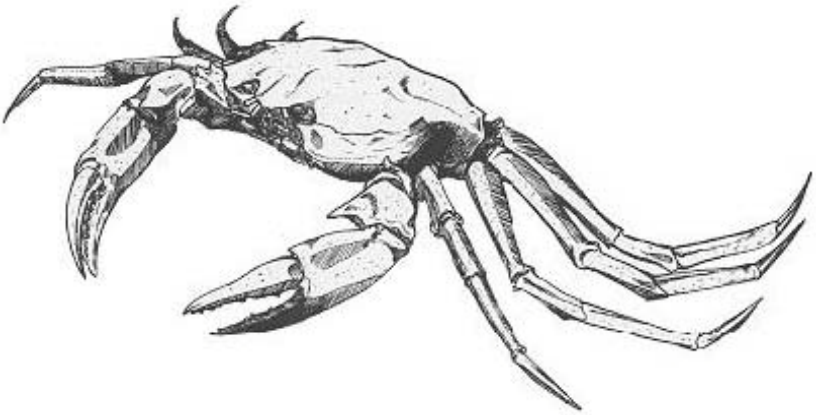
Deep-Sea Red Crab

2010 Fishing Year Specifications (March 1, 2010 – February 28, 2011)

and

Stock Assessment and Fishery Evaluation (SAFE Report)

including the Environmental Assessment (EA), Regulatory Impact Review (RIR), and Initial Regulatory Flexibility Analysis (IRFA)



Prepared by the New England Fishery Management Council in consultation with National Marine Fisheries Service

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TABLE OF CONTENTS

LIST OF FIGURES **4**

LIST OF TABLES **6**

LIST OF ACRONYMS **8**

1.0 EXECUTIVE SUMMARY **9**

2.0 BACKGROUND **10**

2.1 STATUS OF THE STOCK 10
2.2 CURRENT MANAGEMENT MEASURES 11
2.3 ALTERNATIVES CONSIDERED 12

3.0 PURPOSE AND NEED OF ACTION **13**

4.0 PROPOSED 2010 SPECIFICATIONS AND ALTERNATIVES **13**

4.1 ALTERNATIVES 13
4.1.1 Alternative 1 - Council Proposed Action (Status Quo) *14*
4.1.2 Alternative 2 (SSC Recommended) *15*
4.1.3 Alternative 3 (No Action) *15*
4.1.4 Rationale for Proposed Action *15*

5.0 AFFECTED ENVIRONMENT (STOCK ASSESSMENT AND FISHERY EVALUATION) **17**

5.1 BIOLOGICAL FACTORS 18
5.1.1 Target Species *18*
5.1.2 Bycatch *27*
5.1.3 Canadian Red Crab Fishery *38*
5.2 ECOLOGICAL FACTORS 40
5.2.1 Essential Fish Habitat (EFH) *40*
5.2.2 Protected Resources *41*
5.3 ECONOMIC AND SOCIAL FACTORS 42
5.3.1 Update of Commercial Landings and DAS Usage *43*
5.3.2 Description of the fishery since implementation of the FMP *47*

6.0 ENVIRONMENTAL CONSEQUENCES AND ASSESSMENTS OF THE IMPACTS **49**

6.1 ALTERNATIVE 1 – COUNCIL PROPOSED ACTION (STATUS QUO) 50
6.1.1 Impacts to the Red Crab Stock *50*
6.1.2 Impacts to Bycatch/Non-target Species, Habitat, Protected Resources *50*
6.1.3 Impacts to Human Communities *51*
6.2 ALTERNATIVE 2 (SSC RECOMMENDED) 52
6.2.1 Impacts to the Red Crab Stock *52*
6.2.2 Impacts to Bycatch/Non-target Species, Habitat (including EFH), Protected Resources *52*
6.2.3 Impacts to Human Communities *52*
6.3 ALTERNATIVE 3 (NO ACTION) 53
6.3.1 Impacts to the Red Crab Stock *53*
6.3.2 Impacts to Bycatch/Non-target Species, Habitat, Protected Resources *53*
6.3.3 Impacts to Human Communities *54*
6.4 CUMULATIVE EFFECTS ANALYSIS 57
6.4.1 Valued Ecosystem Components (VECs): *57*
6.4.2 Fishing Impacts: Past, Present and Reasonable Foreseeable Future Actions *58*
6.4.3 Direct and Indirect Impacts of Alternative 1 on Red Crab *60*
6.4.4 Non-Fishing Impacts: Past, Present, and Reasonably Foreseeable Future Actions on Red Crab *60*
6.4.5 Summary of Cumulative Effects *60*

7.0 APPLICABLE LAWS **61**

7.1 NEPA 61

7.1.1 Finding of No Significant Impact *61*
7.2 MARINE MAMMAL PROTECTION ACT 65
7.3 ENDANGERED SPECIES ACT 65
7.4 COASTAL ZONE MANAGEMENT ACT 65
7.5 ADMINISTRATIVE PROCEDURE ACT 65
7.6 DATA QUALITY ACT 65
7.7 PAPERWORK REDUCTION ACT 67
7.8 IMPACTS RELATIVE TO FEDERALISM/E.O. 13132 67
7.9 ENVIRONMENTAL JUSTICE/E.O. 12898 67
7.10 REGULATORY FLEXIBILITY ACT/E.O. 12866 68
7.10.1 Regulatory Impact Review *68*
7.10.2 Determination of Significance Under E.O. 12866 ..... *78*
7.10.3 Initial Regulatory Flexibility Analysis *79*

8.0 LIST OF PREPARERS AND PERSONS/AGENCIES CONSULTED 81

9.0 REFERENCES 81

10.0 INDEX 84

11.0 ATTACHMENTS 86

ATTACHMENT A: NEW ENGLAND FISHERY MANAGEMENT COUNCIL SSC REPORT ON ABC FOR RED CRAB 87
ATTACHMENT B: LIST OF SPECIES UNDER NMFS JURISDICTION PROTECTED BY ENDANGERED SPECIES ACT OR MARINE MAMMAL PROTECTION ACT 89

LIST OF FIGURES

Figure 1 – Red crab landings and DAS charged 2004-2008. 19

Figure 2- Size distribution of male red crabs caught in monkfish trawl surveys, excluding tows in the Gulf of Maine. 23

Figure 3- Size distribution of female red crabs caught in monkfish trawl surveys, excluding tows in the Gulf of Maine. 24

Figure 4- Size distribution of male crabs caught in the Gulf of Maine during the 2004 and 2009 NEFSC Cooperative Monkfish Trawl Surveys. 24

Figure 5- Size distribution of female crabs caught in the Gulf of Maine during the 2004 and 2009 NEFSC Cooperative Monkfish Trawl Surveys. 25

Figure 6- Total pounds of red crab bycatch for all observed trips and percentage of observed trips with red crab bycatch from 2001 through 2008. Observed trips are not chosen randomly, which means that the proportion of observed trips by target species may vary from year to year, causing the appearance of trends that may not be real. 28

Figure 7– Statistical areas where discards were reported to the NMFS Observer Database from 2001 through July 2004 29

Figure 8– Location of observed trips with two or more pounds of red crab bycatch, recorded in the NMFS Observer Database for 2000-2008. (91 meters equals approximately 50 fathoms.) 30

Figure 9– Discards of red crab per haul on directed monkfish tows versus tows that did not direct on monkfish from the NMFS Observer Database. 34

Figure 10– Red crab discards on tows that targeted monkfish, as compared to all other tows that reported red crab discards in the NMFS Observer Database (2001-July 2004)..... 35

Figure 11 – Observed tows targeting monkfish from the NMFS Observer Database (2001-July 2004) that reported red crab discards. 37

Figure 12 – NAFO Statistical Areas 39

Figure 13- Annual landings of red crab in metric tons, 1973-2008 with average landings for 1973-2008 and average landings for 2002-2008, the TAC for 2002-2008, and the TAC specified in the proposed action. 42

Figure 14- Landings by month for fishing years 2004-2008. 45

Figure 15- Relative landings by quarter from 2004-2008 (shown in bars), along with the average pounds of red crab landed per DAS charged per quarter (shown in line). 45

Figure 16- Red crab trip locations reported to the VTR database. Trips greater than 10,000 lb. 2009 data through October 19. 46

LIST OF TABLES

Table 1- Red crab specification alternatives for fishing year 2010..... 9

Table 2 Effects of the Preferred Alternative on VECs..... 10

Table 3- Summary of MSY/OFL, ABC, and TAC Specification Alternatives..... 14

Table 4– Comparison of the alternatives..... 14

Table 5- Current Overfishing Definition Reference Points and Status for Red Crab. 21

Table 6– Summary of red crab carapace width (mm) from port sampling measurements of landed crabs. (Source: NMFS Commercial Fish Data, 2009) 26

Table 7- Red crab bycatch from observed trips for 2001-2008, showing main statistical area and main target species. The main statistical area shifted from the Gulf of Maine to southern New England and the Mid-Atlantic during 2007 and 2008..... 27

Table 8- Comparison of discard records by gear type for the entire NMFS Observer Database versus records of red crab discards only. 31

Table 9– Comparison of discard records by statistical area for the entire NMFS Observer Database versus records of red crab discards only. 32

Table 10 – Summary of red crab discards by targeted species per tow from the NMFS Observer Database from 2001 through July 2004. 33

Table 11– Red crab discards on monkfish directed tows by year from the NMFS observer database. 37

Table 12 - Red crab discards on monkfish directed tows by area from the NMFS observer database 37

Table 13– Discards of all crab species reported to the NMFS Observer Database..... 38

Table 14– Annual Landings in the Canadian Red Crab Fishery *(Source: DFO)* 39

Table 15- Average landings of red crab in metric tons and million pounds 42

Table 16- DAS used and charged by quarter and year from 2004-2008..... 44

Table 17- DAS usage, total landings, and landings per DAS charged 2004-2008. 44

Table 18- Comparison of TAC Options and recent landings..... 50

Table 19- Impact category definitions and qualifiers..... 54

Table 20- Qualitative summary of the expected impacts of various alternatives for the red crab action. 55

Table 21- Live weight landings, revenue, average price per pound, DAS charged, and dollars per DAS charged by fishing year for the limited access red crab fleet for fishing years 2004 through 2008. 73

Table 22- Comparison of the alternatives. 76

Table 23- Alternative target TACs compared to actual landings, 2005-2008..... 78

LIST OF ACRONYMS

ALWTRP	Atlantic Large Whale Take Reduction Plan
B	Biomass
BRP	Biological Reference Point
CEA	Cumulative Effects Assessment
CEQ	Council on Environmental Quality
DAS	Days-at-Sea
DCAC	Depletion-Correction Average Catch
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act of 1973
F	Fishing Mortality Rate
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FW	Framework Adjustment
FY	Fishing Year
IRFA	Initial Regulatory Flexibility Analysis
M	Natural Mortality Rate
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
NAO	NOAA Administrative Order
NEFMC	New England Fishery Management Council
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS	National Standard
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SSC	Science and Statistical Committee
TAC	Total Allowable Catch
VECs	Valued Ecosystem Components

1.0 EXECUTIVE SUMMARY

The proposed action, as described in Section 4.0, would establish specifications for the 2010 fishing year (FY) for the Atlantic Deep-Sea Red Crab fishery. The action would replace specifications implemented through emergency action on April 6, 2009, which were extended through a notice published in the Federal Register on August 24, 2009, and will expire on February 28, 2010. This action is needed to put new specifications in place for the start of FY 2010, on March 1, 2010. Under this action the Council is proposing a target total allowable catch (TAC) and a days-at-sea (DAS) allocation to the red crab fleet that is the same as the levels currently in effect under the emergency action. The Council considered, but rejected, two other alternatives. One would have set fishing levels at a higher level, equal to what was in effect before the current emergency action. Based on recent scientific information, this alternative could allow overfishing of the red crab resource. The other alternative would be more conservative than Alternative 1, the proposed action, in reducing any risk of possible overfishing, and was recommended by the Council's Scientific and Statistical Committee (SSC). However, the Council decided this alternative provided more caution than needed because red crab is not overfished nor subject to overfishing. The Council based its decision on the results of the most recent peer-reviewed assessment of the red crab resource carried out by the Data Poor Stocks Working Group (DPSWG). The Council believes the proposed target TAC provides a sufficient buffer below maximum sustainable yield (MSY), and is more representative of recent historical catches, which were recognized as sustainable by both the DPSWG and the SSC.

These alternatives would result in the target TACs and fleet DAS shown in Table 1.

Table 1- Red crab specification alternatives for fishing year 2010.

Alternatives	ABC/target TAC	Fleet DAS
1. Proposed action	3.56 million lb (1,615 mt)	582
2. SSC recommended action	2.83 million lb (1,284 mt)	464
3. No action	5.93 million lb (2,689 mt)	780

The Council has also begun the development of Amendment 3 to the Red Crab FMP, which will bring the FMP in full compliance with the provisions of the Magnuson-Stevens Fishery Conservation and Management Act as reauthorized in 2007 (Magnuson-Stevens Act), including annual catch limits (ACLs) and accountability measures (AMs). Because Alternative 1 is the same as the current Emergency Action, similarly negligible environmental impacts would be expected. The impacts associated with Alternative 1 and those of the other two alternatives are described in subsequent sections of this document. This document also includes a Stock Assessment and Fishery Evaluation Report (SAFE Report) that meets the requirement for such a report to be made available every three years.

The proposed target TAC is higher than the most recent landings, but below the level of landings that was determined to be sustainable by the DPSWG and the SSC; therefore, the sum of the effects from the implementation of all fishing and non-fishing actions is expected to be negligible for biological valued environmental components (VECs) and positive for human communities in the long-term. The qualitative effects of Alternative 1 are shown in Table 2.

Table 2 Effects of the Preferred Alternative on VECs

Action Alternatives		Valued Ecosystem Component (VEC)				
		Managed Resource (Red Crab)	**Non-target/Bycatch Species**	**Habitat (including EFH)**	**Protected Resources**	**Human Communities**
		Neglible	**Negligible**	**Negligible**	**Negligible**	**Short-term: Negligible** **Long-term: Positive**
Alternative 1 Council Proposed (Status Quo)	**MSY=** 1700mt (3.75 Mill lb) **ABC=** N/A **Target TAC=**1615mt (3.56 mill lb) **DAS‡=** 582	Both the Data Poor Stocks Working Group and the SSC found that the exploitation history of the resource appears to be sustainable with average landings higher than the target TAC proposed in Alternative 1.	The catch rate of non-target and bycatch species is very low. The lower target TAC compared to that specified in the FMP would result in lower impacts than those analyzed in the FMP.	Data on the impacts of deep-sea pots on the environment are scarce.	Interactions with protected species are already very low and this level of fishing is expected to have no measurable impact on the probability that an interaction might occur.	This alternative would allow some expansion in landings compared to 2007 and 2008 and would be somewhat less than the landings in 2005 and 2006. Effective management will provide positive long-term impacts.

‡Based on average catch per DAS used in Emergency Action published April 6, 2009 (6,100 lb / DAS)

2.0 BACKGROUND

This document contains the Council-recommended specifications for red crab for FY 2010, as required by the Magnuson-Stevens Act, as reauthorized in 2007, and the Red Crab FMP. This document also includes the SAFE Report. It also contains the supporting analysis required by the National Environmental Policy Act (NEPA) in an EA, the Regulatory Flexibility Act in an Initial Regulatory Flexibility Analysis (IRFA), and Executive Order 12866 in a Regulatory Impact Review (RIR), and other applicable laws.

2.1 Status of the Stock

The 2006 red crab stock assessment (NMFS 2006) concluded that: "as currently defined in the FMP, overfishing is not occurring because landings of male red crab during 2003-2005 were 2013 mt, which is less than an estimate of MSY (2670 mt) from the last assessment (Serchuk 1977), and less than the FMP preferred MSY of 2830 mt." The same report from the 43rd SAW states that: "stock status relative to biomass thresholds and targets is unknown because biological reference points have not been defined."

The management unit specified in the Red Crab FMP includes red crab (*Chaceon quinquedens*) in U.S. waters of the Atlantic Ocean from 35˚ 15.3' N. lat. (the latitude of Cape Hatteras Light, North Carolina) northward to the U.S./Canada border. The most recent peer-reviewed scientific advice that is applicable to the red crab fishery was produced by the Data Poor Species Working Group (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), measurable BRPs and MSY proxies for several species, as well as advising on the

scientific uncertainty and risks for the SSC to consider, and commenting on what can be done to improve the information and assessments of the species involved in the review.

Red crab is considered a data poor stock in part because regularly scheduled research cruises do not sample the depths at which red crabs live. For that reason, there is a deficiency in fishery independent data. Fishery dependent data are influenced by more than just biological factors because the fishery is small and changes in individual vessel operations have a large influence on the fleet performance. Fishery dependent data are also influenced by the interpretation of vessel trip reports (VTR) requirements by vessel captains, making it difficult to interpret VTR data at present. Additionally, there is uncertainty in discard rates, discard mortality, and biological trends in growth and recruitment. For these reasons, the DPSWG explored alternative methods of estimating sustainable yield for red crab.

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." Although the methods used by the DPSWG estimated sustainable yield, rather than *maximum* sustainable yield, the Review Panel recommended that MSY be set between 3.75 and 4.19 million lb (1,700 – 1,900 mt) based primarily on the congruence between long-term average landings and the results of sustainable yield estimates from the Depletion Corrected Average Catch Model (DCAC). This is a nearly 40% reduction from the MSY estimate of 6.24 million lb (2,830 mt) that guided the fishery between 2002 and 2008.

2.2 Current Management Measures

NMFS issued regulations on October 10, 2002, implementing measures contained in the Red Crab FMP effective October 21, 2002 (67 FR 63222). Included in the measures were a limited access program for the directed fishery with a target TAC of 5.928 million lb and a DAS allocation of 780 fleet DAS. The target TAC was set at 95% of the MSY, which was intended to achieve optimum yield (OY) by approximating the maximum economic yield. The Red Crab Fishery Management Plan (NEFMC 2002) provides a full explanation of the methodology used to calculate the MSY and OY/target TAC that were specified in the FMP. The regulations also require the Council to review the status of the red crab stock and the fishery every year, and to prepare a SAFE Report every three years, and specifications for MSY, OY, TAC, and DAS allocations at least every third year. Framework 1 (August 31, 2005, 70 FR 44066) established a multi-year specifications process and established the specifications through FY 2007. The specifications established for FY 2007 were continued without action into FY 2008, as allowed under the regulations, because there was no new information that would have indicated a change to the specifications was required.

On April 6, 2009, NOAA's National Marine Fisheries Service (NMFS) implemented an emergency action for the red crab fishery that adjusted the target TAC and, as a result, the DAS allocations (Table 3). The emergency rule was needed in order to be in compliance with National Standard 2 of the Magnuson-Stevens Act by using the best available scientific information for this

fishery, i.e., the results of the DPSWG that were released in January 2009. The emergency action reduced the MSY for red crab from 6.24 million lb established by the FMP to 3.75 million lb. The emergency action also established a new target TAC of 3.56 million lb and reduced the fleet DAS from 780 to 582.

Other management measures that remain in place, and were not affected by the emergency action, include trip limits, trap/pot restrictions, a prohibition on landing more than an incidental level of female crabs (an experimental fishing permit currently in effect provides for limited harvesting of female crabs to support research on growth and fecundity, and to determine the feasibility of a market for female red crab), and restrictions on at-sea processing and mutilation. Specific permitting and reporting requirements were implemented by the FMP, including an Interactive Voice Response (IVR) system for limited access vessels and VTRs that must be filled out by all vessels with a red crab permit. The regulations also provide for allocation of the fleet DAS equally among the limited access permit holders. Incidental catch trip limits were set at 500 lb per trip for non-limited access vessels. All of these management measures were intended either to prevent overfishing in the red crab fishery or to avoid the "race for fish" that can be stimulated by unrestricted competitive fishing for a total allowable catch. There are five limited access red crab permits.

The current management specifications for the target TAC and DAS are the same as for Alternative 1 and are shown in Table 1 in the Summary. The environmental impacts of the emergency measures (the current management specifications) were analyzed in accordance with NEPA and National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6, "Environmental Review Procedures for Implementing the National Environmental Policy Act."

The current regulations require that vessel owners wishing to declare their vessel out of the red crab fishing year inform NMFS at least 6 months prior to the start of the fishing year. As was allowed in FY 2009, the Council requests that the 6-month notification requirement be waived for FY 2010. The waiver of this requirement would provide the red crab fleet with greater flexibility in adjusting to the reduced target TAC and DAS and to changes in fleet operations that will be necessary to provide a consistent, year-round supply of red crab to the new processing plant which has begun operation in New Bedford, MA.

2.3 Alternatives Considered

On November 19, 2009, the Council voted to adopt specifications for the 2010 fishing year that would continue the specifications that were put in place for the 2009 fishing year by the Emergency Action on April 6, 2009. This EA analyzes the following alternatives that were considered by the Council:

- Council Proposed Action – a target TAC and DAS allocation equal to the current emergency action
- SSC Recommended Action - a target TAC equal to the ABC recommended by the SSC and a DAS allocation calculated appropriately

- No-action alternative - the target TAC and DAS allocation specified in the FMP and in effect before the implementation of the emergency action.

3.0 PURPOSE AND NEED OF ACTION

The need for this action is to ensure management measures would continue the sustainability of the red crab fishery, and comply with provisions within the FMP that require the Council to review the status of the stock and the fishery every year and to prepare a SAFE Report and set allowable catch and DAS specifications at least every three years.

The purpose of this action is to set appropriate specifications to ensure that the landings do not exceed sustainable levels. This action is intended do the following: (1) adjust the MSY to the lower end of the range recommended by the DPSWG Review Panel (1,700 mt); (2) set the OY at 95% of the new MSY (1,615 mt); (3) set the target TAC for FY 2010 (1,615 mt); and, (4) set the number of fleet DAS (582 DAS) and individual vessel DAS to correspond to the target TAC.

4.0 PROPOSED 2010 SPECIFICATIONS AND ALTERNATIVES

Alternative 1 would adjust the MSY, set OY, and establish a target TAC for the 2010 fishing year. The action would also establish the fleet and individual vessel DAS allocations. Alternative 1 is based on the legal requirement to prevent overfishing of the red crab resource.

NEPA requires the analysis of the "no action" alternative which provides a benchmark, enabling decision-makers to compare the magnitude of environmental effects of the action alternatives. It is also an example of a reasonable alternative outside the jurisdiction of the agency which must be analyzed (Section 1502.14(c)). Inclusion of such an analysis is necessary to inform the Congress, the public, and the President as intended by NEPA (Section 1500.1(a)).

As noted above, the primary constraint on the directed, limited access red crab fishery is a DAS program that is based on the annual target TAC, set by the FMP at 5.928 million lb (2,689 mt). For FY 2009, MSY was set at 3.75 million lb (1,700 mt) through the Emergency Action by NMFS on April 6, 2009, based on the results of the DPSWG. The FMP specifies that the target TAC is calculated as 95 % of MSY, so the reduction in MSY necessitated a reduction in the annual target TAC, set at 3.56 million lb (1,615 mt) for FY 2009. The reduction in the target TAC was accompanied by a reduction[1] in the annual DAS allocated to the fleet from 780 DAS to 582 DAS.

4.1 Alternatives

Table 3 and Table 4 provide comparisons of the alternatives that were analyzed and considered by the Council and are explained in greater detail below.

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[1] The reduction in the DAS allocation for the Emergency Action and for the proposed action is not proportional to the reduction in the TAC that was implemented by the Emergency Action because the DAS reduction was based on updated average landings per DAS charged in the red crab fishery for the fishing years 2005-2008. The average landings per DAS were then used to calculate the fleet DAS by dividing the target TAC by the average landings per DAS.

4.1.1 Alternative 1 - Council Proposed Action (Status Quo)

Alternative 1 would maintain the "status quo" management measures for FY 2009 that were put in place by the Emergency Action on April 6, 2009. Although the regulations governing the Red Crab FMP call for a continuation of the specifications in effect unless the specifications are changed by Council action, the law also prohibits the extension of an emergency action beyond 186 days, plus one 180-day extension. The Emergency Action specifications are scheduled to expire on February 28, 2010. The Status Quo Alternative would maintain the FY 2009 MSY (3.75 million lb; 1,700 mt), and its respective allocations in FY 2010 (i.e., a target TAC of 3.56 million lb (1,615 mt) and a DAS allocation of 582 fleet-wide DAS). Section 4.1.4 below explains the Council's rationale for choosing Alternative 1 over the other alternatives.

Table 3- Summary of MSY/OFL, ABC, and TAC Specification Alternatives

	MSY (mt)	MSY (lb)	Buffer	ABC or OY (mt)†	ABC or OY (lb)	Target TAC (lb)
Status Quo	1,700	3,748,500	5%	1,615	3,561,075	3,561,075
SSC Recommended	1,700-1,900	3,746,800-4,187,600	24-32%	1,284	2,829,936	2,829,936
No Action (FMP)	2,830	6,240,150	5%	2,689	5,928,143	5,928,143

† ABC refers to the allowable biological catch established by the Council's Scientific and Statistical Committee. The "No Action" and "Status Quo" alternatives would not use the SSC's ABC but would set the catch on the basis of optimum yield (OY) as described in the FMP.

