Draft Environmental Impact Statement –Regulatory Impact Review – Initial Regulatory Flexibility Analysis

To Consider Management Measures for the Jonah Crab Fishery

in the Exclusive Economic Zone

based upon management measures specified in the

INTERSTATE FISHERY MANAGEMENT PLAN

FOR JONAH CRAB

and ADDENDA I and II

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NOAA FISHERIES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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List of Acronyms

ACRONYM	DEFINITION
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
ALWTRP	Atlantic Large Whale Take Reduction Plan
ALWTRT	Atlantic Large Whale Take Reduction Team
APSD	Analysis and Program Support Division
ASMFC	Atlantic States Marine Fisheries Commission
CBP	County Business Patterns
CEQ	Council on Environmental Quality
CFDBS	Commercial Fishing Dealer Database System
CFR	Code of Federal Regulations
CFRF	Commercial Fisheries Research Foundation
CPH	Confirmation of Permit History
CPUE	Catch Per Unit Effort
CZMA	Coastal Zone Management Act
DAS	Days-at-Sea
DPS	Distinct Population Segment
DPSWG	Data Poor Stocks Working Group
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FMP	Fishery Management Plan
FRFA	Final Regulatory Flexibility Analysis
GARFO	Greater Atlantic Regional Fisheries Office
GOM	Gulf of Maine
IRFA	Initial Regulatory Flexibility Analysis
LOF	List of Fisheries
MMPA	Marine Mammal Protection Act
NAICS	North American Industry Classification System
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fishery Science Center
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NWA	Northwest Atlantic
PBR	Potential Biological Removal
PDT	Plan Development Team
PRA	Paperwork Reduction Act

ACRONYM	DEFINITION
RFA	Regulatory Flexibility Act
RFAA	Regulatory Flexibility Act Analysis
SBA	Small Business Act
SNE	Southern New England
SSC	Scientific and Statistical Committee
STDN	Sea Turtle Disentanglement Network
TEWG	Turtle Expert Working Group
USFWS	U.S. Fish and Wildlife Service
VEC	Valued Ecosystem Component
VTR	Vessel Trip Report

Executive Summary

From Maine through North Carolina, Jonah crabs are managed by the by the states and federal government through the Atlantic States Marine Fisheries Commission[1]. The Commission prepares fishery management actions on an ongoing, as-needed basis, in consultation with the states and the federal government. Once new measures are approved through the Commission process, states and federal government are asked to implement and enforce them. States manage the resource within their state waters (0-to-3 nautical miles from the shoreline). The federal government's management authority is the Atlantic Coastal Fisheries Cooperative Management Act (Atlantic Coastal Act).[2] Thus, federal management of the Jonah crab fishery is largely, though not exclusively, influenced by the management recommendations of the Commission.

We, NOAA's National Marine Fisheries Service or NMFS, have prepared this draft environmental impact statement (EIS) to address the management measures recently approved by the Commission for the Jonah crab fishery. The actions to be evaluated with this draft EIS thus are fundamentally management in nature and their potential impacts on fishery management will be evaluated herein, along with other impacts (e.g., biological and physical, social and economic). The Commission has forwarded these measures to us, with a recommendation that federal regulations to support these measures be promulgated. The recommendations submitted by the Commission employ several strategies to control fishing effort in the Jonah crab fishery: 1) Limiting the number of permit holders that may commercially harvest Jonah crab, 2) biological measures focused on ensuring sustainability, and 3) reporting requirements.

Status of the Jonah Crab Fishery

The biological status of the Jonah crab fishery is not completely understood, as, to date, no stock assessment has been completed. In recent years, Jonah crab (*Cancer borealis*) landings have increased from nearly 3 million pounds in 1994, to approximately 7 million pounds in 2005, to a high of over 17 million pounds in 2014. Available landings data suggest that Cancer crabs[3] were an unintentional, and now are increasingly a targeted catch from lobster traps, as anywhere from 90.91 percent to 99.71 percent of Cancer crabs landings between 1990 and 2014 have been from pot and trap gear. With small, legal modification to lobster gear and small shifts in the area where traps are fished, American lobster harvesters can target either Jonah crab or American lobster, depending on availability and market. Due to this apparent linkage between the lobster fishery and the Jonah crab fishery and an increase in recent landings, the Atlantic States Marine Fisheries Commission's American Lobster Board began development of an Interstate Fishery Management Plan for Jonah Crab (Appendix 1).

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[1] The Atlantic States Marine Fisheries Commission was formed in 1942 by the 15 coastal states to improve interstate coordination in the protection and management of marine fisheries resources. It is a "deliberative" body, composed of representatives from the states and the federal government, that serves to facilitate coordination among its members on matters of fishery management. Member states are Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida.

[2] 16 U.S.C. 5101-5109; Title VIII of Pub. L. 103-206, as amended, (ACFCMA, 1993).

[3] Jonah crab and rock crab (*Cancer irroratus*)

Relevant Management Actions

Interstate Fishery Management Plan for Jonah Crab

In August 2014, the Lobster Board initiated its process to develop an Interstate Fishery Management Plan for Jonah crab by approving a Public Information Document for public comment. Public hearings were held and public comments were received during autumn 2014. The Lobster Board officially tasked the Jonah Crab Plan Development Team (PDT) with developing a draft Interstate Fishery Management Plan for Jonah Crab in October 2014. During the next several months, the PDT met on several occasions to review fishery data, develop a range of management alternatives, and describe the fishery in the draft Jonah Crab Plan. A completed draft was released for the May 2015 Commission meeting, where it was reviewed and discussed at length. Ultimately, the Lobster Board voted to send this completed draft out for public comment. Public hearings were scheduled in Maine, New Hampshire, Massachusetts, Rhode Island, and Maryland. A summary of the public comments is available on the Commission's website. Following the public comment period, the Lobster Board convened again in August 2015, provided the opportunity for additional public comment, considered all public comment on the draft Plan, selected final management measures, and approved the Plan.

Addendum I

Following approval of the Jonah Crab Plan, it was soon clear that several items required further development or the consideration of additional management measures. At its November 2015 meeting, the Lobster Board reconsidered the incidental catch limit originally approved in the Jonah Crab Plan. Through a similar public process to the original Jonah Crab Plan, draft Addendum I was initiated in November 2015 to address incidental catch limits, developed during the winter, and was released for public comment following the February 2016 Commission meeting. Public hearings were again scheduled in Maine, New Hampshire, Massachusetts, Rhode Island, and Maryland. A summary of the public comments is available on the Commission's website. Following the public comment period, the Lobster Board convened again in May 2016, provided the opportunity for additional public comment, considered all public comment on the draft Plan, selected final management measures, and approved Addendum I (Appendix 2).

Addendum II

In November 2015, the Lobster Board and the PDT began investigating Jonah crab claw landings to inform the development of another addendum to address this issue. Through a similar public process to the original Jonah Crab Plan and Addendum I, draft Addendum II was initiated in May 2016 to consider options that would prohibit or allow coastwide Jonah crab claw landings and consider instituting an incidental catch definition. Addendum II was developed during the summer and autumn, and was released for public comment following the November 2016 Commission meeting. Public hearings were again scheduled in Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Maryland, Delaware, and Virginia. A summary of the public comments is available on the Commission's website. Following the public comment period, the Lobster Board convened again in January 2017, provided the opportunity for public comment, considered all public comment on the draft Plan, selected final management measures, and approved Addendum II (Appendix 3).

Alternatives

The National Environmental Policy Act (NEPA) requires that any federal agency proposing a major action consider the environmental impacts of the action and its reasonable alternatives. The evaluation of alternatives in an Environmental Impact Statement assists the Secretary of Commerce assess and understand the potential environment impacts of the proposed action, as well as the impacts to the action's reasonable alternatives. It also assists the public to better understand the potential action and provide input into the rulemaking process. Doing so results in better, more informed decision-making.

To warrant detailed evaluation, an alternative must be reasonable[4] and meet the Secretary's purpose and need (see Section 2.2). Prior to finalizing the Jonah Crab Plan and its addenda, the Commission considered several alternatives for each management measure. This document analyzes the Commission's recommended alternative, other alternatives considered by the Commission, and the No Action alternative. Table 1 summarizes the alternatives considered in this document.

[4] "Section 1502.14 (of NEPA) requires the EIS to examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are *practical or feasible from the technical and economic standpoint and using common sense*, rather than simply desirable from the standpoint of the applicant." (40 Questions) (emphasis added)

Table 1. Jonah Crab Management Alternatives

Sector	Management Measure	Alternatives
Commercial Fishery	Permitting	Lobster Permit
		Jonah Crab Permit
		No Action
	Minimum Size	4.75-inch carapace width
		5-inch carapace width
		No Action
	Landing Disposition	Whole-Crab Fishery
		Incidental Claw Allowance
		Whole-crab and Claw Fishery
		No Action
	Broodstock Protection	Prohibit Retention of Egg-Bearing Females
		Prohibit Retention of Females
		No Action
	Incidental Limits (non-trap and non-lobster trap)	1000 crabs/day
		200/day up to 500/trip
		No Action
	Incidental Definition	50% of weight onboard
		No Action
	Dealer Reporting	Mandatory Reporting
		No Action
	Harvester Reporting	Jonah crab-only harvesters
		All Jonah crab harvesters
		No Action
Recreational Fishery	Broodstock Protection	Prohibit Retention of Egg-Bearing Females
		Prohibit Retention of Females
		No Action
	Catch Limit	50 crabs/day
		No Action

VECs Impacts Summary

The environmental impacts of all of the alternatives under consideration are described in Section 5.2. Due to the number of management measures and alternatives, this EIS is structured so that it evaluates the impacts of all Valued Ecosystem Components (VECs) by alternative. Said another way, each alternative will contain a complete analysis of impacts to all VECs. As required by NEPA, the Preferred Alternatives are compared to the No Action alternative and other alternatives.

Biological Impacts

The impacts of the alternatives are expected to range from no impact to slight positive impacts on the target species, Jonah crabs. Permitting, catch limits, and other biological measures are expected to result in slight positive impacts because these measures impose management on this fishery, which help to ensure the future sustainability of the stock. While reporting requirements collect information on the harvest of the fishery, reporting is expected to have no impacts on the target species, because it does not alter fishing practices. These management alternatives are expected to be more positive than the No Action alternatives, which continue the federal fishery in an unregulated state. In general, the No Action (unregulated) alternative is expected to have slight negative impacts on the Jonah crab resource because it increases the likelihood that the resource could be overfished.

Other Affected Species Impacts

The impacts of the alternatives are expected to range from no impact to slight positive impacts on the other affected species, including bait and bycatch. Permitting, the only measure that authorizes fishing, is expected to result in slight positive impacts because permits impose management on this fishery, which helps to ensure the future sustainability of these other affected species. All other requirements regulate the fishery after gear is deployed (what and how much can be retained), and therefore have no impacts on other affected species. Permitting alternatives are expected to have more positive impacts than the No Action alternative because the No Action alternative allows unregulated fishing. The No Action alternative is expected to result in slight negative impacts because an unregulated fishery could risk the sustainability of these other affected species. Other alternatives are expected to result in no impact because they regulate the fishery after gear is deployed.

Habitat Impacts

The impacts of the alternatives are expected to range from no impact to slight negative impacts on habitat. Permitting, the only measure that authorizes fishing, is expected to result in slight negative impacts because it authorizes trap gear to be used. Trap gear is known to have a minimal footprint on the bottom, and, in general, results in negligible impacts on habitat, therefore impacts are categorized as slight negative. Permitting alternatives are expected to have the same, slight negative impact as the No Action alternative because all the alternatives will allow the use of trap gear to target Jonah crabs. All other measures regulate the fishery after gear is deployed (what and how much can be retained), and therefore have no impacts on habitat. Other alternatives are expected to result in the same no impact as the No Action alternative because regulate they fishery after gear is deployed.

Protected Resources Impacts

The impacts of the alternatives are expected to range from no impact to moderate negative impacts on protected resources. Permitting, the only measure that authorizes fishing, will result in little to no new trap gear being authorized; it is overwhelmingly the same gear that is used in the lobster fishery. However, as all permitting alternatives will authorize trap gear to be used, a gear which is known to have interactions with several protected species, including North Atlantic right whales, humpback whales, fin whales, and sei whales; and Northwest Atlantic distinct population segment loggerhead and leatherback sea turtles, some level of negative impacts to these species is possible. Taking into consideration the latter, as well as the resource condition for those protected species potentially affected by the Jonah Crab fishery, the level of negative impacts is expected to be slight to moderate. All other requirements

(alternatives) regulate the fishery after gear is deployed (what and how much can be retained) and will not change the presence, quantity, and degree of traps used in this fishery relative to current conditions. That is, the measures in these requirements will not directly or indirectly influence fishing behavior or effort and thus, are more administrative in nature. Based on this, these other requirements are not expected to impact, directly or indirectly, any protected species.

Human Communities Impacts

The impacts of the alternatives are expected to range from no impact to slight negative short-term impacts on human communities, but longer term slight positive impacts. Slight short-term negative impacts are expected for most alternatives because they impose restrictions on harvesters and limit the potential for profits. In the long term, however, such limits would help ensure the long-term sustainability of the stock and therefore a harvester's long-term profitability. Further, Jonah crab harvesters already have to abide by many of these proposed measures by virtue of their state lobster/crab permits, and would have to follow measures irrespective of which alternative that NMFS chooses. As such, alternatives that match what the states have already implemented would ensure that there is no disconnect between state and federal regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative, and enforcement objectives, and minimizes confusion. These management alternatives are expected to result in more short-term negative impacts than the No Action alternative, but more positive long-term impacts using the same logic above. Most No Action alternatives are expected to result in short term slight positive impacts but longer-term slight negative impacts. Under these scenarios, harvesters could maximize their profits in the short term, but may risk the long-term sustainability of the stock. Reporting requirements are expected to have no impact. At present, the majority of landings are generated from Southern New England where reporting rates in the lobster fishery are high by virtue of those vessels having other permits with mandatory reporting requirements. Because these harvesters are already reporting, no impact is expected. Compared to the No Action reporting alternatives, the same no impacts are expected.

1.0 Introduction

1.1 Background

In recent years, Jonah crab (*Cancer borealis*) landings have increased from nearly 3 million pounds in 1994, to approximately 7 million pounds in 2005, to a high of over 17 million pounds in 2014. Available landings data suggest that Cancer crabs[5] were an unintentional, and now are increasingly a targeted catch from lobster traps, as anywhere from 90.91 percent to 99.71 percent of Cancer crabs landings between 1990 and 2014 have been from pot and trap gear. With small, legal modification to lobster gear and small shifts in the area where traps are fished, American lobster harvesters can target either Jonah crab or American lobster, depending on availability and market. Due to this linkage between the lobster fishery and the Jonah crab fishery and an increase in recent landings, the Atlantic States Marine Fisheries Commission's American Lobster Board began development of an Interstate Fishery Management Plan for Jonah Crab (Appendix 1).

1.2 Atlantic Coastal Act and Atlantic States Marine Fisheries Commission Authority and Process

The Commission was formed in 1942 by the 15 Atlantic coastal states to improve interstate coordination in the protection and management of marine fisheries resources. In 1993, Congress passed the Atlantic Coastal Fisheries Cooperative Management Act[6] facilitating a state-oriented fishery management structure for several species which strengthened the role of the Commission in the development of management measures. Member states are Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. The federal government is not a member of the Commission, but attends Commission meetings and sits as a voting member on many Commission species management boards, including the American Lobster Board that oversees management of Jonah crab. The Commission provides a public forum for representatives from the states and the federal government to coordinate fisheries management.

From Maine through Virginia, Jonah crabs are harvested in both state and federal waters. Individual states manage the resource within their state waters (0-to-3 nautical miles from the shoreline). The federal government has primary jurisdiction over the resource in waters 3-to-200 nautical miles from the shoreline (also known as the Exclusive Economic Zone, or EEZ). Management measures deemed necessary for the protection of the Jonah crab resource are advanced by the Commission process through the development of the Interstate Fishery Management Plan for Jonah crab and any future amendments and addenda. The Commission prepares these actions on an ongoing, as-needed basis, and then makes recommendations to the states and federal government to implement measures consistent with its plan. The states then process and implement these recommendations in state waters under state statutory

[5] Jonah crab and rock crab (*Cancer irroratus*)
[6] 16 U.S.C. 5101-5109; Title VIII of Pub. L. 103-206, as amended, (ACFCMA 1993).

authorities. Similarly, we process and potentially implement complementary measures under the Atlantic Coastal Act, which is the federal statutory authority.

1.3 Regulatory Setting for Jonah Crab

From a federal perspective, Jonah crab management has an unusual construct. Management actions are developed through the state-initiated Commission process in which federal managers act in coordination with the Commission. This process differs from the Fishery Management Council process as is seen in many other areas of fishery management (e.g., groundfish, scallops, squid) because we, NOAA's National Marine Fisheries Service or NMFS, have the authority to approve, partially approve, or disapprove Council-recommended management measures based on their compliance with federal laws and statutes and laws. On the one hand, the Commission's management structure is a practical response to the state/federal jurisdictional realities behind Jonah crab and lobster management: Lobster harvest occurs primarily within state waters, with complementary regulations in federal waters, and Jonah crab is predominantly harvested by lobster permit holders in federal waters. On the other hand, the Commission's management structure also serves to spotlight the differences in jurisdictional perspectives: Though a broad view of the needs of the overall fishery may suggest one type of action from a federal perspective, we may reject that option because it is deemed to be inconsistent with the National Standards as articulated under the Magnuson-Stevens Fishery Conservation and Management Act. Furthermore, when implementing regulations, it is the obligation of federal Jonah crab managers to ensure that those regulations are compatible with the Commission's Jonah Crab Plan. Because management interests can and often do diverge however, not only between the states and federal managers but also between the states themselves, finding compatible regulatory approaches to lobster and Jonah crab management can be challenging.

Commission management of the Jonah crab fishery is the responsibility of the American Lobster Board. This, in large part, is due to the fact that Jonah crab were an unintentional catch, and more increasingly as a target species, of lobster permit holder's trap gear. Although Jonah crabs are harvested primarily in federal waters, the majority of harvesters have both state and federal lobster permits and are subject to both state and federal lobster regulations. Given the federal component to the fishery, the New England Fishery Management Council (NEFMC), responsible for managing federal fishery resources, considered developing its own Jonah Crab Fishery Management Plan. Ultimately, however, the Council opted not to develop its own Jonah Crab Plan, but will have a Council representative sit on the Lobster Board to participate in Jonah Crab fishery management.

NMFS has placed a strong emphasis on improving coordination between itself, the states, and the Council via the Commission. The goal of this coordination is to improve consistency between state and federal regulation. Potential inconsistency can result from the fragmented nature of state/federal management and the pace at which new management measures continue to be advanced through the Commission process. A number of factors contribute to these circumstances.

The Commission's inherent structure:

- The Commission (and its Lobster Board) is not a singular entity so much as it is an amalgamation of multiple independent and sovereign entities. Specifically, the Lobster Board is composed of ten (10) state governments, the New England Council, and the federal government. Each state and the federal government has its own laws and authorities that govern what it can do and how it can do it. The New England Council has does not manage the Jonah crab fishery but votes on Jonah crab issues at the Lobster Board, given that the fishery predominately takes place in federal waters. Further, the Jonah Crab Plan is open to interpretation, so one's opinion as to what constitutes compatible and consistent regulations might vary from one government to another.
- Governments have different rulemaking apparatuses – e.g., some states can create regulations quickly by executive action, while others need legislative approval – as a result, regulations are often enacted on different timelines. NMFS does not typically begin its rulemaking for a Commission Plan action until the Commission process ends. Combining this with existing detailed federal rulemaking requirements, a lag time between when the states create their regulations and when NMFS can create its regulations is typical.[7] Accordingly, while there may be one singular Commission Jonah Crab Plan, in reality there are eleven independent and separate sets of regulations implementing that Plan – one for each state and the federal government. In this environment, it is challenging to maintain regulatory consistency amongst the ten states and the federal government.

State/federal regulatory disconnects:

Regulatory consistency across state/federal jurisdictions is a particular challenge to NMFS due to unique characteristics of the lobster and Jonah crab federal fisheries.

- A challenge to consistency that is unique to NMFS involves the nature of so-called "dual lobster permit holders." Dual lobster permit holders are individuals that hold two permits: A state lobster permit allowing the person to fish in state waters 0-to-3 nautical miles from shore; and a federal lobster permit allowing the person to fish in federal waters beyond 3 nautical miles from shore.[8] Although fishing under two lobster permits, these dual permit holders operate their fishing businesses as a singular entity. The Commission's Interstate Fishery Management Plan for American Lobster, through Addendum XII provisions, considers their fishing practices and fishing history to be unified and indivisible. While the Commission has not yet stated such for the Jonah Crab Plan, the same concept may apply. This creates further incentive for the involved

[7] Occasionally, this lag time can be of benefit insofar as it allows time for further reflection and potentially, revision, of Commission addenda that are created and passed with such speed that details are sometimes necessarily left unresolved to future dates. This federal action is a perfect example. While development of this action began soon after the Commission approved the Jonah Crab Plan, several addenda have provided additional management measures or revised management measures included in the original Jonah crab plan.

[8] It may also be possible in certain limited situations to have dual state permits, but such situations are rare and not germane to the present analysis.

state and federal jurisdictions to make consistent decisions on the dual permit holder and disincentive (and potential for chaos) should the jurisdictions not do so.

- For an individual state, dual lobster permit holder consistency is less complex because it needs to seek compatibility with NMFS only. And even in so doing, a state need only look at the Commission Plan and interpret it as it sees fit because NMFS is usually unable to preemptively create federal regulations in time to guide the states during the state regulatory process. For the federal government, however, compatible dual lobster permit holder regulations requires attempted consistency with each of the ten (10) managing states, which are themselves not always consistent with one another. Furthermore, given the time lag between state and federal rulemaking, NMFS can often be left trying to reconcile up to ten sets of independently developed and already enacted regulations before it can issue its own regulations. NMFS expects this same challenge to arise with Jonah crab regulations, as states were required to implement regulations consistent with the Jonah Crab Plan by June 1, 2016.
- In addition to reconciling regulations between NMFS and ten state jurisdictions, the challenge may be greater because of the interaction between unique duality between the Lobster and Jonah crab fisheries. Specifically, the fisheries are prosecuted by the same harvesters using the same gear at the same time. As such, any regulation targeting the Jonah crab fishery will necessarily impact the lobster fishery. Lobster board members at the Commission level must now consider the implications of any proposed measure on both fisheries to prevent unintended consequences of one fishery's restrictions affecting the other fishery. In addition, state and federal regulators must carefully draft the regulations for these connected fisheries so that they are clear and not redundant.

It is within this overall regulatory context, where state/federal regulatory consistency has become increasingly difficult to achieve, that the proposed management measures that are the subject of this draft Environmental Impact Statement (EIS) are being considered by NMFS.

1.4 Notice of Intent, Scoping, and Public Comments

Public participation in the NEPA process promotes open communication between the public and the government and enhances decision-making. All persons and organizations having an interest in the decision of the Secretary of Commerce on whether to promulgate the proposed regulations are encouraged to participate in the decision-making process. The actions set forth in the rulemaking associated with this draft EIS have undergone extensive and open public notice, debate and discussion both at the Commission and federal levels and will undergo additional public comment during the rulemaking process.

Commission Public Process – General

Typically, the public discussion of a potential action begins within the Commission process. Specifically, the Commission's Lobster Board forms a Plan Development Team (PDT) and tasks it to develop an Interstate Fishery Management Plan to address a problem or need, or whether an existing plan needs to be revised or amended. The PDT is typically comprised of personnel from state and federal agencies knowledgeable in scientific data, stock, and fishery condition, and fishery management issues. If the PDT concludes that management action is warranted, it will advise the Lobster Board. The Board will likely

initiate the Interstate Fishery Management Plan, amendment, or addendum and again task the Plan Development Team with the development of potential management measures.

The Commission's Lobster Board will often attempt to seek specialized comment from both the Technical Committee and Advisory Panel, if these groups have been formed, before the proposal is formally brought before the Board. The Technical Committee is composed of specialists, often scientists, whose role is to provide the Lobster Board with specific technical or scientific information. The Advisory Panel is a committee of individuals with particular knowledge and experience in the fishery, whose role is to provide the Lobster Board with comment and advice. Minutes of the Advisory Panel can be found at the Commission's website for Jonah crab under the Advisory Panel Meeting Summaries subcategory in the Meeting Summaries & Reports section.

After receiving sub-committee advice, the Lobster Board debates the proposed measures in an open forum whenever the Board convenes (usually four times per year, one time in each of the spring, summer, fall, and winter seasons). Minutes from the Lobster Board can be found on the Commission's website for Jonah crab under the Board Proceedings subcategory in the Meeting Summaries & Reports section. These meetings are typically scheduled months in advance and the public is invited to comment at every Board meeting. When initiating a new Interstate Fishery Management Plan, an amendment, or addendum, the Board will vote on potential measures to include in a draft document. Upon approving a draft document for public comment, the Lobster Board will conduct further public hearings on that draft document for any state that so requests. After conducting the public hearing, the Lobster Board will again convene to discuss the public comments, new information, and/or whatever additional matters are relevant. After the debate, which may or may not involve multiple Lobster Board meetings, additional public comment and/or requests for further input from the PDT, Technical Committee, and Advisory Panel, the Lobster Board will vote to adopt the document, in this case the Jonah Crab Plan, and if applicable, request that the federal government implement compatible regulations.

Commission Public Process – Jonah Crab Plan

Beginning in August 2014, the Lobster Board initiated its process to develop an Interstate Fishery Management Plan for Jonah crab by approving a Public Information Document for public comment. Hearing and public comments were received during autumn 2014. The Lobster Board officially tasked the PDT with developing a draft Jonah Crab Plan in October 2014. During the next several months, the PDT met on several occasions to review fishery data, develop a range of management alternatives, and describe the fishery in the draft Jonah Crab Plan. A completed draft was released for the May 2015, Commission meeting, where it was reviewed and discussed at length. Ultimately, the Lobster Board voted to send this completed draft out for public comment. In conjunction with the public comment period, public hearings were scheduled in Maine, New Hampshire, Massachusetts, Rhode Island, and Maryland. A summary of the public comments is available on the Commission's website. Following the public comment period, the Lobster Board convened again in August 2015, provided the opportunity for additional public comment, considered all public comment on the draft Plan, selected final management measures, and approved the Plan.

Commission Public Process – Jonah Crab Addenda

Following approval of the Jonah Crab Plan, it was soon clear that several items required further development or the consideration of additional management measures. At its November 2015 meeting, the Lobster Board reconsidered the incidental catch limit originally approved in the Jonah Crab Plan.

Through a similar public process to the original Jonah Crab Plan, draft Addendum I was initiated in November 2015 to address incidental catch limits, developed during the winter, and was released for public comment following the February 2016 Commission meeting. Public hearings were again scheduled in Maine, New Hampshire, Massachusetts, Rhode Island, and Maryland. A summary of the public comments is available on the Commission's website. Following the public comment period, the Lobster Board convened again in May 2016, provided the opportunity for additional public comment, considered all public comment on the draft Plan, selected final management measures, and approved Addendum I (Appendix 2).

In November 2015, the Lobster Board and the Jonah Crab PDT began investigating Jonah crab claw landings to inform the development of another addendum to address this issue. Through a similar public process to the original Jonah Crab Plan, draft Addendum II was initiated in May 2016 to consider options that would prohibit or allow coastwide Jonah crab claw landings and consider instituting an incidental catch definition. Addendum II was developed during the summer and autumn, and was released for public comment following the November 2016 Commission meeting. Public hearings were again scheduled in Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Maryland, Delaware, and Virginia. A summary of the public comments is available on the Commission's website. Following the public comment period, the Lobster Board convened again in January 2017, provided the opportunity for additional public comment, considered all public comment on the draft Plan, selected final management measures, and approved Addendum II (Appendix 3).

Federal Public Process

Following Board approval of the Jonah crab Plan and at the request of the Lobster Board, we, the NMFS, established June 2, 2015 as a control date for the Jonah crab fishery through an advance notice of proposed rulemaking (80 FR 31347). The control date informed fishery participants that we were considering future action. The notice was intended to promote awareness of a possible future rulemaking, and discourage speculative entry into and/or investment in the Jonah crab fishery. It gave notice that interested Jonah crab fishery participants should locate and preserve records that verify participation in the fishery. Finally, it requested public comment. In response to this notice, two comments were received. The first supported establishing a control date. The second opposed the establishment of a control date and overall management by the Commission. Instead, the commenter stated that the fishery should be managed by the Council, as most of the landings are harvested from federal waters.

Following Board approval of the Jonah crab Plan, we initiated the public scoping process for this action by publishing an advance notice of proposed rulemaking and notice of intent (81 FR 70658; October 13, 2016) notifying Jonah crab harvesters that we are initiating the rulemaking process. We sought additional input to help determine the scope of issues to be addressed by potential federal regulations in support of the Jonah Crab Plan, as well as to identify significant issues for inclusion in the draft EIS. A scoping webinar was held on October 20, 2016. During the webinar, NMFS staff summarized the Commission process, the Commission-recommended measures, and requested comment on upcoming rulemaking and analysis.

We received one public comment during the scoping webinar and three written comments during the open comment period. A summary of comments and NMFS responses are available in Appendix 4.

1.5 Regulatory Requirements

NMFS is the lead federal agency for the proposed actions evaluated in this draft EIS. Any regulations that result from these actions will be drafted under the Atlantic Coastal Act. Although the Atlantic Coastal Act is the primary regulatory driver behind the proposed management measures, requirements under many other federal environmental laws concerning specific environmental resources are also triggered by the proposed measures and must be factored in to any final decision made by the agency. Examples of these include the Magnuson-Stevens Act, Section 7 of the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and Section 307 of the Coastal Zone Management Act (CZMA). These requirements are discussed in detail in Section 8.0, "*Other Applicable Laws*."

1.6 Scope and Organization of this EIS

In considering the proposed management measures, the Secretary, through NMFS, is responsible for complying with a number of federal regulations, including NEPA. As such, the purpose of this draft EIS is to provide an environmental analysis to support the Secretary's regulatory decision and to encourage and facilitate involvement by the public in the environmental review process.

This draft EIS assesses potential impacts on the biological and human environments associated with the establishment of various effort control measures for the Jonah crab fishery under federal regulation. This chapter, Chapter 1, provides background information on the Commission, the authority of the Commission, a summary of the open and public process leading to the development of this action, and a summary of regulatory requirements. Chapter 2 more fully describes the Commission's Jonah Crab Plan, including the Plan goals and objectives. Chapter 2 also includes the purpose and need for this federal action. Chapter 3 describes the Commission-recommended management measures and potential alternatives. Chapter 4 includes a summary of the affected environment (e.g., biological, physical, social and economic environment) as it currently exists. The probable consequences on the human environment that may result from the implementation of the proposed management measures and their alternatives, and the potential cumulative impacts from the proposed measures and their alternatives are described in Chapter 5. In developing this EIS, NMFS adhered to the procedural requirements of NEPA, the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508)[9], and NOAA's procedures for implementing NEPA[10].

2.0 The Commission's Interstate Fishery Management Plan for Jonah Crab

2.1 Jonah Crab Plan Development

As discussed in Section 1.4, beginning in August 2014, the Lobster Board then initiated its process to develop an Interstate Fishery Management Plan for Jonah Crab. This effort concluded in August 2015, with the Board's selection of Jonah crab management measures and the approval of the Jonah Crab Plan.

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[9] See Reference (CEQ 1969).
[10] NOAA Administrative Order 216-6, Environmental Review Procedures for Implementing the National Environmental Policy Act

Since that time, the Commission has drafted and approved Addenda I and II to the Jonah Crab Plan, which modifies the incidental catch limits and further develops alternatives for Jonah crab-only and claw-only harvest.

2.2 Purpose and Need

Jonah crab landings from the northwest Atlantic have increased dramatically in the past 20 years. While scientific information is not available to estimate the size of the Jonah crab stock in the U.S. waters, the available information on Jonah crabs and its fishery indicates that current harvest levels are thought to be sustainable. This action is needed to begin sustainable management of the Jonah crab fishery in federal waters, recognizing that federal management occurs in consort with state management.

The purpose of the proposed measures is to manage the federal Jonah crab fishery in a manner consistent with:

- The Atlantic Coastal Act,
- the National Standards of the Magnuson-Stevens Act,
- the Jonah Crab Plan,
- states laws and regulations,
- and other applicable federal laws.

NMFS is proposing to adopt management measures for the Jonah crab fishery that are consistent with the Commission's goal of responding to the recent rapid increase in landings. The analysis in this document attempts to identify potential adverse effects that overfishing has on biological resources that include Jonah crab, protected species, species caught unintentionally, and bait fish.

Because the biological status of Jonah crab in U.S. waters is not completely understood, the Commission's Jonah Crab Plan aims to: 1) Collect consistent data on Jonah crab to support a future stock assessment, 2) implement consistent state-to-state and complementary federal regulations to ensure consistent management, and 3) establish an Interstate Fishery Management Plan to ensure that future concerns or changes in the fishery can be addressed.

The goals and objectives of the Commission's Jonah Crab Plan are detailed on page 11 of Appendix 1.

3.0 Proposed Action

3.1 Background

While the Lobster Board originally considered a range of management alternatives, the Board ultimately approved discrete commercial and recreational measures and reporting requirements. States were required to comply with measures approved in the Jonah Crab Plan by June 1, 2016. The Commission formally requested that we issue complementary regulations to the Jonah Crab Plan in federal waters in September 2015. Subsequently, incidental catch limits were reconsidered in Addendum I and claw fishery requirements and an incidental catch definition were developed in Addendum II.

Under NEPA, any federal agency proposing a major action must consider a range of reasonable alternatives to the proposed action, despite the Commission recommending specific measures for federal implementation. The evaluation of alternatives in an EIS assists the Secretary in ensuring that any

unnecessary impacts are avoided through an assessment of alternative ways to achieve the underlying purpose of the project that may result in less environmental harm.

To warrant detailed evaluation by NMFS, an alternative must be reasonable[11] and meet the Secretary's purpose and need (see Chapter 2). Screening criteria are used to determine whether an alternative is reasonable. The following discussion identifies the screening criteria used in this EIS to evaluate whether an alternative is reasonable; evaluates various alternatives against the screening criteria (including the proposed measures), and identifies those alternatives found to be reasonable; identifies those alternatives found not to be reasonable; and for the latter, the basis for this finding. Alternatives considered but found not to be reasonable are not evaluated in detail in this EIS.

Screening Criteria – To be considered "reasonable" for purposes of this EIS, an alternative must meet the following criteria:

- *An alternative must be compatible with the Jonah Crab Plan and consistent with its goals*[12]. The Jonah Crab Plan embodies the state management directives for the fishery. It would make no practical sense to advance federal management measures that conflict with the efforts of the states, which are relied upon for the overall success of the fishery. Given this, while there may be other ways, not identified here, to cap effort in the Jonah crab fishery while providing the potential for economic flexibility it is in the federal interest to focus on measures that will support coordinated management of this state/federal resource.
- *An alternative must be consistent with the 10 National Standards set forth in the* Magnuson-*Stevens Act.*[13]

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[11] "Section 1502.14 (of NEPA) requires the EIS to examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are *practical or feasible from the technical and economic standpoint and using common sense*, rather than simply desirable from the standpoint of the applicant." (40 Questions) (emphasis added)

[12] Jonah Crab goals can be found in Appendix 1 Section 2.2

[13] The 10 National Standards are:

(1) Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the U.S. fishing industry.

(2) Conservation and management measures shall be based upon the best scientific information available.

(3) To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

(4) Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation shall be: (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

(5) Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

(6) Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

(7) Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

(8) Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to: (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

(9) Conservation and management measures shall, to the extent practicable: (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

(10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

- *An alternative must be administratively feasible*. The costs associated with implementing an alternative cannot be prohibitively exorbitant or require unattainable infrastructure, such as databases or additional staffing.
- *An alternative cannot violate other laws (e.g., ESA, MMPA).*

The Secretary is proposing to act on the Commission's recommendations to promulgate regulations designed to control fishing effort in the Jonah crab fishery. However, the alternatives described below meet NEPA requirements, including the option for No Action, the Commission-recommended management measure, and another reasonable alternative either considered by the Lobster Board, the PDT, or developed through the scoping process.

The following sections (Sections 3.2 and 3.3) summarize the suite of commercial and recreational management measures. Each measure includes several alternatives, including a No Action alternative and the Commission-recommended alternative. Together, these alternatives create a suitable range for analysis.

3.2 Commercial Management Alternatives

This section summarizes management measures and alternatives for the commercial Jonah crab fishery. Management measures include permitting requirements, harvesting restrictions, and reporting requirements. Several alternatives, including No Action, the Commission-recommended alternative, and any other alternatives considered by the Commission are described for each management measure.

3.2.1 Permitting Alternatives

Permits are an important tool in fisheries management that help identify what a commercial harvester is allowed to fish for, retain, and sell to a dealer. Permits aid state and federal enforcement officers in their roles by affirming what a vessel is allowed to catch. Permitting also has a benefit of allowing fishery managers to target outreach efforts (i.e., only vessels permitted for a species will receive updates on regulatory changes in that fishery). There are two types of permits used: Open access and limited access. Open access permits can be obtained by anyone; there is no finite limit on the number of permits that can be issued. Limited access permits can only be obtained by a person for a vessel that has qualified into the fishery through its fishing history, or other criteria established through the Council or Commission process and implemented by NMFS. There are, therefore, only a limited number of limited access permits available. The Lobster Board considered a permitting system for the Jonah crab fishery, but abandoned this measure following the development of incidental catch limits described later in this section. Below is the range of permitting alternatives, developed from discussions at Lobster Board.

3.2.1.1 No Permits Required (No Action)

Under the No Action alternative, no federal permits would be required for Jonah crab harvest, possession, or sale. However, states have already enacted regulations consistent with the Commission's recommendations. Any federal vessel with state permits must abide by state requirements. As a result, those harvesting exclusively from federal waters may still be subject to Jonah crab restrictions by virtue of state regulations.

3.2.1.2 Jonah Crab harvest by Lobster Permit Holders (Preferred)

The preferred alternative leverages the existing lobster permit structure, allowing only federal American lobster permit holders to harvest Jonah crab, both commercially and recreationally. Under this structure, any limited access lobster trap permit holder may harvest an unlimited amount of Jonah crab from permitted lobster areas. Commercial non-trap harvesters would be subject to any incidental catch limits, described in Section 3.2.6. While the Lobster Board has not taken specific action to develop a limited access permit program for Jonah crab, this alternative is consistent with the Lobster Board's intent because it captures commercial and incidental harvesters according to their current fishing practices.

