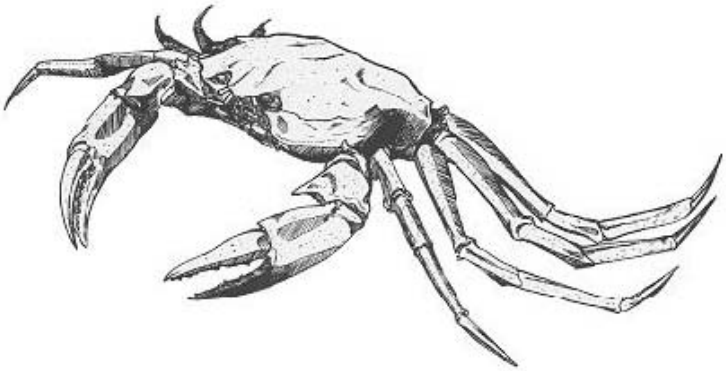
Atlantic Deep-Sea Red Crab Fishery Management Plan

Fishing Years 2020-2023 Specifications

Including a Supplemental Environmental Assessment, Regulatory Impact Review and Regulatory Flexibility Analysis



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1.0 EXECUTIVE SUMMARY

This document contains the New England Fishery Management Council (Council) recommendations for the Atlantic deep-sea red crab fishery specifications for the 2020-2023 fishing years (FY) (Table 1), consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Atlantic Deep-Sea Red Crab Fishery Management Plan (FMP), approved by the National Marine Fisheries Service (NMFS) on March 1, 2000. This document also contains information and supporting analyses required under other applicable law, including the National Environmental Policy Act (NEPA) and Regulatory Flexibility Act (RFA).

The Atlantic deep-sea red crab fishery specifications are annual amounts specified for FY 2020-2023 (March - February), including:

- Acceptable Biological Catch (ABC);
- Stock-wide red crab Annual Catch Limit (ACL);
- Total allowable landings (TAL)

This supplemental environmental assessment (SEA) updates the previously approved Amendment 3 to the Atlantic Deep-Sea Red Crab FMP Environmental Assessment (EA) to analyze a small increase in TAL in light of new scientific information. Amendment 3 ensured consistency with the ACL and accountability measures (AM) requirements of the MSA and established specifications for the red crab fishery for FY 2011-2013.

Proposed Action

The Proposed Action, as described in Section 4.2, would establish specifications for the FY 2020-2023 for the Atlantic deep-sea red crab fishery. The action is needed to put new specifications in place by the start of the FY on March 1, 2020, and to align the specifications process with the revised 4-year assessment cycle. Under this action, the Council is proposing a 2,000 mt ABC for the red crab fleet, which is a 12.7% increase from the ABC currently in effect under the FY 2017-2019 specifications and analyzed in Amendment 3 to the Atlantic Deep-Sea Red Crab FMP. Due to the data-poor nature of this fishery and limited reference points, the ACL = ABC = TAL. The Council based its decision on updated red crab fishery-dependent data, the most recent peer-reviewed assessment of the red crab resource carried out by the Data Poor Stocks Working Group (DPSWG) in 2009, and recommendations from the Council's Scientific and Statistical Committee (SSC). The Council believes the proposed TAL and discards adequately account for scientific uncertainty and would most likely result in continued biological and economic stability (Section 3.3). The SSC further supported the Proposed Action because recent data indicate favorable market conditions for red crab and the ability of the resource to sustain a low level of increase in landings.

The No Action alternative would maintain the FY 2017-2019 specifications of 1,775 mt for ABC, ACL, and TAL.

The Proposed Action and the No Action alternative are summarized in Table 1.

Table 1. Red crab specification alternatives.

	No Action (FY2020-2022)	Proposed Action (FY2020-2023)
Maximum Sustainable Yield (MSY)	Undetermined	Undetermined
Overfishing Limit (OFL)	Undetermined	Undetermined
Optimum Yield (OY)	Undetermined	Undetermined
Acceptable Biological Catch (ABC)	1,775 mt	2,000 mt
Annual Catch Limit (ACL)	1,775 mt	2,000 mt
Total Allowable Landings (TAL)	1,775 mt	2,000 mt

Affected Environment

The Affected Environment for the 2020-2023 Atlantic deep-sea red crab fishery specifications is in Section 5.0. The Affected Environment is described based on valued ecosystem components (VECs). VECs represent the marine resources, areas, and human communities that may be affected by the measures under consideration in this management action. VECs are the focus, since they are the "place" where the impacts of management actions are exhibited. The VECs for consideration in the 2020-2023 Atlantic deep-sea red crab fishery specifications include: Target Species (red crab); Non-Target Species (bycatch); Physical Environment and Essential Fish Habitat (EFH); Protected Resources; and Human Communities.

Impacts of the Alternatives

The impacts of the alternatives considered by the Council on each VEC described in the Affected Environment are in Section 6.0 and summarized in Table 2. Overall, there are minimal differences in terms of potential impacts between the status quo No Action TAL and the higher TAL. The change in the specification cycle from 3 to 4 years is an administrative action that does not have any impact on the VECs.

Table 2. Summary of specifications impacts expected on each VEC (preferred alternative shaded).

Specifications		Target Species (Red Crab)	Non-Target Species (Bycatch)	Physical Env. & EFH	Protected Resources	Human Communities
TAL	**No Action**	Low positive	Low positive	Negligible	Low negative to low moderate negative	Economic: low positive, Social: low positive
TAL	**Proposed Action**	Low positive; less positive than No Action for *Scenarios 1 and 2*	Low positive; *Scenario 1*: neutral to the No Action and *Scenario 2*: less positive to the No Action	Negligible; neutral to the No Action for *Scenarios 1 and 2*	Low moderate negative to moderate negative; *Scenario 1*: slightly more negative than No Action and *Scenario 2*: moderately more negative than No Action	Economic: low positive, Social: low positive; more positive than No Action *for Scenarios 1 and 2*

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2.3 List of Acronyms

ABC	Acceptable Biological Catch
ACL	Annual Catch Limit
ALWTRP	Atlantic Large Whale Take Reduction Plan
AM	Accountability Measure
APA	Administrative Procedures Act
BRP	Biological Reference Point
CEQ	Council on Environmental Quality
CZMA	Coastal Zone Management Act
DAS	Days-at-Sea
DCAC	Depletion-Corrected Average Catch
DFO	Department of Fisheries and Oceans Canada
DPS	Distinct Population Segment
DPSWG	Data Poor Stocks Working Group
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act of 1973
FMP	Fishery Management Plan
FY	Fishing Year
GARFO	Greater Atlantic Regional Fisheries Office
IRFA	Initial Regulatory Flexibility Analysis
IQA	Information Quality Act
LCMA	Lobster Conservation Management Area
LPUE	Landings per Unit Effort
MMPA	Marine Mammal Protection Act
MSY	Maximum Sustainable Yield
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCC	Northeast Region Coordinating Council
OHA2	Omnibus Habitat Amendment 2
OFL	Overfishing Limit
OY	Optimum Yield
PDT	Plan Development Team
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SBA	Small Business Administration
SIR	Supplemental Information Report
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
TAL	Total Allowable Landings
VEC	Valued Ecosystem Component
VTR	Vessel Trip Reports

3.0 INTRODUCTION AND PURPOSE

This supplemental environmental assessment (SEA) updates the previously approved Amendment 3 to the Atlantic Deep-Sea Red Crab Fishery Management Plan (FMP) Environmental Assessment (EA) to analyze a small increase in total allowable landings (TAL) in light of new scientific information. Amendment 3 ensured consistency with the annual catch limit (ACL) and accountability measures (AM) requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act, or MSA) and established specifications for the red crab fishery for fishing years (FY) 2011-2013. This document is not a stand-alone document, but rather a supplement and is intended to be utilized in conjunction with Amendment 3 to the Atlantic Deep-Sea Red Crab FMP (September 29, 2011). Unless otherwise noted, the original EA prepared for this action remains applicable. Therefore, sections addressed in this supplement should be considered within the context of the original EA.

3.1 Purpose and Need

The purpose of this action is for the New England Fishery Management Council (Council or NEFMC) to establish an acceptable biological catch (ABC) and set specifications for the Atlantic deep-sea red crab fishery for FY 2020-2023 (Table 3).

The action is needed to manage the fishery and prevent overfishing while promoting the full utilization of optimum yield (OY), pursuant to the MSA, and consistent with the goals and objectives of the Atlantic Deep-Sea Red Crab FMP. In addition, this action is needed to align the specifications process with the revised 4-year assessment cycle.

Table 3. Purpose and need for 2020-2023 fishery specifications.

Purpose	Need
Establish an ABC and set specifications for the 2020-2023 fishing years.	To prevent overfishing while promoting the full utilization of optimum yield (OY).
Change the specifications cycle from 3 to 4 years.	Update the specifications cycle to match the scientific assessment cycle established by the NRCC.

3.2 Goals and Objectives

The FY 2020-2023 Atlantic deep-sea red crab fishery specifications are intended to meet the following goals and most of the objectives of the Atlantic Deep-Sea Red Crab FMP (NEFMC 2002):

Goals:

1. Consistent with the National Standards and other required provisions of the MSA, manage the Atlantic deep-sea red crab fishery at sustainable levels.
2. Create a management system so that fleet capacity will be commensurate with resource status so as to achieve the dual goals of economic efficiency and biological conservation.

3. Maintain a directed fishery for Atlantic deep-sea red crab, while at the same time allowing all fishermen the continued opportunity to land appropriate amounts of red crab as bycatch.
4. Minimize, to the extent practicable, adverse impacts on fishing communities during the transition from an unregulated fishery to a regulated one.

Objectives:

1. Achieve, on a continuing basis, OY for the U.S. fishing industry.
2. Prevent overfishing of the red crab resource.
3. Develop a definition of overfishing.
4. Develop biological, economic and social measures of success for the red crab fishery and resource.
5. Develop a controlled access system to keep fishing capacity matched to the available resource.
6. Adopt fishery management measures that constrain fishing mortality to levels that are compliant with the Sustainable Fisheries Act.
7. Promote research and improve the collection of information to better understand red crab population dynamics, biology and ecology, and to improve assessment procedures in cooperation with the industry.
8. Minimize, to the extent practicable, adverse impacts associated with management of the red crab fishery on other fisheries.
9. To the maximum extent possible, maintain a twelve-month fishery.

3.3 Background

Atlantic deep-sea red crab is a data poor stock. The Data Poor Stocks Working Group (DPSWG) assessed red crab in 2008. Since this time, there have been no updates to the assessment or specifications methods, which are described in in Section 5.1.2. The ABC, ACL, and TAL limit from FY 2010-2019 were based on average long-term (1974-2008) landings of the directed red crab fishery.

3.3.1 Original Atlantic Deep-Sea Red Crab Fishery Management Plan and Modifications

The Atlantic Deep-Sea Red Crab FMP was implemented in 2002. The management unit specified in the FMP includes red crab (*Chaceon quinquedens*) in U.S. waters of the Atlantic Ocean from 35˚ 15.3’ N (the approximate latitude of Cape Hatteras Light, North Carolina) northward to the U.S./Canada border. The FMP originally included a target total allowable catch (TAC) limit, limited access permits and trip limits based on historical participation, days-at-sea (DAS) allocations for the limited access fleet, a prohibition on retaining more than 100 lbs. of female red crab, as well as fishing gear requirements and other restrictions.

Framework Adjustment 1 to the FMP modified the annual review process to allow specifications to be set for up to three years (August 31, 2005). Amendment 1 incorporated the Standardized Bycatch Reporting Methodology (SBRM) (February 27, 2008), and Amendment 2 is the Council’s Essential Fish Habitat Omnibus Amendment 2 (OHA2) (April 9, 2018). Amendment 3 to the Atlantic Deep-Sea Red Crab FMP ensured consistency with the ACL and AM

requirements of the MSA (September 29, 2011). Amendment 4 revised the SBRM (June 30, 2015). Amendment 5 is the Omnibus Industry-Funded Monitoring Amendment and Environmental Assessment (EA; ongoing). Amendment 6 is the Omnibus Deep-Sea Coral Amendment, which has been approved by NMFS and for which rulemaking is ongoing, with implementation expected in early 2020.

The TAL proposed in Amendment 3 was the same as the landings limit that was in place for the FY 2010 specifications (NEFMC, 2011).[1] The long-term average landings were determined to be sustainable by the DPSWG and were recommended as the ABC for red crab by the SSC. Amendment 3 also included measures to eliminate DAS, eliminate trip limits, and modify the trap limit regulatory language.

The specifications alternative in Amendment 3 to the Atlantic Deep-Sea Red Crab FMP (FY 2011-2013) had positive impacts on the red crab stock because the landings level would maintain a healthy red crab resource while preventing overfishing. This preferred alternative was determined to have negligible impacts on non-target species, protected resources, and the physical environment because the fishery has very little bycatch, a relatively minimal impact on habitat, and minimal known interactions with protected resources. The amendment had uncertain but likely positive impacts on human communities by maintaining a sustainable red crab resource and by making it possible for the red crab fleet to increase efficiency and safety by not being pressured to maximize the productivity of each DAS. Section 6.0 of this document provides details on the impacts of the proposed action on each of the valued ecosystem components (VECs).

3.3.2 Fishing Years 2011-2019 Specifications

As described above, Amendment 3 originally established specifications for the red crab fishery for FY 2011-2013. In August 2013, the Council's SSC recommended an ABC for fishing years 2014-2016 of 1,775 mt for the directed fishery (which is equal to the long-term average landings of the directed red crab fishery), and the Council approved the SSC's recommendations. The specifications included a supplemental information report (SIR), (NEFMC 2013) and NMFS published the final rule in February 2017 (79 FR 24356; April 30, 2014).

In August 2016, the SSC again recommended an ABC of 1,775 mt for FY 2017-2019 for the directed fishery on red crab. The Council approved the SSC's recommendation at the September 2016 Council meeting. The specifications included a SIR, (NEFMC 2016b) and NMFS published the final rule in February 2017 (82 FR 11322; February 22, 2017).

[1] The Council approved an in-season adjustment to the red crab TAL and DAS in September of 2010, which was the first year the TAL was set at 1,775 mt with corresponding 665 DAS (75 FR 49420, August 13, 2010). The previous TAL was 1,615 mt (75 FR 27219, May 14, 2010).

4.0 ALTERNATIVES UNDER CONSIDERATION

4.1 No Action

The No Action alternative would maintain the current TAL of 1,775 mt and the 3-year specifications cycle for the Atlantic deep-sea red crab fishery.

Rationale: The No Action alternative would maintain the TAL that has been in place since FY 2010. This TAL has not been exceeded since implementation. While a stock assessment has not been conducted since 2008, analysis of fishery dependent data indicates the red crab population has remained stable under this landings limit. Anecdotal information on the red crab market indicates that there is demand for more red crab products (mostly processed) should there be an increase in the TAL; therefore, maintaining the status quo TAL under the No Action alternative would not allow for this market demand to be met and for a higher level of economic benefits to be obtained from the fishery.

4.2 Proposed Action

The Proposed Action is to set the ABC, ACL and TAL for the Atlantic deep-sea red crab fishery for FY 2020-2023 at 2,000 mt, which is a 12.7 % increase over the current TAL of 1,775 mt (Table 4). This action also incorporates an administrative change in the specifications cycle from 3 years to 4 years.

Rationale: Recent landings, landings per unit of effort (LPUE), port samples, discard information, and economic data suggest biological and economic stability in the size of the red crab stock since 2011. After reviewing this information presented by the PDT, the Council's Scientific and Statistical Committee (SSC) recommended setting the ABC slightly above the long-term (1974-2008) average landings of the directed red crab fishery (2,000 mt) for FY 2020-2023 (Table 1). The SSC noted that the fishery has routinely been operating under the current ABC/TAL. The SSC also commented on the steady performance of the fishery under the existing ABC with no negative signals (e.g. consistent pattern of distribution of egg bearing and non-egg bearing females). Maximum sustainable yield (MSY) and the overfishing limit (OFL) remain unknown.

The change in the specifications cycle from 3 years to 4 years resulted from a NOAA Fisheries request to the Northeast Region Coordinating Council (NRCC) to evaluate the prioritization and scheduling of stock assessments in the Northeast. Since 2007, the Northeast Fisheries Science Center (NEFSC) informed the other members of the NRCC that it did not have the resources to complete all the assessments the Councils and the Atlantic States Marine Fisheries Commission needed for the Councils to meet the reauthorized 2006 MSA requirements to set annual catch limits for all managed stock or stock complexes.

The NRCC developed a stock assessment prioritization process to identify assessment needs and schedule stock assessments. In 2018, the NRCC unanimously approved a new assessment process that established a research track for assessments using new models and research findings, and a management track for assessments using previously approved methods with limited modifications.

The prioritization process considered 17 biological, economic/social, and scientific characteristics of each stock as well as scientific resource limitations and management needs for assessments. It also changed the frequency of the management track assessments for many stocks resulting in more frequent management track assessments for some, no changes for others, and less frequent assessments for a third group. Because of its low level of biological information, relatively low economic value, and lower biological vulnerability, and because of constraints on scientific resources, the NRCC changed the Atlantic deep-sea red crab assessment from a 3-year to a 4-year assessment cycle. Consequently, the Council is proposing to change the management specifications to align with the new 4-year assessment cycle.

Table 4. Proposed red crab specifications for FY 2020-2023.

	Proposed Action
Maximum Sustainable Yield (MSY)	Undetermined
Overfishing Limit (OFL)	Undetermined
Optimum Yield (OY)	Undetermined
Acceptable Biological Catch (ABC)	2,000 mt
Annual Catch Limit (ACL)	2,000 mt
Total Allowable Landings (TAL)	2,000 mt

5.0 AFFECTED ENVIRONMENT

This section describes key Valued Ecosystem Components (VECs) of the affected environment for the red crab fishery: target species (red crab), non-target species (bycatch), physical environment and Essential Fish Habitat (EFH), protected resources, and human communities.

5.1 Target Species (Red Crab)

This section provides information on the biology, life history, and status of the red crab population based on recent fishery-dependent data, including vessel trip report (VTR) data, dealer data, and observer data.

5.1.1 Biology and Life History

General information on the biology and life history of the Atlantic deep-sea red crab (*Chaceon quinquedens*) is provided in the Environmental Assessment (EA) for Amendment 3 to the Red Crab FMP (NEFMC, 2011). As this is a supplemental EA (SEA), these biological factors in Section 6.1.1 are incorporated by reference. Since 2011, there have been several new studies that have provided preliminary information on the reproductive biology of red crab:

Stephens and Guida (2016) conducted research on depth and temperature distribution, morphometrics, and sex ratios of red crab, and reported the following:

- Size at 50% maturity (SM_{50}) could not be determined through examining the growth rate of the crab carapace and chela.
    - SM_{50} was estimated at 61.6 mm carapace length (CL) for females based on gonopore condition, which is smaller than previously understood.
- Females at the southern range of their distribution had a greater mean CL.
- Sex ratios of female crabs above SM_{50} were <0.5, indicating that large males may be depleted in comparison to female abundance.
- The presence of eggs on less than 50% of female crabs is a strong indicator that reproduction occurs at biennial (or longer) intervals.

Martinez Rivera (2018) conducted research on the reproductive biology of female red crabs that provides new insight into this species:

- Size at sexual maturity (SM_{50}) indicates differences in SM_{50} of females by location (i.e., decreasing with higher latitude) and by season (i.e., larger CL in summer and fall than winter and spring).
- A positive correlation between fecundity and female size was observed.
    - Fecundity, the number of eggs per brood, of *C. quinquedens* ranged from 34,691–324,729 for females between 62.6 and 106.2 mm in CL.
- Results implied asynchrony between morphological and physiological sexual maturity, suggesting that mating occurs prior to completion of ovarian development.
- Results support earlier evidence (Stevens and Guida 2016) that the female red crab reproductive cycle is at least two years, and hatching is seasonal but semi-continuous.

- Red crabs can mate when they reach morphometric maturity but may take up to a year to produce their first brood mass.
- The biennial reproductive cycle observed in red crabs is unusual due to the relative warm temperatures they inhabit. Hence, this species may serve as a model for temperate deep-sea crabs, and further investigation is warranted.

5.1.2 Assessment Process

The most recent peer-reviewed scientific advice applicable to the red crab fishery was produced by the DPSWG and the associated Peer Review Panel, which met in December 2008 and issued its report on January 20, 2009. The DPSWG was tasked with recommending biological reference points (BRPs), and measurable BRPs and MSY proxies to consider when recommending catch limits.

The methods used by the DPSWG are explained in a working paper that is available at http://www.nefsc.noaa.gov/publications/crd/crd0902. The DPSWG produced estimates of sustainable yield that approximated recent and long-term average annual landings, leading the DPSWG to "recommend a catch limit that mimics both recent and long term mean annual landings." The Council's Red Crab PDT further analyzed the methods used by the DPSWG and determined that the estimates of sustainable yield from the Depletion Corrected Average Catch (DCAC) model are likely to be less than MSY. The SSC, therefore, concluded "the information available for red crab is insufficient to estimate MSY or OFL." In lieu of an estimate of OFL, the SSC recommended an ABC based on the long-term average landings of male red crab. The SSC noted that the two survey estimates of abundance and their variance do not provide evidence of significant depletion of currently market-sized males from 1974 to 2003-2005.

Further, the SSC determined that there is insufficient data to determine the historic level of discards and discard mortality that accompanied the historic landings that were used to establish the ABC. However, the SSC concluded that the historical landings of male red crab and historical discarding practices appear to be sustainable, and that an interim ABC based on long-term average landings of 1,775 mt was safely below an undetermined overfishing threshold and adequately accounts for scientific uncertainty. The TAL for FY 2011-2013 was set at 1,775 mt in Amendment 3 (76 FR 60379; September 29, 2011), and this level has been maintained through FY 2019. All specification values assumed a male-only directed fishery, and the regulations prohibit possession of female crabs.

Section 5.5.2 provides updated data on red crab landings and LPUE, using VTR data. These data indicate there have been minimal changes in the size structure of the population.

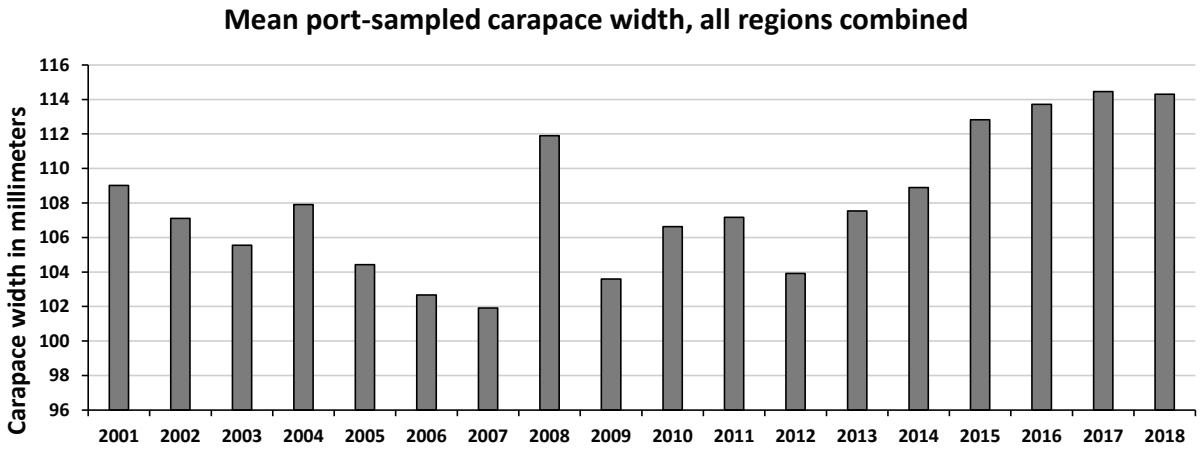
5.1.3 Port Sampling and Observer Data

Aggregated port sampling data indicate that the mean size of landed males has increased since 2013 (Figure 1). This may be due to market demand. When port sampled length frequencies are plotted by year and region, this trend of landing larger crabs is true across all regions, with the largest crabs landing from Region 3 (Figure 2).

The red crab fishery is market driven. When landings are low, it is often because the demand for red crabs has decreased and the fleet has targeted other more profitable species; however, there has been a strong market in recent years. See Section 5.5.5 for more market and economic information.

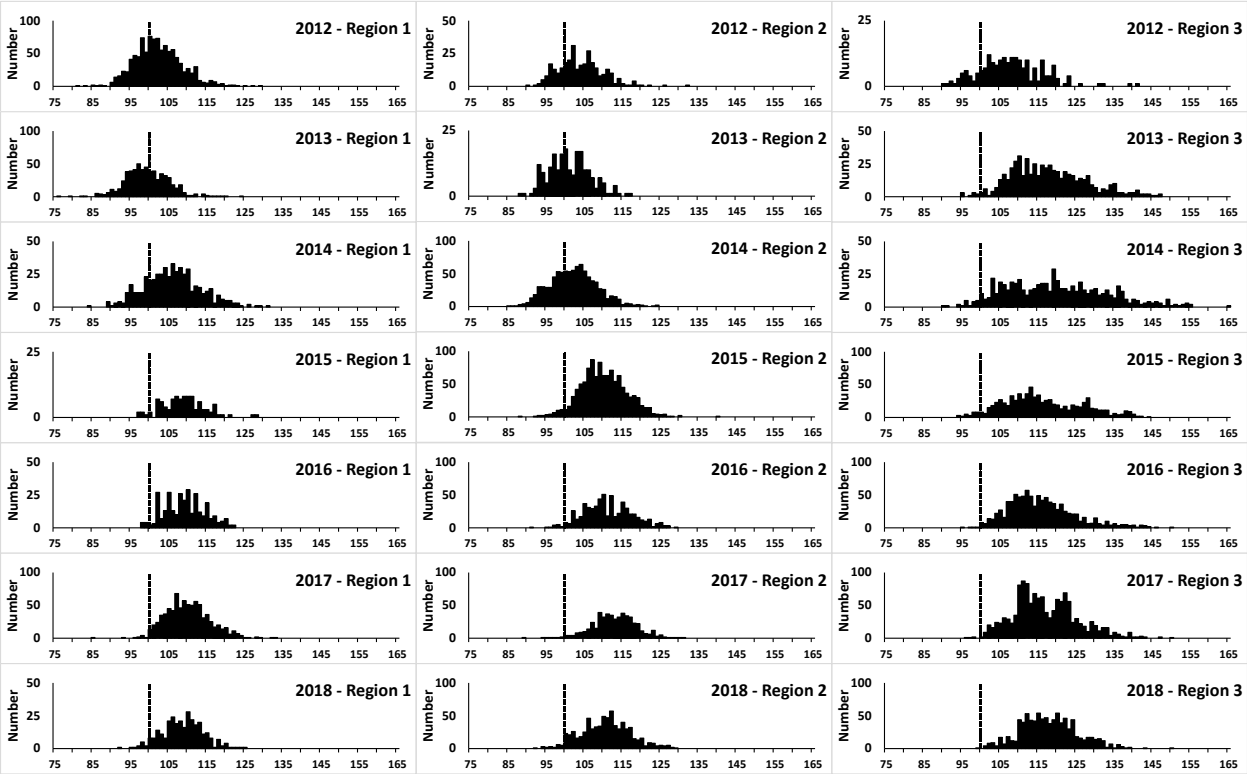
Based on the landings, LPUE, and port sampling information from recent fishing years, there is no evidence of a change in the overall red crab stock size. The fishery-dependent data available do not allow for a measure of recruitment; however, observer coverage has recently increased on red crab vessels, and provides insight into recruitment.

