New England Fishery Management Council
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MEMORANDUM

DATE: July 26, 2019

TO: Dr. Jason McNamee, Chair, Science and Statistical Committee

FROM: Jessica Gribbon Joyce, Chair, Deep-Sea Red Crab Plan Development Team

SUBJECT: PDT Memo – Application of the Risk Policy Implementation Plan for the Deep-Sea Red Crab Specifications (2020-2022) process

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Following adoption of the Risk Policy Implementation Plan by the Council in June 2016, this memo outlines progress on several of the tracks utilized for the FY 2020-2022 specifications setting process.

Track 1 – Document the Current Management Procedures

The original *Red Crab Risk Policy Matrix* (2015) has been updated, and is included as Appendix 1 to this memo.

While a separate *Fishery Performance Report* was not prepared for this specifications process, this memo refers to the documents where the requested information can be located:

- Updated Catch and landing statistics are included in the PDT Specifications Memo (#3) as well as the PDT presentation to the SSC (#2), with updated landings, landings per unit effort (LPUE), port sampling data, observer data, and discard information. A comparison of VTR and dealer data show similar results across both data sets. Historical catch and landings information is included in Section 6.1 of the Red Crab Amendment 3 (2011) and the *Northeast Data Poor Stocks Working Group Report* (2009).

- There are both proactive and reactive Accountability Measures (AMs) for red crab. The reactive AM reduces the Annual Catch Limit (ACL) for the year following the overage on a pound for pound basis. The proactive AM gives the Regional Administrator the authority to close the landings of red crab by the limited access fleet when landings are projected to reach the Total

Allowable Landings (TAL). The TAL has not been exceeded since this fishery has been managed (2002); therefore, the AMs have not been triggered.

- Market and fishery revenue information is provided in Section 6.3 of Red Crab Amendment 3 and Sections 5.2, 5.3, and 9.9 of the Red Crab Fishing Years 2017-2019 Specification Package (2016). The chair of the PDT contacted Jon Williams, who has five permits and owns (or partially owns, along with another business entity) four active vessels as well as a processing facility. Mr. Williams reiterated that the increase in landings in recent years in Massachusetts (MA) and Virginia (VA) continues to be market driven, with both processed products and a live market. There is a live market in VA and NYC, while the landings in MA are processed and consumed throughout the region. The NYC market yields a higher price than VA, where prices are affected by substitutes from the blue crab market. Mr. Williams mentioned the market has been strong and could likely accept more landings should the TAL be increased. The New Bedford, MA processing plant recently started processing Jonah crab, which now comprise more than half of sales; however, competition from Canadian processors are driving Jonah crab prices down.[1] A table with updated landings and revenue information from 2016-2018 is included in the PPT presentation (#2).

- Status of the Resource: Updated PDT analysis based on the landings, LPUE, observer data and port sampling information from recent fishing years (2016-2018) indicates there is no evidence of a decline in the overall red crab stock size. Red crab remains a data-poor stock, with limited fishery-independent data, variable fishery-dependent data, and uncertainty around discard rates, discard mortality, and biological trends in growth and recruitment. A thorough description of the status of the stock is provided in Section 2.2 of the Amendment 3 to the Red Crab FMP. The PPT presentation (#2), PDT Specifications Memo (#3), and PDT Meeting Summary (#4) provide updated stock status information, as well as new research on reproductive biology.

- Observer Data: Samples from observer data on 48 trips between 2016-2019 suggest female crabs are larger the Southern area (Regions 2 & 3) than the Northern Area (Region 1). This may be evidence for a latitudinal gradient in size. Female sizes were compared since there would not have been removals by the fishery. This recent observer data also indicate smaller males are caught consistently in red crab traps, which suggests there is a supply of younger crabs to recruit to the fishery in the future. Observer data plots are included in the PDT presentation to the SSC (#2) and PDT Specifications Memo (#3).

[1] Personal communication with J. Williams, June 11, 2019.

Track 2 – Applying the Risk Policy to Council Decisions: Initial Application, Apply the Risk Policy to ABC Control Rules and ABC decisions.

Track 2 of the Risk Policy Implementation Plan outlines a process for PDTs to consider information in the Matrix to identify the positive and negative outcomes of their proposed ABC's. Following this process, the Red Crab PDT identified several undesirable outcomes and factors that might undermine management stability. The undesirable outcomes would not result from the proposed action considered during this specifications process. Rather, they are related actions that would directly affect the performance of red crab fishery, including net benefits to the nation. Table 1 utilizes the table template from the Risk Policy Implementation Plan to address these outcomes and weigh the expected benefits with the risks of undesirable outcomes.