3.2.1.3 Jonah Crab Harvest by Jonah Crab Permit Holders

This alternative would establish a separate permit and qualification program for Jonah crab harvesters, under a tiered permit system. While the Lobster Board has not taken and likely will not take specific action to further develop a limited access permit program for Jonah crab, this alternative builds off several other Lobster Board decisions, including establishing a control date and setting an incidental catch limit. The Board did not pursue this alternative because they could not identify any Jonah crab harvesters that did not already have a lobster permit. The following permit system alternative attempts to balance the Lobster Board's intent of tying the Jonah crab fishery to the lobster fishery while allowing any unidentified historic participants to continue to operate in the fishery:

- Lobster trap permit holders may retain and sell Jonah crabs;
- A limited access permit program for any Jonah crab trap harvester without a lobster trap permit that can demonstrate trap landings in excess of 1,000 Jonah crabs or 1,000 pounds of Jonah crabs by the control date of June 2, 2015.
- An open access incidental permit.

3.2.2 Minimum Size Alternatives

Many fisheries employ a minimum size as a tool to protect immature fish. They are typically set to a size where at least 50 percent of fish are considered mature and would have had the opportunity to reproduce and, therefore, help to maintain the fishery. Because there is a lack of data for the Jonah crab fishery (discussed in Section 4.1), the Lobster Board relied on market preferences to set minimum size. For crustaceans, the carapace (the portion of the shell covering the back part of the animal) is used to measure the minimum size. In the case of Jonah crab, size is measured by carapace width. The Lobster Board considered options for a minimum carapace width ranging from no minimum size to 5.5 inches (13.97 cm). The alternatives below capture a portion of this range and include the Commission's recommended minimum size and a slightly larger size.

3.2.2.1 No Minimum Size (No Action)

The No Action alternative would allow the Jonah crab fishery to continue to operate without a minimum size. Commercial harvesters would be allowed to legally possess and land Jonah crabs of any size. However, states have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, commercial harvesters with both state and federal permits would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations), which in this case would be the 4 ¾ inches (12.065 cm) minimum size adopted by the states.

As a result, those harvesting exclusively from federal waters may still be subjected to size restrictions even in the absence of federal regulations.

3.2.2.2 4 ¾-inch (12.065-cm) Minimum Size (Preferred)

The preferred alternative would restrict commercial harvesters to possessing and landing Jonah crabs with a minimum carapace width of 4 ¾ inches (12.065 cm), consistent with the minimum size approved in the Jonah Crab Plan. This minimum size was selected by the Lobster Board because it balances biological concerns over the size at which crabs become mature and minimizes enforcement's concern with the harvest of female crabs, which tend to be smaller, in this high volume fishery.

3.2.2.3 5-inch (12.7-cm) Minimum Size

This alternative would restrict commercial harvesters to possessing and landing Jonah crabs with a minimum carapace width of 5 inches (12.7 cm), consistent with an option developed by the PDT and considered by the Lobster Board in the development of the Jonah Crab Plan. Similar to the preferred alternative, this alternative addresses concerns over size-at-maturity for male crabs and minimizes the harvest of female crabs, which tend to be smaller. However, states have already enacted regulations consistent with the Commission's recommendations. Commercial harvesters with both state and federal permits would be required to comply with the most restrictive rule (i.e., comply with the most restrictive federal minimum size).

3.2.3 Landing Disposition Alternatives

In this document, landing dispositions refers to any requirements on how crabs should be landed. During development of the Jonah Crab Plan, it became clear that different states have different landing disposition requirements, with some states allowing only whole crabs to be landed and other states that would allow claws to be landed (with the crab body discarded at sea). The Lobster Board considered several alternatives for landing disposition in the Jonah Crab Plan and in Addendum II. The alternatives below span the range from only a whole crab fishery to no specific landings disposition requirements (i.e., whole crabs and claws may be landed), including the Commission's recommended measure.

3.2.3.1 Whole crabs and claws may be landed (No Action)

The No Action alternative puts no specific landing disposition requirements on the commercial Jonah crab fishery. Commercial harvesters would be allowed to legally possess and land whole Jonah crabs and claws. However, states have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, commercial harvesters with both state and federal permits would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those harvesting exclusively from federal waters may not be subjected to any state regulations.

3.2.3.2 Whole crab fishery

This alternative would restrict commercial harvesters to possessing and landing only whole Jonah crabs. This management measure was considered by the PDT while developing the Jonah crab plan and Addendum II and the Lobster Board. It was included as an option in these documents to align with some

existing state requirements and because existing data demonstrates low survivability of Jonah crab with one or both claws removed.

3.2.3.3 Coastwide whole crab fishery with minimal claw allowance

This alternative would restrict commercial harvesters to possessing and landing only whole Jonah crabs, but allow for a small amount (i.e., one 5-gallon bucket) of claws to be harvested. This management measure was considered by the Lobster Board in an early draft of Addendum II because it balances concern due to a lack of data demonstrating survivability of Jonah crab with one or both claws removed with historic prosecution of the fishery.

3.2.3.4 Coastwide regulated claw fishery

This alternative would allow commercial harvesters coastwide to possess and land both whole Jonah crabs and claws, with the following restrictions:

- A commercial harvester may possess up to one 5-gallon bucket of claws meeting no minimum claw size.
- A commercial harvester may possess in excess of one 5-gallon bucket, but must meet a minimum claw length of 2.75 inches (6.985 cm). Claw length is measured along the bottom of the claw, from the joint to the lower tip of the claw. Commercial harvesters may land an unlimited amount of claws.
- Commercial harvesters may possess both whole crabs and claws.
- An incidental harvester may translate incidental catch limits into claw counts and land up to 2,000 claws.

This management measure was considered by the Lobster Board and approved in Addendum II. Coastwide measures help to address National Standard 4 concerns with other options that would have granted an exception to certain states to allow claw harvest. It is also consistent with historic prosecution of the fishery.

3.2.4 Broodstock Protection Alternatives

In this document, broodstock protection alternatives refer to protection afforded to egg-bearing female Jonah crabs. Like setting a minimum size, providing protection for egg-bearing females ensures that these eggs are given the opportunity to hatch, add to the population, and, therefore, help to maintain the future fishery. Similar protections for females are provided in other Greater Atlantic fisheries. Retaining egg-bearing females is prohibited in the lobster fishery. Retaining any female is prohibited in the deep-sea red crab fishery. The Lobster Board considered two alternatives, allowing retention of egg-bearing females (No Action) and prohibiting retention of egg-bearing females (the Commission's recommended measure). This document also considers prohibiting the retention of all females as another alternative.

3.2.4.1 No Broodstock Protection (No Action)

The No Action alternative puts no specific broodstock protection measures (i.e., protection for egg-bearing females or all females) for the commercial fishery in place. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, state commercial harvesters and those with both state and federal permits would be required to comply with the

most restrictive rule (i.e., comply with the most restrictive state regulations). Because the vast majority of Jonah crab harvesters will also have state permits, broodstock requirements would apply to harvesters in federal waters due to the most restrictive rule.

3.2.4.2 Prohibition on the retention of egg-bearing females (Preferred)

The preferred alternative would prohibit commercial harvesters from retaining egg-bearing female Jonah crabs, consistent with the management alternative approved by the Lobster Board in the Jonah Crab Plan. Prohibiting the retention of egg-bearing females would help to ensure that these females remain in the water when eggs hatch, helping to ensure that new crabs will mature and recruit to the fishery.

3.2.4.3 Retention of females prohibited

This alternative would prohibit commercial harvesters from retaining all female Jonah crabs, consistent with an option developed by the PDT and considered by the Lobster Board in the development of the Jonah Crab Plan. Prohibiting the retention of all females would ensure that female crabs remain in the water for all stages of reproduction, helping to increase the odds that new crabs will mature and recruit to the fishery. States have already enacted regulations consistent with the Commission's recommendations. Under this alternative, federal harvesters and harvesters with both state and federal permits would be required to comply with the most restrictive rule (i.e., comply with the prohibition on the retention of females).

3.2.5 Incidental Catch Definition Alternatives

The Lobster Board developed, considered, and approved an incidental catch definition as another means to ensure that incidental harvesters do not increase their effort on that species. Specifically, it responded to concern that a harvester could target Jonah crab by taking a trip where only the incidental amount of Jonah crab would be landed. By approving this definition, harvesters would need to demonstrate that Jonah crab truly is incidental catch because a certain amount of other species must be onboard. The Lobster Board considered two options, no definition (No Action) and a requirement that Jonah crabs be no more than 50 percent of the catch.

3.2.5.1 No incidental catch definition (No Action)

The No Action alternative would allow the Jonah crab fishery to continue to operate without an incidental catch definition for other commercial fisheries using non-trap and non-lobster trap gear. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, commercial fishermen would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those harvesting exclusively from federal waters would be allowed unlimited harvest and would not be subjected to any state limit.

3.2.5.2 50 percent limit (Preferred)

The preferred alternative would further restrict the commercial non-trap and non-lobster trap incidental catch of Jonah crabs to no more than 50 percent, by weight, of all species onboard a vessel, consistent with the management measures approved in Addendum I. This restriction would help to ensure that some

amount of Jonah crabs could be harvested by commercial fishermen targeting other species with non-trap or non-lobster trap gear and provide some protection for the Jonah crab stock.

3.2.6 Incidental Catch Limit Alternatives for Non-Trap and Non-Lobster Trap Gear

Incidental limits are often set for harvesters who are not targeting the species in question; these limits allow those harvesters to retain a small amount of catch. Such limits also help to ensure that incidental harvesters do not increase their effort on that species. The Lobster Board spent several meetings setting (in the Jonah Crab Plan) and perfecting (in Addendum I) the incidental catch limit, including discussion on gears that must abide by this limit. Ultimately, the Lobster Board determined that their recommended limit should apply to both non-trap gear (i.e., trawls, gillnets, dredges, etc.) and non-lobster trap gear (whelk pots, fish pots, etc.). The alternatives below encompass the range of incidental catch limit alternatives considered by the Lobster Board, including the recommended limit.

3.2.6.1 No incidental catch limit (No Action)

The No Action alternative would allow the Jonah crab fishery to continue to operate without an incidental catch limit for other commercial fisheries using non-trap and non-lobster trap gear. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, commercial harvesters with state and federal permits would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those harvesting exclusively from federal waters would be allowed unlimited harvest and would not be subjected to any state limit.

3.2.6.2 1,000 crabs per trip (Preferred)

The preferred alternative would restrict the commercial non-trap and non-lobster trap incidental catch to a limit of 1,000 crabs per trip, consistent with the management measures approved in Addendum I. This restriction would help to ensure that some amount of Jonah crabs could be harvested by commercial fishermen targeting other species with non-trap or non-lobster trap gear and provide some protection for the Jonah crab stock.

3.2.6.3 200 crabs per day up to 500 crabs per trip

This alternative would restrict the commercial non-trap and non-lobster trap incidental catch to a limit of 200 crabs per day up to 500 crabs per trip, consistent with a management approved in Jonah Crab Plan and considered in Addendum I. This alternative was developed to mirror the incidental limits for the lobster fishery, which is 100 lobsters per day up to 500 lobsters per trip. This restriction would help to ensure that some amount of Jonah crabs could be harvested by commercial fishermen targeting other species with non-trap or non-lobster trap gear and provide some protection for the Jonah crab stock. States have already enacted regulations consistent with Addendum I. Under this alternative, federal harvesters and harvesters with both state and federal permits would be required to comply with the most restrictive rule (i.e., comply with this lower incidental limit).

3.2.7 Harvester Reporting Alternatives

Most commercial fisheries under federal management in the Greater Atlantic Region have harvester reporting requirements or vessel trip reports. Vessel trip reports include information on catch (including

landings and discards), location of fishing activity, gear, and effort and are required to be submitted by the first Tuesday following the end of the reporting period (weekly or monthly, depending on the fishery). Federal lobster permit holders, however, do not have federal harvester reporting requirements. Those that also have a state license must abide by the specific reporting requirements for their state. The Lobster Board considered several options for Jonah crab harvester reporting requirements, including the frequency of reporting and the percent of harvesters that must submit reports. The options below attempt to balance the Lobster Board's recommendation with the fact that the crab and lobster fisheries are tied, but have different recommendations for reporting requirements.

3.2.7.1 No Mandatory Harvester Reporting (No Action)

The No Action alternative would allow federally-permitted commercial Jonah crab harvesters (e.g., Jonah crab and Lobster permit holders) to retain Jonah crabs without being required to report catch via the VTR. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, commercial harvesters would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those harvesting exclusively from federal waters would continue to follow the current regulations and may not be subjected to any state reporting requirements.

3.2.7.2 Mandatory Harvester Reporting for Jonah crab-only harvesters with no mandatory harvester reporting for lobster permit holders

The preferred alternative would require Jonah crab-only harvesters (e.g., harvesters with a limited access Jonah-crab-only permit) to submit harvester reports (e.g., federal vessel trip reports, or VTRs). However, federal lobster permit holders that may also be permitted to retain Jonah crabs would not be required to submit harvester report, consistent with both the Interstate Fishery Management Plan for American Lobster and the management alternative included in the Jonah Crab Plan. Those Federal lobster permit holders permitted to catch Jonah crabs and already required to submit federal VTRs because they have a requirement under a different federal fishery would still be required to report under that system. Mandatory reporting by Jonah crab harvesters would help to ensure that managers and scientists have better information when assessing this stock or making future management decisions.

3.2.7.3 Mandatory Harvester Reporting for all commercial Jonah crab harvesters

This alternative would require all commercial Jonah crab harvesters, including those with limited access lobster permits with no mandatory reporting requirements, to submit harvester reports (e.g., VTRs), consistent with an option developed by the PDT and considered by the Lobster Board in the development of the Jonah Crab Plan. Mandatory reporting by all Jonah crab harvesters would help to ensure that managers and scientists have a complete set of information when assessing this stock or making future management decisions.

3.2.8 Dealer Alternatives

All commercial fisheries under federal management in the Greater Atlantic Region have dealer permitting and reporting requirements. Federally-permitted dealers are currently required to submit trip-level reports of all species purchased by the first Tuesday following the end of the reporting week. This document considers extending such requirements to dealers purchasing Jonah crabs.

3.2.8.1 No Mandatory Dealer Reporting (No Action)

The No Action alternative would allow dealers to purchase Jonah crabs without being required to obtain a permit or report. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, dealers would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those purchasing from harvesters exclusively fishing in federal waters would continue to follow the current reporting requirements and would not be subjected to any state reporting requirements.

3.2.8.2 Mandatory Dealer Reporting (Preferred)

The preferred alternative would require dealers purchasing Jonah crabs from a federal commercial harvester must obtain a federal dealer permit for Jonah crabs and submit dealer reports, consistent with the management measure approved in the Jonah Crab Plan. Permitting and mandatory reporting by dealers would help to ensure that managers and scientists have better information when assessing this stock or making future management decisions.

3.3 Recreational Management Alternatives

This section summarizes management measures and alternatives for the recreational Jonah crab fishery. Several alternatives, including No Action, the Commission-recommended alternative, and any other alternatives considered by the Commission are described for each management measure. Together, these alternatives create a suitable range for analysis.

3.3.1 Broodstock Protection Alternatives

As discussed above, broodstock protection alternatives refer to protection afforded to egg-bearing female Jonah crabs. Like setting a minimum size, providing protection for egg-bearing females ensures that these eggs are given the opportunity to hatch, add to the population, and, therefore, help to maintain the future fishery. Similar protections for females are provided in other Greater Atlantic fisheries. Retaining egg-bearing females is prohibited in the lobster fishery. Retaining any female is prohibited in the deep-sea red crab fishery. The Lobster Board considered two alternatives, allowing retention of egg-bearing females (No Action) and prohibiting retention of egg-bearing females (the Commission's recommended measure). This document also considers prohibiting the retention of all females as another alternative.

3.3.1.1 No Broodstock Protection (No Action)

The No Action alternative puts no specific broodstock protection measures (i.e., protection for egg-bearing females or all females) for the recreational fishery in place. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, recreational harvesters would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those harvesting exclusively from federal waters would continue to follow the current regulations and may not be subjected to any state prohibition.

3.3.1.2 Prohibition on the retention of egg-bearing females (Preferred)

The preferred alternative would prohibit recreational harvesters from retaining egg-bearing female Jonah crabs, consistent with the management alternative approved by the Lobster Board in the Jonah Crab Plan. Prohibiting the retention of egg-bearing females would help to ensure that these females remain in the water when eggs hatch, helping to ensure that new crabs will mature and recruit to the fishery.

3.3.1.3 Retention of females prohibited

This alternative would prohibit recreational harvesters from retaining all female Jonah crabs, consistent with an option developed by the PDT and considered by the Lobster Board in the development of the Jonah Crab Plan. Prohibiting the retention of all females would ensure that female crabs remain in the water for all stages of reproduction, helping to increase the odds that new crabs will mature and recruit to the fishery. States have already enacted regulations consistent with the Commission's recommendations. Under this alternative, commercial harvesters would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations).

3.3.2 Recreational Catch Limit Alternatives

The Lobster Board developed, considered, and approved a catch limit for the recreational fishery, allowing recreational harvesters to retain a small amount of catch. Such limits help to ensure that recreational harvesters are allowed the enjoyment of harvesting the species but do not increase their effort on the target species. The Lobster Board considered two alternatives, described below.

3.3.2.1 No recreational catch limit (No Action)

The No Action alternative would allow the Jonah crab an unlimited amount of harvest to continue by recreational harvesters. States have already enacted regulations consistent with the Commission's recommendations. Under the No Action alternative, recreational harvesters would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations). Those harvesting exclusively from federal waters would be allowed unlimited harvest and would not be subjected to any state limit.

3.3.2.2 50 crabs per day (Preferred)

The preferred alternative would restrict the recreational fishery to a limit of 50 whole crabs per day, consistent with the management alternative approved by the Lobster Board in the Jonah Crab Plan. This restriction would help to ensure that some amount of Jonah crabs could be harvested by recreational harvesters, that Jonah crabs are not being targeted for illegal commercial harvest, and, provide some protection for the Jonah crab stock given that there is no minimum size for recreational harvesters.

4.0 Affected Environment

Consistent with Section 1502.15 of the NEPA regulations (40 CFR 1500), this chapter describes key components of the environment affected by the management alternatives for the Jonah crab fishery.

We are proposing to adopt management measures for the Jonah crab fishery that are consistent with the Commission's goal of responding to the recent rapid increase in landings. This analysis attempts to identify potential adverse effects that overfishing has on biological resources that include Jonah crab, protected species, species caught unintentionally, and bait fish. This analysis takes a comprehensive look at the impacts of these management measures and the complex interactions between regulatory actions and the natural and human-based environmental implications of these management actions. All of these topics are discussed in turn below.

Five major Valued Ecosystem Components (VECs) are examined in detail:

- Section 4.1 describes the status of the Jonah crab fishery, including its biological characteristics;
- Section 4.2 describes the status of other potentially affected commercial fish species, including and bait fish species and species caught unintentionally;
- Section 4.3 describes the physical environment that could be affected by the proposed action, including Jonah crab habitats and essential fish habitats for federally-managed species;
- Section 4.4 identifies protected species that may be affected by elements of the proposed Jonah crab management measures; and
- Section 4.5 describes the economic environment and social aspects of the fishing communities potentially affected by the proposed Jonah crab management measures.

For purposes of this assessment, areas that may be directly or indirectly affected by the alternatives under evaluation include all of federal waters within the Jonah crab fishery, encompassing inshore coastal zone and offshore waters from Maine to Virginia.

The resources evaluated include those species and habitats that may be directly or indirectly affected by the proposed management measures. In addition to American lobster, other biological resources evaluated for this document include protected species such as marine mammals, sea turtles, coastal and marine birds, fisheries resources, federally-listed threatened or endangered species, benthic habitats used by lobsters, and essential fish habitats (EFH) for federally-managed species that could be affected by this action. Determining which habitats and species occur in the project area was accomplished through literature reviews and coordination with appropriate NMFS staff and other knowledgeable experts.

4.1 Jonah Crab Fishery

4.1.1 Biological Characteristics[14]

Jonah crabs are found in waters of the Atlantic Ocean from Newfoundland, Canada to Florida, U.S. (Haefner 1977), which is considered the species' biological range. The life history of Jonah crab is generally poorly understood, as is specific information on the Jonah crab in waters off the Northeast U.S. Female crabs (and likely some males) are documented moving into the nearshore and even subtidal habitats during the late spring and summer (Krouse 1980). Motivations for this inshore migration are unknown, but maturation, spawning, and molting have all been postulated. It is also widely accepted

[14] Much of the information included in this section is from ASMFC 2015

these migrating crab move back offshore in the fall and winter, though this phenomenon has not been quantified. Lewis and Ayers (2014) demonstrated that Jonah crab will adjust the direction and magnitude of its movements towards a preferred temperature range. Due to the lack of a widespread and well-developed aging method for crustaceans, age and growth of Jonah crab is poorly described. The largest recorded Jonah crab was a male caught in Canada and measured 8 21/32 inches (22.0 cm); females generally do not exceed 5 29/32 inches (15.0 cm) (Robichaud et al. 2000).

Jonah crabs are frequently confused with rock crabs (*Cancer irroratus*), despite being biologically and taxonomically distinct (Figure 1). This confusion is largely due to overlapping habitat and numerous regional common names attributed to both species. The two species can be distinguished in a few ways. First, Jonah crabs have rough edged teeth on their carapace edge, whereas rock crabs have smooth edged teeth on the edge of the carapace. Second, Jonah crabs have yellow spots on the carapace while rock crabs have purplish-brown spots. Finally, Jonah crabs can be slightly larger than rock crabs. Because of this confusion, Jonah crabs and rock crabs may not be identified correctly in state and federal data, complicating analysis and the Commission's development of management alternatives. [15]

Figure 1. Picture of a Jonah Crab (left) and a rock crab (right)

Sea sampling of commercial trap fishing gear was conducted by the Maine Department of Marine Resources on 15 trips during 2003 on 7,131 crabs, with 6048 male/637 female sampled (ASMFC 2015). Similar sea sampling was conducted by the Commercial Fisheries Research Foundation (CFRF) and reported in the Jonah crab Plan, with 8,392 crabs (962 females and 7,428 males) sampled (CFRF, unpublished data). These data (Table 2) indicate that 96-98 percent of females are smaller than 5 inches (12.7 cm), while only 19-31 percent of males are smaller than 5 inches (12.7 cm). This morphometric difference likely accounts for the difference in encounter rates in sampling studies using commercial trap gear. Port sampling of 6,464 Jonah crabs by the Massachusetts Division of Marine Fisheries between 2013 and 2015 indicate that the typical market size has been larger than 5 inches (12.7 cm) (Table 2).

[15] ASMFC 2015

Table 2. Percent of Jonah crabs below various size thresholds

		ME Sea Sampling		CFRF Sea Sampling		MA Port Sampling
		male	female	male	female	all crabs
size (inches)	4	3%	27%	2%	39%	<0.1%
	4.25	6%	41%	4%	50%	<0.1%
	4.5	11%	65%	7%	70%	0.10%
	4.75	18%	84%	15%	93%	0.40%
	5	19%	96%	31%	98%	2.50%
	5.25	NA	NA	NA	NA	13.60%
	5.5	NA	NA	NA	NA	34.80%

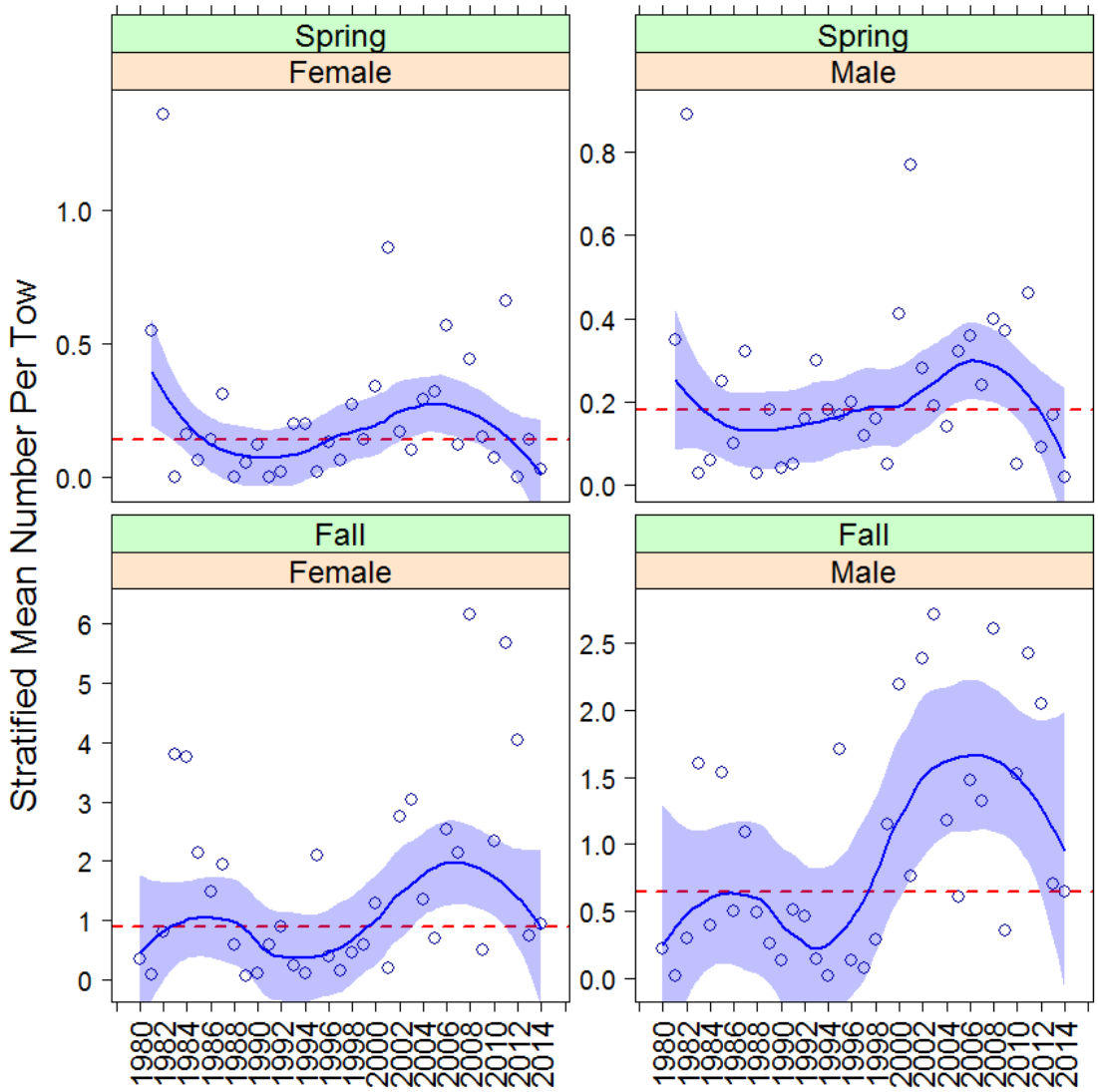
There is a lack of Jonah crab maturity data in U.S. waters. What little is known comes from unpublished documents and published studies with low sample sizes. Wenner et al (1992) determined that 46 of 66 female Jonah crabs inspected from the continental slope off the Southeastern U.S. had mature ovaries. The carapace width of mature female crabs ranged from 3 ½ inches (8.9 cm) to 5 13/64 inches (13.2 cm), with a mean of 4 9/64 inches (10.5 cm). In an unpublished master's thesis, Carpenter (1978) found the size at maturity to be between 3 35/64 inches (9.0 cm) and 3 15/16 inches (10.0 cm) for males, and 3 11/32 (8.5 cm) for females in Norfolk Canyon, off the mouth of Chesapeake Bay. An unpublished study conducted by Ordzie and Satchwill (1980) on 154 females and 94 male crabs collected from Southern New England waters used gonad color, presence of sperm in spermathecae, and width of sixth abdominal segment as indicators of sexual maturity in females and gonad color and presence of spermatozoids in spermatophores as indicators of maturity in males. Examination of the data suggests that both sexes reach near 100% maturity by 3 35/64 inches (9.0 cm).

Moriyasu et al. (2002) reported 50% of male Jonah crabs had mature gonads at 2 45/64 inches (6.85 cm) and reached morphometric maturity at 5 3/64 inches (12.8 cm) on the Scotian Shelf. Morphometric maturity is determined by a change in allometric relationships, in the case of Jonah crabs, the relationship between chela height and width. Moriyasu et al. (2002) cautioned that gonads of most brachyuran crabs could be classified as mature before they reach functional maturity, which should be considered when establishing limits for commercial harvest. Functional maturity is determined by the presence of mating scars on the claws of male crabs, eggs on female crabs, or other evidence of successful mating. Females as small as 3 45/64 inches (9.4 cm) have been recorded as carrying eggs by commercial fishermen participating in the Lobster/Jonah Crab Research Fleet Pilot Program administered through the Commercial Fisheries Research Foundation.

Maine, New Hampshire, Massachusetts, and Rhode Island conduct inshore state water trawl surveys, which are primarily focused on finfish and encounter Jonah crab infrequently, therefore providing only minimal data. Conservatively assumed high amounts of undocumented catch, along with spatial and temporal inconsistencies in reported landings make abundance difficult to estimate. The Massachusetts Division of Marine Fisheries has conducted seasonal spring (May) and fall (September) bottom trawl surveys in state waters since 1978. Information on the number, weight, size, gender, and distribution are collected. North of Cape Cod, Jonah crabs are frequently caught in the survey; however, south of Cape Cod Jonah crabs are infrequently caught as the crabs prefer deeper, cooler waters in this area and the

survey is restricted to shallower areas. Survey trends for males and females in both the spring and fall have been declining in recent years (Figure 2).

Figure 2. Jonah crab stratified mean number per tow from the Massachusetts Division of Marine Fisheries spring and fall trawl survey indices by sex in the Gulf of Maine. *

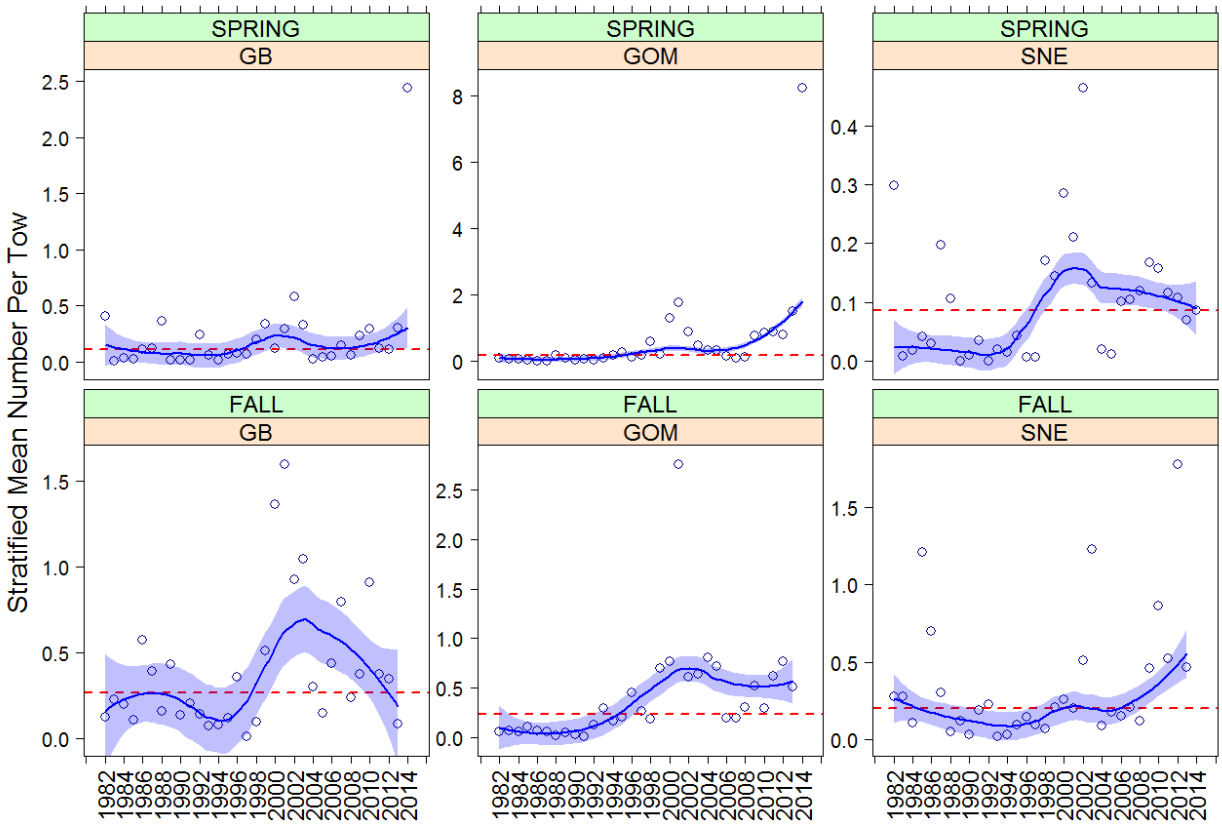


*Red, dashed line is the time series median, blue line is a loess fit using family=symmetric and span=0.66. Blue shaded area is approximate 95% confidence interval for the fit.

The NMFS Northeast Fisheries Science Center (NEFSC) conducts a spring (generally March to May) and fall trawl survey (generally conducted in September and October). Jonah crab stratified mean number per tow are given by region (Georges Bank, Gulf of Maine, and Southern New England) in Figure 3. The spring 2014 survey showed record high abundance in the Georges Bank and Gulf of Maine regions, the 2014 data points are extreme positive outliers from the rest of the time series. The spring survey in Southern New England has been fairly stable, hovering near the time-series median. The fall survey shows a declining trend in Georges Bank since reaching record high abundance in the early 2000s. The

Gulf of Maine has been fairly stable in the fall since 2000, staying generally above the time-series median. The fall survey has shown a recent increase in abundance in Southern New England.

Figure 3. Jonah crab stratified mean number per tow from the NMFS spring and fall trawl survey indices by sex and region (Georges Bank, Gulf of Maine, and Southern New England). *



* Red, dashed line is the time series median, blue line is a loess fit using family=symmetric and span=0.66. Blue shaded area is approximate 95% confidence interval for the fit.

American lobster (Ojeda and Dearborn 1991) and fish are predators of Jonah crab, particularly at smaller sizes. There have also been several studies documenting relatively high rates of predation on Jonah crab by gulls, primarily during northern latitude summers when Jonah crab move into subtidal habitats (Good 1992; Krediet and Donahue 2009).

Like other Cancer species, Jonah crabs consume a variety of prey including snails, arthropods, algae, mussels, and polychaetes (Donahue et al. 2009). Donahue et al. (2009) found that over 50% of stomach contents of wild-sampled crabs were blue mussels, (*Mytilus edulis*) along the coast of Maine. Jonah crabs found in the soft sediments of the New York Bight commonly ate polychaetes and mollusks (Stehlik 1993).

4.2 Other Affected Species

4.2.1 Unintentional catch and bycatch

The term "unintentional catch" typically refers to the unintentional landing and discarding of animals not specifically targeted by fishing vessels. Animals may be discarded for a variety of reasons, both economic and regulatory. Commonly discarded animals include those that are of an undesirable size, sex, or species. In addition to discards, fishing typically involves some degree of unobserved animal mortality associated with fishing gear (e.g., animals entangled in nets, breaking free of hooks or lines, and ghost fishing). In fisheries management, many unintentionally landed species have retention or landings limits placed on these species to ensure that catch does not increase. These limits are often called incidental limits.

Several marine fish and shellfish species are unintentionally caught in the directed lobster and Jonah crab trap fishery. These species vary depending on seasons and geographic area. Size of individuals caught in lobster traps is generally limited by the circular openings in the entrance of the trap as well as the escape vent size. This section discusses, on a qualitative level, some species that are most likely expected to be caught in lobster and Jonah crab traps. This is not meant to be an exhaustive list of all the regulated and non-regulated species that may be caught in the traps.

The coastal trap fishery in Massachusetts Bay and the Gulf of Maine is seasonal one that directly targets lobster and Jonah crab. Species caught unintentionally include unregulated benthic finfish species such as sculpins (*Myoxocephalus spp*.), sea raven (*Hemitripterus americanus*), sea robins (*Prionotus spp*.), wrymouth eel (*Cryptacanthoides maculates*), lumpfish (*Cyclopterus lumpus*), and Atlantic tomcod (*Microgadus tomcod*). Regulated species such as cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), pollock (*Pollachius virens*), red hake (*Urophycis chuss*), and windowpane flounder (*Scopthalmus aquosus*) may be encountered in lobster traps. Flatfish such as yellowtail flounder (*Limanda ferrugina*), winter flounder (*Pseudopleuronectes americanus*) and American plaice (*Hippoglossiodes platessoides*) may also be encountered in the traps. In Canada, cod and cusk are species of concern, but bycatch rates of these species are low and vary by area. At present, no efforts are underway to limit the very small bycatch of these species (Miller 2005; Pezzack 2005). Regulated species to a varying degree are sometimes harvested if the vessel has the associated permits necessary to do so, as required under 50 CFR part 648.

South of New England, the trap fishery remains directed on lobster and Jonah crab although some vessels, with the appropriate permits, may seasonally focus their efforts on finfish such as tautog (*Tautoga onitis*), scup (*Stenotomus chrysops*) and black sea bass (*Centropristis striata*) in the coastal fisheries from Nantucket Sound south to North Carolina. A study monitoring bycatch in the lobster fishery off New York found that tautog (23%) and scup (30%) were the two species of finfish most commonly taken in lobster pots (ASMFC 1997). Unintentional catch of non-federally regulated species such as four-spot flounder (*Paralychthys oblongus*), among others is likely. All vessels with a federal lobster permit are required to comply with the lobster gear specifications set forth under the federal lobster regulations at § 697.21 regardless of whether lobster is the target species. Vessels with federal Jonah crab permits would be similarly restricted.

In the offshore component of the fishery, federal vessels direct their trap fishing on lobster and Jonah crab. Some unintentional catch of regulated and non-regulated finfish and shellfish species is known to

occur. Specifically, the regulated species mentioned above as well as Atlantic wolffish (*Anarhicas lupus*), white hake (*Urophycis tenuis*), cusk (*Brosme brosme*), and redfish (*Sebastes fasciatus*) may also be encountered. The red crab fishery is a directed trap fishery occurring in the deeper canyons along Georges Bank. Of the generally small number of participants in this fishery, some subset may hold federal lobster permits (and may in the future hold federal Jonah crab permits) and therefore may keep lobster and Jonah crab as unintentional catch for commercial purposes as regulations allow. Due to the depths at which the red crab fishery is prosecuted, lobsters and Jonah are not as likely to be encountered in red crab directed trap fishing operations.

In addition to fish, a variety of invertebrates are found in and attached to traps. These include rock crabs, red crabs, starfish, urchins, whelks and conchs (ASMFC 1997; Butler 2004; Miller 2005).