Figure 1. Mean red crab (males) carapace widths in millimeters (mm), 2001-2018.



Note: Port agents sampled during the year and in all regions.
Source: NOAA Fisheries port sampling data.

Figure 2. Carapace-width frequencies of port-sampled red crabs by region, 2002-2018.



Note: Region 1 (GBK, SNE) in the left column, Region 2 (NY, NJ, DE) in the middle column, and Region 3 (MD, VA, NC) in the right column. The black line is at 100 millimeters, just to use for comparison. Numbers of crabs sampled does not relate to landings.
Source: NOAA Fisheries port sampling data.

Since 2016, the Northeast Fisheries Observer Program (NEFOP) has increased its allocation of observers to red crab trips. Observer data provide information not available from any other source, since there is no regular fishery-independent survey that includes red crab, and other fishery-dependent data are limited to data collected on VTRs and dealer reports. Observers estimate and record discarded red crabs, measure and sex all the crabs caught in a subset of traps, note females that are carrying eggs, and measure and record species caught other than red crab, among other things. Red crab Region 1 is considered the 'northern region' for observer data, and Regions 2 and 3 are considered the 'southern region' for this analysis (Figure 10).[2]

Analyses of NEFOP data presented in this section are considered preliminary due to the relatively small sample size but provide valuable insight on several aspects of the fishery. For example, observer data from 48 directed red crab trips from July 2016 through February 2019 indicate smaller males (discarded due to market constraints) are caught consistently in red crab

[2] The sample sizes were too small to divide into the traditional three regions. The line between the northern and southern regions is just north of Hudson Canyon.

traps, which suggests there is a supply of younger crabs to recruit to the fishery in the future (Figure 3).

Length frequency data from 2016-2019 suggest females (which are minimally impacted by the fishery and are more likely to retain their natural length distributions) in Regions 2 and 3 are larger than those in Region 1, which may be evidence for a latitudinal gradient in size (Figure 4). Observer data from red crab trips can help scientists examine egg-bearing female length frequencies, estimate discards of undersized and female red crabs, and assess the level of bycatch of other species in the red crab fishery. Figure 5 shows the length frequencies of egg-bearing females in the northern and southern regions.

Figure 3. Carapace-width frequencies of discarded and kept crabs (males only), measured by observers in the northern region, by year.

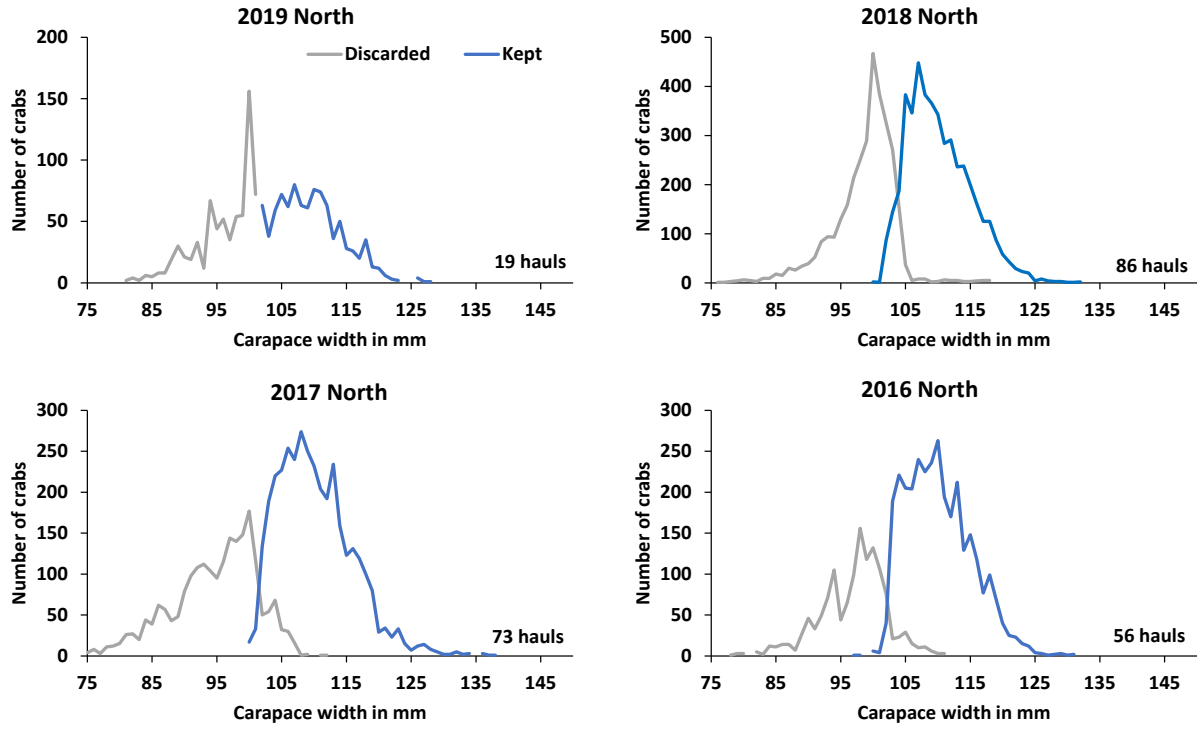
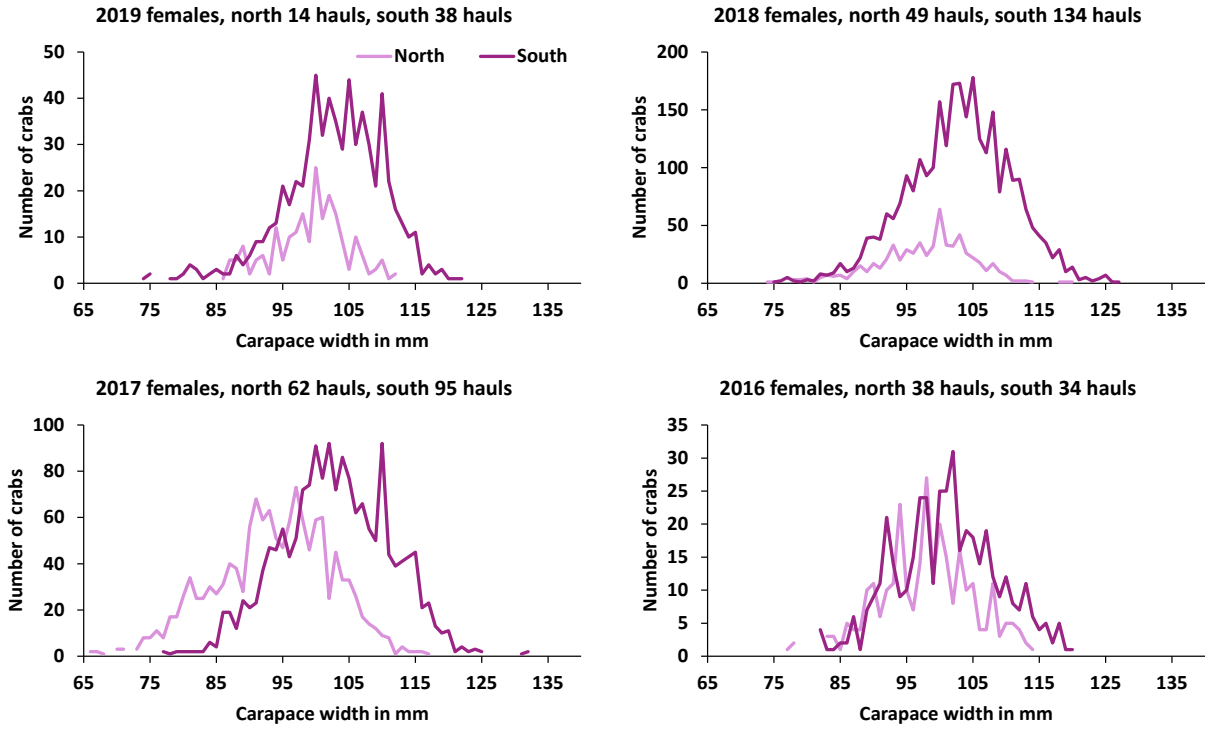
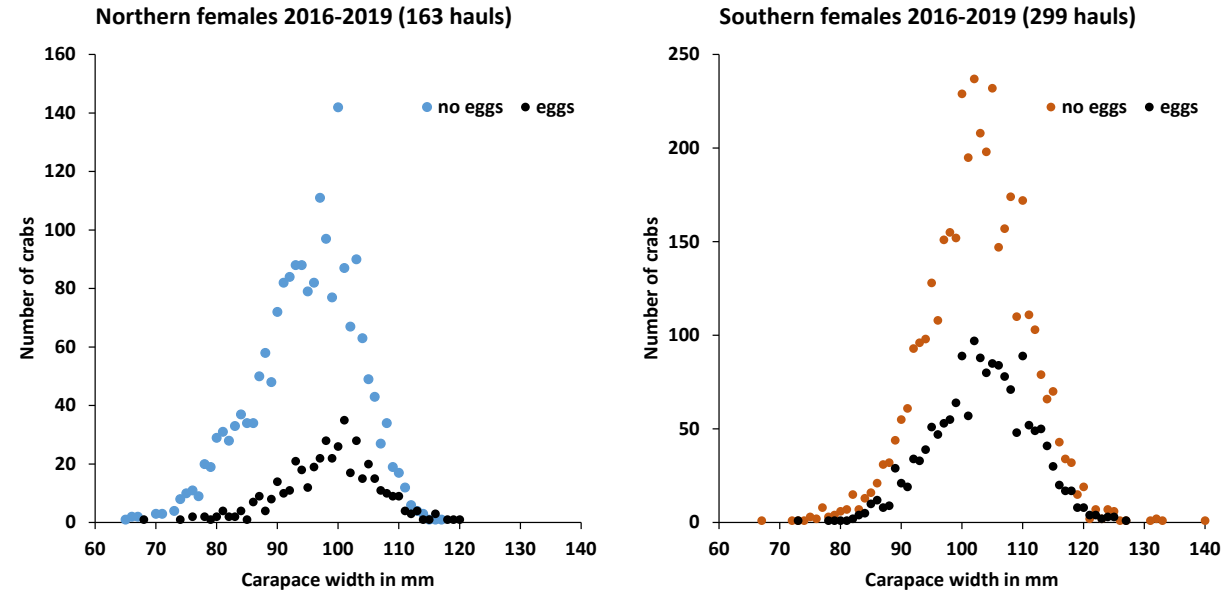


Figure 4. Carapace-width frequencies of female red crabs from the northern and southern regions.



Note: All females are discarded since it is a male-only fishery, measured by observers and plotted together by year.

Figure 5. Carapace-width frequencies and presence of eggs of female crabs in the northern and southern regions.



Note: The colored dots represent the crabs without visible eggs and the black dots represent the crabs carrying eggs.

5.1.4 Red Crab Discards

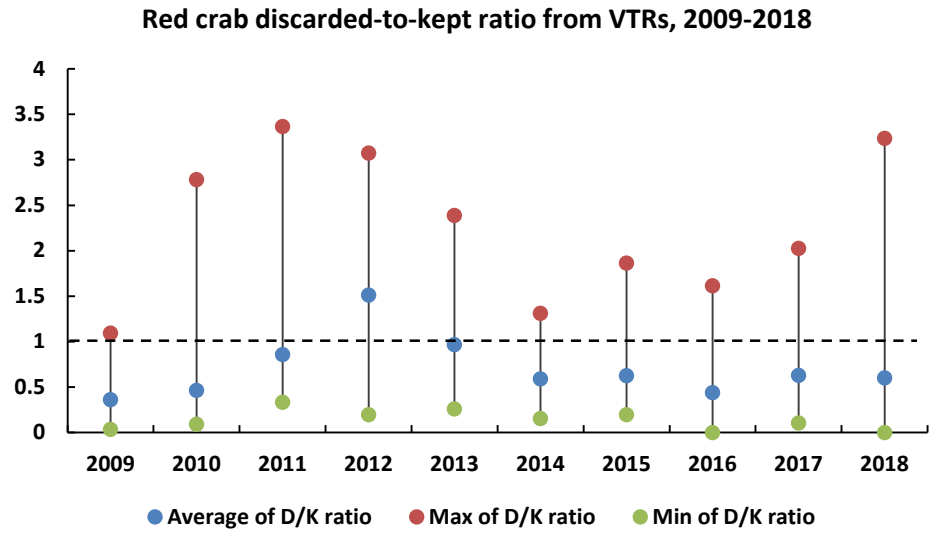
VTR data of red crab discards are highly variable and uncertain. Variability is caused by culling for preferred market sizes, the depth and location of the gear, the time of year, and amount of attention given to discard estimation as the traps are handled on deck. In 2013, the SSC concluded that the available monitoring data on discards and research on discard mortality were inadequate to reliably estimate dead discards. Since 2016, there has been an increase in observer coverage of red crab vessels (i.e., from July 2016- February 2019, 48 trips were observed), and observer data confirm discards remain highly variable. Thus, the best scientific information available for deriving ABC continues to be the time series of landings, since there have been no updates to calculating discard mortality rates or new research on discard mortality.

Over the last ten years, VTR reporting rate of discards has increased to 100% of red crab fleet trips reporting estimated red crab discard weights (Table 5), although discard rates remain highly variable. The annual mean estimated discarded-to-kept ratios from 2009-2018 vary from 0.36 to 1.51, with a mean of 0.71. Figure 6 shows the mean discard to kept ratio for 2009 through 2018, from a period when the number of trips reporting discards was over 50%. Discards likely vary between fishing regions and vessels.

Table 5. The number of directed red crab trips and the percentage where the VTR log included both red crab landings and an estimate of red crab discards, 2002-2018.

	Number of red crab trips	Percentage of red crab trips reporting discards
2002	58	28
2003	58	28
2004	71	56
2005	63	44
2006	62	50
2007	53	34
2008	55	25
2009	43	56
2010	54	94
2011	55	89
2012	47	98
2013	44	89
2014	42	100
2015	57	100
2016	76	100
2017	75	100
2018	78	100

Figure 6. Mean annual discard rates of red crabs expressed as the ratio of VTR-reported discarded weight of red crab to VTR-reported landed weights of red crab (blue dots).



Note: The dashed line represents the one-to-one ratio, and the red and green dots represent maximum and minimum values.

5.2 Non-Target Species (Bycatch)

Section 6.1.2.3 of Amendment 3 to the Red Crab FMP noted very little bycatch of other species in the red crab fishery, and in general, little interaction with non-target species. Tallack (2007) provides a more quantitative, if still limited, assessment of bycatch in the red crab fishery. Recent observer data (2016-2019) indicate there is still minimal bycatch of non-target species in the red crab fishery, including, but not limited to: Jonah crabs, lobster, white hake, and monkfish. All bycatch since 2016 has been well under the incidental trip limits for managed species (e.g., aside from Jonah crab, discards of managed species have been under 16 pounds a year).

5.3 Physical Environment and Essential Fish Habitat

5.3.1 Essential Fish Habitat

The 2002 Red Crab FMP (Section 3.7.4) described Essential Fish Habitat (EFH) for red crab and is incorporated by reference. The EFH designations for red crab eggs, larvae, juveniles, and adults were revised in 2018 through the Omnibus Essential Fish Habitat Amendment 2 (OHA2, Amendment 2 to the Red Crab FMP). The updated EFH designations (Table 6, see OHA2 Volume 2, Section 2.2.7) are based on a re-evaluation of published size and sex-specific data collected during a 1974 NMFS deep-water trawl survey and on observations of red crabs on two seamounts during remotely operated vehicle surveys (NEFMC 2016a). Bear Seamount was surveyed in 2000, 2002, and 2003 (Moore *et al*. 2003 and Moore *et al.* 2004). Retriever Seamount was surveyed in 2004 with the Hercules remotely operated vehicle (Pers. Com. Peter Auster 2005).

Table 6. Summary of red crab EFH designations as updated in OHA2. Maps are provided in OHA2, Volume 2.

Life stage	Text description	Notes
Eggs	Red crab eggs are brooded attached to the underside of female crabs until they hatch into larvae and are released into the water column. The EFH designation for red crab eggs is the same as the known distribution of egg-bearing females (320 – 640 meters) along the outer continental shelf and slope.	Depth range where catches of female crabs were higher
Larvae	Near-surface water habitats on the outer continental shelf and slope and over Bear and Retriever seamounts across the entire depth range identified for the species (320 - 1300 meters on the slope and down to 2000 meters on the seamounts).	Depth range where the juveniles and adults were most commonly caught
Juveniles	Bottom habitats with unconsolidated and consolidated silt-clay sediments at depths of 320 - 1300 meters in submarine canyons and on the continental slope, and to a maximum depth of 2000 meters on Bear and Retriever seamounts.	Depth range where juveniles were most common
Adults	Bottom habitats with unconsolidated and consolidated silt-clay sediments at depths of 320 - 900 meters in submarine canyons and on the continental slope, and to a maximum depth of 2000 meters on Bear and Retriever seamounts. Red crabs generally spawn on the slope at depths of 320 – 640 meters.	Depth range where adults were most common

OHA2 includes a detailed assessment of fishing impacts to habitat by gear type. The vulnerability assessment in OHA2 (NEFMC 2011b) concluded that the impacts of trap gear on seafloor habitats are generally minimal and temporary, especially as compared to mobile bottom-tending gears, and are likely similar to other fixed gears such as longlines and gillnets. It should be noted that the fixed gear impact assessments, although peer-reviewed, were relatively data poor and informed in large part by professional judgment. The assessment also estimated that federally reported trap gear fishing is responsible for only 1% of the overall bottom contact associated with bottom tending gears region-wide. The red crab trap fishery accounts for less than 1% of VTR-reported trips and less than 2% of trap days absent during the period 2008-2015.

The area fished for red crab includes designated EFH for a number of other species as well. Although the distribution of managed resources on the continental slope south of Georges Bank is somewhat uncertain given a lack of survey data, the following species occur on the slope, with the maximum depth of their updated OHA2 EFH designations as indicated in parentheses: Acadian redfish (600 m); halibut (700 m); offshore hake, red hake, barndoor skate (750 m); white hake, thorny skate, smooth skate (900 m); monkfish (1,000 m); and witch flounder (1,500 m). Most of these species are typically associated with mud and sand habitats, which are generally less vulnerable to the impacts of fishing gear than more highly structured habitat types.

5.3.2 Deep-Sea Corals, Canyons and Seamounts

As described above, the red crab fishery is prosecuted in relatively deep water along the entire northeast shelf edge, from eastern Georges Bank to Virginia. Within this region, the continental

slope is incised by roughly forty named canyons, which are steeply sloped and have exposed hard substrates that provide suitable attachment sites for deep-sea corals. As noted above, many types of corals are vulnerable to anthropogenic impacts including fishing. Inter-canyon areas tend to be dominated by softer sediments and have different faunal associations (Quattrini *et al*. 2015). Red crabs are found in canyons as well as inter-canyon areas of the slope. Seamounts, which are extinct underwater volcanoes formed along previously active subduction zones, also harbor corals and other deep-sea fauna. Four seamounts in the New England seamount chain lie within the U.S. Exclusive Economic Zone (EEZ).

Deep-sea habitats, including those occupied by red crab, can be particularly vulnerable to the effects of fishing due to the presence of deep-sea or cold-water corals and other slow-growing organisms. These corals are a conservation target in their own right, but also provide essential habitats for target and non-target fishery species. Certain species of corals are highly susceptible to impacts from fishing gear, given their vertical relief off the seafloor and branching structure, and may take a long time to recover from damage given slow growth rates and low reproductive output.

The vulnerability of corals to fishing gear impacts is discussed in detail in Section 6.5 of the Council's Deep-Sea Coral Amendment (NEFMC 2019). As noted in the coral amendment, bottom trawling specifically is very damaging to deep-sea coral (other mobile bottom-tending gears including dredges are generally not used at the depths at which corals occur in the Northeast region). Fixed gears may also have negative effects:

> *Passive or static gear types, such as pots, traps, or longlines, impact localized areas of corals, though their impacts are not as widespread as bottom trawls and dredges. Several studies have described passive gear interactions with benthic habitat, commonly in the form of observed entanglements of coral with fishing gear (Fosså et al. 2002, Ross et al. 2015). Even though these gears contact a much smaller area of the seafloor than towed gear, in certain conditions they may drag across the seafloor, potentially entangling corals or stirring up sediments (Clark et al. 2015). A Canadian report (DFO 2010) concluded that traps can crush and entangle sponges and corals and cited a number of factors that can affect their habitat impacts, including the type of bottom, their weight, size, and construction material, the type of rope (floatline or sinkline), retrieval methods and weather conditions, soak time, the number of traps on a string, and the use of anchors (NEFMC 2019, Section 6.5.2).*

In recent years, substantial scientific and policy efforts have been focused on these deep-sea habitats. The 2007 reauthorization of the Magnuson-Stevens Act (MSA) grants fishery management councils discretionary authority to protect deep-sea coral habitats from the negative effects of fishing. In the northeast, the period from 2012-2015 saw significant advances in mapping and exploration of the canyons, slope, and seamounts, and deep-sea corals and various other fauna were documented using remotely operated vehicles, autonomous underwater vehicles, and towed camera systems in previously unexplored locations. This scientific work is ongoing and includes modeling studies to estimate locations of suitable deep-sea coral habitats. All three Atlantic coast fishery management councils, in addition to numerous environmental non-governmental organizations, have active coral conservation initiatives.

The NEFMC began work on management approaches to protect deep-sea coral in 2010, and the final regulations are expected to be implemented by early 2020.[3] The Deep-Sea Coral Amendment includes management areas in the canyons, on the seamounts, and along the slope, as well as in the Gulf of Maine. The New England amendment covers areas from Alvin Canyon offshore Rhode Island east to the EEZ (red crab Region 1). More data are needed to fully evaluate the possible impacts of the red crab fishery on deep-sea corals. However, based on currently available information, in particular the small size of the fishery, its impact on seafloor habitats appears to be minimal. Thus, the proposed regulations include an indefinite exemption for the red crab fishery. Figure 7 shows the coral management zones for both New England and the Mid-Atlantic.

The Mid-Atlantic Fishery Management Council (MAFMC) coral management zones went into effect on January 13, 2017, and cover areas west of Alvin canyon to southern Virginia (red crab regions 2 and 3). The zones include a larger 'broad' area, the Frank R. Lautenberg Deep-Sea Coral Protection Area, and smaller discrete canyon zones nested within the broad zone. The red crab fishery has been exempted from fishing regulations in the management zones to date. However, the MAFMC may reconsider the red crab exemption from fishing regulations in discrete zones (canyons), but not the entire slope. Both the broad and discrete zones are listed at 50 CFR §648.372.

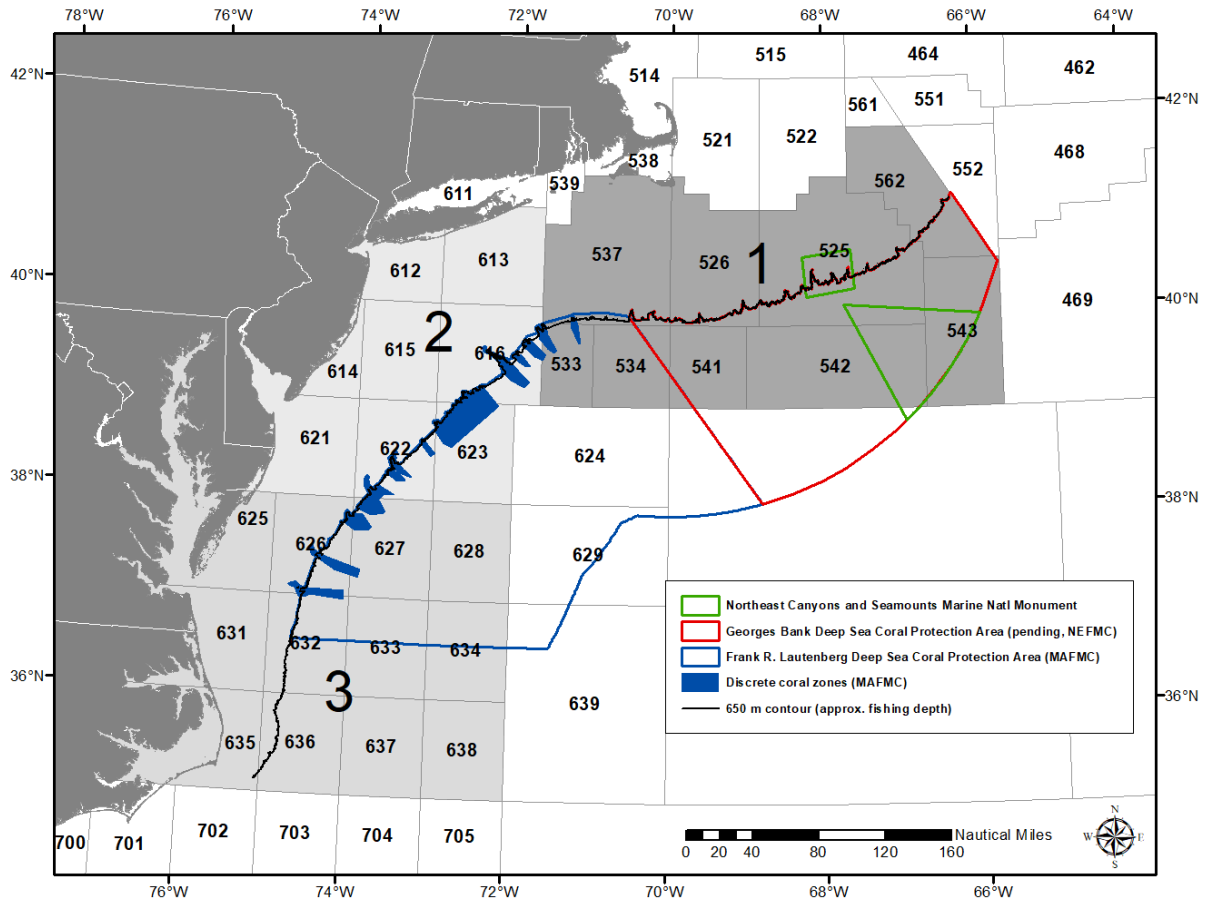
In addition to Council actions protecting deep-sea habitats in New England, President Obama designated the Northeast Canyons and Seamounts Marine National Monument on September 15, 2016 (Figure 8). This was the first National Monument in the Atlantic Ocean, which was designated using the President's authority under the Antiquities Act of 1906. The Monument includes two distinct areas, one encompassing canyons (Oceanographer, Gilbert, Lydonia, and other minor canyons) and the other covering four seamounts (Bear, Physalia, Retriever, and Mytilus). The Monument overlaps Region 1 of the red crab fishery. Under the designation, the red crab and American lobster fisheries can continue fishing within the Monument for up to seven years (through September 15, 2023), but all other commercial fisheries are prohibited.