Table 4– Comparison of the alternatives.

Comparison of the alternatives under consideration in this specification package.				
Alternative	**2010 MSY (Million lb)**	**2010 Target TAC (Million lb)**	**2010 Fleet-wide DAS allocation**	**2010 Individual vessel DAS allocation**
Alternative 1(Preferred)				
Council Preferred (Status Quo)	3.75	3.56	582**	194††
Alternative 2				
SSC Recommended	3.75 - 4.19	2.83	464*	155††
Alternative 3				
No Action	6.24	5.928	780†	195

* Based on updated average landings per DAS for 2006-2008 (6,106 lb/DAS)
** Based on average landings per DAS for 2005-2008 (6,100 lb/DAS)

† Based on original average landings per DAS (7,600 lb/DAS)

†† Based on three limited access vessels (as 1 vessel has consistently declared out and a second vessel declared out in 2009)

4.1.2 Alternative 2 (SSC Recommended)

Alternative 2 sets MSY at 3.75 - 4.19 million lb (1,700 – 1,900 mt) as recommended by the Review Panel for the DPSWG, and accepted by the SSC. Alternative 2 also establishes an interim ABC at 2.83 million lb (1,284 mt), as set by the SSC as representative of recent landings, which the SSC designated as equal to landings in FY 2007. Alternative 2 would set the target TAC equal to the ABC (2.83 million lb; 1,284 mt.) Alternative 2 would maintain the objective established in the FMP to set the OY at 95% of MSY (3.56 – 3.98 million lb; 1,615 – 1,805 mt) as an approximation of the maximum economic yield. This option preserves the bio-economic principles that were incorporated into the FMP and creates an incentive to reduce scientific uncertainty so that the ABC can be set closer to MSY and OY can be achieved. The fleet DAS allocation would be 464 DAS, based on an updated calculation of the average daily catch per charged DAS for the years 2006-2008. These years were used to calculate the fleet average catch per DAS as being most likely to represent future resource and fishery conditions.

4.1.3 Alternative 3 (No Action)

Alternative 3 is the no-action alternative, which in this case would cause the Emergency Action to expire and the MSY would revert back to 6.24 million lb (2,830 mt), as specified in the FMP. Because the no action alternative would revert back to regulations that were in effect prior to the Emergency Action, there would be no specified ABC and the target TAC would be equal to optimum yield. The FMP sets OY at 95% of MSY, so the *de facto* ABC would be equal to OY, or 5.928 million lb (2,689 mt.) The fleet allocation would be 780 DAS, as prescribed in the FMP.

4.1.4 Rationale for Proposed Action

The Council chose Alternative 1 for the Proposed Action for the following reasons:

1) Alternative 1 sets the target TAC below the estimated range of MSY recommended by the DPSWG Review Panel and accepted by the Council's SSC,

2) The target TAC under Alternative 1 closely approximates recent historical catch, a criterion that was recommended by the Council's SSC and conforms with the most recent clarification from the SSC that recent historical catch is generally considered to encompass catch from more than only one year.

3) The red crab resource is not currently experiencing overfishing, but the overfished status is not determined. Therefore, the Council believes that Alternative 1 represents an acceptably low level of risk of overfishing red crab, while providing the greatest economic benefits in terms of revenues and employment to the fishing industry including shore-side processors and the fishing communities.

Alternative 1 sets MSY at 3.75 million lb (1,700 mt), the lower end of the range recommended by the Review Panel for the DPSWG and accepted by the SSC. Alternative 1 also follows the procedure outlined in the FMP for establishing OY and the target TAC at 95% of MSY.
The report of the DPSWG states that "we recommend a catch limit that mimics recent and long-term mean annual landings..." The DPSWG Review Panel used estimates of sustainable yield to conclude that "estimates of MSY in the male only fishery of 1,700-1,900 mt represent the best available scientific information, based on the congruence of average landings and results from the DCAC model. The panel noted that the current overfishing level threshold is exceeded when male landings are greater than the estimated MSY." The Review Panel noted the substantial uncertainty in all BRP estimates, but did not provide any advice on the application of a buffer between their estimate and an appropriate catch limit.

The Council based the target TAC directly on the advice from the DPSWG rather than that recommended by the SSC because the Council thought this advice provided an acceptably low risk of avoiding overfishing. According to the National Standard 1 guidelines, it is the role of the Council to determine an acceptable level of risk of overfishing after receiving scientific information about what is the level of overfishing. (National Standard 1 Guidelines (Federal Register Vol. 74, No. 11, January 16, 2009, p. 3192).

The Council did not accept the SSC's choice of the lowest single year in recent history as being a scientifically valid representation of recent landings. The SSC report to the Council on September 23, 2009 noted that:

> "The SSC would prefer to base the ABC recommendation on a longer series of recent catch (e.g., the average catch from 2002-2007, the most reliable series of catch statistics). However, this magnitude of catch is at the upper end of the range of approximate values of OFL recommended by the DPSWG. Given that there should be a substantial buffer between OFL and ABC for data-poor stocks, an ABC based on the 2002-2007 average landings would contradict the DPSWG advice."

These comments make it clear that the SSC chose 2007 landings without policy guidance from the Council on the appropriate level of precaution.

The proposed National Standard 2 Guidelines (DOC NOAA 2009) address the relationship between scientific input and policy that is at issue in this Council decision. The Guidelines suggest that the amount of uncertainty that is acceptable or the amount of precaution used in an analysis are policy considerations that are in the purview of the Secretary and the Councils. The National Standard 1 Guidelines (Federal Register Vol. 74, No. 11, January 16, 2009, p. 3192) also make it clear that:

> "Determining the level of risk of overfishing that results from scientific uncertainty is the policy issue. The SSC must recommend an ABC to the Council after the Council advises the SSC what would be the acceptable probability that a catch equal to the ABC would result in overfishing. This risk policy is part of the required ABC control rule."

In the case of red crab, because overfishing is not occurring (although the overfished status is not determined), the Council had not yet considered or advised the SSC concerning the acceptable probability that a catch equal to the ABC would result in overfishing. In effect, the Council made this policy decision on November 19, 2009, when it voted on the specifications for FY 2010, establishing a 5% buffer between the target TAC and the low end of the recommended MSY range, and a 15% buffer between the TAC and the high end of the MSY range. Council members judged the risk of overfishing to be low with only three vessels fishing at a level below that which was determined to be sustainable by both the DPSWG and the SSC. The SSC did not offer any guidance to the Council concerning the risk of overfishing that was associated with its recommendation. The report of the DPSWG does indicate the precautionary nature of the sustainable yield estimates produced by the DPSWG:

> "There is appreciable risk that reference points in this report will result in unnecessarily foregone catches" because "some of the methods used to calculate biological reference points in this report rely heavily on landings data collected during a period when exploitation levels were relatively low. Historical catches may understate MSY to the extent that fishing mortality has been less than F_{MSY} during recent years."

Council members also took into consideration the fact that both the DPSWG and the SSC characterized historical landings as sustainable and the fact that NMFS had determined that the specifications that were implemented through emergency action were precautionary and sustainable.

The Council determined that Alternative 3 (No Action) would not meet the purpose and need of this action which is to set an allowable catch level to ensure sustainability of this stock. The DPSWG concluded that the MSY of 6.24 million lb (2,830 mt) specified in the FMP is too high.

5.0 AFFECTED ENVIRONMENT (STOCK ASSESSMENT AND FISHERY EVALUATION)

This section is a description of the Affected Environment supporting this action. This section also serves as the SAFE Report, which is a triennial requirement under the FMP. A complete description of the affected environment was part of the Red Crab FMP and Environmental Impact Statement (EIS) (NEFMC, March 2002: Section 8.0). Any new information collected about the status of the stock that has undergone peer review, or the economic and social changes that have occurred since the implementation of the FMP are described in this section. There is little new biological information that would suggest that red crab distribution has changed since the FMP was implemented.

The Valued Ecosystem Components (VECs) potentially affected by the alternatives include the target species (red crab), non-target/bycatch species, habitat including EFH, protected resources, and human communities, all of which are described below.

5.1 Biological Factors

5.1.1 Target Species

Red crab (*Chaceon quinquedens*) is a slow-growing crustacean. Serchuk and Wigley (1982) estimated a life span of fifteen years or more, implying a natural mortality rate of $0.2y^{-1}$. The red crab FMP used a natural mortality rate of $0.15y^{-1}$. The 2006 red crab stock assessment referred to both the Serchuck and FMP estimates of natural mortality as "probably unrealistic," and more applicable to short-lived fish species. Limited data for related species (*Geryon maritae*; Mellville-Smith 1989) suggest that *M* may be as low as $0.1y^{-1}$, which would imply a life span considerably longer than fifteen years.

The Atlantic deep sea red crab is patchily distributed along the continental shelf edge and slope of the western Atlantic, primarily at depths of 400-1800 meters. A genetically distinct stock of *Chaceon quinquedens* exists in the Gulf of Mexico (Weinberg et al., 2003). The closely related species *Geryon maritae* is also commonly referred to as red crab and supports a fishery off the west coast of Africa (Melville-Smith 1989). Juvenile crabs live in deeper waters than adult crabs, and for the majority of the year, males are generally distributed in deeper waters than females.

Since implementation of the FMP in 2002, the biological and economic information about the red crab resource and fishery has been updated in the 2004 SAFE Report, through the 2006 Stock Assessment Workshop, and through the January 2009 DPSWG and Review Panel Report. These reports provide additional data to supplement the red crab assessment completed over 30 years ago (Wigley et al, 1975). Researchers have used both trawl- and camera-based sampling methods to determine whether the abundance, size structure, and sex composition of the population has changed since the 1974 survey. Preliminary findings suggest that the overall population density estimates of red crab are higher than the previous survey, but the proportion of large male crabs (larger than 114 mm carapace width (CW)) is less than the 1974 survey (Wahle et al., 2004). Whereas the 1974 survey represented an unexploited stock, a reduction in size composition of males subject to fishing would be expected with any level of exploitation. The apparent market-shift down to smaller male crabs (90+ mm CW) indicates that the market as it existed in prior years is unlikely to serve as an appropriate constraint on the minimum size of landed crabs. The red crab fishery obtained Marine Stewardship Council Certification in September 2009. The concern for the decline in the proportion of large males was reflected in the conditions placed on Marine Stewardship Certification for the red crab fishery, including a requirement that the red crab industry increase the average size of male crabs in the landings.

Landings in the red crab fishery have fluctuated widely since the 1970s, when the fishery began. In recent years, landings have decreased from over 4 million lb in 2005 to less than 3 million lb in 2007 and 2008. Members of the Red Crab Advisory Panel report that the decline in landings is the result of reduced market demand rather than lower availability of marketable crabs. The trend in DAS matches the trend in landings, supporting the industry explanation for the decline in landings (Figure 1). Note that red crab DAS are charged on a calendar day basis. That is, for any day or portion of a day fished, DAS are charged as a whole day.

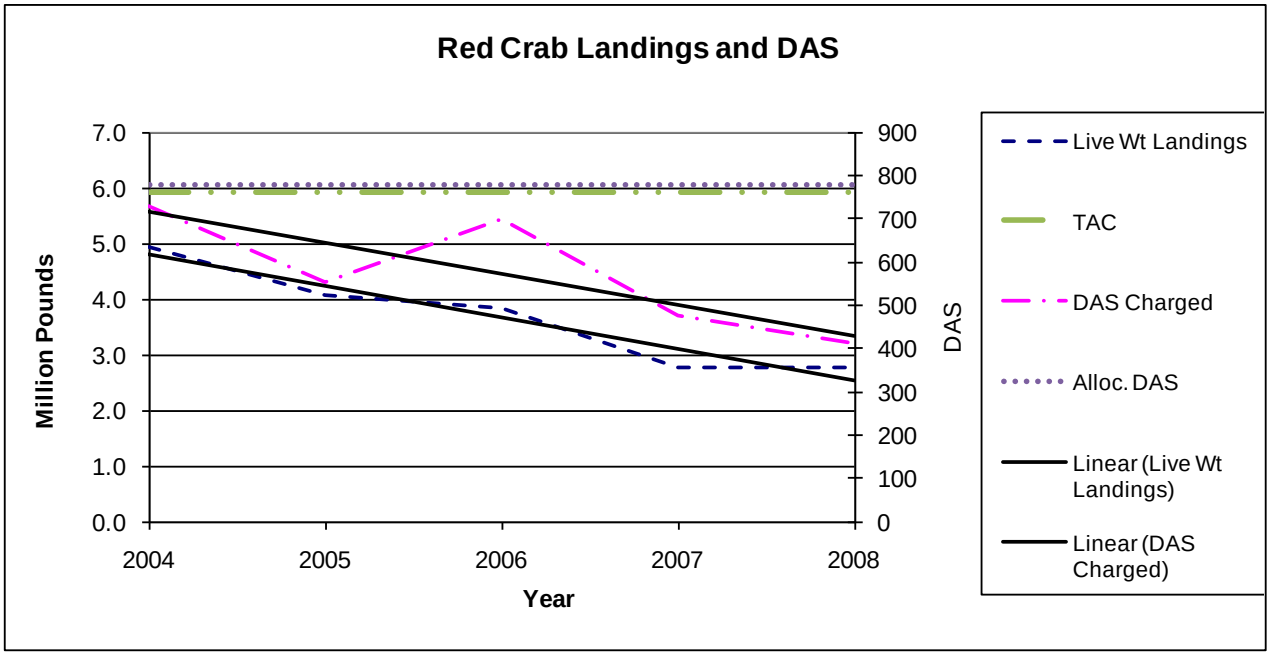

Figure 1 – Red crab landings and DAS charged 2004-2008.

Red crab is caught incidentally in other fisheries, primarily in the offshore lobster fishery. Section 3.1.2.1 of the 2004 SAFE Report describes the bycatch of red crab in other fisheries from the data available. As mentioned in the FMP, there may be considerable potential for bycatch of red crab in the offshore monkfish fishery, but the program under which monkfish trawl vessels would be allowed to fish in the primary red crab fishing area qualified zero vessels, significantly reducing the likelihood that monkfish vessels would impact the red crab resource. However, trends in red crab bycatch on observed monkfish trips show a steady and significant increase in recent years

Table 7 and Figure 6). More recently, Amendment 1 to the Tilefish FMP prohibited bottom-tending mobile gear from four submarine canyons along the edge of the continental shelf off New England. These closures reduce the likelihood that monkfish or other deep-water trawl fisheries would catch significant quantities of red crab. If other fisheries extend their operations into red crab habitat, more research through observers will be needed to determine the level of red crab bycatch in other fisheries. At present the bycatch of red crab in other fisheries is minimal and insignificant.

5.1.1.1 Overfishing Definition

The Red Crab FMP/EIS established criteria to determine whether the red crab stock was either in an overfished condition, subject to overfishing, or both. The 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 measure of exploitation used will be determined by the availability of suitable data (CPUE data, landings, etc.).

Definition of Overfished: The red crab stock will be considered to be in an overfished condition if one of the following three conditions are 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.

The current status of red crab with respect to the definition of overfishing and the definition of overfished is shown in Table 5. Application of both of these definitions is dependent upon the availability of suitable data on which to determine whether overfishing is occurring or the stock is overfished. The FMP/EIS established two types of proxies that could be used to assess whether overfishing is occurring. The first, in its simplest form, relies upon a comparison of the current fleet average CPUE with the expected CPUE under MSY conditions, with adjustments to account for any differences in the size distribution of the current catch compared to the size distribution that was assumed in the calculation of MSY. If CPUE data are not available, the second proxy allows for a straightforward comparison of current landings to MSY (i.e., if the ratio L:MSY > 1.0, then overfishing is considered to be occurring; otherwise, overfishing is not considered to be occurring). Using this proxy, it is possible to make at least a crude assessment of whether overfishing is occurring in the red crab fishery, as landings are always known and the FMP developed an estimate of MSY.

In order to make an assessment as to whether the red crab stock is overfished, either an estimate of current biomass or fleet average per trap haul CPUE is required. Red crab vessels fill out VTRs that include information on catch and fishing effort, but that information is not easy to analyze and is not regularly used to determine trends in CPUE. At the time the FMP/EIS was developed, it was expected that NMFS and the industry would implement a voluntary subsampling protocol to collect trap-level data for a representative sample of trap hauls on each red crab fishing trip. The purpose of this subsampling was to collect data on per trap CPUE, derived from the number and size of all crabs (male, female, and juvenile) brought up in the sampled trap, and the composition of any bycatch also brought up in the sampled trap. Averaged across all trips by all participating vessels, the intent was to be able to estimate an annual fleet-wide per trap CPUE, which could be used in assessing the status of the red crab stock. Unfortunately, this subsampling program has yet to be initiated, although progress is being made in the development of an appropriate protocol through a study currently in progress by Dr. Richard Wahle of the Bigelow Laboratory, in collaboration with Dr. Yong Chen and Jon Williams (New England Red Crab Harvesters' Association.)

Table 5- Current Overfishing Definition Reference Points and Status for Red Crab.

Definition	Criteria	Reference Point	Proxy	Value	Status
Overfishing	F	F:FMSY > 1	CPUE MSY: CPUE L	Not Available	Overfishing Not Occurring
			L* : MSY	0.67-.74	
Overfished	B	B < ½ BMSY	None	Not Available	Unknown
	CPUE	CPUE < ½ CPUE0	N/A	Not Available	
		CPUE < ¼ CPUE0	N/A	Not Available	

*Landings

5.1.1.2 Current Stock Status

Based on the reported landings from the dealer weigh-out system in FY 2008 and the range of MSY values recommended by the DPSWG Review Panel, the ratio of landings to MSY can be calculated to be between:

L : MSY = 2,762,239 lb : 3,747,858 lb = 0.74
and
L : MSY = 2,762,239 lb : 4,188,740 lb = 0.67

Because the ratio of L:MSY is less than 1.0, overfishing is not considered to be occurring on the red crab stock, based on FY 2008 data.

To assess whether the stock is considered to be overfished, current data on either stock status or fleet per trap CPUE are necessary. Because none of these data are currently available, stock status with respect to being in an overfished condition cannot be determined at this time. Stock abundance was higher in 2003-2005 than it was in 1974 and landings have been lower than the long-term average landings since 2005.

The most recent peer-reviewed scientific advice that is applicable to the red crab fishery was produced by the Data Poor Species Working Group (DPSWG) and the associated Peer Review Panel, which met during the latter half of 2008 and issued its report on January 20, 2009.

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." Although the methods used by the DPSWG estimated sustainable yield, rather than

maximum sustainable yield, the Review Panel recommended that MSY be set between 3.75 and 4.19 million lb (1,700 – 1,900 mt) based primarily on the congruence between long-term average landings and the results of sustainable yield estimates from the DCAC model. This is a nearly 40% reduction from the MSY estimate of 6.24 million lb (2,830 mt) that guided the fishery between 2002 and 2008.

The primary concern for the red crab resource expressed by the DPSWG was the reduction in the stock size structure. The report of the DPSWG notes that "the [Review] panel rejected the current estimate of MSY (2,830 mt) as too high, based on observed changes in population size structure since the beginning of the fishery." The Review Panel commented that "reductions in the size structure of landings that have been observed indicate that previous higher landings were not at a sustainable MSY levels [sic] as had been previously assumed" (DPSWG Peer Review Panel 2009). However, the SSC report to the Council on September 23, 2009, pointed out that "although the average size of male crabs decreased from 1974 to 2003, the 1974 survey was at the beginning of the fishery, some decrease in size structure should be expected, and there is no indication that the decrease in average size results from an unsustainable fishery." A fishery that was consistently exploited at MSY or some other level of sustainable yield would develop a stable size structure that would fluctuate depending on the strength of incoming year-classes but would not show any long-term trend. The highly variable landings that have taken place over the history of the red crab fishery and the slow growth of the species would be expected to lengthen the time period over which a stable population size would develop even if fishing pressure stabilized. Expected high variability in recruitment success would create fluctuations in size structure even when fishing pressure was constant. The red crab stock assessment completed in 2006 (NMFS 2006) notes a trend toward landing smaller crab during 2001-2005, but offers explanations for that observed trend in landings that do not imply a corresponding trend in stock structure:

> Cumulative size distributions for all areas combined (Figure D4.14), show a trend towards landing smaller red crab during 2001-2005. With the exception of 2004, crabs landed each year were generally smaller than during the year before. The apparent trend for all areas combined may have been driven by relatively few samples in the Mid-Atlantic region because no trend is evident in samples from the Georges Bank region (Figure D4.14). Changes in culling, landings of female crabs, changes in location fished, or sampling bias may also be responsible. Plots of mean size by year for each survey strata do not show trends over time during 2001-2005 (Figure D4.15).

The stock assessment does not note the impact of the apparent good recruitment evident in the 2003-2005 survey, which would shift the size frequency toward lower sizes. Whereas the mean size by year does not show any trends when the survey strata are analyzed separately, the trend in the combined data would appear to result from differential sample sizes or other causes suggested in the assessment. It should be noted that there is very little data available on red crab size distribution, and no data on abundance, between the 1970s and post-2000, a period of highly fluctuating landings that would be expected to impact both abundance and size distribution.

Red crab landings have fluctuated dramatically since 1974 as a result of market demand and the financial condition of red crab fishing companies. Landings from 1980 through 1989 averaged 5.9

million lb (2,667 mt) compared to an average of 2.6 million lb (1,195 mt) from 1990 through 1999. Landings in the early 1980s approached the peak levels that were seen again in 2000 and 2001. If average recruitment remained relatively steady through those years, population modeling exercises indicate that the proportion of large males in the population in the 1980s and 90s may have been lower than those observed in the 2003-2005 survey. Reduced landings in the 1990s could have allowed the biomass of large males to increase during the late 1990s, and the high landings in 2000 and 2001, just prior to the 2003-2005 survey, could have reduced the proportion of large males again.

Most research trawl surveys do not extend into red crab habitat, with the exception of the NEFSC Cooperative Monkfish Survey. NMFS has been involved in monkfish industry based trawl surveys in 2001, 2004, and 2009. The findings from the 2001 survey were summarized in the 2004 Red Crab Specification Document. All surveys began in February, but due to weather delays the legs were sporadic and in some cases the last leg did not end until the beginning of June. The 2004 and 2009 surveys went into the Gulf of Maine; red crabs caught there were removed from the data before plotting the size distribution data shown in Figure 2 and Figure 3 because the directed red crab fishery takes place outside the Gulf of Maine. The peak size for males is higher in 2001 and 2009 compared to 2004, perhaps further evidence of the recruitment pulse that appeared in the 2003-2005 red crab survey. The peak size of female crabs was higher in 2004 and 2009 compared to 2001. The size distribution of male and female red crab caught in the monkfish trawl surveys in the Gulf of Maine is shown in Figure 4 and Figure 5 for comparison.

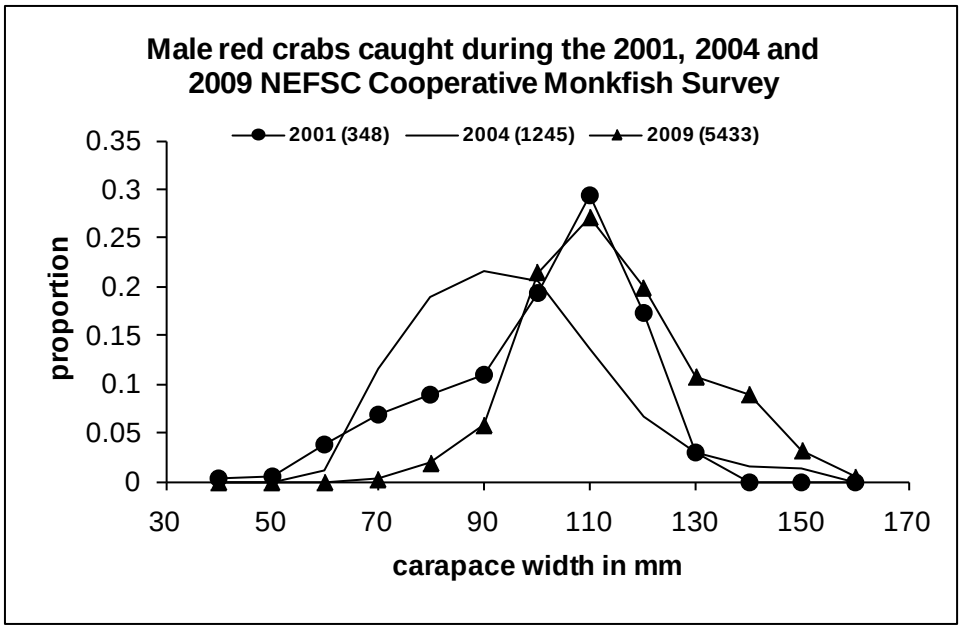

Figure 2- Size distribution of male red crabs caught in monkfish trawl surveys, excluding tows in the Gulf of Maine.