In general, the traps used in commercial Jonah crab fishery, similar to those used in lobster fishery but with slight modification, are among the more selective types of fishing gear. As a result, overall *levels* of unintentional catch in traps are low in Jonah crab fishery relative to other marine fisheries. Few federal data exist to inform us about species that are unintentionally caught in traps when configured to catch Jonah crab. That being said, we assume that the most common types of unintentional catch in Jonah crab traps are lobsters and other crabs, as well as some bottom fish and other invertebrates. These species are consistent with those identified as unintentional catch in the American lobster fishery, and are assumed to be the same, given that the design and placement of gear is similar between the Jonah crab and American lobster fishery. The discard mortality rates (the percentage of discarded animals that die) associated with animals caught in traps is assumed to be low, particularly when compared against the mortality rates linked with mobile fishing gears such as trawls and dredges (Davis 2002).

The Magnuson-Stevens Act defines bycatch as fish harvested in a fishery, but not sold or kept for personal use, and includes economic discards and regulatory discards. NMFS is required to assess the amount and type of bycatch occurring in all fisheries managed under the Magnuson-Stevens Act. Because the lobster and Jonah crab fisheries are not managed under the Magnuson-Stevens Act, there is currently no U.S. bycatch monitoring program for these fisheries. While there has been no systematic review, bycatch in lobster/Jonah crab traps is reported to consist of a variety of animals attracted to bait and capable of entering traps. Because trap fisheries capture non-target animals but are generally non-lethal, fish and invertebrates landed in traps are likely to be discarded with lower mortality rates than those landed with other gear types such as trawls and dredges (Davis 2002).

American Lobster

The American lobster is a long-lived species known to reach more than 40 pounds (18 kg) in body weight (Wolff 1978). It is a bottom-dwelling, marine crustacean characterized by a shrimp-like body and ten legs, two of which are enlarged to serve as crushing and gripping appendages. Lobsters are encased in a hard external skeleton that provides body support and protection. Periodically, this skeleton is cast off to allow body size to increase and mating to take place. Lobster growth and reproduction are linked to the molting cycle. Although methods for ageing lobsters are currently being developed, they have not been used widely. Scientists generally estimate lobster ages based on size, per-molt growth increments, and growth frequencies. Based on this kind of information, Cooper and Uzmann (1980) estimated that the American lobster may live to be 100 years old.

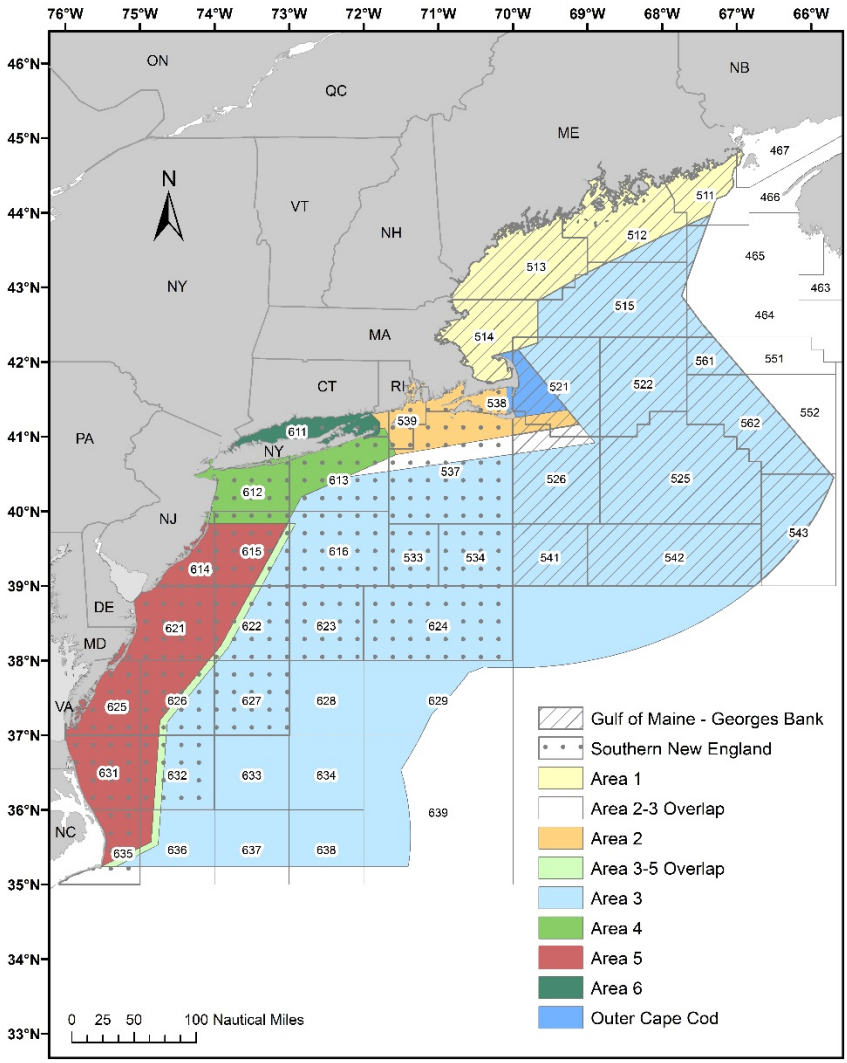
Lobsters typically form a brief pair bond for mating, with maximum receptivity for females peaking immediately after molting (Dunham and Skinner-Jacobs 1978; Waddy and Aiken 1990). Eggs (7,000 to

80,000) are extruded and carried under the female's abdomen during the 9 to 12-month incubation period. Seasonal timing of egg extrusion and larval hatching is somewhat variable among areas and may also vary due to seasonal weather patterns. Overall, hatching tends to occur during the course of several days over a four-month period from May through September, occurring earlier and over a longer period in the southern part of the range.

For the first three molt stages (15-30 days), larvae remain planktonic. During settlement, fourth stage post larvae exhibit strong habitat selection behavior and seek small shelter-providing substrates, with the greatest abundance of newly settled lobsters occurring in cobble beds (Wahle and Steneck 1991; Cobb and Wahle 1994; Palma et al. 1999). During their first year on the sea bottom, lobsters move little and can be found within a meter of where they settled (Wahle 1992; Palma et al. 1999). They do not usually emerge from their shelters until reaching about 25 mm carapace length (Wahle 1992; Cobb and Wahle 1994). As they grow, their daily and annual ranges of movement increase. Adolescent phase lobsters are found on a variety of bottom types, usually characterized by an abundance of potential shelters. By the time lobsters reach sexual maturity, the annual range of lobster averages just over 20 miles (32 km) (Campbell and Stacko 1985; Campbell 1986). In general, mature legal lobsters are more abundant offshore and in deeper water (Harding and Trites 1989). For the offshore trap fishery, the deep water canyons contain habitat with an abundance of favorable potential shelters.

The Commission manages the American lobster fishery in a unique way, allowing each of the seven Lobster Conservation Management Areas to help develop management measures to help achieve the goals of a particular Commission action (Figure 4). This approach has resulted in differing regulations between the management Areas.

Figure 4. Lobster Conservation Management Areas



Source: NEFSC

In 2015, the Commission completed an American lobster stock assessment, updating the previous 2009 stock assessment. The 2015 stock assessment recommended combining the Gulf of Maine and Georges Bank stocks into one stock (previously they were considered distinct). The Gulf of Maine/Georges Bank stock is in favorable condition, with high abundance levels. The Southern New England stock is currently in poor condition, with historically low abundance.

In 2015, 3,072 vessels were permitted to land lobster in federal waters, with the majority (over 2,000 vessels) permitted to fish commercially with trap gear in the various management areas. Approximately 825 non-trap vessels are also permitted to land a small amount of lobster from trawls, gillnets, dredges,

etc. While landings and value vary by state and in federal waters, coastwide landings are provided in Table 3.

Table 3. American Lobster Landings 2010-2015.

Year	Coastwide American Lobster Landings (lb)	Value ($) of American Lobster Landings	Average ex-vessel Price ($/lb)
2010	115,433,000	396,757,000	3.44
2011	126,318,000	423,531,000	3.35
2012	149,500,000	429,280,000	2.87
2013	149,323,000	460,131,000	3.08
2014	147,786,000	566,563,000	3.83
2015	145,921,000	617,187,000	4.23

Source: Fisheries of the U.S., 2010-2015

Landings have generally increased between 2010 and 2015, with a small decrease in landings from 2013 to 2015. Maine and Massachusetts have combined for the largest percent of landings over that time. Average ex vessel price has fluctuated over the same time period.

Rock Crab

Rock crabs, *Cancer irroratus*, are distributed in the northwest Atlantic Ocean from Labrador, Canada to South Carolina (Gendron 1998). Rock crabs have historically been identified as far south as Florida (NMFS 1979). Preferred depth varies with latitude, with rock crabs being encountered in more shallow waters in northern habitats and in deeper, sandy bottom regions in southern habitats, with some seasonal variation (NMFS 1979). Habitat preferences in Canadian populations of Rock crab also vary by size, with larger crabs inhabiting sandy or muddy bottom, and smaller crabs display a preference for rocky bottom (Gendron 1998). U.S. and Canadian research show pronounced sexual dimorphism (measuring the width of the carapace). Males have been observed as large at 5 33/64 inches (14 cm), while females rarely attain a carapace width of 3 15/16 inches (10 cm). Canadian (Gendron 1998) and U.S. (NMFS 1979) data indicates that female crabs reach sexual maturity at 2 23/64 inches (6 cm), and males at 2 ¾ inches (7 cm). NMFS 1979 suggests that rock crabs in southern waters may mature at slightly smaller sizes. Rock crabs are omnivorous, feeding opportunistically. Stomach content analysis indicated that rock crabs feed on pelecypods such as the mussel, plus other animal and plant tissues.

Presently, there is no coastwide management of rock crabs. Instead, states may elect to manage the rock crab harvest, and applicable regulations vary. As discussed in Section 4.1.1, Jonah crabs and rock crabs are frequently confused, complicating the interpretation of landings data. Recent rock crab landings are reported in Table 4.

Table 4. Rock Crab Landings and Value by Region and State, 2010-2015

	2010		2011		2012		2013		2014		2015	
State	**Landings (lb)**	**Value ($)**	**Landings (lb)**	**Value ($)**	**Landings (lb)**	**Value ($)**	**Landings (lb)**	**Value ($)**	**Landings (lb)**	**Value ($)**	**Landings (lb)**	**Value ($)**
ME	1,371,139	452,964	1,194,046	480,835	1,006,349	422,591	892,455	431,738	1,321,357	644,710	1,390,207	691,729
NH/MA	46,322	22,977	81,434	54,245	61,206	34,393	400,764	65,884	449,359	119,946	90,869	50,656
RI	1,003,926	498,821	727,225	361,766	613,875	358,692	291,230	181,811	467,638	326,468	483,800	343,432
CT/NY	14,602	2,783	33,393	11,801	23,485	9,517	21,787	11,413	50,572	20,496	376,011	10,483
NJ / DE / MD / VA	1,464	1,911	1,981	1,079	18,749	7,403	571	711	1,033	844	407	916
Total	**2,437,453**	**979,456**	**2,038,079**	**909,726**	**1,723,664**	**832,596**	**1,606,807**	**691,557**	**2,289,959**	**1,112,464**	**2,341,294**	**1,097,216**

Source: Data provided by NMFS GARFO, APSD from CFDBS (dealer data)

Coastwide, rock crab landings have ranged between 1.5 million pounds and 2.5 million pounds, with no discernable trend. Since 2010, New England has dominated the landings of rock crab, with the majority of landings coming from Maine. Rhode Island landings have fluctuated, but in most years has had the second highest landings. Drastically fewer rock crabs are landed in Southern New England and Mid-Atlantic regions and landings have been more variable. The value of the fishery has ranged between approximately $700,000 and $1.1 million and fluctuating in a pattern similar to the landings. Average price, as determined by diving the value by landings, has ranged from 40 cents/pound to approximately 50 cents/pound.

Red Crab

Deep-sea Red crabs, *Chaceon quinquedens*, are distributed along the continental shelf edge and slope of the western Atlantic from Emerald Bank, Nova Scotia to the Gulf of Mexico. They are typically found at depths of 200 to 1800 meters (700-5900 feet), reach a maximum carapace width of 7.09 inches (180 mm), and may live 15 years or more (Serchuk and Wigley, 1982). Scientific research suggests that red crabs are most likely opportunistic omnivores due to the limited availability of food at the depths common for this species. The red crab fishery was previously limited by the high catch-related mortality of the crabs (and rapid degradation of the meat) and a lack of economical processing. Technological advances have made fishing for this species feasible and fresh and frozen meat from the crab is now sold commercially (NEFMC, 2002).

Vessels operating in the red crab fishery typically make 28 to 35 trips per year, with each trip lasting seven to ten days. Trips are limited in duration primarily by the hold capacity of the vessel and the need to keep the product fresh and alive. Vessels fish 500 to 600 traps/pots using 90 to 120 traps/pots per trawl. Traps/pots are allowed to soak 18 to 36 hours, with an average soaking time of 22.5 hours. The reported average trap/pot loss is just over 10 pots/traps per trip (NEFMC, 2002).

Management of the red crab fishery under the Magnuson-Stevens Act occurred relatively recently. Following a request from the NEFMC, the Secretary of Commerce issued an emergency rule effective May 18, 2001 for management of the red crab fishery in the EEZ from 35°15.3' North Latitude (the latitude of Cape Hatteras Light, North Carolina) northward to the U.S./Canada border. A fishery management plan (FMP) was subsequently developed by the NEFMC, approved by NMFS and implemented by regulations effective October 20, 2002 (NEFMC, 2002). The regulations include

measures to limit and control effort in the fishery, including a limited-access permit system. Specifically, access to the fishery is limited to those fishermen who met specific criteria during a qualifying period; no additional entrants are allowed, but permits may be sold or otherwise transferred to a new owner. The regulations include gear restrictions and days-at-sea (DAS) allocations. Other measures include gear marking requirements, mandatory vessel trip reports, and a requirement for operator permits and dealer permits (NMFS, 2002a).

According to the Atlantic Deep-Sea Red Crab Fishing Years 2017-2019 Specifications, the Council's recommended specifications were based on the results of the most recent peer-reviewed assessment of the red crab fishery carried out by the Data Poor Stocks Working Group in 2009, and the recommendations from the NEFMC's Scientific and Statistical Committee (SSC). In addition, recent landings, landing per unit of effort, port samples, discard information, and economic data suggest there has been no change in the size of the red crab stock since Amendment 3 was implemented in 2011. To assess whether the stock is considered to be overfished, current data on either stock status or fleet per trap catch per unit effort (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.[16]

Of the 1,345 vessels permitted to fish for red crab in fishing year 2015, 1,341 vessels had unintentional catch permits and 4 had limited access permits. Table 5 includes a summary of red crab landings by gear for fishing years 2010 through 2015. Traps/pots are the most prevalent primary gear, with minimal landings from other traps, bottom otter trawls, and sink gillnet.

[16] See NEFMC Stock Assessment and Fishery Management Report, January 6, 2010, http://www.nefmc.org/crab/.

Table 5. Red Crab Landings by Gear Type, Fishing Years 2010-2016

	Sum of Total Pounds Landed	Sum of Total Revenue
2010	**2,882,807**	**$2,811,807**
Bottom Otter Trawl	15,204	$459
Crab Pot	2,863,708	$2,803,450
Fish Pot	1,900	$3,909
Lobster Pot	1,795	$3,577
Unidentified	200	$412
2011	**3,358,517**	**$3,262,627**
Crab Pot	3,342,111	$3,252,266
Fish Pot	89	$27
Lobster Pot	6,967	$5,645
Unidentified	9,350	$4,689
2012	**2,901,252**	**$2,900,394**
Crab Pot	2,888,260	$2,888,260
Lobster Pot	12,793	$11,985
Unidentified	200	$150
2013	**2,024,420**	**$2,024,420**
Crab Pot	2,024,395	$2,024,395
Lobster Pot	25	$25
2014	**2,440,974**	**$2,440,974**
Crab Pot	2,440,965	$2,440,965
Sink Gillnet	9	$9
2015	**3,609,774**	**$3,586,613**
Crab Pot	3,510,957	$3,487,809
Lobster Pot	98,817	$98,804
2016	**3,492,343**	**$3,191,832**
Crab Pot	2,753,499	$2,753,499
Lobster Pot	212,169	$211,710
Other Pot	75,990	$75,990
Unidentified	450,685	$150,633
Grand Total	**20,710,087**	**$20,218,667**

Source: Data provided by NMFS, GARFO, APSD from CFDBS (dealer data)

The ex-vessel value of red crab landings in the Northeast totaled roughly $3 million in 2016. More recently, overall landings have decreased from over 4 million pounds in 2005 to between 2 and 3 million pounds in 2012 to 2014. Landings in 2015 and 2016 have increased slightly, to approximately 3.5 million pounds.

4.2.2 Bait

Bait is used in traps to attract Jonah crabs and is an important component of the Jonah crab fishery. Skate, which is one source of bait used in the lobster fishery, is reported as being an important source of bait in the Jonah crab fishery (Derek Perry, personal comms). The skate bait fishery bait has been prosecuted historically as a directed fishery, involving vessels primarily from Southern New England ports that target a combination of little skates (>90%) and, to a much lesser extent, juvenile winter skates (<10%) (NEFMC 2015).

Little Skate

The geographical distribution of little skate (*Leucoraja erinacea*) includes the southwestern Gulf of Maine, specifically Cape Cod Bay and inshore north of Cape Ann, Georges Bank, Southern New England, and the Mid-Atlantic Bight. The highest abundances are on Georges Bank and in Southern New England. They are occasionally caught in the Maine/New Hampshire trawl survey. Little skate are generally found on sandy or gravelly bottoms, but also occur on mud (Bigelow and Schroeder 1953; McEachran and Musick 1975; Langton et al. 1995; Packer and Langton, unpublished manuscript). In southern New England, at a depth of 55 m, little skate was associated with particular microhabitat features on the surface of the sediment during the day, including biogenic depressions and flat sand, but were randomly distributed at night (Auster et al. 1995). Skates are known to remain buried in depressions during the day and are more active at night (Michalopoulos 1990).

Generally, invertebrates such as decapod crustaceans and amphipods are the most important prey items, followed by polychaetes. Isopods, bivalves, and fishes (sand lance, alewives, herring, cunners, silversides, tomcod, and silver hake) are of minor importance. Little skate also eat hydroids, copepods, ascidians and squid.

Egg cases are found partially- to fully-developed in mature females year-round but several authors report that they are most frequently encountered from late October-January and from June-July (Fitz and Daiber 1963; Richards et al. 1963; Scott and Scott 1988). Little skate gestation is at least six months after the cases are deposited (Bigelow and Schroeder 1953, Richards et al. 1963).

As of the 2008 Data Poor Stocks Working Group (DPSWG) meeting, little skate biomass was at 5.04 kg/tow, which is above overfished threshold reference point of 3.51 kg/tow indicating that the species is not overfished. Based on the coefficient of variation in the survey index, the species is not experiencing overfishing. Data collected through spring 2013 indicate that the status remains not overfished/overfishing not occurring.

Winter Skate

Similar to little skate, the geographical distribution of winter skate (*Leucoraja ocellata*) includes the southwestern Gulf of Maine, specifically Cape Cod Bay and inshore north of Cape Ann, Georges Bank, Southern New England, and the Mid-Atlantic Bight. The highest abundances are on Georges Bank. Relative to other skates (smooth, thorny, barndoor), winter skate has a fairly shallow distribution. Bigelow and Schroeder (1953) stated that this species is confined to sandy and gravelly bottoms, but Tyler (1971) reported it from mud bottoms in Passamaquoddy Bay. In Long Island Sound during the spring, winter skate were most abundant on sand bottoms in the Mattituck Sill and Eastern Basin (Gottschall et al. 2000). On the Scotian Shelf, Scott (1982) reports that the distribution of winter skate

was confined to sand and gravel bottoms and Scott (1982) suggests that bottom type, rather than depth, appears more important in determining the distributions of winter skate.

According to the NEFSC food habits database, crustaceans make up more than half the diet of smaller winter skates (<61 cm TL), and fish dominate the diet for larger winter skates (>91 cm TL). The proportion of polycheates in the diet increases until the skates are 81 cm TL. Prey exceeding the 5% by weight threshold in the stomachs of juvenile and adult winter skate include: Sand lance (17%), bivalve mollusks (13%), polychaetes (12%), other fish (8%), and gammarid amphipods (7%).

Bigelow and Schroeder (1953) report egg deposition to occur during summer and fall off Nova Scotia and, quoting Scattergood, probably in the Gulf of Maine as well. They also state that egg deposition continues into December and January off southern New England. Sulikowski et al. (2004) found that egg-case production is highest in the fall in the Gulf of Maine off New Hampshire. However, the presence of reproductively capable females during most months of the year and spermatocysts within the male testis year round implies that reproduction could occur at other times of the year.

As of the 2008 DPSWG meeting (NDPSWG 2009), winter skate biomass was at 2.93 kg/tow, which is above overfished threshold reference point of 2.83 kg/tow indicating that the species is not overfished. Based on the coefficient of variation in the survey index, the species was not experiencing overfishing at that time. However, the most recent assessment update indicates a 23% decrease in survey catch per tow during 2010-2012 as compared to 2009-2011, which means that overfishing is occurring on the stock. At 6.68 kg/tow, the stock is still above the biomass threshold, so it is not overfished.

4.3 Physical Environment

The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the Greater Atlantic Region: The Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope.

The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, North Carolina. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

Pertinent physical characteristics of the three sub-regions that could potentially be affected by this action are described in this section. Information included in this document was extracted from Stevenson et al. (2004).

4.3.1 Gulf of Maine

The Gulf of Maine is actually an enclosed coastal sea, bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape

Cod and Georges Bank. The Gulf of Maine was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

The Gulf of Maine is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The Gulf of Maine's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. It contains twenty-one distinct basins separated by ridges, banks, and swells. The three largest basins are Wilkinson, Georges, and Jordan. Depths in the basins exceed 250 meters, with a maximum depth of 350 meters in Georges Basin, just north of Georges Bank. The Northeast Channel between Georges Bank and Browns Bank leads into Georges Basin, and is one of the primary avenues for exchange of water between the Gulf of Maine and the North Atlantic Ocean.

High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 meters below the surface, as well as lower flat topped banks and gentle swells. Some of these rises are remnants of the sedimentary shelf that was left after most of it was removed by the glaciers. Others are glacial moraines and a few, like Cashes Ledge, are outcroppings of bedrock. Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the Gulf of Maine, particularly in its deep basins. These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. Some shallower basins are covered with mud as well, including some in coastal waters. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, as on Sewell Ridge to the north of Georges Basin and on Truxton Swell to the south of Jordan Basin. Sand predominates on some high areas and gravel, sometimes with boulders, predominates on others.

Coastal sediments exhibit a high degree of small-scale variability. Bedrock is the predominant substrate along the western edge of the Gulf of Maine north of Cape Cod in a narrow band out to a depth of about 60 meters. Rocky areas become less common with increasing depth, but some rock outcrops poke through the mud covering the deeper sea floor. Mud is the second most common substrate on the inner continental shelf. Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Many of these basins extend without interruption into deeper water. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Large expanses of gravel are not common, but do occur near reworked glacial moraines and in areas where the seabed has been scoured by bottom currents. Gravel is most abundant at depths of 20 - 40 meters, except in eastern Maine where a gravel-covered plain exists to depths of at least 100 meters. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 meters. Sandy areas are relatively rare along the inner shelf of the western Gulf of Maine, but are more common south of Casco Bay, especially offshore of sandy beaches.

4.3.2 Georges Bank

Georges Bank is a shallow (3-150 meters depth), elongate (161 kilometers wide by 322 kilometers long) extension of the continental shelf that was formed by the Wisconsinian glacial episode. It is characterized by a steep slope on its northern edge and a broad, flat, gently sloping southern flank. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. It is anticipated that erosion and reworking of sediments will reduce the amount of sand available to the sand sheets, and cause an overall coarsening of the bottom sediments.

Glacial retreat during the late Pleistocene deposited the bottom sediments currently observed on the eastern section of Georges Bank, and the sediments have been continuously reworked and redistributed by the action of rising sea level, and by tidal, storm and other currents. The strong, erosive currents affect the character of the biological community. Bottom topography on eastern Georges Bank is characterized by linear ridges in the western shoal areas; a relatively smooth, gently dipping sea floor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 meters high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin.

The central region of the Bank is shallow, and the bottom is characterized by shoals and troughs, with sand dunes superimposed upon them. The two most prominent elevations on the ridge and trough area are Cultivator and Georges Shoals. This shoal and trough area is a region of strong currents, with average flood and ebb tidal currents greater than 4 kilometers/hour, and as high as 7 kilometers/hour. The dunes migrate at variable rates, and the ridges may also move. In an area that lies between the central part and Northeast Peak, there are high-energy areas as between 35 - 65 meters deep, where sand is transported on a daily basis by tidal currents, and a low-energy area at depths > 65 meters that is affected only by storm currents.

The area west of the Great South Channel, known as Nantucket Shoals, is similar in nature to the central region of the Bank. Currents in these areas are strongest where water depth is shallower than 50 meters. This type of traveling dune and swale morphology is also found in the Mid-Atlantic Bight, and further described in that section of the document. The Great South Channel separates the main part of Georges Bank from Nantucket Shoals. Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity.

4.3.3 Mid-Atlantic Bight

The Mid-Atlantic Bight includes the shelf and slope waters south of Georges Bank to Cape Hatteras, and east to the Gulf Stream. Like the rest of the continental shelf, the topography of the Mid-Atlantic Bight was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet, and the subsequent rise in sea level. Since that time, currents and waves have modified this basic structure. The northern part of this area is also referred to as southern New England.

The shelf slopes gently from shore out to between 100 and 200 kilometers offshore where it transforms to the slope (100 - 200 meters water depth) at the shelf break. In both the Mid-Atlantic and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 meters into the shelf, with the exception of the Hudson Shelf Valley that is about 35 meters deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

Sediments are uniformly distributed over the shelf in this region. A sheet of sand and gravel varying in thickness from 0 - 10 meters covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf, but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the "mud line," and sediments are 70 - 100% finer on the slope. On the slope, silty sand, silt, and clay predominate.

The southern New England area is somewhat distinct from the rest of the Mid-Atlantic Bight because the geology there was – like Georges Bank – more affected by the glaciers. As a result, there is a greater variety of bottom habitats south of Rhode Island and Cape Cod than in the rest of the Mid-Atlantic. The following text is excerpted from the Rhode Island Special Ocean Area Management Plan, Vol. 1 2010: citations to primary references in that report have been deleted.

The glacially derived bottom topography and composition determines the benthic characteristics that will create the ecological habitats of Rhode Island and Block Island Sounds. The seafloor in this area is characterized by four major depositional environments, presented below in order of increasing grain size:

a. A shore-parallel feature, called a depositional platform sand sheet, comprised of medium sand containing small ripples. This feature serves an important function as a short-term sand storage area for supplying alongshore transport of sand to the east, or onshore transport to shoreline environments. These features provide habitats that regularly undergo significant change;

b. Features that are slightly lower than the cobble-gravel surrounding them, called cross-shore swaths, are composed of medium to coarse sand with small dunes. These features serve as a conduit for sand transport during storm events, providing habitat that undergoes regular, but less frequent, alteration;

c. Cobble gravel that is in equilibrium (e.g., no loss or accretion), but often rearranged after and during storm events, called depositional gravel pavement. These features provide habitat that is relatively stable, yet subject to occasional disturbance;

d. Concentrations of boulders and gravel inherited from the moraine, referred to as glacial outcrops, and which are more or less fixed in place, providing long-term habitats. These features, containing sand, coarse sand, cobble- gravel, and boulders, describe the composition of the major benthic environments found in the area. These features are characteristic, though not definitive, of the seafloor composition which shows gradation from and between one to another of these features.

While the basic overall geology of the area can be considered to be static, the actual local, physical, benthic environment found on the bottom is not. Sediments and bottom features are continually subjected to physical forces that alter their characteristics, and their location on the seafloor. Upwelling and downwelling currents, the orbital motion of waves, and unidirectional lateral flows all act upon and alter bottom features. Likewise, channels, bottom topographic high points, and other bathometric features will influence as well as create these flows and currents. The flows and currents promote the transport of sand-sized materials and the migration of large bedforms such as dunes, sand ripples and sand waves, across

the bottom. The sorting, movement, and placement of seafloor sediments that occurs during these processes creates a patchwork of habitats ranging from fine silts to gravelly areas to boulder fields. The diversity of physical habitats is a powerful influence on benthic ecological make up, determining what species will reside in what habitats in the bottom community; most often, the greater the structural physical diversity of an environment, the greater the biotic diversity of that ecosystem. Since these ecological "shaping" processes are ongoing, the bottom community of the area, particularly those comprised of mud, sand, and/or silt, are in a constant state of flux as habitat patches are altered or destroyed, moved or recreated along the bottom. These benthic communities could therefore be expected to be composed of organisms that can withstand, and perhaps even thrive in an ever changing benthic environment.

4.3.4 Jonah Crab Habitat

Jonah crabs likely have spatial and temporal variability in habitat use; some of this seasonality has been hinted at in the current literature, but the overall description of habitat use remains severely lacking in specifics. Large adult Jonah crabs are most frequently caught in rocky offshore habitats. It is widely thought that during spring in northern latitudes Jonah crab migrate to shallower waters where they remain until returning to deeper water in the fall and winter. This shallow-water residence period has been studied primarily in the context of predation by gulls (Krediet and Donahue 2009) and in documentation of microhabitat (Jeffries 1966; Krouse 1980). Both Jeffries and Krouse suggest Jonah crab are associated with rockier, deeper sites with cover/crevices, but Wenner et al. (1992) used a submersible and found the crabs to be common in softer sediments along the continental slope. Most studies that report optimal temperature for Jonah crab are consistent in reporting a range of roughly 8–12° C.

4.3.5 Essential Fish Habitat (EFH)

The physical environment that could potentially be affected by this action includes essential fish habitat for fishery resource species in the Greater Atlantic region managed under the authority of the Magnuson-Stevens Act. Because Jonah crabs and lobsters are harvested using bottom-tending fishing gear (pots and, to a very limited extent, bottom trawls) which do cause some disturbance to benthic habitat features, EFH is described in the Table 6 for those federally-managed species and life stages in the region that inhabit the seafloor in depths that could be adversely affected by the lobster fishery.

Full descriptions and maps of EFH for each species and life stage are available on the NOAA website. In general, EFH for species and life stages that rely on the seafloor for shelter (e.g., from predators), reproduction, or food is vulnerable to disturbance by any type of bottom tending fishing gear. The most vulnerable habitat is more likely to be hard or rough bottom with attached epifauna (NEFMC 2018a and b).

Table 6. Habitat characteristics of Essential Fish Habitat designations for benthic fish and shellfish species managed by the New England and Mid-Atlantic fishery management councils in the Greater Atlantic region, up-dated January 2018

Species	Life Stage	Depth (meters)	Habitat Type and Description
Acadian redfish	Juveniles	50-200 in Gulf of Maine, to 600 on slope	Sub-tidal coastal and offshore rocky reef substrates with associated structure-forming epifauna (e.g., sponges, corals) , and soft sediments with cerianthid anemones

Species	Life Stage	Depth (meters)	Habitat Type and Description
Acadian redfish	Adults	140-300 in Gulf of Maine, to 600 on slope	Offshore benthic habitats on finer grained sediments and on variable deposits of gravel, silt, clay, and boulders
American plaice	Juveniles	40-180	Sub-tidal benthic habitats on mud and sand, also found on gravel and sandy substrates bordering bedrock
American plaice	Adults	40-300	Sub-tidal benthic habitats on mud and sand, also gravel and sandy substrates bordering bedrock
Atlantic cod	Juveniles	Mean high water-120	Structurally-complex intertidal and sub-tidal habitats, including eelgrass, mixed sand and gravel, and rocky habitats (gravel pavements, cobble, and boulder) with and without attached macroalgae and emergent epifauna
Atlantic cod	Adults	30-160	Structurally complex sub-tidal hard bottom habitats with gravel, cobble, and boulder substrates with and without emergent epifauna and macroalgae, also sandy substrates and along deeper slopes of ledges
Atlantic halibut	Juveniles & Adults	60-140 and 400-700 on slope	Benthic habitats on sand, gravel, or clay substrates
Atlantic herring	Eggs	5-90	Sub-tidal benthic habitats on coarse sand, pebbles, cobbles, and boulders and/or macroalgae
Atlantic sea scallop	Eggs	18-110	Inshore and offshore benthic habitats (see adults)
Atlantic sea scallop	Larvae	No information	Inshore and offshore pelagic and benthic habitats: pelagic larvae ("spat"), settle on variety of hard surfaces, including shells, pebbles, and gravel and to macroalgae and other benthic organisms such as hydroids
Atlantic sea scallop	Juveniles	18-110	Benthic habitats initially attached to shells, gravel, and small rocks (pebble, cobble), later free-swimming juveniles found in same habitats as adults
Atlantic sea scallop	Adults	18-110	Benthic habitats with sand and gravel substrates
Atlantic surfclams	Juveniles and adults	Surf zone to about 61, abundance low >38	In substrate to depth of 3 ft
Atlantic wolffish	Eggs	<100	Sub-tidal benthic habitats under rocks and boulders in nests
Atlantic wolffish	Juveniles	70-184	Sub-tidal benthic habitats
Atlantic wolffish	Adults	<173	A wide variety of sub-tidal sand and gravel substrates once they leave rocky spawning habitats, but not on muddy bottom
Barndoor skate	Juveniles and adults	40-400 on shelf and to 750 on slope	Sub-tidal benthic habitats on mud, sand, and gravel substrates
Black sea bass	Juveniles and adults	Inshore in summer and spring	Benthic habitats with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas, also offshore clam beds and shell patches in winter
Clearnose skate	Juveniles	0-30	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Clearnose skate	Adults	0-40	Sub-tidal benthic habitats on mud and sand, but also on gravelly and rocky bottom
Deep-sea red crab	Eggs	320-640	Benthic habitats attached to female crabs
Deep-sea red crab	Juveniles	320-1300 on slope and to 2000 on seamounts	Benthic habitats with unconsolidated and consolidated silt-clay sediments
Deep-sea red crab	Adults	320-900 on slope and up to 2000 on seamounts	Benthic habitats with unconsolidated and consolidated silt-clay sediments

Species	Life Stage	Depth (meters)	Habitat Type and Description
Golden tilefish	Juveniles and adults	100-300	Burrows in semi-lithified clay substrate, may also utilize rocks, boulders, scour depressions beneath boulders, and exposed rock ledges as shelter
Haddock	Juveniles	40-140 and as shallow as 20 in coastal Gulf of Maine	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel
Haddock	Adults	50-160	Sub-tidal benthic habitats on hard sand (particularly smooth patches between rocks), mixed sand and shell, gravelly sand, and gravel and adjacent to boulders and cobbles along the margins of rocky reefs
Little skate	Juveniles	Mean high water-80	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Little skate	Adults	Mean high water-100	Intertidal and sub-tidal benthic habitats on sand and gravel, also found on mud
Longfin inshore squid	Eggs	Generally <50	Bottom habitats attached to variety of hard bottom types, macroalgae, sand, and mud
Monkfish	Juveniles	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on a variety of habitats, including hard sand, pebbles, gravel, broken shells, and soft mud, also seek shelter among rocks with attached algae
Monkfish	Adults	50-400 in the Mid-Atlantic, 20-400 in the Gulf of Maine, and to 1000 on the slope	Sub-tidal benthic habitats on hard sand, pebbles, gravel, broken shells, and soft mud, but seem to prefer soft sediments, and, like juveniles, utilize the edges of rocky areas for feeding
Ocean pout	Eggs	<100	Sub-tidal hard bottom habitats in sheltered nests, holes, or rocky crevices
Ocean pout	Juveniles	Mean high water-120	Intertidal and sub-tidal benthic habitats on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel
Ocean pout	Adults	20-140	Sub-tidal benthic habitats on mud and sand, particularly in association with structure forming habitat types; i.e. shells, gravel, or boulders
Ocean quahogs	Juveniles and adults	9-244	In substrate to depth of 3 ft
Offshore hake	Juveniles	160-750	Pelagic and benthic habitats
Offshore hake	Adults	200-750	Pelagic and benthic habitats
Pollock	Juveniles	Mean high water-180 in Gulf of Maine, Long Island Sound, and Narragansett Bay; 40-180 on Georges Bank	Intertidal and sub-tidal pelagic and benthic rocky bottom habitats with attached macroalgae, small juveniles in eelgrass beds, older juveniles move into deeper water habitats also occupied by adults
Pollock	Adults	80-300 in Gulf of Maine and on Georges Bank; <80 in Long Island Sound, Cape Cod Bay, and Narragansett Bay	Pelagic and benthic habitats on the tops and edges of offshore banks and shoals with mixed rocky substrates, often with attached macro algae
Red hake	Juveniles	Mean high water-80	Intertidal and sub-tidal soft bottom habitats, esp those that that provide shelter, such as depressions in muddy substrates, eelgrass, macroalgae, shells, anemone and polychaete tubes, on artificial reefs, and in live bivalves (e.g., scallops)
Red hake	Adults	50-750 on shelf and slope, as shallow as 20 inshore	Sub-tidal benthic habitats in shell beds, on soft sediments (usually in depressions), also found on gravel and hard bottom and artificial reefs
Rosette skate	Juveniles and adults	80-400	Benthic habitats with mud and sand substrates

Species	Life Stage	Depth (meters)	Habitat Type and Description
Scup	Juveniles	No information	Benthic habitats, in association with inshore sand and mud substrates, mussel and eelgrass beds
Scup	Adults	No information, generally overwinter offshore	Benthic habitats
Silver hake	Juveniles	40-400 in Gulf of Maine, >10 in Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats in association with sand-waves, flat sand with amphipod tubes, shells, and in biogenic depressions
Silver hake	Adults	>35 in Gulf of Maine, 70-400 on Georges Bank and in the Mid-Atlantic	Pelagic and sandy sub-tidal benthic habitats, often in bottom depressions or in association with sand waves and shell fragments, also in mud habitats bordering deep boulder reefs, on over deep boulder reefs in the southwest Gulf of Maine
Smooth skate	Juveniles	100-400 offshore Gulf of Maine, <100 inshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Smooth skate	Adults	100-400 offshore Gulf of Maine, to 900 on slope	Benthic habitats, mostly on soft mud in deeper areas, but also on sand, broken shells, gravel, and pebbles on offshore banks in the Gulf of Maine
Summer flounder	Juveniles	To maximum 152	Benthic habitats, including inshore estuaries, salt marsh creeks, seagrass beds, mudflats, and open bay areas
Summer flounder	Adults	To maximum 152 in colder months	Benthic habitats
Spiny dogfish	Juveniles	Deep water	Pelagic and epibenthic habitats
Spiny dogfish	Female sub-adults	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male sub-adults	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Female adults	Wide depth range	Pelagic and epibenthic habitats
Spiny dogfish	Male adults	Wide depth range	Pelagic and epibenthic habitats
Thorny skate	Juveniles	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
Thorny skate	Adults	35-400 offshore Gulf of Maine, <35 inshore Gulf of Maine, to 900 om slope	Benthic habitats on a wide variety of bottom types, including sand, gravel, broken shells, pebbles, and soft mud
White hake	Juveniles	Mean high water - 300	Intertidal and sub-tidal estuarine and marine habitats on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats
White hake	Adults	100-400 offshore Gulf of Maine, >25 inshore Gulf of Maine, to 900 on slope	Sub-tidal benthic habitats on fine-grained, muddy substrates and in mixed soft and rocky habitats
Windowpane flounder	Juveniles	Mean high water - 60	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Windowpane flounder	Adults	Mean high water - 70	Intertidal and sub-tidal benthic habitats on mud and sand substrates
Winter flounder	Eggs	0-5 south of Cape Cod, 0-70 Gulf of Maine and Georges Bank	Sub-tidal estuarine and coastal benthic habitats on mud, muddy sand, sand, gravel, submerged aquatic vegetation, and macroalgae
Winter flounder	Juveniles	Mean high water - 60	Intertidal and sub-tidal benthic habitats on a variety of bottom types, such as mud, sand, rocky substrates with attached macro algae, tidal wetlands, and eelgrass; young-of-the-year juveniles on muddy and sandy sediments in and

Species	Life Stage	Depth (meters)	Habitat Type and Description
			adjacent to eelgrass and macroalgae, in bottom debris, and in marsh creeks
Winter flounder	Adults	Mean high water - 70	Intertidal and sub-tidal benthic habitats on muddy and sandy substrates, and on hard bottom on offshore banks; for spawning adults, also see eggs
Winter skate	Juveniles	0-90	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Winter skate	Adults	0-80	Sub-tidal benthic habitats on sand and gravel substrates, are also found on mud
Witch flounder	Juveniles	50-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Witch flounder	Adults	35-400 and to 1500 on slope	Sub-tidal benthic habitats with mud and muddy sand substrates
Yellowtail flounder	Juveniles	20-80	Sub-tidal benthic habitats on sand and muddy sand
Yellowtail flounder	Adults	25-90	Sub-tidal benthic habitats on sand and sand with mud, shell hash, gravel, and rocks

4.4 Protected Resources

Numerous protected species inhabit the affected environment of the Jonah crab FMP (Table 7). These species are under NMFS jurisdiction and are afforded protection under the ESA of 1973 and/or the MMPA of 1972.