Department of Fisheries and Oceans (DFO) Canada has implemented conservation measures to protect coral and sponge habitats in their waters. In September 2016, DFO designated coral management zones that include regulations for the Canadian red crab fishery. The Corsair and Georges Canyons Conservation Area is 9,106 square kilometers (km^2) (extending 300 m to the EEZ) and is adjacent to the NEFMC's proposed Georges Bank Deep-Sea Coral Protection Area (NEFMC 2019). Surveys in this Conservation Area have documented a variety of corals and other vulnerable deep-sea species. All bottom contact fishing is prohibited in this Conservation Area, except for two small 'limited fishing' zones located next to Georges Canyon which allow red crab fishing. The Jordan Basin Conservation Area is 49 km^2 in the eastern portion of Jordan Basin. It provides protection for two prominent bedrock ridges and contains high densities of soft corals (including the species *Primnoa resedaeformis*) and other sensitive filter feeding invertebrate communities, as well as providing habitat for other species of finfish and shellfish.

[3] When the final rule is published, NEFMC's Georges Bank, Mt. Desert Rock, and Outer Schoodic Ridge Deep-Sea Coral Protection Areas will be available at 50 CFR §648.373.

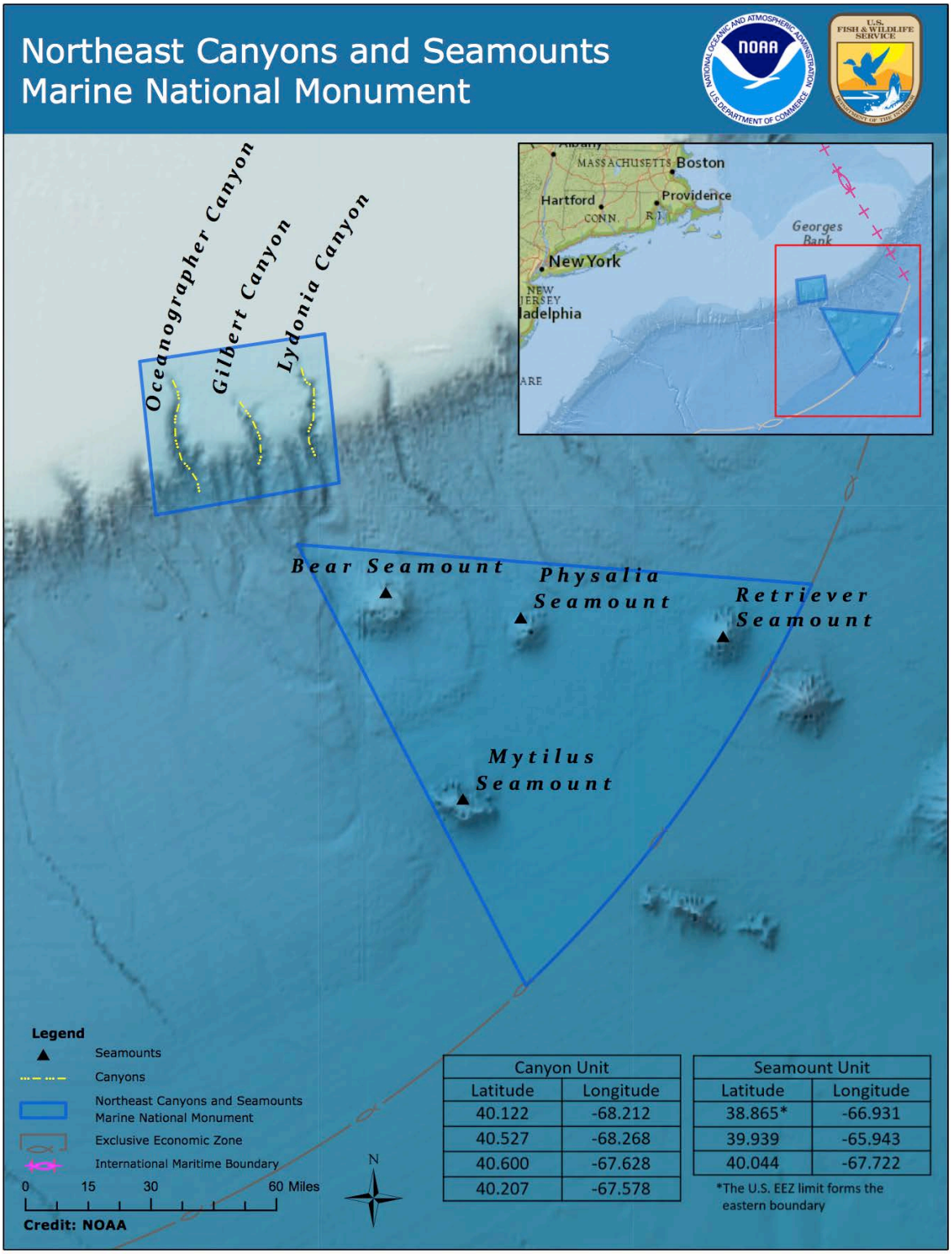
This Conservation Area is closed to all bottom-contact fishing activity, including red crab fishing.[4] It has similar physical and biological features as the coral habitats under NEFMC's jurisdiction in the western and central parts of Jordan Basin. Through the deep-sea coral amendment, NEFMC designated a coral research area in Jordan Basin but there are no fishing gear restrictions associated with the Jordan Basin Dedicated Habitat Research Area.

Figure 7. Coral management zones and red crab fishing areas in New England and the Mid-Atlantic.



[4] http://www.dfo-mpo.gc.ca/oceans/ceccsr-cerceef/measures-mesures-eng.html

Figure 8. Northeast Canyons and Seamounts National Monument.



5.4 Protected Resources

5.4.1 Species Present in the Area

Numerous protected species occur in the affected environment of the Atlantic Deep-Sea Red Crab FMP (Table 7) and have the potential to be affected by the Proposed Action (i.e., there have been observed/documented interactions in the fishery or with gear type(s) similar to those used in the fishery (i.e., pot/trap gear)). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Table 7. Species protected under the ESA and/or MMPA that may occur in the affected environment of the Atlantic deep-sea red crab. Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks.[1]

Species	Status[2]	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (*Megaptera novaeangliae*)[3]	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter microcephalus)	***Endangered***	***Yes***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (*Globicephala spp.*)[3]	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	No
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	No
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	No
Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Bottlenose dolphin, Western North Atlantic Offshore bottlenose dolphin stock (*Tursiops truncates*)	Protected (MMPA)	No
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	No
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	*Endangered*	*Yes*
Kemp's ridley sea turtle (*Lepidochelys kempii*)	*Endangered*	*Yes*
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	*Threatened*	*Yes*
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	*Threatened*	*Yes*
Hawksbill sea turtle (*Eretmochelys imbricate*)	*Endangered*	*No*
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	No
Atlantic sturgeon (*Acipenser oxyrinchus*)		
Gulf of Maine DPS	Threatened	No

New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	No
Cusk (*Brosme brosme*)	Candidate	No
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	No
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	No
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	No
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	No
Critical Habitat		
North Atlantic Right Whale	ESA (Protected)	No

Notes:
[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3, 1972).

[2] The status of the species is defined by whether the species is listed under the ESA as endangered (species are at risk of extinction) or threatened (species at risk of endangerment), or protected under the MMPA. Note, marine mammals listed under the ESA are also protected under the MMPA. Candidate species are those species in which ESA listing may be warranted.

[3] There are two species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.

Cusk are NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. Thus, this species will not be discussed further in this action; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any Proposed Action. Additional information on cusk is at:
https://www.fisheries.noaa.gov/species/cusk

5.4.2 Species and Critical Habitat Not Likely Affected by the Proposed Action

Based on available information, it has been determined that this action is not likely to affect multiple ESA listed and/or marine mammal protected species or any designated critical habitat (Table 7). This determination has been made because either the occurrence of the species is not known to overlap with the area primarily affected by the action and/or there have never been documented interactions between the species and the primary gear type (i.e., pot/trap) used to prosecute the Atlantic deep-sea red crab fishery (see

https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region; https://www.nefsc.noaa.gov/fsb/take_reports/nefop.html; NMFS NEFSC FSB 2019; https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries). In the case of critical habitat, this determination has been made, because the action will not affect the essential physical and biological features of North Atlantic right whale critical habitat and therefore, will not result in the destruction or adverse modification of this species critical habitat (NMFS 2015 a, b).

5.4.3 Species Potentially Affected by the Proposed Action

Table 7 has a list of protected species of sea turtle, marine mammal, and fish species present in the affected environment of the Atlantic deep-sea red crab fishery, and that may also be affected by the operation of this fishery; that is, have the potential to become entangled or bycaught in the fishing gear used to prosecute the fishery. To aid in the identification of MMPA protected species potentially affected by the action, the MMPA List of Fisheries and marine mammal stock assessment reports for the Atlantic Region were referenced (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region ; https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries). To help identify ESA listed species potentially affected by the action, the 2002 Biological Opinion (Opinion) issued by NMFS on the operation of the Atlantic deep-sea red crab fishery, and its impact on ESA listed species was referenced (NMFS 2002). The 2002 Opinion concluded that implementation of the Atlantic deep-sea red crab FMP may affect, but is not likely to jeopardize the continued existence of the ESA-listed species of whales (i.e., North Atlantic right, fin, sei, and sperm whales) and sea turtles (i.e., loggerhead and leatherback sea turtles) or destroy/adversely modify critical habitat designated for North Atlantic right whales. The Opinion included an incidental take statement (ITS) authorizing the take of specific numbers of ESA listed species of sea turtles. Reasonable and prudent measures and terms and conditions were also issued with the ITS to minimize impacts of any incidental take.

Up until recently, the 2002 Opinion remained in effect; however, new information indicates that North Atlantic right whale abundance has been in decline since 2010 (Pace *et al*. 2017). This new information is different from that considered and analyzed in the 2002 Opinion and; therefore, may reveal effects from this fishery that were not previously considered. As a result, per an October 17, 2017, ESA 7(a)(2)/7(d) memo issued by NMFS, the 2002 Opinion, as well as several other fishery Opinions, has been reinitiated. However, the October 17, 2017, ESA 7(a)(2)/7(d) memo issued by NMFS, determined "...For the consultations being reinitiated… Allowing these fisheries to continue during the reinitiation period will not increase the likelihood of interactions with these species above the amount that would otherwise occur if consultation had not been reinitiated, because allowing these fisheries to continue does not entail making any changes to any fishery during the reinitiation period that would cause an increase in interactions with whales, sea turtles, sturgeon, or Atlantic salmon. Because of this, the continuation of these fisheries during the reinitiation period would not be likely to jeopardize the continued existence of any whale, sea turtle, Atlantic salmon, or sturgeon species." Until replaced, the Atlantic deep-sea red crab FMP is currently covered by the October 17, 2017, memo.

As the primary concern for both MMPA protected and ESA listed species is the potential for the fishery to interact (e.g., bycatch, entanglement) with these species, it is necessary to consider (1) species occurrence in the affected environment of the fishery and how the fishery will overlap in time and space with this occurrence; and (2) data and observed records of protected species interaction with particular fishing gear types, to understand the potential risk of an interaction. Information on species occurrence in the affected environment of the Atlantic deep-sea red crab fishery is provided below, while information on protected species interactions with specific fishery gear is in Section 5.4.4.

5.4.3.1 Sea Turtles

This section contains a brief summary of the occurrence and distribution of leatherback and hard-shelled sea turtles (i.e., green (North Atlantic DPS), loggerhead (Northwest Atlantic Ocean DPS), Kemp's ridley) in the affected environment of the Atlantic deep-sea red crab fishery. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; Conant *et al*. 2009; NMFS and USFWS 2013; NMFS and USFWS 2015; Seminoff *et al*. 2015), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992), Kemp's ridley sea turtle (NMFS *et al.* 2011), and green sea turtle (NMFS and USFWS 1991).

Hard-shelled Sea Turtles

In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, Massachusetts, although their presence varies with the seasons due to changes in water temperature (Shoop and Kenney 1992; Epperly *et al.* 1995a, 1995b; Braun and Epperly 1996; Mitchell *et al.* 2003; Braun-McNeill *et al.* 2008; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, MA, they are known to occur in the Gulf of Maine. Loggerheads, the most common hard-shelled sea turtle in the Greater Atlantic Region, feed as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7 °C to 30 °C, but water temperatures ≥11 °C are most favorable (Shoop and Kenney 1992; Epperly *et al.* 1995b). Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Mitchell *et al.* 2003; Braun-McNeill and Epperly 2002; Morreale and Standora 2005; Blumenthal *et al.* 2006; Hawkes *et al.* 2006; McClellan and Read 2007; Mansfield *et al.* 2009; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Hard-shelled sea turtles occur year-round in waters off Cape Hatteras, North Carolina and south. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Epperly *et al.* 1995a, 1995b, 1995c; Braun-McNeill and Epperly 2002; Morreale and Standora 2005; Griffin *et al.* 2013), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the Gulf of Maine in June (Shoop and Kenney 1992). The trend is reversed

in the fall as water temperatures cool. The large majority leave the Gulf of Maine by September, but some remain in Mid-Atlantic and Northeast areas until late fall. By December, sea turtles have migrated south to waters offshore of NC, particularly south of Cape Hatteras, and further south (Shoop and Kenney 1992; Epperly *et al.* 1995b; Hawkes *et al.* 2011; Griffin *et al.* 2013).

Leatherback Sea Turtles

Leatherbacks, a pelagic species, are known to use coastal waters of the U.S. continental shelf and to have a greater tolerance for colder water than hard-shelled sea turtles (James *et al.* 2005; Eckert *et al.* 2006; Murphy *et al.* 2006; NMFS and USFWS 2013b; Dodge *et al.* 2014). Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters (NMFS and USFWS 1992; James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014). They are found in more northern waters (i.e., Gulf of Maine) later in the year (i.e., similar time frame as hard-shelled sea turtles), with most leaving the Northwest Atlantic shelves by mid-November (James *et al.* 2005; James *et al*. 2006; Dodge *et al.* 2014).

5.4.3.2 Marine Mammals-Large Whales

North Atlantic right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean. In general, these species follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41°N; Hayes *et al.* 2019; NMFS 1991, 2005, 2010, 2011, 2012). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Hayes *et al.* 2019; Khan *et al*. 2009, 2010, 2011, 2012; Brown *et al*. 2002; NOAA 2008; Cole *et al.* 2013; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Mayo and Marx 1990; Kenney *et al*. 1986, 1995; Baumgartner *et al*. 2003; Baumgartner and Mate 2003; Payne *et al*.1986, 1990; Brown *et al.* 2002; Kenney and Hartley 2001; Schilling *et al.* 1992). For additional information on the biology, status, and range wide distribution of each whale species refer to: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

To further assist in understanding how the Atlantic deep-sea red crab fishery may overlap in time and space with the occurrence of large whales, a general overview on species occurrence and distribution in the area of operation for the summer flounder fishery is provided in the following table (Table 8).

Table 8. Large whale occurrence, distribution, and habitat use in the affected environment of the Atlantic deep-sea red crab fishery (SNE=Southern New England; GOM=Gulf of Maine; GB=Georges Bank).

Species	Occurrence/Distribution/Habitat Use in the Affected Environment
North Atlantic Right Whale	• Occur and are distributed throughout all continental shelf waters along the U.S. eastern seaboard throughout the year. Although whales can be found consistently in particular locations throughout their range, there is a high interannual variability in right whale use of some habitats. • Starting in 2010, acoustic and visual surveys indicate an apparent shift in habitat use patterns (e.g., shift from previously prevalent northern grounds (greater GOM) to spending more time in the Mid-Atlantic regions (waters off south of Martha's Vineyard and Nantucket Islands, New Jersey, and Virginia); increased use of Cape Cod Bay and decreased use of Great South Channel). • New England waters = **Foraging Grounds.** Seasonally important aggregating/foraging grounds include, but not limited to: › Massachusetts and Cape Cod Bays; › Great South Channel; › Jordan Basins; and, › Georges Basin (along the northeastern edge of GB). • Mid-Atlantic waters: Migratory corridor to/from northern (high latitude) foraging and southern calving grounds. • Passive acoustic and telemetry data shows excursions into deeper water off the continental shelf (e.g., shelf edge along southern Georges Bank and Mid-Atlantic) • Location of much of the population unknown in winter; however, increasing evidence of wintering areas (~November – January) in: › Cape Cod Bay; › Jeffreys and Cashes Ledges; › Jordan Basin; and › Massachusetts Bay (e.g., Stellwagen Bank).
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • New England waters (GOM and GB regions) = Foraging Grounds (~March-November). • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds. • Increasing visual and acoustic evidence of whales remaining in mid- and high-latitudes throughout the winter (e.g., Mid- Atlantic: waters near Chesapeake and Delaware Bays, peak presence about January through March; Massachusetts Bay: peak presence about March-May and September-December).
Fin	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year; recent review of sighting data

	shows evidence that, while densities vary seasonally, fin whales are present in every season throughout most of the EEZ north of 35°N. • Mid-Atlantic waters: › Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds; and › Possible offshore calving area (October-January). • New England (GOM and GB)/SNE waters = Foraging Grounds (greatest densities March-August; lower densities September-November). Important foraging grounds include, but are not limited to: > Massachusetts Bay (esp. Stellwagen Bank); > Great South Channel; > Waters off Cape Cod (~40-50 meter contour); > GOM; > Perimeter (primarily eastern) of GB; and > Mid-shelf area off the east end of Long Island. • Evidence of wintering areas in mid-shelf areas east of New Jersey (NJ), Stellwagen Bank; and eastern perimeter of GB.
Sei	• Uncommon in shallow, inshore waters of the Mid-Atlantic (SNE included), GB, and GOM; however, occasional incursions during peak prey availability and abundance. • Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks. • Spring through summer, found in greatest densities in offshore waters of the Gulf of Maine and Georges Bank; sightings concentrated along the northern, eastern (into Northeast Channel) and southwestern (in the area of Hydrographer Canyon) edge of Georges Bank.
Minke	• Widely distributed within the U.S. EEZ. • Spring to Fall: widespread (acoustic) occurrence on the continental shelf; however, most abundant in New England waters during this period of time. • September to April: high (acoustic) occurrence in deep-ocean waters.

*Sources***:** Baumgartner *et al*. 2007; Baumgartner *et al*. 2011; Baumgartner and Mate 2005; Bort *et al*. 2015; Brown *et al*. 2002; CETAP 1982; Clapham *et al*. 1993; Cole *et al*. 2013; Davis *et al.* 2017; Good 2008; Hain *et al.* 1992; Hamilton and Mayo 1990; Hayes *et al*. 2017, 2018, 2019; Kenney *et al.* 1986, 1995; Khan *et al*. 2009, 2010, 2011, 2012; Leiter *et al*. 2017; Mate *et al*. 1997; McLellan *et al*. 2004; NMFS 1991, 2005, 2010, 2011, 2012; 2015; NOAA 2008; Pace and Merrick 2008; Payne *et al*. 1984; Payne *et al*.1990; Pendleton *et al*. 2009; Record *et al*. 2019; Risch *et al*. 2013; Schevill *et al*. 1986; Swingle *et al*. 1993; Vu *et al*. 2012; Watkins and Schevill 1982; Winn *et al.* 1986; 50 CFR 224.105; 81 FR 4837 (January 27, 2016).

5.4.4 Interactions Between Gear and Protected Species

Protected species are at risk of interacting with various types of fishing gear, with interaction risks associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Available information on gear interactions with a given species (or species group) is in the sections below. These sections

are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used to prosecute the deep-sea red crab fishery (i.e., pot/trap gear).

5.4.4.1 Marine Mammals

Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions). In the Northwest Atlantic, the 2019 LOF (84 FR 22051 (May 16, 2019)) categorizes the commercial deep-sea red crab fishery as a Category II Atlantic mixed species trap/pot fishery.

Large Whales and Fixed Fishing Gear (e.g., Pot/Trap Gear)

The greatest entanglement risk to large whales is posed by fixed fishing gear (e.g., trap/pot gear, sink gillnet gear) with vertical or ground lines that rise into the water column (Kenney and Hartley 2001; Knowlton and Kraus 2001; Hartley *et al*. 2003; Johnson *et al*. 2005;Whittingham *et al*. 2005a,b; Cassoff *et al.* 2011; Knowlton *et al.* 2012; NMFS 2014; Henry *et al.* 2015; Henry *et al.* 2016; Henry *et al.* 2017; Henry *et al.* 2019; see Marine Mammal Stock Assessment Reports: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region). Any line can become entangled in the mouth (baleen), flippers, and/or tail of the whale when the animal is transiting or foraging through the water column (Johnson *et al*. 2005; NMFS 2014; Kenney and Hartley 2001; Hartley *et al*. 2003; Whittingham *et al*. 2005a, b; Henry *et al.* 2015; Henry *et al.* 2016; Henry *et al.* 2017; Henry *et al.* 2019). The effects of entanglement to large whales range from no injury to death. The risk of injury or death in the event of an entanglement may depend on such things as the characteristics of the whale involved (species, size, age, health, etc.), the nature of the gear (e.g., whether the gear incorporates weak links designed to help a whale free itself), human intervention (i.e., the feasibility or success of disentanglement efforts), or other variables (Angliss and Demaster 1998; Johnson *et al*. 2005; Cassoff *et al.* 2011; Moore and Van der Hoop 2012; NMFS 2014; van der Hoop *et al*. 2016; Pettis *et al.* 2017; van der Hoop *et al.* 2017). Although the interrelationships among these factors are not fully understood, and the data needed to provide a more complete characterization of risk are not available, to date, available data indicate that entanglement in fishing gear is a significant source of serious injury or mortality for Atlantic large whales (Cassoff *et al.* 2011; NMFS 2014; Henry *et al.* 2015; van der Hoop *et al.* 2016; Henry *et al.* 2016; Henry *et al.* 2017; Pettis *et al.* 2017; van der Hoop *et al.* 2017; Henry *et al.* 2019; Sharp *et al.* 2019; see Marine Mammal Stock Assessment Reports: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region).

Large whale interactions (entanglements) with fishing gear have been observed and documented in the waters of the Northwest Atlantic. Although not specific to any fishery, including the deep-sea red crab fishery, Table 9 summarizes confirmed serious injury or mortality to whales (i.e., humpback, fin, sei, minke, and North Atlantic right whales) from entanglement in fishing gear, including pot/trap along the Gulf of Mexico Coast, U.S. East Coast, and Atlantic Canadian Provinces from 2012 to 2016 (Henry *et al.* 2019). The data are specific to confirmed injury or

mortality to whales from entanglement in fishing gear. As many entanglement events go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, it is important to recognize that the information likely underestimates the rate of large whale serious injury and mortality due to entanglement. Further studies looking at scar rates for right whales and humpbacks suggest that entanglements may be occurring more frequently than the observed incidences indicate (NMFS 2014; Robbins 2009; Knowlton *et al.* 2012).

Table 9. Summary of confirmed human-caused injury or mortality to fin, minke, humpback, sei, and North Atlantic right whales from 2012-2016 due to entanglement in fishing gear.

Species	Total Confirmed Entanglement: Serious Injury	Total Confirmed Entanglement: Non-Serious Injury	Total Confirmed Entanglement: Mortality	Entanglement Events: Total Average Annual Injury and Mortality Rate (US waters/Canadian waters/unassigned waters)
North Atlantic Right Whale	21	34	6	5.15 (0.4/0.4/4.35)
Humpback Whale	33	70	8	7.1 (1.65/0.3/ 5.15)
Fin Whale	8	4	1	1.5 (0/0.4/ 1.1)
Sei Whale	0	1	0	0
Minke Whale	17	11	21	7.1 (1.9/2.55/2.65)

Notes: Information is based on confirmed human-caused injury and mortality events along the Gulf of Mexico Coast, US East Coast, and Atlantic Canadian Provinces; it is not specific to US waters only. NMFS defines serious injury as an injury that is more likely than not to result in mortality (https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-policies-guidance-and-regulations#distinguishing-serious-from-non-serious-injury-of-marine-mammalsf).

Source: Henry *et al.* 2019

In response to its obligations under the MMPA (section 118(f)(1)), in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP or Plan)) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear.[5] In 1997, the ALWTRP was implemented;

[5] The measures identified in the ALWTRP are also beneficial to the survival of the minke whale, which are also known to be incidentally taken in commercial fishing gear.

however, since 1997, the Plan has been modified; recent adjustments include the Sinking Groundline Rule and Vertical Line Rules (72 FR 57104, October 5, 2007; 79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015). The Plan consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area- and season- specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, seek to assist in the recovery of North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries (http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/; 73 FR 51228; 79 FR 36586; 79 FR 73848; 80 FR 14345; 80 FR 30367). The Plan recognizes trap/pot and gillnet Management Areas in Northeast, Mid-Atlantic, and Southeast regions of the U.S, and identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in these regions; these Category I and II fisheries must comply with all regulations of the Plan.[6] For further details on the ALWTRP, see: http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/.

5.4.4.2 Sea Turtles and Pot/Trap Gear

Leatherback, loggerhead, green, and kemp's ridley sea turtles are at risk of interacting with trap/pot gear. Interactions are primarily associated with entanglement in vertical lines, although sea turtles can also become entangled in groundline or surface systems. Records of stranded or entangled sea turtles indicate that fishing gear can wrap around the neck, flipper, or body of the sea turtle and severely restrict swimming or feeding (Balazs 1985, NMFS Northeast Region Sea Turtle Disentanglement Network (STDN) 2019). As a result, sea turtles can incur serious injuries, and in some case, mortality immediately or at a later time.

NMFS Northeast Region STDN database, a component of the Sea Turtle Stranding and Salvage Network, provides the most complete dataset of sea entanglements. Based on information provided in this database, a total of 270 sea turtle entanglements in vertical line gear were reported to the STDN and NMFS GARFO between 2009 and 2018 (STDN 2019); these cases were classified as probable (32 cases) or confirmed (238 cases) vertical line gear entanglements. Interactions involved 254 leatherback sea turtles, followed by 15 loggerhead, and one unknown sea turtle species."