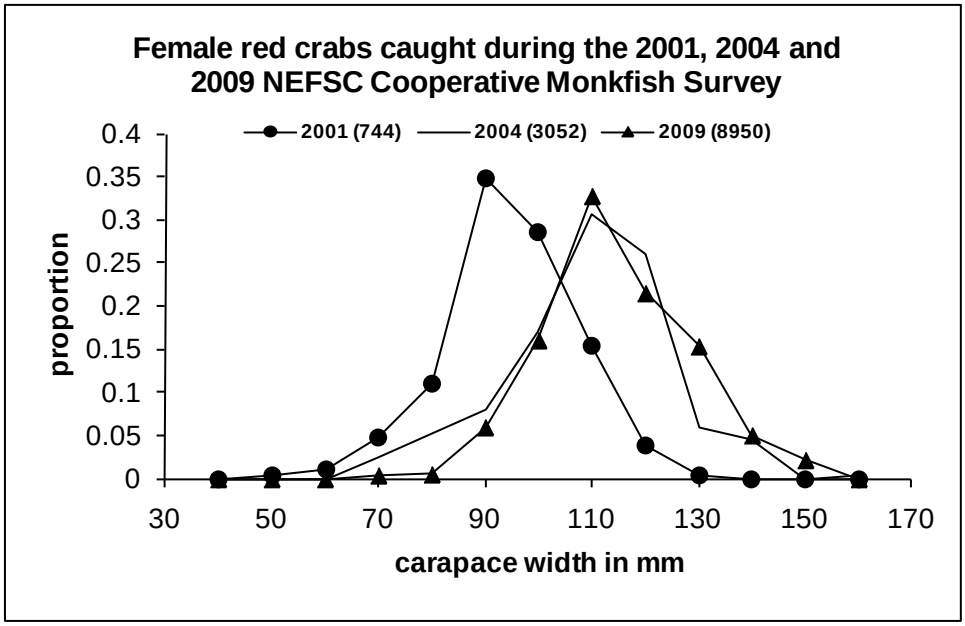

Figure 3- Size distribution of female red crabs caught in monkfish trawl surveys, excluding tows in the Gulf of Maine.

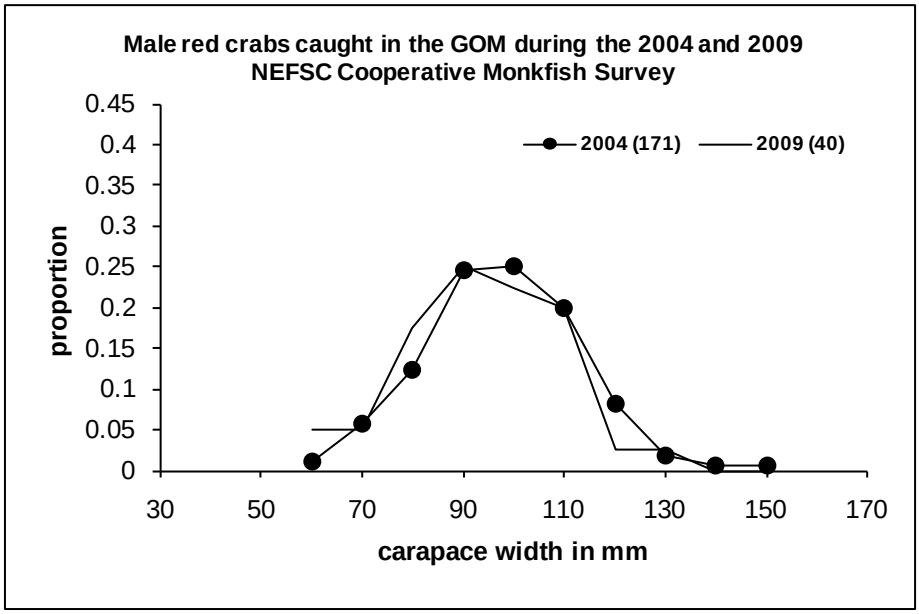

Figure 4- Size distribution of male crabs caught in the Gulf of Maine during the 2004 and 2009 NEFSC Cooperative Monkfish Trawl Surveys.

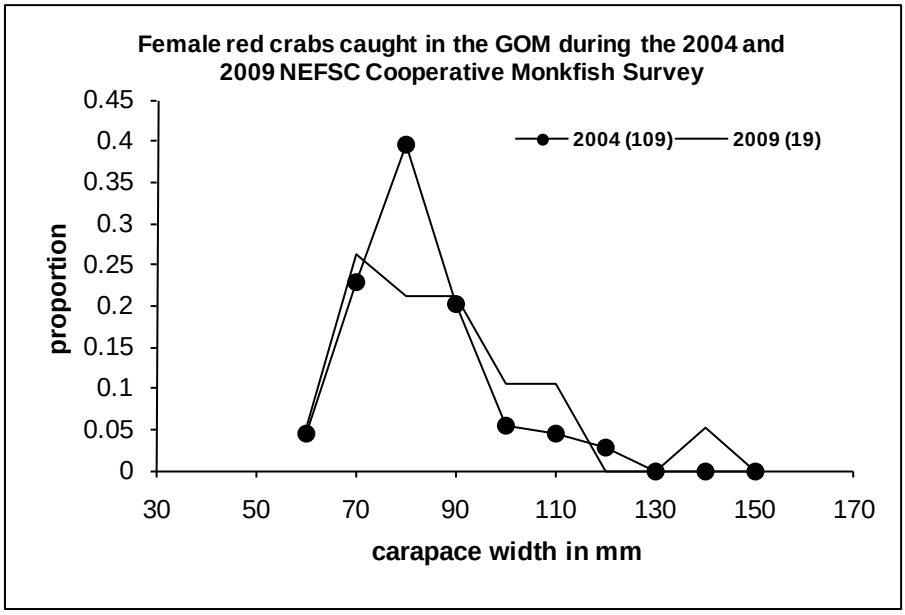

Figure 5- Size distribution of female crabs caught in the Gulf of Maine during the 2004 and 2009 NEFSC Cooperative Monkfish Trawl Surveys.

5.1.1.3 Description of Resource and Current Data Collection Efforts

The stock of red crabs is patchily distributed along the continental shelf edge and slope of the western Atlantic at depths of 400-1800 m between Emerald Bank, Nova Scotia and Cape Hatteras, with populations also present in the Gulf of Mexico and the Gulf of Maine. The physical environment is described in more detail in Section 8.2.1 of the Red Crab FMP. Overall, the continental slope north of Cape Hatteras contains many submarine canyons and small gullies.

The biological environment is described in more detail in Section 8.1 of the Red Crab FMP. Early reports indicated that red crabs may live for fifteen years or more and they are slow growing (Serchuk and Wigley, 1982). More recent scientific opinion seems to favor a longer life span and a lower natural mortality rate. Since 2001, almost 11,000 red crabs have been sampled dockside. These port samples are used to monitor the size and sex distribution of catch. Based on a comparison of information from the late 1970s with current port sampling data, size at recruitment appears to have decreased from 114mm CW (Serchuk, 1977) in 1977, thought to be a minimum landed size, to a mean width very close to 102mm CW (Table 6). The proportion of male crabs landed that are smaller than 102 mm CW, the recruit size stated in the FMP, increased steadily from 2001 through 2007 and then declined in 2008. These results may suggest that the availability of large males for harvest may be down, or the selectivity practiced by the industry has changed and the boats have been landing smaller red crabs than the FMP anticipated. In either case, the size and sex distribution of the catch is important to monitor. NMFS (2006) calculated fishery selectivity for red crab during 2004-2005 and determined that selectivity was near 0% at sizes less than 80 mm CW and increased rapidly to nearly 100% by 120 mm CW. The size at 50% selectivity was determined to be about 90-94 mm CW.

A small percentage of the total landings sampled were female; the FMP prohibits the landing of female red crabs in more than incidental levels (1 standard tote or 100 lb per trip.)

Table 6– Summary of red crab carapace width (mm) from port sampling measurements of landed crabs. (Source: NMFS Commercial Fish Data, 2009)

Year	Male	Female	Unknown	%female	Total samples	Mean width	%<102mm
2001			243		243	108.4	17.3
2002	362	5	883	0.40	1250	106.4	27.4
2003	1477	7		0.47	1484	104.9	34.4
2004	1228	8		0.65	1236	107.2	26.3
2005	1729	12		0.69	1741	104.0	38.7
2006	1671	15	100	0.85	1786	102.1	52.5
2007	1431	6	207	0.37	1644	101.0	54.9
2008	1307	1	185	0.07	1493	111.4	27.9

The red crab industry has supported research efforts aimed at improving data availability for red crab. In 2003-2005, data were collected to allow for another complete assessment of the stock. Dr. Richard Wahle (Bigelow Laboratories), Dr. Yong Chen (University of Maine) and Jon Williams (F/V Krystle James) received funding from several sources to gather demographic information on the red crab resource in order to develop an updated stock assessment of the resource. The researchers used both trawl and camera-based sampling methods to determine whether the abundance, size structure, and sex composition of the population has changed since the 1974 survey. The findings suggest that the overall population density estimates of red crab are higher than the previous survey, but the proportion of males larger than 114 mm CW is less than the 1974 survey.

In addition, this research team has tagged approximately 8,000 red crabs since 2003. The tag return rate has been very low so far, but based on the crabs with tags that have been returned, there is very little evidence of growth (Wahle et al, 2004). Size distribution, growth data, and fishing mortality rates are important to monitor in order to prevent recruitment overfishing.

In July 2009, NMFS approved an experimental fishery permit for up to four red crab vessels. The permit allows the taking of a limited number of female red crabs and is intended to support additional data collection that meets the following objectives:

1) Characterize regional variability in the reproductive characteristics of the red crab population along the geographic range of the fishery on the New England and mid-Atlantic shelf break;

2) Conduct tagging to evaluate growth rates that will facilitate the development of growth and yield and egg production models for the fishery; and

3) Develop yield and egg per recruit models to identify potential biological reference points for red crab stock assessment and to evaluate impacts of fishing on the female red crab resource.

The genetic subdivisions of deep-sea red crabs in the North Atlantic and the Gulf of Mexico have been assessed (Weinberg et al., 2003). Genetic differences between red crabs in the Gulf of Mexico and southern New England were large enough to conclude that they are different fishery stocks. More locations need to be sampled from the Gulf of Mexico to the Gulf of Maine to get a better understanding of the pattern of divergence.

5.1.2 Bycatch

5.1.2.1 Bycatch of red crab in other fisheries

In order to assess the potential bycatch of red crab in other fisheries the entire observer database was queried to determine where, when, and by what gear types red crab was reported as bycatch. The observer database records are widely distributed throughout the region. The database was then queried to separate discard from kept records. The statistical areas with discard records from 2001 through July 2008 are identified in Figure 7.

Prior to 2007, the majority of red crab discards was reported in statistical areas 521 and 522, east of Cape Cod along the northern edge of Georges Bank (Figure 8). This area does not overlap with where the red crab fleet currently fishes. The FMP describes the red crab abundance in the Gulf of Maine as not dense enough for a directed fishery. Red crabs are more densely distributed along the continental shelf in depths of 400-800 meters. Red crab discard data from observed trips show a shift to southern New England in 2007 and to the Mid-Atlantic in 2008. Observed trips are not chosen randomly over time. Trends in data from observed trips may be an artifact of the process for choosing which trips to observe. Different target species and different areas may be emphasized differently in different years, causing the appearance of changes that may not be real.

Table 7- Red crab bycatch from observed trips for 2001-2008, showing main statistical area and main target species. The main statistical area shifted from the Gulf of Maine to southern New England and the Mid-Atlantic during 2007 and 2008.

	Total observed trips	# trips with red crab bycatch	Percentage of observed trips with red crab bycatch	Total lbs red crab bycatch for all observed trips	Mean lbs red crab bycatch per trip	Main statistical area	Main target species
2001	1,380	27	2%	16,067	595	521	Haddock
2002	1,226	35	3%	15,923	455	522	Groundfish NK
2003	1,669	103	6%	10,288	100	522	Monkfish
2004	3,358	159	5%	16,562	104	522	Monkfish
2005	4,337	380	9%	45,209	119	522	Monkfish
2006	2,292	190	8%	48,031	253	522	Monkfish
2007	2,634	179	7%	78,279	437	616	Silver hake
2008	2,429	240	10%	147,044	613	537	Monkfish

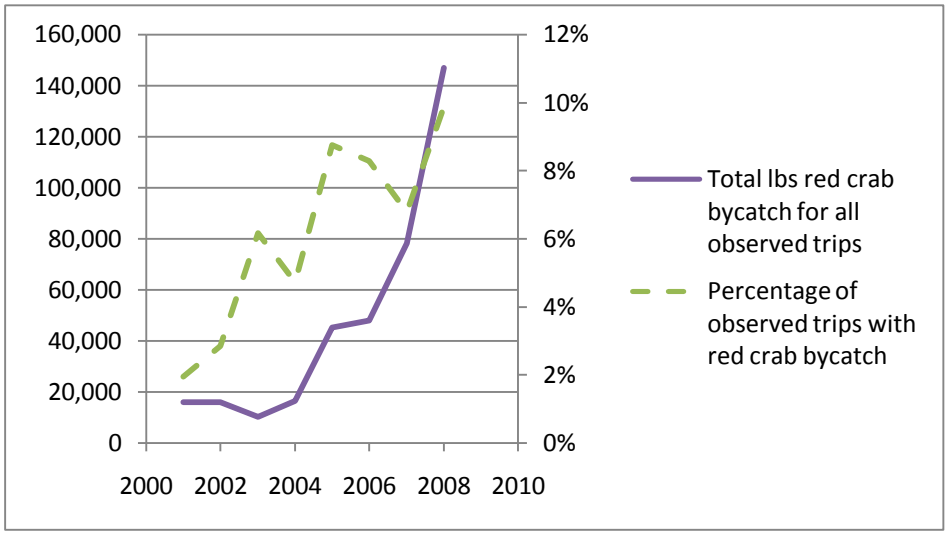

Figure 6- Total pounds of red crab bycatch for all observed trips and percentage of observed trips with red crab bycatch from 2001 through 2008. Observed trips are not chosen randomly, which means that the proportion of observed trips by target species may vary from year to year, causing the appearance of trends that may not be real.

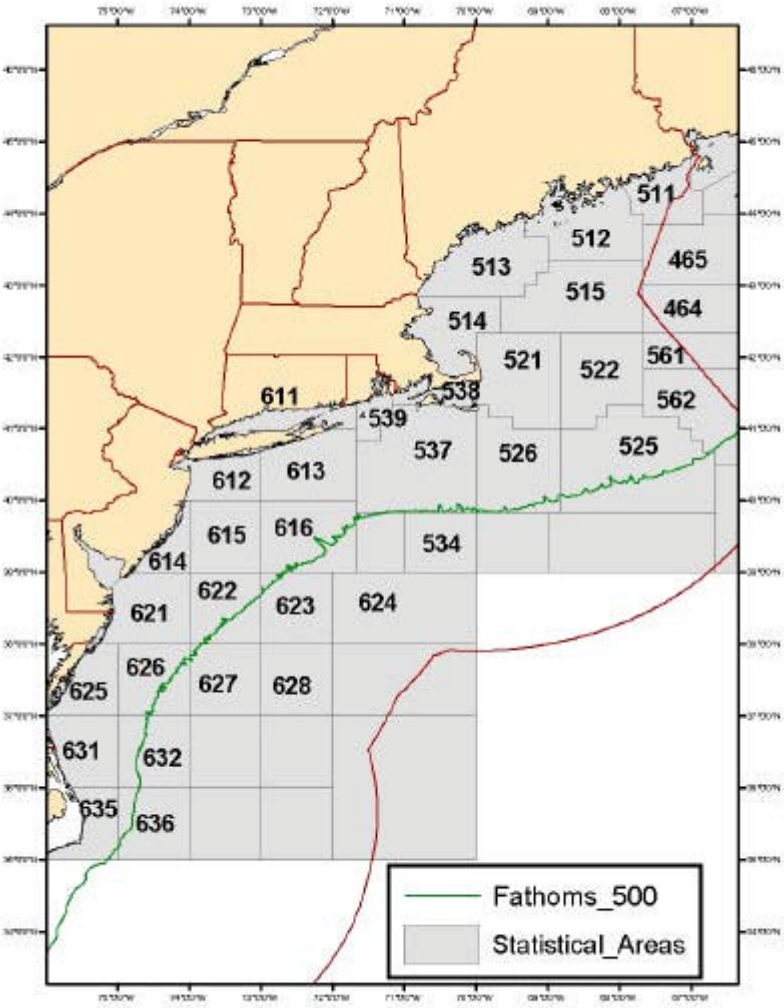

Figure 7– Statistical areas where discards were reported to the NMFS Observer Database from 2001 through July 2004

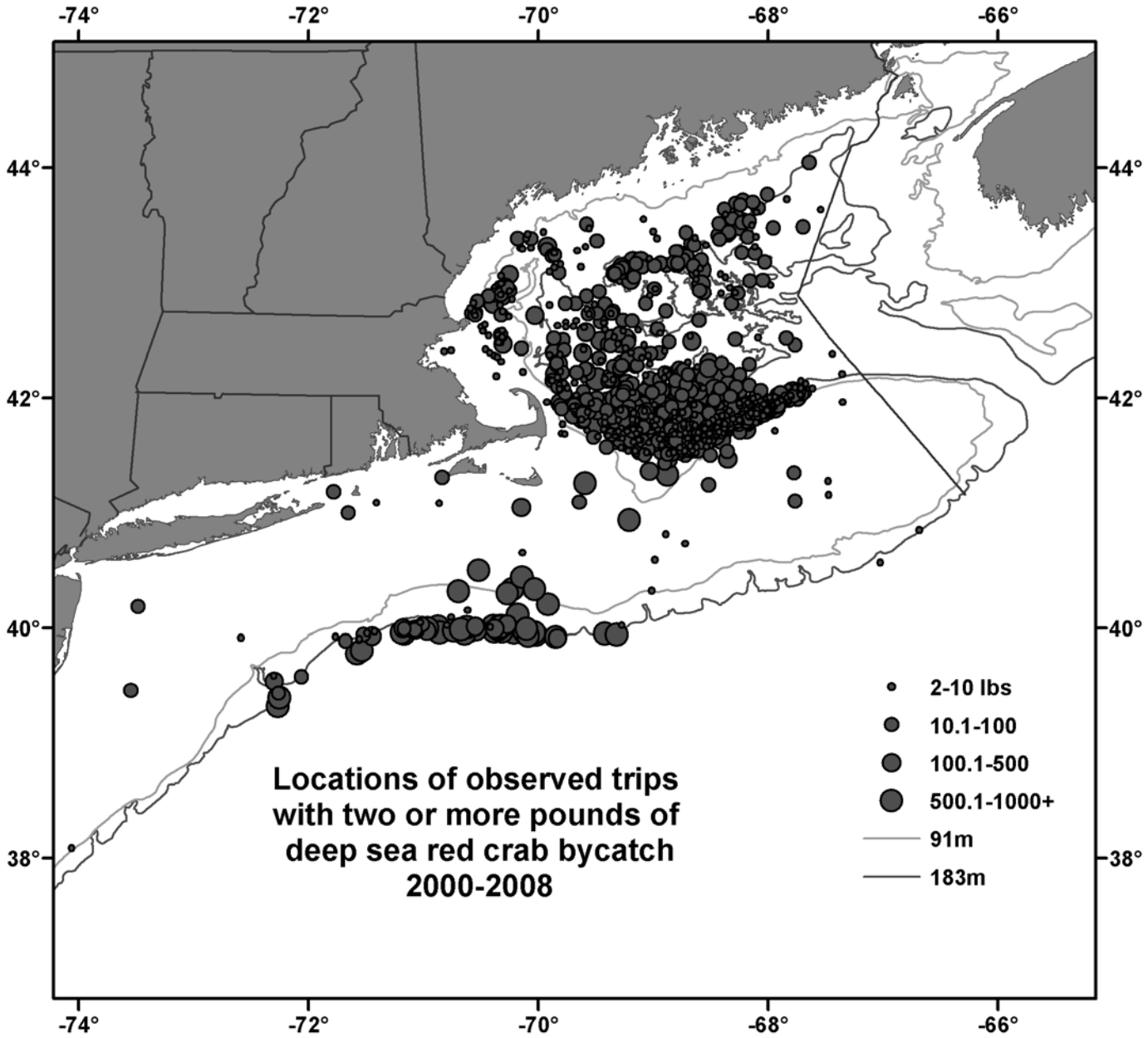

Figure 8– Location of observed trips with two or more pounds of red crab bycatch, recorded in the NMFS Observer Database for 2000-2008. (91 meters equals approximately 50 fathoms.)

When interpreting these bycatch results it is very important to keep in mind that some areas, fisheries and gear types are observed more than others. Therefore, it would require more investigation before a region-wide bycatch estimate could be made. In the meantime, the following tables and figures are intended to describe the spatial distribution of red crab bycatch from the data available. Table 8 is a summary of all the reported discards in the observer database from 2001 through July 2004 by gear type, as compared to the total red crab discards. Almost all

of the red crab discards reported to the observer database were from bottom otter trawl gear. Only a few tows with sink gillnet gear reported red crab discards. The majority of red crab discards were reported in statistical areas 521 and 522 (Table 9). However, in terms of catch per tow reported with red crab bycatch, statistical areas 525 and 526 had more red crab discards per record reported for those areas. The majority of the statistical areas with reported discards in the observer database did *not* have red crab discards, according to the tows that were observed during this time period.

Table 8- Comparison of discard records by gear type for the entire NMFS Observer Database versus records of red crab discards only for the years 2001-2004.

Gear Types	Total # of Records	Pounds of Total Discards	# of Records with RC discards	Pounds of Red Crab Discards
Bottom Longline	447	40,048		
Hand Line, Other	1	15		
Bottom Otter Trawl (fish)	131,804	10,298,099	1,512	48,716
Bottom Otter Trawl (scallop)	75	2,688		
Bottom Otter Trawl (shrimp)	953	5,987		
Sink Gillnet	18,156	757,787	4	18
Anchored-Floating Gillnet	10	2,099		
Drift-Floating Gillnet	34	587		
Drift-Sink Gillnet	1,092	56,126		
Scallop Dredge	63,266	2,823,292	1	1
Paired Midwater Otter Trawl	2	3,100		
Scottish Seine	519	22,717		
Midwater Otter Trawl	184	41,126		
TOTAL	**216,543**	**14,053,671**	**1,517**	**48,735**

Table 9– Comparison of discard records by statistical area for the entire NMFS Observer Database versus records of red crab discards only for the years 2001-2004.

Stat. Area	Total # of Records	Pounds of Total Discards	# of Records with RC discards	Pounds of Red Crab Discards	**Stat. Area**	Total # of Records	Pounds of Total Discards	# of Records with RC discards	Pounds of Red Crab Discards
464	103	10,181	2	3	**614**	315	13,112		
465	546	15,769			**615**	12,322	509,540		
511	77	3,631			**616**	9,638	628,423	2	8
512	2,437	78,967	61	225	**621**	15,560	873,335	1	1
513	5,706	196,746	72	612	**622**	6,448	463,046		
514	25,411	1,023,083	55	792	**623**	169	32,409		
515	7,110	269,312	154	903	**624**	7	1,199		
521	39,844	2,328,788	442	20,410	**625**	1,574	77,376		
522	27,006	1,931,371	669	24,513	**626**	12,101	501,323		
525	7,454	1,414,968	2	260	**627**	32	6,355		
526	9,657	491,354	6	425	**628**	7	136		
534	10	130	1	25	**631**	1,306	82,877		
537	4,702	512,529	11	237	**632**	431	39,473		
538	1,306	57237			**635**	335	10,120		
539	2,810	183,106			**636**	25	967		
561	9,289	655,215	38	311	**640**	12	193	1	5
562	7,102	1,216,091			**700**	42	333		
611	434	30,809			**701**	37	177		
612	2,150	167,852			**703**	37	1,758		
613	3,981	227,038			**707**	10	345		

The observer database was queried further to determine if particular fisheries have higher red crab discard rates. Every tow in the observer database has a field that identifies the primary targeted species of that tow. Since the observer database does not sample all fisheries equally, it would take more time and data to determine the expected discard rates from each fishery. Table 10 summarizes the red crab discards by the species identified as the primary target species from observed tows currently analyzed. The majority of red crab discards reported to the observer database are from tows that were primarily targeting groundfish. (Groundfish trips are generally observed more often than other fisheries.) According to this dataset, directed monkfish tows have the second highest total of red crab discards.

Table 10 – Summary of red crab discards by targeted species per tow from the NMFS Observer Database from 2001 through July 2004.