Table 7. Species protected under the ESA and/or MMPA that occur in the affected environment of the Jonah crab fishery[1]

Species	Status	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	Endangered	Yes
Humpback whale , West Indies DPS (*Megaptera novaeangliae*)	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	Endangered	Yes
Sei whale (Balaenoptera borealis)	Endangered	Yes
Blue whale (Balaenoptera musculus)	Endangered	No
Sperm whale (Physeter macrocephalus	Endangered	No
Pygmy sperm whale (*Kogia breviceps*)	Protected (MMPA)	No
Dwarf sperm whale (*Kogia sima*)	Protected (MMPA)	No
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)[2]	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	No
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	No
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	No
Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected (MMPA)	No
Beaked whales (*Ziphius and Mesoplodon spp*)[3]	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[4]	Protected (MMPA)	Yes

Species	Status	Potentially affected by this action?
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	No
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	No
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	No
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	No
Cusk (*Brosme brosme)*	Candidate	No
Alewife (*Alosa pseudoharengus*)	Candidate	No
Blueback herring (*Alosa aestivalis*)	Candidate	No
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected	No
Gray seal (*Halichoerus grypus*)	Protected	No
Harp seal (*Phoca groenlandicus*)	Protected	No
Hooded seal (*Cystophora cristata*)	Protected	No
Critical Habitat		
North Atlantic Right Whale	Protected (ESA)	No
Northwest Atlantic DPS of Loggerhead Sea Turtle	Protected (ESA)	No

Notes:
[1] Marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks. A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) The level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).
[2] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.
[3] There are multiple species of beaked whales in the Northwest Atlantic. They include the cuvier's (*Ziphius cavirostris*), blainville's (*Mesoplodon densirostris*), gervais' (*Mesoplodon europaeus*), sowerbys' (*Mesoplodon bidens*), and trues' (*Mesoplodon mirus*) beaked whales. Species of *Mesoplodon*; however, are difficult to identify at sea, and therefore, much of the available characterization for beaked whales is to the genus level only.
[4] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins.

Cusk, alewife, and blueback herring are considered a "candidate species" under the ESA. Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA and also include those species for which NMFS has initiated an ESA status

review through an announcement in the *Federal Register*. Once a species is proposed for listing the conference provisions of the ESA apply (see § 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, cusk, alewife, and blueback herring will not be discussed further in this and the following sections. For additional information on these species, please visit the NMFS Greater Atlantic Regional Fisheries Office (GARFO) candidate species website.

4.4.1 Species and Critical Habitat Not Likely to be Affected by the Proposed Action

Based on available information, it has been determined that this action is not likely to affect blue whales, sperm whales, dwarf sperm whales, pygmy sperm whales, pilot whales, beaked whales, Risso's dolphins, Atlantic white-sided dolphins, short beaked common dolphins, harbor porpoise, Atlantic spotted dolphins, striped dolphins, hawksbill sea turtles, shortnose sturgeon, Atlantic sturgeon, Atlantic salmon, harbor seals, gray seals, harp seals, or hooded seals. Further, this action is not likely to adversely affect any critical habitat provided in Table 7. This determination has been made because either the occurrence of the species is not known to overlap with the Jonah crab fishery or there have never been documented interactions between the species and the primary gear type (i.e., pot/trap) used to prosecute the Jonah crab fishery (see Hayes et al. 2017; Waring *et al*. 2014, 2015, 2016; NMFS NEFSC FSB 2015, 2016; NEFSC online take reports). In the case of critical habitat, this determination has been made because the action will not affect the essential physical and biological features of critical habitat designated for North Atlantic right whale or the Northwest Atlantic Ocean DPS of loggerhead sea turtle and therefore, will not result in the destruction or adverse modification of either species critical habitat (NMFS 2014a; NMFS 2015a,b).

4.4.2 Species Potentially Affected by the Proposed Action

4.4.2.1 Sea Turtles

Below is a brief summary of the occurrence and distribution of sea turtles in the affected environment of the Jonah crab fishery. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; Turtle Expert Working Group [TEWG] 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant *et al*. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS *et al*. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Hard-shelled sea turtles

Distribution. In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, Massachusetts, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly et al. 1995a, 1995b; Mitchell et al. 2003; Shoop & Kenney 1992; TEWG 2009). While hard-shelled turtles are most common south of Cape Cod, Massachusetts, they are known to occur in the Gulf of Maine. Loggerheads, the most common hard-shelled sea turtle in the Greater Atlantic Region, feed as far north as southern Canada. Loggerheads have been observed in waters with surface temperatures of 7°C to 30°C, but water temperatures ≥11°C are most favorable (Epperly et al. 1995a; Shoop & Kenney 1992).

Sea turtle presence in U.S. Atlantic waters is also influenced by water depth. While hard-shelled turtles occur in waters from the beach to beyond the continental shelf, they are most commonly found in neritic waters of the inner continental shelf (Blumenthal et al. 2006; Braun-McNeill & Epperly 2004; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell et al. 2003; Morreale & Standora 2005).

Seasonality. Hard-shelled sea turtles occur year-round in waters off Cape Hatteras, North Carolina and south. As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast U.S. and also move up the Atlantic Coast (Epperly et al. 1995a, 1995b, 1995c; Braun-McNeill and Epperly 2004; Morreale and Standora 2005; Griffin et al. 2013), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the Gulf of Maine in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by September, but some remain in Mid-Atlantic and Northeast areas until late fall (i.e., November). By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles

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

4.4.2.2 Large Whales

As provided in Table 7, as North Atlantic right, humpback, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean, these species will occur in the affected environment of the Jonah crab fishery. In general, these species follow an annual pattern of migration between low latitude wintering/calving grounds (south of 35ºN) and high latitude spring/summer foraging grounds (primarily north of 41ºN) (Hayes et al. 2017; NMFS 1991; 2005; 2010; 2011; 2012; Waring *et al*. 2014; Waring *et al*. 2015, Waring *et al*. 2016). This, however, is a simplification of whale movements, particularly as it relates to winter movements. It remains unknown if all individuals of a population migrate to low latitudes in the winter, although, increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Brown *et al*. 2002; Clapham *et al*. 1993; Cole *et al*. 2013; Hayes et al. 2017; Khan *et al*. 2009, 2010, 2011, 2012; NOAA 2008; Swingle *et al*. 1993; Vu *et al*. 2012; Waring *et al.* 2014; Waring *et al*. 2015, Waring *et al*. 2016). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Movements of whales into higher latitudes coincide with peak productivity in these waters. As a result, the distribution of large whales in higher latitudes is strongly governed by prey availability and distribution, with large numbers of whales coinciding with dense patches of preferred forage (Baumgartner *et al*. 2003; Baumgartner &

Mate 2003; Brown *et al*. 2002; Kenney and Hartley 2001; Kenney *et al*. 1986; Kenney *et al*. 1995; Mayo & Marx 1990; Payne *et al*. 1986; Payne *et al.* 1990; Schilling *et al*. 1992). These foraging areas are consistently returned to annually, and therefore, can be considered important, high use areas for whales.

As the affected area of the Jonah crab fishery occurs in waters north of 35ºN, and whales may be present in these waters throughout the year, the Jonah crab fishery and large whales are likely to co-occur in the affected area. To further assist in understanding how the Jonah crab fishery overlaps in time and space with the occurrence of large whales, Table 8 gives an overview of species occurrence and distribution in the continental shelf waters of the affected environment of the fishery. For additional information on the biology, status, and range wide distribution of each whale species, refer to: Hayes et al. 2017; Waring *et al*. (2014), Waring *et al*. (2015) , Waring *et al*. 2016, and NMFS (1991; 2005; 2010; 2011; 2012).

Table 8. Large cetacean occurrence in the affected environment of the Jonah crab fishery

Species	**Prevalence and Approximate Months of Occurrence**
North Atlantic Right Whale	• Distributed throughout all continental shelf waters of the GOM, GB, and Mid-Atlantic (SNE included) throughout the year. • New England waters (GOM and GB regions): **Foraging Grounds** (January through October). Seasonally important foraging grounds include: o Cape Cod Bay (January-April); o Great South Channel (April-June) o western GOM (April-May and July-October); o northern edge of GB (May-July); o Jordan Basin (August-October); and o Wilkinson Basin (April-July) • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern calving grounds (primarily November-April). • Increasing evidence of wintering areas (approximately November – January) in: o Cape Cod Bay; o Jeffreys and Cashes Ledges; o Jordan Basin; and o Massachusetts Bay (e.g., Stellwagen Bank).
Humpback	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB throughout the year. • New England waters (GOM and GB regions): **Foraging Grounds** (approximately March-November). • Mid-Atlantic waters: Migratory pathway to/from northern (high latitude) foraging and southern (West Indies) calving grounds. • Increasing evidence of wintering areas (for juveniles) in Mid-Atlantic (e.g., waters in the vicinity of Chesapeake and Delaware Bays; peak presence approximately January through March) and Southeastern coastal waters.
Fin	• Distributed throughout all continental shelf waters of the Mid-Atlantic (SNE included), GOM, and GB sub-regions throughout the year. • Mid-Atlantic waters: o Migratory pathway to/from northern (high latitude) foraging and southern (low latitude) calving grounds; o Possible offshore calving area (October-January)

Species	Prevalence and Approximate Months of Occurrence

	• New England/SNE waters (GOM, GB, and SNE regions): **Foraging Grounds** (greatest densities March-August; lower densities September-November).
	• Important foraging grounds include:
	  o Massachusetts Bay (esp. Stellwagen Bank)
	  o Great South Channel
	  o Waters off Cape Cod (~40-50 meter contour)
	  o Western GOM (esp. Jeffrey's Ledge)
	  o Perimeter (primarily eastern) of GB
	  o Mid-shelf area off the east end of Long Island.
	• Evidence of wintering areas in mid-shelf areas east of New Jersey, Stellwagen Bank; and eastern perimeter of GB.

Sei	• Uncommon in shallow, inshore waters of the Mid-Atlantic (SNE included), GB, and GOM; however, occasional incursions during peak prey availability and abundance. • Primarily found in deep waters along the shelf edge, shelf break, and ocean basins between banks. • Spring through summer, found in greatest densities in offshore waters of the GOM and GB (eastern margin into the Northeast Channel area; along the southwestern edge in the area of Hydrographer Canyon).
Minke	• Widely distributed throughout continental shelf waters (<100 m deep) of the Mid-Atlantic (SNE included), GOM, and GB. • Most common in the EEZ from spring through fall, with greatest abundance found in New England waters.
Sources: NMFS 1991, 2005, 2010, 2011, 2012; Hain *et al.* 1992; Payne 1984; Good 2008; Pace and Merrick 2008; McClellan et al. 2004; Hamilton and Mayo 1990; Schevill *et al*. 1986; Watkins and Schevill 1982; Payne *et al*. 1990; Winn et al. 1986; Kenney et al. 1986, 1995; Khan *et al*. 2009, 2010, 2011, 2012; Brown *et al*. 2002; NOAA 2008; § 224.105; CETAP 1982; Clapham *et al*. 1993; Swingle *et al*. 1993; Vu *et al*. 2012; Baumgartner *et al*. 2011; Cole *et al*. 2013; Risch *et al*. 2013; Hayes *et al.* 2017; Waring *et al*. 2014; Waring *et al*. 2015; Waring *et al*. 2016; 81 FR 4837(January 27, 2016); NMFS 2015b; Bort *et al*. 2015.	

4.4.2.3 Small Cetaceans

As provided in Table 7, the only small cetacean that co-occurs with, and has the potential to be affected by the Jonah crab fishery are the following stocks of bottlenose dolphin: Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal. To further assist in understanding how the Jonah crab fishery may overlap in time and space with the occurrence of bottlenose dolphin stocks, a general overview of species occurrence and distribution in the area of operation for the Jonah crab fishery is provided in Table 9. For additional information on the biology, status, and range wide distribution of each bottlenose dolphin stock, please refer to Waring *et al*. (2014), Waring *et al.* (2015), and Waring *et al*. (2016).

Table 9. Bottlenose dolphin occurrence and distribution in the affected environment of the Jonah crab fishery

Species	Prevalence and Approximate Months of Occurrence (if known)
Bottlenose Dolphin	**<u>Western North Atlantic Offshore Stock</u>** o Distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic from Georges Bank to FL. o Depths of occurrence: ≥40 meters. **<u>Western North Atlantic Northern Migratory Stock</u>** o Warm water months (July-August): Distributed from the coastal waters from the shoreline to approximately the 25-m isobaths between the Chesapeake Bay mouth and Long Island, New York. o Cold water Months (January-March): Stock occupies coastal waters from Cape Lookout, NC, to the NC/VA border. **<u>Western North Atlantic Southern Migratory Stock</u>** o Spring and Summer (April-August): Distributed along coastal waters from North Carolina to Virginia. o Fall and Winter (October-March): Distributed in coastal waters from southern North Carolina to northern Florida..
Notes: Information presented in table is representative of bottlenose dolphin occurrence in the Northwest Atlantic continental shelf waters out to the 1,000 meters isobath. *Sources*: Waring *et al*. (2014; 2015, 2016)	

4.4.3. Gear Interactions and Protected Species

The Jonah crab commercial fishery is prosecuted with trap/pot gear. Species of cetaceans and sea turtles (see Table 7) are known to interact with this gear type. Available information on gear interactions with a given species (or species group) is provided in the sections below. Please note, these sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used in the Jonah crab fishery and their associated interaction risk to the species under consideration.

4.4.3.1 Sea Turtles

Leatherback, loggerhead, green, and kemp's ridley sea turtles are known to interact with trap/pot gear, with interactions primarily associated with entanglement in vertical lines, although sea turtles can also become entangled in groundline or surface systems. Records of stranded or entangled sea turtles indicate that fishing gear can wrap around the neck, flipper, or body of the sea turtle and severely restrict swimming or feeding (Balazs 1985, Sea Turtle Disentanglement Network (STDN) 2016). As a result, sea turtles can incur serious injuries and in some case, mortality immediately or at a later time.

GARFO's STDN database, a component of the Sea Turtle Stranding and Salvage Network, provides the most complete dataset on sea entanglements. Based on information provided in this database, a total of 333 sea turtle entanglements in vertical line gear were reported to the STDN and NMFS GARFO between 2002 and 2016 (STDN 2016).[17] Of the 333 reports, 316 were classified as probable or confirmed vertical

[17] Data for 2016 was only available through September; data through the remainder of 2016 is still being processed.

line gear entanglement with a high confidence rating. Out of the 316 confirmed and probable entanglement events, there were 147 cases in which the gear type associated with the entanglement could be assigned to a specific fishery. The majority of interactions involved leatherback sea turtles (130) followed by loggerhead (16), and green (1) sea turtles. Of the 130 leatherbacks, 68.5 % of the vertical line interactions involved gear associated with the lobster fishery (vertical line), 17.7 % the whelk fishery, 7.7% the seabass fishery, 2.3 % the crab fishery, 1.5 % the conch fishery, 1.5% research, and 0.77 % whelk and lobster fishery (both trap/pots present). Of the 16 loggerheads, 56.3% involved interactions with vertical line associated with the whelk fishery and 43.8% the crab fishery. The one green sea turtle case involved an interaction with vertical line associated with the whelk fishery.

4.4.3.2. Marine Mammals

Depending on species, marine mammals have been observed seriously injured or killed in trap/pot gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (Table 10).[18] The Jonah crab fishery is considered a Category II trap/pot fishery; specifically, this fishery is identified as part of the Atlantic mixed species trap/pot fishery.

Table 10. LOF Classification Categories

Category	Level of incidental mortality or serious injury of marine mammals	Annual mortality and serious injury of a stock in a given fishery is…
Category I	frequent	≥50% of the PBR level
Category II	occasional	between 1% and 50% of the PBR level
Category III	remote likelihood, or no known	≤1% of the PBR level

The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements. Individuals fishing in Category I or II fisheries must comply with requirements of any applicable take reduction plan.

Large Whales

The greatest entanglement risk to large whales is posed by fixed fishing gear (e.g., trap/pot gear, sink gillnet gear) comprised of lines (vertical or ground) that rise into the water column. Any line can become entangled in the mouth (baleen), flippers, and/or tail of the whale when the animal is transiting or foraging through the water column (Johnson *et al*. 2005; NMFS 2014b; Kenney and Hartley 2001; Hartley *et al*. 2003; Whittingham *et al*. 2005a,b; Hayes *et al*. 2017). Although available data (e.g., Johnson *et al*. (2005), Hayes *et al*. (2017); Henry *et al*. (2017)) provides insight into large whale entanglement risks with fixed fishing gear, determining which part of fixed gear creates the most entanglement risk for large whales is difficult (Johnson *et al.* 2005). As a result, any type or part of fixed

[18] The most recent LOF was issued February 7, 2018; 83 FR 5349.

gear is considered to create an entanglement risk to large whales and should be considered potentially dangerous to large whale species (Johnson *et al.* 2005).

Large whale interactions (entanglements) with fishing gear have been observed and documented in the waters of the Northwest Atlantic. Although not specific to any fishery, including Jonah crab, Table 11 summarizes confirmed serious injury or mortality to whales (i.e., humpback, fin, sei, minke, and North Atlantic right whales) from entanglement in fishing gear, including pot/trap along the Gulf of Mexico Coast, U.S. East Coast, and Atlantic Canadian Provinces from 2011 to 2015 (Henry *et al.* 2017). As many entanglement events go unobserved, and because the gear type, fishery, and/or country of origin for reported entanglement events are often not traceable, it is important to recognize that the information presented in Table 11 likely underestimates the rate of large whale serious injury and mortality due to entanglement.

Table 11. Summary of confirmed, serious injury or mortality to fin, minke, humpback, sei, and North Atlantic right whales from 2011-2015 due to fisheries entanglements[1]

Species	Total Confirmed Entanglement: Serious Injury[2]	Total Confirmed Entanglement: Non-Serious Injury	Total Confirmed Entanglement: Mortality	Entanglement Events: Total Average Annual Injury and Mortality Rate (US waters/Canadian waters/unassigned waters)
North Atlantic Right Whale	19	35	5	4.55 (0.4/0/4.15)
Humpback Whale	32	61	5	6.45 (1.5/0.3/4.65)
Fin Whale	6	2	4	1.85 (0.2/0.8/0.85)
Sei Whale	0	0	0	0
Minke Whale	20	12	22	7.75 (1.9/3.25/2.6)

Notes:
[1] Information presented in Table 11 is based on confirmed human-caused injury and mortality events along the Gulf of Mexico Coast, US East Coast, and Atlantic Canadian Provinces; it is not specific to US waters only.
[2] NMFS defines a serious injury as an injury that is more likely than not to result in mortality (additional details)
***Source*:** Henry *et al.* 2017

As noted above, pursuant to the MMPA, NMFS publishes a LOF annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injurious and mortalities of marine mammals in each fishery. Large whales, in particular, humpback, fin, minke, and North Atlantic right whales, are known to interact with Category I and II fisheries in the Northwest Atlantic Ocean. As fin, and North Atlantic right whales are listed as endangered under the ESA, these

species are considered strategic stocks under the MMPA.[19] Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan for any strategic marine mammal stock that interacts with Category I or II fisheries. In response to its obligations under the MMPA, in 1996, NMFS established the Atlantic Large Whale Take Reduction Team (ALWTRT) to develop a plan (Atlantic Large Whale Take Reduction Plan (ALWTRP) to reduce serious injury to, or mortality of large whales, specifically, humpback, fin, and North Atlantic right whales, due to incidental entanglement in U.S. commercial fishing gear.[20] In 1997, the ALWTRP was implemented; however, since 1997, it has been modified as NMFS and the ALWTRT learn more about why whales become entangled and how fishing practices might be modified to reduce the risk of entanglement. Recent adjustments include the Sinking Groundline Rule and Vertical Line Rules (72 FR 57104, October 5, 2007; 79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015).[21]

The ALWTRP (73 FR 51228; 79 FR 36586; 79 FR 73848; 80 FR 14345; 80 FR 30367) consists of regulatory (e.g., universal gear requirements, modifications, and requirements; area-and season- specific gear modification requirements and restrictions; time/area closures) and non-regulatory measures (e.g., gear research and development, disentanglement, education and outreach) that, in combination, seek to assist in the recovery of North Atlantic right, humpback, and fin whales by addressing and mitigating the risk of entanglement in gear employed by commercial fisheries, specifically trap/pot and gillnet fisheries. The ALWTRP recognizes trap/pot and gillnet Management Areas in Northeast, Mid-Atlantic, and Southeast regions of the U.S, and identifies gear modification requirements and restrictions for Category I and II gillnet and trap/pot fisheries in these regions; these Category I and II fisheries must comply with all regulations of the Plan.[22]. For further details on the Plan, please refer to the ALWTRP.

Small Cetaceans

Over the past several years, observer coverage has been limited for fisheries prosecuted with trap/pot gear. In the absence of extensive observer data for these fisheries, stranding data provides the next best source of information on species interactions with trap pot gear. It is important to note; however, stranding data underestimates the extent of human-related mortality and serious injury because not all of the marine mammals that die or are seriously injured in human interactions are discovered, reported, or

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

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

[21] The most recent rule (Vertical Line Rule) focused on trap/pot vertical line reduction as the ALWTRT determined that gillnets represent less than 1% of the total vertical lines on the east coast and that the impacts from this gear on large whales is minimal (see Appendix 3A, NMFS 2014); however, even with the new Rule, gear will still be subject to existing restrictions under the ALWTRP for gillnet gear.

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

show signs of entanglement. Additionally, if gear is present, it is often difficult to definitively attribute the animal's death or serious injury to the gear interaction, or to a specific fishery. As a result, the conclusions below should be taken with these considerations in mind, and with an understanding that interactions may occur more frequently than what we are able to detect at this time.

As provided in Table 7, specific stocks of bottlenose dolphin are the only small cetacean species that occur in the affected environment of the Jonah crab fishery and have the potential to interact with pot/trap gear used in this fishery. Reviewing the stock assessment reports for each dolphin stock, stranding data provides the best source of information on species interaction history with these gear types. Specifically, based on stranding data from 2007-2013, estimated mean annual mortality for each stock due to interactions with trap/pot gear was approximately one animal (Waring et al. 2014; Waring et al. 2016).23 Based on this and the best available information, trap/pot gear is expected to pose a low interaction, and thus, serious injury and mortality risk to small cetaceans (i.e., bottlenose dolphins).

4.5 Human Communities/Social-Economic Environment

4.5.1 Overlap with the Lobster Fishery

As previously mentioned, available landings data suggest that Cancer crabs[24] have been caught in lobster traps. Between 1990 and 2014, anywhere from 90.91 percent to 99.71 percent of Cancer crabs landings have been from pot and trap gear (ASMFC 2015).

[23] Stranding data provided in Waring *et al*. (2015) was not considered in estimating mean annual mortality as not all bottlenose dolphin stocks are addressed in this stock assessment report. As all bottlenose dolphin stocks are considered in Waring *et al.* (2014) and Waring *et al*. (2016), these stock assessment reports were used to estimate mean annual mortality. Estimates of mean annual mortality were calculated based on the total number of animals that stranded between 2007-2013, and that were determined to have incurred serious injuries or mortality as result of interacting with trap/pot gear. Please note, for bottlenose dolphin stocks, Waring *et al*. (2014) and Waring *et al*. (2016) provides two categories for trap/pot gear: (Atlantic Blue) Crab Pot, and Other Pot gear. We combined the two to get an overall number of interactions associated with trap/pot gear in general. In addition, any animals released alive with no serious injuries were not included in the estimate. Also, if maximum or minimum number of animals stranded were provided, to be conservative, we considered the maximum estimated number in calculating our mean annual estimate of mortality.

[24] Jonah crab and rock crab (*Cancer irroratus*)

Table 12. Percentage of Jonah crab and rock crab landed by gear type from 1990-2014, ACCSP May 2015

Year	Dredge	Hand Line	Long Line	Other	Pots & Traps	Trawls
1990	0.07	0.00	0.00	0.00	99.71	0.22
1991	0.00	0.00	0.00	0.00	99.65	0.35
1992	0.00	0.00	0.00	0.00	99.24	0.76
1993	0.09	0.00	0.00	0.00	99.54	0.37
1994	0.00	0.00	0.00	0.01	94.43	5.56
1995	0.00	0.00	0.00	0.06	99.38	0.56
1996	0.00	0.00	0.00	8.00	91.62	0.38
1997	0.00	0.00	0.00	3.27	96.16	0.57
1998	0.00	0.01	0.00	1.21	97.43	1.36
1999	0.00	0.00	0.00	0.19	99.45	0.36
2000	0.00	0.01	0.00	0.31	99.57	0.11
2001	0.00	0.01	0.00	3.24	94.19	2.56
2002	0.00	0.00	0.00	0.49	99.43	0.08
2003	0.00	0.00	0.00	1.09	98.75	0.16
2004	0.01	0.09	0.00	8.46	90.91	0.53
2005	0.00	0.52	1.55	5.35	92.57	0.01
2006	0.85	0.04	0.04	7.16	91.86	0.05
2007	1.29	1.49	0.01	5.03	92.04	0.15
2008	0.16	0.22	0.07	5.91	93.55	0.09
2009	1.93	2.53	0.14	5.91	89.26	0.23
2010	0.10	0.31	0.59	3.07	94.75	1.18
2011	1.11	0.15	0.00	1.29	96.50	0.95
2012	0.10	0.07	0.10	3.84	95.44	0.45
2013	0.07	0.05	0.13	3.95	95.04	0.76
2014	0.64	0.08	0.01	3.46	95.47	0.34

Cancer crabs (Jonah and rock crabs) were used in this analysis due to the fact that these species are frequently confused. While many fisheries authorize the use of trap gear, traps are the primary gear type used in the lobster fishery. The lobster fishery also likely accounts for the majority of traps set in Greater Atlantic Regional waters.

When developing the Jonah Crab Plan and Addendum I, the PDT made several efforts to mine state and federal data for potential Jonah crab harvesters that did not already hold a lobster permit (Jonah-crab only harvesters). No Jonah crab-only harvesters were identified in the data. This is not surprising, given that most states tie the landings of all crustaceans to having a lobster permit. Therefore, the Jonah crab fishery and Jonah crab harvesters can reasonably be assumed to be the same as the lobster fishery and lobster harvesters.

4.5.2 Jonah Crab Fishery Characteristics

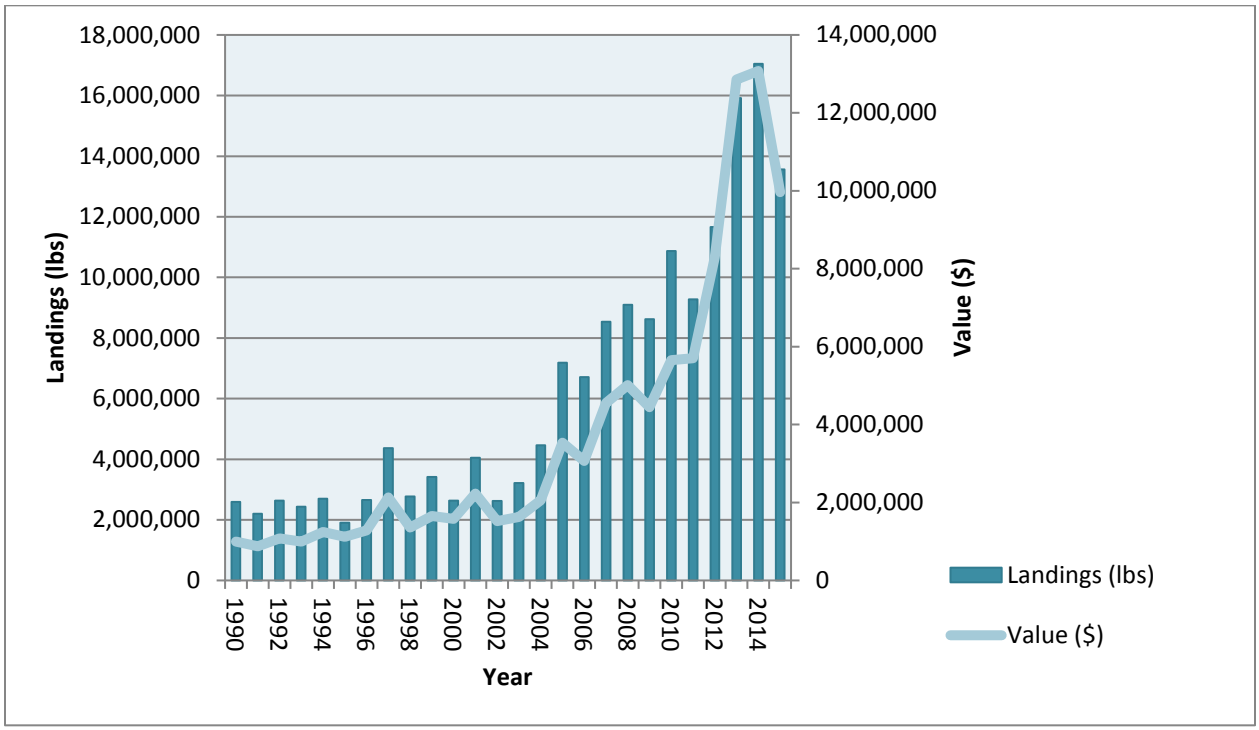
Jonah crabs are harvested and landed coastwide, ranging from Maine to Virginia. As described in Section 1.1, Jonah crab landings have increased dramatically from 1990 to 2015. Jonah crab landings have ranged from a low of 2 million pounds in 1995 to a high of over 17 million pounds in 2014. Landings in 2015 dropped off slightly, to approximately 13.5 million pounds. The trend of increasing Jonah crab landings in the late 1990's tracks with the stock collapse and decrease in lobster landings in Southern New England, as harvesters are likely turning to Jonah crab to supplement their income. While there is some variation, an increasing trend in coastwide landings is observed. As landings have increased, so too has the value of the fishery. Revenue has increased from approximately $1 million to a high of over $13 million in 2014, with the average price per pound nearly doubling from approximately 40 cents/pound to over 70 cents/pound. Trends between years can be found in Table 13 and Figure 5.

Table 13. Jonah Crab Landings, Revenue and Price per Pound, 1990-2015

Year	Landings (lb)	Value ($)	Price per Pound ($/lb)
1990	2,589,949	995,454	0.38
1991	2,198,069	875,748	0.40
1992	2,634,776	1,076,321	0.41
1993	2,428,150	998,322	0.41
1994	2,695,421	1,240,749	0.46
1995	1,905,446	1,122,410	0.59
1996	2,650,838	1,286,034	0.49
1997	4,367,857	2,132,321	0.49
1998	2,767,228	1,359,233	0.49
1999	3,414,305	1,650,665	0.48
2000	2,630,328	1,581,986	0.60
2001	4,046,509	2,227,714	0.55
2002	2,625,524	1,521,534	0.58
2003	3,216,152	1,631,568	0.51
2004	4,463,168	2,055,491	0.46
2005	7,180,766	3,536,382	0.49
2006	6,710,836	3,063,353	0.46
2007	8,538,345	4,551,219	0.53
2008	9,097,352	5,012,196	0.55
2009	8,624,254	4,442,500	0.52
2010	10,872,716	5,653,102	0.52
2011	9,273,632	5,701,619	0.61
2012	11,662,595	8,293,585	0.71
2013	15,912,923	12,856,754	0.81
2014	17,048,056	13,074,447	0.77
2015	13,567,000	9,965,000	0.73

Source: Jonah Crab Plan and 2015 Fisheries of the U.S.

Figure 5. Jonah Crab Landings and Revenue, 1990-2015



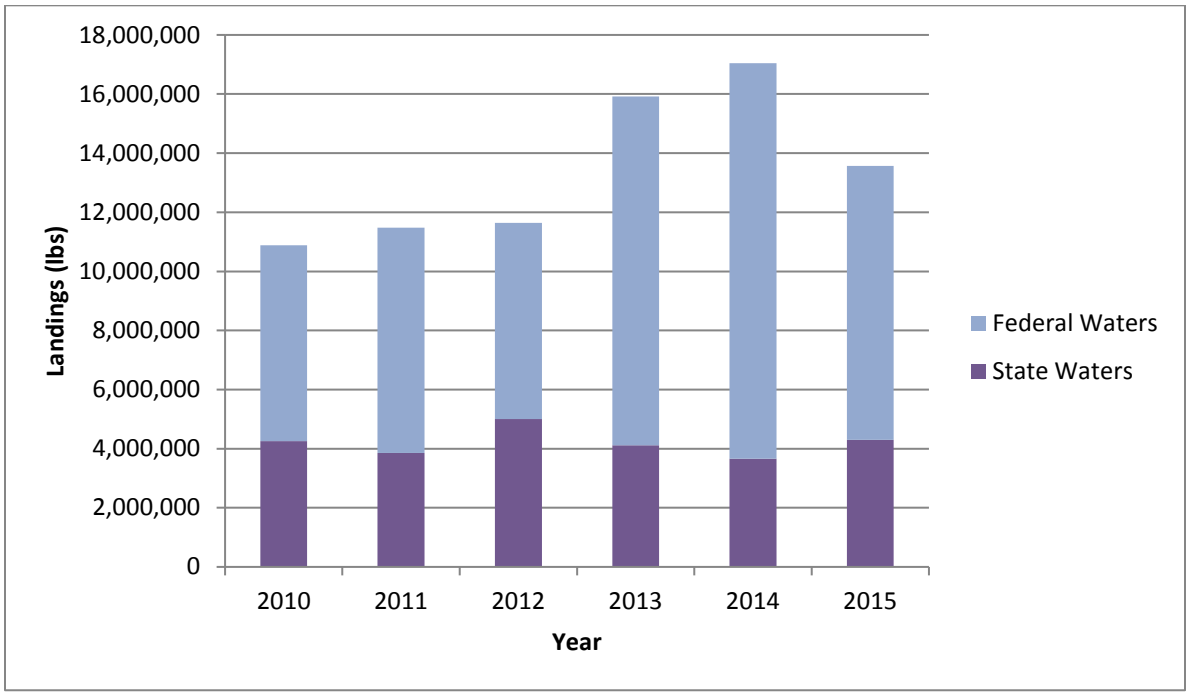
While landings have increased overall, the majority of this increase has been observed in federal waters, as reported by NMFS' Fisheries of the U.S., 2010-2015. While landings in state waters have fluctuated between 3.5 million and 5 million pounds, the landings in federal waters have increased from approximately 6.5 million to over 13 million pounds, as seen in Table 14 and Figure 6.

Table 14. Jonah Crab Landings in State and Federal Waters, 2010-2015

	State Waters			Federal Waters		
Year	Landings (lb)	Percent of Total Landings (%)	Value ($)	Landings (lb)	Percent of Total Landings (%)	Value ($)
2010	4,254,000	39	2,168,000	6,626,000	61	3,482,000
2011	3,857,000	34	2,388,000	7,618,000	66	3,314,000
2012	5,007,000	43	3,511,000	6,635,000	57	4,772,000
2013	4,115,000	26	3,354,000	11,798,000	74	9,502,000
2014	3,662,000	21	2,723,000	13,386,000	79	10,352,000
2015	4,301,000	32	3,191,000	9,266,000	68	6,774,000

Source: Fisheries of the U.S., 2010-2015

Figure 6. Jonah Crab Landings in State and Federal Waters, 2010-2015



4.5.2 Location of the Commercial Jonah Crab Industry

Without having previously regulated the Jonah crab fishery, it is difficult to characterize the location of the fishery. This section attempts to describe the location of the fishery based on the number of harvesters and the amount and location of landings. While the data presented is the best available, it is best viewed as an approximation of industry participation in the Jonah crab fishery. Exact figures are not available for several reasons:

1. This fishery is not yet federally managed;
2. Federal trip reports have not been required; and
3. Lobster permit holders, who account for the vast majority of landings, are also not required to submit federal trip reports.

The Jonah crab fishery has emerged in the wake of the Southern New England American lobster stock collapse. As lobster has become more scarce to the extreme southern range of the fishery, more harvesters are likely turning to Jonah crab to supplement their income. As Southern New England lobster management measures become even more stringent, this trend is expected to continue.