5.5 Human Communities

This section updates the socioeconomic description of the fishery in Section 6.3 of Amendment 3 to the FMP, which was published in May 2011.

[6] The fisheries currently regulated under the ALWTRP include: Northeast/Mid-Atlantic American lobster trap/pot; Atlantic blue crab trap/pot; Atlantic mixed species trap/pot; Northeast sink gillnet; Northeast anchored float gillnet; Northeast drift gillnet; Mid-Atlantic gillnet; Southeastern U.S. Atlantic shark gillnet; and Southeast Atlantic gillnet (NMFS 2014c).

5.5.1 Red Crab Permits and Vessels

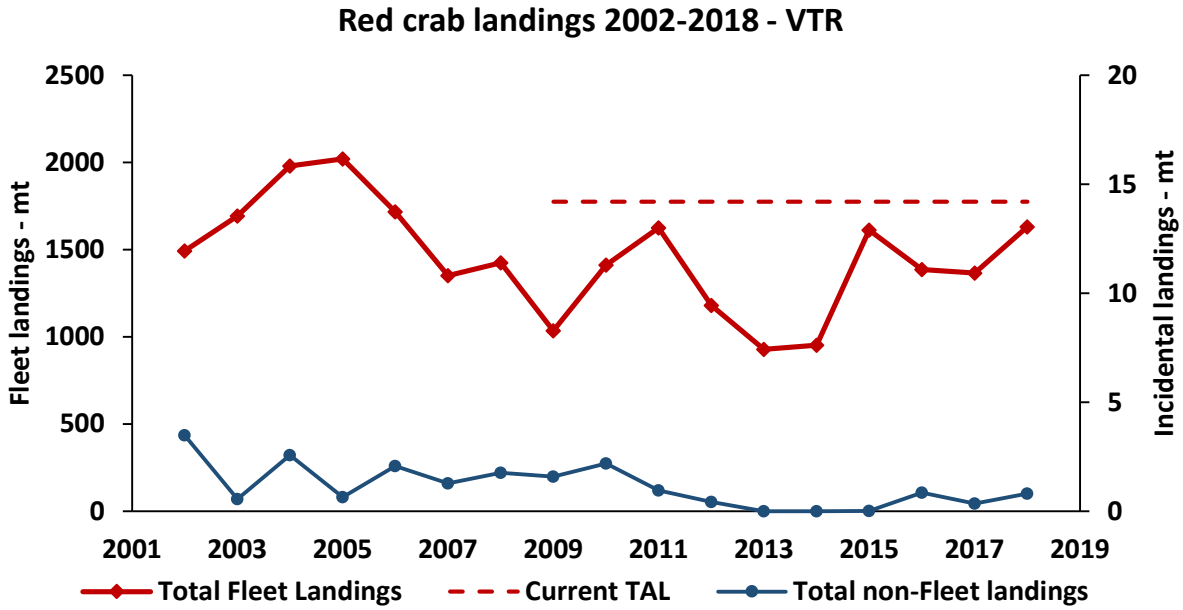
As of FY2018, there are four active, limited access permits and vessels in the red crab fishery, with one inactive permit and one inactive vessel (in most years, the fifth vessel opted out of the fishery). Table 10 in Section 5.5.3.2 lists the number of active red crab vessels since 2002, which is typically between three and four vessels. There is also an open access permit category that allows incidental landings up to 500 lbs. of red crab per trip regardless of gear type. While there are about 1,300 open access permits issued annually, less than ten have been active annually in recent years.

5.5.2 Updated Red Crab Landings and Landings Per Unit Effort

Section 6.1 of the Amendment 3 EA (NEFMC 2011a) provides information on the status of the red crab fishery landings and other fishery-dependent data through 2011 and is hereby incorporated by reference. The information provided in this section utilizes the most recent data available, and provides data on the most recent fishing years, as well as trend information from 2002, when the Red Crab FMP was implemented. The years in the text and table titles refer to fishing year (FY) unless otherwise stated.

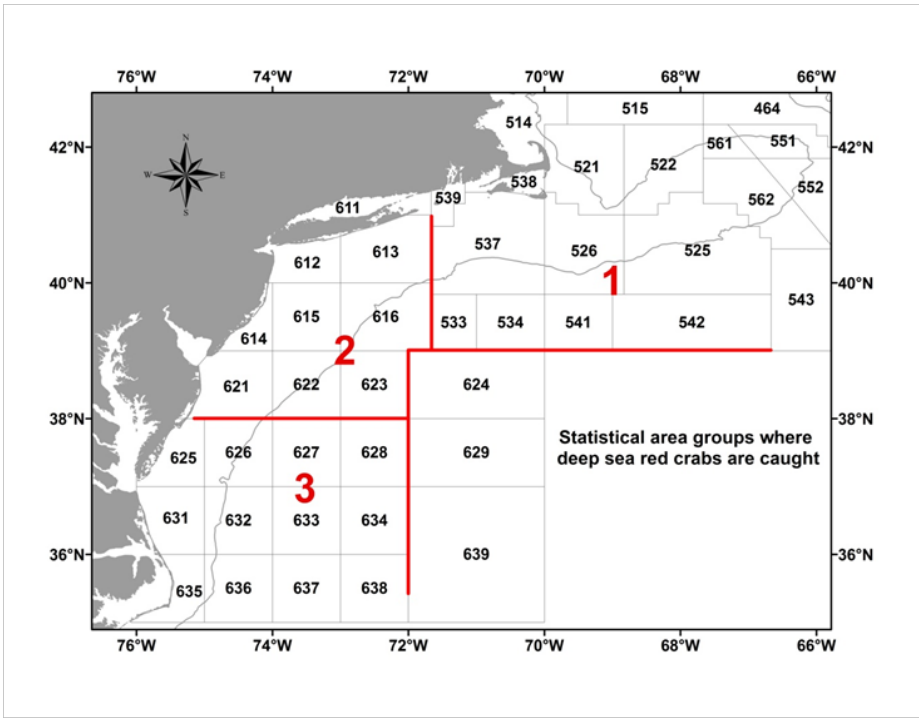
Red crab landings have remained relatively stable from 2016-2018, with an increase in 2018, where landings were approximately 95% of the TAL (Figure 9). Incidental landings by vessels not targeting red crabs were nearly zero. Based on Vessel Trip Report (VTR)-reported statistical area fished, landings were assigned to one of three fishing regions: Georges Bank and Southern New England (1), New York, New Jersey, Delaware and Maryland (2), and Virginia and North Carolina (3) (Figure 10). Annual landings-by-region is one measure of the spatial extent of the fishery. Since 2013, landings have started increasing from Region 2, compared with early years in the fishery when most of the landings were concentrated from Region 1 (Figure 11). Landings from Region 3 have stabilized since 2013 after being highly variable in previous years.

Figure 9. Red crab landings, 2002-2018.



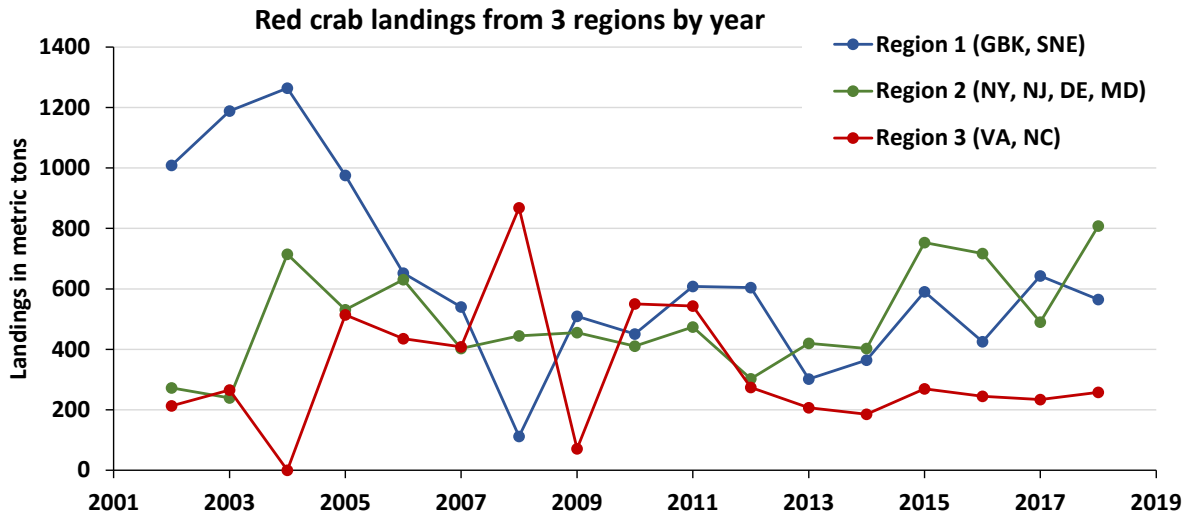
Note: The red dashed line represents the TAL of 1,775 metric tons (mt), the red solid line is red crab permitted vessel landings, and the blue line is incidental landings from other fisheries.
Source: Landings data come from VTR data accessed May 2019. There is a negligible difference between dealer and VTR landings in recent years.

Figure 10. Statistical area groups used to determine the region where red crabs are caught.



Note: The regions roughly cover Georges Bank and southern New England (1), New York, New Jersey, Delaware and Maryland (2), and Virginia and North Carolina (3).

Figure 11. Red crab landings from each of three regions, 2002-2018.



Source: Landings data come from VTR data accessed May 2019.

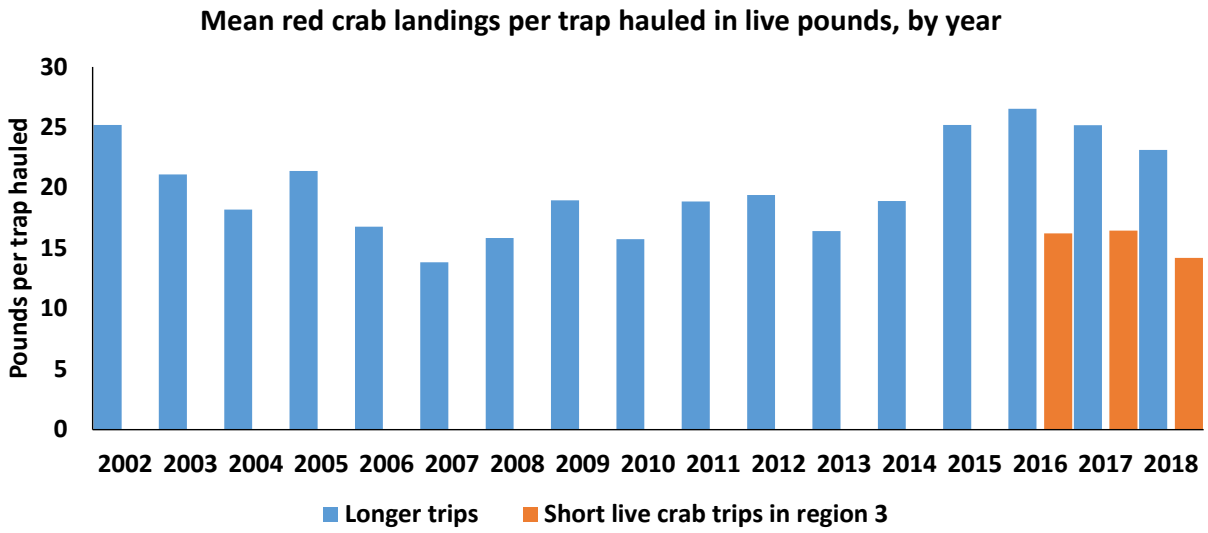
Average landings per unit effort (LPUE), estimated using VTR-reported haul and gear data, has fluctuated between 15 to 25 pounds per trap hauled since 2002. LPUE has been fairly consistent overall and across regions (for similar trips, when compared to each other, i.e., longer trips for the processing market and the shorter trips for the live market), though there has been a slight decrease since 2017 (Figure 12).

Geographically, LPUE is more variable across time in Region 3, in comparison to Regions 1 and 2, perhaps due to different market conditions, and therefore trip types, in that region (Figure 13). In addition to regular trips for crab to be processed, the fishery started taking shorter trips in 2016 to target crabs for the live market (orange columns in Figure 12). Section 5.5.7 has more information on the markets for these two products.

There are some caveats with LPUE estimates due to variability in reports; however, the method used to estimate LPUE has been consistent since 2006. Landings per day absent are also calculated and are very similar in trend to landings per trap. However, since landings per day absent have varying steam times to account for, they are not as true an indicator of resource condition as landings per trap.

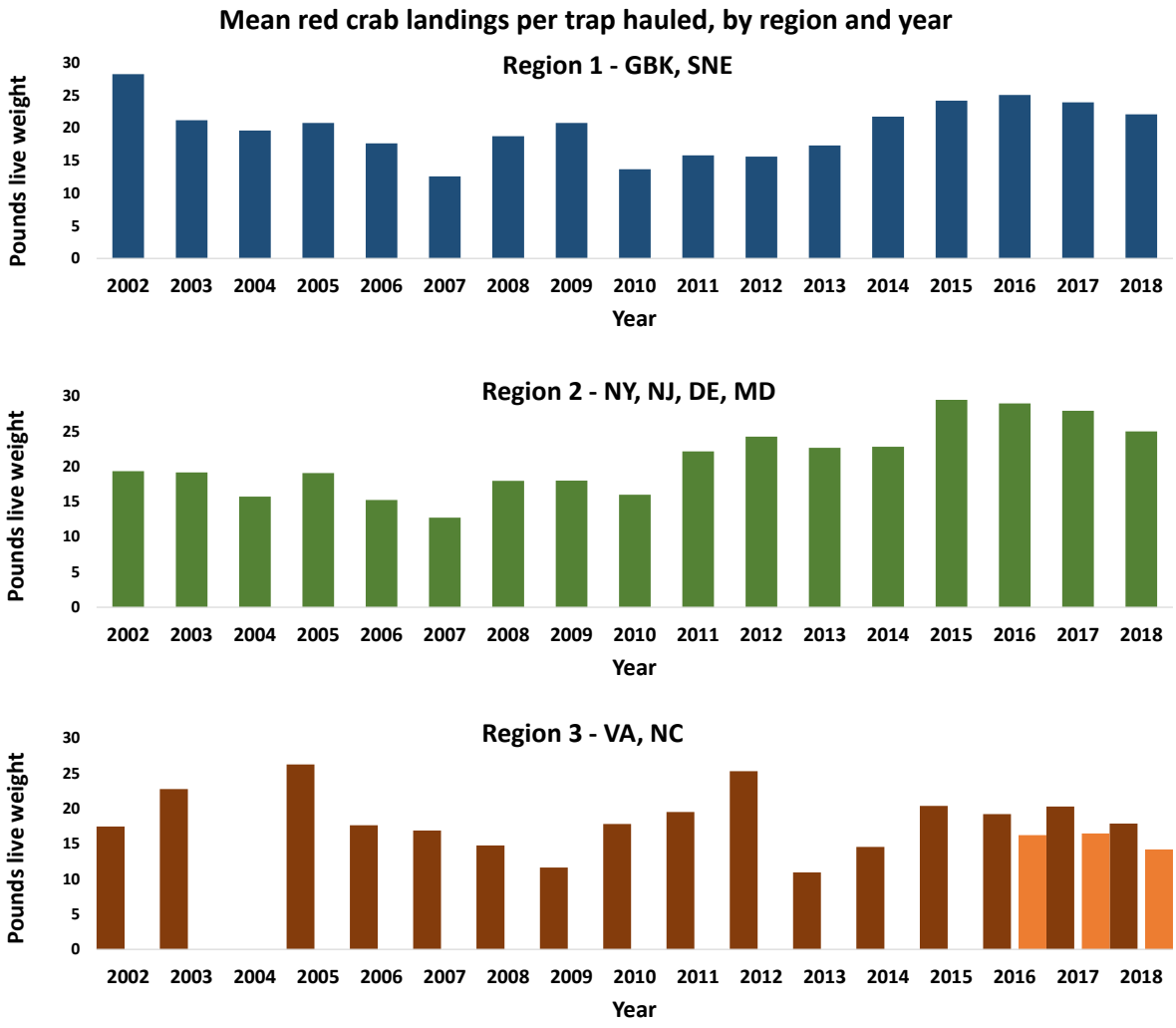
LPUE is used for red crab instead of catch per unit effort (CPUE) because “catch” includes both kept and discarded crabs, and an accepted method of estimating total weight of discarded crabs (such as SBRM) has not been developed. For red crab, LPUE is a better indicator of the availability of market-sized animals. First, the way red crabs are distributed seasonally and by sex leads to variable discard amounts which are not necessarily linked to abundance. Second, there are reasons for discards, especially in a trap fishery, that are unrelated to the size or sex of the crabs such as crabs in traps being in warm surface water over a certain length of time. This results in some mortality and thus discards. Culling patterns can also alter the discard amounts. However, the combination of discard weight and discard reason provides valuable information about the population.

Figure 12. Red crab LPUE in live pounds caught per trap hauled for all trips, 2002-2018.



Note: The orange columns represent a single vessel that makes short trips for the live market since 2016, which should not be compared to the longer trips made by 2-3 vessels that land red crabs for processing.
Source: Estimated using VTR data.

Figure 13. Red crab LPUE in live pounds caught per trap hauled for all trips by region, 2002-2018.



Note: The orange columns represent a single vessel that makes short trips for the live market.
Source: Estimated using VTR data.

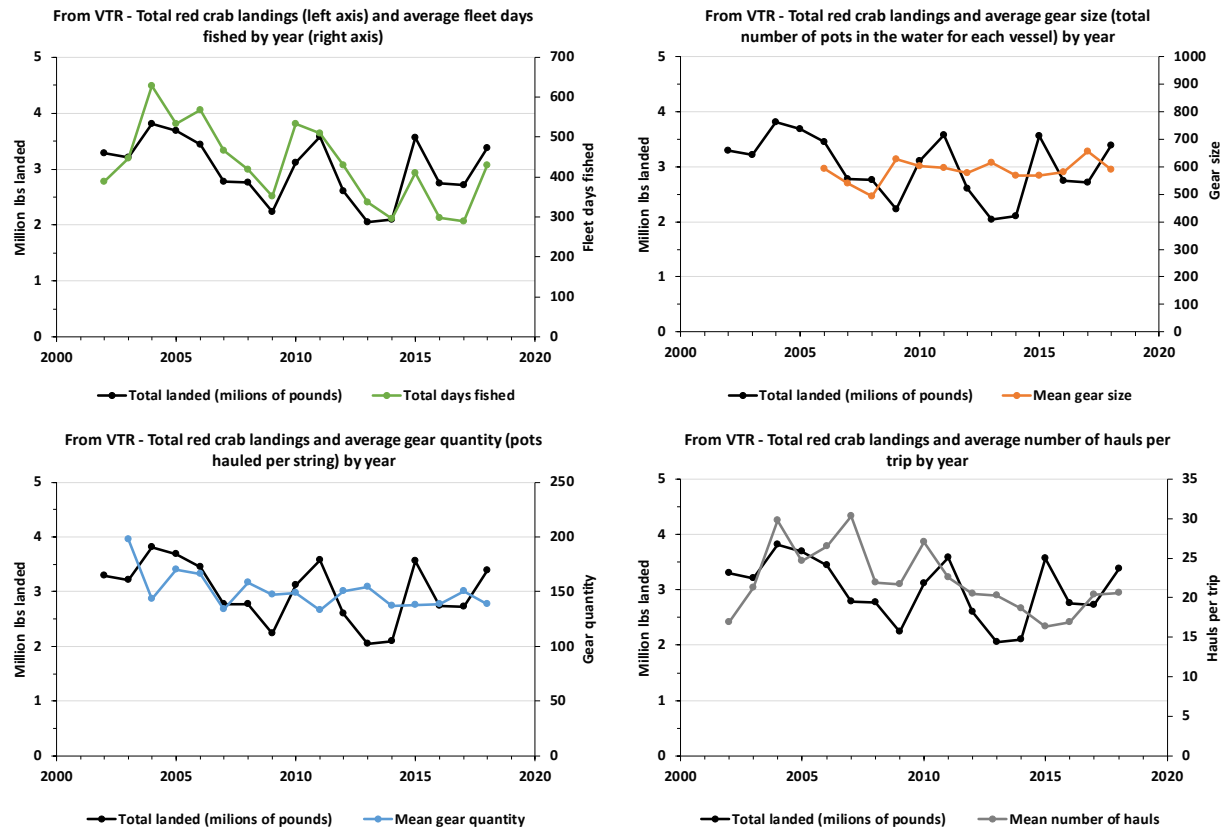
5.5.3 Effort and Historic Performance of the Fishery

5.5.3.1 Relationship between landings, days fished, and number of trips

VTR data from 2002-2018 indicate that in years with higher landings, the gear size (total number of traps/vessel) and gear configuration (number of traps/trawl) remain relatively stable, but the number of trips and days fished increased (Figure 14). For example, in 2004 and 2005, landings were closer to the 2,000 mt level being proposed by this action, and in 2011, 2015, and 2018, landings were close to the current 1,775 mt TAL (No Action Alternative). In each of these years, the days fished directly correspond with the landings, indicating a direct relationship.

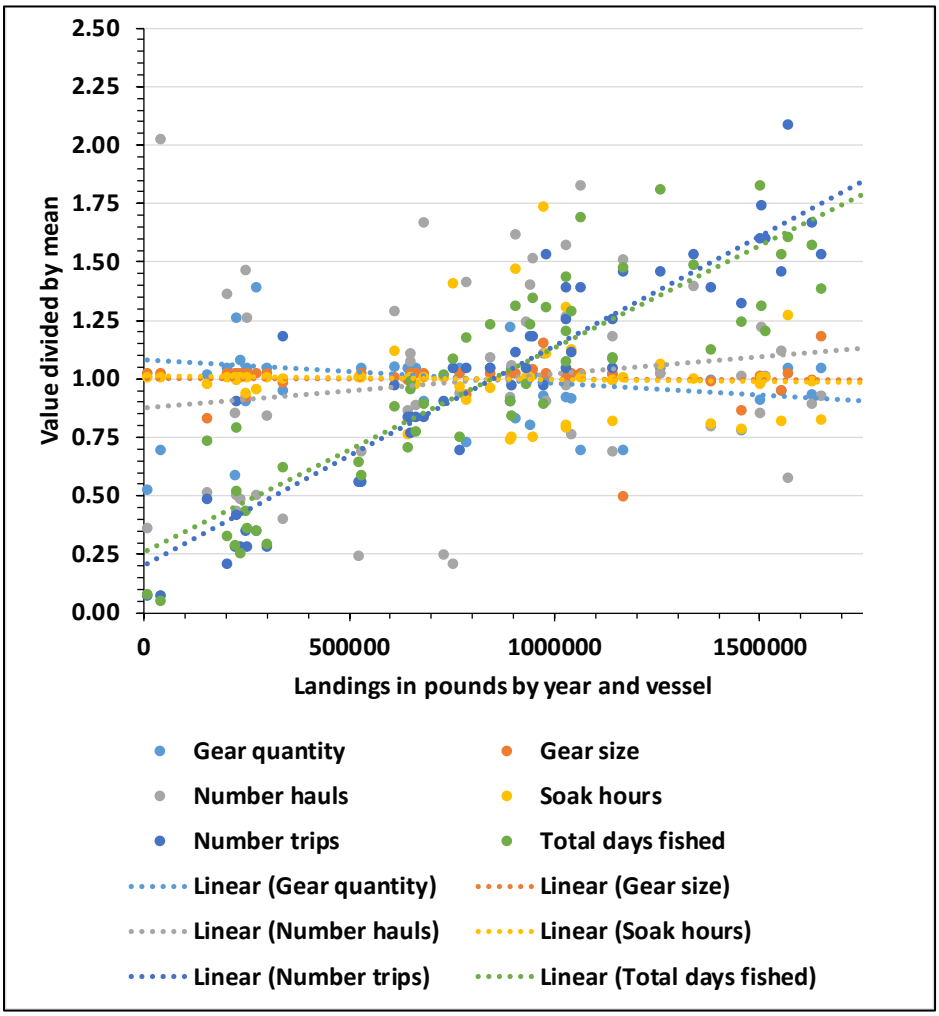
Figure 15 demonstrates this direct relationship between landings and days fished/number of trips while gear size, quantity, and other variables remain stable.

Figure 14. Individual time series of VTR data and landings, FY 2002-2018.



Note: Not all years are included due to missing, sparse or erroneous data.

Figure 15. VTR data plotted against total landings by year and vessel, FY 2002-2018.



Note: Four vessels are represented, not including the small vessel that lands crab for the live market. For each vessel and year, the mean gear quantity, mean gear size, mean soak hours, mean number of hauls, total days fished, and total number of trips are plotted against the total catch for the year.

5.5.3.2 Relationship between vessels and landings

As stated in Section 5.5.1, the regulations implementing the Red Crab FMP (2002) included measures to limit entry in this fishery to five permits, which are held by two business entities (Section 7.9.1). However, the fifth permit and vessel has opted out of the fishery since 2009 and has only been active in 2 of the last 17 fishing years since 2002.

From 2002 to 2018, there were 11 years when four of the permits were utilized and 4 years when three permits were utilized. More recently, three vessels operated in 2014, 2015, and 2018 and four vessels operated in 2016 and 2017 (Table 10). Landings were 75%-95% of the TAL from 2015-2018, indicating that even three vessels can catch 95% of the current TAL.

In the last 5 fishing years (2014-2018), VTR data indicate these three- to four- active vessels operate from 3- to 12-months out of the year in a given year; therefore, some vessels operate on a part-time basis while others operate year-round in some years. The annual average months fished for three of these vessels during the last 5 years is: 9.2 months, 6.6 months, and 9.2 months. Given the collaborative nature of this fleet, described in Section 5.5.3.3, year-round landings are possible even if all vessels are not active each month; as one vessel may haul another vessel's gear.

Table 10. Red crab vessels, vertical lines, and landings (metric tons), FY 2002-2018.

Year	Number of vessels fishing	Maximum number of vertical lines	Total landings
2002	3	24	1494
2003	4	32	1457
2004	4	32	1731
2005	4	32	1673
2006	5	40	1562
2007	4	32	1260
2008	4	32	1254
2009	5	40	1014
2010	4	32	1412
2011	4	32	1625
2012	4	32	1180
2013	4	32	928
2014	3	24	952
2015	3	24	1613
2016	4	32	1246
2017	4	32	1235
2018	3	24	1535

Source: VTR data, Northeast Fisheries Science Center, October 4, 2019.

5.5.3.3 Gear configuration, duration, and collaborative fishing

The regulations implementing the Red Crab FMP (50 CFR § 648.264) set a maximum of 600 traps per vessel; and VTR data show that the vessels have consistently fished right around (or slightly less than) 600 traps in the last 12 years (see mean gear size in Figure 14).