Primary Target Species per Tow	# of Records with RC discards	Pounds of Red Crab Bycatch	Percent of total red crab discards for each directed species	RC Catch per tow for each targeted species
Cod	102	1,378	2.8%	13.5
Winter Flounder	31	354	0.7%	11.4
Summer Flounder	1	0.1	0.0%	0.1
Witch Flounder	67	1,471	3.0%	22.0
Yellowtail Flounder	4	16	0.0%	4.0
American Plaice	82	1,131	2.3%	13.8
Flounders (NK)	214	4,971	10.2%	23.2
Haddock	45	635	1.3%	14.1
White Hake	15	113	0.2%	7.5
Pollock	5	118	0.2%	23.6
Weakfish	1	60	0.1%	60.0
Skates	4	18	0.0%	4.5
Winter Skate	1	5	0.0%	5.0
Whiting	1	2	0.0%	2.0
Groundfish (unclassified)	534	27,591	56.6%	51.7
Other Fish	1	10	0.0%	10.0
Lobster	7	118	0.2%	16.9
Scallop	1	1	0.0%	1.0
Squid	2	2	0.0%	1.0
Monkfish	400	10,738	22.0%	26.8
Total	**1,517**	**48,735**		**32.1**

In addition to the red crab bycatch information from the observer database and the monkfish industry-based surveys, some anecdotal reports suggest that there may be a considerable level of red crab bycatch in the offshore monkfish fishery. Preliminary results suggest that observed directed monkfish tows did have higher red crab discard rates than tows that did not direct on monkfish in 2003 and 2004 (Figure 9). These two years are the only years with a considerable number of observed directed monkfish tows in the observer database. Figure 10 spatially compares the directed monkfish tows with red crab discards from tows that did not target monkfish. There are directed monkfish tows offshore as well as within the Gulf of Maine that caught red crab as bycatch. One tow in particular in the Gulf of Maine caught almost 800 lb of red crab discards. The level of observer coverage on tows that directed on monkfish has changed over time. Figure 11 displays the directed monkfish observed tows with reported red crab discards, by year. Tows offshore were not observed until 2004, and the level of observer coverage increased in 2003 and 2004.

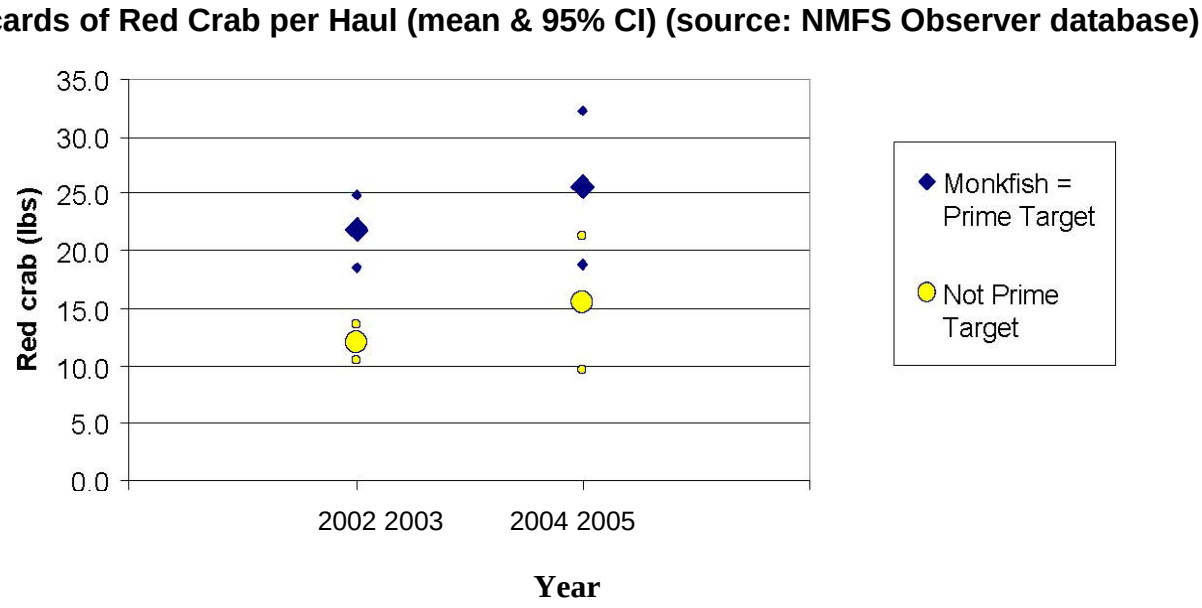

Figure 9– Discards of red crab per haul on directed monkfish tows versus tows that did not direct on monkfish from the NMFS Observer Database for 2003 and 2004.

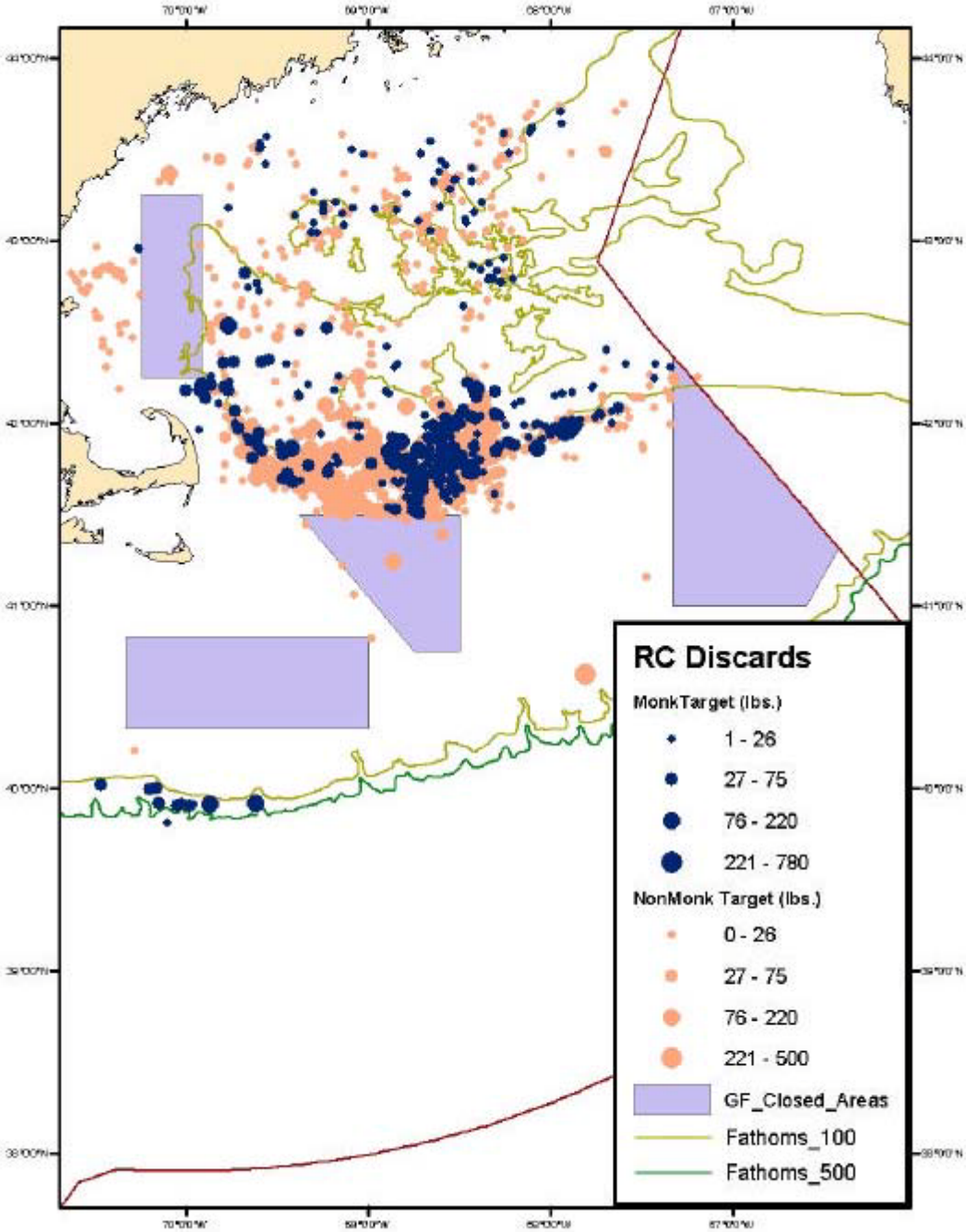

Figure 10– Red crab discards on tows that targeted monkfish, as compared to all other tows that reported red crab discards in the NMFS Observer Database (2001-July 2004)

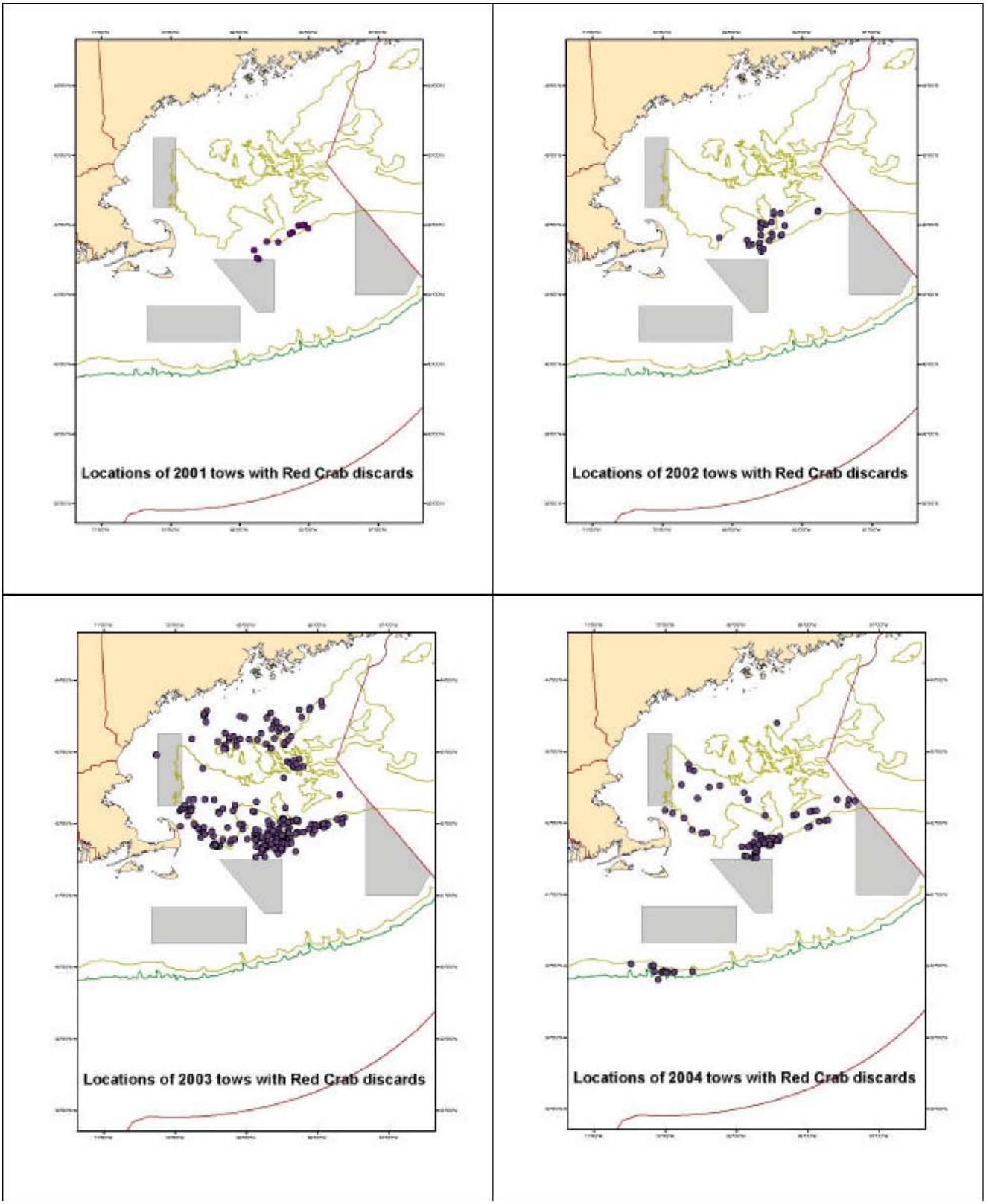
Locations of 2001 tows with Red Crab discards
Locations of 2002 tows with Red Crab discards
Locations of 2003 tows with Red Crab discards
Locations of 2004 tows with Red Crab discards

Figure 11 – Observed tows targeting monkfish from the NMFS Observer Database (2001-July 2004) that reported red crab discards.

As shown in Table 11, the number of observed monkfish tows with red crab discards has increased in recent years. The total pounds of red crab discards from observed monkfish tows was about 5,725 lb in 2003; however, the catch per observed tow is lower in 2003 and 2004 than in 2002 (Table 11). In 2002, only 27 directed monkfish tows with red crab discards were observed, but a substantial amount of red crab discards were observed on those tows. Red crab discards do seem to vary by area. The number of directed monkfish observed tows with red crab discards was highest in statistical area 522. However, the statistical areas with the highest red crab discards per tow were 526 and 514 (Table 12).

Table 11– Red crab discards on monkfish directed tows by year from the NMFS observer database.

	# of Directed MF tows with RC discards	Pounds of Red Crab Discards	RC Catch per tow
2001	12	243	20.25
2002	27	2,208	81.78
2003	261	5,725	21.93
2004	100	2,562	25.62
TOTAL	**400**	**10,738**	**26.85**

Table 12 - Red crab discards on monkfish directed tows by area from the NMFS observer database for the years 2001-2004.

Statistical Area	# of Directed MF tows with RC discards	Pounds of Red Crab Discards	RC Catch per tow by area
512	14	39	2.79
513	20	89	4.45
514	4	230	57.50
515	39	283	7.26
521	77	2,326	30.21
522	223	6,956	31.19
526	5	425	85.00
534	1	25	25.00
537	9	235	26.11
561	8	130	16.25
TOTAL	**400**	**10,738**	**26.85**

As compared to other crab species in the observer database, red crab discards are higher than most crab species, except for Jonah and rock crab (Table 13). However, the average catch per tow of red crab discards was higher than both Jonah and rock crab discards per tow.

Table 13– Discards of all crab species reported to the NMFS Observer Database for the years 2001-2004.

Species of Crab	# of Records	Lbs. of Crab Reported as Discards	Catch per tow
Jonah Crab	8,506	241,272	28.4
Rock Crab	5,537	78,457	14.2
Unknown Crab	1,902	82,830	43.5
Red Crab	1,518	48,728	32.1
Horseshoe Crab	1,045	40,157	38.4
Spider Crab	925	16,316	17.6
Queen Snow Crab	153	720	4.7
Blue Crab	84	195	2.3
Green Crab	66	1,193	18.1
Cancer Crab	9	144	16.0

5.1.2.2 Bycatch of other species in the red crab fishery

There is very little bycatch of other species in the red crab fishery. In general, the red crab fishery has little interaction with non-target species and does not have significant levels of bycatch, if any, as described in the 2005 SAFE report (Section 4.1.2.2) based on initial reports from industry members. The VTR database indicates that lobster and blue crab are rare bycatch species. The FMP did identify that the bycatch of red crab in other fisheries may be a more significant issue.

Tallack (2007) investigated bycatch in the red crab fishery and reported that: "From 450 gear trial trap hauls, a total of 16 non-target organisms were recorded; this equates to 0.001% of the total catch of target species (n = 11 257). The organisms captured included golden crab (*C. fenneri*, n = 2), Jonah crab (*Cancer borealis*, n = 8), unidentified whelk spp. (n = 3), ocean pout (*Macrozoarces americanus*, n = 1), and wrymouth (*Cryptacanthodes maculatus*, n = 1).

5.1.3 Canadian Red Crab Fishery

The northern edge of red crab distribution is in deep waters off Nova Scotia, therefore it is important to also monitor the Canadian red crab fishery and trends in stock status within Canadian waters. The fishery in Canada began in the late 1960s, but has been sporadic over the years. In 1998, there were five exploratory licenses for deep-sea red crab in Canada. The fishery is managed with size and effort controls with a TAC, and there is 100% dockside monitoring. The fishing grounds were considered fully exploited with evidence of stock depletion in 2005. According to the Canadian Department of Fisheries and Oceans (DFO), landings and effort (number of trips) have increased slightly in recent years (2001, 2002 and 2003), but the fishery is described as prone to short periods of abundance followed by periods of low abundance. Table 14 describes the landings of red crab by the limited number of license holders in Canada. Most of the recent effort is from NAFO areas 4X, 5ze and 4W (Figure 12).

Table 14– Annual Landings in the Canadian Red Crab Fishery *(Source: DFO)*

Year	Landings
1996	683.2 mt *(1,506,198 lb.)*
1997	343.7 mt *(757,729 lb.)*
1998	25.7 mt *(56,659 lb.)*
1999	32.0 mt *(70,548 lb.)*
2000	54.6 mt *(120,372 lb.)*
2001	123.5 mt *(272,271 lb.)*
2002	66.5 mt *(146,607 lb.)*
2003 *(PRELIMINARY DATA)*	74.9 mt *(165,126 lb.)*

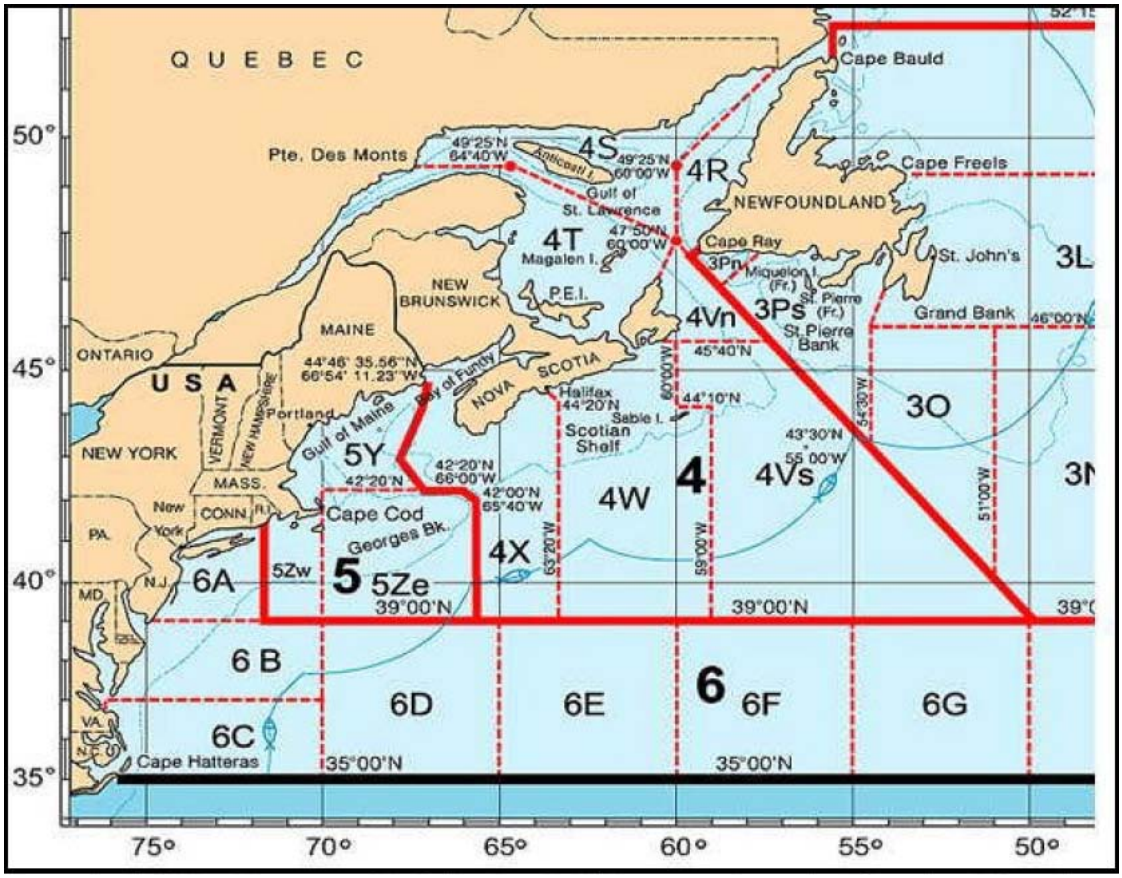

Figure 12 – NAFO Statistical Areas

Source: NAFO website http://www.nafo.ca/About/FRAMES/AbFrMand.html

5.2 Ecological Factors

5.2.1 Essential Fish Habitat (EFH)

5.2.1.1 Red Crab

The EFH designation for red crab has not changed since implementation of the FMP, however, the designations for red crab EFH are being reevaluated as part of the next Omnibus Habitat Amendment, a multi-year process to review and update all EFH designations, as well as other requirements related to essential fish habitat regulations. This Amendment is not yet implemented. The proposed Omnibus Habitat Amendment prepared by the NEFMC does recommend some additions to red crab EFH.

Section 3.7.4 of the FMP describes the EFH text and map definition for each life stage. EFH for red crab is based primarily on known depth affinities from Cape Hatteras to the Hague line. Figures 5 through 8 of the FMP, display where red crab EFH is spatially; but in general, EFH for red crab eggs is benthic habitats on the continental slope between 200-400 meters, larvae is from 200-1800 meters, juvenile EFH is from 700-1800 meters, and adult EFH is defined as 200-1300 meters. Additional information about red crab EFH can be found in Appendix A of the FMP, which is the EFH source document prepared for red crab. Table 1 in that document summarizes the life history and habitat characteristics of red crab for each life stage. Characteristics such as growth, substrate, temperature, salinity, prey and predator species are provided, but some information is unknown about this species.

Since development of the Red Crab FMP, there is some additional information about red crab habitat from the camera sled that Wahle et al. (2004) have developed. The camera images document red crabs scurrying out of burrow-like structures on the ocean floor. The implications of this finding are unclear, however, and additional information is necessary to determine whether this affects the aforementioned EFH designations for red crab. The researchers have also documented that more juvenile crabs live in deeper waters than larger crabs, confirming previous observations that red crabs sizes are segregated by depth (Wigley et al. 1975). In a comparison of surveys conducted in July and again in August 2003 at the same sites, Wahle et al. observed a significant upslope movement of small crabs.

The red crab fishery is entirely a pot/trap fishery, and, as stated in the FMP (Section 8.2.3), pots have relatively little impact on the habitats and communities where they are fished. There is, however, little information regarding the impacts of deep-water pots on benthic habitats. Further, because the fishery is limited to 5 vessels (with only 3 active at present) and a maximum pot limit of 600 per vessel, the impact of the red crab fishery on habitat is minimal.

5.2.1.2 Other Northeast Region Species

The area where the Red Crab fishery takes place is primarily between 400 and 800 meters along the continental shelf from Maine to North Carolina. There are a handful of species in this region that overlap with this fishery. Table 1 in Appendix 1 summarizes the EFH text descriptions for all benthic (demersal) life stages for federally-managed species in the Northeast region. The species with EFH that potentially overlap with the red crab fishery (based on depth) are in bold face. The only species that have benthic EFH defined in waters that potentially overlap with the primary red crab fishing zone (400-800 meters) are halibut, redfish, witch flounder, spiny dogfish, golden crab, and most skate species.

5.2.2 Protected Resources

NMFS most recently considered the effects of the implementation of the Atlantic Deep-Sea Red Crab Fishery Management Plan (Red Crab FMP) on ESA-listed marine mammals, sea turtles, and fish during formal Section 7 consultation initiated on December 14, 2001. A Biological Opinion (Opinion) resulting from this consultation was completed on February 6, 2002, and concluded that the implementation of the Red Crab FMP may adversely affect, but would not jeopardize the continued existence of right whales, humpback whales, fin whales, sei whales, sperm whales, or loggerhead and leatherback sea turtles, nor would it destroy or adversely modify designated right whale critical habitat. An Incidental Take Statement (ITS) for sea turtles was issued along with the Opinion exempting the lethal or non-lethal take of up to one loggerhead and/or one leatherback sea turtle annually. Reasonable and Prudent Measures to minimize the impacts of incidental take were also provided in the ITS (NMFS 2002). Section 8.7.4.6 of the Red Crab FMP concludes that the Red Crab FMP will affect, but is not likely to jeopardize the continued existence of right whales, humpback whales, fin whales, blue whales, sei whales, sperm whales, or leatherback turtles. Furthermore, NMFS has determined that the red crab fishery will not affect the endangered roseate tern, piping plover, loggerhead, ridley, green, and hawksbill sea turtles, shortnose sturgeon or the Gulf of Maine distinct population segment of Atlantic salmon.

The Atlantic Large Whale Take Reduction Plan (ALWTRP) is a program to reduce the risk of serious injury to or mortality of large whales due to incidental entanglement in U.S. commercial fishing gear. The plan is required by the MMPA and has been developed by NMFS. The ALWTRP focuses on the critically endangered North Atlantic right whale, but is also intended to reduce entanglements of endangered humpback and fin whales and to benefit non-endangered minke whales. For the purposes of ALWTRP, the red crab fishery is considered part of the Atlantic Mixed Species Trap/Pot fishery, and takes place primarily in the Offshore Trap/Pot Area. Regulations pertaining to this area, in addition to the universal requirements, include gear marking and weak links, which are designed to reduce injury should an interaction occur. The red crab fishery is considered a Category II fishery under the MMPA, which means occasional incidental interactions and serious injury may occur, however, given the small scale of the fleet and the management measures that restrict the number of traps a vessel may use, interaction with protected species is rare.