Harvesters

Because the Jonah crab fishery has not previously been regulated, no federal permits have been issued. Therefore, permit data is not available for examination and analysis. Instead, Table 15 below summarizes the number of Jonah crab harvesters by state from 2010-2015. In some instances, state's data have been combined to prevent reporting confidential data.

Table 15. Jonah Crab Harvesters by State, 2010-2015

	2010	2011	2012	2013	2014	2015
ME/NH	514	427	318	221	186	225
MA	103	86	94	122	126	124
RI	83	62	69	80	63	62
CT/NY	70	31	26	33	32	15
NJ	21	34	25	20	26	25
DE/MD/VA/NC	9	7	3		5	9
Total*	**786**	**639**	**531**	**471**	**431**	**452**

*counts may not sum to total due to harvesters landing in more than one state
Source: Data provided by NMFS, GARFO, APSD from CFDBS

Overall, the number of harvesters reported as selling Jonah crab has decreased from 786 harvesters in 2010 to 452 harvesters in 2015. Harvesters selling their product in New England states account for the vast majority of harvesters coastwide. Despite accounting for a small percentage of landings, Maine and New Hampshire account for the largest percentage of harvesters in each of the 6 years. Over this time series, the number of Maine and New Hampshire harvesters has steadily decreased, from a high of 514 harvesters in 2010 to a low of 186 harvesters in 2015. In contrast, the number of harvesters in Massachusetts has generally increased from a low of 86 in 2011 to a high of 126 in 2014. This is not surprising, given the increase in Massachusetts landings in recent years. The number of Rhode Island harvesters have fluctuated between 62 and 83, with no discernable trend. While these results begin to characterize the commercial Jonah crab fishery, they tell only about the size of the industry over time; making the link between the number of vessels and the amount of fishing effort is more difficult.

Landings

While examining the number of harvesters is one way to characterize the location of the fishery, another is to look at landings data in finer detail. Massachusetts and Rhode Island have accounted for the greatest percentage of landings in each year from 1990 through 2015. While landings have generally increased or fluctuated in most states between those years, Massachusetts and Rhode Island have experienced the greatest increase in landings. Table 16 and Figure 7 include a summary of Jonah crab landings by each state, from 1990 through 2015. As of 2015, Massachusetts and Rhode Island accounted for approximately 97% of the 2015 landings (Figure 8).

Table 16. Jonah Crab Landings in Pounds by State, 1990-2015

Year	CT	DE	MA	MD	ME	NC	NH	NJ	NY	RI	VA	Total
1990			1,264,321	6,573	403,843			18,845	480	882,843	13,044	2,589,949
1991			979,250	7,209	194,780			38,040		976,744	2,046	2,198,069
1992			1,487,991	5,448	34,610			37,833	1,040	1,067,826	28	2,634,776
1993		2,000	1,312,751	5,725	50,281			18,548	10,459	1,028,322	64	2,428,150
1994		400	1,294,893	*	63,844		*	22,431	249,150	1,059,321		2,695,421
1995	10		1,048,824	*	*			22,101	39,074	731,518	*	1,905,446
1996	9		1,202,790	1,028	131,260			26,253	331,467	958,031		2,650,838
1997	267		2,693,851	*	169,233		*	20,700	120,069	534,319	*	4,367,857
1998	535		1,118,194	490	*		*	76,792	115,261	843,575	*	2,767,228
1999	1,022		1,739,112	2,925	52,356		*	14,037	757	1,396,757	*	3,414,305
2000	16,806		1,358,571	*	*	*	*	16,446	54,919	225,435	*	2,630,328
2001	6,244		1,507,268	33,210	*	*	*	18,668	111,845	5,535		4,046,509
2002	688		1,667,683	*	223,071		*	18,308	34,763	127,992		2,625,524
2003		*	1,530,595	*	1,279,228		*	22,698	62,426	308,681		3,216,152
2004	570		933,869	93	2,579,162		*	7,209	35,300	906,660		4,463,168
2005	328		3,663,582	*	2,717,849			29,254	11,160	754,594	*	7,180,766
2006	*		3,614,261	2,762	2,299,912			15,545	24,465	752,490	*	6,710,836
2007	*		4,118,477	8,720	2,062,084			80,062	202,898	2,065,799	*	8,538,345
2008	287		4,478,505	12,188	1,482,514		*	115,995	561,386	2,303,482	*	9,097,352
2009	*		4,869,605	11,657	1,103,629		*	38,460	510,642	1,618,121	*	8,624,254
2010	*		5,689,431	18,045	1,075,747	*	*	28,400	968,122	2,922,404		10,872,716
2011	*		5,379,792	92,401	1,096,592	*	*	26,286	69,440	2,540,337	*	9,273,632
2012	2,349		7,540,392	*	556,675		*	68,252	609	3,286,569	*	11,662,595
2013	51,462		10,095,401	*	378,340		344,551	7,803	*	4,397,734		15,912,923
2014	49,998		11,943,076	152,614	332,997	*	404,703	33,456	*	4,130,880	*	17,048,056
2015	7989	*	9,096,374	30,244	309,715		*	68,116	*	3,861,260		13,565,974

*Landings have been removed for confidential purposes; totals do not include confidential data.
Source: Jonah Crab Plan and 2017 Jonah Crab FMP Review

Figure 7. Jonah Crab Landings by State, 1990-2015

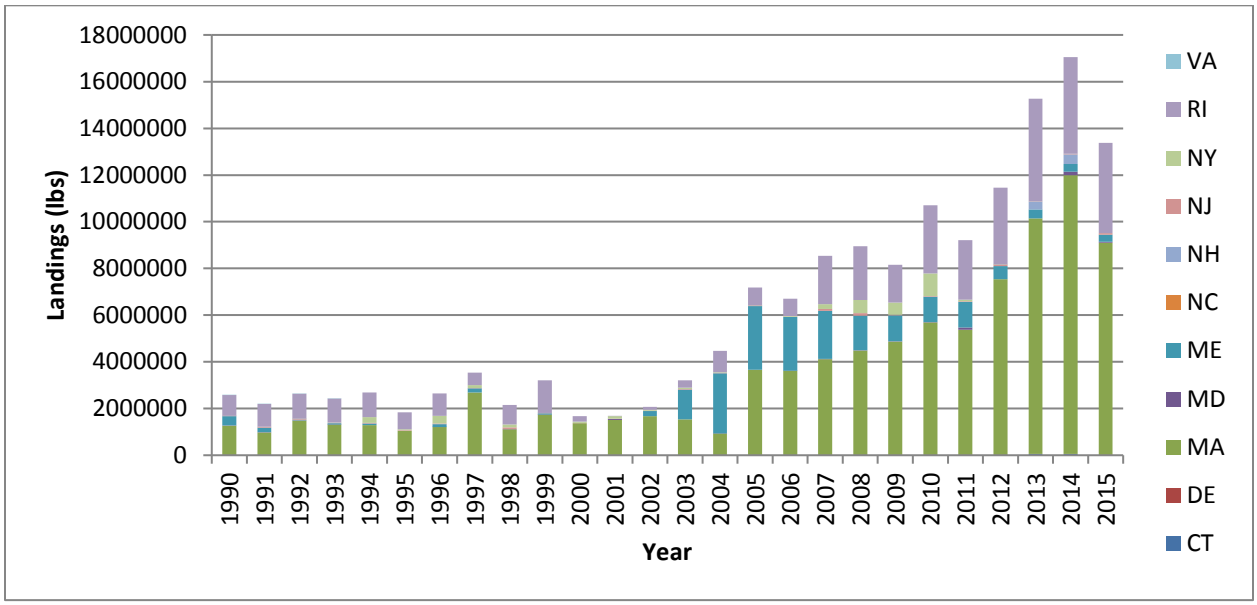
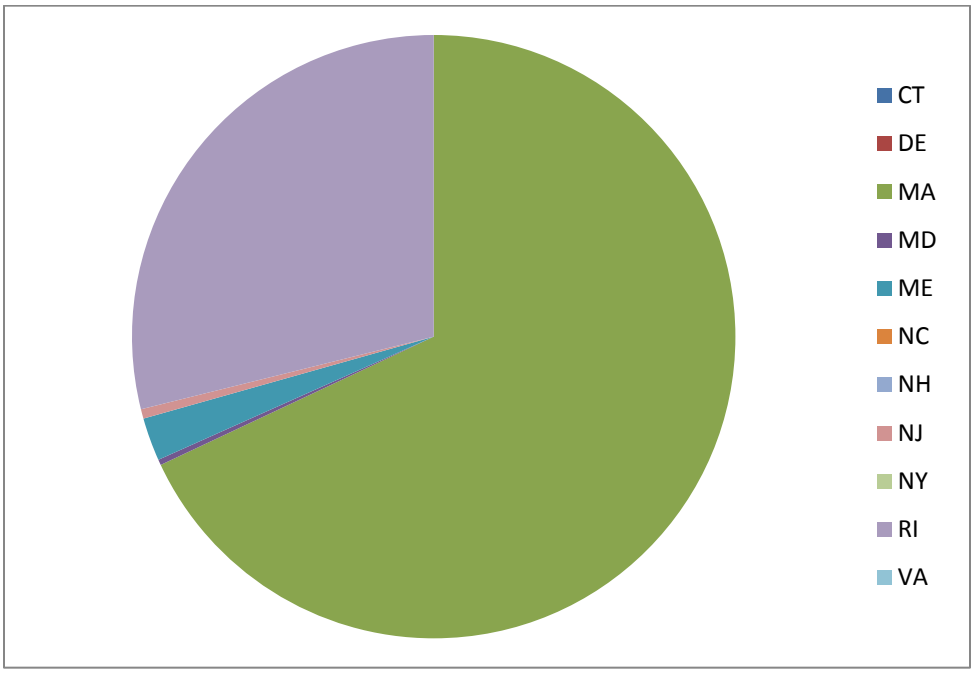


Figure 8. State Summary of 2015 Jonah Crab Landings



In summary, there is no readily available data that precisely measures fishing effort within the commercial Jonah crab fishery. However, based on the relative number of Jonah crab harvesters across states as well as the proportion of landings, the data show in general that Massachusetts and Rhode Island are the major participants.

The size of the recreational fishery is unknown. Given that the commercial fishery is prosecuted mostly offshore and the types of gear deployed on recreational trips (e.g., non-trap gear), landings from recreational fishermen are thought to be minimal due to several factors:

1. There is no significant recreational lobster fishery in federal waters,
2. Jonah crab is not used as bait in other fisheries, and
3. Jonah crab is not a prized recreational species.

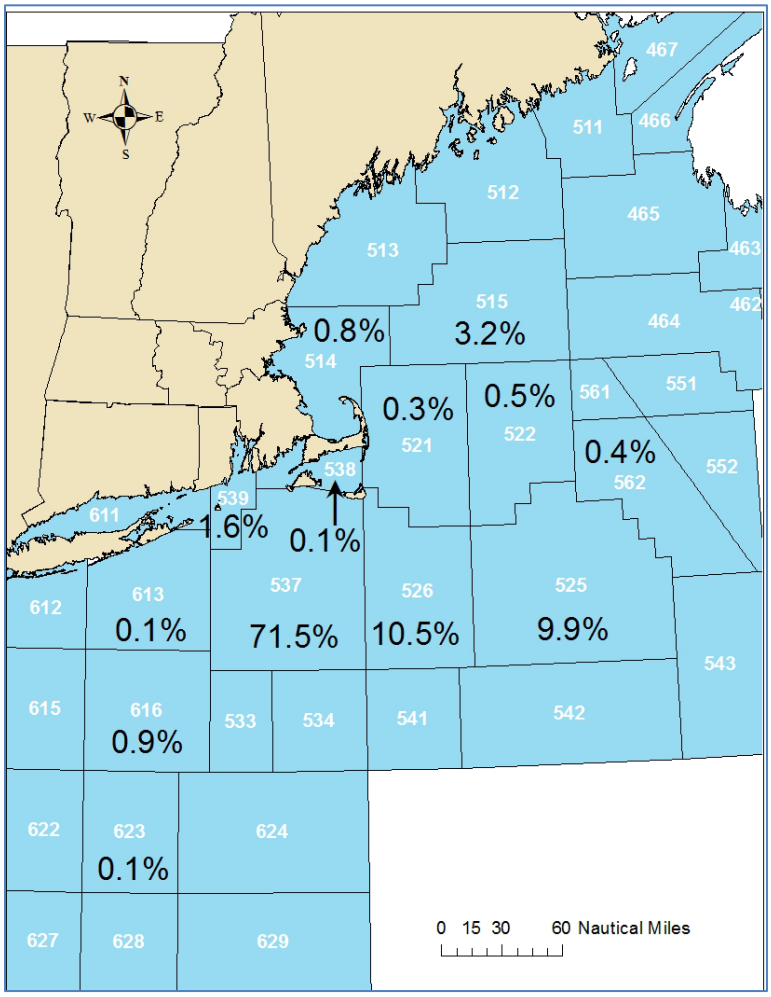
4.5.3 Social Environment

The social environment discussion below examines the social and cultural setting of the communities potentially affected by the proposed Jonah crab action. For reference, the Magnuson-Steven Act defines a fishing community as "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community."

Potentially affected communities were identified by first looking at the distribution of Jonah crab harvesters (who are predominantly lobster trap harvesters) across the relevant states and management areas, then identifying the towns in which those harvesters reside. Social and cultural characteristics of the towns with the strongest participation in the Jonah crab fishery are described in Appendix 5. Social parameters considered include regional and local demographic attributes of the fishing communities identified, (e.g., age, income, education); and cultural parameters such as institutions that support the attitudes, beliefs and values of fishery related workers and the communities in which they work.

During the development of the Jonah Crab Plan, the PDT attempted to characterize where landings are harvested. Using 2014 Massachusetts and Rhode Island landings data (accounting for approximately 95% of all 2014 landings), Jonah crabs are primarily harvested from Statistical Area 537 (71%), followed by 526 (10%) and 525 (10%), as shown in Figure 9. These areas correspond with Lobster Conservation Management Areas 2 and 3. Geographically, landings are coming from waters immediately accessible from these states.

Figure 9. 2014 MA and RI Jonah Crab Landings by Statistical Area*



*Areas with less than 0.1% of landings are omitted
Source: Jonah Crab Plan

While communities affected by this action range from Maine to Virginia, information above indicated that 95 percent of 2014 catch was landed in Massachusetts and Rhode Island. These landings, however, are not distributed equally among ports. Approximately 87 percent of landings in 2015 were landed in the communities identified in Table 17.

Table 17. Jonah Crab Landings by Port 2015

Port State	Port Name
MA	New Bedford
	Sandwich
	Fairhaven
RI	Newport
	Point Judith

Source: Data provided by NMFS, GARFO, APSD from CFDERS

Social and cultural characteristics of the towns with the strongest participation in the Jonah crab fishery are described in Appendix 5. Social parameters considered include regional and local demographic attributes of the fishing communities identified, (e.g., age, income, education); and cultural parameters such as institutions that support the attitudes, beliefs and values of fishery related workers and the communities in which they work.

5.0 Impacts of the Proposed Action and Alternatives

5.1 Introduction

Chapter 5 reviews the alternatives that are the subject of this evaluation, establishes criteria for evaluating the impact of each alternative on the VECs identified in Chapter 4, and discusses impacts. This section reviews the VECs and provides definitions that will be used in the impact assessment.

This analysis considers impacts to 5 VECs:

Target species: For the purpose of this analysis, the target species VEC includes Jonah crab managed under the Commission's Jonah Crab Plan. Section 4.1 describes the current condition this stock.

Other Affected Species: For the purposes of this analysis, the other affected species includes bycatch and bait, including lobster, red crab, and skate. Section 4.2 also describes the current condition of these species.

Physical Environment: For the purpose of this analysis the physical environment VEC consists of general habitat, the physical environment, and EFH in the Greater Atlantic region. The Sustainable Fisheries Act defines EFH as "[t]hose waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Section 4.3 describes the conditions of the physical environment.

Protected Resources: This VEC includes species under NMFS' jurisdiction which are afforded protection under the Endangered Species Act (ESA) (i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act (MMPA). Section 4.4 lists the 18 marine mammal, sea turtle, and fish species that are classified as endangered or threatened under the ESA. The remaining species in Section 4.4 are protected by the MMPA and are known to interact with gear used in the Jonah crab fishery. Section 4.4 describes the current condition of these protected resources.

Human Communities/Social-Economic Environment: This VEC includes impacts to people's way of life, traditions, and communities. These social and economic impacts may be driven by changes in fishery flexibility, opportunity, stability, certainty, safety, and other factors. Impacts would most likely be experienced across communities, gear cohorts, and vessel size classes. Section 4.5 describes the current conditions in the potentially impacted communities.

This EIS evaluates the potential impacts to the VECs using the criteria outlined in Table 18. Resource conditions describe the baseline for each VEC; it should be noted that the baselines are not consistent across VECs, but vary to capture pre-project environmental conditions and statutory definitions and requirements. Due to the large number of management measures and alternatives, this EIS is structured so that it evaluates the impacts of all VECs by alternative. Said another way, each alternative will contain a complete analysis of impacts to all VECs.

Impacts from all alternatives are judged relative to the baseline conditions, as described in Chapter 4 and compared to each other.

Table 18. General definitions for impacts and qualifiers relative to resource condition (i.e., baseline).

General Definitions				
VEC	**Resource Condition**	**Impact of Action**		
		Positive (+)	Negative (-)	No Impact (0)
Target and Other Affected Species	Overfished status defined by the Magnuson-Stevens Act	Alternatives that would maintain stock status above an overfished condition*	Alternatives that would maintain or result in an overfished condition*	Alternatives that do not impact stock / populations
Protected Species: ESA listed / MMPA Protected	Populations at risk of extinction (endangered) or endangerment (threatened) / Stock health may vary but populations remain impacted	Alternatives that contain specific measures to ensure no interactions with protected species (e.g., no take) / Alternatives that will maintain takes below PBR and approaching the Zero Mortality Rate Goal	Alternatives that result in interactions/take of listed resources, including actions that reduce interactions / Alternatives that result in interactions with/take of marine mammal species that could result in takes above PBR	Alternatives that do not impact ESA listed or MMPA protected species
Physical Environment	Many habitats degraded from historical effort and slow recovery time (see condition of the resources table for details)	Alternatives that improve the quality or quantity of habitat or allow for recovery	Alternatives that degrade the quality, quantity or increase disturbance of habitat	Alternatives that do not impact habitat quality
Human Communities/ Socioeconomic Environment	Highly variable but generally stable in recent years (see condition of the resources table for details)	Alternatives that increase revenue and social well-being of fishermen and/or communities	Alternatives that decrease revenue and social well-being of fishermen and/or communities	Alternatives that do not impact revenue and social well-being of fishermen and/or communities
	Impact Qualifiers			
A range of impact qualifiers is used to indicate any existing uncertainty	Negligible	To such a small degree to be indistinguishable from no impact		
	Slight (sl), as in slight positive or slight negative)	To a lesser degree / minor		
	No qualifier or moderate (m), as in positive or negative	To an average degree (i.e., more than "slight", but not "high")		
	High (H), as in high positive or high negative	To a substantial degree (not significant unless stated)		
	Significant (in the case of an EIS)	Affecting the resource condition to a great degree, see 40 CFR 1508.27.		
	Likely	Some degree of uncertainty associated with the impact		
*Actions that will substantially increase or decrease stock size, but do not change a stock status may have different impacts depending on the particular action and stock. Meaningful differences between alternatives may be illustrated by using another resource attribute aside from the Magnuson-Stevens Act status, but this must be justified within the impact analysis.				

5.2 Impacts Analysis for Commercial Management Alternatives

The following section analyzes the impacts of each commercial management alternative on the VECs. Table 19 summarizes the direct and indirect impacts of each alternative as compared to the current,

unregulated condition of the fisheries. Table 20 provides a comparison among the alternatives. These impacts of each alternatives are discussed in greater detail in this chapter.

Table 19. Summary of Direct and Indirect Impacts of Commercial Alternatives to VECs

			VECs				
	Management Measure	**Alternatives**	**Target Species**	**Other Affected Species**	**Physical Environment**	**Protected Resources**	**Human Communities/ Socioeconomic Environment**
Commercial	**Permitting**	No Action	likely sl -	likely sl -	likely sl -	Likely m to sl -	likely short term sl + likely long term sl -
		Lobster Permit	likely sl +	likely sl +	likely sl -	Likely m to sl -	likely short term sl -, likely long term sl +
		Jonah Crab Permit	likely sl +	likely sl +	likely sl -	Likely m to sl -	likely short term sl -, likely long term sl +
	Minimum Size	No Action	likely sl -	no impact	no impact	no impact	likely short term sl + likely long term sl -
		4.75-inch carapace width	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term +
		5-inch carapace width	likely sl to mod +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
	Landing Disposition	No Action	likely sl -	no impact	no impact	no impact	likely short term sl + likely long term sl -
		Whole-crab Fishery	likely +	no impact	no impact	no impact	likely short term -, likely long term sl +
		Whole-crab Fishery and Incidental Claw Allowance	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
		Whole-crab Fishery and Regulated Claw Fishery	likely sl -	no impact	no impact	no impact	likely short term sl + likely long term sl -
	Broodstock Protection	No Action	likely -	no impact	no impact	no impact	likely short term sl + likely long term sl -
		Prohibit Retention of Egg-Bearing Females	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
		Prohibit Retention of Females	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
	Incidental Limits (non trap and non-lobster trap)	No Action	likely -	no impact	no impact	no impact	likely short term sl + likely long term sl -
		1000 crabs/day	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
		200/day up to 500/trip	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
	Incidental Definition	No Action	likely sl -	no impact	no impact	no impact	likely short term sl + likely long term sl -
		50% of weight onboard	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
	Dealer Reporting	No Action	no impact	no impact	no impact	no impact	no impact
		Mandatory Reporting	no impact	no impact	no impact	no impact	no impact
	Harvester Reporting	No Action	likely sl -	no impact	no impact	no impact	no impact
		Jonah crab-only harvesters	likely sl +	no impact	no impact	no impact	no impact
		all Jonah crab harvesters	likely sl +	no impact	no impact	no impact	no impact

Table 20. Comparison between Commercial Alternatives*

	Management Measure	Alternatives	VECs: Target Species	Other Affected Species	Physical Environment	Protected Resources	Human Communities/ Socioeconomic Environment
Commercial	**Permitting**	No Action	2	2	2	2	short term 1 long term 2
		Lobster Permit	1	1	1	1	short term 2 long term 1
		Jonah Crab Permit	1	1	1	1	short term 2 long term 1
	Minimum Size	No Action	3	0	0	0	short term 1 long term 3
		4.75-inch carapace width	2	0	0	0	short term 2 long term 2
		5-inch carapace width	1	0	0	0	short term 3 long term 1
	Landing Disposition	No Action	3	0	0	0	short term 1 long term 4
		Whole-crab Fishery	1	0	0	0	short term 4 long term 1
		Whole-crab Fishery and Incidental Claw Allowance	2	0	0	0	short term 3 long term 2
		Whole-crab Fishery and Regulated Claw Fishery	4	0	0	0	short term 2 long term 3
	Broodstock Protection	No Action	3	0	0	0	short term 1 long term 3
		Prohibit Retention of Egg-Bearing Females	2	0	0	0	short term 2 long term 2
		Prohibit Retention of Females	1	0	0	0	short term 3 long term 1
	Incidental Limits (non-trap and non-lobster trap)	No Action	3	0	0	0	short term 1 long term 3
		1000 crabs/day	2	0	0	0	short term 2 long term 2
		200/day up to 500/trip	1	0	0	0	short term 3 long term 1
	Incidental Definition	No Action	2	0	0	0	short term 1 long term 2
		50% of weight onboard	1	0	0	0	short term 2 long term 1
	Dealer Reporting	No Action	0	0	0	0	0
		Mandatory Reporting	0	0	0	0	0
	Harvester Reporting	No Action	2	0	0	0	0
		Jonah crab-only harvesters	1	0	0	0	0
		all Jonah crab harvesters	1	0	0	0	0

* Comparison scores range from 1 to the number of alternatives for each measure (2 to 4). A lower score (1) is best is the best alternative, a higher score is worst. A score of 0 represent no impact.

Because few data exist on the Jonah crab fishery, it is difficult to assess the impacts of this measure with precision. Where possible, the following analysis will incorporate quantitative analysis, using the lobster fishery as a proxy. Where a proxy is inappropriate, the analysis will be qualitative.

5.2.1 Impacts of Permitting Alternatives

As discussed in greater detail in Section 3.2.1, the Commission considered permitting requirements, but has not yet made formal recommendations beyond tying Jonah crab harvesting to a federal lobster permit.

5.2.1.1 No Permits Required (No Action)

The No Action alternative (Section 3.2.1.3) would allow the Jonah crab fishery to continue to operate in federal waters without requiring harvesters to obtain a federal permit. However, given that most federal vessels either fish in or transit state waters where permits or licenses are required, these vessels would be required to comply with whatever regulations and restrictions that are required by their state permit, which would include most of these measures because the states have already enacted the Commission's Jonah Crab Plan. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The direct and indirect impact of not establishing permit requirements for Jonah crab harvesters is expected to be slightly negative for the Jonah crab resource and the most negative of all permitting alternatives. Without permits, state and federal fishery managers would not know who is targeting and catching Jonah crabs and may not be able to examine the harvest of Jonah crab. The lack of oversight in the fishery creates a risk that the fishery could reach an overfished state because regulators would lack data on who is fishing for Jonah crabs and how much is being harvested. It is qualified as slight, however, because the states have already approved permitting for the Jonah crab fishery. State permits (with reporting requirements) means that some information will be available to examine harvest. It is also qualified as slight because measures already in place for the lobster fishery (mandatory state reporting, trap design, etc.) help to control the catch of Jonah crabs. Compared to the two alternatives that establish permitting requirements, the No Action alternative would result in the highest degree of negative biological impacts due to the lack of fishery information.

Other Affected Species

The No Action alternative is expected to result in slight negative direct and indirect impacts on other affected species and the most negative impacts of all permitting alternatives. Allowing fishing, either through the permitting program and a trap allocation or outside of a permitting program authorizes gear to be used without the knowledge of who is using the gear or the extent of their fishing effort. This lack of information regarding bait and incidental catch of lobsters, rock crabs, and red crabs creates a risk that the fishery could reach an overfished state and therefore has a negative impact. It is qualified as slight, however, because these are not new or additional traps being authorized. They are the same traps that are used in the lobster fishery, which already has analyzed and accounts for some of the impacts to bait and other species caught incidentally. Further, the No Action alternative is expected to result in the same, slight negative impacts as other options that permit vessels.

Habitat

The No Action alternative is expected to result in, ranging from worst to most conservatively, slight negative direct and indirect impacts on habitat and the most negative impacts of all permitting alternatives. Allowing fishing, either through expanding species that can be targeted in an existing permitting program that has an associated trap allocation, allowing a new permit category to be established, or outside of a permitting program, allows gear to be used, in this case slightly modified lobster traps. Traps are weighted to sit on the ocean floor and, therefore, have, at worst, some negative impact to bottom habitat because they create habitat disturbance. Each trap, however, has a limited and minimal footprint on the bottom and the gear is often fished in areas where the habitat was previously disturbed by fishing. Therefore, in general, impacts on habitat are minor, especially when compared to mobile bottom-tending gear (Morgan and Chuenpagdee 2003, NEFSC 2002a). Further, as established in Section 4.5.1, Jonah crab harvesters and lobster harvesters are one-and-the-same, using the same traps to fish for both species. This helps to further reduce the conservative negative impact. Therefore, slight negative impacts are expected because the No Action alternative will allow some traps to have contact with bottom habitat. Because not establishing a permitting program may result in an unregulated proliferation of the fishery (and an increase in traps deployed), the No Action alternative is more negative for habitat than either of the options that establish a permitting program.

Protected Resources

The No Action alternative is expected to result in slight to moderate negative direct and indirect impacts on protected species (ESA listed and MMPA protected species) and the most negative impacts of all permitting alternatives. As discussed in Section 4.4, pot/trap gear, specifically the vertical lines associated with this gear type, is known to interact with ESA-listed species of large whales and sea turtles and MMPA-protected (non-ESA listed) species of large whales and bottlenose dolphins pot/trap gear. The risk of an interaction is associated with the amount of gear and the time that gear spends in the water, as well as the presence of protected species in the same area and time as the gear. Increases in any of these factors equates to elevated interaction risk to protected species. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely.

Allowing fishing, either through a permitting program and trap allocation or outside of a permitting program allows gear to be used, in this case slightly modified lobster traps. However, for the vast majority of the fishery, the same traps that are used in the lobster fishery will be used under this No Action alternative. Few if any additional traps are expected to be fished under this alternative, relative to current fishery conditions. As a result, there will be no difference in effort between the Lobster Plan and fishery and the Jonah Crab Plan and fishery. Fishing behavior and effort are not expected to change significantly from status quo conditions under this alternative. Therefore, the presence, quantity, or degree of pot/trap gear, and thus, vertical lines, used in lobster/Jonah crab fishery and associated management areas are also not expected to change significantly. As noted above, interactions risks with protected species are strongly associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of "status quo" fishing behavior/effort is not expected to change any of these operating conditions. As a result, relative to current conditions, new or elevated (e.g., more gear, longer soak time) interaction risks to protected species are not expected. Given the risk for interactions, the overlap with the lobster fishery

(listed as a Category I fishery in the MMPA List of Fisheries), and the information provided in Section 4.4 and Table 18, impacts to protected species are expected to range from slight to moderate negative, with moderate to slight negative impacts likely for MMPA protected species (non-ESA listed) and moderate negative impacts likely for ESA-listed species.

The No Action alternative allows for anyone to harvest Jonah crabs in federal waters, which could result in an unregulated expansion of the fishery. Tying Jonah crab harvest to either a lobster permit or a Jonah crab-only permit prevents such an expansion. Therefore, this alternative is expected to result in more negative impacts than the two alternatives that establish a permitting program.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most positive in the short term and the most negative in the long term. Under the No Action, harvesters would be able to retain, sell, and profit from Jonah crabs harvested in federal waters without obtaining a federal permit. Therefore, harvesters would encounter the least amount of inconvenience (i.e., paperwork and oversight) compared to other permitting alternatives. However, these impacts are qualified as slight because, as was stated above, the majority of permit holders are already being inconvenienced by state permit requirements. The impacts are also qualified as slight because failing to establish a complementary permitting program when the states already permitted Jonah crab harvesters would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive impacts to human communities. In the long-term however, forgoing a permitting program introduces risk that that stock could be overfished in the future, as described above, and therefore could lead to slight negative impacts on the population. This could ultimately affect a harvester's ability to catch and sell Jonah crabs. Under this scenario, harvesters could lose out on future profits. Potential profits combined with the inconsistencies in regulations would likely lead to slightly negative long-term impacts. Compared to the alternatives that establish a federal permitting program, this option would have the most positive short-term impacts for human communities and socioeconomic environment because it inconveniences harvesters the least but would have the most negative long-term positive impacts because it introduces the risk of overfishing.

5.2.1.2 Jonah Crab harvest by Lobster Permit Holders Impacts (preferred)

The preferred alternative (Section 3.2.1.1) would restrict the targeted commercial harvest of Jonah crabs to only lobster permit holders. It would also allow for the incidental harvest of Jonah crabs by other harvesters, provided they obtain an incidental permit. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The direct and indirect impact of establishing permit requirements and limiting targeted commercial harvest to lobster permit holder is expected to be slightly positive for the Jonah crab resource, the same (or substantially similar) impacts as the Jonah crab only alternative and more positive than the No Action.

Permits will allow state and federal fishery managers to know who is targeting and catching Jonah crabs and, if reporting requirements are approved, examine the harvest of Jonah crab. This minimizes the risk that the fishery could reach an overfished state due to a lack of harvest controls. It is qualified as slight, however, because measures already in place for the lobster fishery (mandatory state reporting, trap design, etc.) help to control the catch of Jonah crabs. Compared to the alternative that allows for the qualification of Jonah crab-only harvesters, the preferred alternative would result in the same slight positive biological impacts due to collection of fishery information. Compared to the No Action alternative, the preferred alternative would result in impacts that are more positive because more fishery information will be available.

Other Affected Species

The preferred alternative is expected to result in slight positive direct and indirect impacts on other affected species, the same (or substantially similar) impacts as the Jonah crab only alternative and more positive than the No Action. Allowing fishing through this permitting alternative authorizes lobster harvesters to retain Jonah crabs and allows other incidental harvesters to retain a small amount of Jonah crabs. Permitting these harvesters gives managers a better sense of who is catching Jonah crabs, and, where harvesters reporting is required, a better sense of targeted catch, bait usage, and incidental catch. Collection of this information helps to minimize the risk of the fisheries reaching an overfished state. Therefore, positive impacts are expected. The impacts are qualified as slight, however, because the bait and incidentally caught species already have measure in place to ensure the sustainability of those fisheries. This preferred permitting alternative is expected to have the same, slight positive impacts as the other permitting alternative because they both capture information on harvesters. Compared to the No Action alternative, this alternative would be more positive because it captures information on the fishery.

Habitat

The preferred alternative is expected to result in, ranging from worst to most conservatively, slight negative direct and indirect impacts on habitat, similar to the other permitting alternative and more positive than the No Action. Please see the *Habitat* discussion in Section 5.2.1.1 for a full discussion of the direct and indirect impacts determination. As established in Section 4.5.1, Jonah crab harvesters and lobster harvesters are one-and-the-same, using the same traps to fish for both species. Tying Jonah crab harvest to either a lobster permit or another permitting alternative will prevent unregulated proliferation of the fishery. Therefore, the preferred alternative will have the same impacts as the other permitting alternative. Both permitting alternatives will be more positive for habitat, compared to the No Action because an increase in traps will be prevented.

Protected Resources

The preferred alternative is expected to result in slight to moderate direct and indirect negative impacts on protected species (ESA listed and MMPA protected species), similar to the other permitting alternative and more positive than the No Action. Please see the *Protected Resources* discussion in Section 5.2.1.1 for a full discussion of the direct and indirect impacts determination. Tying Jonah crab harvest to either a permit will prevent the unregulated proliferation of the fishery. Therefore, the preferred alternative will have the same impacts as the other permitting alternative. Both permitting alternatives will be more

positive for protected resources, compared to the No Action because an increase in traps will be prevented.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the No Action, this alternative is more negative in the short term and more positive long term. This alternative is expected to have the same (or substantially similar) impacts as the Jonah crab-only permit alternative. Under this permitting scenario, lobster permit holders would automatically be allowed to retain, sell, and profit from Jonah crabs harvested in federal waters Jonah crabs without obtaining a separate federal Jonah crab permit. Incidental harvesters would be required to elect an incidental Jonah crab permit on either an initial vessel application or a permit renewal application. At present, it is estimated that it would take an applicant approximately 45 minutes to complete an initial vessel application and approximately 30 minutes to complete a permit renewal application. Costs associated with these applications result from mailing and are estimated at approximately 50 cents. Due to the burden of completing this application annually, short-term negative impacts are expected. However, the addition of one additional permit category (incidental Jonah crab permit) is not expected to add more time or cost to these burdens, therefore the impact is qualified as slight. In the longer term, however, approving a permitting program minimizes the risk that the stock could be overfished in the future. This could ultimately ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability. Therefore, this would result in slight positive long-term impacts for harvesters. Further, establishing a permitting program that matches what the states have implemented would ensure that there is no disconnect in the regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative and enforcement objective and minimizes confusion. This helps to temper any negative short-term impacts associated with cost and inconvenience, and makes for positive long-term impacts. Compared to other option that establish a different permitting program, this option would have the same slight positive short-term impacts and the same slight negative long-term impacts because it establishes similar permitting programs. Compared to the No Action alternative, this alternative would have more negative short-term impacts and more positive long-term impacts because it would inconvenience harvesters by requiring permit (if they do not already have one) but would help to ensure long-term stability in the population.

5.2.1.3 Jonah Crab Harvest by Jonah Crab Permit Holders

This alternative (Section 3.2.1.2) would restrict commercial harvest of Jonah crabs to lobster permit holders and others who can demonstrate Jonah crab-only landings. It would also allow for the incidental harvest of Jonah crabs by other harvester, provided they obtain an incidental permit. This alternative meets the Commission's goal of setting conservation measures that are consistent with current practices but it fails to establish complementary measures to what the Commission approved and recommended.

Target Species

The direct and indirect impact of establishing permit requirements and limiting targeted commercial harvest to lobster permit holder and Jonah crab-only harvesters is expected to be slightly positive for the

Jonah crab resource, the same (or substantially similar) impacts as the lobster permit alternative and more positive than the No Action. Please see the *Target Species* discussion in Section 5.2.1.2 for a full discussion of these impacts determinations.

Other Affected Species

This alternative is expected to result in slight positive direct and indirect impacts on other affected species, the same (or substantially similar) impacts as the lobster permit alternative and more positive than the No Action. Please see the *Other Affected Species* discussion in Section 5.2.1.2 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in, ranging from worst to most conservatively, slight negative direct and indirect impacts on habitat, similar to the other permitting alternative and more positive than the No Action. Please see the *Habitat* discussion in Section 5.2.1.1 for a full discussion of the direct and indirect impacts determination. As established in Section 4.5.1, Jonah crab harvesters and lobster harvesters are one-and-the-same, using the same traps to fish for both species. Tying Jonah crab harvest to either a lobster permit or another permitting alternative will prevent unregulated proliferation of the fishery. Therefore, the preferred alternative will have the same impacts as the other permitting alternative. Both permitting alternatives will be more positive for habitat, compared to the No Action because an increase in traps will be prevented.

Protected Resources

This alternative is expected to result in slight to moderate direct and indirect negative impacts on protected species (ESA listed and MMPA protected species), similar to the other permitting alternative and more positive than the No Action. Please see the *Protected Resources* discussion in Section 5.2.1.1 for a full discussion of the direct and indirect impacts determination. Tying Jonah crab harvest to either a permit will prevent the unregulated proliferation of the fishery. Therefore, the preferred alternative will have the same impacts as the other permitting alternative. Both permitting alternatives will be more positive for protected resources, compared to the no action because an increase in traps will be prevented.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the No Action, this alternative is more negative in the short term and more positive long term. This alternative is expected to have the same (or substantially similar) impacts as the Jonah crab-only permit alternative. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.1.2 for a full discussion of these impacts determinations.

5.2.2 Impacts of Minimum Size Alternatives

As discussed in Section 3.2.2, the Lobster Board considered and approved a minimum size of 4 ¾-inch (12.065-cm) carapace width for the Jonah crab fishery. This section considers the impacts to the five VECs of a 4 ¾-inch (12.065-cm) minimum size, a 5-inch (12.7-cm) minimum size, and the No Action alternative that would set no minimum size for the fishery.