In recent years, two- to three fishing vessels typically alternate hauling two sets of gear (each with four trawls of 150 traps each, and eight end lines), for a total of 1,200 traps and 16 end lines.[7] The vessels fish collaboratively, sharing gear.

[7] One of the 3-4 vessels that operates is a smaller vessel that catches crab for the live market and takes shorter trips with less gear (4 trawls w/ 75 traps per trawl for a total of 300 traps and 8 vertical lines). This vessel is not expected to change fishing operations as a result of the Proposed Action because the live crab market is smaller, niche market. Therefore, any effort shifts will be realized by the remaining vessels catching crab to be processed.

Table 10 also shows the maximum number of vertical lines potentially present by year, as the number of vessels active in the red crab fishery varies by year. This analysis relies on the configuration of four trawls per vessel and two end/vertical lines per trawl, as described above. Since 2016, the vessel count includes a smaller vessel that fishes fewer traps and shorter trips for the live market. Therefore, in any given year since 2010, the maximum amount of gear for four vessels would result in a total of 32 vertical lines (Table 10). The same four vessels and permits are expected to be utilized in fishing years 2020-2023. If the fifth vessel were to be utilized, there could be an increase in vertical lines to 40, although as described in Section 5.5.1, this is unlikely given the fact that this vessel has rarely active over the last 17 years.

5.5.3.4 Soak time

Soak time, the amount of time a trap is left in the water between hauling, has averaged 24-hours since 2002 (based on VTR data). This variable has remained stable in periods of higher or lower effort or landings (see soak hours in Figure 14). When a vessel is not actively fishing for a period of around four weeks, the gear is hauled out (Pers. Comm. Jon Williams October 2019). All active vessels can bring all gear (600 pots) aboard in one trip.

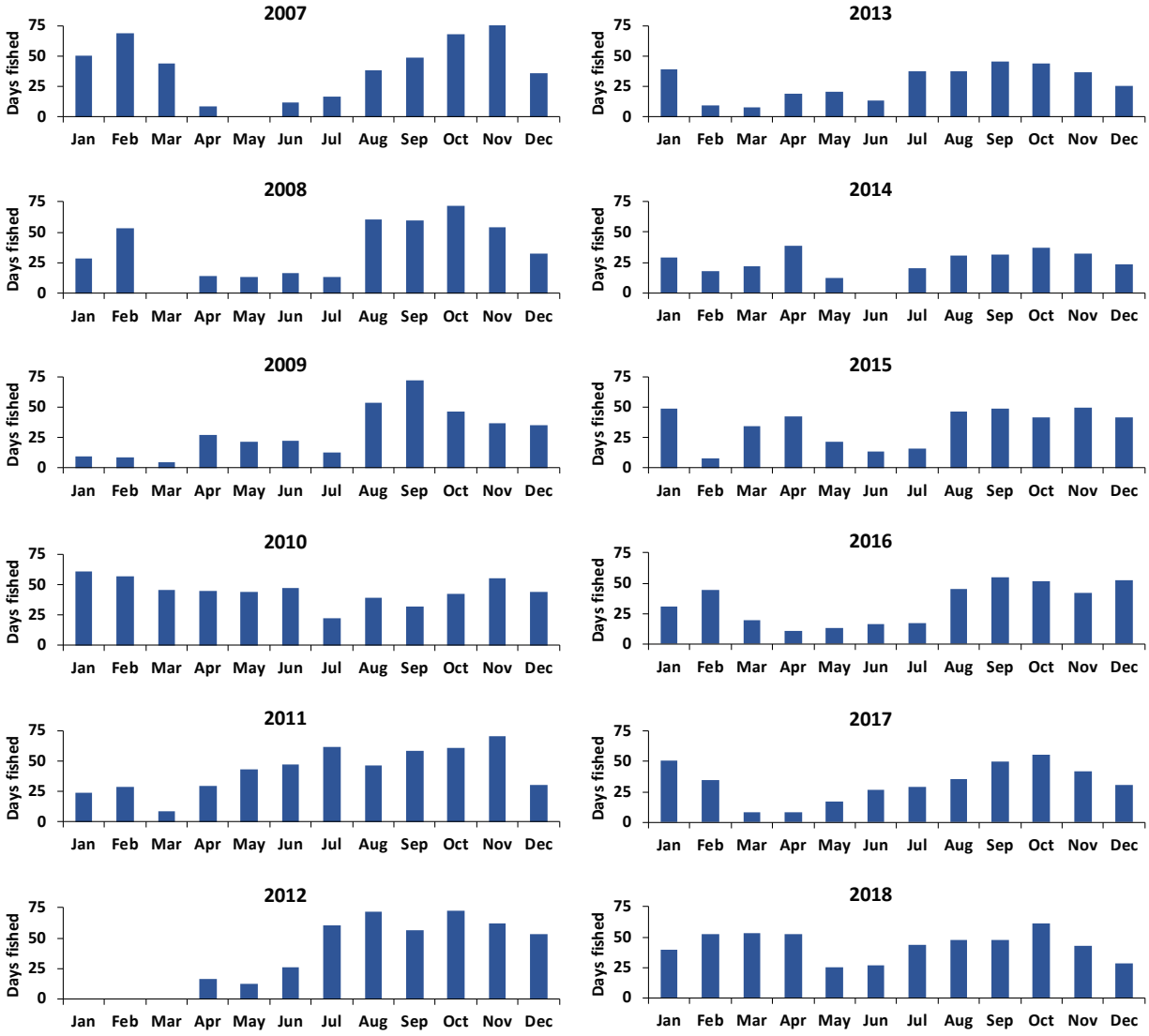
5.5.3.5 Location and seasonality of fishing

The red crab fishery operates year-round in all three regions. In the last 7 years, there have been patterns of lesser effort in spring and early summer, then increasing until November or December, when the number of days fished has typically decreased, and picking up again in January (Figure 16). While there is slight annual variability in the days fished by month, the overall fishing activity is not expected to substantially change from activity observed in recent years.

When analyzing activity by region, fishing doesn't typically pick up in Region 1 until October (Figure 17). On an annual level, landings have increased in Region 2 over the last 6 years, surpassing landings from Region 1 in all years aside from 2017, and landings in Region 3 are low but stable.

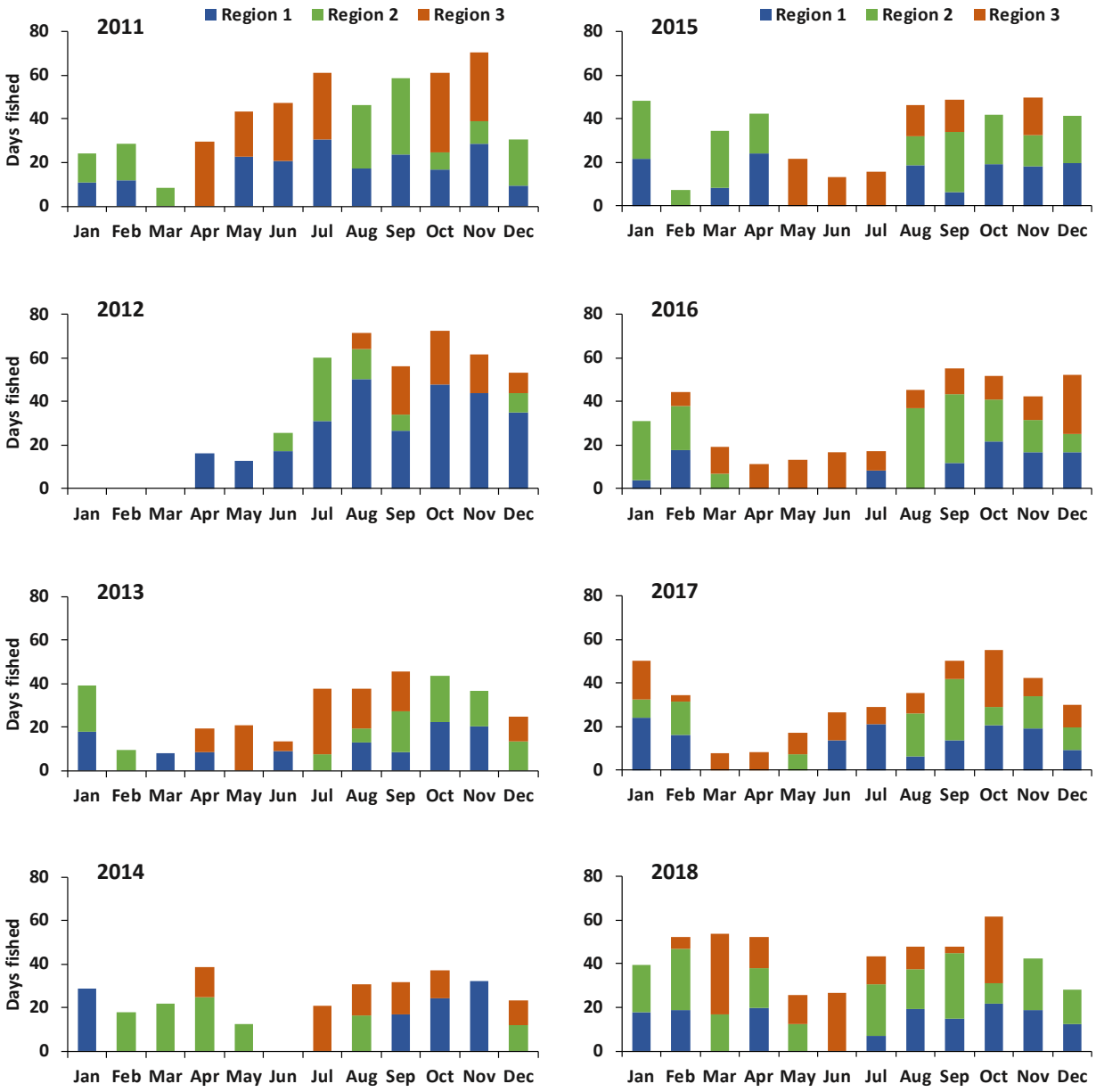
The red crab market influences the year-round nature of this fishery and the desire to have landings more evenly spread out to produce a steady supply and a higher price than flooding the market with a high volume of landings. Therefore, in either scenario where an existing vessel extends their fishing season or if a fifth vessel is added, it is unlikely that there would be any material shifts in the location or seasonality of the red crab fishery from past operations.

Figure 16. Number of days fished (date landed – date sailed) by month, all vessels, FY 2007 – 2018.



Source: VTR data, Northeast Fisheries Science Center, November 4, 2019.

Figure 17. Days fished by month and region, all vessels, FY 2014-2018.



Note: The height of the column represents the total days fished by the red crab fleet for the month and year. The different colors represent the portion of the total days in each of the three regions, as reported by VTR.
Source: VTR data, Northeast Fisheries Science Center, November 4, 2019.

5.5.4 Incidental Landings and Discards of Red Crab in Other Fisheries

Adult red crabs inhabit water depths of 400-900 meters on the continental slope and are found to 2,000 meters on the seamounts. This depth range is below where most other fishing takes place, and therefore bycatch in other fisheries is not a major concern.

Prior to FY 2010, incidental red crab landings were less than 1% of the TAL (Amendment 3, Section 6.1.2.1). Analysis of vessels with incidental landing permits in the six fishing years (FY 2010-2015) since the Amendment 3 analysis in 2011 showed consistent landings with the previous 6 years. The proposed TAL is not expected to change incidental landings, which are minimal (less than 100-lbs/trip) and mostly taken home for consumption by crew (Pers. Com. Jon Williams June 2019).

Discards of red crabs in other fisheries are estimated annually using the NEFSC Standardized Bycatch Reporting Methodology (SBRM), which is based on discard data gathered by at-sea observers from a variety of fleets. While variable, the results from July 2011 through June 2018 suggest trawl fleets are typically responsible for most red crab discards in both the New England and mid-Atlantic regions (Table 11), although there was a recent increase in discards from the lobster pot/trap fleet in 2017-2018 (Wigley and Tholke 2019).

The total number of red crab discards from all fisheries from July 2017-June 2018 were 152 mt, down from a high of 334 mt in July 2012 – June 2013 (Table 11). From July 2017-June 2018, most red crab discards (70%) were observed in crab pots and traps in the Northeast region, followed by other fleets (24%), and then lobster pots and traps in the Mid-Atlantic region (6%). Of the 'other fleets' discarding red crab, otter trawl fleets are responsible for the majority discards, followed by scallop dredge (Wigley and Tholke 2019). The proposed TAL is not expected to change bycatch or discarding of red crab in other fisheries.

Table 11. Estimated red crab discards by other fisheries by year, in metric tons, 2011-2018.

Gear	July 2011 - June 2012	July 2012 - June 2013	July 2013 - June 2014	July 2014 - June 2015	July 2015 - June 2016	July 2016 - June 2017	July 2017 - June 2018
Mid-Atlantic small-mesh otter trawl	47	222	3	0.002	7	19	3
Mid-Atlantic large-mesh otter trawl		3	2	4	3	14	17
New England small-mesh otter trawl						1	
New England large-mesh otter trawl	94	107	37	25	35	108	7
Mid-Atlantic shrimp trawl				77	37	7	80
New England large-mesh gillnet	0.2	0.08	0.08	0.04			
Scallop dredge	0.05	0.7	0.01	0.9			
Lobster pots and traps		0.6	4		23	6	45
Total estimated discards by other fleets (mt)	141	334	46	108	104	154	152

Source: Wigley *et al*. 2013, 2015, 2015, 2016, 2017, and Wigley and Tholke 2019.

5.5.5 Market Conditions for Red Crab

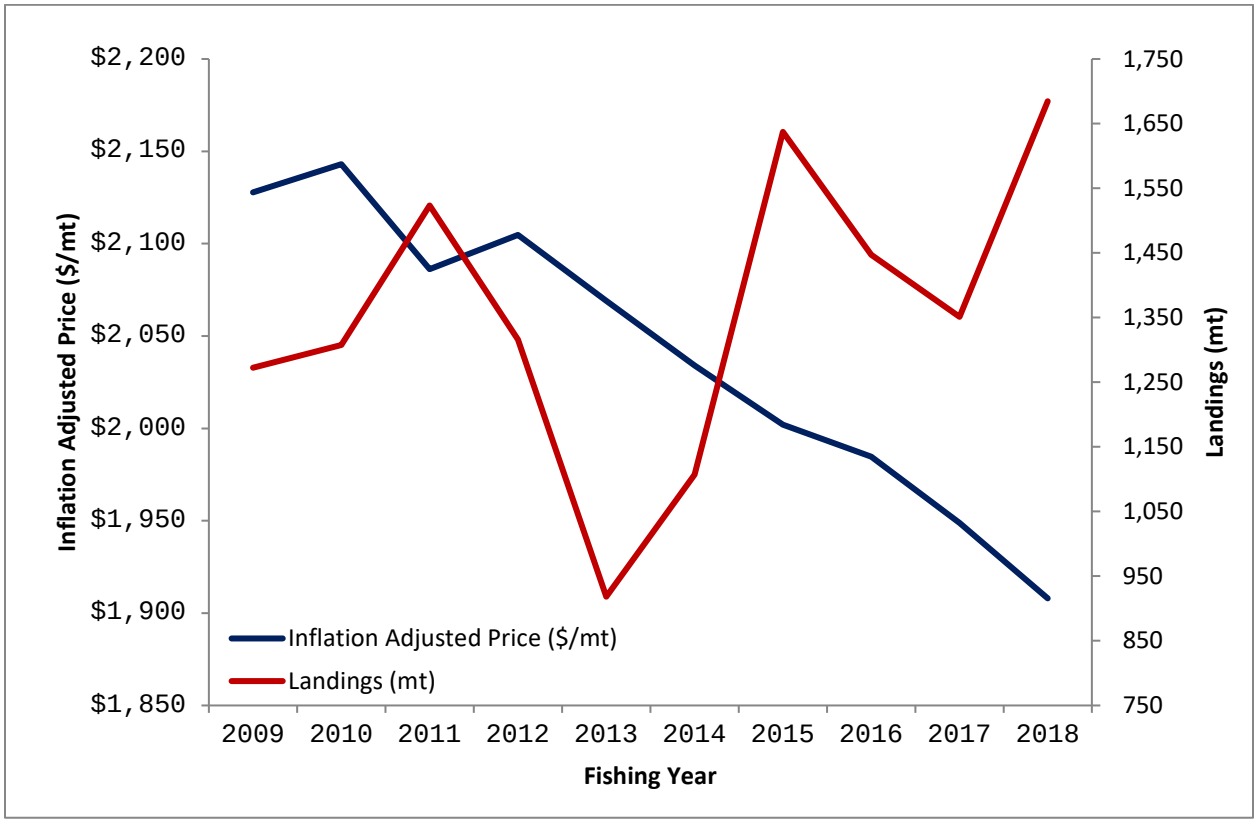
The red crab fishery is market-driven. The market in recent years has been strong, thus the fishery has been close to the Total Allowable Landings (TAL), and there are indications the market could absorb more landings if the TAL were to increase. Red crab landings have generally increased from FY 2009-2018, with the three most recent years close to or above the 10-year landings average (Table 12, Figure 18). Landings do not include landings for bait or home consumption. The inflation-adjusted price has decreased slightly from FY 2009-2018, with the three most recent years below the 10-year average. In recent years, more landings have been occurring late in the fishing year, but it is unknown if this increase in seasonal supply caused a decline in price, is driven by a seasonal increase in demand, or other conditions. The ex-vessel price is the price paid by the dealer to the vessel. Ex-vessel inflation adjusted revenues fluctuated through time but overall have increased, with the three most recent years above the 10-year average. In addition to market fluctuations that affect landings, sometimes vessel maintenance affects landings, which occurred in 2018 when one of the four active vessels was undergoing repairs for part of the year.

Table 12. Red crab landings, 2010 CPI inflation adjusted price, and estimated ex-vessel inflation adjusted revenue, FY 2009-2018.

Fishing Year	Landings (live mt)	2010 CPI* Inflation Adjusted Price ($/mt)	Ex-Vessel Revenue ($)
2009	1,272	$2,128	$2,685,393
2010	1,308	$2,143	$2,811,807
2011	1,523	$2,086	$3,262,627
2012	1,316	$2,105	$2,900,394
2013	918	$2,069	$2,024,420
2014	1,107	$2,034	$2,440,974
2015	1,637	$2,002	$3,586,613
2016	1,447	$1,985	$3,189,504
2017	1,351	$1,949	$2,978,797
2018	1,685	$1,908	$3,711,759
Annual Average	1,356	$2,041	$2,959,229

Data source: DMIS data (limited access vessels only), Greater Atlantic Regional Fisheries Office, June 24, 2019.
Note: The *Consumer Price Index (CPI) was used to convert nominal dollars to 2010 equivalent dollars is from the Bureau of Economic Analysis Table 1.1.0 (www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1).

Figure 18. Red crab inflation adjusted price ($/mt) and landings (mt), FY 2009-2018.



Source: DMIS data (limited access vessels only), Greater Atlantic Regional Fisheries Office, June 24, 2019.

5.5.6 Dependence on Red Crab

About 40 full time employees work on the red crab fishing vessels while 60-70 employees work in shoreside operations. Jonah crab and red crab are processed in the same processing facility, with Jonah crab accounting for ~65% of sales.[8] Red crab demand has increased over the past couple of years while demand for Jonah crab has fluctuated over time (Pers. Com. Jon Williams June 2019).

5.5.7 Processing, Market, and Substitute Goods

Red crab landed in New Bedford, MA is processed for human consumption and primarily sold domestically, with a small portion sent overseas for additional processing. The Virginia red crab landings are primarily live (i.e., no processing) and > 60% are trucked directly to Chinatown in New York City, also for human consumption, where a premium price is received. The remaining Virginia landings are sold locally but cannot compete with the local blue crab market for price when blue crab is available. Catch destined for the live market are typically from shorter trips of

[8] Jonah crab is not landed by vessels with red crab permits. It is landed by other vessels and processed in the same facility as the red crab landings (Pers. Com. Jon Williams August 2019).

2-4 days, while trips landing crabs for the processing plant vary between a 6-12 days, not including steam time (Pers. Com. Jon Williams June 2019).

Red crab competes in the market with other crab species. The red crab processors are also active in the Jonah crab fishery (Section 5.5.5). Canadian red crab/lobster processors recently started processing Jonah crab between the peak seasons of other fisheries. This is directly affecting the U.S. Jonah crab market, particularly the prices for Jonah crab caught in the Northeast region of the U.S., because the market is now flooded with this species (Pers. Com. Jon Williams June 2019).

5.5.7.1 Canadian Red Crab Fishery

A recent market competitor is the Canadian red crab fishery, which was not active before 2011 (Amendment 3, Section 6.1.3). However, there has been a small fishery in recent years. The Canadian fishery was unlikely to reach its 300 mt TAC in FY 2018. The TAC remains at 300 mt in FY 2019 and is split between two licenses (80% or 240 mt held by K&N Fisheries Limited and 20% or 60 mt held by Blair Scott Goodwin); (Pers. Com Tim Hayman June 2019). Landings data are not available at present due to Canadian data confidentiality standards (there are less than five Canadian license holders).

5.5.8 Fishing Communities

Section 6.3 of Amendment 3 to the FMP contains a community profile of New Bedford, MA, where the majority of the red crab vessels are docked and red crabs are regularly landed and processed. Red crab is also landed by a smaller vessel in the Mid-Atlantic, with landings occurring in Newport News, Hampton, and Virginia Beach, VA. While the red crab revenue to New Bedford and the other ports is small relative to all fishing activity, the vessels engaged in the red crab fishery are highly dependent on this species.

6.0 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

The impacts of the alternatives under consideration are evaluated relative to the Valued Ecosystem Components (VECs): target species (red crab), non-target species (bycatch), physical environment and EFH, protected resources, and human communities described in the Affected Environment (Section 5.0). Impacts are compared between No Action and the Proposed Action. The proposed change in the specifications cycle from 3 to 4 years is administrative in nature, and thus has no direct impacts on any VECs; therefore, this aspect of the Proposed Action is not analyzed in the individual impacts analysis sections.

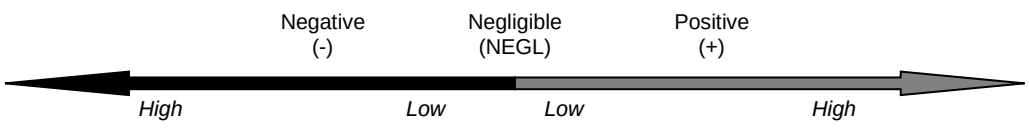
6.1 Introduction

6.1.1 Evaluation Criteria

The potential impacts of the alternatives are evaluated using the criteria in Table 13. The Proposed Action analysis will consider both minimum and maximum effort scenarios to demonstrate the range of impacts from the potential increase in effort.

Table 13. Terms used to summarize impacts on VECs.

VEC	Direction		
	Positive (+)	**Negative (-)**	**Negligible/Neutral**
Allocated target species, other landed species, and protected species	Actions that increase stock/population size for stocks in rebuilding. For stocks that are rebuilt, actions that maintain stock population sizes at rebuilt levels. For protected species, actions that increase the population size, or decrease gear interactions.	Actions that decrease stock/population sizes for overfished stocks. Actions that would cause a rebuilt stock to become overfished. For protected species, actions that decrease the population size, or increase or maintain gear interactions.	Actions that have little or no positive or negative impacts to stocks or populations.
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers:			
	All VECs: Mixed	**both positive and negative**	
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree (not significant)		
Likely	Some degree of uncertainty associated with the impact		



6.1.2 Potential for Effort Increases under the Proposed Action

The 12.7% increase in the TAL is not expected to substantially change the way the fishery operates, but is likely to result in a commensurate increase in the number of trips and number of days fished[9], which, based on an analysis of VTR data, are the only two variables that were shown to change when effort/landings increase (see Section 5.5.3). As such, an increase in the number of trips will likely be achieved by one of two scenarios: 1) lengthening the season of existing vessels (keeping the *amount* of gear static, but extending the duration gear remains in the water with four vessels [minimum effort]) or 2) using the fifth vessel and potentially an additional set of gear (maximum effort). Each vessel in the fishery has up to 600 traps, with 150 traps to a trawl, and eight vertical lines, which is referred to as one 'set' of gear. Due to the collaborative nature of this fishery where multiple vessels share the same gear sets, adding a fifth vessel would not automatically mean adding another set of gear. Both scenarios 1 and 2 are analyzed in the Proposed Action impacts on VECs, although for most VECs, the impact determination is the same for both scenarios.

While either scenario is possible, it is unlikely that Scenario 2 (maximum effort) would be realized, as operating a fifth vessel has significant operating costs, especially when the existing vessels have overlapping ownership and fish collaboratively (see Section 5.5.3.3). Further, this fifth vessel has only been active in 2 of the last 17 fishing years. Therefore, Scenario 1 (minimum effort) is more likely, and would result in potentially extending the amount of time one set of gear is in the water by 3- to 6- months but would not add any gear. This additional effort would be distributed throughout all three regions (Pers. Com. Jon Williams August 2019).

In either scenario, the increase in effort should be commensurate with the percent increase in the TAL (12.7%). Therefore, it is highly unlikely that scenarios 1 and 2 would *both* be realized, as this high level of effort increase would only result in an economic benefit if there was a significant increase in the TAL.

6.2 Impacts on Target Species (Red Crab)

6.2.1 No Action

As described in Section 7 of the Amendment 3 EA (NEFMC 2011a), the impacts of management actions on the red crab resource and fishery likely have been low positive by maintaining a stable red crab population through implementing a hard TAL and accountability measures (AMs). The EA attributes these positive impacts to keeping landings within scientifically determined limits, particularly in combination with the proactive and reactive AMs, which would close the fishery if landings are projected to reach the TAL and to pay back any overage the next year. The No Action alternative would maintain a TAL at the same level analyzed in the Amendment 3 EA (1,775 mt). The red crab fishery performance has remained stable in the last 10 years since the TAL was implemented (Section 5.5.2), and any declines in landings have been attributed to a

[9] The actual percent increase in the number of trips/days fished to achieve a 12.7% increase in TAL is dependent on LPUE, though it is expected to be non-substantial.

decrease in market demand. Further, the fishery has remained below this TAL. Therefore, it is expected that similar low positive impacts to the red crab population would continue with the No Action alternative.

6.2.2 Proposed Action

The impacts of the Proposed Action on the red crab resource are expected to be low positive, but less positive than the No Action alternative, as it would potentially result in removing more red crabs from the population. While there has been a slight decrease in LPUE since 2016 (see Figure 4), the long-term LPUE trend has been increasing, which is expected to continue. Overall landings have remained relatively consistent, fluctuating between 76% and 95% of the TAL between 2016-2018. The updated fishery information in Section 5.5.2 does not show any evidence of a change in the red crab stock size, and recent observer data indicate positive signs of recruitment (see Section 7 and Figure 3). Based on this information, the SSC stated that the performance of the fishery has been steady under the existing TAL with no negative signals and proposed a modest increase in the TAL.