There is no new information that reveals effects of this action may affect listed species or critical habitat in a manner or to an extent not previously considered and no new species have been listed or critical habitat designated that may be affected by the red crab fishery.

5.3 Economic and Social Factors

The red crab resource has been commercially exploited since the 1970s. During the 1960s and 1970s, the resource was considered an underutilized species, and several US vessels began experimenting in the early 1970s to develop a deep-sea red crab fishery. Interest in the red crab resource coincided with the introduction of the hydraulic trap hauler and the development of the offshore lobster trap fishery. The directed red crab fishery is entirely a trap fishery that takes place at the edge of the continental shelf, beyond the depths in which almost all other US Atlantic coast fisheries are prosecuted. The fishery has fluctuated widely over the years in terms of the number of vessels pursuing red crab and the annual landings (Figure 13).

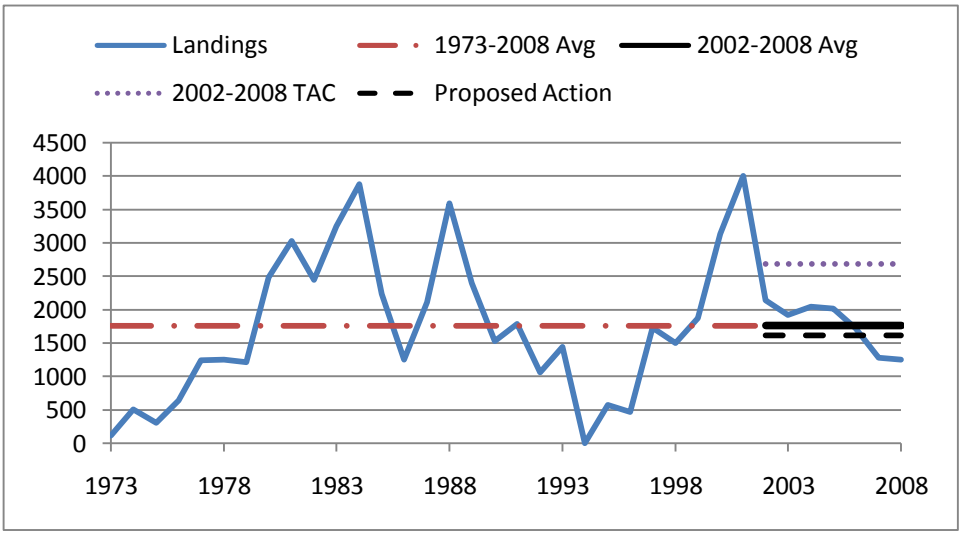

Figure 13- Annual landings of red crab in metric tons, 1973-2008 with average landings for 1973-2008 and average landings for 2002-2008, the TAC for 2002-2008, and the TAC specified in Alternative 1.

Landings in the 1980s and in 2000 and 2001 exceeded current estimates of MSY. Red crab is marketed as picked meat and, until recently, red crab meat competed in an undifferentiated worldwide commodity market for crab meat. Demand and price for red crab was determined by the supply of crab meat from other fisheries and by general economic conditions as they affected demand for restaurant meals and upscale foods like picked crab meat. Landings averaged 3.91 million lb (1,775 mt) from 1973 through 2007. Average landings for different time periods are shown in Table 15.

Table 15- Average landings of red crab in metric tons and million pounds

	Metric Tons	Million Pounds
Average ’73 – ‘07	1,775	3,912,522
Average ’00 – ‘07	2,281	5,027,352
Average ’02 – ‘07	1,853	4,083,277

On March 1, 2000, a control date was established to discourage speculative entry into the fishery while the FMP was under development. During 2000 and 2001, two large catcher-processing vessels entered the red crab fishery and increased landings. The FMP was implemented on October 21, 2002. Five vessels were granted limited access red crab permits, but only four of those vessels have reported landings since 2002.

For the current fishing year, five vessels were once again granted directed red crab permits, and about 1,100 incidental red crab permits were issued. One of the five limited access vessels has opted out of the fishery each year since 2004; allowing the fleet DAS to be equally divided among the four active vessels. Further, in response to the reduced target TAC and DAS implemented by the Emergency Action on April 6, 2009, a second permit has opted out for FY 2009, leaving three active boats.

5.3.1 Update of Commercial Landings and DAS Usage

Because one vessel has opted out of the fishery each year since 2004, the four active vessels received an equal portion of the total 780 fleet DAS allocated (195 DAS per vessel) in each year from 2004 through 2008. Table 17 describes the DAS usage and total landings for the fleet from 2004 to 2008. In recent years, landings have decreased as the result of depressed market conditions. Landings declined from over 5 million lb in 2004 to less than 3 million lb in 2007 and 2008. DAS usage showed the same declining trend, as shown in Figure 1. Table 16 lists both DAS used and DAS charged, by quarter. DAS used are calculated by subtracting the date and time that the vessel left the dock from the date and time that the vessel returned. DAS used are actual time at sea. DAS charged count any portion of a day as a full day. In 2008, 362.2 of the 780 DAS allocated were used, 410 DAS were charged, and approximately 2.762 million lb (1,252 mt), out of the 5.9 million lb (2,688 mt) target TAC, were landed.

In addition to the limited access directed fishery red crab permits, the FMP provided for open-access incidental catch red crab permits that allow a vessel to land 500 lbs of whole red crab per trip. According to the VTR and dealer weighout database, landings by vessels with incidental red crab permits are insignificant.

Table 16- DAS used and charged by quarter and year from 2004-2008.

Qtr	Fishing Year	Used	Charged	Live Wt Lbs
MAM		136	149	
JJA		184	206	
SON		165	187	
DJF		169	186	
	2004	654	728	4,930,204
MAM		91	101	
JJA		110	120	
SON		161	181	
DJF		139	153	
	2005	501	555	4,079,670
MAM		56	62	
JJA		136	150	
SON		246	277	
DJF		189	209	
	2006	626	698	3,841,577
MAM		44	48	
JJA		65	73	
SON		208	232	
DJF		109	121	
	2007	426	474	2,771,501
MAM		34	39	
JJA		81	94	
SON		195	219	
DJF		52	58	
	2008	362	410	2,762,239

Table 17- DAS usage, total landings, and landings per DAS charged 2004-2008.

Fishing Year	Allocated DAS	DAS Charged	Live wt landings (lbs) from weighout database	Total RC landings per DAS charged for the entire fleet
2004	780	728	4,930,204	6,772
2005	780	555	4,079,670	7,351
2006	780	698	3,841,577	5,504
2007	780	474	2,771,501	5,847
2008	780	410	2,762,239	6,737

The total landings and DAS used by quarter and month are described in Table 16 as well as Figure 14 and Figure 15. The average landings per DAS used varies by quarter, apparently as the result of both seasonal catch rates and processing availability. Members of the Red Crab Advisory Panel report that new marketing arrangements require a more stable year-around supply to be processed and distributed fresh to supermarkets. This change in processing and marketing may also require a change in fishing strategy that would change the average catch per DAS and monthly and quarterly distribution of landings. The industry has reported that catch per unit of effort increases in the summer and fall, and that is also when average landings per DAS are highest according to these data. Average landings per DAS are 10,227 lb/DAS on trips in September through November, and drop to 4,697 lb/DAS on trips in December through February. However, further

analysis is needed to evaluate the affects of seasonality on the CPUE of individual vessels by area in this fishery.

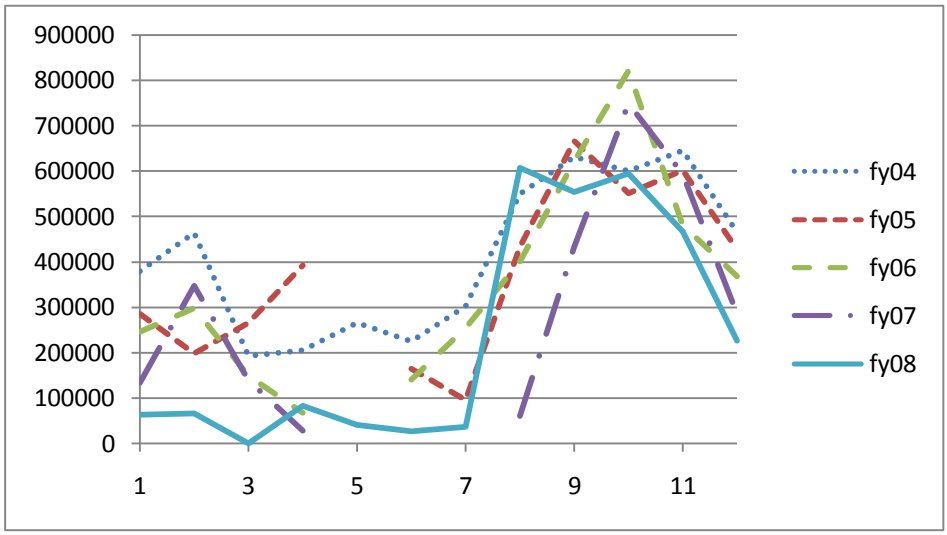

Figure 14- Landings by month for fishing years 2004-2008.

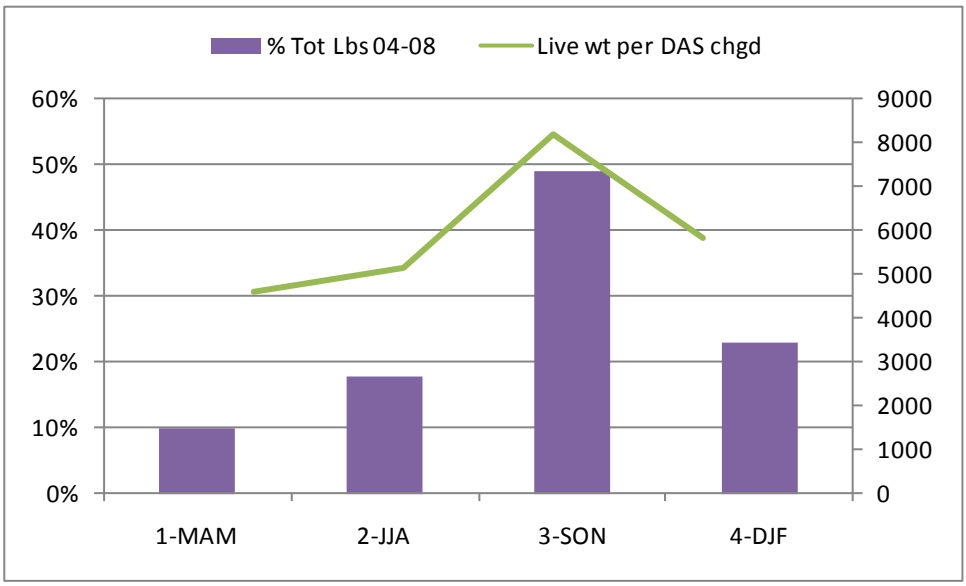

Figure 15- Relative landings by quarter from 2004-2008 (shown in bars), along with the average pounds of red crab landed per DAS charged per quarter (shown in line).

Source: NMFS DAS database and Dealer Weighout database

In addition to reporting to the IVR database, each vessel also submits a VTR to NMFS after each fishing trip. The VTR database is useful to help determine where vessels are generally fishing. Captains are required to fill in a location for each trip. Figure 16 displays the vessel locations for all red crab trips reported to the VTR database from 2002 through October 19, 2009. According to

these data, effort is primarily concentrated along the continental shelf between depths of 200 to 500 fathoms.

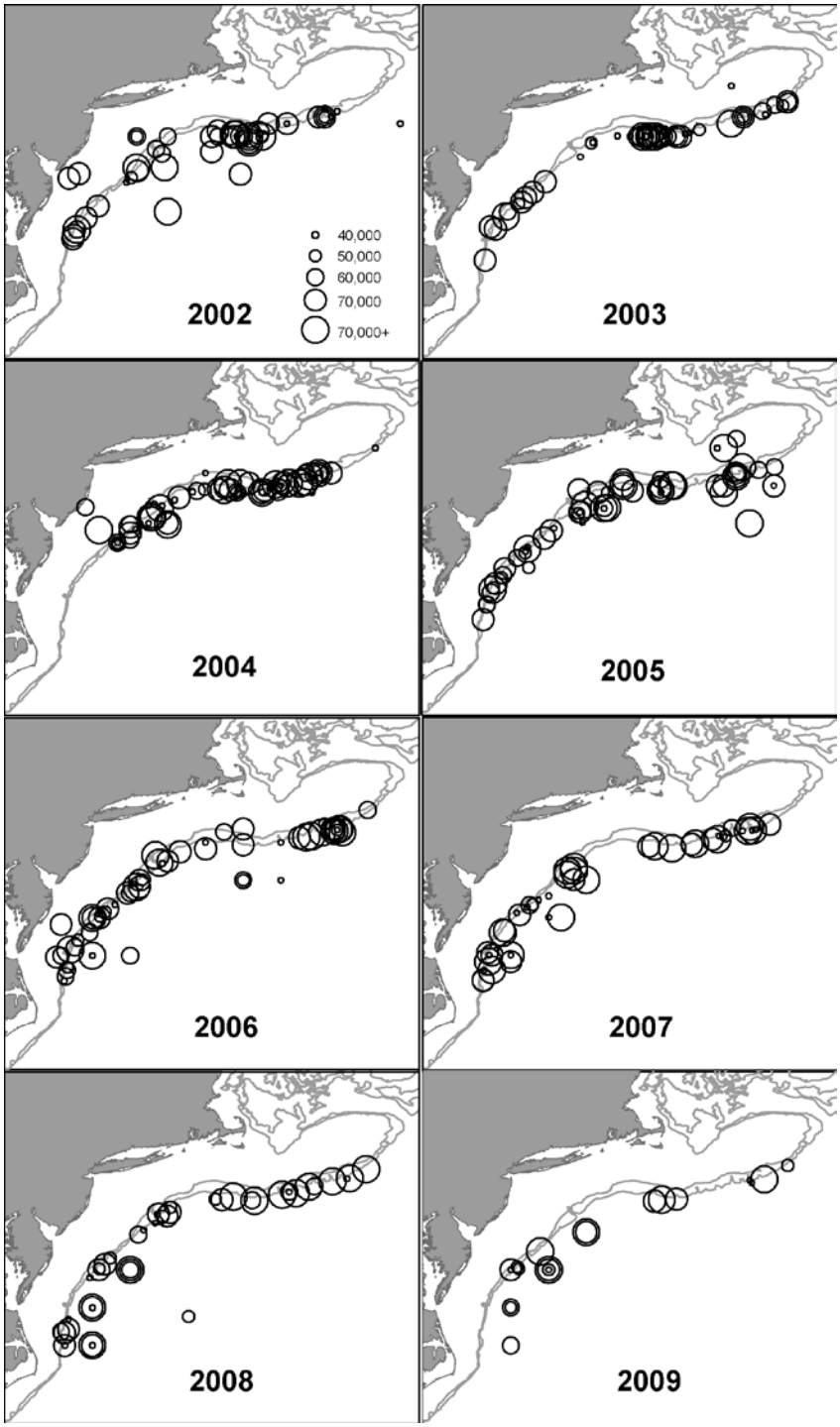

Figure 16- Red crab trip locations reported to the VTR database. Trips greater than 10,000 lb. 2009 data through October 19.

Note: some reported trip locations overlap

5.3.2 Description of the fishery since implementation of the FMP

A report on the social and economic baseline information for the red crab fishery was completed in 2001 during the development of the Red Crab FMP (Appendix B within the FMP). A detailed survey was completed, and the Red Crab Advisory Panel supplied information such as demographics of the fleet, dependence on the fishery, community infrastructure, and crew information. The character of the fishery has not changed significantly since 2002. The most significant changes have been the establishment of a new processing plant in New Bedford in August of 2009 and the retirement of the largest boat and only semi-processing vessel in the red crab fleet, also in 2009.

5.3.2.1 Harvesting Sector

Since implementation of the FMP, four vessels have harvested the total red crab landings. However, in early 2009 one of the four vessels suffered significant mechanical damage and has been retired. The permit for that vessel was subsequently declared out of the fishery because the reduction in target TAC and DAS that was implemented through emergency action in April made it more economical to make those DAS available to fewer vessels rather than putting the permit on another vessel. Although this is a small fishery in terms of the number of vessels that participate, the individuals that are involved in this fishery have a very high dependence on the red crab resource. The handful of vessels that received limited access permits were surveyed during the development of the FMP, and the majority of harvesters reported that revenues from the red crab fishery make up the vast majority of their annual income. Since implementation of the FMP, vessel owners still report red crab as the primary fishery that supports their annual income. In 2008 all of the red crab permits joined together in a harvesting cooperative that allows the permits and boats to be allocated in the most efficient manner. The harvesting cooperative provides for the distribution of profits from the fishery among all of the permitted vessels. Under the terms of the cooperative harvesting agreement, the vessels agree to stop fishing when the target TAC has been landed, regardless of whether they have DAS remaining.

One of the red crab vessels that was involved in the offshore lobster fishery in 2002 was not involved in the red crab fishery in 2008 and 2009, but is intending to fish for red crab again in FY 2010. One vessel has participated in the hagfish fishery, but has no plans to engage in that fishery in FY 2010. Currency exchange rates have not been favorable for hagfish in recent months and the fishery is unlikely to provide a profitable alternative for a boat that freezes at sea in 2010. There have been some changes in terms of vessel replacement, vessel participation, vessel ownership and landing ports since the FMP was adopted.

Six ports were identified in the FMP as primary ports of vessel operations and mooring including: Fall River, Gloucester, and New Bedford, MA; Bristol, ME; and Portsmouth and Tiverton, RI. According to the industry, all limited access vessels landed exclusively in Fall River, MA from 2004 through 2006. During 2007 and 2008, some crabs were landed in Newport News, VA. In August of 2009 a new red crab processing plant opened in New Bedford, MA and all of the active red crab boats are expected to land their catch in New Bedford in the future. The average number of crew per vessel has not changed since implementation of the FMP, and some of the crew members are the same. Advisors report that crew turnover is increasing. Crew income is no

longer attractive enough to keep the same crew on a continuing basis. Most crew in this fleet are from New England, but there are some crew members from Seattle, WA.

The average length of vessels prior to the FMP was 105', ranging from 72' to 150'. Since implementation of the FMP one of the vessels has been replaced and one has been retired, leaving the average length slightly lower at about 98'. During the development of the FMP the fleet reported that on average vessels landed 63,000 lb of red crab per trip and received an average of approximately $42,000 per trip in gross revenue. The weighout data for 2008 indicate that average pounds per trip was 52,732 lb (ignoring trips of less than 1,000 lb). Gross revenues per trip averaged $53,371. Average annual revenue from red crab for the red crab fleet for the years 2004-2008 was $3.44 million. The gear used by the limited access fleet did not change from 2002 through 2008. The vessel that retired in 2009 used a rectangular wooden trap, and the other three vessels use a conical trap. In general, the overall capacity represented by limited access permits is the same as before the FMP was implemented. The major change in capacity since implementation of the FMP is that vessels that were not granted a limited access permit are no longer harvesting red crab in this region. Active capacity in the red crab fishery was initially reduced when one permit was declared out of the fishery in 2004. A second permit was declared out of the fishery in 2009. The remaining active vessels are also limited by the processing capacity of the new processing plant in New Bedford. The fleet and the plant are now focused on maintaining a steady, year-around supply of fresh crab meat to supermarkets, rather than supplying a bulk, frozen, food-service market as was the case between 2002 and 2009. The industry members still involved in the red crab fishery believe that this resource could not have withstood the level of effort working in this region prior to implementation of the FMP. Recent estimates of sustainable yield are substantially lower than the landings that took place in the two years prior to the FMP, which averaged 7.86 million lb (3,566 mt).

Industry reports that fishing costs have increased. The prices for fuel and oil based products have increased dramatically since the FMP was implemented. Fuel prices peaked in 2008 at approximately $4.00 per gallon, but have declined to approximately $2.30 per gallon in 2009. Insurance rates increased by about 50% from 2002 to 2005, but have since stabilized. The price for red crab increased between 2002 and 2005, but has since stabilized at approximately $.95-$1.00 per pound, depending on meat yield.

5.3.2.2 Processing Sector

The processing sector for red crabs was relatively small prior to the FMP, and all crabs were processed at one facility in Nova Scotia, Canada from 2004 through 2007. The Canadian processor sold the picked crab meat to one large restaurant chain. The crab was sold primarily as generic crabmeat and cocktail claws. This processor is also involved in lobster, snow crab, and mussels.

On average, the Canadian processor experienced about a 2% dead loss of the live crabs during transport from Fall River to Nova Scotia. Once the crab were at the plant, about 100 individuals were employed to process the crab; 25-30 individuals killed and butchered the crab, and about 60 more cooked and packed the crab. Since implementation of the FMP, the processor worked with the industry and their clients to reduce costs. For example, they developed a creative way to change the packing of red crab to reduce costs, which enabled the processor to pay the vessels

approximately ten cents more a pound than was previously the case. The demand for red crab meat by the primary buyer has declined in recent years as the result of menu changes and alternative supplies, primarily from the Centolla crab fishery in Chile.

The red crab industry has always been limited by the market. Until recently, red crab meat has competed in an undifferentiated world-wide commodity market for picked crab meat. During the last six years the red crab industry has invested substantial amounts of time and money in an effort to improve the status of red crab in the market and to find new markets.

One result of that effort was the certification of the red crab fishery as sustainable by the Marine Stewardship Council. Red crab is the first fishery on the Atlantic coast of the U.S. to be certified. The red crab industry has also put into operation a new, state-of-the-art crab processing plant in New Bedford, MA. This plant has the potential to improve the quality and quantity of red crab that can be sold into upscale markets. This plant began production in August 2009, and is expected to employ approximately 65 workers when fully operational. The Canadian processor has provided assistance in the development of this additional processing capacity and broader markets. The new processing plant has entered into a marketing contract with a major seafood distributor and red crab are expected to be marketed as fresh crab meat through supermarkets, and will carry the MSC logo, informing consumers that the fishery has been certified as sustainable by the Marine Stewardship Council. The seafood distributor has made a commitment to take all of the red crab that the plant can produce. All of the planning for these improvements took place prior to the promulgation of the Emergency Action that significantly reduced the red crab target total allowable catch on April 6, 2009. Prior to April 6, 2009, the maximum sustainable yield for red crab was set at 6.24 million pounds and the target TAC was 5.928 million lb. This action will maintain the reduced target TAC of 3.56 million pounds that was put in place by the Emergency Action. The proposed target TAC represents a 9% reduction from the average red crab landings from 2002, when the FMP was implemented, through 2008. The proposed TAC is 8% lower than the long-term mean landings from 1973 through 2008.

6.0 ENVIRONMENTAL CONSEQUENCES AND ASSESSMENTS OF THE IMPACTS

Table 18 defines the impact categories and qualifiers that are used in Table 20 to provide a qualitative summary of the direct and indirect impacts of the various alternatives on the valued ecosystem components (VECs) described in Section 5.0 - Affected Environment. The alternative management measures are fully described in Section 4.0 of this document. In summary, all of the alternatives provide specifications for MSY, ABC, OY, and a target TAC. Alternatives also include a fleet DAS allocation, and an allocation of DAS to individual vessels, as described in Section 2.0 above. This section further details the impacts of the alternatives on each of the VECs.

Table 18- Comparison of TAC Options and recent landings.

	2010 Target TAC	Percent Change compared to 2005 landings (4.44 million lb)	Percent Change compared to 2006 landings (3.78 million lb)	Percent Change compared to 2007 landings (2.83 million lb)	Percent Change compared to 2008 landings (3.12 million lb)	Percent Change compared to Average landings 2005-2008 (3.54 million lb)
Alternative 1 - Status Quo (Proposed)						
Status Quo	3,560,466	13 % decrease	7 % decrease	28% increase	49 % increase	9 % increase
Alternative 2 (SSC Recommended)						
SSC ABC	2,830,706	36% decrease	25% decrease	No Change.	9% decrease	20% decrease
Alternative 3 (No Action)						
FMP OY/TAC	5,928,000	34% increase	57% increase	109% increase	90 % increase	67 % increase

6.1 Alternative 1 – Council Proposed Action (Status Quo)

Alternative 1 would continue the management measures that are in place for FY 2009, as implemented by the Emergency Action that became effective on April 6, 2009. These include an MSY of 3.75 million lb (1,700 mt), a target TAC at 3.56 million lb (1,615 mt), and 582 DAS for the fleet.

6.1.1 Impacts to the Red Crab Stock

The MSY and target TAC were chosen for the Emergency Action to be precautionary, based on a determination by the DPSWG that catches in the range of 3.75 to 4.19 million pounds (1,700 to 1900 mt) were sustainable. The environmental assessment that was completed in conjunction with the Emergency Action concluded that no negative impact on the resource would be expected in FY 2009 with a target TAC of 3.56 million lb (1,615 mt), provided there were no major unforeseen environmental changes that cause the red crab resource to dramatically decrease or increase. Since that time, the Council's SSC has recommended a lower ABC, but has also agreed that "the exploitation history of the resource appears to be sustainable." The DPSWG recommended "a catch limit that mimics both recent and long term mean landings…" The proposed target TAC represents a 9% reduction from the average red crab landings from 2002, when the FMP was implemented, through 2008. The proposed target TAC is 8% lower than the long-term mean landings from 1973 through 2008.