Table 1. Potential Risks & Management Stability for Red Crab

Undesirable Outcomes (FY 2020-2022)	
Item	**Comments**
1. The Administration may change the 7-year sunset on exemptions for red crab fishery restrictions in the Northeast Canyons and Seamounts Marine Monument (Region 1).[2]	Potentially significant short- and long-term adverse economic impacts on the red crab fishery.
	The fishery may be constrained from harvesting the TAL, and potentially achieving OY[3] (in compliance with MSRA NSA 1) given the potential for fishing restrictions or closures in one of the three regions the fishery operates in (Region 1).
	Potential for a shift in effort to regions 2 & 3. Short-term potential for adverse biological impacts to red crabs in those regions. Long-term possibility of a lower TAL if a large fraction of red crab biomass is inaccessible such that existing limits could lead to localized depletion.
2. Potential reconsideration of the MAFMC exemption for red crab fishing restrictions in the coral management zones implemented by the Deep-Sea Coral Omnibus Amendment in 2017.	Exemption for red crab fishing restrictions for the first two years of implementation. Potential regulation changes in discrete deep-sea coral management zones (canyons) in regions 1, 2, and 3 of the red crab fishery could result in gear restrictions or closures in these zones.
3. The ALWTRT develops regulations that may affect the red crab fishery.	The ALWTRT is developing regulations to reduce the risk of serious injury and mortality to right whales from gear entanglement. Currently, they are focusing on lobster trap/pot gear; however, individual states and/or NMFS may include regulations for the red crab trap/pot gear.

[2] While this is not a management decision under the jurisdiction of the Council, it is included in this table as it does present uncertainty with the performance of the fishery and the TAL set by the SSC and approved by the Council.

[3] While the OFL, MSY and OY are unknown, on a qualitative basis, it is assumed that the fishery would not achieve OY under these conditions.

Methods of Analysis	
Item	**Comments**
1. National Monument regulation changes	The monument overlaps with three stat areas in Region 1. As VTR data are reported at the statistical area level, fine-scale spatial and economic analyses are possible, but are not currently available.
	Currently the 7-year sunset ends September 2023, which is outside of the fishing year for these specifications.
2. MAFMC Coral Omnibus Amendment	There is spatial overlap between the discrete zones and the red crab fishery in all three regions. If the MAFMC implements gear restrictions or closures in the discrete zones, it could result in short- and long-term adverse economic impacts to the fishery.
	Coral amendment is intended to balance coral conservation with socioeconomic impacts to fisheries prosecuted in the areas.
3. ALWTRT regulations	If vertical line regulations are extended to red crab trap/pot gear, it would result in short- and/or long-term adverse economic impacts to the fishery. Previous ALWTRT analyses indicate there is spatial and temporal overlap with the red crab fishery and right whale habitat. While GIS maps would need to be created to display the full extent of the overlap and trap/pot gear is an ALWTRP-regulated gear, data are available, though not necessarily at a fine scale.
Factors that Influence Management Stability	
Item	**Comments**
Discard variability/unknown discard mortality rates	*TBD (Response depends on SSC recommendation.)*
No recent survey or available fishery-independent data	
Data poor stock w/ highly uncertain biology	
Market-driven fishery	

Track 3 – 4 – Conduct a Generic MSE/ Conduct MSE

One limitation to conducting an MSE process on red crab is that the fishery is data-poor, and additional research on life history and reproduction would be helpful to have prior to conducting an MSE. In addition, analysis on alternative models to consider using to develop an ABC control rule are limited. Therefore, an MSE process will not be conducted for this specifications process.

Appendix 1 – Red Crab Risk Policy Matrix

FMP	**ATLANTIC DEEP-SEA RED CRAB**
STOCK(S)	**Deep-Sea Red Crab**
LAST ASSI	**2008 Data Poor Working Group Assessment;**

Assessment Model, Terminal Year	Description of Assessment Model	Overfishing?/ Overfished?	In Rebuilding Program?	OFL	ABC/ABC CR	ACL	ACT
N/A	Depletion-Adjusted Average Catch Model/Long-term average landings	Unknown	No	N/A	1,775 mt (long-term average landings - males only)	1,775 mt (males only)	**None**

*Major management issues/challenges: Highly uncertain biology, virtually no fishery independent information, limited discard information (though discard data are increasing with increased observer coverage)	MSY/OY	AMs	Discards	State Waters
	N/A	In-season closure; pound-for-pound payback	Uncertainty about discard rates and mortality	N/A