As indicated in Section 5.5.4, red crab landings by vessels with *incidental* permits are very low, and consistent with levels analyzed in the Amendment 3 EA. Bycatch of red crab in other fisheries fluctuates and has been low in recent years (see Table 11). The proposed TAL is not expected to change bycatch or discarding of red crab in other fisheries from what has occurred since it was last analyzed in Amendment 3 (NEFMC 2011a).

While the proposed 12.7% increase in the TAL is likely to increase landings, a review of recent fishery information and long-term trends point to a biologically stable fishery, and the SSC concurs that there are no negative signals. Achieving the TAL has historically been related to market demand, and landings rarely have been within 5% of the TAL; from 2009-2018, the average landings were 76% of the TAL (1,775 mt). Further, this is a small, cooperative fishery with four active vessels, overlapping ownership of permits, and has supported industry-funded research to improve data available for this fishery. If the fishery is projected to reach the TAL, the proactive AM would be applied, closing the fishery and any overage would be accounted for the following year. The impact of the Proposed Action would be analyzed again in 2023, prior to setting the specifications for fishing years 2024 – 2028. Therefore, while the Proposed Action has the potential for a minor increase in red crab effort, it would likely result in a low positive impact to the red crab resource as it would ensure the fishery would maintain under the TAL.

This determination is expected to be the same for Scenarios 1 and 2 described in Section 6.1.2, because the increase in landings up to the TAL (removals from the population) would be similar whether it is achieved by extending the season that one part-time vessel leaves gear in the water or if an extra set of gear is added. From an economic perspective, there would be no incentive to utilize the fifth vessel/permit when the fishery could achieve the same level of landings with existing vessels. As described in Section 5.5.3.2, analysis of VTR data demonstrate the part-time nature of several active vessels, indicating that at least one or two vessels operate seasonally each year and have the capacity to extend their season, which further supports the likelihood of the minimum effort scenario. Provided LPUE remains stable, given the relatively minor increase in

TAL (12.7%), the level of fishing effort on the target species should increase accordingly while balancing market demand/pricing, operating costs, and a steady supply to customers.

6.3 Impacts on Non-Target Species (Bycatch)

6.3.1 No Action

As described in Section 5.2, there is very little, if any, bycatch of other species in the red crab fishery. As fishing effort would not change with the No Action alternative, this minimal level of bycatch would be expected to continue, maintaining sustainable stock status, and resulting in low positive impacts on non-target species.

6.3.2 Proposed Action

The impacts of the Proposed Action on non-target species is expected to be low positive, and Scenario 1 is neutral relative to No Action alternative, whereas Scenario 2 is less positive. Section 7.1.1.2 of the Amendment 3 EA stated that the TAL was not expected to result in a different level of bycatch or non-target species caught compared to the No Action alternative and would have a negligible impact on bycatch and non-target species (NEFMC 2011a).

The Proposed Action is a slight variation of the Amendment 3 preferred alternative (a 12.7% increase in TAL). Even if the fishery comes close to landing the proposed TAL (which has only happened in 2015 and 2018, where landings were 92% and 95% of the *current* TAL, respectively, that was preferred in Amendment 3), bycatch is minimal, and the areas fished will remain the same. Thus, a slight increase in effort will not substantially change the amount or composition of non-target species bycatch. In addition, the proposed TAL would not result in any gear changes or change in distribution of fishing effort. Therefore, as the Proposed Action has low interaction rates and would maintain the sustainability of non-target stocks, it is expected to have low positive impacts on non-target species. When comparing between alternatives, Scenario 1 and No Action are likely to result in the same impacts because they have the same amount of gear and therefore the same interaction rates. When comparing Scenario 2 and the No Action, Scenario 2 would likely have less positive impacts than the No Action due to the additional vessel and potential for another set of gear, which may increase interactions with non-target species.

6.4 Impacts on the Physical Environment and Essential Fish Habitat

Section 5.3.1 describes the physical environment and Essential Fish Habitat (EFH) designations for red crab, as updated in the Omnibus Essential Fish Habitat Amendment 2 (OHA2). Section 5.3.1 also summarizes recent evaluations of fishing gear impacts that support previous conclusions that the traps used in the red crab fishery have limited impacts on habitat. This assessment relates both to the type of gear used in the fishery, which has minimal impacts per unit area, and the overall magnitude of effort, which is low relative to other fleets. The red crab fishery occurs in areas designated as EFH for species such as redfish, witch flounder, and monkfish, which are benthic resources generally but not exclusively associated with soft bottom habitats (see Section 5.3.1).

Deep-sea corals are a specific feature of interest in the area of the red crab fishery. Section 5.3.2 describes the location of coral habitats, the vulnerability of corals to fishing gear, and the management measures that have been implemented throughout the region to protect deep-sea corals from negative effects of fishing.

6.4.1 No Action

The No Action alternative would maintain the current TAL, and therefore, effort is not expected to increase. This, combined with the minimal impacts of the gear, suggests that No Action will have negligible impacts on the physical environment, including designated EFH and deep-sea coral habitats, similar to the determination in the Amendment 3 EA that analyzed the same TAL. The Amendment 3 EA references the determinations from the Red Crab FMP (NEFMC 2002), which found there were no adverse impacts on EFH for the following reasons: 1) this fishery has a small number of limited access vessels (five or less), 2) the gear for the limited access fleet is restricted to pots (which do not have more than minimal or temporary effects on EFH), and 3) the number of pots per vessel is limited. While effort in the fishery may continue to shift between Regions 1, 2, and 3 in response to market conditions and restricted access in Region 1 due to the National Monument (starting in September 2023), regional shifts in effort should not affect this determination (i.e. these shifts should have a net neutral impact on EFH).

6.4.2 Proposed Action

The Proposed Action increases the TAL by 12.7%. Considering the overall size and nature of the fishery and the nature of the effort increase described in Section 6.1.2, combined with minimal impacts of the gear, it is expected that the Proposed Action would have negligible impacts on the physical environment, including designated EFH and deep-sea coral habitats, regardless of whether Scenario 1 or 2 is utilized, and similar to the Amendment 3 determination described in Section 6.4.1. The negligible impacts of the Proposed Action are neutral relative to No Action due to the minimal impacts of the gear in general.

6.5 Impacts on Protected Resources

6.5.1 No Action

The No Action alternative would maintain a TAL of 1,775 mt for the red crab fishery, which has been in place since FY 2010. Fishing effort would not change relative to current operating conditions described in Section 5.5.3. Specifically, the number of active vessels is likely to remain around 3-4 (Section 5.5.3.2); the location of fishing is expected to continue throughout the three regions, likely maintaining the recent trend of more landings from Region 2, followed by Region 1, and then Region 3 (Section 5.5.3.5); and the seasonality of fishing with lower effort in the spring/summer, increasing through fall and winter months, is not expected to materially change. The gear size and configuration of gear (*e.g. 600 traps/vessel, in four trawls of 150 traps with two vertical lines to each trawl, resulting in 8 vertical lines/vessel and a total number of 24-32 vertical lines for the fleet of 3-4 vessels that operate annually*) is not expected to change, nor is the average soak time of 24 hours (Sections 5.5.3.3 and 5.5.3.4).

The impacts of No Action on protected species is likely low negative to low moderate negative. As provided in Section 5.4, the distribution of protected species of large whales (North Atlantic right, humpback, minke, fin, sei, and sperm) and sea turtles (leatherback, loggerhead, Kemp's ridley, green) have the potential to overlap with the Atlantic deep-sea red crab fishery. In addition, the Atlantic deep-sea red crab fishery is prosecuted with pot/trap gear. Protected species of large whales and sea turtles are at risk of interacting with pot/trap gear, specifically via the entanglement in vertical lines associated with this gear type (see Section 5.4.4). Based on this, the Atlantic deep-sea red crab fishery has the potential to interact with these species, and therefore, result in some level of negative impacts to protected species of large whales and sea turtles. Interaction risks to protected species are strongly associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species (with risk of an interaction increasing with increases in of any or all of these factors). As noted above, fishing effort under the No Action alternative is expected to remain similar to what has been observed in this fishery over the last 5-8 years. Specifically, the number of pots/traps, and thus vertical lines, set in the water, soak times, and area fished are not expected change from current operating conditions. Given this, new or elevated interaction risks to protected species of large whales and sea turtles are not expected. Taking information provided on the No Action fishing effort into consideration, as well as information provided on protected species in the affected environment (Section 5.4), the impacts of the No Action alternative on protected species of large whales and sea turtles are low negative to low moderate negative.

6.5.2 Proposed Action

The Proposed Action would increase the TAL by 12.7% to 2,000 mt, potentially resulting in low moderate negative to moderate negative impacts on protected species of large whales and sea turtles. This increase would not substantially change the way the fishery operates (as summarized in Section 6.5.1), and is likely to result in a low level of change in fishing effort, likely through an increase in the number of trips and number of days fished, which, based on an analysis of VTR data, are the only two variables that were shown to have a direct relationship when effort/landings increase (Section 5.5.3).

The two effort scenarios to achieve the increase in TAL are described in Section 6.1.2. In either of these scenarios, the seasonality and location of the fishery is not likely to change from the way the fishery has operated in the last 5-10 years, which is described in Section 5.5.3.5.

Given the above, Scenario 1 (minimum effort) has the potential to increase interaction risks with protected species of large whales and sea turtles as gear and vertical lines may be present in the water for a longer duration, resulting in low moderate negative to moderate negative impacts. Under this scenario, it is likely that the fishery will deploy three- to four- vessels and fish in the same areas with the same gear size and configuration (e.g., 24-32 vertical lines for the entire fleet); the primary changes would be an increase in the length of season (i.e., gear for one part-time vessel remaining in the water for longer). This scenario is supported by VTR data from the last 16 years that indicate days fished and number of trips are the only variables that increase in years with higher landings (see Figure 15). While hauling gear more frequently would not increase interaction risks to protected species of large whales and sea turtles (see Table 7),

lengthening the fishing season for one of these vessels (as indicated in Section 6.1.2), has the potential to increase the amount of time one set of gear (i.e., 600 traps/eight vertical lines) is in the water by 3-6 months. As provided above, interaction risks to protected species are strongly associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species (with risk of an interaction increasing with increases in of any or all of these factors). Given this and the information above, this scenario could result in a slight increase in interaction risks to protected species of large whales and sea turtles. Taking into account this information, information provided in the No Action alternative, as well as information provided in the protected species affected environment, specifically the status of the species and interaction risks posed to protected species of large whales and sea turtles by pot/trap gear, this scenario is expected to result in low moderate negative to moderate negative effects to protected species of sea turtles and large whales.

Under Scenario 2 (maximum effort), each vessel typically has up to eight vertical lines if they utilize the full 600-trap limit and adding a fifth vessel could result in the addition of more gear, and thus, vertical lines to the water. This has the potential to increase interaction risks with protected species of large whales and sea turtles (see Table 7), resulting in low moderate to moderate negative impacts. If the fishery decided to utilize this fifth vessel rather than continuing to fish collaboratively with the three- to- four vessels that typically operate (some on a part-time basis), it could add up to 600 traps to the water, and with the standard gear configuration, this would result in an additional eight vertical lines in the water for a fleet wide total of 40 vertical lines (vs. 24-32 in the No Action alternative). As the TAL is a modest increase (~12.7%), it is not expected that this fishing vessel would operate more than 3-6 months a year, and location is not expected to change as a result of the Proposed Action; therefore, while there may be a temporal change in overlap with protected species, the spatial overlap would remain the same.

While this addition of vertical lines has the potential to moderately increase interaction risks to protected species of large whales and sea turtles (see Table 7); Scenario 2 is very unlikely as there is little to no economic incentive to add a fifth vessel. Adding this vessel would increase capital costs with the costs of vessel maintenance, fuel, bait, new gear, and hiring an additional captain and crew members. This additional high operating cost would likely exceed the cost of simply utilizing one of the currently active vessels that typically operates on a part-time basis. Therefore, there is a stronger economic incentive for Scenario 1, which would likely yield a higher net revenue. However, should Scenario 2 occur, taking into consideration the above information, and information provided in the protected species affected environment, specifically the status of the species and interaction risks posed to protected species of large whales and sea turtles by pot/trap gear, impacts to protected species of sea turtles and large whales under this scenario are expected to be low moderate negative to moderately negative.

Based on the above information, the Proposed Action is expected to result in low moderate to moderate negative impacts to protected species of large whales and sea turtles. Compared to the No Action alternative, the impact of Scenario 1 is expected to be slightly more negative, and the impact of Scenario 2 is expected to be moderately more negative to protected species of sea turtles and large whales given the potential for effort to increase relative to No Action.

6.6 Impacts on Human Communities

6.6.1 No Action

The No Action alternative would maintain a TAL of 1,775 mt for the red crab fishery, which has been in place since FY 2010. The economic impacts of the No Action alternative of maintaining a TAL of 1,775 mt are likely low positive. Total red crab revenue in recent years has been about $3.0M (Table 12). If the price of red crab remains within the recent levels and the catch remains close to the current TAL, the total revenue from red crab under the No Action alternative would likely not change. In the long term, the No Action alternative is likely to have positive stock benefits, likely leading to low positive long-term economic impacts.

The social impacts of the No Action alternative are likely low positive. Continuing under the current TAL would maintain employment levels in the fishery and business opportunities for shoreside service providers, with little change in employment in the wider fishing community. If the No Action alternative ultimately facilitates the long-term sustainability of the resource, there could be low positive social impacts on the historical dependence on, and participation in, the red crab fishery.

6.6.2 Proposed Action

The economic impacts of the Proposed Action on human communities are likely low positive. The proposed TAL is likely to slightly increase the current supply of red crab; however, because it is a small increase and this is a market driven demand fishery, it will not substantially change the market drivers or the ex-vessel price of red crab and wholesale or retail prices. Consequently, the proposed TAL is unlikely to substantially change consumer surplus. The few boats with limited access red crab permits have overlapping ownership and operate as a voluntary cooperative. The cooperative relationship fosters a strong incentive to harvest red crab in a way that maximizes profits for the whole fleet.

As a result, the vessels are unlikely to compete to harvest the largest possible amounts of red crab per vessel as quickly as possible before the TAL is reached. This TAL increase could be harvested by extending the season of the one vessel that is currently part-time (Scenario 1) or by operating the fifth vessel (Scenario 2). Scenario 1 is most likely because it is more economically efficient. If the TAL of 2,000 mt is achieved under Scenario 1, it may result in slight positive impacts on employment or on the income of crew members, if there are strong market conditions. If the TAL of 2,000 mt is achieved under Scenario 2, it may result in neutral or low negative economic impacts as the high operating costs for a fifth vessel may not exceed the ex-vessel revenue of the increased landings.

The social impacts on human communities are expected be positive, for either the minimum or maximum effort scenarios, maintaining the positive impacts described in Amendment 3 (NEFMC 2011a). With a minor increase in the TAL, there would likely be a degree of constancy and predictability for fishing industry operations as slightly more red crab would be supplied to the market (in addition to the stability provided by 4-year specifications process). The size and demographic characteristics of the fishery-related workforce would likely be unchanged, as would the historical dependence on and participation in the fishery.

The impacts on human communities from the Proposed Action are likely to be more positive relative to the No Action alternative under both effort scenarios. This is because the No Action alternative would have a lower TAL, so catch and revenue would be more restricted compared to the Proposed Action alternative.

6.7 Cumulative Effects

6.7.1 Introduction

A cumulative effects assessment (CEA) is a required part of an EIS or EA according to the Council on Environmental Quality (CEQ; 40 CFR part 1508.7) and NOAA's policy and procedures for NEPA, found in NOAA Administrative Order 216-6A (Companion Manual, January 13, 2017). The purpose of the CEA is to integrate into the impact analyses, the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but rather, the intent is to focus on those effects that are truly meaningful. This section serves to examine the potential direct and indirect effects of the alternatives in this action together with past, present, and reasonably foreseeable future actions that affect the human environment. The predictions of potential synergistic effects from multiple actions, past, present and/or future are generally qualitative.

Valued Ecosystem Components (VEC)
The valued ecosystem components for the red crab fishery are generally the "place" where the impacts of management actions occur, and are identified as noted in Section 5.0:

1. Target species (Red Crab);
2. Non-target species (Bycatch);
3. Protected species;
4. Physical environment and essential fish habitat; and
5. Human Communities

The CEA identifies and characterizes the impact on the VECs by the alternatives under consideration when analyzed in the context of other past, present, and reasonably foreseeable future actions. To enhance clarity and maintain consistency, terms are as defined in Table 13.

Temporal Scope of the VECs
While the effects of historical fisheries are considered, the temporal scope of past and present actions for regulated red crab stocks, non-red crab species, habitat and the human environment is primarily focused on actions that have taken place since implementation of the initial Red Crab FMP in 2002. However, since this is a Supplemental EA (SEA), cumulative impacts prior to the Amendment 3 EA in 2011 are incorporated by reference, so the past impacts are analyzed from 2011 to present. An assessment using this timeframe demonstrates the changes to resources and the human environment that have resulted through management under the Council process and through U.S. prosecution of the fishery, rather than foreign fleets. For protected species, the context is largely focused on the 1980s and 1990s, when NMFS began generating stock

assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. For future actions, this analysis examines the period between the expected implementation of this action, 2020, and 2025. The dynamic nature of resource management for these species and lack of information on projects that may occur in the future make it difficult to predict impacts beyond this timeframe with any certainty.

Geographic Scope of the VECs

The geographic scope of the impacts to species is the range of each in the western Atlantic Ocean, as described in the Affected Environment (Section 5.0). The physical environment, including physical environment and EFH, is bounded by the range of the red crab fishery, from the Gulf of Maine through the Mid-Atlantic Bight (Regions 1, 2, and 3 – Figure 10), and includes adjacent upland areas (from which non-fishing impacts may originate). For endangered and protected species, the geographic range is the Northwest Atlantic Ocean. The geographic range for human communities focuses on the Northeast and Mid-Atlantic U.S., where the majority of the landings and processing occurs.

Analysis of Total Cumulative Effects

A cumulative effects assessment ideally makes effect determinations based on the combination of: 1) impacts from past, present and reasonably foreseeable future actions; 2) the baseline condition of the VECs (the combined effects from past, present and reasonably foreseeable future actions plus the present condition of the VEC); and 3) impacts of the alternatives under consideration for this action.

6.7.2 Past, Present and Reasonably Foreseeable Future Actions

6.7.2.1 Fisheries Impacts

A synopsis of the most applicable past, present, and reasonably foreseeable future actions (from 2011 to 2025) that have the potential to interact with the current action is in Table 14. Section 7.9 in the Amendment 3 EA, including Table 23, provides a detailed cumulative effects analysis of past, present and reasonably foreseeable future actions through 2011. This includes the following actions: changes in coral management zones, designation of a National Monument, gear restrictions to reduce/eliminate interactions with protected species, and an update of essential fish habitat (EFH). In summary, there have been numerous actions taken in the past, present, and likely in the near future as well that have impacts that range from positive, but minimal, to positive. Amendment 3 was expected to have positive impacts to the red crab resource and human communities given management at long-term sustainable levels. Positive, but minimal impacts were expected for non-target species, habitat, and protected resources through regulations to control red crab fishing effort and, thus, impacts to habitat disturbance and ESA and MMPA species.

More specifically, in 2015, NMFS amended the regulations implementing the Atlantic Large Whale Take Reduction Plan (ALWTRP) to change the minimum number of traps per trawl to allow fishing with a single trap in certain MA and RI state waters. These ALWTRP regulations also modified the requirement to use one endline on trawls within certain areas in MA state waters. These regulations require gear marking and weak links for the red crab fishery.

Section 5.3.2 also describes the Northeast Canyons and Seamounts Marine National Monument. The Monument boundaries overlap with a portion of the red crab Region 1 (see Figure 8), and after 7 years from implementation (September 15, 2023) the red crab fishery will be prohibited from fishing in this area. The specifications for this action are for FY 2020-2023, so red crab fishing would be prohibited from the Monument near the end of this timeframe. The fishing year runs March through February; therefore, the red crab fishery would be affected by these regulations six months into FY 2023, starting in September. The Monument covers approximately 25-30% of Region 1, where the fishery would be displaced from. Thus, effort may shift within the remainder of Region 1, along with regions 2 and 3. Since 2013, landings have generally been higher in Region 2 than Region 1 (opposite from the previous 10 years), and this trend may be amplified by loss of fishing grounds.

Note that effort shifts associated with closure of the Monument could result in slightly negative economic impacts on the fishery if it is not able to land up to the TAL. The Deep-Sea Coral Amendment (NEFMC 2019) analyzed landings revenue in the Monument for the top ten species from 2010-2015. On average, red crab revenue landed from the Monument prior to the designation (derived from VTR data) was in the range of $100,000-$200,000 annually. However, provided that these regulations would change halfway through FY 2023, and are known well in advance, it is possible the fishery will adjust effort prior to this change, resulting in negligible impacts.

In October 2017, NMFS updated management activities under the MMPA and ESA to promote protection, conservation, and recovery of the North Atlantic right whale population, including the reinitiation of the ESA Section 7 consultations for the U.S. American Lobster, Atlantic Deep-Sea Red Crab, and Batched Fisheries Biological Opinions.

The New England Fishery Management Council (Council) initiated the Omnibus EFH Amendment 2 (OHA2), effective April 2018, to update EFH designations for all species managed by the Council (including red crab), designate new Habitat Areas of Particular Concern, and revise the current habitat and groundfish management areas. The red crab fishery is exempt from any gear restrictions resulting from OHA2.

As described in Section 5.3.2, the Council subsequently developed and submitted a Deep-Sea Coral Omnibus Amendment in June 2019 that designated coral management zones and fishing gear restrictions. The red crab fishery is exempt from these regulations. The Mid-Atlantic Fishery Management Council's (MAFMC) coral amendment became effective in January 2017, and the red crab fishery is exempt from regulations in both of these actions. While the MAFMC plans to reconsider this exemption, possibly in the coming year, it is highly unlikely there will be final action before the red crab specifications are implemented.

Due to the offshore nature of the fishery and depth at which fishing occurs, few fisheries interact with the red crab fishery. The American lobster and red crab fishery have historically operated in the same region, however, interactions between these two fisheries is limited because red crab

primarily operates in deeper water (~600 m) compared to the lobster fishery (~500 m).[10] The Jonah crab fishery also operates in the region where red crab fishing occurs with similar gear to what is used in the lobster fishery. Other fisheries, including monkfish, whiting, and some mid-Atlantic fisheries (e.g. shrimp, tilefish, squid, etc.) also operate in the same region utilizing otter trawl and mid-water trawl gear. However, while these fisheries have the potential to incidentally catch red crab, there is minimal red crab incidental catch in other fisheries overall, as described in Section 5.5.4. Therefore, given the minimal overlap of these fisheries at the depth of red crab habitat in addition to the low level of red crab discards in these fisheries, changes to these FMPs would most likely result in negligible interactions with the red crab fishery.

Furthermore, the way the fishery operates is not expected to fundamentally change in terms of effort (maximum of 40 vertical lines fleetwide), and fishing location and management measures are in place to minimize the impacts of the red crab fishery on protected resources and EFH (Sections 5.3 and 5.4). The impacts of non-fishing activities are also considered below.

Most of the actions affecting the VECs come from fishery-related activities (e.g., Federal fishery management actions), which have straightforward effects on environmental conditions, and were, are, or will be taken, in large part, to improve those conditions. The reason for this is the statutory basis for Federal fisheries management, the reauthorized Magnuson-Stevens Act (MSA 1996). That legislation was enacted to promote long-term positive impacts on the environment in the context of fisheries activities, stipulating that management comply with a set of National Standards that collectively serve to optimize the conditions of the human environment. Under the MSA, the cumulative impacts of past, present, and future Federal fishery management actions on the VECs should be expected to result in positive long-term outcomes. Nevertheless, these actions are often associated with offsetting impacts. For example, constraining fishing effort frequently results in negative short-term socioeconomic impacts on fishery participants. However, these impacts are usually necessary to bring about the long-term sustainability of a given resource, and as such, should, in the long term, promote positive effects on human communities, especially those that are economically dependent upon the managed resource. Generally, these actions have had low negative impacts on habitat due to continued fishing operations; however, some actions have had direct or indirect long-term positive impacts on habitat through designating or protecting important habitats. FMP actions have also had a range of impacts on protected species, including generally low negative impacts on ESA-listed species, and a range of impacts on non-ESA listed marine mammals from low negative to low positive, depending on the species.

Table 14. Summary of effects from past, present and reasonably foreseeable future actions on the VECs.

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions

[10] At the Mid-Atlantic Bight sampling sites of one research project, the highest abundance of red crab occurred at depths between 500 and 650 m, and few crabs were captured at depths <400 m (Stevens and Guida 2016).

	A	B	B	A+B+C
Target Species (Red Crab)	**Positive** Combined effects of past actions have prevented potential overharvesting of the red crab resource.	**Positive** Current regulations continue to manage for sustainable stocks.	**Positive** Future actions are anticipated to continue to maintain a stable red crab resource.	**Positive** Stocks are being managed to achieve optimum yield and prevent overfishing.
Non-Target Species (Bycatch)	**Low Positive** Past actions prevented potential increases in red crab effort and therefore effort on direct and discard/bycatch species.	**Low Positive** Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species.	**Low Positive** Future actions are anticipated to continue to control effort and minimize bycatch.	**Low Positive** Increased red crab fishing effort with negligible bycatch is expected to continue.
Physical Environment and Essential Fish Habitat	**Low Positive** Regulations controlled catch and fishing effort, thus preventing potential increases in habitat impacts.	**Positive** Omnibus Essential Fish Habitat Amendment 2, MAFMC coral management zones, and the Northeast Canyons and Seamounts Marine National Monument protect the deep-sea habitats, incl. red crab habitat.	**Low Positive** Future actions are likely to continue rebuilding a healthy environment and increase habitat quality (Omnibus Deep-Sea Coral Amendment, effective 2020).	**Low Positive** Continued fisheries management will likely protect deep-sea habitats and control fishery effort and thus fishery related habitat impacts.
Protected Species	**Low to Moderate Negative** Combined effects of past actions have prevented potential increases in red	**Low Moderate Negative to Moderate Negative** Current regulations increase fishing effort.	**Low Positive to Low Moderate Negative** Future regulations will control effort and the Atlantic Large Whale Take Reduction	**Low Positive to Low Moderate Negative** Continued catch and effort controls along with protected species' regulations should help mitigate the

	crab effort and therefore potential interactions with protected species (i.e., large whales and sea turtles).		Plan is expected to continue ongoing conservation actions to reduce the risk of serious injury and mortality to large whales caused by incidental entanglement in fixed fishing gear and sinking groundline.	risk of entanglement to protected species.
Human Communities	**Positive** Establishing catch targets improved the likelihood that the red crab fishery will remain sustainable, which has positive impacts on human communities.	**Positive** Current levels of effort maintain a stable red crab fishery.	**Positive** Future actions are anticipated to continue to maintain a stable red crab fishery.	**Positive** Continued fisheries management will likely control effort for a sustainable fishery and thus should support viable communities and economies.