The impacts to the red crab stock that would result from Alternative 1 are likely to be negligible because the target TAC is below the level of historical landings that were determined to be sustainable. The DCAC model that was favored by the DPSWG Review Panel can be expected to produce sustainable yield estimates that are 50-75% of MSY, making it highly unlikely that the target TAC specified in Alternative 1 would produce negative impacts on the stock.

6.1.2 Impacts to Bycatch/Non-target Species, Habitat, Protected Resources

6.1.2.1 Impacts to Bycatch/Non-target Species

As discussed in Section 4.1.2.2, there is little, if any, bycatch of other species in the red crab fishery. As a result, the Alternative 1 would have negligible impacts on the amount of bycatch or non-target species caught.

6.1.2.2 Impacts to Habitat (including EFH)

Red crab fishing activity occurs in a limited area and narrow depth range (400 to 800 meters) along the continental slope of the United States, from the southern flank of Georges Bank south to Cape Hatteras, North Carolina. The range of this activity occurs across designated EFH for a number of species managed by the New England, Mid-Atlantic, or the South Atlantic Fishery Management Councils. The list of species with EFH that potentially overlap with the red crab are halibut, redfish, witch flounder, spiny dogfish, golden crab, white hake, whiting, tilefish, monkfish, offshore hake, red hake and most skate species.

As described above in Section 4.3.1.1, there is relatively low impact on habitat in pot fisheries. There are little data regarding the impacts that deep-sea pots have on their environment.

This alternative proposes the same specifications for FY 2010 that are currently in place. All other measures under the FMP would remain in effect, except the requirement to notify NMFS at least six months prior to the start of the fishing year if declaring a vessel out of that fishing year. The EFH Assessment in the Red Crab FMP/EIS determined that there are no adverse impacts to the EFH of any species in the region 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 any known adverse impacts on EFH), and (3) the number of pots per vessel is limited.

This alternative further reduces overall fishing opportunity in the region, and habitat impacts generated from this alternative are minor and no more than temporary in nature. As such, there is no need to implement management measures to minimize the impacts from the red crab fishery on EFH because the alternatives reduce fishing effort and result in a negligible effect on essential fish habitat compared to baseline conditions (i.e., the specifications evaluated in the FMP).

6.1.2.3 Impacts to Protected Resources

As stated in the FMP (Section 8.7; NEFMC 2002), the primary geographic area affected by the red crab fishery includes Northeast and Mid-Atlantic waters, and while the red crab pots are very similar to those used in the lobster fishery, the red crab fishery is limited to the narrow shelf edge habitat. There are several species that are protected under the ESA and the MMPA in the area of the red crab fishery. However, because of small size and scope of the fishery and regulatory limits on the number of pots allowed per vessel, the red crab fishery is not expected to adversely affect those populations in any way.

The biological impacts on protected species are not expected to change as a result of this action, since Alternative 1 recommends a significantly reduced target TAC as compared to the specifications in the FMP. The impacts to protected resources from implementing any of these alternatives would be negligible.

6.1.3 Impacts to Human Communities

This alternative would provide approximately $730,000 of additional potential revenue to the red crab fleet compared to Alternative 2 and approximately $3.1 million less revenue than Alternative

3, the No Action alternative. The current target TAC that would be maintained by this alternative is greater than the average of the past four years' landings, two of which were higher and two lower. For the past two years, the fleet has landed less than the target TAC that would result from this alternative. Whereas a limited market has been responsible for the shortfall in landings compared to the target TAC, red crab vessel owners have invested heavily in a new processing plant in New Bedford, MA and have developed new marketing outlets.

The impacts to human communities from this alternative depend on the relationship between the estimated sustainable yield from the resource and the true sustainable yield, which can't be known with certainty and may be influenced by unpredictable changes in the environment. This alternative would allow some expansion in landings compared to 2007 and 2008 and would be somewhat less than the landings in 2005 and 2006. Effective management will provide positive long-term impacts. The action's potential social and economic impacts are expected to be negligible in the short term and positive in the long term.

6.2 Alternative 2 (SSC Recommended)

Alternative 2 would set MSY at 3.75 – 4.19 million lb (1,700 – 1,900 mt); OY at 95% of MSY (3.56 – 3.98 million lb; 1,615 – 1,805 mt); ABC and the target TAC at 2.83 million lb (1,284 mt). Alternative 2 sets the fleet DAS allocation at 464, based on an average fleet catch per DAS charged of 6,106 lb for FY 2006 – 2008.

6.2.1 Impacts to the Red Crab Stock

The 2.83 million lb (1,284 mt) target TAC proposed in Alternative 2 would represent a 20% reduction in landings compared to the average landings from 2005-2008, and a 27% reduction from the average red crab landings since 2002, when the FMP was implemented. The implementation of Alternative 2 would likely be expected to result in positive impacts to the red crab resource by reducing landings, since a reduction in fishing would generally be expected to lead to an increase in stock biomass. However, the impact of the reduction in the target TAC and average landings on the red crab resource are uncertain because there is uncertainty concerning the stock-recruitment relationship.

6.2.2 Impacts to Bycatch/Non-target Species, Habitat (including EFH), Protected Resources

The impacts of this alternative on bycatch/non-target species, habitat, and protected resources are expected to be essentially the same as those that have been discussed in the Environmental Assessment that accompanied the Emergency Action, and are negligible.

6.2.3 Impacts to Human Communities

For the 2009 fishing year, two permits were declared out of the fishery and three of the five permitted vessels were allocated DAS. The loss in revenue to the red crab fleet from Alternative 2 compared to the no action alternative would potentially be approximately $3.1 million from the reduced red crab catch. Potential losses from alternative fisheries that may result from the need to readjust vessel time among fisheries are uncertain. The loss in revenue to the red crab fleet from

this alternative compared to the status quo alternative would potentially be approximately $730,000. The comparable dollar loss to the red crab processing plant are not known because the operating margin of the plant is not known. The product flow available to the processing plant would be approximately 20% less than the status quo alternative.

Section 4.2.1 provides information on recent and historical landings. Figure 13 in Section 4.2.1 illustrates the relationship between the TAC specified in Alternative 2 and recent and historical landings.

This alternative might require red crab harvesters to change the allocation of vessel time to the various fisheries for which they are permitted. Although the fleet has averaged fewer than 550 DAS per fishing year, that average includes part-time red crab vessels that nevertheless take red crab DAS out of production. If a part-time vessel uses all of its red crab DAS, and must give up participation in another fishery to do so, the income from those DAS could be lost to the fleet because they may not be made up by another vessel.

This alternative would reduce the target TAC and corresponding DAS allocation, and would reduce revenue and thus may have negative impacts on fishing vessel owners, captains, and crews, and on processing workers and businesses that supply services to the red crab industry.

6.3 Alternative 3 (No Action)

Alternative 3 would cause the suite of management measures to revert to those adopted by the FMP. Alternative 3 would result in an MSY of 6.24 million lb (2,830 mt), an OY (95% of MSY) and target TAC of 5.928 million lb (2,688 mt), and a fleet-wide DAS allocation of 780 DAS.

6.3.1 Impacts to the Red Crab Stock

This alternative would allow the red crab fleet to harvest more crabs than the best available science recommends, and could potentially have a negative impact on the long-term sustainability of the resource. The red crab fleet operates under a cooperative harvesting agreement that provides a degree of centralized control over fleet operations. The red crab fishery must also undergo periodic reviews and re-assessments in order to maintain MSC certification. For these reasons it is likely that the fleet would constrain the harvest below the target TAC that would result from this alternative. However, there is no in-season authority granted to the Regional Administrator that would ensure that the target TAC is not exceeded. Therefore, this alternative could have a negative impact on the resource by allowing fishing at an unsustainable and scientifically unsound level.

6.3.2 Impacts to Bycatch/Non-target Species, Habitat, Protected Resources

The impacts of this alternative on bycatch/non-target species, habitat, and protected resources are expected to be essentially the same as those that have been discussed in the FMP, and in subsequent actions and assessments. Therefore, impacts to bycatch/non-target species, habitat, including EFH, and protected resources as a result of the implementation of the No Action Alternative would be negligible.

6.3.3 Impacts to Human Communities

The MSY prescribed by this alternative would allow for approximately $3.1 million more potential revenue for the red crab fleet in the short-term compared to Alternative 2, and approximately $2.4 million more revenue compared to Alternative 1, the status quo. Alternative 3 could create potentially negative long-term economic effects due to overexploitation, given the estimates of MSY provided by the DPSWG Peer Review Panel. This alternative would create the potential for increased revenue (positive impact) in the short-term, but would have potentially long-term negative impacts if this level of landings proved unsustainable.

The following definitions and qualifiers are used in the narratives and tables of this EA:

Table 19- Impact category definitions and qualifiers.

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible (NEGL)**
Habitat	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
Target Species, Non-Target Species, Bycatch, Protected Resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impact on stocks/populations
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:	
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
Likely	Some degree of uncertainty associated with the impact
ND	Impacts could not be determined at time of this writing

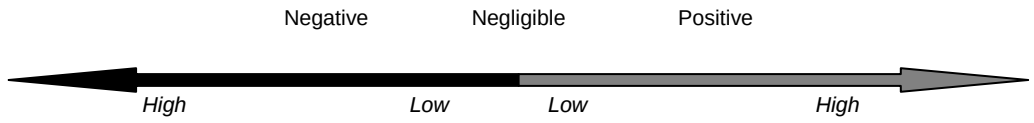

Table 20- Qualitative summary of the expected impacts of various alternatives for the red crab action.

Action Alternatives		Valued Ecosystem Component (VEC)				
		Managed Resource (Red Crab)	**Non-target/Bycatch Species**	**Habitat (including EFH)**	**Protected Resources**	**Human Communities**
Alternative 1 Council Proposed (Status Quo)		**Neglible**	**Negligible**	**Negligible**	**Negligible**	**Short-term: Negligible Long-term: Positive**
	MSY= 1700mt (3.75 Mill lb) **ABC=** N/A **Target TAC=**1615mt (3.56 mill lb) **DAS‡=** 582	Both the Data Poor Stocks Working Group and the SSC found that the exploitation history of the resource appears to be sustainable with average landings higher than the target TAC proposed in Alternative 1.	The catch rate of non-target and bycatch species is very low. The lower target TAC compared to that specified in the FMP would result in lower impacts than those analyzed in the FMP.	Data on the impacts of deep-sea pots on the environment are scarce.	Interactions with protected species are already very low and this level of fishing is expected to have no measurable impact on the probability that an interaction might occur.	This alternative would allow some expansion in landings compared to 2007 and 2008 and would be somewhat less than the landings in 2005 and 2006. Effective management will provide positive long-term impacts.
Alternative 2		**Likely Positive**	**Negligible**	**Negligible**	**Negligible**	**Negative**
	MSY= 1700-1900mt (3.75 - 4.19 million lb) **ABC** = 1284 mt **Target TAC** = 1284mt (2.83 million lb) **DAS*** = 464	The impact from the reduced target TAC would normally be positive but is uncertain in the case of red crab because the stock-recruitment relationship is unknown.	The catch rate of non-target and bycatch species is very low. The lower target TAC compared to that specified in the FMP would result in lower impacts than those analyzed in the FMP.	There is little data regarding impacts of deep-sea pots on the environment. Gear impacts on habitat are not known to be adverse. Impacts would be lower than those analyzed in the FMP.	Interactions with protected species are already very low. The reduced target TAC and DAS allocation would likely result in fewer opportunities to interact with protected species.	The target TAC in this alternative is 27% below the average landings for 2004-2008 and would result in loss of revenue for boat owners, crew, processing workers, and associated businesses compared to either the no action or status quo alternatives.
Alternative 3 (No Action)		**Negative**	**Negligible**	**Negligible**	**Negligible**	**Short-term: Positive Long-term: Negative**
	MSY= 2830mt (6.24 mill lb) **ABC=** N/A **Target TAC=** 2689mt (5.928 mill lb) **DAS†** = 780	These specifications were rejected as unreliable and possibly detrimental to the stock.	This alternative would revert to the specifications that were analyzed in the FMP, and are considered very low.	This alternative would revert to the specifications that were analyzed in the FMP, and are considered very low.	This alternative would revert to the specifications that were analyzed in the FMP, and are considered very low.	This alternative would create the potential for more revenue in the short-term but would have potentially negative long-term results if the MSY and Target TAC levels lead to overexploitation.

* Based on updated average catch per charged DAS for 2006-2008 (6106 lb / DAS)
† Based on original average catch per DAS from FMP (7,600 lb / DAS)
‡ Based on average catch per DAS used in Emergency Action published April 6, 2009 (6,100 lb / DAS)

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6.4 Cumulative Effects Analysis

The need for a cumulative effects analysis (CEA) is referenced in the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Part 1508.25). CEQ regulations define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action." The purpose of a CEA is to consider the effects of the proposed action and the combined effects of many other actions on the human environment 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. The CEA Baseline in this case consists of combined effects of Alternative 1, past, present, and reasonably foreseeable fishing and non-fishing actions which are described in Sections 6.4.1 through 6.4.4.

This CEA assesses the combined impact of the direct and indirect effects of the Alternatives with the impact from the past, present, and reasonably foreseeable future actions as well as factors external to the red crab fishery that affect the physical, biological, and socioeconomic resource components of the red crab environment. The analysis is focused on the VECs (see below) and compares the impacts of fishing under the Alternatives with the impacts of fishing under the No Action Alternative. The cumulative impacts of the management plan, according to the principles of CEA from CEQ were previously assessed in the EIS associated with the FMP (Section 12.10.7.2 of the FMP/EIS). Several fishery actions have been implemented in this region since the FMP was implemented, but most do not have cumulative impacts on this resource. The monkfish FMP had the effect of reducing directed monkfish fishing in areas where red crab might be a significant bycatch. Amendment 1 to the tilefish FMP will reduce mobile gear fishing in red crab habitat. The monkfish, herring, and lobster FMPs have all implemented new restrictions on entry and fishing effort since the red crab FMP was implemented in 2002. All of these restrictions serve to reduce the flexibility of red crab vessels that were qualified to fish in these fisheries at the time when the red crab plan was implemented. The most significant action that has cumulative impacts on the red crab fishery is the Emergency Action that was implemented on April 6, 2009 to reduce the MSY, OY, target TAC, and DAS.

6.4.1 Valued Ecosystem Components (VECs):

The cumulative effects analysis focuses on the VECs:

- Target Species (Red crab);
- Non-Target and Bycatch species;
- Habitat (including EFH);
- Protected resources/Endangered species; and
- Human communities.

6.4.1.1 Temporal and Geographic Scope of the Analysis:

In terms of past actions for fisheries, habitat and economic and social impacts, the temporal scope of this analysis is primarily focused on actions that have taken place since implementation of the

Red Crab FMP in 2002. For endangered and other 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. In terms of future actions, the analysis examines the period between implementation of this action (expected implementation date of March 1, 2010) until the next amendment to the red crab FMP is prepared by the New England Fisheries Management Council (expected for March 1, 2011.) The geographic scope of the analysis of impacts to fish species and habitat for this action is the range of the red crab resource in the Western Atlantic Ocean, as described in the Affected Environment and Environmental Consequences sections of the document (Sections 5.0 and 6.0). For endangered and protected species the geographic range is the total range of each species. The geographic range for the human environment is defined as those fishing communities bordering the range of the red crab fishery (Section 4.5) from the southern flank of Georges Bank south to Cape Hatteras, North Carolina.

6.4.2 Fishing Impacts: Past, Present and Reasonable Foreseeable Future Actions

6.4.2.1 Red Crab

Since the FMP, there have been two specification packages for FY 2004 and FY 2005, as well as the implementation of Framework Adjustment 1 (FW 1) in 2005, and an Emergency Action on April 6, 2009. FW 1 allowed specifications to be set for up to 3 years at a time, and maintained the target TAC of 5.93 million lb and 780 fleet DAS for FY 2006 and FY 2007. These target TAC and DAS allocations were consistent with the specifications allowed in FY 2004 and 2005, as well as in the FMP. Because no specifications were set for FY 2008, the specifications defaulted to what was written in the FMP, which have been in place since its implementation in 2002. The Emergency Action reduced the target TAC to 3.56 million lb and the fleet DAS to 582. It is unclear what the impacts of the FMP, the specifications packages, FW1 and the Emergency Action have had on the resource, other than eliminating the potential for the continuation of high landings that occurred with unregulated fishing effort in 2000 and 2001. Whereas the FMP and the Emergency Action first capped and then reduced fishing effort and landings, it is likely that they have had a positive effect on the resource.

Only a handful of fisheries occur in deep waters that potentially overlap with the red crab fishery, specifically tilefish, monkfish, and offshore lobster fisheries. All of these fisheries are under management plans that assess the impacts of that fishery on the red crab resource for red crab. As explained in the FMP (Section 6.6, NEFMC 2002), “due to the offshore, deep water nature of the fishery, there are very few known interactions between the fishery and other fisheries. This also results in very few interactions expected between this FMP and other fisheries, with the exception of the specific cases identified above. None of these interactions, however, are expected to be significant.”

One action that may impact the red crab resource is Tilefish Amendment 1. This Amendment changed the management of the Tilefish FMP into an Individual Transferable Quota (ITQ) system. Only a handful of vessels qualified for this ITQ, and this system of management is intended to result in a more efficient fleet; therefore, incidental catch of red crab by this fishery, which is minimal to non-existent, is not expected to increase. Tilefish Amendment 1 also prohibited

mobile gear fishing in certain tilefish EFH, which overlaps with red crab habitat. A reduction in mobile gear fishing in red crab habitat should reduce red crab bycatch.

6.4.2.2 Non-Target/Bycatch Species

As discussed previously, the FMP explains that initial reports from industry members indicate that there is very little, if any, bycatch of other species in the directed red crab fishery. According to the 2004 SAFE report, the only species reported to the VTR database as bycatch by the limited access red crab fleet are red crab, and on rare occasion, lobster and blue crab. Tallack (2007) provides a more quantitative, if still limited, assessment of bycatch in the red crab fishery.

Since the catch of non-target and bycatch species is already very low in the red crab fishery, past, present and reasonably foreseeable future fishing actions likely have had minimal (if any) impact on any other species.

6.4.2.3 Habitat

When the draft Omnibus Amendment is finalized, it is expected to update, identify, and delineate information on the EFH for red crab. The Omnibus Amendment recommends few, minor adjustments to red crab EFH. No past, present or reasonably foreseeable future fishing action has had or is expected to have a significant impact on red crab habitat.

6.4.2.4 Protected Resources

Because this fishery relies on pots to which buoys are attached by lines in the water, there may be some interactions with protected resources, particularly whales, sea turtles, and other marine mammals. Those interactions have been determined to be minimal primarily due to the small scale of the fishery and strict limits on the number of pots allowed. In addition, ALWTRP regulations pertaining to this area include gear marking and weak links, which are designed to reduce injury should an interaction occur.

6.4.2.5 Social/Economic Impacts to Human Communities

On April 6, 2009, NMFS promulgated an Emergency Action that reduced the target TAC and DAS allocations for the vessels involved in the red crab fishery. The reduction in the target TAC and DAS required individuals who depend on the red crab fishery to adjust their expectations and plans that were based on the previous specifications. Although the annual landings have not approached the annual target TAC set for FY 2007 and 2008, the decline in landings in these two years relative to the previous eight years was caused by a reduction in the order placed by the single buyer of red crab products, not necessarily due to a decline in either harvest efficiency or crab availability. Because market demand has increased this year, the specifications that were put in place by the Emergency Action are now affecting the potential for the red crab industry to take full advantage of the marketing opportunities provided by MSC certification, which was awarded in September 2009. In addition, the red crab industry has made a substantial investment in processing capacity and marketing arrangements that were expected to allow for increased landings in future years.

All of the alternatives retain the DAS control that was incorporated into the original FMP and continued under the Emergency Action. There are some underlying safety concerns about days-at-sea management that become more troublesome when the market will take the entire target TAC, making it more likely that the allocated DAS will prove insufficient to harvest the entire target TAC. Potential problems with DAS management have been raised by the red crab industry, but it is not possible to change the current DAS management system through the specifications setting process. These concerns will be considered in Amendment 3 to the red crab FMP, which is currently under development and expected to be implemented in 2011.

Amendment 3 will develop annual catch limits and accountability measures as required by the MSA. Amendment 3 will also consider potential modifications to management measures for the purpose of improving the sustainability of the fishery and responding to current conditions in the fishery.

6.4.3 Direct and Indirect Impacts of Alternative 1 on Red Crab

As discussed in Section 6.1, Alternative 1 is expected to have negligible impact on the red crab stock, and negligible impacts on bycatch/non-target species, protected resources, and habitat, including EFH. There is expected to be a negligible short-term impact on the human community and a positive long-term impact as a result of effective management of the red crab fishery.

6.4.4 Non-Fishing Impacts: Past, Present, and Reasonably Foreseeable Future Actions on Red Crab

In Section 8.2.3 of the Red Crab FMP, the primary threats to the chemical, physical, and biological ecosystem of the red crab resource were described. In summary there are several chemical threats identified to have detrimental impacts on offshore habitats including release of oil, heavy metals, pesticides, and excessive amounts of suspended particles in the water column. Biological threats include invasion of non-indigenous species, increased levels of nutrients, and pathogens that could cause shell disease. Several physical threats identified in the FMP are sand and gravel mining, oil exploration, offshore discharging, and disposal of dredged materials. Despite all these threats to offshore habitats, red crab live in areas where the water is very deep, so there are very few, if any direct impacts to the red crab resource. The only non-fishing activities identified in the FMP as having potential significant concerns are offshore oil and mineral exploration, the installation of fiber optic and electrical cables, and the potential release of toxic chemicals from any activities described above. At this time, there are no known proposals for any of these activities. Individually, any one of these types of projects may not have a significant effect, but there may be cumulative effects to the red crab resource if multiple projects are approved.

6.4.5 Summary of Cumulative Effects

There are no significant cumulative impacts of fishery actions on the red crab resource, non-target/bycatch species, habitat/EFH, protected resources, or human communities that have occurred since the FMP was implemented, or are expected in the reasonably foreseeable future. Alternative 1 would have negligible to positive impacts on the physical and biological environment, and on human communities. No significant cumulative effects are expected from

non-fishing actions due to the remote habitat and the lack of proposed projects (e.g., offshore oil and mineral exploration, the installation of fiber optic and electrical cables) in the area of the red crab resource. The sum of the effects from implementation of Alternative 1 and other fishing and non-fishing actions is expected to be negligible for red crab stock, non-target/bycatch, habitat/EFH, protected resources, and for human communities in the short-term. The sum of the long-term effects from implementation of Alternative 1 is expected to be positive for human communities in the long-term through the maintenance of a sustainable resource that is expected to provide a reliable source of future income.

7.0 APPLICABLE LAWS

7.1 NEPA

7.1.1 Finding of No Significant Impact

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6) (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. '1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1. Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?

Alternative 1 is not expected to jeopardize the sustainability of the target species affected by this action – red crab. The intent of this action is to maintain the reduced total amount of red crab that may be harvested. The specifications recommended by Alternative 1 are expected to maintain a sustainable resource. The impacts of Alternative 1 on the red crab resource are discussed in Section 6.1 of this document. In addition, the Red Crab FMP/EIS contains additional assessment information on days-at-sea limits (Section 5.3.8 of the FMP/EIS).

2. Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?

Alternative 1 is not expected to jeopardize the sustainability of any non-target species. The red crab fishery is a single species fishery that does not have significant bycatch levels of non-target species (Section 6.1.2 of this document and Section 5.1.3 of the Red Crab FMP/EIS). Since this action maintains the reduced fishing level that was implemented through emergency action, the expected impacts on non-target species are expected to be reduced compared to levels that existed prior to the Emergency Action.

3. Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Fishery Conservation and Management Act and identified in FMPs?

Impacts of this action on ocean and coastal habitats and/or EFH were assessed in Section 6.1.2.2 of this document. Section 5.0 of the Red Crab FMP/EIS assessed the overall impacts of this management plan on EFH and those impacts apply to this action as well. This action is not expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Fishery Conservation and Management Act and identified in the FMP. In general, this fishery takes place in very deep waters of the continental shelf, which do not overlap with a significant number of EFH designations for the regions. Furthermore, pots are the only gear type utilized to harvest red crab by the limited access fleet, and this gear type has no known adverse impacts on EFH.

4. Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

This action is not expected to have substantial adverse impacts on public health. Alternative 1 is the same as the status quo alternative and, therefore, will have no additional impacts on safety-at-sea.

5. Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Impacts of this action on endangered and threatened species and marine mammals were assessed in Section 6.1.2.3 of this document. In addition, the overall impacts of the red crab fishery on endangered and threatened species and marine mammals were assessed in Section 5.0 of the FMP/EIS for each management measure. Section 5.3.10.6 of the FMP/EIS explains that the DAS limits under the FMP will not likely increase the existing entanglement threat to endangered species, and the same applies for this action, which reduces the DAS limits from the FMP. The activities to be conducted under Alternative 1 are within the scope of the FMP and do not change the basis for the determinations made in previous consultations.

6. Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships)?

Alternative 1 is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area, due to the lack of effects on habitat and non-target species. There is insufficient information available on the ecosystem function of the red crab resource, and how it impacts other aspects of the environment. There is little indication that red crab constitutes a major prey item for any species in the region (Steimle et al., 2001). Red crabs are most likely opportunistic omnivores due to the limited availability of food at the water depths where red crabs live (Gray, 1969). Alternative 1 is likely to continue to ensure biodiversity and ecosystem stability over the long-term.

7. Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

The EA documents that no significant natural or physical effects will result from implementation of Alternative 1 (Section 6.4.5). Alternative 1 is designed to maintain sustainable population of red crab. Negligible to positive impacts to the physical and biological environment are expected

as a result of this action. The action's potential social and economic impacts are expected to be negligible in the short term and positive in the long term, as discussed in the EA (see Sections 6.1.3 and 6.4.2.5) and in the Executive Order 12866 review (Section 7.10).

8. To what degree are the effects on the quality of human environment expected to be highly controversial?

The effects of Alternative 1 are not expected to be highly controversial. While there may be some disagreement with the proposed target TAC, the action of setting specifications itself, and the estimated effects of those specifications, are not controversial.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

This action merely addresses the target TAC and DAS allocation for red crab. This fishery is not known to be prosecuted in any unique areas such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. Therefore, Alternative 1 is not expected to have a substantial impact on any of these areas.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The impacts of Alternative 1 on the human environment are described in Section 6.0 of the EA. This action merely addresses the target TAC and DAS allocation for red crab. Alternative 1 is not expected to significantly alter fishing methods or activities. The measures contained in this action are not expected to have highly uncertain, unique, or unknown risks on the human environment.

11. Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Alternative 1, together with past and future actions, is not expected to result in significant cumulative impacts on the biological, and physical components of the environment or on human communities.

12. Is the proposed action likely 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?

This action merely addresses the target TAC and DAS allocation for red crab. This fishery is not known to be prosecuted in any areas that might affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause the loss or destruction of significant scientific, cultural or historical resources. Therefore, Alternative 1 is not expected to affect on any of these areas.

13. Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

This action merely addresses the target TAC and DAS allocation for red crab. There is no evidence or indication that this fishery has ever resulted in the introduction or spread of non-indigenous species. Alternative 1 is not expected to significantly alter fishing methods or activities. Therefore, it is highly unlikely that Alternative 1 would be expected to result in the introduction or spread of a non-indigenous species.

14. Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

This action addresses the target TAC and DAS allocation for red crab. Alternative 1 is not expected to significantly alter fishing methods. When new stock assessment or other biological information about these species becomes available in the future, then the specifications may be adjusted according to the overfishing definitions contained in the FMP and the National Standard 1 Guidelines. Alternative 1 is not likely to result in significant effects, nor does it represent a decision in principle about a future consideration.

15. Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

This action merely addresses the target TAC and DAS allocation for red crab. Alternative 1 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.

16. Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

The impacts of Alternative 1 on the biological, physical, and human environment are described in Section 6.0. The cumulative effects of Alternative 1 on target and non-target species are detailed in Section 6.4. Alternative 1 is not expected to have substantial effect on either the target or any non-target species.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment, it is hereby determined that the proposed actions in this specification package will not significantly impact the quality of the human environment as described above and in the 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.

Pat Kurkul — April 7, 2010

Regional Administrator, Northeast Region, NMFS — Date

7.2 Marine Mammal Protection Act

The Agency has reviewed the impacts of the action on marine mammals and has concluded that the management actions are consistent with the provisions of the MMPA, and will not alter existing measures to protect the species likely to inhabit the red crab management unit. For further information on the potential impacts of the fishery and the proposed management action on marine mammals, see Section 5.4 of this document.

7.3 Endangered Species Act

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 Agency has concluded, using information available at this writing, that the action for the red crab fishery is not likely to jeopardize any ESA-listed species or alter or modify any critical habitat, based on the discussion of impacts in this document (Section 6.1.2-6.1.2.3).

7.4 Coastal Zone Management Act

Section 307(c)(1) of the Coastal Zone Management Act (CZMA) of 1972, as amended, 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. The CZMA provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals. The Council has developed this amendment document and will submit it to NMFS; NMFS must determine whether this action is consistent to the maximum extent practicable with the CZM programs for each state (Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina). Letters documenting NMFS' determination will be sent to the coastal zone management program offices of each state.

7.5 Administrative Procedure Act

Section 553 of the 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. At this time, the NEFMC is not requesting any abridgement of the rulemaking process for this action.

7.6 Data Quality Act

Utility of Information Product

This action includes: A description of the proposed specifications, description of the alternatives considered, and the reasons for selecting the management measures. This action would implement an MSY based on the best available science, a target TAC, and DAS allocations for red crab fishery in FY 2010. This action implements the FMP's conservation and management goals consistent with the Magnuson-Stevens Act as well as all other existing applicable laws.

The Federal Register notice that announces the rule and the implementing regulations will be made available in printed publication and on the website for the Northeast Regional Office. The notice provides 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.)

Objectivity of Information Product

The category of information product that applies for this product is "Natural Resource Plans."

In preparing this revision of the target TAC and DAS allocation, 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 Agency has determined that these specifications are consistent with the National Standards of the Magnuson-Stevens Act and all other applicable laws.

This information product uses information of known quality from sources acceptable to the relevant scientific and technical communities. Stock status indicators (including estimates of biomass and fishing mortality) reported in this product are based on either assessments subject to peer-review through the Stock Assessment Review Committee or on an update of those assessments prepared by scientists of the Northeast Fisheries Science Center. The updated assessment was reviewed by the DPSWG and included participation by independent stock assessment scientists. Landing and revenue information is based on information collected through the Vessel Trip Report and Commercial Dealer databases. In addition to these sources, additional information is presented that has been accepted and published in peer reviewed journals or by scientific organizations. Original analyses in this document were prepared using data from accepted sources, and the analyses have been reviewed by members of the Groundfish Plan Development Team.

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 2008. 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 revenue produced by the sale of those landings to dealers, and the number of DAS used by those vessels. Specialists (including professional members of plan development teams, 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 choices are clearly articulated, in sections 4.0 of this document, as

the management alternatives considered in this action. The supporting science and analyses, upon which the policy choices are based, are summarized and described in section 5.0 of this document. 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, the Northeast Fisheries Science Center, the Northeast Regional Office, and NOAA Fisheries Service Headquarters. The Center'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 the Regional Office 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 document 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.

7.7 Paperwork Reduction Act

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 this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

7.8 Impacts Relative to Federalism/E.O. 13132

This action does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order (EO) 13132.

7.9 Environmental Justice/E.O. 12898

This EO provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." EO 12898 directs each Federal agency to analyze the environmental effects, including human health, economic, and social effects of Federal actions on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA. Agencies are further directed to "identify potential effects and mitigation measures in consultation with affected communities, and improve the accessibility of meetings, crucial documents, and notices."

The action is not expected to affect participation in the red crab fishery because it will maintain the current target TAC and DAS allocation. Fishing activity relative to the current fishing levels in this fishery will not be affected by this action. No economic or social effects are expected (section 6.0). This action is not expected to cause disproportionately high and adverse human

health, environmental or economic effects on minority populations, low-income populations, or Indian tribes.

7.10 Regulatory Flexibility Act/E.O. 12866

7.10.1 Regulatory Impact Review

7.10.1.1 Background

In compliance with Executive Order (E.O.) 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. E.O. 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 E.O. 12866. An RIR also serves as the basis for assessing whether or not 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.

The Atlantic Deep-Sea Red Crab FMP was developed by the New England Fishery Management Council (Council) and was implemented by NMFS on October 21, 2002 (67 FR 63222). The FMP was intended to manage the red crab fishery at sustainable levels, prevent overfishing of the red crab resource, and prevent overcapitalization of the red crab fishing fleet. 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. lat. (the latitude of Cape Hatteras Light, North Carolina) northward to the U.S./Canada border. The FMP established a limited access permit program, per trip possession limits, gear requirements, and a days-at-sea (DAS) program for the limited access permit vessels, among other measures. DAS are assigned to each limited access permit holder based on a fleet-wide allocation of DAS that is calculated to achieve, but not exceed, a target total allowable catch (TAC). Every year from 2002 when the FMP was implemented through 2008, the target TAC was 5.928 million lb (2,689 mt), and the limited access fleet was allocated 780 DAS, divided evenly among the limited access permit vessels. The Red Crab FMP was adjusted once, by Framework Adjustment (FW) 1 (70 FR 44066) and again by the FY 2009 Emergency Action. FW 1 established a multi-year specifications process and established the specifications through fishing year (FY) 2007. The specifications established for FY 2007 were continued without action into FY 2008, as allowed under the regulations, because there was no new information that would have indicated a change was required. The Emergency Action in 2009 reduced the target TAC based

on the best scientific information available (i.e., the results of the Data Poor Stocks Working Group (DPSWG) and Review Panel.)

In the fall of 2008, NMFS' Northeast Fisheries Science Center convened a panel of stock assessment biologists, the DPSWG, to evaluate the biological reference points and status of several fishery stocks that have proven challenging to assess using traditional stock assessment methods. The results and recommendations of the DPSWG were peer-reviewed by a panel of outside scientists (Review Panel) composed of relevant experts primarily from the Scientific and Statistical Committees (SSCs) of the Mid-Atlantic and New England Fishery Management Councils. One of the stocks considered by the DPSWG was Atlantic deep-sea red crab, a deep-water crustacean that lives off the continental shelf along the east coast of the United States and supports a small but valuable fishery.

As stated above, although the Review Panel was not able to recommend new biological reference points for the stock due to the existing data limitations, it noted substantial uncertainty in all reference point estimates and recommended consideration of additional fishery-independent survey work as well as several avenues of research that would be useful for management. Most significant to the subject action, the Review Panel agreed with the DPSWG that the estimate of maximum sustainable yield (MSY) developed for the original FMP is no longer reliable as a foundation for setting biological reference points. The Review Panel concluded that an MSY in the range of 3.75 million – 4.19 million lb (1,700 – 1,900 mt), instead of the estimate of 6.24 million lb (2,830 mt) in the FMP, represents the best available science for the stock. This was a 33- to 40-percent reduction in MSY from the original FMP.

Because the results of the Data Poor Stocks Workshop and peer review were not available until January 20, 2009, and the next fishing year was scheduled to start on March 1, 2009, there was insufficient time for the Council to consider this new scientific information and prepare and submit revised specifications for the 2009 fishing year. Also, because a 33- to 40-percent reduction in the target TAC, with a similar reduction in the DAS allocation, was required in order to bring the management measures into compliance with the best available science on the red crab stock and to minimize the risk that overfishing might occur, on April 6, 2009 NMFS implemented emergency measures under section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Section 305(c) of the Magnuson-Stevens Act provides that, if an emergency or overfishing exists, NMFS, acting on behalf of the Secretary of Commerce, may implement measures for a fishery to address the emergency or overfishing. The emergency measures were limited to a decrease in the target TAC and a concomitant decrease in the number of DAS allocated to the fishery for the 2009 fishing year. The Emergency Action reduced the maximum sustainable yield (MSY) for red crab from the 6.24 million lb (2,830 mt) level established by the FMP to 3.75 million lb (1,700 mt), the lower bound of the 3.75-4.19 million lb (1,700 – 1,900 mt) MSY estimate recommended by the Peer Review Panel of the DPSWG. The Emergency Action also established a new optimum yield value of 3.56 million lb (1,615 mt), which is 95% of the MSY value, as specified in the red crab FMP. As noted above, the primary constraint on the directed, limited access red crab fishery is a DAS program that is based on the annual target TAC. Based on the annual target TAC for the fishery of 3.56 million

lb, the annual DAS allocated to the fleet was also reduced from 780 DAS to 582 DAS.[2]

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

The Fishery Management Plan (FMP) for Deep Sea Red Crab requires the Council to review the status of the deep-sea red crab stock and the fishery every year, and to prepare a Stock Assessment and Fishery Evaluation (SAFE Report) and specifications for MSY, optimum yield (OY), target TAC, and DAS allocations at least every third year. The regulations governing the red crab fishery, found at subpart M of 50 CFR part 648, stipulate that "The target TAC for each fishing year will be 5.928 million lb [2,689 mt], unless modified pursuant to this paragraph," and that "Each limited access permit holder shall be allocated 156 DAS" (780 DAS divided between the five limited access permit holders) "unless . . . the TAC is adjusted." The TAC and DAS were adjusted through Emergency Action on April 6, 2009. That Emergency Action was extended on August 24, 2009 and will expire on February 28, 2010. The Red Crab FMP established a fishing year that begins on March 1 of each year, through the last day of February.

In the absence of any action to establish specifications for FY 2010, the Emergency Action will expire on February 28, 2010 and the fishing year will open with the 5.928 million lb (2,689 mt) target TAC and 780 fleet DAS that are specified in the FMP. This level of fishing exceeds that recommended by the best available scientific information. This action is intended to establish specifications for the 2010 fishing year for the Atlantic Deep-Sea Red Crab fishery in accordance with the provisions of the Red Crab FMP and the requirements of the Magnuson-Stevens Act. This action also includes a SAFE Report.

In keeping with the requirements of the Magnuson-Stevens Act that will become effective for the red crab fishery in fishing year 2011, the SSC met on August 11, 2009 to consider an appropriate method for calculating the overfishing limit (OFL) and allowable biological catch (ABC) for red crab. The SSC met again on September 16, 2009 to finalize its recommendations for OFL and ABC. The SSC relied heavily on the report of the Peer Review Panel of the DPSWG. On September 23, 2009 the SSC reported to the Council that its recommendation for an interim ABC for 2010 only for red crab would be 2.83 million lb (1,284 mt), based on 2007 landings as representing recent catch. The report of the SSC is attached to this document as ATTACHMENT A.

On September 23, 2009, the Council received the report of the SSC. Council members heard testimony from the red crab industry explaining that 2007 was not representative of recent landings from the fishery. Rather, 2007 was the lowest year of landings during the last decade for the sole reason that the single buyer of red crab meat had reduced their order for that year. The Council was also informed that there was not a quorum present during the last part of the SSC meeting when the choice of year was made. After discussing the SSC report the Council voted unanimously to "send the red crab ABC back to the SSC for further analysis after new peer review information is available and that a quorum is present throughout the SSC deliberation."

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[2] Rather than a simple proportional reduction in the DAS allocation (i.e., a 33- to 40-percent reduction from the current 780 DAS), the DAS specification was based on average landings per DAS in the red crab fishery for the fishing years 2005-2008.

The Council met again on November 19, 2009 to consider alternative specifications for fishing year 2010. After considerable discussion concerning the best science available, the Council voted to adopt Alternative 1, the Status Quo Alternative, which would maintain the 3.75 million lb (1,700 mt) MSY and the 3.56 million lb (1615 mt) target TAC specifications that were put in place through emergency action on April 6, 2009. Fleet DAS would be set at 582 as established by the Emergency Action.

The Council chose Alternative 1 for the Proposed Action for the following reasons:

4) Based on the best scientific information as decided by the DPSWG Review Panel and the Council's SSC, Alternative 1 sets the TAC below the estimated range of MSY.

5) The TAC under Alternative 1 closely approximates recent historical catch, a criterion that was recommended by the Council's SSC and conforms with the most recent clarification from the SSC that recent historical catch is generally considered to encompass catch from more than only one year. This alternative uses 2004-2007 on which to base historical catch.

6) As a result of landings levels that correspond to target landings under Alternative 1, the red crab resource is not overfished nor subject to overfishing. Therefore the Council thinks the alternative represents an acceptably low level of risk of overfishing red crab.

The report of the DPSWG states that "we recommend a catch limit that mimics recent and long-term mean annual landings..." The DPSWG Review Panel used estimates of sustainable yield to conclude that "estimates of MSY in the male only fishery of 1700-1900 mt represent the best available scientific information, based on the congruence of average landings and results from the DCAC model. The panel noted that the current overfishing level threshold is exceeded when male landings are greater than the estimated MSY." The Review Panel noted the substantial uncertainty in all BRP estimates, but did not provide any advice on the application of a buffer between their estimate and an appropriate catch limit.

The Council based the target TAC directly on the advice from the DPSWG rather than that recommended by the SSC because the Council thought this advice provided an acceptably low risk of avoiding overfishing. According to the National Standard 1 guidelines, it is the role of the Council to determine an acceptable level of risk of overfishing after receiving scientific information about what is the level of overfishing. (National Standard 1 Guidelines (Federal Register Vol. 74, No. 11, January 16, 2009, p. 3192).

The Council did not accept the SSC's choice of the lowest single year in recent history as being a scientifically valid representation of recent landings. The SSC report to the Council on September 23, 2009 noted that:

> "The SSC would prefer to base the ABC recommendation on a longer series of recent catch (e.g., the average catch from 2002-2007, the most reliable series of catch statistics). However, this magnitude of catch is at the upper end of the range of approximate values of OFL recommended by the DPSWG. Given that there should be a substantial buffer

> between OFL and ABC for data-poor stocks, an ABC based on the 2002-2007 average landings would contradict the DPSWG advice."

These comments make it clear that the SSC chose 2007 landings without policy guidance from the Council on the appropriate level of precaution.

The proposed National Standard 2 Guidelines (DOC NOAA 2009) clarify the distinction between scientific input and policy that is at issue in this Council decision. The Guidelines point out that the amount of uncertainty that is acceptable or the amount of precaution used in an analysis are policy considerations that are in the purview of the Secretary and the Councils. The National Standard 1 Guidelines (Federal Register Vol. 74, No. 11, January 16, 2009, p. 3192) also make it clear that:

> "Determining the level of risk of overfishing that results from scientific uncertainty is the policy issue. The SSC must recommend an ABC to the Council after the Council advises the SSC what would be the acceptable probability that a catch equal to the ABC would result in overfishing. This risk policy is part of the required ABC control rule."

In the case of red crab, because the stock is not overfished and overfishing is not occurring, the Council had not yet considered or advised the SSC concerning the acceptable probability that a catch equal to the ABC would result in overfishing. In effect, the Council made this policy decision on November 19, 2009 when it voted on the specifications for FY 2010, establishing a 5% buffer between the target TAC and the low end of the recommended MSY range, and a 15% buffer between the TAC and the high end of the MSY range. Council members judged the risk of overfishing to be low with only three vessels fishing at a level below that which was determined to be sustainable by both the DPSWG and the SSC. The SSC did not offer any guidance to the Council concerning the risk of overfishing that was associated with its recommendation. The report of the DPSWG does indicate the precautionary nature of the sustainable yield estimates produced by the DPSWG:

> "There is appreciable risk that reference points in this report will result in unnecessarily foregone catches" because "some of the methods used to calculate biological reference points in this report rely heavily on landings data collected during a period when exploitation levels were relatively low. Historical catches may understate MSY to the extent that fishing mortality has been less than F_{MSY} during recent years."

Council members also took into consideration the fact that both the DPSWG and the SSC characterized historical landings as sustainable and the fact that NMFS had determined that the specifications that were implemented through emergency action were precautionary and sustainable.

This action is necessary to ensure that the management measures for this fishery are based on the best available science and to minimize the risk that overfishing will occur during the 2010 fishing year, which would be expected under the No Action alternative. Council members judged the risk of overfishing under Alternative 1 to be low with only three vessels fishing and supplying a limited market.

7.10.1.3 Description of the Affected Fishery

During the 1960s and 1970s, the red crab resource was considered underutilized, and several vessels began experimenting in the early 1970s to develop a deep-sea red crab fishery in this region. The directed red crab fishery is entirely a trap fishery. According to the Stock Assessment Workshop 43 (SAW 43, 2006) report, red crab landings are primarily from specially designed crab traps, although some landings occur as incidental catch in offshore lobster traps. The primary fishing zone for red crab, as reported by the fishing industry, is at a depth of 400-800 meters along the continental shelf in the Northeast region, and is limited to waters north of 35° 15.3' N lat (Cape Hatteras, NC) and south of the Hague Line. Prior to implementation of the FMP, the fishery fluctuated widely both in terms of the number of vessels pursuing red crab and in terms of the annual landings. Until September of 2009, red crab was sold in a commodity market for picked crab meat. Demand for red crab fluctuated with economic conditions and with the supply of crab meat from other sources. Fluctuations in red crab fishery participation from 1973 through 2002 reflected the profitability of the fishery because the fishery was open access during that time. Fluctuations in landings after 2002 continued to reflect market demand because all of the landings were processed into crab meat and the market dictated how much crab would be purchased by the processor. In August 2009 a new red crab processing plant went into operation with state-of-the-art processing techniques that are expected to produce a higher quality product. Beginning in 2009, red crab products will be distributed by a major seafood wholesaler and sold through retail outlets.

The FMP was implemented on October 21, 2002, and included limited access permit criteria intended to constrain the number of vessels that could harvest red crab in a directed fishery. Based on the landings history-based criteria in the FMP, five fishing vessels qualified for a limited access permit. The Red Crab FMP regulations established a limited access permit program for the directed fishery with a target TAC of 5.93 million lb (2,689 mt) and a DAS allocation of 780 fleet days to harvest the TAC. Management measures include trip limits, limit on the number of traps permitted per vessel, a prohibition against harvesting female crabs, and several other measures intended to prevent overfishing. Although this is a small fishery in terms of the number of vessels that participate, ex-vessel revenues have ranged from $2.43-4.22 million dollars a year since 2004 (Table 21). The majority of individuals that are involved in the harvesting sector of this fishery report almost complete economic dependence on red crab as their primary fishery, although some vessels have participated in the offshore lobster fishery and, in recent years, red crab vessels have participated in the hagfish fishery on a sporadic basis. Vessel owners still report red crab as the primary fishery that supports their annual income. There have been some changes in terms of vessels, ownership and ports since implementation of the FMP.

Table 21- Live weight landings, revenue, average price per pound, DAS charged, and dollars per DAS charged by fishing year for the limited access red crab fleet for fishing years 2004 through 2008.

Year	Live wt landed	Revenue	Price/lb	DAS Chg	$/DAS Chg
FY 04	4,930,204	$ 4,218,888	$ 0.86	728	$ 5,795
FY 05	4,079,670	$ 3,376,211	$ 0.83	555	$ 6,083
FY 06	3,841,577	$ 3,581,651	$ 0.93	698	$ 5,131
FY 07	2,771,501	$ 2,527,576	$ 0.91	474	$ 5,332
FY 08	2,857,162	$ 2,429,309	$ 0.85	410	$ 5,925
Average	3,696,023	$ 3,226,727	$ 0.88	573	$ 5,653

All limited access vessels are now docked out of New Bedford, MA in response to the opening of a new red crab processing plant in August 2009. Prior to that, all of the red crab vessels had operated from Fall River, MA, but some also landed in Newport News, VA when high fuel costs made it more economical to truck landed crabs the extra distance rather than running the boats back to their home port. The processing sector for red crabs was relatively small and sporadic prior to the FMP. From 2002 through July 2009 almost all crabs were processed at one facility in Nova Scotia, Canada. This processor then sold the entire red crab product to one large restaurant chain in the U.S. During that time, the red crab product was primarily sold as frozen, generic crabmeat and cocktail claws. A new crab processing plant began operations in New Bedford, MA in August 2009. The new processing plant is expecting to take advantage of the fact that the Atlantic deep sea red crab fishery received MSC certification in September 2009. The Atlantic Red Crab Company has recently contracted with a major seafood distribution company to market fresh picked crab meat to retail customers through supermarkets.

During the development of the FMP, the fleet reported that on average vessels landed 63,000 lb of red crab per trip and received an average of approximately $42,000 per trip in gross revenue. The dealer weigh-out data for 2003 report that average pounds per trip ranged from about 43,000 to 77,000 lb. Gross revenues per trip averaged between $34,000 and $71,000. Landings in 2003-2005 were between 4.2 and 4.5 million lb (1,905 – 2,041 mt). In 2008, landings totaled 2.86 million lb (1,296 mt) worth $2.43 million. The NMFS weighout data for 2008 indicate that average pounds per trip were 52,732 lb (ignoring trips of less than 1,000 lb). Gross revenues per trip averaged $53,371. Ex-vessel prices reported by the industry have risen from $0.44-0.57 per lb in 1982-1999 to $0.90 per lb in 2005 ($0.45 when adjusted for inflation since 1982) and to $0.95-$1.00 per lb depending on meat yield in 2009 ($0.43-0.45 in 1982 dollars).

Since implementation of the FMP in October 2002, reporting of red crab landings has improved, and all vessels that land red crab are now required to report total landings by trip. Gross revenues to the fleet from red crab exclusively were approximately $3.23 million annually for FY2004-FY2008. Hagfish revenue was substantial during the period March 2007 to January 2008, but is unlikely to contribute to fleet revenue in FYs 2009 and 2010 because of market and exchange rate conditions.