5.2.2.1 No Minimum Size (No Action)

The No Action alternative (Section 3.2.2.3) would allow the Jonah crab fishery to continue to operate without a minimum size. Jonah crab harvesters in federal waters-only would continue to operate without a minimum size. However, given that most federal vessels also hold state permits, these vessels would be required to comply with the most restrictive rule, and, therefore, must comply with the minimum size requirements already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The impact of not setting a minimum size to Jonah crabs is expected to be slightly negative for the Jonah crab resource and the most negative impacts of the minimum size alternatives. A fishery lacking a minimum size would allow Jonah crabs of any size to be harvested, including crabs that have not yet reached maturity. Removing an excess of crabs before they reach maturity decreases reproductive rates which would likely lead to an overall decrease in the Jonah crab population. Such a decrease could threaten the long-term stability of the stock. However, the impact is qualified as slight because, prior to approval of the Jonah Crab Plan, the market already demanded crabs that a minimum of 5-inch (12.7-cm), although if the market changed, this alternative would provide no regulatory backstop to prevent a market on immature Jonah crabs. Compared to the two alternatives which set a minimum size, the No Action alternative would result in the highest degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other minimum size alternatives. Whether regulated or unregulated in this No Action alternative, the fishery is expected to continue operating under current practices. Bait would be used to catch Jonah crabs, regardless of setting, or not setting a minimum size. Traps would continue to be set, which can be expected to catch lobster, and to a lesser degree rock crab and red crab, regardless of whether or what minimum size is approved. Therefore, no impacts to other affected species are expected to result from not setting a minimum size. Further, the No Action alternative is expected to result in the same, no impacts as setting a minimum size.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to the other minimum size alternatives. Harvesters are expected to set traps to target Jonah crabs, regardless of whether a minimum size is approved in the fishery. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. Not setting a minimum size is expected to result in the same, no impacts to habitat, as setting a 4 ¾-inch (12.065-cm) or a 5-inch (12.7-cm) minimum size because these alternatives do not alter the effort, location, or timing of the fishery.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other minimum size alternatives. This measure only regulates

the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, because there are no data that suggest that Jonah crabs in the Northwest Atlantic segregate by size, this measure will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of the unregulated, status quo fishery is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to the other options that set a minimum size, the No Action is expected to have the same impacts (i.e., no impacts) to protected resources.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most positive in the short term and the most negative in the long term. Under the No Action, harvesters would be able to retain, sell, and profit from Jonah crabs of any size. Therefore, harvesters would have the ability to profit the most from this scenario. However, the impact is qualified as slight because the market currently demands crabs that are approximately 4 ¾ inches (12.065 cm) or larger. It is also qualified as slight because failing to set a federal minimum size when the states have set a minimum size would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive to human communities. In the long-term however, harvesting crabs that have not had the opportunity to reproduce could have negative impacts on the population, and, therefore, on a harvester's ability to catch and sell Jonah crabs. Under this scenario, harvesters could lose out on future profits. Potential profits combined with the inconsistencies in regulations would likely lead to slightly negative long-term impacts. Compared to the alternatives that set a minimum size, this option would be more positive in the short-term, but more negative in the long-term.

5.2.2.2 4 ¾-inch (12.065-cm) Minimum Size (Preferred)

The preferred alternative (Section 3.2.2.1) would restrict commercial harvesters to possessing and landing Jonah crabs that have a minimum carapace width of 4 ¾ inches (12.065 cm). This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in slight positive direct and indirect impacts on Jonah crabs, and are more positive than the No Action but more negative than the 5-inch (12.7-cm) minimum size

alternative. Such regulations would restrict harvest to crabs that have reached maturity and had the opportunity to reproduce, based on size and maturity data presented in Section 4.1.1. Protecting mature Jonah crabs is likely to help maintain current reproductive rates and would likely help to ensure a stable and sustainable population in the long-term. However, the impact is qualified as slight because, prior to approval of the Jonah Crab Plan, the market already demanded crabs that a minimum of 5-inch (12.7-cm) but allows some room should slightly smaller crabs be retained. Compared to setting a 5-inch (12.7-cm) minimum size, this alternative is expected to have slightly less positive impacts because it sets a smaller minimum size, providing protections for slightly fewer Jonah crabs to reproduce. Compared to the No Action, this alternative is expected to result in higher positive impacts because it sets a minimum size which protects juvenile crabs.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other minimum size alternatives. Please see the *Other Affected Species* discussion in Section 5.2.2.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other minimum size alternatives. Please see the *Other Affected Species* discussion in Section 5.2.2.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other minimum size alternatives. Please see the *Protected Resources* discussion in Section 5.2.2.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the other alternatives, this alternative falls in the middle of the other alternatives in both the long term and the short term. In the short term, harvesters would be able to retain, sell, and profit from some crabs, though potential a much smaller amount of crabs compared to an unregulated state. Limiting the harvest to only larger, mature crabs will help to ensure the long-term protection of the stock. However, the impact is qualified as slight because the market currently demands crabs that are approximately 4 ¾ inches (12.065 cm) or larger, so it is not believed that Jonah crabs below 4 ¾ inches are being harvested. In the long-term however, harvesting crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability. These impacts may be disproportionate between inshore and offshore harvesters, as smaller crabs are more frequently capture in inshore waters and larger crabs are more typically found offshore. Further, setting a minimum size that matches what the states have set would ensure that there is no disconnect in the regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative and enforcement objective and minimizes confusion. This helps to temper any negative short-term impacts associated with being able to retain fewer crabs and makes for positive long-term impacts. Compared to the alternative that sets a

larger minimum size, this option would have the slightly more positive short-term impacts and slightly more negative long-term impacts because harvesters can retain and sell more crabs in the short term but could have fewer mature crabs contributing to the long-term population. Compared to not setting a minimum size (No Action), this alternative would have more negative short term impacts and more positive long-term impacts because harvesters would be able to retain and sell fewer crabs in the short term but would have more mature crabs contributing to the long-term population.

5.2.2.3 5-inch (12.7-cm) Minimum Size

This alternative (Section 3.2.2.2) would restrict commercial harvesters to possessing and landing Jonah crabs that have a minimum carapace width of 5 inches (12.7 cm). This alternative meets the Commission's goal of setting conservation measures that are consistent with current practices but it fails to establish complementary measures to what the Commission approved and recommended. Given that most federal harvesters also hold state permits, these harvesters would be required to comply with the more restrictive federal minimum size requirements.

Target Species

This alternative is expected to result in slight to moderate positive direct and indirect impacts on Jonah crabs and the most positive impacts of the minimum size alternatives. Please see the *Target Species* discussion in Section 5.2.2.2 for a full discussion of the direct and indirect impacts determinations. Compared to setting a 4 ¾-inch (12.065-cm) minimum size and the No Action alternative, this alternative is expected to result in higher positive impacts because it establishes the most conservative restrictions.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other minimum size alternatives. Please see the *Other Affected Species* discussion in Section 5.2.2.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other minimum size alternatives. Please see the *Other Affected Species* discussion in Section 5.2.2.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other minimum size alternatives. Please see the *Protected Resources* discussion in Section 5.2.2.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative impacts and longer term slight positive impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most negative in the short term and the most positive in the long term. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.2.2 for a full discussion of the direct and indirect impacts determinations. A 5-inch (12.7-cm) minimum size is the most restrictive

alternative under consideration. Harvesters would be able to retain, sell, and profit from the fewest crabs. Therefore, harvesters could be expected to profit the least from this scenario. In addition, setting a different minimum size from what was approved by the states would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive impact on human communities. In the long-term however, harvesting crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability. This effect, however, would be tempered by sustained confusion regarding inconsistent regulation. Compared to the alternatives that set a 4 ¾ inch (12.065-cm) minimum size and no minimum size (No Action), this option would have the most negative short-term impacts, but the most positive long-term impacts.

5.2.3 Impacts of Landing Disposition Alternatives

As discussed in Section 3.2.3, the Lobster Board considered and approved landing disposition requirements. This section considers the impacts of a coastwide whole crab fishery, a coastwide whole crab fishery with a minimal claw allowance, a coastwide regulated claw fishery, and the No Action alternative that would allow both whole crabs and claws to be landed to the five VECs.

5.2.3.1 Whole crabs and claws may be landed (No Action)

The No Action alternative (Section 3.2.3.4) would allow the Jonah crab fishery to continue to operate without landing disposition requirements. Jonah crab harvesters in federal waters-only would continue to operate without specific requirements on landing whole crabs or claws. However, given that most federal vessels also hold state permits, these vessels would be required to comply with the most restrictive rule, and, therefore, must comply with the landing disposition requirements already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The direct and indirect impact on Jonah crabs of not approving broodstock protections is expected to be slight negative and more negative than the whole crab fishery and small claw allowance alternatives, but more positive than the coastwide claw fishery. A fishery lacking landing disposition requirements would allow whole crabs and an unlimited amount of claws to be harvested from any sized Jonah crab, including claws from crabs that have not yet reached maturity. Preliminary laboratory studies conducted by New Hampshire Fish and Game, as reported in the Commission's 2017 Jonah Crab Compliance report, indicate a 56-percent mortality rate for Jonah crabs that have had one claw removed and a 75 percent mortality rate for Jonah crabs that have had two claws removed. New Hampshire researchers have, to date, conducted five trials spanning 3 seasons. While it is impossible to predict mortality rates in the field, mortality for de-clawed crabs could range from 56 or 75 percent (depending on the number of claws removed) up to 100 percent, similar to a whole crab fishery. Enforcing an unregulated claw fishery would be difficult, as allowing a claw fishery undermines other measures (minimum size, broodstock protections, etc.) aimed at ensuring a sustainable fishery. Should other management measures be compromised, the overall population could decrease which threatens the long-term stability of the stock. Therefore, a negative impact could be expected. However, states have regulations in place to regulate the

claw fishery; and states that see the majority of landings have established whole crab fisheries, which helps to minimize the negative impact. Therefore, the impact is qualified as slight. It is further qualified as slight because the market currently demands whole crabs and the harvest of claws is relative small and regionally-based. Compared to the alternatives that prohibit or regulate the claw fishery, the No Action alternative would result in the highest degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other landing disposition alternatives. No matter which landing disposition alternative is approved, the fishery is expected to continue operating under current practices as this measure only applies to the possession of Jonah crabs after gear is deployed and hauled. Bait would be used to catch Jonah crabs, regardless of establishing, or not establishing landing disposition requirements. Traps would continue to be set, which can be expected to catch lobster, and to a lesser degree rock crab and red crab, regardless of whether or what landing disposition requirement is approved. Therefore, no impacts on other affected species are expected to result from not setting landing disposition requirements. Further, allowing for an unregulated harvest of claws is expected to result in the same, no impacts as a whole crab fishery, a minimal claw fishery, and a regulated claw fishery.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other landing disposition alternatives. Harvesters are expected to set traps to target Jonah crabs, regardless of whether landing disposition requirements are approved in the fishery. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. A whole crab fishery, a minimal claw allowance, a regulated claw fishery, and the No Action are expected to have no impact on habitat because approving these measures do not alter the effort, location, or timing of the fishery.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other landing disposition alternatives. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, failing to establish landing disposition requirements will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Approving a whole crab fishery with an incidental limit on claws is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is

more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to the other options that approve a whole crab fishery, a minimal claw allowance, and a regulated claw fishery, the No Action is expected to have no impact on protected resources because approving these measures do not alter the effort, location, or timing of the fishery.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most positive in the short term and the most negative in the long term. Under the No Action alternative, harvesters would be able to retain, sell, and profit from both whole Jonah crabs and an unlimited amount of claws from any size Jonah crab (while discarding the crab bodies). Therefore, harvesters would have the ability to profit the most from this scenario. However, the impact is qualified as slight because, as of now, the vast majority of crabs are landed whole due to regional market demand. A small amount of claws is currently landed, largely in the southern component of the fishery where air temperatures are too warm to support bringing the whole crab to market. It is also qualified as slight because failing to establish landing disposition requirements when the states have already set landing disposition requirements would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable state and federal regulations for permit holders, which also tempers the positive impact on human communities. In the long-term however, harvesting a substantial amount of claws could undermine the enforcement of other measures aimed at ensuring a sustainable fishery and could lead to a decrease in the overall population. A shrinking Jonah crab population could have negative impacts on a harvester's ability to catch and sell Jonah crabs. Under this scenario, harvesters could lose out on future profits. Potential profits combined with the inconsistencies between state and federal regulations would likely lead to negative long-term impacts. Compared to the alternatives that establish a whole crab fishery or regulate the amount of claws that can be harvested, this option would be more positive in the short-term, but more negative in the long-term.

5.2.3.2 Whole crab fishery

This alternative (Section 3.2.3.1) would restrict commercial harvesters to possessing and landing only whole Jonah crabs (i.e., possession of Jonah crab parts would be prohibited). This alternative meets the Commission's goal of setting conservation measures but it fails to establish complementary measures to what the Commission approved and recommended (Section 3.2.3.3). Given that most federal harvesters also hold state permits, these harvesters would be required to comply with the more restrictive federal landing disposition requirements.

Target Species

This alternative is expected to result in positive impacts on the Jonah crab fishery and the most positive impacts when compared to the other landing disposition alternatives. While regulations that require the landings of whole crabs makes 100-percent mortality for harvested crabs an unavoidable certainty, this is expected to have little to no effect on the mortality of crabs that remain in the water. However, the ease

of enforcing this alternative helps to ensure that other measures (minimum size, broodstock protections, etc.) are not undermined and, therefore, helps to ensure the sustainability of the population. Compared to the other alternatives that allow a claw fishery (either regulated or unregulated), this whole crab fishery alternative would result in the highest degree of positive biological impacts.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other in similar to the other landing disposition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other in similar to the other landing disposition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other in similar to the other landing disposition alternatives. Please see the *Protected Resources* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most negative in the short term and the most positive in the long term. Under this alternative, harvesters would be able to retain, sell, and profit from only whole Jonah crabs. Prohibiting the retention of claws may limit some harvester's catch, as whole crabs require particular storage conditions and take up more space. Therefore, harvesters would have the ability to profit the least from this scenario. This would likely differentially impact harvesters in the southern states, where air temperatures are too warm to easily bring whole crabs to market without vessel modification. In addition, establishing a different landing disposition requirement from what the states have approved would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which adds the negative impacts to human communities. In the long-term however, harvesting only whole crabs ensures a more stable long-term population as other regulatory requirements will not be undermined by a measure that compromises enforcement. A more stable population would likely have positive impacts on a harvester future ability to catch and sell Jonah crabs. However, these long-term positive impacts are tempered by inconsistencies between state and federal regulations, yielding long term slight positive impacts. Compared to the alternatives that allow a regulated or unregulated harvest of Jonah crab claws, this option would be the most negative in the short-term and more positive in the long-term.

5.2.3.3 Coastwide whole crab fishery with minimal claw allowance

This alternative (Section 3.2.3.2) would restrict commercial harvesters to possessing and landing only whole Jonah crabs and a minimal amount (one 5-gallon bucket) of crab claws. This alternative meets the Commission's goal of setting conservation measures and balances current practices with potential negative effects to the stock, but it fails to establish complementary measures to what the Commission approved and recommended. Given that most federal harvesters also hold state permits, these harvesters would be required to comply with the more restrictive federal landing disposition requirements.

Target Species

This alternative is expected to result in slight positive impacts on Jonah crabs and more positive impacts than the No Action and the regulated claw alternative, but less positive impacts than the whole crab fishery. While regulations that require the landings of whole crabs makes 100-percent mortality for harvested crabs an unavoidable certainty, this is expected to have little to no effect on the mortality of most crabs that remain in the water. In addition, this alternative would allow for the harvest of one 5-gallon bucket of claws. Preliminary laboratory studies conducted by New Hampshire Fish and Game, as reported in the Commission's 2017 Jonah Crab Compliance report, indicate a 56-percent mortality rate for Jonah crabs that have had one claw removed and a 75 percent mortality rate for Jonah crabs that have had two claws removed. New Hampshire researchers have, to date, conducted five trials spanning 3 seasons. While it is impossible to predict mortality rates in the field, mortality for de-clawed crabs could range from 56 or 75 percent (depending on the number of claws removed) up to 100 percent, similar to a whole crab fishery. However, the ease of enforcing a majority whole crab fishery helps to ensure that other measures (minimum size, broodstock protections, etc.) are not undermined and, therefore, helps to ensure the sustainability of the population. Allowing a small claw fishery introduces a small amount of risk that these measures could be undermined, reducing the impact to slightly positive. Compared to a whole crab fishery, this alternative would result in more negative impacts because it undermines enforcement to a small extent. Compared to the regulated and unregulated claw fishery alternatives, this alternative would result in a higher degree of positive impacts because it minimizes the risk to enforcement.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other in similar to the other landing disposition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other in similar to the other landing disposition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other in similar to the other landing disposition alternatives.

Please see the *Protected Resources* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to a whole crab fishery, these impacts are more positive in the short term and more negative in the long term. Compared to a regulated and unregulated claw fishery, these impacts are more negative in the short term and more positive in the long term. Under this alternative, harvesters would be able to retain, sell, and profit from the whole Jonah crabs and a small amount of claws. Because this alternative places additional restrictions on what harvesters may retain and land, this alternative is expected to result in slight negative short-term impacts compared to an unregulated state. These impacts would likely affect the southern states more than the northern states, where air temperatures are too warm to easily bring whole crabs to market without vessel modification. In addition, establishing a different landing disposition requirement from what the states have approved would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which adds the negative impacts to human communities. In the long-term however, harvesting the majority of the fishery as whole crabs ensures a more stable long-term population, as other regulatory requirements will not be undermined by a measure that compromises enforcement. A more stable population would likely have positive impacts on a harvester future ability to catch and sell Jonah crabs. However, these long-term positive impacts are tempered by allowing a small amount of claws to be harvested and inconsistencies between state and federal regulations, leading to long term slight positive impacts. Compared to the whole crab fishery alternative, this alternative is expected to result in more positive short-term impacts and more negative long-term impacts because it allows for some claws to be harvested. Compared to the regulated and unregulated (No Action) claw fishery alternatives, this alternative would result in a higher degree of short-term positive impacts and minimizes long-term negative impacts because it minimizes the amount of claws that can be harvested.

5.2.3.4 Coastwide regulated claw fishery

This alternative (Section 3.2.3.3) would restrict commercial harvesters to possessing and landing both whole crabs and claws, provided certain volumetric or claw size requirements be met. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

This alternative is expected to result in slight negative impacts on Jonah crabs and the most negative of all the alternatives. While regulations that require the landings of whole crabs makes 100-percent mortality for harvested crabs an unavoidable certainty, this is expected to have little to no effect on the mortality of most crabs that remain in the water. This option allows for the harvest of crab claws under several different scenarios, including an incidental allowance of claws of any size targeted harvesters, unlimited possession of claws that meet a minimum size for targeted harvesters, and possession limits for incidental

harvesters. As previously discussed in Section 5.2.3.2, mortality for de-clawed crabs could range from 56 or 75 percent (depending on the number of claws removed) up to 100 percent, similar to a whole crab fishery, though it is impossible to predict mortality rates in the field. However, the ease of enforcing a majority whole crab fishery helps to ensure that other measures (minimum size, broodstock protections, etc.) are not undermined and, therefore, helps to ensure the sustainability of the population. Allowing a claw fishery introduces a risk that these measures could be undermined. Should other management measures be compromised, the overall population could decrease which threatens the long-term stability of the stock. Therefore, a negative impact could be expected. However, the impact is qualified as slight because the Commission-selected a minimum claw size of 2.75 inches (6.985 cm) corresponds to a 5-inch (12.7-cm) carapace width crab, which is larger than the Commission-recommended minimum size. This will help to ensure that both whole crabs and crabs from which the claws have been harvested have had the opportunity to reproduce, minimizing the negative impact on the Jonah crab population. Compared to other alternatives that limit or prohibit claw harvest, this option would result in more negative impacts because it allows for a larger coastwide claw fishery. Compared to the No Action alternative, this option would result in more positive impacts because it puts some regulations on the harvest of Jonah crab claws.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other in similar to the other landing disposition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other in similar to the other landing disposition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other in similar to the other landing disposition alternatives. Please see the *Protected Resources* discussion in Section 5.2.3.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight positive impacts and longer term slight negative impacts on human communities/socioeconomic environment. Compared to a whole crab fishery and the small claw allowance, these impacts are more positive in the short term and more negative in the long term. Compared to an unregulated claw fishery, these impacts are more negative in the short term and more positive in the long term. Under this alternative, harvesters would be able to retain, sell, and profit from both whole Jonah crabs and claws, provided certain restrictions are met. Because this alternative allows for the most claws to be landed under a regulated scenario and because it could allow for the expansion of the claw fishery, it is expected to result in positive short-term impacts. Implementing regulations that match what the states have set typically would ensure that there is no disconnect in the regulations for this species. However, for this measure, we expect states to implement a variety of claw measures that range from matching what the Commission approved to allowing only whole crabs to be

harvested. The impact is qualified as slight because establishing a different landing disposition requirement from what any state has approved would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which adds to the negative impacts to human communities. In the long-term however, harvesting a substantial amount of claws could undermine the enforcement of other measures aimed at ensuring a sustainable fishery and could lead to a decrease in the overall population. A shrinking Jonah crab population could have negative impacts on a harvester's ability to catch and sell Jonah crabs. Under this scenario, harvesters could lose out on future profits. Potential profits combined with the inconsistencies in regulations would likely lead to slight negative long-term impacts. Compared to the alternatives that establish a whole crab fishery or an incidental amount of claws that can be harvested, this option would be more positive in the short-term, but more negative in the long-term because it provides harvesters with the most access to a claw fishery. Compared to the No Action alternative, this option would be more negative in the short-term, but more positive in the long-term because it places some restrictions on the claw fishery.

5.2.4 Impacts of Broodstock Protection Alternatives

As discussed in Section 3.2.4, the Lobster Board considered and approved protections for egg-bearing female Jonah crabs. This section considers the impacts to the five VECs of prohibiting retention of egg-bearing female, prohibiting retention of all females, and the No Action alternative that would provide no such protection.

5.2.4.1 No Broodstock Protection (No Action)

The No Action alternative (Section 3.2.4.3) would allow the Jonah crab fishery to continue to operate without providing broodstock protections. Jonah crab harvesters in federal waters-only would continue to operate without broodstock restrictions. However, given that most federal harvesters also hold state permits, these harvesters would be required to comply with the most restrictive rule, and, therefore, must comply with the broodstock restrictions already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in slight negative direct and indirect impacts on the Jonah crab resource and the most negative impacts of the broodstock alternatives. A fishery lacking protections for its reproductive population would allow actively reproducing (i.e., females with eggs) Jonah crabs to be harvested. Removing an excess of crabs before they have had the opportunity to reproduce decreases reproductive rates which would likely lead to an overall decrease in the Jonah crab population. Such a decrease could threaten the long-term stability of the stock. However, the impact is qualified as slight because the vast majority (96-98%) of female crabs are smaller than the unregulated targeted size of the fishery (i.e., approximately 4 ¾-inches or larger). This means that the majority of females will already be protected due to market preferences. Compared to the two alternatives which establish broodstock protections, the No Action alternative would result in the highest degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no impacts on other affected species, similar to the other broodstock alternatives. Whether regulated or unregulated in this No Action alternative, the fishery is expected to continue operating under current practices. Bait would be used to catch Jonah crabs, regardless of setting, or not setting a minimum size. Traps would continue to be set, which can be expected to catch lobster, and to a lesser degree rock crab and red crab, regardless of whether broodstock protections are approved. Therefore, no impacts on other affected species are expected to result from not providing broodstock protections. Further, the No Action alternative is expected to result in the same, no impacts as providing broodstock protections.

Habitat

The No Action alternative is expected to result in no impacts on habitat, similar to the other broodstock alternatives. Harvesters are expected to set traps to target Jonah crabs, regardless of whether protections to females Jonah crabs are approved. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. Prohibiting the retention of all females, prohibiting the retention of egg-bearing females, and the No Action are expected to have no impact on habitat because approving these measures do not alter the effort, location, or timing of the fishery.

Protected Resources

This alternative is expected to result in no impacts on protected species compared to current fishery conditions, similar to the other broodstock alternatives. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, because there are no data that suggest that Jonah crabs in the Northwest Atlantic segregate by size or reproductive status, this measure will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of status quo unregulated fishery is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to the other options that establish broodstock protections, this No Action alternative is expected to have same impact (no impact) on protected resources because approving these measures do not alter the effort, location, or timing of the fishery.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most positive in the short term and the most negative in the long term. Under the No Action, harvesters would be able to retain, sell, and profit from male and female Jonah crabs, including actively reproducing females. Therefore, harvesters would have the ability to profit the most from this scenario. The impact is qualified as slight because the vast majority (96-98%) of female crabs are smaller than the unregulated targeted size of the fishery (i.e., approximately 4 ¾-inches or larger). This means that the majority of females will already be protected due to market preferences. It is also qualified as slight because failing to set a federal minimum size when the states have set a minimum size would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive impacts on human communities. In the long-term however, harvesting crabs that have not had the opportunity to reproduce could have negative impacts on the population, and, therefore, a harvester's ability to catch and sell Jonah crabs. Under this scenario, harvesters could lose out on future profits. Potential profits combined with the inconsistencies in regulations would likely lead to negative long-term impacts. Compared to the alternatives that prohibit the retention of egg-bearing or all females, this option would be the most positive in the short-term, but the most negative in the long-term.

5.2.4.2 Prohibition on the retention of egg-bearing females (Preferred)

The preferred alternative would prohibit commercial harvesters from retaining egg-bearing female Jonah crabs. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in slight positive impacts on the Jonah crab resource compared to the current condition with more positive impacts compared the No Action but less positive impacts compared to the other alternative. Such regulations would restrict harvest to crabs that are not actively extruding eggs. Protecting actively reproducing Jonah crabs is likely to help maintain current reproductive rates and would likely help the stability and sustainability of population in the long-term. The impact is qualified as slight because the vast majority (96-98%) of female crabs – including crabs that are reproductively mature - are smaller than the unregulated targeted size of the fishery (i.e., approximately 4 ¾-inches or larger). This means that the majority of egg-bearing females will already be protected due to market preferences. However, in the very long-term, should the Jonah crab fishery follow the lobster fishery northward as water temperature increases, crabs in the Gulf of Maine may grow larger and mature later, making female crabs more susceptible to the fishery. Compared to prohibiting the retention of all females, this alternative is expected to provide slightly less positive impacts because it provides protection for only a subset of females - e.g., reproductively mature females above the minimum size but not extruding eggs would still be harvestable - thereby providing protections for slightly fewer Jonah crabs to complete the reproduction process. Compared to the No Action, this alternative is expected to result in higher positive impacts because it establishes protections for reproductive females.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other in similar to the other broodstock alternatives. Please see the *Other Affected Species* discussion in Section 5.2.4.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to the other in similar to the other broodstock alternatives. Please see the *Other Affected Species* discussion in Section 5.2.4.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other in similar to the other broodstock alternatives. Please see the *Protected Resources* discussion in Section 5.2.4.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the other alternatives, this alternative falls in the middle of the other alternatives in both the long term and the short term. Harvesters would be able to retain, sell, and profit from some crabs, but fewer crabs than under the No Action alternative. This could result in a small loss of revenue to commercial harvesters, but also helps to ensure the long-term protection of the stock. The impact is qualified as slight because the vast majority (96-98%) of female crabs are smaller than the unregulated targeted size of the fishery (i.e., approximately 4 ¾-inches or larger). This means that the majority of egg-bearing females will already be protected due to market preferences. In the long-term however, harvesting crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability. Further, providing protections that match what the states have set would ensure that there is no disconnect in the regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative and enforcement objectives and minimizes confusion. This helps to temper any negative short-term impacts associated with being able to retain fewer crabs and makes for positive long-term impacts. Compared to the alternative that prohibit the retention of all females, this option would have the slightly more positive short-term impacts and slightly more negative long-term impacts because harvesters can retain and sell more crabs in the short term but could have fewer mature crabs contributing to the long-term population. Compared to providing no protections (No Action, this alternative would have more negative short term impacts and more positive long-term impacts because harvesters would be able to retain and sell fewer crabs in the short term but would have more mature crabs contributing to the long-term population.

5.2.4.3 Retention of females prohibited

This alternative (Section 3.2.4.2) would restrict commercial harvesters to possessing and landing Jonah crabs only male Jonah crabs (i.e., retaining female Jonah crabs would be prohibited). This alternative

meets the Commission's goal of setting conservation measures that are consistent with current practices but it fails to establish complementary measures to what the Commission approved and recommended. Given that most federal harvesters also hold state permits, these harvesters would be required to comply with the most restrictive rule, and, therefore, must comply with the federal female crab retention prohibition.

Target Species

This alternative is expected to result in slight positive direct and indirect impacts on the Jonah crab resource compared to the current condition, similar to the preferred alternative. Please see the *Target Species* discussion in Section 5.2.4.2 for a full discussion of the direct and indirect impacts determinations. Compared to prohibiting the retention of egg-bearing females and the No Action alternative, this alternative is expected to result in higher positive impacts because it establishes the most conservative restrictions.

Other Affected Species

This preferred alternative is expected to result in no direct or indirect impacts on other affected species similar to the other in similar to the other broodstock alternatives. Please see the *Other Affected Species* discussion in Section 5.2.4.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other in similar to the other broodstock alternatives. Please see the *Other Affected Species* discussion in Section 5.2.4.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other in similar to the other broodstock alternatives. Please see the *Protected Resources* discussion in Section 5.2.4.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most negative in the short term and the most positive in the long term due to limits on the ability to harvest crabs and management inconsistencies. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.4.2 for a full discussion of the direct and indirect impacts determinations. Prohibiting the retention of all female crabs is the most restrictive broodstock protection alternative under consideration. Harvesters would be able to retain, sell, and profit from the fewest crabs (i.e., male crabs only). In addition, setting different protections for female crabs from what was approved by the states would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the

positive to human communities. The impact is qualified as slight because the vast majority (96-98%) of female crabs are smaller than the unregulated targeted size of the fishery (i.e., approximately 4 ¾-inches or larger). This means that the majority of females will already be protected due to market preferences. In the long-term, however, providing protections for female crabs to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability. Compared to the alternatives that prohibit retention of egg-bearing females and the No Action, this alternative would have the most negative short-term impacts, but the most positive long-term impacts because it would restrict short term harvest the most, but provide long-term protections for the population.

5.2.5 Impacts of Incidental Catch Definition Alternatives

As discussed in Section 3.2.5, the Lobster Board considered and approved an incidental catch definition as another means to ensure that incidental harvesters do not increase their effort on Jonah crabs. This section considers the impacts to the five VECs of establishing an incidental catch definition and the No Action alternative that would establish no definition.

5.2.5.1 No incidental catch definition (No Action)

The No Action alternative (Section 3.2.5.2) would allow the Jonah crab fishery to continue to operate without establishing an incidental catch definition for other commercial fisheries using non-trap and non-lobster trap gear. Harvesters not targeting Jonah crabs in federal waters-only would continue to operate without needing to abide by this restriction. However, given that most federal vessels also hold state permits – i.e., federal lobster permit holders not fishing traps - these dually permitted vessels would be required to comply with the most restrictive rule, and, therefore, must comply with the incidental catch definition already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in slightly negative direct and indirect impacts to the Jonah crab resource and the most negative impacts of the two alternatives. Such regulations would allow commercial harvesters targeting other species to harvest an unlimited amount of Jonah crabs, and possibly increase effort. Removing an excess of Jonah crabs could lead to an overall decrease in the Jonah crab population. Such a decrease could threaten the long-term stability of the stock. Further, should the No Action for the incidental catch definition and incidental catch limit be approved, increasing negative impacts to the Jonah crab stock could be expected. Compared to the alternative that establishes a definition, the No Action alternative would result in a higher degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to the No Action alternative. Whether a definition is established or not, the fishery is expected to continue operating under current practices. Bait or may not be used (depending on gear type) to aid in the harvest of other species, regardless of whether an incidental catch definition is approved. Fishing gear would continue to be used, which can be expected to catch a variety of species, regardless of whether limits are placed on the incidental catch of Jonah crabs. Therefore, no impacts on other affected species

are expected to result from not establishing an incidental catch definition. Further, the No Action alternative is expected to result in the same, no impacts as approving a definition.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to the No Action alternative. Harvesters are expected to set gear, regardless of whether limits are placed on the incidental catch of lobster. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. While other gears (trawl, gillnet, dredge, etc.) may be used to harvest a small amount of Jonah crab, it is not expected to increase the amount of effort, location, timing, or use of this gear in other fisheries. Therefore, no impacts on habitat are expected to result from not approving an incidental catch definition. Further, the same impact (i.e., no impact) is expected to result from approving an incidental catch definition.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the No Action alternative. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, establishing an incidental catch definition helps to ensure that Jonah crabs are not targeted and will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of status quo unregulated fishery is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to establishing an incidental catch definition, the No Action is expected to have the same impacts (i.e., no impacts) on protected resources.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to the alternative establishing a definition, the No Action alternative is more positive in the short term and more negative in the long term. Under the No Action, incidental harvesters would be able to retain and sell an unlimited amount of Jonah crabs. Therefore, harvesters would have the ability to profit the most from this scenario. However, the impact is qualified as slight because, to date, incidental catch of Jonah crabs has been relatively low. It is also qualified as slight because failing to approve a federal incidental catch definition when the states have set a minimum size would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly

to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive to human communities. In the long-term, however, allowing incidental harvesters to catch, retain, and sell an unlimited amount of crabs could have negative impacts on the population, and, therefore, a harvester's ability to catch and sell Jonah crabs. Under this scenario, all harvesters could lose out on future profits. Potential loss of future profits combined with the inconsistencies in regulations would likely lead to negative long-term impacts. Compared to the alternative that establishes an incidental catch definition, this option would be more positive in the short-term, but more negative in the long-term.

5.2.5.2 50 percent limit (Preferred)

The preferred alternative would restrict the commercial non-trap and non-lobster trap incidental catch to no more than 50 percent, by weight, of other non-Jonah crab species onboard a vessel. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The impact on Jonah crabs of establishing a definition restricting the amount of Jonah crabs that commercial harvesters can legally retain while targeting other species is expected to be slightly positive compared to the current status quo condition and the most positive impacts of the two alternatives. Such regulations would prevent incidental harvesters from drastically increasing their catch of Jonah crabs, thereby helping to maintain harvest at current levels. The impact is qualified as slight because incidental harvest is expected to be merely a fraction of targeted catch. Compared to the No Action alternative, this alternative is expected to result in higher positive impacts because it establishes limits on incidental catch.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other incidental catch definition alternatives. Please see the *Other Affected Species* discussion in Section 5.2.5.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to the other incidental catch definition alternatives. Please see the *Habitat* discussion in Section 5.2.5.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other incidental catch definition alternatives. Please see the *Protected Resources* discussion in Section 5.2.5.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the No Action, this preferred alternative is more negative in the short term and more positive in the long term. Incidental harvesters would be able to retain, sell, and profit from some crabs, but fewer crabs than under the No Action alternative. This could result in a small loss of revenue to incidental harvesters, resulting in short-term negative impacts, but also helps to ensure the long-term protection of the stock. The impact is qualified as slight because incidental harvest is expected to be merely a fraction of targeted catch (see Table 12). In the long-term however, ensuring that incidental harvesters do not increase effort on Jonah crabs is likely to ensure that overfishing does not occur, which helps protect the long-term sustainability of the population, and, therefore, all harvesters' long-term profitability. Further, providing protections that match what the states have set would ensure that there is no disconnect in the regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative, and enforcement objectives and minimizes confusion. This helps to temper any negative short-term impacts associated with being able to retain fewer crabs and makes for positive long-term impacts. Compared to adopting no restrictions (No Action), this alternative would have more negative short-term impacts and more positive long-term impacts because harvesters would be able to retain and sell fewer crabs in the short term but would have access to a more sustainable long-term population.

5.2.6 Impacts of Incidental Catch Limit Alternatives for Non-Trap and Non-Lobster Trap Gear

As discussed in Section 3.2.6, the Lobster Board considered and approved an incidental catch limits to ensure that non-trap and non-lobster trap incidental harvesters do not increase their effort on Jonah crabs. This section considers the impacts to the five VECs of establishing an incidental catch limit of 1,000 crabs per trip, 200 crabs per day up to 500 crabs per trip, and the No Action alternative that would establish no incidental catch limit.

5.2.6.1 No incidental catch limit (No Action)

The No Action alternative (Section 3.2.6.3) would allow the Jonah crab fishery to continue to operate without establishing an incidental catch limit for other commercial fisheries using non-trap and non-lobster trap gear. Jonah crab harvesters in federal waters-only would continue to operate without needing to abide by this restriction. However, given that most federal vessels also hold state permits, these dually permitted vessels would be required to comply with the most restrictive rule, and, therefore, must comply with the incidental catch definition already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in slightly negative direct and indirect impacts to the Jonah crab resource and the most negative impacts of the incidental catch limit alternatives. Such regulations would allow commercial harvesters targeting other species to harvest an unlimited amount of Jonah crabs, and possibly increase effort. Removing an excess of Jonah crabs could lead to an overall decrease in the Jonah crab population. Such a decrease could threaten the long-term stability of the stock. The impact is qualified as slight because incidental harvest is expected to be merely a fraction of

targeted catch. Further, should the No Action for the incidental catch definition and incidental catch limit be approved, increasing negative impacts to the Jonah crab stock could be expected. Compared to the alternatives that establish an incidental catch limit, the No Action alternative would result in a higher degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to other incidental catch limit alternatives. Whether a limit is established or not, the fishery is expected to continue operating under current practices. Bait or may not be used (depending on gear type) to aid in the harvest of other species, regardless of whether an incidental catch definition is approved. Fishing gear would continue to be used, which can be expected to catch a variety of species, regardless of whether limits are placed on the incidental catch of Jonah crabs. Therefore, no impacts on other affected species are expected to result from not establishing an incidental catch limit. Further, the No Action alternative is expected to result in the same, no impacts as approving a limit.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to other incidental catch limit alternatives. Harvesters are expected to set gear, regardless of whether limits are placed on the incidental catch of Jonah crabs. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. Further, while other gears (trawl, gillnet, dredge, etc.) may be used to harvest a small amount of Jonah crab, it is not expected to increase the amount of effort, location, timing, or use of this gear in other fisheries. Therefore, no impacts are expected to result from not approving an incidental catch limit. Further, the same impact (i.e., no impact) is expected to result from approving an incidental catch limit.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to other incidental catch limit alternatives. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, because establishing a reduced incidental catch limit helps to ensure that Jonah crabs are not targeted, this measure will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of status quo unregulated fishery is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not

expected to impact, directly or indirectly, any protected species. Compared to establishing an incidental catch limit, the No Action is expected to have the same impacts (i.e., no impacts) on protected resources.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to the alternative establishing an incidental limit, the No Action alternative is the most positive in the short term and the most negative in the long term. Under the No Action alternative, incidental harvesters would be able to retain and sell an unlimited amount of Jonah crabs. Therefore, harvesters would have the ability to profit the most from this scenario. However, the impact is qualified as slight because, to date, incidental catch of Jonah crabs has been relatively low. It is also qualified as slight because failing to approve a federal incidental catch definition when the states have set a minimum size would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive impacts on human communities. In the long-term, however, allowing incidental harvesters to catch, retain, and sell an unlimited amount of crabs could have negative impacts on the population, and, therefore, a harvester's ability to catch and sell Jonah crabs. Under this scenario, all harvesters could lose out on future profits. Potential loss of future profits combined with the inconsistencies in regulations would likely lead to negative long-term impacts. Compared to the alternatives that establish an incidental catch limit, this option would be more positive in the short-term, but more negative in the long-term.