Availability of Biological and Assessment Data	Port sampling and landings, two combination trawl/video surveys (1974 & 2003-2005) used in assessment.
Recent Performance Against Harvest Control Rule	Landings have remained below the TAL from 2016-2018, with a peak in 2018, just below the TAL (discards presumed to remain the same as time series). In 2016, landings were 82% of the TAL, in 2017, landings were 76% of the TAL, and in 2018, landings were 95% of the TAL.
Current Management Program	Limited access fishery (five permits); limits on trap numbers and butchering at sea; restriction on female crabs (100 lb incidental allowed per trip)
Catch, Revenues, and Variability	From 2002-2009 landings followed a decreasing trend, with lower landings from 2007-2009, which started to increase in 2010 before another decline from 2012-2014 (due to market influences). Landings have been relatively stable since 2015. Prices have fluctuated between $0.86-0.96/lb over the last 5 yrs. While dealer revenue has slightly increased from 2009-2018 ($2.9 M), the inflation-adjusted price per pound has slightly declined over the same period (average=$0.93).
Data - Vessels, Permits, Dealers, Processors, Employment	Of the five permits, four are actively being fished (between two separate businesses entities, though the same owner has partial or full ownership of each permit/vessel). There is a processing plant in New Bedford, MA and a dealer in Norfolk, VA (mostly for live crabs), both are owned by the permit holder. Together, the dealer/processing plants and vessel operations employ approximately 100-110 people, including captains and crew.
% Commercial, % Recreational	100% commercial. There is no recreational fishery for red crab due to the great depth at which they generally occur.
Fishing Communities	The fishery is based out of the ports of New Bedford, MA and Norfolk, VA.
Other Economic/Social Factors	The MA landings are primarily processed, and the VA landings are primary live for markets in Chinatown, NYC and VA. Market demand has been increasing in recent years. Processed crab is sold primarily to the grocery market and some are exported to China.
Major Sources of Scientific Uncertainty	There are many sources of uncertainty: life history (including longevity and natural mortality, growth and maturity, and reproductive biology), discards, discard mortality, natural mortality, potential issues of localized depletion; only two fishery independent surveys ~30 years apart, with uncertain comparability.
Major Sources of Management Uncertainty	Very few; when landings decrease much below the TAL it is typically due to a lack of market demand. A recent increase in observer coverage (i.e., 48 trips from 2016-2019) is providing helpful information about discards, length frequency data by region, the level of bycatch of other species, and data to examine egg-bearing female length by region.
How is the probability of overfishing addressed?	Because of the lack of information to develop the OFL, MSY, and OY, and the evidence of long-term stability in landings, the SSC uses long-term average landings to determine the interim ABC. Decreased landings are primarily market-driven, though a strong market in recent years has resulted in landings at or above 75% of the TAL, with 2018 closer to the TAL than the previous two years.
What is the consequence of overfishing?	Direct impact on small red crab fishery, minimal impact on other fisheries
How are expected net benefits to the Nation currently measured/evaluated?	Ex-vessel revenues are used as a proxy for estimating net benefits to the nation. There are no constraints or conditions that prevent the fishery from maximizing consumer benefits and industry profits other than the ABC and additional measures established to ensure the sustainability of the red crab resource.
Interactions with Other Fisheries/Stocks, Bycatch Issues	Very few; some cross over of participants with the offshore lobster fishery. Bycatch of other species is minimal.
Ecosystem Considerations: Trophic Interactions	Very few
Ecosystem Considerations: Habitat	Very few; fishery is prosecuted entirely with traps which in general have minimal and temporary impacts to habitat. However, fishery overlaps to an unknown degree with vulnerable deep-sea coral habitats. Currently the red crab fishery is exempt from any fishing regulations in NEFMC and MAFMC coral management zones.

Ecosystem Considerations: Climate	Low - Overall Climate Vulnerability Rank. "The effect of climate change on Deep-sea Red Crab on the Northeast U.S. Shelf is estimated to be neutral, but with a moderate degree of uncertainty (66-90% certainty in expert scores)" (Hare et al., 2016).
Other Important Considerations/Notes	While observer data is starting to provide verified discard information, there have only been 54 observed trips (on targeted red crab trips) since 2007. Discard data from both observers and VTRs confirm the variability of discards; therefore, discards are not utilized in in catch estimates or CPUE. So the entire catch limit structure is based on landings information only. Discards and discard mortality are presumed to be similar to historic levels.