There is a provision in the Red Crab FMP that if one or more limited access permit holders formally declares out of the directed red crab fishery for an entire fishing year, the DAS that would otherwise be allocated to that permit are to be distributed equally to the remaining permit holders. As has occurred each year since 2003, one of the limited access permits has been declared out of the fishery for the 2010 fishing year, and, if the 6-month notification requirement is waived, a second vessel is expected to opt out for the 2010 fishing year. This means that the fleet DAS allocated to the fishery for the 2010 fishing year would be distributed equally to the remaining three limited access permit vessels, or less if additional boats declare out.

In addition to the fleet of limited access permit vessels, the FMP also includes provisions for an open access, incidental catch red crab permit. This permit allows a fishing vessel to possess and land up to 500 lb of whole weight equivalent red crab per fishing trip. Although several hundred fishing vessels initially requested and obtained this open access permit, total landings of red crab by vessels with an open access permit remain negligible relative to the landings by the limited access fleet. That's because the fishing grounds used by other fisheries do not overlap with areas

of significant red crab densities. Vessels with an open access, incidental catch red crab permit are unaffected by this action.

Additional information on the red crab fishery is provided in the report prepared by the Data Poor Stocks Working Group, available at http://www.nefsc.noaa.gov/publications/crd/crd0902/ .

7.10.1.4 Description of the Alternatives

Alternative 1 – Status Quo. The status quo would be the MSY, OY, target TAC, and DAS allocation adopted through emergency action on April 6, 2009. If the status quo alternative were adopted, MSY would be 3.75 million lb (1,700 mt), OY and the target TAC would be 3.56 million lb (1,615 mt), and the fleet DAS would be 582. If the DAS were allocated equally to the four vessels that have been active in recent years, the DAS per vessel would be 146. If only three vessels remain in the fishery, the resulting DAS allocation would be 194 DAS for each active vessel.

Alternative 2 – SSC Recommended ABC. Alternative 2 would adopt the SSC's recommended ABC value of 2.83 million pounds (1,284 mt) as the target TAC for the 2010 fishing year. The corresponding fleet DAS would be 464, based on the fleet average daily landings per charged DAS for the years 2006 – 2008 (6,106 lb/DAS.) The fleet DAS would be divided by the five current limited access permits, or less depending on the number of permits that declare out of the fishery. As noted above, one of the limited access permits has been declared out of the fishery each year since 2004 and a second vessel opted out for the 2009 fishing year as well. If four vessels remain in the fishery, the resulting DAS allocation would be 116 DAS for each active vessel. If only three vessels remain in the fishery, the resulting DAS allocation would be 155 DAS for each active vessel. Optimum yield (OY) would be set at 95% of MSY, or 3.56 – 3.98 million lb (1,615 – 1,804 mt.) The fact that OY would be higher than ABC would require an OY reserve, which would only become available when scientific uncertainty surrounding the overfishing level enabled the SSC to set ABC within 5% of MSY.

Alternative 3 – No Action. If no action were taken, MSY would revert to the 6.24 million lb (2,830 mt) value established by the FMP, and OY and the target TAC for the 2010 fishing year would revert to 5.93 million lb (2,689 mt.) The fleet-wide DAS allocation would be 780 DAS. If these DAS were distributed equally to the four limited access vessels that have been active in the fishery in recent years, the allocation per vessel would be 195 DAS. If a second vessel were to opt out for FY 2010, the allocation for each of the remaining three vessels would be 260 DAS.

7.10.1.5 Expected Economic Effects of the Alternatives

Predicting future impacts is difficult without accurate information on the trends of the resource, the market, and the alternatives available to red crab permit holders. Since 2002, when the FMP was implemented, the fleet has not harvested the TAC or used all allocated DAS. The fleet caught more than the target TAC proposed in the status quo alternative in every year from 2002 through 2006, but caught less than the proposed target TAC in 2007 and 2008. Production potential in 2009 and 2010 is uncertain because the new processing plant began production in August 2009 and during this start-up period the plant will require regular deliveries of smaller quantities than the fleet has customarily landed. For these reasons, the extent to which Alternative 1 will constrain potential landings is uncertain. The direct and indirect effects of the FMP were expected

to protect the resource from overexploitation and maintain a sustainable fishery. Since this alternative would result in a decrease in allowable fishing compared to the specifications in the FMP and through 2008, it is expected to have the same effect.

Table 22- Comparison of the alternatives.

Alternative	2010 MSY (lb)	2010 Target TAC (lb)	2010 Fleet-wide DAS allocation	2010 Individual vessel DAS allocation
Alternative 1 (Council Proposed Action)				
Status Quo - Emergency Measures	3,747,858	3,560,466	582**	194††
Alternative 2				
SSC ABC Recommendation	3,747,820-4,188,740	2,830,706	464*	155††
Alternative 3				
No Action – Orig FMP	6,240,000	5,928,000	780†	195

*Based on updated average landings per charged DAS for 2006-2008 (6,106 lb/DAS)
**Based on average landings per DAS for 2005-2008 (6,100 lb/DAS)
† Based on original average landings per DAS (7,600 lb/DAS)
††Based on three limited access vessels (one vessel has declared out of the fishery each year since 2004 and a second vessel declared out in 2009)

Alternative 1 – Status Quo

Alternative 1 would not create any economic impacts to the limited access red crab fishing fleet for the 2010 fishing year compared to FY 2009 because there would be no changes to either the target TAC or the DAS allocations compared to those in place during 2009. Future impacts are uncertain because there is uncertainty surrounding the estimate of MSY that provides the basis for the current target TAC. If the current target TAC is actually more than the surplus production from the red crab stock, the stock would decline. If the stock is also smaller than B_{MSY}, the decline in the stock would lead to lower catches in the future. If the true maximum sustainable yield is higher than the landings, and the stock is larger than B_{MSY}, the stock would increase but surplus production would likely decrease in response to density-dependent population controls.

Alternative 2 – SSC Recommended ABC

Under the assumption that the red crab fleet would take advantage of the new processing and marketing opportunities provided by a new processing plant in New Bedford and Marine Stewardship Council Certification for the red crab fishery, Alternative 2 would potentially reduce fleet red crab landings and revenue by 3.1 million lb and approximately $3.02 million compared to the No Action Alternative, and by 729,000 lb and approximately $711,000 compared to the Status Quo Alternative, using the mid-point of the industry reported price for 2009. The target TAC proposed in Alternative 2 represents a 27% reduction from the average red crab landings since

2002, when the FMP was implemented. Red crab vessels averaged 6,106 lb per DAS from 2006-2008. However, the red crab fleet has not attained the full target TAC of the No Action Alternative since its implementation in 2002, and has averaged 4.08 million lb (1,853 mt) for 2002 – 2007. Therefore, the reduction in the target TAC proposed under Alternative 2 compared to the average landings for 2002-2007 is approximately 1.15 million lb, or approximately $1 million. Further, the fleet has landed less than or equal to the target TAC proposed in Alternative 2 in both FYs 2007 and 2008, so the true economic impacts are difficult to estimate. The red crab processing plant is expected to experience the same potential loss of production.

At the mid-point of reported current prices, the average daily production would be valued at approximately $5,953 per DAS. Alternative 2 would reduce fleet DAS by 316 DAS compared to the No Action Alternative. Using recent daily average value per DAS, those 316 DAS could potentially represent approximately $1.88 million. However, as stated above, the fleet has never attained the full target TAC represented in the No Action Alternative. Compared to the Status Quo Alternative, Alternative 2 allows 118 fewer fleet DAS. At $5,935 per DAS, Alternative 2 would represent a potential loss of fleet revenue of approximately $700,330 compared to the Status Quo Alternative. Under the FMP, five vessels qualified for limited access red crab permits, and only four of those vessels have reported landings since 2002. For the four active boats, the loss in revenue under Alternative 2 compared to the No Action Alternative would be $470,000 per boat. The loss in revenue per boat under Alternative 2 compared to the Status Quo Alternative would be $175,000, if the boats were capable of taking full advantage of the higher target TACs and DAS provided by those alternatives. Whereas market limitations have caused the fleet to land an amount equal to or slightly less than the target TAC proposed under Alternative 2 for the past two years, the affect of future target TACs is difficult to predict.

Alternative 2 would create a potential economic effect in the form of foregone opportunity to utilize all DAS that would have been allocated in order to attain the higher target TAC of 5.93 million lb (2,689 mt) under the FMP (no action) or 3.56 million lb (1,615 mt) under Alternative 1. If the fishing industry were able to increase its fishing effort in fishing year 2010 to either utilize all 780 DAS and/or attain the full target TAC of 5.93 million lb (2,689 mt), in the case of the no action alternative, the economic effect of Alternative 2 would be in the range of $1.88-3.02 million. This calculation assumes the mid-point of the current ex-vessel price per lb of $0.95-1.00 that has been reported by the Red Crab Advisory Panel, and applies this value against a range of potential landings from 4.76 – 5.93 million lb (2,159 – 2,689 mt). The lower landings of 4.76 million lb (2,159 mt) represent the expected catch with 780 fleet DAS, based on the most recent estimate of catch per DAS (from 2006-2008; 6,106 lb/DAS), while the higher landings of 5.93 million lb (2,689 mt) simply represent the target TAC specified in the FMP.

This analysis concludes there would be adverse economic impacts associated with a 2.83 million lb (1,284 mt) TAC and a fleet allocation of 464 DAS. Since the implementation of the FMP, the fleet has averaged fewer than 550 DAS per fishing year. The red crab industry attributes the decline in DAS used in recent years to lack of market demand for red crab which is expected to improve with a new processing plant and new distribution channels. The DAS allocation proposed in Alternative 2 is set on up-to-date data specifically to help ensure the opportunity of the fleet to harvest the full target TAC.

<u>Alternative 3 – No Action</u>.

The no action alternative would result in a short-term revenue increase for the red crab fleet if they took advantage of the additional fishing opportunity provided by the 5.93 million lb (2,689 mt) target TAC and the 780 fleet DAS allocation. Whereas the fleet has not caught the target TAC or used all of the allocated DAS since the FMP was implemented in 2002, it seems unlikely that the fleet would do so in FY 2010. To the extent that the fleet fished more and harvested more crabs than would be biologically sustainable, future production from the red crab fishery would likely suffer, causing negative economic impacts.

Table 23- Alternative target TACs compared to actual landings, 2005-2008.

	2010 Target TAC	Percent Change compared to 2005 landings (4.44 million lb)	Percent Change compared to 2006 landings (3.78 million lb)	Percent Change compared to 2007 landings (2.83 million lb)	Percent Change compared to 2008 landings (3.12 million lb)	Percent Change compared to Average landings 2005-2008 (3.54 million lb)
TAC Alternative 1						
SSC ABC	2,830,706	36% decrease	25% decrease	No Change.	9% decrease	20% decrease
TAC Alternative 2 (No Action)						
FMP OY/TAC	5,928,000	34% increase	57% increase	109% increase	90 % increase	67 % increase
TAC Alternaitve 3 (Status Quo)						
Emergency OY/TAC	3,560,466	13 % decrease	7 % decrease	28% increase	49 % increase	9 % increase

7.10.2 Determination of Significance Under E.O. 12866

E.O. 12866 requires that the Office of Management and Budget 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 above, this action (for fishing year 2010 only) 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 E.O. 12866.

7.10.2.1 E.O. 12866 Criteria

NMFS Guidelines provide criteria to be used to evaluate whether a proposed action is significant. A significant regulatory action means any regulatory action that is likely to result in a rule that may:

1. *Have an annual effect on the economy of $100 million or more, or adversely effect 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.*

This action is not expected to have either an annual effect on the economy of $100 million, or adversely effect in a material way the economy, a sector of the economy, productivity, competition, the environment, public health or safety, or State, local, tribal governments or communities. During fishing years 2004 through 2008, gross red crab revenues averaged approximately $3.23 million per fishing year. The value of the measures are not fully estimated, but the impact on the National economy, if any, is expected to be well below $100 million. This action is not expected to result in forgone revenues from red crab landings relative to fishing year 2009.

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

Alternative 1 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 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 Northeast.

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 impact of entitlements, grants, user fees or loan programs, or the rights and obligations of their participants.

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

This action does not raise novel legal or policy issues arising out of the President's priorities, or the principles set forth in E.O. 12866.

7.10.3 Initial Regulatory Flexibility Analysis

The following sections contain analyses of the effect of the proposed action on small entities. Under Section 603(b) of the RFA, each initial regulatory flexibility analysis is required to address:

1. Reasons why the agency is considering the action,

2. The objectives and legal basis for the proposed rule,

3. The kind and number of small entities to which the proposed rule will apply,

4. The projected reporting, record-keeping and other compliance requirements of the proposed rule, and

5. All Federal rules that may duplicate, overlap or conflict with the proposed rule.

7.10.3.1 Reasons for Considering the Action

The purpose and need for this action is identified in Section 3.0 of this document. The need for this action is to ensure management measures would continue the sustainability of the red crab fishery, and comply with provisions within the FMP that require the Council to review the status of the stock and the fishery every year and to prepare a SAFE Report and set allowable catch and DAS specifications at least every three years.

7.10.3.2 Objectives and Legal Basis for the Action

The objective of the proposed action is to implement specifications for the 2010 Atlantic deep-sea red crab fishery, as required under the regulations implementing the Red Crab FMP, which are set forth in 50 CFR 648. The objective of this action is to set appropriate specifications to ensure that the landings do not exceed sustainable levels. This action is intended do the following: (1) adjust the MSY to the lower end of the range recommended by the DPSWG Review Panel (1,700 mt); (2) set the OY at 95% of the new MSY (1,615 mt); (3) set the target TAC for FY 2010 (1,615 mt); and, (4) set the number of fleet DAS (582 DAS) and individual vessel DAS to correspond to the target TAC.

7.10.3.3 Description and Number of Small Entities to Which the Rule Applies

All of the potentially affected businesses are considered small entities under the standards described in NOAA Fisheries guidelines because they have gross receipts that do not exceed $4 million annually. During the 2008 fishing year, there were 4 vessels that landed more than the incidental catch limit of 500 lb per trip. There is currently one processor involved in the red crab fishery. That processor began operating in August 2009. More information about the affected entities is provided in Section 5.3 of this document.

7.10.3.4 Recordkeeping and Reporting Requirements

The proposed action does not introduce any new reporting, recordkeeping, or other compliance requirements.

7.10.3.5 Duplication, Overlap, or Conflict with Other Federal Rules

The proposed action does not duplicate, overlap or conflict with any other Federal rules.

7.10.3.6 Economic Impacts on Small Entities Resulting from the Proposed Action

The proposed action will affect the five entities that qualified for limited access permits for the red crab fishery in 2002. From FY 2002 through FY 2008 those entities operated four fishing vessels with an average length of approximately 100'. For FY 2004-2008 the red crab fleet had average revenues of $3.44 million with average annual landings of 1,676 mt (3.7 million lb). Landings in FY 2007 and 2008 averaged 1,269 mt (2.8 million lb), the lowest since FY 1996, as the result of reduced demand from the single significant buyer of red crab. In April 2009 the target TAC was reduced from 2,689 mt (5.93 million lb) to 1,615 mt (3.56 million lb) through Emergency Action.

Also in 2009, one additional red crab limited access permit was declared out of the fishery for the purpose of providing more DAS for the remaining active permits. The red crab fishing fleet operates under a harvesting cooperative that provides for the distribution of profits among all of the permit holders, providing an incentive for the fleet to use the available inputs in the most efficient manner. The proposed specifications maintain the target TAC that was in effect in FY 2009 and will allow the vessels to increase landings compared to FY 2007 and FY 2008 but will limit landings to less than the landings in any other years since the FMP was implemented in FY 2002.

The proposed specifications are expected to maintain healthy red crab stocks. By doing so, these measures may have positive benefits for all fishery participants over the long-term. Healthy fish stocks are an essential foundation for economic and social sustainability in this fishery. Moreover, this action provides encouragement to the industry to continue to support scientific research that will lead to improved management of the fishery.

8.0 LIST OF PREPARERS AND PERSONS/AGENCIES CONSULTED

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10.0 INDEX

Accountability Measures, 9

Allowable Biological Catch, 9, 12, 14, 15, 16, 49, 52, 70, 71, 75, 76, 87, 88

alternatives, 9, 12, 13, 14, 17, 49, 51, 55, 65, 75, 76, 77

Annual Catch Limit, 87

Atlantic Large Whale Take Reduction Plan, 8, 41, 59, 82

Biological Reference Point, 8

Biomass, 8, 21, 47, 89

bycatch, 17, 19, 20, 27, 28, 30, 33, 38, 50, 52, 53, 57, 59, 60, 61, 82

Cumulative Effects Assessment, 8, 57

Data Poor Species Working Group, 10, 11, 12, 13, 15, 16, 18, 21, 22, 50, 54, 69, 70, 71, 80, 82, 87, 88

Days-at-Sea, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 43, 44, 45, 47, 49, 50, 52, 53, 55, 57, 58, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 73, 74, 75, 76, 77, 78, 80

Depletion-Correction Average Catch, 8

emergency action, 9, 11, 12, 13, 17, 47, 61, 71, 72, 75

Environmental Impact Statement, 8, 17, 19, 20, 51, 57, 61, 62, 64

Essential Fish Habitat, 8, 17, 40, 41, 51, 53, 57, 59, 60, 61, 62

Exclusive Economic Zone, 58

Fishery Management Plan, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 25, 27, 38, 40, 43, 47, 48, 49, 50, 51, 52, 53, 55, 57, 58, 59, 60, 61, 62, 64, 65, 67, 68, 69, 70, 73, 74, 75, 76, 77, 78, 80, 82

Fishing Mortality Rate, 8, 21, 26, 61, 82

Framework Adjustment, 8, 58, 68, 82

habitat, 17, 19, 23, 40, 41, 51, 52, 53, 54, 57, 59, 60, 62, 65

human communities, 17, 52, 60, 63

Interactive Voice Response, 12, 45

Magnuson-Stevens Fishery Conservation and Management Act, 8, 9, 60, 61, 62, 66, 69

Marine mammals, 58

Marine Stewardship Council, 18, 49, 53, 74, 76

Maximum Sustainable Yield, 8, 10, 11, 13, 14, 15, 16, 19, 21, 22, 42, 48, 49, 50, 52, 53, 57, 65, 69, 70, 71, 75, 76, 80, 87, 88

National Environmental Policy Act, 8, 10, 13, 57, 61, 66, 67, 81

National Marine Fisheries Service, 1, 8, 11, 12, 13, 17, 20, 22, 23, 25, 26, 29, 30, 31, 32, 33, 34, 35, 37, 38, 41, 45, 51, 58, 64, 66, 68, 69, 72, 74, 78, 79, 81, 82, 89

Natural Mortality Rate, 8, 70, 82, 83

New England Fishery Management Council, 1, 8, 9, 10, 11, 12, 13, 14, 16, 17, 20, 22, 40, 49, 50, 51, 57, 58, 61, 65, 66, 68, 69, 70, 71, 78, 80, 81, 82, 87, 89

No action, 9

overfishing, 9, 12, 13, 19, 20, 21, 26, 64, 68, 69, 70, 72, 73, 75, 87, 88

Proposed Action, 9, 12, 14, 60

protected resources, 17, 51, 52, 53, 59, 60

Regulations, 11, 41, 76, 81, 82

Science and Statistical Committee, 8, 9, 10, 11, 12, 14, 15, 16, 22, 50, 52, 70, 71, 75, 76, 87, 88

Stock Assessment and Fishery Evaluation, 1, 8, 9, 10, 11, 13, 17, 18, 19, 38, 59, 70, 80, 82

Total Allowable Catch, 8, 9, 10, 11, 12, 13, 14, 15, 16, 38, 42, 43, 47, 49, 50, 51, 52, 53, 57, 58, 63, 64, 65, 66, 67, 68, 69, 70, 71, 73, 75, 76, 77, 78, 80, 87

Valued Ecosystem Components, 8, 10, 17, 49, 57

Vessel Trip Report, 11, 38, 43, 45, 46, 59

11.0 ATTACHMENTS

ATTACHMENT A: New England Fishery Management Council SSC REport on ABC for Red crab

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John Pappalardo, *Chairman* | Paul J. Howard, *Executive Director*

To: Paul J. Howard, Executive Director
From: Dr. Steve Cadrin, Chairman, Scientific and Statistical Committee
Date: September 23, 2009

Subject: Red Crab Acceptable Biological Catch (ABC)

The Scientific and Statistical Committee (SSC) was asked to 1) review the information provided by the Red Crab Plan Development Team and 2) develop recommendations specifying acceptable biological catch (ABC) for the 2010 fishing year, as well as the ABC control rule for future years.

On August 11 and September 16 2009, the SSC reviewed several sources of information and associated presentations by the Red Crab Plan Development Team (PDT):

1. Memo from PDT to SSC on recommendations for OFL, ABC, OY, ACL and Target TAC.
2. Discussion document to guide PDT Recommendations for MSY, OFL, ABC, OY, ACL and Target TAC – from Red Crab PDT Chair, Dick Allen to Red Crab PDT.
3. Report Deep Sea Red Crab prepared for the Northeast Data Poor Stocks Working Group Meeting, Woods Hole, MA, December 8-12, 2008. (Chute A., Jacobson L. and Rago P.)
4. Report by the Peer Review Panel for the Northeast Data Poor Stocks Working Group, Woods Hole, MA, January 20, 2009. Thomas Miller, Chair, Robert Muller, Bob O'Boyle and Andrew Rosenberg
5. Copy of presentation by Toni Chute on the 2009 Data Poor Stocks Workgroup assessment of red crab
6. Comments on Data Poor Working Group Report for Red Crab submitted by PDT member R. A. Wahle
7. Wahle, R.A. 2003. Revealing stock-recruitment relationships in lobsters and crabs: is experimental ecology the key? Fisheries Research 65: 3-32.
8. Haefner, P.A. 1977. Reproductive biology of the female deep-sea red crab, *Geryon quinquidens*, fron the Chesapeake Bight. Fishery Bulletin 75: 91-102.

The SSC endorses the range of Maximum Sustainable Yield proxies from the 2008 Data Poor Stocks Working Group (DPSWG) as the best science available for the overfishing limit (OFL). According to the DPSWG Peer Review Report, "The panel found no reason

to change the overfishing definition of catch>MSY" and "The review panel concluded that, using the best available scientific information, estimates of MSY for male crabs only was in the range of 1700-1900 mt." Several approaches to approximating MSY were reviewed by the DPSWG. The OFL recommendation by the Peer Review Panel was based on long-term average landings and depletion-adjusted average catch, both of which had technical problems associated with inaccurate catch statistics, low catches influenced by market conditions, assuming constant stock biomass despite evidence of an increase, or assumed stock-recruit relationship. The MSY proxy is highly uncertain and should be reevaluated. Therefore, the SSC concludes that there is insufficient information to derive an ABC control rule. The SSC encourages fishery participants to be involved in data collection and continued cooperative research to improve the information available for stock assessment and fishery management.

Given the data-poor nature of the stock assessment, the SSC derived an interim ABC on the basis of status quo catch. The exploitation history of the resource appears to be sustainable. The 2003-2005 survey indicated increased abundance of all crab categories, except large males as compared to the 1974 survey. Although the average size of male crabs decreased from 1974 to 2003, the 1974 survey was at the beginning of the fishery, some decrease in size structure should be expected, and there is no indication that the decrease in average size results from an unsustainable fishery. Landings in 2010 were 1,284 mt, which is 68-76% of the approximate OFL. This magnitude of catch provides a 24% to 32% buffer between OFL and ABC, which is consistent with general guidance on buffers for data-moderate to data-poor stocks.

The SSC would prefer to base the ABC recommendation on a longer series of recent catch (e.g., the average catch from 2002-2007, the most reliable series of catch statistics). However, this magnitude of catch is at the upper end of the range of approximate values of OFL recommended by the DPSWG. Given that there should be a substantial buffer between OFL and ABC for data-poor stocks, an ABC based on the 2002-2007 average landings would contradict the DPSWG advice. Therefore, the SSC recommendation is for an interim ABC that is based on 2007 landings until a better estimate of OFL can be determined.

The SSC recommends that:

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

ATTACHMENT B: List of Species Under NMFS Jurisdiction Protected by Endangered Species Act or Marine Mammal Protection Act

There are numerous species that inhabit the environment within the red crab management unit and are afforded protection under the Endangered Species Act of 1973 (ESA; i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA). Fourteen are classified as endangered or threatened under the ESA, while the remainder is protected by the provisions of the MMPA. The Council has determined that the following list of species protected either by the ESA and the MMPA may be found in the environment inhabited by spiny dogfish:

Cetaceans

Species	Status s
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Beaked whales (*Ziphius* and *Mesoplodon* spp.)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala* spp.)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella* spp.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected

Sea Turtles

Species	Status s
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened

Fish

Species	Status s
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Smalltooth sawfish (*Pristis pectinata*)	Endangered