6.7.2.2 Non-fisheries Impacts

Non-fishing activities that occur in the marine nearshore and offshore environments and connected watersheds can cause the loss or degradation of habitat and/or affect the species that reside in those areas. The impacts of most nearshore human-induced non-fishing activities tend to be localized in the nearshore areas and marine project areas where they occur. As the red crab fishery only operates in deep, offshore waters, it is unlikely that nearshore activities would affect the red crab resource or fishery, although in an effort to assess the potential impact to the red crab resource, EFH or the fishery, they are still summarized in this section. The following discussion of impacts is based on past assessments of activities and assume these activities will likely continue as projects are proposed.

Examples of these activities include point and non-point source pollution, shipping, dredging, storm events, wind energy development, oil and gas development, construction, and other activities. The impacts from these non-fishing activities primarily stem from habitat loss due to human interaction and alteration or natural disturbances. These activities are widespread and can have localized impacts on habitat related to the accretion of sediments from at-sea disposal areas,

oil and mineral resource exploration, aquaculture, construction of at-sea windfarms, bulk transportation of petrochemicals, and significant storm events. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and as such may indirectly constrain the sustainability of managed species, non-target species, and protected species. Decreased habitat quality may reduce the resilience of these VECs to the impacts of fishing effort. Direct negative impacts that have been observed to target, non-target, and protected species resulting from non-fishing activities include shifting distributions, decreased reproductive ability and success, disrupted or modified food web interactions, and increased disease. The overall impact on the affected species and their habitats on a population level is unknown, but likely to have no impact to low negative impacts.

Non-fishing activities permitted under other federal agencies (e.g. beach nourishment, offshore wind facilities, etc.) require examinations of potential impacts on the VECs. The MSA imposes an obligation on other federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH (50 CFR 600.930). NMFS and the eight regional fishery management councils engage in this review process by making comments and recommendations on federal and state actions that may affect habitat for their managed species and by commenting on actions likely to adversely impact EFH. To the extent these conservation recommendations are adopted by action agencies, the EFH consultation process serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources under NMFS' jurisdiction. In addition to guidelines mandated by the MSA, NMFS reviews some non-fishing effects during the review processes required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by Federal, state, and local authority.

In recent years, offshore wind energy has become a more relevant activity in the Greater Atlantic region. Offshore wind energy is expected to impact all VECs, as described below. Construction activities may have both direct and indirect impacts on marine resources, ranging from temporary changes in availability to injury or mortality. There may be negative effects on fishing activities in terms of effort displacement or making fishing more difficult or expensive near the turbines or cables. Wind turbines and cables may influence water currents and electromagnetic fields, respectively, which can affect patterns of movement, spawning and recruitment success, and prey availability for various species (target, non-target, protected). Habitats surrounding the turbine and cable sites would be affected, and there could be scouring concerns around the turbines. Impacts on human communities in a general sense will be mixed – there would be economic benefits in the form of jobs associated with construction and maintenance, and replacement of some electricity generated using fossil fuels with renewable resources, and potentially negative economic impacts on the fishing industry if there is a loss of fishing grounds.

While there is only currently one small operational wind farm in New England waters, potential wind energy sites have been identified off Massachusetts and Rhode Island, and into Mid-Atlantic waters. There are also several proposals to develop wind farms both in nearshore and offshore waters. In New England, offshore wind project construction south of Massachusetts/Rhode Island may begin as early as 2020 (multiple projects including Vineyard Wind, Bay State Wind, and South Fork Wind Farm are currently in the environmental review

and permitting process). Additional areas have been leased and site assessment activities will take place in the next few years.

Oil and gas exploration and development is a potential activity in the region. For oil and gas, this timeframe would include leasing and possible surveys. Seismic surveys impact the acoustic environment within which marine species live and have uncertain effects on fish behaviors that could cumulatively lead to negative population level impacts. The science on this is uncertain. If marine resources are affected by seismic surveys, then the fishermen targeting these resources would be affected. However, there would be an economic component in the form of increased jobs where there may be some positive effects on human communities.

The overall impacts of offshore wind energy and oil and gas exploration on the affected species and their habitats on a population level is unknown, but likely to range from no impact to moderate negative, depending on the number and locations of projects that occur, as well as the effects of mitigation efforts.

Global climate change will affect all components of marine ecosystems, including human communities. Physical changes that are occurring and will continue to occur to these systems include sea-level rise, changes in sediment deposition, changes in ocean circulation, increased frequency, intensity and duration of extreme climate events, changing ocean chemistry, and warming ocean temperatures. Emerging evidence suggests that these physical changes may have direct and indirect ecological responses within marine ecosystems which may alter the fundamental production characteristics of marine systems (Stenseth & Mysterud 2002). Climate change could potentially worsen the stresses imposed by fishing and other non-fishing human activities and stressors (described in this section).

Results from the Northeast Fisheries Climate Vulnerability Assessment (Hare *et al.* 2016) indicate that climate change could have overall directional impacts on all VECs that range from negative to positive depending on the species, their climate vulnerability, potential for distribution change, and other factors. However, future mitigation and adaptation strategies to climate change may mitigate some of these impacts as more information becomes available to predict, evaluate, monitor, and categorize these changes.

6.7.3 Baseline Conditions for Resources and Human Communities

The CEA baseline conditions for resources and human communities is the combined effects of the past, present, and reasonably foreseeable future actions plus the present condition of the VECs (i.e., status/trends from Section 6.7.2; Table 15). In general, straightforward quantitative metrics of the baseline conditions are only available for the managed resources, non-target species, and protected resources. The conditions of the physical environment and essential fish habitat and human communities VECs are complex and varied, and described in Sections 5.3 and 5.5, respectively.

Table 15. Baseline conditions of the VECs affected by the red crab fishery.

VEC	Status/Trends, Overfishing/Overfishing	Combined Effects of Past, Present Reasonably Foreseeable Future Actions	Combined CEA Baseline Conditions
Target Species (Red Crab)	Unknown stock status due to data poor fishery; overfished status is unknown, but overfishing is not occurring (based on CPUE proxies); red crab is harvested at a sustainable level (Section 5.1.2)	**Positive** Stocks are being managed to achieve optimum yield and prevent overfishing	**Positive:** Red crab is being managed to maintain future sustainability.
Non-Target Species (Bycatch)	There is very little bycatch in the red crab fishery.	**Low Positive** Future actions are anticipated to continue to control effort and minimize bycatch.	**Positive:** Bycatch in the red crab fishery is negligible, thus, the minimal level of bycatch would be expected to continue.
Physical Environment and Essential Fish Habitat	Red crab fishing gear has minimal impacts on habitat with minimal impacts per unit area and is low relative to other fleets.	**Low Positive** Future actions are likely to continue rebuilding a healthy environment and increase habitat quality (Omnibus Deep-Sea Coral Amendment, June 2019).	**Mixed:** Negligible habitat disturbance by red crab fishing gear but impacts from non-fishing actions, such as global warming, could increase and have a negative impact.
Protected Resources	All large whales in the Northwest Atlantic are protected under the MMPA. Of these large whales, North Atlantic right, fin, blue, sei, and sperm whales are also listed as endangered under the ESA. Leatherback and Kemp's ridley sea turtles are classified as endangered under the ESA; loggerhead (NW Atlantic DPS) and green (North Atlantic DPS) sea turtles are classified as threatened.	**Low Positive to Moderate Negative** Future regulations will control effort and the Atlantic Large Whale Take Reduction Plan is expected to continue conservation actions to reduce the risk of serious injury and mortality to large whales caused by incidental entanglement in fixed fishing gear and sinking groundline.	**Low Positive to Low Moderate Negative**: Reduced gear encounters through gear modifications and additional management actions taken under the MMPA.
Human Communities	Employment opportunities in the red crab fishery and broader coastal communities have remained relatively stable.	**Positive** Future actions are anticipated to continue to maintain a stable red crab fishery.	**Positive:** Sustainable resources should support viable communities and economies.

6.7.4 Impacts from Red Crab Specifications

The Proposed Action would modify the Atlantic Deep-sea Red Crab FMP by: 1) increasing the TAL to 2,000 mt and 2) increasing the specifications cycle from three years to four years (i.e., proposed specifications would set the higher TAL for FY 2020-2023). The measures are designed to increase the harvest of the red crab resource while maintaining the sustainability of red crab. The impacts of the alternatives under consideration are in Sections 6.2 through 6.6 and

summarized in Table 16. Since the change to the specifications cycle is an administrative action, there are no direct impacts to any VEC.

Table 16. Summary of impacts from the specifications expected on each VEC (preferred alternative shaded).

Specifications		Target Species (Red Crab)	Non-Target Species (Bycatch)	Physical Env. & EFH	Protected Resources	Human Communities
TAL	**No Action**	Low positive	Low positive	Negligible	Low negative to low moderate negative	Economic: low positive, Social: low positive
TAL	**Proposed Action**	Low positive; less positive than No Action for *Scenarios 1 and 2*	Low positive; *Scenario 1*: neutral to the No Action and *Scenario 2*: less positive to the No Action	Negligible; neutral to the No Action for *Scenarios 1 and 2*	Low moderate negative to moderate negative; *Scenario 1*: slightly more negative than No Action and *Scenario 2*: moderately more negative than No Action	Economic: low positive, Social: low positive; more positive than No Action *for Scenarios 1 and 2*

6.7.5 Cumulative Effects Analysis

To determine the magnitude and extent of cumulative impacts of the alternatives, the incremental impacts of the direct and indirect impacts should be considered, on a VEC-by-VEC basis, in addition to the effects of all actions (those effects identified and described relative to the past, present, and reasonably foreseeable future actions of both fishing and non-fishing actions). Table 16 summarizes likely effects of the management alternatives contained in this action. The CEA baseline (Table 15), represents the sum of the past, present, and reasonably foreseeable future (identified hereafter as "other") actions and conditions of each VEC. When an alternative has a positive effect on a VEC, for example, reduced fishing mortality on a managed species, it has a positive cumulative effect on the stock size of the species when combined with the other actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect on a VEC, such as increased mortality, the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the "other" actions. The resultant positive and negative cumulative effects are described below for each VEC.

Target Species (Red Crab)

Past fishery management actions taken through the Atlantic Deep-Sea Red Crab FMP and the triennial specifications process (e.g. setting TAL) help ensure that the stock is managed

sustainably and that measures are consistent with the objectives of the FMP under the guidance of the MSA. The red crab stock has remained relatively stable; achieving the TAL has been related to market demand and landings rarely have been within 5% of the TAL, with landings only close to the current TAL in 2018 and 2015. Overall, the past, present, and reasonably foreseeable future actions of all other fishery actions on the Atlantic deep-sea red crab fishery have had positive effects, as the stock is stable, and these actions maintain the stock size at stable levels. The effects of non-fishing activities on the red crab resources are potentially slightly negative. When the direct and indirect effects of the Proposed Action are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), the cumulative effects are expected to yield positive impacts on target species (red crab).

Non-Target Species (Bycatch)

The combined impacts of past federal fishery management actions on non-target species has been low positive as increased fishing effort is not expected to increase catch of non-target species given low bycatch rates of the red crab fishery. Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species. In addition, the effects of non-fishing activities on bycatch are potentially slightly negative. When the direct and indirect effects of the Proposed Action are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), the cumulative effects are expected to yield low positive impacts on non-target species (bycatch).

Physical Environment and Essential Fish Habitat

Gear size and configuration have remained relatively constant in recent years and is expected to continue in the future even with the proposed increase in TAL. As described in Section 5.3, the red crab gear has minimal impacts on the physical environment. The season length and utilization of the fifth previously inactive vessel could result in increased interaction with habitat; however, the Omnibus Essential Fish Habitat Amendment 2 (OHA2) in 2018, the MAFMC and NEFMC coral management zones, and the Northeast Canyons and Seamounts Marine National Monument actions could offset the increase in effort by limiting the spatial extent of the fishery through prohibiting certain types of fishing gears in specific habitat management and coral management zones, protecting deep-sea habitats where red crabs and the red crab fishery occur (see analyses in MAFMC 2016, NEFMC 2016, NEFMC 2019). When the direct and indirect effects of the Proposed Action are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), the cumulative effects are expected to yield mixed impacts with some low positive and negative impacts, thus, in aggregate, negligible to low positive impacts on the physical environment and EFH.

Protected Resources

The red crab fishery has, in past and present actions, capped effort at 600 traps/vessel with a maximum of five red crab vessels and established an ABC and TAL. While the fishery in general has the potential for negative impacts on protected species of large whales and sea turtles due to entanglement risks, these input and output controls have helped minimize negative impacts.

The Proposed Action would likely result in a low increase in current levels of fishing effort in terms of the overall amount of number of trips and days fished, potentially increasing the amount of time gear, including vertical lines are in the water. As described in Section 6.5.2, the Proposed Action is expected to have low moderate to moderate negative impacts on protected species of large whales and sea turtles. In addition, the effects of non-fishing activities on protected resources are potentially negative. When the direct and indirect effects of the Proposed Action are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), the cumulative effects are expected to yield low positive to low moderate negative impacts on the protected resources in the region.

Human Communities

The increase in the red crab TAL is expected to have a positive effect on human communities through the potential increase in catch and revenue if consumer demand increases with the higher TAL (given this is a fishery driven by market demand). Past fisheries actions have had a low positive effect because red crab is being managed to maintain future sustainability of the fishery, thus positive long-term impacts on human communities are expected to continue. While some past actions, like the ALWTRP regulations, may have resulted in slightly negative economic impacts in the short-term to purchase new gear for modifications, compliance with these regulations has allowed the fishery to continue operating, and on balance, results in neutral impacts on human communities. As previously mentioned, if the exemption to fish in the Monument is lifted after the 7-year sunset period, then it is possible this change could result in negative economic impacts (starting in FY2023) if fishing effort is not shifted elsewhere. Overall, the effects of fishing and non-fishing actions are positive for human communities. When the direct and indirect effects of the Proposed Action are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), the cumulative effects are expected to have positive impacts on human communities overall if landings continue to achieve or come close to the TAL.

Summary

The Council's preferred alternative (i.e., the Proposed Action) is described in Section 4.2. The direct and indirect impacts of the Proposed Action on the VECs are described in Section 6.0 and are summarized in the Executive Summary. The magnitude and significance of the cumulative effects, including additive and synergistic effects of the Proposed Action, as well as past, present, and future actions, have been considered (Section 6.7.2).

When considered in conjunction with all other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, the Proposed Action is not expected to result in any significant impact, positive or negative. The Proposed Action for increasing the TAL is expected to have low positive impacts for the red crab resource and human communities, low positive impact to non-target species, negligible impacts to the physical environment/EFH, and low moderate negative to moderate negative impacts to protected resources. The change in the specification cycle from 3 to 4 years is not expected to have any direct or indirect impacts on the VECs.

The regulatory atmosphere within which federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of managed species, habitat, and human communities. Consistent with NEPA, the MSA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs from past, present, and reasonably foreseeable future actions have been generally positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the VECs are not experiencing negative impacts, but rather when considered as a whole and as a result of the management measures implemented in this fishery, the overall long-term trend is positive.

There are no significant cumulative effects associated with the Proposed Action based on the information and analyses presented in this document and in the past FMP documents. Cumulatively, through 2025, it is anticipated that the Proposed Action will result in non-significant impacts on all VECs, ranging from moderate negative to positive.

7.0 COMPLIANCE WITH APPLICABLE LAWS/EXECUTIVE ORDERS

7.1 Magnuson-Stevens Fishery Conservation and Management Act

Section 301 of the Magnuson-Stevens Fishery Conservation and Management Act requires that regulations implementing any fishery management plan or amendment be consistent with the ten National Standards.

The Proposed Action meets the requirements of National Standard 1 by recommending management measures that will continue to prevent overfishing, while achieving optimum yield for Atlantic Deep-Sea Red Crab. The Atlantic Deep-Sea Red Crab FMP established a fishery specifications process that ensures a review of the red crab stock status, fishery performance, and other factors to manage by annual catch limits (ACLs) and prevent overfishing. The measures proposed in this action would continue to prevent the possibility of overfishing the Atlantic Deep-Sea Red Crab resource. Currently, it is not possible to determine an overfished level for red crab, but overfishing is not occurring (Section 5.1).

The Council believes this action is based on the best scientific information available (National Standard 2). Specifically, this action is informed by fisheries-independent data from several surveys, commercial fishery landings data, stock assessments, and other scientific data sources. The 2020-2023 red crab specifications are supported by the most recent scientific information and recommendations for red crab catch during 2020-2023 are based on advice from the Council's Scientific and Statistical Committee (SSC). The science and analyses, on which the proposed action is based, are summarized and described in Section 5.0 and 6.0.

The Council manages the red crab resource as a single unit throughout its range in the U.S. EEZ (National Standard 3). The management measures proposed in this action do not discriminate among residents of different states (National Standard 4). The measures apply equally to red crab permit holders of the same category, regardless of homeport or state of residence.

The proposed 2020-2023 red crab fishery specifications update the ACL /TAL which allows flexibility for business planning, operational safety and capability of the fleet to catch the ACL/TAL without exceeding it. The measures in the action do not directly allocate red crab and, therefore, none has economic allocation as its sole purpose (National Standard 5).

The measures proposed account for variations in the fishery (National Standard 6). The Proposed Action, developed with input of red crab fishermen and processors, considers the market-driven nature of the fishery by allowing flexibility to reach the TAL without exceeding it. Both proactive and reactive AMs are established to address variations that might occur in fishing years 2020-2023.

Consistent with National Standard 7, the management measures in the proposed action are not duplicative and were developed in coordination with NMFS duplication.

The proposed specifications take into account the importance of fishery resources to fishing communities (National Standard 8). A description of the fishing communities that depend on the red crab fishery is provided in Section 6.6. The proposed action is not expected to adversely affect the individuals or communities participating in this fishery because the increased TAL allows vessels flexibility to make fewer, longer fishing trips, which is a benefit because the fishing grounds for red crab are distant. This flexibility helps the red crab fishery remain economically viable.

This action also considers minimize bycatch to the extent practicable (National Standard 9). Section 6.2 of this document provides information showing that there is minimal bycatch in this fishery.

Finally, the Proposed Action is consistent with National Standard 10 to promote the safety of human life at sea. It allows vessels the flexibility to fish when conditions are optimal, and therefore reduces their exposure to hazardous conditions at sea.

7.1.1 Other MSA Requirements

Section 303 (a) of Magnuson-Stevens Act contains 15 required provisions for FMPs that are listed below. The requirement applies to the FMP, and in some cases, the FMP as amended, and not the submission document for the Proposed Action.

(1) contain the conservation and management measures, applicable to foreign fishing and fishing by vessels of the United States;

Foreign fishing is not allowed under this management plan or this action, so specific measures are not included to specify and control allowable foreign catch.

(2) contain a description of the fishery;

An updated description of the fishery is included in Section 5.1 of this document.

(3) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification;

The Council's SSC determined that "the information available for red crab is insufficient to estimate MSY and OY" (Section 5.1.2).

(4) assess and specify – (A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3); (B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and can be made available for foreign fishing; and (C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States;

Due to the lack of scientific data, MSY and long-term OY have not been defined for the red crab fishery. However, U.S. fishing vessels are capable of, and expected to, harvest 100 percent of the ABC from this fishery, as specified in Section 5.1. U.S. processors are also expected to process or hold all landings from U.S. fishing vessels. Therefore, there is no portion of the ABC from this fishery that can be made available to foreign fishing. Some of the bulk crab product is further processed overseas, and there is a developing live market to Asia, though both products undergo initial processing or holding in the U.S.

(5) specify the pertinent data which shall be submitted to the Secretary with respect to commercial, recreational, and charter fishing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used;

Red crab vessels currently must submit VTRs for each fishing trip. Dealers are also required to submit reports on the purchases of red crab from permitted vessels. Current reporting requirements are detailed in 50 CFR 648.7.

(6) consider and provide for temporary adjustments, after consultation with the Coast Guard and persons utilizing the fishery, regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safe conduct of the fishery;

The Proposed Action does not contain any measures that would penalize vessels that were prevented from harvesting red crab because of weather or other ocean conditions. The Proposed Action will maintain vessels' flexibility to respond to adverse ocean conditions by enabling them to extend the length of their trips and fish fewer trips when they choose.

(7) describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under section 305 (b)(1)(A), minimize to the extent

practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;

EFH for red crab was defined in the Atlantic Deep-Sea Red Crab FMP, which was implemented in 2002. The Council recently updated EFH designations for all NEFMC-managed species, including red crab, in OHA2, which was implemented in April 2018 (Section 5.3.1). OHA2 included measures to minimize the effects of fishing on EFH across all the Council's FMPs, including the Atlantic Deep-Sea Red Crab FMP, to the extent practicable. This action does not change the EFH designations or adverse effects minimization measures.

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 304(a) (including any plan for which an amendment is submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

Scientific needs are continuously reviewed and revised by the Council and the Northeast Stock Assessment Workshop, which consult with NMFS, the Council and its PDTs, SSC and species oversight committees about scientific data needs.

(9) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on – (A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;

Impacts on fishing communities affected by this action is in Section 5.5, Human Communities, and Section 6.6, Impacts on Human Communities.

(10) specify objective and measurable criteria for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery;

The Atlantic Deep-Sea Red Crab FMP and Amendment 3 (Sections 2.1.2, 2.1.3, and 6.1.1.1) established criteria to determine whether the red crab stock was either in an overfished condition, subject to overfishing, or both. The previously approved overfishing and overfished definitions are as follows:

Definition of Overfishing: Overfishing is defined as any rate of exploitation such that the ratio of current exploitation to an idealized exploitation under MSY conditions exceeds a value of 1.0. The actual measures of

exploitation used will be determined by the availability of suitable data (CPUE data, landings, etc.).

Definitions of Overfished: The red crab stock will be considered to be in an overfished condition if one of the following three conditions is met:

Condition 1 – The current biomass of red crab is below ½ B_{MSY} in the New England Council's management area.

Condition 2 – The annual fleet average CPUE, measured as marketable crabs landed per trap haul, continues to decline below a baseline level (½ $CPUE_0$) for three or more consecutive years.

Condition 3 – The annual fleet average CPUE, measured as marketable crabs landed per trap haul, falls below a minimum threshold level (¼ $CPUE_0$) in any single year.

While the Amendment 3 definitions reference CPUE, Landings Per Unit of Effort (LPUE) has subsequently been utilized as a proxy for CPUE, as "catch" includes both kept and discarded crabs, and an accepted method of estimating total weight of discarded crabs has not been developed (see Sections 5.1.3 and 5.1.4 of this document). As described in Section 5.1.2, there is insufficient information to determine Maximum Sustainable Yield (MSY) or an overfishing level (OFL). Accordingly, Section 6.1.1.1 of the Amendment 3 EA describes the use of proxies to evaluate the status of red crab, and determined that overfishing is not occurring, and the overfished status is unknown (NEFMC, 2011).

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority – (A) minimize bycatch; and (B) minimize the mortality of bycatch which cannot be avoided;

This action does not include changes to the current Standardized Bycatch Reporting Methodology implemented in 2015 under the revised Standardized Bycatch Reporting Methodology Omnibus Amendment (Amendment 4 to the Atlantic Deep-Sea Red Crab FMP). This methodology is expected to assess the amount and type of bycatch in the red crab fishery and help identify ways the fishery can minimize bycatch and mortality of bycatch, which cannot be avoided.

(12) assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

There is no recreational fishing for Atlantic deep-sea red crab.

(13) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

Section 5.1 provides a description of the commercial red crab fishery. There is no recreational or charter fishing for Atlantic deep-sea red crab.

(14) to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, allocate any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery;

The Proposed Action does not reduce the overall harvest to fishery participants.

(15) establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability;

The Proposed Action maintains an ABC, ACL, TAL, and AMs that would prevent overfishing and ensure accountability.

7.2 National Environmental Policy Act (NEPA)

7.2.1 Finding of No Significant Impact

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a Proposed Action are significant. Each criterion is discussed below with respect to the Proposed Action and considered individually as well as in combination with the others.

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?
The Proposed Action is not expected to result in significant impacts on any of the VECs, nor will it result in overall significant effects, either beneficial or adverse. The Proposed Action establishes 2020-2023 catch limits for red crab that are consistent with FMP objectives and changes the specifications from a 3- to 4-year cycle. Overall, this action is expected to have low positive impacts for target species (red crab), because it would likely result in a catch level that would maintain biological and economic stability (Section 6.2). Impacts on other VECs, including habitat and non-target species (bycatch) are negligible and low positive, respectively. The proposed increase in TAL would potentially result in low positive impacts to the fishery, as landings may increase if market demand increases. Due to the potential slight increase in effort, interaction risks with protected species may be slightly elevated, potentially resulting in low moderate to moderate negative impacts to protected species.

2. Can the proposed action reasonably be expected to significantly affect public health or safety?
The Proposed Action does not alter the way the industry conducts fishing activities for the target species. Therefore, no changes in fishing behavior are anticipated that would affect safety. The

overall effect of the Proposed Action on these fisheries, including the communities in which they operate, will not adversely impact public health or safety.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?
Historic or cultural resources (e.g., shipwrecks) may be present in the area where the red crab fishery occurs. However, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is unlikely that the Proposed Action would result in substantial impacts to unique areas. Fishing will occur within the portion of the National Monument that overlaps with red crab fishing Region 1 until partially through fishing year 2023, when the fishery will be indefinitely prohibited from the Monument. Section 6.4 describes the negligible impacts of this fishery on habitat, including the corals and seamounts protected by the Monument.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?
The impacts of the Proposed Action on the human environment are described in Section 6.6. The Proposed Action primarily establishes landing limits for the red crab fishery. The Proposed Action is based upon measures contained in the FMP which have been in place for years. In addition, the scientific information upon which the annual quotas are based includes the most recent information available. Therefore, the measures contained in this action are not expected to be highly controversial.

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?
The impacts of the Proposed Action on the human environment are described in Section 6.6. The Proposed Action establishes a TAL for the red crab fishery. The Proposed Action is not expected to substantially alter fishing methods or activities and is not expected to substantially alter fishing methods or activities and is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort. The measures contained in this action are not expected to have highly uncertain, unique, or unknown risks on the human environment.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?
The Proposed Action establishes an ABC and TAL for red crab and is not expected to substantially alter fishing methods or activities and is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort. When a new stock assessment or other biological information about red crab becomes available in the future, then the specifications may be adjusted according to the FMP and MSA. Therefore, the Proposed Action will not result in significant effects, nor does it represent a decision in principle about a future consideration.

