and interpret any apparent patterns. In the meantime, the SSC did not express great concern for the near-term impacts of discarding.

Correspondence from the red crab industry informed the SSC that a request will be made to the Council to revisit the male-only harvest strategy among 2014 priorities. The SSC discussed the rationale for such a strategy, as well as its potential unintended consequences. In particular, the strategy aims to maximize egg production, but potentially introduces sperm-limitation and/or problems with spawning behavior due to a truncated male age structure. Those trade-offs should be more thoroughly investigated, which might call for a change in the harvest strategy. The SSC therefore endorses the rationale behind the industry's request, but did not specifically discuss whether it should rise to the level of a Council priority.

Summary of recommendations

1. **Acceptable biological catch (ABC) for the red crab fishery remains at the status quo level of 1775mt.**
2. **The overfishing level (OFL) for the red crab fishery remains unknown given the data-poor nature of the assessment.**
3. **Market constraints on the catch of red crab need to be analyzed and communicated more systematically (to the extent that proprietary restrictions will allow in a small fleet) since these have been proposed as the major reason landings are consistently below the ABC.**
4. **Discard rates and trends should continue to be analyzed, in particular to determine if a seemingly increasing trend is primarily due to more thorough reporting as opposed to a biological explanation.**
5. **The effects of harvest on the sex ratio and sex-specific size structure of the stock, and the implications of those effects, should be more thoroughly investigated, consistent with requests from the industry to revisit the male-only harvest strategy.**