5.2.6.2 1,000 crabs per trip (Preferred)

The preferred alternative would restrict the commercial non-trap and non-lobster trap incidental catch to 1,000 crabs per trip. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in slight positive impacts on the Jonah crab resource compared to the current condition with more positive impacts compared the No Action but less positive impacts compared to the other alternative. Such regulations would prevent incidental harvesters from drastically increasing their catch of Jonah crabs, thereby preventing overfishing and helping to achieve a stable and sustainable population. The impact is qualified as slight because incidental harvest has historically been roughly 0.1% of the total Jonah crab harvest (ASMFC 2016) and catch rates are expected to remain a fraction of targeted Jonah crab catch. Compared to allowing incidental harvesters to retain 200 crabs per day up to 500 crabs per trip, this alternative is expected to provide slightly less positive impacts because it allows for the incidental harvest of more crabs. Compared to the No Action alternative, this alternative is expected to result in higher positive impacts because it establishes limits on incidental catch.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other incidental catch limit alternatives. Please see the *Other Affected Species* discussion in Section 5.2.6.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to the other incidental catch limit alternatives. Please see the *Habitat* discussion in Section 5.2.6.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other incidental catch limit alternatives. Please see the *Protected Resources* discussion in Section 5.2.6.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative impacts and longer term slight positive impacts on human communities/socioeconomic environment. Compared to the incidental limit alternatives, this alternative falls in the middle of the other alternatives in both the long term and the short term. Incidental harvesters would be able to retain, sell, and profit from some crabs, but fewer crabs than under the No Action alternative. This could result in a small loss of revenue to incidental harvesters, but also helps to ensure the long-term protection of the stock. The impact is qualified as slight because incidental harvest has historically been roughly 0.1% of the total Jonah crab harvest (ASMFC 2016) and catch rates are expected to remain a fraction of targeted Jonah crab catch. In the long-term however, ensuring that incidental harvesters do not increase effort on Jonah crabs is likely to ensure the long-term sustainability of the population, and, therefore, all harvester's long-term profitability. Further, providing protections that match what the states have set would ensure that there is no disconnect in the regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative and enforcement objectives and minimizes confusion. This helps to temper any negative short-term impacts associated with being able to retain fewer crabs and makes for positive long-term impacts. Compared to the alternative that limits incidental catch to 200 crabs per day up to 500 crabs per trip, this option would have the slightly more positive short-term impacts and slightly more negative long-term impacts because harvesters can retain and sell more crabs in the short term but could have fewer crabs contributing to the long-term population. Compared to adopting no incidental catch restrictions (No Action), this alternative would have more negative short term impacts and more positive long-term impacts because harvesters would be able to retain and sell fewer crabs in the short term but would have more sustainable long-term population.

5.2.6.3 200 crabs per day up to 500 crabs per trip

This alternative (Section 3.2.6.2) would restrict commercial non-trap and non-lobster trap incidental catch to 200 crabs per day up to 500 crabs per trip. This alternative meets the Commission's goal of setting conservation measures that are consistent with current practices but it fails to establish complementary

measures to what the Commission approved and recommended. Given that most federal harvesters also hold state permits, these harvesters would be required to comply with the most restrictive rule, and, therefore, must comply with the federal incidental catch limit.

Target Species

This alternative is expected to result in slight positive direct and indirect impacts on the Jonah crab resource compared to the current condition, similar to the preferred alternative. Please see the *Target Species* discussion in Section 5.2.6.2 for a full discussion of the direct and indirect impacts determinations. Compared to setting a 1,000 crab trip limit and the No Action alternative, this alternative is expected to result in higher positive impacts because it establishes the most conservative limits on incidental catch.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other incidental catch limit alternatives. Please see the *Other Affected Species* discussion in Section 5.2.6.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to the other incidental catch limit alternatives. Please see the *Habitat* discussion in Section 5.2.6.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other incidental catch limit alternatives. Please see the *Protected Resources* discussion in Section 5.2.6.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment, similar to the other incidental catch limit alternatives. Compared to the other alternatives, this alternative is the most negative in the short term and the most positive in the long term. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.6.2 for a full discussion of the direct and indirect impacts determinations. Limiting incidental harvest to 200 crabs per day up to 500 crabs per trip is the most restrictive incidental harvest alternative under consideration. Incidental harvesters would be able to retain, sell, and profit from the fewest crabs. In addition, setting different incidental catch limits from what was approved by the states would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also contributes to the negative impact on human communities. In the long-term however, ensuring that incidental harvesters do not increase effort on Jonah crabs is likely to ensure the long-term sustainability of the population, and, therefore, all harvester's long-term profitability. Therefore, compared to the alternatives that establish a 1,000 crab trip limit and

the No Action alternative, this option would have the most negative short-term impacts, but the most positive long-term impacts because it would restrict short term harvest the most, but provide the most long-term protections for the population.

5.2.7 Impacts of Harvester Reporting Alternatives

As discussed in Section 3.2.7, the Lobster Board considered and approved reporting requirements for harvesters. This section considers the impacts to the five VECs of mandatory reporting for all commercial Jonah crab-only harvesters, all Jonah crab harvesters, and the No Action alternative that would require no reporting.

5.2.7.1 No Mandatory Harvester Reporting (No Action)

The No Action alternative (Section 3.2.7.1) would allow the Jonah crab fishery to continue to operate without mandatory harvester reporting. All Jonah crab harvesters would continue to operate without having to submit vessel trip reports. However, given that many federally-permitted harvesters also have state permits, these harvesters would be required to comply with the most restrictive rule, and, therefore, must comply with the mandatory reporting requirements already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in no direct impacts on the Jonah crab resource but may have slight negative indirect impacts, the most negative impacts of the incidental catch limit alternatives. Approving or failing to approve mandatory harvester reporting is not expected to alter existing fishing practices or operations. Harvesters will continue to target and catch Jonah crab, regardless of whether mandatory harvester reporting is approved. Therefore, no direct impacts to the target species are expected to result from not approving mandatory harvester reporting. Without harvester reports, managers will not have access to the information provided by such reports. The lack of oversight in the fishery creates a risk that the fishery could reach an overfished state because regulators would lack data on who is fishing for Jonah crabs and how much is being harvested, leading to an indirect slight negative impact. Compared to the alternatives that establish harvester reporting, the No Action alternative would result in a higher degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to other harvester reporting alternatives. Harvester reporting or the lack of mandatory harvester reporting is not expected to alter existing fishing practices or operations. Bait would be used to catch Jonah crabs, regardless of whether mandatory harvester reporting is approved. Traps would continue to be set, which can be expected to catch lobster, and to a lesser degree rock crab and red crab, regardless of mandatory harvester reporting is approved. Therefore, no impacts on other affected species are expected to result from not approving mandatory harvester reporting. Further, failing to approve mandatory harvester reporting is expected to result in the same, no impacts, as approving mandatory harvester reporting.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to other harvester reporting alternatives. Harvesters are expected to set traps to target Jonah crabs, regardless of whether mandatory harvester reporting is approved in the fishery. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, does not institute reporting requirements after gear is deployed and hauled. Because establishing harvester report does not alter the effort, location, or timing of the fishery, no impacts are expected to result from approving or not approving mandatory harvester reporting.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to other harvester reporting alternatives. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, because there are no data that suggest that approving or not approving mandatory harvester reporting will have an effect on where Jonah crabs are caught, this measure will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Failing to approve mandatory harvester reporting is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to establishing mandatory harvester reporting, the No Action is expected to have the same impacts (i.e., no impacts) on protected resources, using the same logic provided above.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in no direct or indirect impacts on human communities/socioeconomic environment, similar to other harvester reporting alternatives. At present, most federal vessel permits have mandatory federal reporting requirements, called federal vessel trip reports. The federal lobster permit, however, is an exception and does not presently have mandatory harvester reporting and this alternative remains consistent with lobster reporting requirements. By virtue of holding other federal permits, some lobster permit holders are required to submit vessel trip reports, though reporting rates vary by region. The Commission estimated that "a smaller percentage reporting in nearshore waters of the GOM and a higher portion reporting in Southern New England and the Mid-Atlantic" in in Draft Addendum III to the Jonah Crab Plan. The Commission further estimated that "only 10% of all Maine federal permit holders and 3% of the total Maine lobster fleet report through vessel trip reports. In statistical area 514 (Massachusetts coast), 25% of permits report with vessel trip reports. This percentage increases with distance from shore as roughly 63% of the lobster fleet which fishes in statistical area 537 (south of Cape Cod) reports through vessel trip reports and 98% of the fleet in

statistical area 515 (near Hague line) reports with vessel trip reports. A high portion of vessels (95%) hailing from New Jersey through Virginia submit vessel trip reports." Due to the overlap with the lobster fishery and other fisheries that require federal vessel trip reports, no change is expected in the number of harvesters that would be required to submit a federal vessel trip report. Compared to establishing mandatory harvester reporting for Jonah crab-only harvesters and for all Jonah crab harvesters, this alternative would have the same impacts (i.e., no impacts), using the logic provided above.

5.2.7.2 Mandatory Harvester Reporting for Jonah crab-only harvesters with no mandatory harvester reporting for lobster permit holders

Should we approve a measure that would establish a limited access permit for only the harvest of Jonah crab, the preferred alternative (Section 3.2.7.1) would require those Jonah-crab only harvesters to submit mandatory harvester reports, also known as a federal vessel trip report. It does not include any additional reporting requirements for federal lobster permit holder that may also harvest Jonah crab beyond what is required by the Lobster Plan. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in no direct impacts on the Jonah crab resource but may have slight positive indirect impacts, similar to the other harvester reporting alternative and more positive than the No Action. Approving or failing to approve mandatory harvester reporting is not expected to alter existing fishing practices or operations. Harvesters will continue to target and catch Jonah crab, regardless of whether mandatory harvester reporting is approved. Therefore, no direct impacts to the target species are expected to result from not approving mandatory harvester reporting. With harvester reports, managers will have access to the information provided by such reports which may lead to better management measures. This oversight in the fishery decreases the risk that the fishery could reach an overfished state, leading to an indirect slight positive impact. Compared to the other reporting alternative, the preferred alternative will have the same impacts. Compared to the no action alternative, this preferred alternative would result in a higher degree of positive biological impacts.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other harvester reporting alternatives. Please see the *Other Affected Species* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to the other harvester reporting alternatives. Please see the *Habitat* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other harvester reporting alternatives. Please see

the *Protected Resources* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in no direct or indirect impacts on human communities/socioeconomic environment, similar to the preferred harvester reporting alternative. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.7.2 for a full discussion of these impacts determinations.

5.2.7.3 Mandatory Harvester Reporting for all commercial Jonah crab harvesters

This alternative (Section 3.2.7.2) requires all commercial Jonah crab harvesters, including those with limited access lobster permits with no mandatory reporting requirements, to submit harvester reports (e.g., VTRs), consistent with an option developed by the PDT and considered by the Lobster Board in the development of the Jonah Crab Plan. This alternative meets the purpose and need because it implements expanded measures that are also complementary to what the Commission recommended.

Target Species

This alternative is expected to result in no direct impacts and slight positive indirect impacts on the target species, similar to the preferred harvester-reporting alternative. Please see the *Target Species* discussion in Section 5.2.7.2 for a full discussion of these impacts determinations. Compared to the No Action alternative, this preferred alternative would result in a higher degree of positive biological impacts because it establishes an information collection program. Compared to the other reporting alternative, the preferred alternative will have the same impacts because it establishes a similar information collection program.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other harvester reporting alternatives. Please see the *Other Affected Species* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to the other harvester reporting alternatives. Please see the *Habitat* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other harvester reporting alternatives. Please see the *Protected Resources* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in no direct or indirect impacts on human communities/socioeconomic environment, similar to the other harvester reporting alternatives. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.7.1 for a full discussion of these impacts determinations.

5.2.8 Impacts of Dealer Alternatives

As discussed in Section 3.2.8, the Lobster Board considered and approved reporting requirements for dealers. This section considers the impacts to the five VECs of mandatory reporting for all federal dealers and the No Action alternative that would require no reporting.

5.2.8.1 No Mandatory Dealer Reporting (No Action)

The No Action alternative (Section 3.2.8.2) would allow the Jonah crab fishery to continue to operate without a mandatory dealer permitting and reporting. Jonah crab dealers would continue to operate without a permit and without having to report Jonah crab purchases. However, given that most, if not all, federally-permitted dealers also have state dealer permits, these dealers would be required to comply with the most restrictive rule, and, therefore, must comply with the mandatory reporting requirements already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in no direct or indirect impacts on the Jonah crab resource, similar to the other dealer reporting alternative. Failing to approve mandatory dealer permitting and reporting is not expected to alter existing fishing practices or operations. Harvesters will continue to target and catch Jonah crab, regardless of whether mandatory dealer reporting is approved. Therefore, no impacts to the target species are expected to result from not approving mandatory dealer permitting and reporting. Further, failing to approve mandatory dealer permitting and reporting is expected to result in the same, no impacts, as approving mandatory dealer permitting and reporting.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on the other affected species, similar to the other dealer reporting alternative. The lack of mandatory dealer permitting and reporting is not expected to alter existing fishing practices or operations. Bait would be used to catch Jonah crabs, regardless of whether mandatory dealer permitting and reporting is approved. Traps would continue to be set, which can be expected to catch lobster, and to a lesser degree rock crab and red crab, regardless of mandatory dealer permitting and reporting is approved. Therefore, no impacts on other affected species are expected to result from not approving mandatory dealer permitting and reporting. Further, failing to approve mandatory dealer permitting and reporting is expected to result in the same, no impacts, as approving mandatory dealer permitting and reporting.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to the other dealer reporting alternative. Harvesters are expected to set traps to target Jonah crabs, regardless of

whether mandatory dealer reporting is approved in the fishery. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, does not institute dealer reporting requirements after gear is deployed and hauled. Because establishing dealer permitting and reporting does not alter the effort, location, or timing of the fishery, no impacts are expected to result from approving or not approving mandatory dealer permitting and reporting.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other dealer reporting alternative. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, because there are no data that suggest that not approving mandatory dealer permitting and reporting will have an affect on where Jonah crabs are caught, this measure will not influence or provide any incentive for vessels to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. The unregulated, status quo fishery is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to establishing mandatory dealer permitting and reporting, the No Action alternative is expected to have the same impacts (i.e., no impacts) on protected resources, using the same logic provided above.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in no direct or indirect impacts on human communities/socioeconomic environment, similar to the other dealer reporting alternative. Presently, a dealer must obtain a federal dealer permit if:

1. The dealer intends to purchase fish or shellfish listed in Table 21 harvested from federal waters,
2. The dealer purchases Atlantic tunas harvested from state or federal waters, or
3. The dealer purchases these fish or shellfish from a vessel issued a federal permit.

Table 21. List of managed species that require a Greater Atlantic Federal Dealer Permit

Species		
American lobster	Butterfish	Silver hake (whiting)
American plaice (dab)	Clearnose skate	Skipjack tuna
Atlantic bluefish	Haddock	Smooth skate
Atlantic Cod	Illex squid	Spiny dogfish
Atlantic deep-sea red crab	Little skate	Surfclam

Species		
Atlantic Hagfish	Longfin squid	Summer flounder
Atlantic halibut	Monkfish	Tilefish
Atlantic herring	Ocean Pout	Thorny skate
Atlantic mackerel	Ocean quahog	White hake
Atlantic sea scallop	Offshore hake	Windowpane flounder (sand dab)
Atlantic bluefin tuna	Pollock	Winter flounder (blackback)
Albacore tuna	Redfish (ocean perch)	Winter skate
Barndoor skate	Red hake (ling)	Witch flounder (grey sole)
Bigeye tuna	Rosette skate	Yellowfin tuna
Black sea bass	Scup	Yellowtail flounder

Federally-permitted dealers are required to report purchases of all species purchased, including those not listed in Table 21. Due to the overlap with the lobster fishery, it is highly likely that federally-permitted dealers are already reporting the catch of Jonah crab. Because little to no change is expected in the number of dealers that would require a federal dealer permit or the information that these dealers would need to submit, no impacts are expected to result from requiring instituting federal dealer permitting and reporting requirements. Compared to establishing mandatory dealer permitting and reporting, this alternative would have the same impacts (i.e., no impacts), using the logic provided above.

5.2.8.2 Mandatory Dealer Reporting (Preferred)

The preferred alternative (Section 3.2.8.2) would require federally-permitted dealers purchasing Jonah crab from commercial harvesters to submit dealer reports. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in no direct or indirect impacts on the target species, similar to the No Action alternative. Please see the *Target Species* discussion in Section 5.2.8.1 for a full discussion of these impacts determinations.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to the No Action alternative. Please see the *Other Affected Species* discussion in Section 5.2.8.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to No Action alternative. Please see the *Habitat* discussion in Section 5.2.8.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to No Action alternative. Please see the *Protected Resources* discussion in Section 5.2.8.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in no direct or indirect impacts on human communities/socioeconomic environment, similar to No Action alternative. Please see the *Human Communities/Socioeconomic Environment* discussion in Section 5.2.8.1 for a full discussion of these impacts determinations.

5.3 Impacts Analysis for Recreational Management Alternatives

The following section analyzes the impacts of each recreational management alternative on the VECs. Table 22 summarizes the impacts of each alternative as compared to the current, unregulated condition of the fisheries. Table 23 provides a comparison between the alternatives for each recreational measure. These impacts of each alternative are discussed in greater detail in this chapter.

Table 22. Summary of Recreational Impacts to VECs

			VECs				
	Management Measure	**Alternatives**	**Target Species**	**Other Affected Species**	**Physical Environment**	**Protected Resources**	**Human Communities/ Socioeconomic Environment**
Recreational	**Broodstock Protection**	No Action	likely sl -	no impact	no impact	no impact	likely short term sl +, likely long term sl -
		Prohibit Retention of Egg-Bearing Females	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
		Prohibit Retention of Females	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +
	Catch Limit	No Action	likely sl -	no impact	no impact	no impact	likely short term sl +, likely long term sl -
		50 crabs/day	likely sl +	no impact	no impact	no impact	likely short term sl -, likely long term sl +

Table 23. Comparison between Recreational Alternatives

	Management Measure	Alternatives	VECs: Target Species	Other Affected Species	Physical Environment	Protected Resources	Human Communities/ Socioeconomic Environment
Recreational	Broodstock Protection	No Action	3	0	0	0	short term 1 long term 3
		Prohibit Retention of Egg-Bearing Females	2	0	0	0	short term 2 long term 2
		Prohibit Retention of Females	1	0	0	0	short term 3 long term 1
	Catch Limit	No Action	2	0	0	0	short term 1 long term 2
		50 crabs/day	1	0	0	0	short term 2 long term 1

* Comparison scores range from 1 to the number of alternatives for each measure (2 to 4). A lower score (1) is best is the best alternative, a higher score is worst. A score of 0 represent no impact.

Because few data exist on the Jonah crab fishery, it is difficult to assess the impacts of this measure with precision. Because few data exist on the recreational Jonah crab fishery, the analysis will be qualitative.

5.3.1 Impacts of Broodstock Protection Alternatives

As discussed in Section 3.3.1, the Lobster Board considered and approved protections for egg-bearing female Jonah crabs in the recreational fishery. This section considers the impacts to the five VECs of prohibiting retention of egg-bearing female, prohibiting retention of all females, and the No Action alternative that would provide no such protection.

5.3.1.1 No Broodstock Protection (No Action)

The No Action alternative (Section 3.3.1.3) would allow the recreational Jonah crab fishery to continue to operate without broodstock protections. Recreational Jonah crab harvesters in federal waters-only would continue to operate without broodstock restrictions. However, given that most federal harvesters must also abide by state requirements, these individuals would be required to comply with the most restrictive rule, and, therefore, must comply with the broodstock restrictions already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in slight negative direct and indirect impacts on the Jonah crab resource and the most negative impacts compared to the other alternatives. A fishery lacking protections for its reproductive population would allow actively reproducing female crabs (i.e., females with eggs) to be harvested. Removing an excess of crabs before they reach maturity decreases reproductive rates which would likely lead to an overall decrease in the Jonah crab population. Such a decrease could threaten the long-term stability of the stock. Compared to the two alternatives that establish broodstock protections, the No Action alternative would result in the highest degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to other broodstock alternatives. Whether regulated or unregulated in this No Action alternative, the recreational fishery is expected to continue operating under current practices. Bait may be used to catch Jonah crabs, regardless of whether broodstock measures are approved. Traps would continue to be set, which can be expected to catch lobster, and to a lesser degree rock crab and red crab, regardless of whether and what a minimum size is approved. Therefore, no impacts on other affected species are expected to result from not providing broodstock protections. Further, the No Action alternative is expected to result in the same, no impacts as providing broodstock protections using similar logic.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to other broodstock alternatives. Recreational harvesters are expected to set traps to target Jonah crabs, regardless of whether protections to females Jonah crabs are approved. As previously discussed, trap gear has a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. Because providing or not providing protections for females Jonah crabs does not alter the effort, location, or timing of the fishery, no impacts are expected to result from approving protections to egg-bearing females, all females, or providing no such protection.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to other broodstock alternatives. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, because there are no data indicating that Jonah crabs in the Northwest Atlantic segregate by sex or size, this measure will not influence or provide any incentive for recreational harvesters to change fishing behavior, effort, or area fished. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risks are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of status quo unregulated recreational fishery is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to the other options that either prohibit the retention of all females or only egg-bearing females, the No Action is expected to have the same impacts (i.e., no impacts) on protected species.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic

environment. Compared to other alternatives, these impacts are the most positive in the short term and the most negative in the long term. Under the No Action alternative, recreational harvesters would be able to retain any Jonah crab, including actively reproducing females. Therefore, harvesters would achieve the most personal enjoyment from this scenario. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the size of the commercial fishery." It is also qualified as slight because failing to establish broodstock protections when the states have already done so would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive impact on human communities. In the long-term however, harvesting crabs that have not had the opportunity to reproduce could have negative impacts on the population, and, therefore, a harvester's ability to catch Jonah crabs. Under this scenario, harvesters could lose out on future enjoyment of this fishery. Loss of future enjoyment combined with the inconsistencies in regulations would likely lead to negative long-term impacts. Compared to the alternatives that prohibit the retention of egg-bearing or all females, this option would be more positive in the short-term, but more negative in the long-term, using the logic discussed above.

5.3.1.2 Prohibition on the retention of egg-bearing females (Preferred)

The preferred alternative would prohibit recreational harvesters from retaining egg-bearing female Jonah crabs. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in slight positive direct and indirect impacts on the Jonah crab resource compared to the current condition and the more positive impacts than the No Action, but less positive impacts than a prohibition on retaining all females. Such regulations would restrict harvest to female crabs that are not actively reproducing. Protecting actively reproducing Jonah crabs is likely to help maintain current reproductive rates and would likely help to ensure a stable and sustainable population in the long-term. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the size of the commercial fishery." Compared to prohibiting the retention of all females in the recreational fishery, this alternative is expected to provide slightly less positive impacts because it provides protection for only a subset of females, thereby providing protections for slightly fewer Jonah crabs to reproduce. Compared to the No Action, this alternative is expected to result in higher positive impacts because it establishes protections for reproductive females.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to other broodstock alternatives. Please see the *Other Affected Species* discussion in Section 5.3.1.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to other broodstock alternatives. Please see the *Habitat* discussion in Section 5.3.1.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to other broodstock alternatives. Please see the *Protected Resources* discussion in Section 5.3.1.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the other alternatives, this alternative falls in the middle of the other alternatives in both the long term and the short term. Harvesters would achieve some personal enjoyment from the ability to fish for and retain some crabs, while ensuring the long-term protection of the stock. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the size of the commercial fishery." In the long-term however, harvesting crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term ability to access and enjoy this fishery. Further, providing protections that match what the states have set would ensure that there is no disconnect in the regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative, and enforcement objectives and minimizes confusion. This helps to temper any negative short-term impacts associated with being able to retain fewer crabs and makes for positive long-term impacts. Compared to the alternative that prohibit the retention of all females, this option would have the slightly more positive short-term impacts and slightly more negative long-term impacts because recreational harvesters can retain more crabs in the short term but could have fewer mature crabs contributing to the long-term population. Compared to providing no protections (No Action), this alternative would have more negative short-term impacts and more positive long-term impacts because recreational; harvesters would be able to retain fewer crabs in the short term but would have more mature crabs contributing to the long-term population.

5.3.1.3 Retention of females prohibited

This alternative (Section 3.3.1.2) would restrict recreational harvesters to possessing and landing Jonah crabs only male Jonah crabs (i.e., female Jonah crabs would be prohibited). This alternative meets the Commission's goal of setting conservation measures that are consistent with current practices but it fails to establish complementary measures to what the Commission approved and recommended. Given that most federal harvesters must also abide by state requirements, these individuals would be required to comply with the most restrictive rule, and, therefore, must comply with the federal broodstock requirements.

Target Species

This alternative is expected to result in slight positive direct and indirect impacts on the Jonah crab resource compared to the current condition and the most positive impacts compared to the other alternatives. Such regulations would allow all female Jonah crabs to reach maturity and have the opportunity to reproduce. Protecting female Jonah crabs is likely to help maintain current reproductive rates and would likely help to ensure a stable and sustainable population in the long-term. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the size of the commercial fishery." Compared to prohibiting the retention of egg-bearing females, this alternative is expected to provide slightly more positive impacts because it provides protection for more females, thereby providing protections for more Jonah crabs to reproduce. Compared to the No Action, this alternative is expected to result in higher positive impacts because it establishes protections for all females to reproduce.

Other Affected Species

This alternative is expected to result in no direct or indirect impacts on other affected species, similar to other broodstock alternatives. Please see the *Other Affected Species* discussion in Section 5.3.1.1 for a full discussion of these impacts determinations.

Habitat

This alternative is expected to result in no direct or indirect impacts on habitat, similar to other broodstock alternatives. Please see the *Habitat* discussion in Section 5.3.1.1 for a full discussion of these impacts determinations.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to other broodstock alternatives. Please see the *Protected Resources* discussion in Section 5.3.1.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

This alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight direct and indirect positive impacts on human communities/socioeconomic environment. Compared to other alternatives, these impacts are the most negative in the short term and the most positive in the long term due to limits on the ability to harvest crabs and management inconsistencies. Prohibiting the retention of all female crabs is the most restrictive alternative under consideration. Harvesters would achieve some personal enjoyment from the ability to fish for and retain the only male crabs. In addition, setting different protections for female crabs from what was approved by the states would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for harvesters, which also tempers the positive to human communities. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the

size of the commercial fishery." In the long-term however, providing protections for female crabs to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term ability to access and enjoy this fishery. This positive effect, however, would be tempered by sustained confusion regarding inconsistent regulation. Compared to the alternatives that prohibit retention of egg-bearing females and provide no protections (No Action), this option would have the most negative short-term impacts, but the most positive long-term impacts.

5.3.2 Impacts of Recreational Catch Limit Alternatives

As discussed in Section 3.3.2, the Lobster Board considered and approved an incidental catch limit for recreational harvesters as means to ensure that recreational harvesters do not increase their effort on that species. This section considers the impacts to the five VECs of establishing a recreational catch limit and the No Action alternative that would establish no limit.

5.3.2.1 No recreational catch limit (No Action)

The No Action alternative (Section 3.3.2.2) would allow the recreational Jonah crab fishery to continue to operate without a catch limit. Recreational Jonah crab harvesters in federal waters-only would continue to operate without a recreational catch limit. However, given that most federal harvesters must also abide by state requirements, these individuals would be required to comply with the most restrictive rule, and, therefore, must comply with the catch limits already implemented by the states. This alternative fails to implement complementary measures to what the Commission recommended.

Target Species

The No Action alternative is expected to result in slight negative direct and indirect impacts on the Jonah crab resource and the most negative impacts compared to the other alternative. Such regulations would allow recreational harvesters to harvest an unlimited amount of Jonah crabs, and possibly increase effort. Removing an excess of Jonah crabs could lead to an overall decrease in the Jonah crab population. Such a decrease could threaten the long-term stability of the stock. Compared to the alternative that establishes a definition, the No Action alternative would result in a higher degree of negative biological impacts.

Other Affected Species

The No Action alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other recreational catch limit alternative. Whether a recreational catch limit is established or not, the fishery is expected to continue operating under current practices. Bait may be used, regardless of whether a recreational catch limit is approved. Fishing gear would continue to be used, which can be expected to catch a variety of species, regardless of whether limits are placed on the recreational catch of Jonah crabs. Therefore, no impacts on other affected species are expected to result from not establishing a recreational catch limit. Further, the No Action is expected to result in the same, no impacts as approving a limit.

Habitat

The No Action alternative is expected to result in no direct or indirect impacts on habitat, similar to the other recreational catch limit alternative. Recreational harvesters are expected to set gear, regardless of whether limits are placed on the recreational catch of Jonah crabs. As previously discussed, trap gear has

a minimal footprint on the bottom, and, conservatively results in slight low negative impacts on habitat. This measure, however, only regulates the possession of Jonah crabs after gear is deployed and hauled. Because establishing or not establishing a recreational catch limit does not alter the effort, location, or timing of the fishery, no impacts are expected to result from approving or not approving a recreational catch limit.

Protected Resources

This alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other recreational catch limit alternative. This measure only regulates the possession of Jonah crabs after gear is deployed and hauled. This measure does not alter existing regulations for vertical lines or ground lines used in trap/pot fisheries. Further, this measure will not influence or provide any incentive for recreational harvesters to change fishing behavior, effort, or area fished because fishing behavior, effort, and location are not expected to change significantly from the unregulated current conditions. Therefore, this measure will not change or influence the presence, quantity, and degree of traps used in this fishery. As the Jonah crab fishery uses pot/trap gear, interactions with protected species are possible and some level of negative impacts to protected species is likely. Interaction risk are associated with the amount of gear in the water, gear soak or tow time, as well as the area of overlap, either in space or time, of the gear and a protected species. Continuation of the unregulated, status quo is not expected to change any of these operating conditions and therefore, is not expected to introduce any new or elevated (e.g., more gear, longer soak time) interaction risks to protected species. Considering these factors, this measure will not directly or indirectly influence fishing behavior or effort and therefore, can be considered to be a measure that is more administrative in nature. Based on this, this measure is not expected to impact, directly or indirectly, any protected species. Compared to establishing a recreational catch limit, the No Action is expected to have the same impacts (i.e., no impacts) on protected resources.

Human Communities/Socioeconomic Environment

The No Action alternative is expected to result in short-term slight positive direct and indirect impacts and longer term slight negative direct and indirect impacts on human communities/socioeconomic environment. Compared to the preferred alternative, these impacts are the most positive in the short term and the most negative in the long term. Under the No Action alternative, recreational harvesters would be able to retain an unlimited amount of Jonah crab. Therefore, harvesters would achieve the maximum amount of enjoyment from this scenario. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the size of the commercial fishery." It is also qualified as slight because failing to approve a federal recreational catch limit when the states have set such a limit would create a significant inconsistency between state and federal regulations for this species, increasing the difficultly to achieve management, administrative, and enforcement objectives as a result. Such inconsistencies would likely also create additional confusion about applicable regulations for permit holders, which also tempers the positive to human communities. In the long-term however, allowing recreational harvesters to catch and retain an unlimited amount of crabs could have negative impacts on the population, and, therefore, a harvester's ability to catch Jonah crabs in the future. Under this scenario, harvesters could lose out on future enjoyment of this fishery. Loss of future enjoyment combined with the inconsistencies in regulations would likely lead to negative

long-term impacts. Compared to the alternatives that establishes a recreational catch limit, this option would be more positive in the short-term, but more negative in the long-term.

5.3.2.2 50 crabs per day (Preferred)

The preferred alternative would restrict the recreational fishery to a limit of 50 whole crabs per day. This alternative meets the purpose and need because it implements complementary measures to what the Commission recommended.

Target Species

The preferred alternative is expected to result in slight direct and indirect positive impacts on the Jonah crab resource compared to the current condition. Such regulations would prevent recreational harvesters from drastically increasing their catch of Jonah crabs, thereby helping maintain a stable and sustainable population. The impact is qualified as slight because recreational harvest is expected to be merely a fraction of targeted catch. Compared to the No Action alternative, this alternative is expected to result in higher positive impacts because it establishes limits on incidental catch.

Other Affected Species

The preferred alternative is expected to result in no direct or indirect impacts on other affected species, similar to the other recreational catch limit alternative. Please see the *Other Affected Species* discussion in Section 5.3.2.1 for a full discussion of these impacts determinations.

Habitat

The preferred alternative is expected to result in no direct or indirect impacts on habitat, similar to the other recreational catch limit alternative. Please see the *Habitat* discussion in Section 5.3.2.1 for a full discussion of these impacts determinations.

Protected Resources

The preferred alternative is expected to result in no direct or indirect impacts on protected species compared to current fishery conditions, similar to the other recreational catch limit alternative. Please see the *Protected Resources* discussion in Section 5.3.2.1 for a full discussion of these impacts determinations.

Human Communities/Socioeconomic Environment

The preferred alternative is expected to result in short-term slight negative direct and indirect impacts and longer term slight positive direct and indirect impacts on human communities/socioeconomic environment. Compared to the preferred alternative, these impacts are the most negative in the short term and the most positive in the long term. Due to the restrictions on possession, harvesters would achieve a limited personal enjoyment from the ability to fish for and retain some crabs, resulting in a negative impact. The impact is qualified as slight because the Commission, in its 2017 Jonah Crab Compliance Report indicated that "the magnitude of the Jonah crab recreational fishery is unknown at this time; however, it is believed to be quite small as compared to the size of the commercial fishery." In the long-term however, ensuring that recreational harvesters do not overfish Jonah crabs is likely to ensure the long-term sustainability of the population, and, therefore, all harvester's long-term enjoyment. Further,

providing protections that match what the states have established would ensure that there is no disconnect between the state and federal regulations for this species. All harvesters would be required to abide by the same restrictions, which assists in achieving management, administrative, and enforcement objectives and minimizes confusion. This helps to temper any negative short-term impacts associated with being able to retain fewer crabs and makes for positive long-term impacts. Compared to adopting no restrictions (No Action), this alternative would have the most negative short-term impacts and the positive long-term impacts because harvesters would be able to retain fewer crabs in the short term but would have more sustainable long-term population.

5.4 Cumulative Impacts Analysis

5.4.1 Introduction

The Council on Environmental Quality (CEQ) and agency policy (NOAA Administrative Order 216-6) require a cumulative effects assessment as part of an EIS. CEQ regulations (40 CFR Part 1508.7) define the term "cumulative effects" 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 actions."

In other words, the purpose of the cumulative effects analysis is to integrate into the impact analyses, the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but; rather, the intent is to focus on those effects that are truly meaningful.

This section examines the potential direct and indirect effects of the alternatives in this action together with past, present, and reasonably foreseeable future actions that affect the human environment. These predictions of potential synergistic effects from multiple actions, past, present and/or future will generally be qualitative in nature.

Valued Ecosystem Components (VEC)

The Affected Environment (Section 4.0) identified and described the following VECs considered in this action and cumulative effects analysis:

1. Target Species (Jonah crab resource);
2. other affected species;
3. habitat (including the physical environment and EFH);
4. protected resources; and
5. human communities/socioeconomic environment.

Temporal Scope of the VECs

While the effects of historical fisheries are considered, the temporal scope of past and present actions for the Jonah crab resource, non-target species, and physical environment is primarily focused on actions that have taken place since 2013-the year that landings first exceeded 10 million pounds—to 2023 (approximately 5 years into the future). While the lobster and Jonah crab fisheries have been harvested by the same gear prior to this date, this date encompasses actions that restrict the harvest on the Southern

New England lobster stock, which likely corresponds to when lobster harvesters began to substantially supplement their income with Jonah crabs. This period was also chosen because of the relatively high frequency with which the Commission's Lobster Board adopts new addenda to both the Jonah crab and American Lobster Plans. The temporal scope of past and present actions for protected resources is primarily focused on actions that have taken place since the passage of the Endangered Species Act of 1973 and encompasses actions that have both limited fishing and/or effort and made attempts to provide protections for protected species. While new addenda are a virtual certainty, their details beyond a 5-year time horizon cannot be predicted and thus their effects on the biological and human environments associated with Jonah crab management are unknown.

Geographic Scope of the VECs

The geographic scope of the analysis of impacts to the Jonah crab resource, and other affected species encompass federal waters from Maine to North Carolina, as described in the Affected Environment section of the document (Section 4.0). The physical environment, including habitat and EFH, is bounded by the range of the Jonah crab fishery in the northeast region from Maine to North Carolina and includes adjacent upland areas (from which non-fishing impacts may originate). For endangered and protected species, the geographic range is the total range of each species (Section 4.4).

Because the potential exists for far-reaching sociological or economic impacts on U.S. citizens who may not be directly involved in fishing for the managed resources, the overall geographic scope for human communities is defined as all U.S. human communities. Limitations on the availability of information needed to measure sociological and economic impacts at such a broad level necessitate the delineation of core boundaries for the human communities. Therefore, the geographic range for the human communities is defined as those fishing communities[25] bordering the range of the Jonah crab fishery (Section 4.5) from the U.S.-Canada border to, and including, North Carolina.

Analysis of Total Cumulative Effects

The cumulative effects assessment of an EIS ideally makes effect determinations based on the culmination of the following: (1) impacts from past, present and reasonably foreseeable future actions; PLUS (2) the baseline condition for resources and human communities (note – the baseline condition consists of the present condition of the VECs plus the combined effects of past, present and reasonably foreseeable future actions); PLUS (3) impacts from the alternatives.

Table 24 presents a description of past, present and reasonably foreseeable future actions. The baseline conditions of the resources and human community are subsequently summarized although it is important to note that beyond the stock managed under this Plan and protected species, quantitative metrics for the baseline conditions are not available. Finally, this section includes a brief summary of the impacts from the alternatives contained in this action. The culmination of all these factors is considered when making the cumulative effects assessment. Impact definitions for the tables in this section are summarized in Table 18.

[25] Fishing Community is defined in the Magnuson-Stevens Act as a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.