7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?

The impacts of the Proposed Action on the biological, physical, and human environment are described in Section 6.0. The cumulative effects of the Proposed Action on target and non-target species are detailed in Section 6.7. The Proposed Action is not expected to substantially increase fishing effort or substantially alter the spatial and/or temporal distribution of current fishing effort. The improvements in the condition of the stock through implementation of the ABC and TAL is expected to generate positive impacts overall.

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?
Although shipwrecks may be present in the area where fishing occurs, including some registered on the National Register of Historic Places, vessels typically avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is unlikely that the Proposed Action would adversely affect the historic resources listed above.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?
Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing, or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The Red Crab Biological Opinion completed on February 6, 2002, concluded that the action considered would not jeopardize the continued existence of any listed species. On October 17, 2017, NMFS reinitiated consultation on the Red Crab Biological Opinion due to updated information on the decline of North Atlantic right whale abundance.

Section 7(d) of the ESA prohibits Federal agencies from making any irreversible or irretrievable commitment of resources with respect to the agency action that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives during the consultation period. This prohibition is in force until the requirements of section 7(a)(2) have been satisfied. Section 7(d) does not prohibit all aspects of an agency action from proceeding during consultation; non-jeopardizing activities may proceed as long as their implementation would not violate section 7(d). Per the October 17, 2017 memo, it was concluded that allowing the red crab fishery to continue during the reinitiation period will not increase the likelihood of interactions with ESA listed species above the amount that would otherwise occur if consultation had not been reinitiated. Based on this, the memo concluded that the continuation of the summer flounder fishery during the reinitiation period would not be likely to jeopardize the continued existence of any ESA listed species. Taking this, as well as our analysis of the proposed action into consideration, we do not expect the proposed action, in conjunction with other activities, to result in jeopardy to any ESA listed species.

This action does not represent any irreversible or irretrievable commitment of resources with respect to the FMP that would affect the development or implementation of reasonable and prudent measures during the consultation period. NMFS has discretion to amend its Magnuson-Stevens Act and ESA regulations and may do so at any time subject to the Administrative Procedure Act

and other applicable laws. As a result, the Council has preliminarily determined that fishing activities conducted pursuant to this action will not affect endangered and threatened species or critical habitat in any manner beyond what has been considered in prior consultations on this fishery.

10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?
The Proposed Action establishes an ABC and TAL for the red crab fishery and is not expected to alter fishing methods or activities such that they threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment. The Proposed Action has been found to be consistent with other applicable laws (Section 7.0).

11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?
The impacts of the Proposed Action on marine mammals are discussed in Section 6.5. The activities to be conducted under the proposed alternative are within the scope of the Atlantic Deep-Sea Red Crab FMP and do not change the basis for the determinations made in previous consultations. While the proposed alternative has the potential to increase interactions with marine mammals as compared to the No Action alternative, any interaction that may occur is not expected to change or jeopardize the status of any marine mammal.

12. Can the proposed action reasonably be expected to adversely affect managed fish species?
The Proposed Action establishes an ABC and TAL for the red crab fishery that is consistent with the FMP objectives and the recommendations of the Council's SSC. The Proposed Action is not expected to adversely affect red crab or other non-target fish species that are managed in this region. The biological impacts of the Proposed Action on target species are analyzed in Section 6.2 and non-target species in Section 6.3.

13. Can the proposed action reasonably be expected to adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?
The Proposed Action is not expected to have a substantial impact on the natural or physical environment. The Proposed Action is not expected to alter fishing methods or activities or substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort. Therefore, there are no adverse social or economic impacts interrelated with significant natural or physical environmental effects.

14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?
The Proposed Action is not expected to have significant impacts on the natural or physical environment, including vulnerable marine or coastal ecosystems. The current specifications do not adversely affect these areas, and the Proposed Action is not expected to alter fishing methods or activities or to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort. The areas fished for red crab have been fished for many years, and this action is not expected to change the core locations of any fishing activity. The Proposed Action is not expected to alter red crab fishing patterns relative to this protected area or in any other

manner that would lead to adverse impacts on deep sea coral or other vulnerable marine or coastal ecosystems.

15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?
The Proposed Action establishes an ABC and TAL for the red crab fishery. It is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. The action is not expected to substantially alter fishing methods or activities or fishing effort or the spatial and/or temporal distribution of current fishing effort.

16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?
The Proposed Action establishes an ABC and TAL for the red crab fishery. There is no evidence or indication that this fishery has ever resulted in the introduction or spread of nonindigenous species. The Proposed Action is not expected to substantially alter fishing methods or activities and is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort. Therefore, it is highly unlikely that the Proposed Action would be expected to result in the introduction or spread of a non-indigenous species.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for the 2020-2023 specifications for the Atlantic Deep-Sea Red Crab Fishery Management Plan, it is hereby determined that the Proposed Action will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the Proposed Action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

_____ _____

Regional Administrator, Greater Atlantic Region, NMFS Date

7.2.2 Environmental Assessment

The required elements of an Environmental Assessment (EA) are specified in 40 CFR 1508.9(b). They are included in this document as follows:

- The need for this action is in Section 3.1.;
- The alternatives that were considered are in Section 4.0;
- The environmental impacts of the Proposed Action are in Section 6.0;
- A determination of significance is in Section 7.2.1; and,
- The agencies and persons consulted on this action are in Sections 7.2.4.

While not required for the preparation of an EA, this document includes the following additional sections that are based on requirements for an Environmental Impact Statement (EIS).

- An executive summary is in Section 1.0;
- A table of contents is in Section 2.0;

• Background and purpose are in Section 3.0;
• A summary of the document is in the executive summary, Section 1.0;
• A brief description of the affected environment is in Section 5.0;
• Cumulative impacts of the Proposed Action are in Section 6.7;
• A list of preparers is in Section 7.2.5

7.2.3 Point of Contact

Questions concerning this document may be addressed to:

Mr. Thomas A. Nies, Executive Director
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950 (978) 465-0492

7.2.4 Agencies Consulted

The following agencies were consulted in preparing this document:

- New England Fishery Management Council, including representatives from:
  - Connecticut Department of Environmental Protection
  - Maine Department of Marine Resources
  - Massachusetts Division of Marine Fisheries
  - New Hampshire Fish and Game
  - Rhode Island Department of Environmental Management
- National Marine Fisheries Service, NOAA, Department of Commerce

7.2.5 List of Preparers

The following personnel participated in preparing this document:

- ***New England Fishery Management Council:*** Jessica Gribbon Joyce (Red Crab Plan Development Team Chair, NEFMC/Tidal Bay Consulting, LLC), Michelle Bachman, Jenny Couture, Rachel Feeney, Christopher Kellogg
- ***National Marine Fisheries Service:*** Antonie Chute, Marianne Ferguson, Allison Murphy, Danielle Palmer, Dan Caless

7.2.6 Opportunities for Public Comment

This action was developed in 2019, and there were four public meetings related to this action (Table 17). Opportunities for public comment occurred at meetings of the PDT, SSC, and Council. There are generally more limited opportunities to comment at PDT meetings. Meeting discussion documents and summaries are available at www.nefmc.org.

Table 17. Public meetings related to the Supplemental EA.

Date	Meeting Type	Location
6/18/2019	PDT	Webinar
8/26/2019	PDT	Webinar
8/21/2019	SSC	Providence, RI
9/24/2019	NEFMC	Gloucester, MA

7.3 Marine Mammal Protection Act (MMPA)

Section 6.5 contains an assessment of the impacts of the Proposed Action on marine mammals. The New England Fishery Management Council (NEFMC or Council) has reviewed the impacts of the proposed FY2020-2023 red crab fishery specifications on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA. Although they are likely to affect marine mammals inhabiting the management unit, the specifications will not alter the effectiveness of exiting MMPA measures to protect those species, such as take reduction plans (including the pending regulations to revise the ALWTRP), based on the overall reductions in fishing effort and the effectiveness of other management measures that have been implemented through the Atlantic Deep-Sea Red Crab FMP.

7.4 Endangered Species Act (ESA)

On February 6, 2002, NMFS issued a biological opinion (Opinion) on the operation of the Atlantic deep-sea red crab FMP (red crab FMP). The Opinion concluded that the that implementation of the red crab FMP may affect, but is not likely to jeopardize the continued existence of the ESA-listed species of whales (i.e., North Atlantic right, fin, sei, and sperm whales) and sea turtles (i.e., loggerhead and leatherback sea turtles) or destroy/adversely modify critical habitat designated for North Atlantic right whales.. On October 17, 2017, NMFS reinitiated consultation on the batched Biological Opinion due to updated information on the decline of Atlantic right whale abundance.

Section 7(d) of the ESA prohibits federal agencies from making any irreversible or irretrievable commitment of resources with respect to the agency action that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives during the consultation period. This prohibition is in force until the requirements of section 7(a)(2) have been satisfied. Section 7(d) does not prohibit all aspects of an agency action from proceeding during consultation; non-jeopardizing activities may proceed as long as their implementation would not violate section 7(d). Per the October 17, 2017 memo, it was concluded that allowing the red crab fishery to continue during the reinitiation period will not increase the likelihood of interactions with ESA listed species above the amount that would otherwise occur if consultation had not been reinitiated. Based on this, the memo concluded that the continuation of this fishery during the reinitiation period would not be likely to jeopardize the continued existence of any ESA listed species. Taking this, as well as the analysis of the proposed action into consideration, the proposed action, in conjunction with other activities, is not expected to result in jeopardy for any ESA listed species.

This action does not represent any irreversible or irretrievable commitment of resources with respect to the FMP that would affect the development or implementation of reasonable and prudent measures during the consultation period. NMFS has discretion to amend its MSA and ESA regulations and may do so at any time subject to the Administrative Procedure Act and other applicable laws. As a result, the Council has preliminarily determined that fishing activities conducted pursuant to this action will not affect endangered and threatened species or critical habitat in any manner beyond what has been considered in prior consultations on this fishery.

7.5 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the Federal CZMA of 1972 requires that all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. Pursuant to Section 930.36(c) of the regulations implementing the CZMA, NMFS made a general consistency determination that the Atlantic Deep-Sea Red Crab FMP is consistent to the maximum extent practicable with the enforceable policies of the approved coastal management program of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. This general consistency determination applies to the current Atlantic Deep-Sea Red Crab FMP, and all subsequent routine Federal actions carried out in accordance with the FMP such as FWs and specifications. A general consistency determination is warranted because catch specifications are repeated activities that adjust the use of management tools previously implemented in the FMP. A general consistency determination avoids the necessity of issuing separate consistency determinations for each incremental action. This determination was submitted on May 24, 2011, for review by the responsible state agencies under section 307 of the CZMA. The states of New Hampshire, Connecticut, Rhode Island, New Jersey, Delaware, and Virginia concurred with the consistency determination. The remaining states (listed above) did not respond; therefore, consistency is inferred.

7.6 Administrative Procedure Act (APA)

Section 551-553 of the Administrative Procedures Act (APA) establishes procedural requirements applicable to informal rulemaking by federal agencies. The purpose of these requirements is to ensure public access to the Federal rulemaking process, and to give the public adequate notice and opportunity for comment. Currently, the NEFMC is not requesting any abridgement of the rulemaking process for this action.

7.7 Information Quality Act (IQA)

Utility of Information Product

The information presented in this supplemental environmental assessment (SEA) is helpful to the intended users (the affected public) by clearly describing the purpose and need of the action, the measures proposed, and their impacts. A discussion of the reasons for selecting the Proposed Action is included so that intended users may fully understand of the Proposed Action and its implications. The intended users of this document include individuals involved in the red crab fishery (e.g., fishing vessels, processors, fishery managers) and others interested in the management of the red crab fishery. The information in this SEA will be helpful and beneficial

to owners of vessels holding red crab permits, since it will notify them of the measures contained in this specification package. This information will enable these individuals to adjust their management practices and make appropriate business decisions. Until a proposed rule is prepared and published, this document is the principal means by which the information contained herein is publicly available. The information in this SEA is based on the most recent available information from the relevant data sources, including detailed and relatively recent information on the red crab resource and, therefore, represents an improvement over previously available information. This document will be subject to public comment through proposed rulemaking, as required under the APA and, therefore, may be improved based on comments received.

This document is available in several formats, including printed publication, and online through the NEFMC's web page (www.nefmc.org). The *Federal Register* notice that announces the proposed rule and the final rule and implementing regulations will be made available in printed publication, on the website for GARFO (www.greateratlantic.fisheries.noaa.gov/), and through the Regulations.gov website. The *Federal Register* documents will provide metric conversions for all measurements.

Integrity of Information Product

The information product meets the standards for integrity under the following types of documents:
Other/Discussion (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

Prior to dissemination, information associated with this action, independent of the specific intended distribution mechanism, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information. All electronic information disseminated by NMFS adheres to the standards set out in Appendix III, "Security of Automated Information Resources," of OMB Circular A-130; the Computer Security Act; and the Government Information Security Act. All confidential information (e.g., dealer purchase reports) is safeguarded pursuant to the Privacy Act; Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business, and financial information); the Confidentiality of Statistics provisions of the Magnuson-Stevens Act; and NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics.

Objectivity of Information Product

For purposes of the Pre-Dissemination Review, this document is considered to be a "Natural Resource Plan." Accordingly, the document adheres to the published standards of the Magnuson-Stevens Act; the Operational Guidelines, Fishery Management Plan Process; the Essential Fish Habitat Guidelines; the National Standard Guidelines; and NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act. This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Several sources of data were used in the development of the SEA. These data sources included, but were not limited to, historical and

current landings data from CFDRS, VTR data, and fisheries independent data collected through the NMFS bottom trawl surveys. The analyses contained in this document were prepared using data from accepted sources. These analyses have been reviewed by members of the Red Crab PDT and by the SSC where appropriate.

Despite current data limitations, the conservation and management measures considered for this action were selected based upon the best scientific information available. The analyses important to this decision used information from the most recent complete calendar years, generally through 2018, and a portion of 2019. The data used in the analyses provide the best available information on the number of permits, both active and inactive, in the fishery, the catch (including landings and discards) by those vessels, the LPUE, and the revenue produced by the sale of those landings to dealers. Specialists (including professional members of PDTs, technical teams, committees, and Council staff) who worked with these data are familiar with the most current analytical techniques and with the available data and information relevant to the red crab fishery. The policy choice is clearly articulated in Sections 3.0 and 4.0 of this document. The supporting science and analyses, upon which the policy choice was based, are summarized and described in Sections 5.0 and 6.0 of this SEA. All supporting materials, information, data, and analyses within this document have been, to the maximum extent practicable, properly referenced according to commonly accepted standards for scientific literature to ensure transparency.

The review process used in preparation of this document involves the responsible Council, NEFSC, GARFO, and NOAA Fisheries Service Headquarters. NEFSC's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, population biology, and the social sciences. The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the document. Review by staff at GARFO is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the action proposed in this SEA and clearance of any rules prepared to implement resulting regulations is conducted by staff at NOAA Fisheries Service Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

In preparing this action for the Atlantic Deep-Sea Red Crab FMP, NMFS must comply with the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, the Administrative Procedure Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Information Quality Act, and Executive Orders 12630 (Property Rights), 12866 (Regulatory Planning), 13132 (Federalism), and 13158 (Marine Protected Areas). The Council has determined that the Proposed Action is consistent with the National Standards of the Magnuson-Stevens Act and all other applicable laws and executive orders.

7.8 Paperwork Reduction Act (PRA)

The Paperwork Reduction Act (PRA) concerns the collection of information. The intent of the PRA is to minimize the Federal paperwork burden for individuals, small businesses, state and local governments, and other persons, as well as to maximize the usefulness of information

collected by the Federal government. There are no changes to the existing reporting requirements previously approved under the Atlantic Deep-Sea Red Crab FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of PRA.

7.9 Regulatory Flexibility Act (RFA)

The objective of the Regulatory Flexibility Act (RFA) is to require consideration of the capacity of regulated small entities affected by regulations to bear the direct and indirect costs of regulation. If an action might have a significant impact on a substantial number of small entities, an Initial Regulatory Flexibility Analysis (IRFA) must be prepared. This would identify the need for action, alternatives, potential costs and benefits of the action, the distribution of these impacts, and a determination of whether the Proposed Action would have a significant economic impact on a substantial number of small entities. Depending on the nature of the proposed regulations, assessment of the economic impacts on small businesses, small organizations, and small governmental jurisdictions may be required. If an action is determined to affect a substantial number of small entities, the analysis must include:

1) A description and estimate of the number of regulated small entities and total number of entities in a particular affected sector, and the total number of small entities affected; and
2) Analysis of the economic impact on regulated small entities, including the direct and indirect compliance costs of completing paperwork or recordkeeping requirements, effect on the competitive position of small entities, effect on the small entity's cash flow and liquidity, and ability of small entities to remain in the market.

If it is clear that an action would not have a significant economic impact on a substantial number of small regulated entities, the RFA allows Federal agencies to certify the Proposed Action to that effect to the Small Business Administration (SBA). The decision on whether to certify is generally made after the final decision on the preferred alternatives for the action and may be documented at either the proposed rule or the final rule stage.

7.9.1 Initial Regulatory Flexibility Analysis

An IRFA has been prepared, as required by Section 603 of the RFA. The purpose of the RFA is to reduce the impacts of burdensome regulations and record-keeping requirements on small businesses. The RFA requires government agencies to describe and analyze the effects of regulations and possible alternatives on small business entities. Based on this information, the IRFA determines whether the preferred alternative would have a "significant economic impact on a substantial number of small entities."

7.9.2 Statement of Objectives and Need

This action proposes the specifications for the Atlantic deep-sea red crab fishery for the 2020-2023 fishing years. A description of the action and why it is being considered, and the legal basis for this action, are contained in Section 3.0.

NMFS issued a final rule establishing a small business size standard of $11 million in annual gross receipts for all businesses primarily engaged in the commercial fishing industry (NAICS 11411) for RFA compliance purposes and which became effective on July 1, 2016. As a result, a small business in the shellfish fishery is a firm that is independently owned and operated with receipts of less than $11 million annually. Individual vessels with permits to land red crab also may hold permits for several fisheries and harvest species of fish that are regulated by several different fishery management plans. Furthermore, multiple vessels and/or permits may be owned by entities affiliated by stock ownership, common management, identity of interest, contractual relationships, or economic dependency. For this analysis, "ownership entities" are defined as those entities with identical ownership as listed on the permit application.

Information about vessel ownership is available for all federal permit holders (since 2010), which allows for the identification of business entities that comprise multiple fishing vessels.

There are two business entities and four active vessels to which the Proposed Action applies. The vessel ownership data identifies all the individual people who own fishing vessels. With this information, vessels can be grouped together according to common owners, and the resulting groupings are treated as fishing businesses in this analysis. Revenues summed across all vessels in the group and the activities that generate those revenues were used to determine whether the entities are large or small businesses. As there are only two red crab-harvesting business entities and the data are confidential, the degree of ownership is not known.

For RFA purposes, the total revenue of the businesses, which, in this case, includes the value of other shellfish and some finfish is considered. The additional revenue obtained from other shellfish (lobsters and Jonah crab) and finfish is relatively minor. According to SBA's regulations (CFR 121.104(c)), gross revenue from the most recent three years should be used for classifying marine fishing activity. The total value of landings from all sources over the fishing years 2016-2018 averaged $3.47 million, so all business entities in the harvesting sector are categorized as small businesses.

The Proposed Action will affect the two business entities and the four vessels in the directed red crab fishery. If these vessels land the full 2,000 mt Total Allowable Landings (TAL) limit, it is expected to increase average revenues by approximately 12.7%, depending on market demand. This level is substantially higher than landings in recent years; fishing years 2016 – 2018 landings averaged 3.294 million lbs. or 1,494.33 mt (Table 12). As a result, the Proposed Action would not constrain landings for red crab below 2018 levels. Since the annual revenues per business entity are confidential, Table 18 shows the average value per vessel over the most recent three years for all landings. Recent landings have increased, although market conditions have kept landings below the TAL limit.

Table 18. Average revenue per vessel from all species landed with Category B and C permits, FY 2016-2018.

Number of Vessels	4
Average Revenue from All Species, FY 2016-2018	$3.47 million
Average Revenue/Vessel from All Species, FY 2016-2018	$866,833
Source: GARFO Data Matching and Imputation System (DMIS) database, which matches dealer, VTR, AMZ, and other data on a trip and species level, accessed June 2019.	

7.9.3 Description of Projected Reporting, Recordkeeping, and other Compliance Requirements of the Proposed Rule

This action contains no new collection-of-information, reporting, or recordkeeping requirements. It does not duplicate, overlap, or conflict with any other federal law.

7.9.4 Federal Rules which may Duplicate, Overlap or Conflict with this Proposed Rule

The proposed regulations do not create overlapping regulations with any state regulations or other federal laws.

7.9.5 Summary of the Proposed Action and Significant Alternatives

The proposed specifications would increase the TAL by 12.7% from 1,775 mt to 2,000 mt for four limited access vessels targeting Atlantic deep-sea red crab. Because the Proposed Action will not substantially change the TAL or constrain gross revenues per vessel, it is not necessary to analyze impacts according to the dependence of each vessel in the red crab fishery.

Because the Proposed Action increases the overall landings levels, there are no negative economic impacts associated with this action for both large and small entities. While this action would apply to all four active limited access red crab directed fishery vessels, no entity is expected to incur any negative economic impacts.

7.10 Regulatory Planning and Review/Executive Order (EO 12866)

In compliance with Executive Order (EO) 12866, NOAA's National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions or for significant policy changes that are of public interest. EO 12866 was signed on September 30, 1993, and established guidelines for Federal agencies promulgating new regulations and reviewing existing regulations.

An RIR is a required component of the process of preparing and reviewing fishery management plans (FMPs) or amendments and provides a comprehensive review of the economic impacts associated with the proposed regulatory action. An RIR addresses many of the concerns posed by the regulatory philosophy and principles of EO 12866. An RIR also serves as the basis for assessing whether any proposed regulation is a "significant regulatory action" under criteria specified in E.O. 12866. According to the "Guidelines for Economic Analyses of Fishery Management Actions," published by NMFS in August 2000, an RIR must include the following elements: (1) A description of the management objectives of the regulatory action; (2) a description of the fishery affected by the regulatory action; (3) a statement of the problem the regulatory action is intended to address; (4) a description of each selected alternative, including the "No Action" alternative; and (5) an economic analysis of the expected effects of each selected alternative relative to the baseline. All these elements are addressed in the previous sections of the SIR; therefore, the following sections provide references to this information.

7.10.1 Statement of the Problem and Management Objectives of the Regulatory Action

Section 3.0, Introduction and Purpose, describes the purpose and need of the action.

7.10.2 Description of the Affected Fishery

Section 5.0, Affected Environment, provides a historical description of the fishery, including management measures, and recent fishery-dependent data from fishing years 2016-2018, as well as data and trends from the last 10 fishing years.

7.10.3 Description of the Management Measure Alternatives

Section 4.0, Alternatives Under Consideration, describes the proposed management measures. The Council did not consider any alternatives to the Proposed Action.

7.10.4 Expected Economic Effects of the Proposed Action

Section 6.6, Impacts on Human Communities, describes the economic and social impacts of the Proposed Action. Section 7.9, Regulatory Flexibility Act, further describes the economic impacts on small business entities. Further, there are no material economic effects from an administrative change in the specifications setting process from 3- to 4-years.

7.10.5 Determination of Significance under EO 12866

EO 12866 requires that the Office of Management and Budget (OMB) review proposed regulatory programs that are considered to be significant. A "significant regulatory action" is one that is likely to: (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, safety, or state, local, or tribal Governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

A regulatory program is “economically significant” if it is likely to result in the effects described above. The RIR is designed to provide information to determine whether the proposed regulation is likely to be “economically significant.”

The Council has determined that, based on the information presented in the RIR, this action is expected to have no material economic effect. Because none of the factors defining “significant regulatory action” are triggered by this action, the action has been determined to be not significant for the purposes of EO 12866. See detailed discussion below (Section 7.10.6).

7.10.6 EO 12866 Criteria

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities.

The average revenue for all species landed with Category B and C red crab permits from 2016-2018 is $3.47 million. The 12.7% increase in TAL has the potential to increase landings and ex-vessel revenue up to about 12.7% if there are favorable market conditions, which would potentially increase revenues up to $3.91 million, assuming red crab prices and operating costs remain stable. The administrative change from a 3-year to 4-year specifications cycle will not change the revenue. Therefore, the Proposed Action would not have an annual effect on the economy of $100 million or would it adversely affect the economy or any other governmental or non-governmental entities or communities.

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency.

The Proposed Action does not create an inconsistency or otherwise interfere with an action taken or planned by another agency. The activity that would be allowed under this action involves commercial fishing for red crab in Federal waters of the exclusive economic zone (EEZ), for which NMFS is the sole agency responsible for regulation. Therefore, there is no interference with actions taken by another agency. Furthermore, this action would create no inconsistencies in the management and regulation of commercial fisheries in the waters off the coast of the northeast region.

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

This action will not materially alter the budgetary impacts of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients of these programs as management of the red crab fishery has no bearing on these programs.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

This action does not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in EO 12866. All fishery management measures in the Proposed Action are commonly used in fishery management plans for federally managed fisheries.

7.11 Executive Order 13132 (Federalism)

This Executive Order (E.O.) established nine fundamental federalism principles for Federal agencies to follow when developing and implementing actions with federalism implications. The E.O. also lists a series of policy making criteria to which Federal agencies must adhere when formulating and implementing policies that have federalism implications. However, no federalism issues or implications have been identified relative to the proposed measures in this action. This action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 13132. The affected states have been closely involved in the development of the proposed management measures through their representation on the NEFMC and MAFMC (all affected states are represented as voting members of at least one Regional Fishery Management Council). No comments were received from any state officials relative to any federalism implications that may be associated with this action.

7.12 Executive Order 13158 (Marine Protected Areas)

E.O. on Marine Protected Areas requires each federal agency whose actions affect the natural or cultural resources that are protected by an MPA to identify such actions, and, to the extent permitted by law, and to the maximum extent practicable, in taking such actions, avoid harm to the natural and cultural resources that are protected by an MPA. This E.O. directs federal agencies to refer to the MPAs identified in a list of MPAs that meet the definition of MPA for the purposes of the E.O. The E.O. requires that the Departments of Commerce and the Interior jointly publish and maintain such a list of MPAs. A list of MPA sites has been developed and is available at: http://marineprotectedareas.noaa.gov/nationalsystem/nationalsystemlist/. No further guidance related to this E.O. is available at this time.

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