5.4.2 Past, Present, and Reasonably Foreseeable Cumulative Actions

5.4.2.1 Fisheries Impacts

Federal waters that comprise the Jonah crab fishery also support many other non-Jonah crab related activities. Multiple federal jurisdictions oversee these activities, the boundaries of which often times overlap and cover a vast amount of the Outer Continental Shelf (OCS) area. The following is a synopsis of the most applicable past, present, and reasonably foreseeable future actions that have the potential to interact with the current action. This table also provides an analysis of the range of actions taking place within the geographic boundaries for this cumulative impact analysis and briefly identifies their cumulative impact on Jonah crab-related resources.

Table 24. Summary of Effects on VECs from Past, Present, and Reasonably Foreseeable Future Jonah Crab Plan and Other Trap Fishery Related Actions (including Lobster, Large Whale, and Habitat actions)

Actions	Target Species	Other Affected Species	Habitat	Protected Resources	Human Communities
Past and Present Fishing Actions					
American Lobster Area 1 Limited Entry Program - Final Rule 2012: Capped the number of federal Area 1 lobster trap permits at recent levels to prevent migration of trap effort into the Area.	Likely +	Likely +	Likely no Impact to sl +	Likely sl +	Likely - to +
Vertical Line Rule – Final Rule 2014: In response to the continued serious injury and mortality of large whales from entanglement in vertical lines (or buoy lines) of commercial fishing gear, new measures were implemented to reduce the risk of vertical line entanglements in areas and times where abundance of large whales and high trap/pot gear density overlap.	Likely no Impact	Likely no Impact	Likely no Impact	Likely sl +	Likely sl -
Area 2 and Outer Cape Trap Fishery Eligibility Program – Final Rule 2014: Considers ISFMP measure to cap and control trap fishing effort in, Area 2 and the Outer Cape qualifying eligible vessels against yet unspecified criteria	Likely +	Likely +	Likely no Impact	Likely sl +	Likely no Impact
Intertransferable Trap Program for Area 2, Area 3 and the Outer Cape Area – Final Rule 2014: Transfer of all or part of a trap allocation from one vessel to another	Likely +	Likely +	Likely no Impact	Likely sl +	Likely +
Trap Reductions and Brood Stock Protection Measures – Final Rule 2015: Approved trap reductions for Lobster Conservation Management Areas 2 and 3 and a variety of broodstock protection measures for areas 3, 4, and 5 to achieve a 10-percent reduction in expoitation.	Likely sl +	Likely sl +	Likely no Impact to sl +	Likely sl +	Mixed
Area 4 Closed Season Modification – Final Rule 2015: Modified the seasonal closure for Area 4 based on Commission evaluation that the previously approved closed season did not achieve conservation goals.	Likely sl +	Likely sl +	Likely no Impact to sl +	Likely sl +	Likely sl -
Habitat Omnibus Amendment- Phase 2: considering the effects of fishing gear on EFH and moves to minimize, mitigate or avoid those impacts that are more than minimal and temporary in nature. Further,	Likely no Impact to sl+	Likely no Impact to sl +	sl +	Likely sl +	Mixed

Actions	Target Species	Other Affected Species	Habitat	Protected Resources	Human Communities
Phase 2 is reconsidering closures put in place to protect EFH and groundfish mortality in the Northeast Region.					
Reasonably Foreseeable Future Fishing Actions					
Modifications to the Lobster trap transfer program in Areas 2 and 3: Considers additional adjustments to the transfer program, including a conservation tax, aggregate trap caps, and ownership caps, as well as other corrections and clarifications to the regulations. As part of this action, NMFS established a control date (DATE) to provide notice that the number of permits or traps that a single individual or entity may own might be restricted in the future.	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending	Unknown - Pending
Lobster/Jonah crab Reporting Improvements: Considers improvements to harvester reporting and biological data collection programs in state and federal waters. The goals of this addendum are to: 1) utilize the latest technology to improve reporting; 2) increase the spatial resolution of harvester data; 3) collect greater effort data; and 4) advance the collection of biological data offshore.	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending	Unknown - Pending
Gulf of Maine Lobster Management Standardization: Considers increasing the resiliency of the GOM/GB stock by considering the standardization of management measures across Areas. It is intended to be a proactive management action in response to signs of reduced settlement and the combination of the GOM and GB stocks following the 2015 Stock Assessment. The goal of this addendum is to add an additional biological buffer to the stock through the protection of spawning stock biomass across Areas.	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending	Unknown - Pending
New England Council Omnibus Coral Amendment: The Council is developing a deep-sea coral amendment that considers coral conservation measures: (1) in canyons and on seamounts south of Georges Bank and (2) in the Gulf of Maine, both inshore off the eastern Maine coast and offshore in Jordan and Georges Basins.	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending	Unknown - Pending
Large Whale Take Reduction Team-Recommended Reporting Improvements: Considers improvements to fishing effort data availability to support the further development and implementation of the Plan with a goal of reducing variability of the effort data and obtaining a comprehensive and consistent set of effort data.	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending

Actions	Target Species	Other Affected Species	Habitat	Protected Resources	Human Communities
Large Whale Take Reduction Team Efforts: Monitors, recommends, and NMFS implements measures to reduce injuries and deaths of large whales due to incidental entanglement in fishing gear	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending
Upcoming Lobster and Jonah Crab Fishery Biological Opinion: Outcome of the opinion may result in reasonable and prudent measures and reasonable and prudent alternatives that aim to minimize the impacts of incidental takes	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown -- Pending	Unknown - Pending

Commission Jonah crab management is not a static process; new issues are always arising. Often, by the time the Commission completes one part of its Jonah Crab Plan, additions, edits and amendments to that same part can already be under development. As such, it approved multiple measures through several addenda, all of which attempt to maintain the Jonah crab fishery at current levels.

Target Species

The cumulative impacts of past, present, and reasonably foreseeable future management actions have resulted maintaining the Jonah crab fishery at 2014 levels. While the Southern New England lobster stock collapse likely contributed to harvesters' increasing reliance on Jonah crabs to supplement income prior to 2013, actions in the recent past that include effort reductions and additional protection for broodstock in the American lobster fishery have likely contributed to maintaining effort levels for Jonah crabs. These measures are intended to help support a healthy Jonah crab stock and fishery. In general, the actions in the foreseeable future are expected to have positive impacts on the Jonah crab resource overall. In summary, the cumulative impacts of past, present and reasonably foreseeable future actions are positive impacts on the Jonah crab resource.

Other Affected Species

Actions taken by the Commission in the Jonah Crab and American Lobster Plans in the past and present have had a mostly positive impact on non-target species. Gear restrictions have limited the need for bait, and afforded protection for smaller-sized target and non-target species (i.e., lobsters). Future actions are anticipated to continue rebuilding and will maintain sustainable stocks. Therefore, the cumulative impacts of past, present and reasonably foreseeable future actions should yield positive impacts for non-target species and other fisheries in the long-term.

Habitat

As previously discussed, available information suggests trap gear, including the traps used in the commercial Jonah crab (and lobster) fisheries, tend to have limited long-term adverse impacts on the seafloor habitat, particularly when compared with mobile fishing gears such as trawls and dredges. Past actions have reduced the number of harvesters and, therefore, the number of traps authorized and instituted seasonal closures, which likely have had no impact to slight positive impact on habitat. While this action authorizes fishing and could result in slight negative impacts on habitat, the cumulative

impacts of past and present actions is likely no impact. Future actions are expected to continue the past trend of affording protections to habitat. In summary, the cumulative impacts of past, present and reasonably foreseeable future actions are no impact to slight positive impact for habitat.

Protected Species

Sea turtles, large whales, and small cetaceans are the primary protected species impacted by the Jonah crab and lobster fishery. The American Lobster Plan, which has overlap with the Jonah crab fishery, has, in past and present actions, capped the number of vessels and trap and subsequently reduced trap allocations. While the fishery in general has negative impacts to protected resources due to entanglement risks, these measures have helped to minimize these negative impacts. Future actions are expected to continue these trends. Overall, the cumulative impacts of past, present and reasonably foreseeable future actions are slightly negative for protected resources, due to potential for gear interactions with protected species.

Human Communities

All actions listed above have had effects on human communities[26]. The impacts have ranged from directly benefitting the domestic commercial industry, to short-term costs due to size limits, gear requirements and trap reductions. Individually, certain measures in each action have a range of impacts, and offset impacts from other actions. For example, as previously discussed, it is expected that the Lobster Trap Transfer Program could mitigate any potentially negative impacts of trap reductions. Similarly, approving a measure to cap lobster trap ownership could address the potential for the consolidation in the lobster fishery. However, as these actions provide protections for the stocks they manage, past and present measures are likely to have a long-term positive impact on human communities, as the fisheries will be able to support increased harvest. Future actions are expected to continue this trend. Therefore, the cumulative impacts of past, present, and reasonably foreseeable future actions range from short-term negative to long-term positive for human communities.

5.4.2.2 Non-fisheries Impacts

Non-fishing activities were also considered when determining the combined effects from past, present and reasonably foreseeable future actions. Activities that have meaningful effects on the VECs include the introduction of chemical pollutants, sewage, changes in water temperature, ocean acidification, salinity, dissolved oxygen, and suspended sediment into the marine environment. These activities pose a risk to the all of the identified VECs in the long term. Human induced non-fishing activities that affect the VECs under consideration in this document tend to be concentrated in near shore areas. Examples of these activities include, but are not limited to, agriculture, port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging, and the disposal of dredged material. It is likely that these activities will continue to grow in importance in the future. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the Jonah crab resource, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts

[26] Fishing Community is defined in the Magnuson-Stevens Act as a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.

of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. This action is not expected to change the impacts on the VECs described above from non-fishing impacts. More information on such projects is provided in Appendix 6.

Table 25. Summary of Non-Fishing Impacts Applicable to this Action

Action	Description	Impacts on Target Species	Impacts on Other Affected Species	Impacts on Habitat	Impacts on Protected Species	Impacts on Human Communities
Port maintenance	Dredging of wetlands, coastal, ports, and harbor areas for port maintenance	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Direct and Indirect Negative** Potential interactions with protected species; reduced habitat quality/availability; dependent on mitigation efforts	**Uncertain-Likely Positive** Dependent on mitigation effects
Offshore disposal of dredged materials	Disposal of dredged materials	**Potentially Negative** Reduced habitat quality	**Potentially Indirect Negative** Reduced habitat quality	**Potentially Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality; dependent on mitigation efforts	**Potentially Negative** Reduced habitat quality negatively affects resource viability
Beach nourishment	Offshore mining of sand for beaches	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Direct Negative** Reduced habitat quality	**Direct and Indirect Negative** Reduced habitat quality; dredge interactions; dependent on mitigation efforts	**Potentially Mixed** Positive for mining companies, possibly negative for fisheries
Beach nourishment	Placement of sand to nourish beach shorelines	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Direct Negative** Reduced habitat quality	**Direct and Indirect Negative** Reduced habitat quality; dredge interactions; dependent on mitigation efforts	**Potentially Positive** Beachgoers generally like sand
Marine transportation	Expansion of port facilities, vessel operations and recreational marinas	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Direct Negative** Reduced habitat quality	**Direct and Indirect Negative** Reduced habitat quality/availability; potential for interactions (ship strikes) with protected species	**Potentially Mixed** Positive for some, potential displacement for others
Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines,	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Potentially Direct Negative** Reduced habitat quality	**Direct and Indirect Negative** Reduced habitat quality; Sound	**Uncertain** Dependent on mitigation effects

Action	Description	Impacts on Target Species	Impacts on Other Affected Species	Impacts on Habitat	Impacts on Protected Species	Impacts on Human Communities
	utility lines and cables				Exposure (physical injury or behavioral harassment); dependent on mitigation efforts	
Atlantic Large Whale Take Reduction Measures	Gear and area restrictions on lobster fishing to reduce takes of whales in lobster gear.	**Uncertain-No Impact** Not likely to affect Jonah crab resource	**Uncertain-No Impact** Not likely to affect bycatch of non-targeted species	**Uncertain** Sinking groundline may have some unknown impact on hard-bottom habitat	**Potentially Positive** Gear and area restrictions may decrease takes of large whales and cetaceans	**Potentially Negative** Some short and long-term economic impacts to industry may occur to comply with new gear requirements
Offshore Wind Energy Facilities (within 5 years)	Construction of wind turbines to harness electrical power (Several facilities proposed from ME through NC, including off the coasts of MA, NY/NJ, RI, and VA)	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Direct and Indirect Negative** Reduced habitat quality; Sound Exposure (physical injury or behavioral harassment); dependent on mitigation efforts	**Uncertain** Dependent on mitigation effects
Liquefied Natural Gas (LNG) terminals (within 5 years)	Transportation of natural gas via tanker to terminals located offshore and onshore	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible, but potential that no fishing zone could create refuge	**Direct and Indirect Negative** Reduced habitat quality; Sound Exposure (physical injury or behavioral harassment); dependent on mitigation efforts	**Uncertain-Likely Positive** Dependent on mitigation effects
Agricultural runoff	Nutrients applied to agricultural land are introduced into aquatic systems	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource viability
Rising Water Temperature	A long-term warming trend observed throughout range	**Uncertain** Impacts of water temperatures on Jonah crab is unknown	**Uncertain**	**Uncertain**	**Uncertain**	**Uncertain** Impacts of water temperatures on Jonah crab is unknown

Table 26 summarizes the effects of past, present and reasonably foreseeable future actions on the VECs from this action. The combined effects of past, present and reasonably foreseeable future actions is exhibited in the last column (shaded).

Table 26. Summary Effects of Past, Present, and Reasonably Foreseeable Future Actions on the VECs from this Action

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Jonah Crab	**Mixed:** Past actions have limited participation in the lobster fishery which has limited the number of Jonah crab harvesters and therefore pressure on the resource. The poor condition of the SNE lobster stock has led to an increase in targeting Jonah crabs. Impacts on the Jonah crab resources from these actions are largely mitigated through state regulatory oversight.	**Positive:** Current regulations limit participation in the fishery to historic levels and establish basic fishery regulations in an attempt to manage for sustainable stocks.	**Positive:** Future measures will combine increased reporting with additional lobster effort control measures in SNE and management standardization in GOM, which should help to maintain a sustainable Jonah crab population.	**Positive:** The Jonah crab resource is expected to remain sustainable through current and future management.
Other Affected Species	**Mixed:** Combined effects of past actions have decreased effort, improved habitat protection, and implemented rebuilding plans when necessary.	**Positive:** Current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species.	**Positive:** Future actions are anticipated to continue rebuilding and strive to maintain sustainable stocks.	**Long-Term Positive:** Stocks are being managed to attain rebuilt status.
Habitat	**Mixed:** Combined effects of effort reductions and better control of non-fishing activities have been positive. But fishing activities and non-fishing activities continue to reduce habitat quality.	**Mixed:** Effort reductions and better control of non-fishing activities have been positive. But fishing activities and non-fishing activities continue to reduce habitat quality.	**Mixed:** Future regulations will likely control effort and thus habitat impacts. But fishing activities and non-fishing activities continue to reduce habitat quality.	**Mixed:** Continued fisheries management will likely control effort and thus fishery related habitat impacts. But fishery and non-fishery related activities will continue to reduce habitat quality.
Protected Resources	**Mixed:** Combined effects of past fishery actions authorize fisheries that have interactions with protected species. However, actions have reduced effort and thus interactions with protected resources.	**Mixed:** Current regulations authorize fisheries that have interactions with protected species. However, these actions are expected to cap effort and thus interactions with protected resources.	**Mixed:** Future regulations will likely continue to authorize fisheries that have interactions with protected species. However, future actions are expected to continue to minimize interactions.	**Mixed:** Fisheries will continue to have negative impacts on protected species, but current and future actions will likely help stabilize protected species interactions

VEC	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Human Communities	**Mixed:** Jonah crab landings have steadily increased in the past 20 years, with the largest portion of landings coming from SNE, where the American lobster resource is in poor condition. Harvesters are likely shifting effort to maintain profitability. Regulation of the American lobster fishing industry, as well as other commercial fishing industries, has increased substantially over the past decade in response to biological concerns for fishery resources. Affected fishing communities have expressed concerns with the difficulties of preserving the cultural heritage associated with their ties to fishing as a way of life, which they believe are under growing threat from regulation and competition for other uses of coastal real estate.	**Positive:** Current regulations limit participation in the fishery to historic levels in an attempt to manage for sustainable stocks and profitable industries.	**Mixed:** Economic uncertainty regarding costs/revenues are likely to continue. On-going regulatory actions in the Jonah crab and lobster fisheries, unknown at this time, will cumulatively add to the regulatory requirements placed on the fishing industry.	**Positive:** Regulatory restrictions can reduce both catch and flexibility and have the potential to negatively impact income in the short term. These same regulations and restrictions, however, are designed to protect fisheries in the long term. Sustainable resources should support viable communities and economies which is an overall benefit to the fishery.

5.4.3 Baseline Conditions for Resources and Human Communities

For the purposes of a cumulative effects assessment, the baseline conditions for resources and human communities are considered the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions. Table 26 summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 5.4.2) and the sum effect of the past, present and reasonably foreseeable future actions (from Table 26 above). The resulting cumulative effects assessment baseline for each VEC is exhibited in the last column (shaded). In general, straightforward quantitative metrics of the baseline conditions are only available for the managed resources, non-target species, and protected resources. The conditions of the habitat and human communities VECs are complex and varied. As such, the reader should refer to the characterizations given in Section 5.1. As mentioned above, this cumulative effects baseline is then used to assess cumulative effects of the proposed management actions in Table 27.

Table 27. Cumulative Effects Assessment Baseline Conditions on the VECs

VEC	Status/Trends, Overfishing/Overfishing	Combined Effects of Past, Present Reasonably Foreseeable Future Actions	Combined CEA Baseline Conditions
Target Species	Unknown/Unknown	**Positive:** The Jonah crab resource is expected to remain sustainable through current and future management.	**Positive:** It is unknown if the Jonah crab resource is overfished or if overfishing is occurring. Jonah crab is now being managed to maintain future sustainability.
Other Affected Species	Previous actions taken for the American lobster fishery have helped to decreased effort, improved habitat protection, and implemented rebuilding plans when necessary.	**Long-term Positive:** Stocks are being managed to attain rebuilt status.	**Long-term Positive:** Regulatory actions taken over time have reduced fishing effort and with the addition, stocks are expected to rebuild in the future.
Habitat	Fishing impacts are complex and variable and typically adverse (see Section 4.2); Non-fishing activities had historically negative but site-specific effects on habitat quality.	**Mixed:** Future regulations will likely control effort and thus habitat impacts. But non-fishing activities occurring. An omnibus amendment to the FMP with mitigating habitat measures has been approved and implemented by NMFS.	**Mixed:** Reduced habitat disturbance by fishing gear but impacts from non-fishing actions, such as global warming, could increase and have a negative impact.
Protected Resources	Numerous species of whales are listed under the Endangered Species act as Endangered or threatened. Other species are afforded protection under the Marine Mammal Protection Act.	**Slightly Negative:** Combined effects of past, present, and reasonably foreseeable future actions authorize fisheries that have interactions with protected species. However, many actions have reduced gear encounters through gear modifications, effort reductions, and area closures.	**Positive**: Reduced gear encounters through gear modifications and additional management actions taken under the MMPA.
Human Communities	The Jonah crab fishery has increased in the last 20 years as a profitable replacement for more expensive crab species and is helping Southern New England lobster harvesters adapt to changing conditions.	**Positive:** Sustainable resources should support viable communities and economies	**Positive:** Sustainable resources should support viable communities and economies

5.4.4 Summary Effects of this Action

The impacts of the management measures considered in this action are summarize Table 28 (summary of impacts from action – for a complete discussion of impacts please see Section 5.0). In general, the adoption of all of these measures will benefit the Jonah crab resource because they are designed to maintain a sustainable Jonah crab stock. These measures are also likely to have no impacts to slight positive impacts on non-target species. Overall, the measures are expected to have no impacts to habitat. No impacts to slight negative impacts on protected resources can be expected. These measures are likely to have no impact to slight negative impacts on communities in the short term, but communities should benefit from maintaining a stable stock through larger future catches in the long term.

Table 28. Summary of Impacts Expected on the VECs

Management Measure	Target Species	Other Affected Species	Habitat	Protected Resources	Human Communities
Permitting	**Slight Positive:** Contributes to maintaining a sustainable stock.	**Slight Positive:** Limiting the number of harvesters may decrease the bycatch of non-target species and reduce the need for bait.	**Slight Negative:** Measures are not expected to create additional impacts to habitat, as trap gear has minimal impact.	**Moderate to Slight Negative:** Trap gear is known to have interactions with whales, turtles, and cetaceans.	Short-term **Slight Negative,** Long-term **Slight Positive:** Permits would limit the opportunity to harvest Jonah crabs, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.
Minimum Size	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** A minimum size would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.
Landing Disposition	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to result in direct or indirect impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** Landing disposition requirements would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.
Broodstock Protection	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** Broodstock protections would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.
Incidental Catch Limits	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** An incidental catch limit would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.
Incidental Catch Definition	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts to non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** An incidental catch definition would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.

Management Measure	Target Species	Other Affected Species	Habitat	Protected Resources	Human Communities
Dealer Reporting	**No Impact:** Measures are not expected to create additional impacts to Jonah crabs.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	**No Impact:** Measures are not expected to create additional impacts to human communities
Harvester Reporting	**No Impact:** Measures are not expected to create additional impacts to Jonah crabs.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	**No Impact:** Measures are not expected to create additional impacts to human communities
Recreational Broodstock Protection	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** Broodstock protections would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.
Recreational Catch Limit	**Slight Positive:** Contributes to maintaining a sustainable stock.	**No Impact:** Measures are not expected to create additional impacts on non-target species.	**No Impact:** Measures are not expected to create additional impacts on habitat.	**No Impact:** Measures are not expected to create additional impacts on protected resources.	Short-term **Slight Negative,** Long-term **Slight Positive:** An recreational catch limit would limit the amount of crabs that could be harvested, resulting in reduced economic income. A sustainable stock, however, could support a robust future fishery.

5.4.5 Cumulative Effects Analysis

The regulatory atmosphere within which federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of resources, habitat, and human communities. Consistent with NEPA, the Atlantic Coastal Act and the Magnuson-Stevens Act require that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, **the overall cumulative effects of the preferred alternative on all VECs should result in no impact to non-significant positive impacts, for the purposes of NEPA**. This is not to say that some aspects of the various VECs are not experiencing negative impacts, but rather that when taken as a whole and compared to the level of unsustainable effort that existed prior to and just after the fishery came under management control, the overall long-term trend is generally positive.

To determine the magnitude and extent of cumulative impacts of the preferred alternatives, the incremental impacts of the direct and indirect impacts should be considered, on a VEC-by-VEC basis, in addition to the effects of all actions (those effects identified and discussed relative to the past, present, and reasonably foreseeable future actions of both fishing and non-fishing actions). Table 29 provides as a summary of likely cumulative effects found in the management alternatives contained in this action. The cumulative effects analysis baseline that, as described above in Table 27, represents the sum of the past,

present, and reasonably foreseeable future (identified hereafter as "other") actions and conditions of each VEC. When an alternative has a positive effect on a VEC, for example, reduced fishing mortality on a managed species, it has a positive cumulative effect on the stock size of the species when combined with the "other" actions that were also designed to increase stock size. In contrast, when an alternative has a negative effect on a VEC, such as increased mortality, the cumulative effect on the VEC would be negative and tend to reduce the positive effects of the "other" actions. The resultant positive and negative cumulative effects are described below for each VEC.

Table 29. Summary of Cumulative Effects of the Preferred Alternative

	Target Species	**Other Affected Species**	**Habitat**	**Protected Resources**	**Human Communities**
Direct/Indirect Impacts of Preferred Alternative	Positive	No Impact to Slightly Positive	Slight Negative to No Impact	No Impact to Moderate Negative	Slightly Negative to Slightly Positive
Combined Cumulative Effects Assessment Baseline Conditions	Positive	Long term Positive	Mixed	Mixed	Positive
Cumulative Effects	*Non-significant Positive*	*Non-significant No impact to Positive*	*Non-significant no impact to Positive*	*Non-significant no impact to slightly negative*	*Non-significant Slightly Positive*

Target Species

As noted in Table 29, the combined impacts of past federal fishery management actions have had a generally positive impact on the Jonah crab resource. Several past actions in other fisheries have likely resulted in some protections for the Jonah crab resource. This proposed action may sustain efforts to protect the Jonah crab resource by implementing the first federal management measures for the fishery; consequently, these alternatives are expected to have a positive impact on the Jonah crab resource. Thus, when the direct and indirect effects of the alternatives are considered in combination with all other actions (*i.e.*, past, present, and reasonably foreseeable future actions), **the cumulative effects of this action should yield non-significant positive impacts on the Jonah crab resource, for the purposes of NEPA.**

Other Affected Species

As noted in Table 29, the combined impacts of past federal fishery management actions have been relatively positive, as limitations on the number of traps fished in the lobster fishery may be associated with fewer interactions with non-target species in the lobster trap fishery. In addition, current regulations continue to manage for sustainable stocks, thus controlling effort on direct and discard/bycatch species. The alternatives proposed by this action are expected to continue this trend. Permitting, as previously discussed, would be expected to limit interactions with non-targets species and help to collect information

on such interactions. Other measures are expected to have no impacts. Overall, the introduction of Jonah crab management will likely also control catch of non-target species. **Therefore, the cumulative effects of this action should yield no impacts to non-significant slight positive impacts on non-target species, for the purposes of NEPA.**

Habitat

As noted in Table 29, the combined impacts of past federal lobster fishery management actions have reduced trap fishing effort on lobster, and therefore have been positive for habitat protection. In terms of reasonably foreseeable future actions, there are several EFH actions that may have potentially positive effects on habitat. In addition, better control of non-fishing activities has also been positive for habitat protection. However, both fishing and non-fishing activities continue to decrease habitat quality. This action would, among other measures, allow lobster trap harvesters to retain Jonah crabs. Because trap gear is known to have minimal impacts on bottom habitat, this action, at worst, is expected to have slight negative impacts on habitat. Other measures are expected to have no impacts. Overall, the combination of past, present, and future actions is expected to control fishing effort and hence reduce damage to habitat; however, it is likely that fishing and non-fishing activities will continue to degrade habitat quality. Thus, when the direct and indirect effects of the alternatives are considered in combination with all other actions (i.e., past, present, and reasonably foreseeable future actions), **the cumulative effects for this action should yield no impacts to non-significant positive impacts on habitat, for the purposes of NEPA.**

Protected Resources

As noted in Table 29, the combined impacts of past federal fishery management actions have had slight negative effects on protected resources. Limited access programs have served to cap and control lobster fishery participation since the moratorium on lobster permits was initiated in the mid-1990's. Since that time, no new federal lobster permits have been issued and the moratorium has been continued indefinitely. Subsequent federal actions, in cooperation with the states, have capped the number of traps and trap fishing vessels in every lobster management area and reduced the number of traps authorized in some areas. These measures have likely reduced the number of traps fished and, therefore, the number of vertical lines used. While trap gear, specifically the groundline and vertical line associated with the gear, poses an entanglement risk to protected species, the cap on traps has reduced the number of vertical and/or sinking groundlines in the water, thereby lowering the risk of entanglement, especially for large whales, in lobster trap gear. Further, trap gear modifications such as sinking groundline and modifications to vertical lines requirements have provided protections to large whales and other protected species that interact with the lobster trap fishery. This action would allow the lobster harvesters to retain and sell Jonah crabs, without an expansion of trap effort or additional gear. Because this action authorizes fishing with gear known to result in interactions, it is expected to have moderate to slight negative impacts. In terms of reasonably foreseeable future actions, there are several protected resource-related actions (Table 23) that may have positive effects on protected resources as they aim to reduce interactions and improve data collection and quality. Thus, when the direct and indirect effects of the alternatives are considered in combination with other actions (i.e., past, present, and reasonably foreseeable future actions), **the cumulative effects for this action should yield no impact to non-significant slight negative impacts, for the purposes of NEPA.**

Human Communities

As noted in Table 29, the past federal fishery management actions have implemented limited entry programs to cap and control fishing effort on American lobster. From 1998-2004, American Lobster was the highest value fishery in Greater Atlantic Region and remains one of highest in the US today. Regulation of the American lobster fishing industry, as well as other commercial fishing industries, has increased substantially over the past decade in response to biological concerns for fishery resources, including limiting access to specific permits, and specific areas based on fishing history, resulting in the loss of flexibility and the ability to diversify business plans. Multi-jurisdictional management has resulting in times when the states, or the states and federal government, have different regulations that apply to the same situation. The "most-restrictive rule" requires that permit holders abide by the more restrictive regulation to the extent they are confronted with differing regulations applying to the same situation. Affected industry have expressed concern about the growing complexity of the regulations, and ability to abide by the most-restrictive rule. Affected fishing communities have expressed concerns with the difficulties of preserving the cultural heritage associated with their ties to fishing as a way of life, which they believe are under growing threat from regulation and competition for other uses of coastal real estate. These past actions have had an overall long-term positive impact on the American lobster industry by increasing the revenues, producer and consumer surpluses, and net benefits, although increased regulation and restriction may have decreased industry flexibility and had negative impacts to businesses in isolated situations. The direct and indirect effects of the measures under consideration in this action are expected to be potentially negative in the short-term due to reduced fishing opportunity and potentially positive over the long-term because as stock biomass increases, communities and remaining permit holders should benefit from larger future catches. There are several habitat and other fishery-related actions that are expected to have potentially positive or low negative impacts on fishery-related businesses and communities. Therefore, the overall effects of reasonably foreseeable future actions on the fishery-related businesses and communities are no impact, low positive, and low negative. In addition, the effects of non-fishing activities on the fishery-related businesses and communities are mostly potentially negative. In summary, when the direct and indirect effects of the alternatives are considered in combination with other actions (*i.e.*, past, present, and reasonably foreseeable future actions), **this action should yield non-significant potentially slight positive cumulative impacts on the fishery-related businesses and communities, for the purposes of NEPA.**

6.0 List of Preparers and Points of Contact

The following staff members of the NMFS GARFO and the NEFSC collaborated on the preparation of this document:

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7.0 Persons and Agencies Consulted

Staff members of NMFS GARFO and NEFSC were also consulted in preparing this EIS. No other persons or agencies were consulted.

8.0 Compliance with Other Applicable Laws and Executive Orders

8.1 Atlantic Coastal Act

Jonah crab regulations will be issued under the Atlantic Coastal Fisheries Cooperative Management Act in Title 50 of the Code of Federal Regulations, Part 697. These regulations under the Atlantic Coastal Act are in keeping with the regulatory standard set forth in the Atlantic Coastal Act: 1) that the regulations be consistent with the National Standards set forth in the Magnuson-Stevens Act and 2) that the regulations be compatible with the Commission's Jonah Crab Plan. The measures evaluated in this EIS are in keeping with the Atlantic Coastal Act regulatory standard to develop compatible regulations to the Commission's Jonah Crab Plan and are consistent with the National Standards set forth in the Magnuson-Stevens Act.

8.2 Magnuson-Stevens Fishery Conservation and Management Act

Atlantic Coastal Act requires that federal regulations be consistent with the national standards of the Magnuson-Stevens Act.

National Standard 1 requires that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the U.S. fishing industry. There is no stock assessment for Jonah crabs and little information on the Jonah crab stock in U.S. waters. The degree to which the selected management actions would limit fishing effort and associated Jonah crab mortality is difficult to state with precision. Nevertheless, it is anticipated that these measures would cap effort in the Jonah crab fishery at existing levels and prevent additional expansion of the fishery and ensure the sustainability of the Jonah crab stock.

National Standard 2 requires that management measures be based upon the best scientific information available. The information base for evaluation of the proposed measures in this action is based upon the best scientific information available and incorporates the information used in the Commission's Jonah

Crab Plan, which was developed by the Jonah crab Plan Development Team and approved by the Lobster Board. In addition, more recent vessel and landings data is incorporated into the assessment of impacts in this action.

National Standard 3 requires, as practicable, that an individual stock be managed as a unit throughout its range, and that interrelated stocks be managed as a unit or in close coordination. We believe that the proposed action illustrates the consistency and coordination sought by this National Standard because we are proposing coastwide measures for the Jonah crab fishery, at the recommendation of the Commission. Further, these measures are consistent with those already implemented by the states.

National Standard 4 requires that conservation and management measures not discriminate between residents of different states. As a preliminary matter, these proposed actions are not state specific. That is, all federal permit holders must adhere to the same regulations regardless of the state from which they hail. Further, the selected management actions for the EEZ were developed in consultation with the Commission and the Jonah crab/lobster industry through the Commission's public process, and take into account the social and economic distinction among the nearshore and offshore EEZ fisheries. Further, despite a dearth of information due to the lack of mandatory harvester reporting in the lobster fishery, NMFS examined the best available information to discern any unintended discriminatory effect and used its best efforts to create counter measures to guard against such unexpected eventualities. Harvesters coastwide may be impacted by this action, however, the intent of the proposed measures would be to implement management measures for the Jonah crab fishery, consistent with Commission recommendation, and regulations already implemented by the affected states.

National Standard 5 requires that, where applicable, conservation and management measures promote efficiency in the utilization of fishery resources. The proposed actions are consistent with such a standard. Measures in this action were developed to cap effort at existing levels. It allows for the commercial harvest of Jonah crabs by harvesters who most frequently encounter Jonah crabs. It also allows harvesters to encounter Jonah crabs incidentally to retain and sell a small amount. Together, these efforts should maintain opportunities for historical participants.

National Standard 6 requires that conservation and management measures take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. The proposed management actions take into account the variations in fisheries, fishery resources, and catches, in consultation with the Commission and industry groups through coordination at the Commission. Industry involvement (including providing comments) through the Commission's process ensures flexibility in management of the fisheries, and fishery resource throughout its range. Additionally, the proposed measures enact the recommendations of the scientists of the Jonah Crab Plan Development Team which advised that such measures be implemented to facilitate the management and sustainability of the resource.

National Standard 7 requires that, where practicable, conservation and management measures minimize costs and avoid unnecessary duplication. The implementation of the proposed measures would ensure that federal regulations are compatible with the Commission's ISFMP and will not result in additional confusion by industry participants, compliance problems or duplication.

National Standard 8 requires that, consistent with fishery conservation requirements, conservation and management measures take into account the importance of fishery resources to fishing communities. As a preliminary matter, this action, consistent with the Commission's plan, is intended to cap effort in the

Jonah crab fishery at present levels and prevent future expansion. Sustained participation of communities and consideration of economic impacts is facilitated through the Jonah crab Plan's management provisions, which allow fishing communities to participate in, and provide public comment on, proposed management measures. NMFS gave consideration to this public input when developing these measures.

National Standard 9 requires that, to the extent practicable, conservation and management measures minimize bycatch, and to the extent bycatch cannot be avoided; minimize the mortality of such bycatch. The proposed measures establish limits on the fishery including formalizing who can target Jonah crabs with trap gear and setting limits on how many Jonah crabs can be retained by incidental harvesters. While Commission recommended measure do not attempt to restrict the fishery, they do attempt to capture existing effort and prevent expansion. Together, these efforts will not result in increased bycatch or bycatch mortality.

National Standard 10 requires that, to the extent practicable, conservation and management measures promote the safety of human life at sea. This management action will have no anticipated impact on safety at sea, because it would not result in any significant changes in fishing practices.

8.3 Endangered Species Act (ESA)

The American lobster Biological Opinion, which analyzed the effect of this mixed crustacean fishery, completed on July 31, 2014, concluded that the continued operation of several fisheries would not jeopardize the continued existence of any ESA-listed species and would not result in the destruction or adverse modification of designated critical habitat. On October 17, 2017, NMFS reinitiated consultation on the American lobster Biological Opinion due to updated information on the decline of North Atlantic right whale abundance. New information on all listed species will be incorporated into an updated batched Biological Opinion that will be used to evaluate the impact of these fisheries on listed species.

Section 7(d) of the ESA prohibits Federal agencies from making any irreversible or irretrievable commitment of resources with respect to the agency action that would have the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives during the consultation period. Resource commitments may occur and non-jeopardizing activities may proceed as long as their implementation would not violate section 7(d) and would allow the action agency to retain sufficient discretion and flexibility to modify its action to allow formulation and implementation of an appropriate reasonable and prudent alternative.

This action does not represent any irreversible or irretrievable commitment of resources with respect to the FMP that would affect the development or implementation of reasonable and prudent measures during the consultation period. NMFS has discretion to amend its Magnuson-Stevens Act and ESA regulations, and may do so at any time subject to the Administrative Procedure Act and other applicable laws. As a result, I have determined preliminarily that fishing activities conducted pursuant to this action is consistent with Section 7(d) of the ESA and will not affect endangered and threatened species or critical habitat in any manner beyond what has been considered in prior consultations on this fishery.

8.4 Marine Mammal Protection Act (MMPA)

The MMPA prohibits the "take" of marine mammals, with certain exceptions, in waters under U.S. jurisdiction and by U.S. citizens on the high seas. The MMPA requires consultation within NMFS if impacts on marine mammals are unavoidable. NMFS has reviewed the impacts of this action on marine

mammals and concluded that the management actions proposed are consistent with the provisions of the MMPA and would not alter existing measures to protect the species likely to inhabit the management unit of the Jonah Crab Plan. For further information on the potential impacts of the proposed management action, see Section 5.0.

8.5 Essential Fish Habitat (EFH)

Section 305(b) of the Magnuson-Stevens Act requires all federal agencies to consult with NMFS' Habitat Conservation Division on any future action that may adversely affect EFH. NMFS conducted an initial EFH consultation on February 28, 2018. At that time, it was concluded that the regulations would not adversely impact EFH for any federally-managed species (see below table).

Management measures identified, including minimum size, landing disposition, broodstock protections, incidental limits and definition, and reporting requirements are not expected to adversely impact EFH. Additional measures, including permitting authorize trap gear to be fished, which may have slight negative impacts on habitat.

Table 30. Management Authority for FMPs

Council/Management Authority	FMPs
New England Fishery Management Council (NEFMC)	Multispecies; Sea Scallop; Monkfish, Red Crab
Mid-Atlantic Fishery Management Council (MAFMC)	Summer Flounder, Scup, and Black Sea Bass; Squid, Atlantic Mackerel, and Butterfish; Surf Clam and Ocean Quahog
South Atlantic Fishery Management Council (SAFMC)	Coastal Migratory Pelagics; Red Drum; Golden Crab
NMFS	Atlantic Highly Migratory Species; Atlantic Billfishes

8.6 National Environmental Policy Act (NEPA)

NEPA provides a mechanism for identifying and evaluating the full spectrum of environmental issues associated with federal actions, and for considering a reasonable range of alternatives to avoid or minimize adverse environmental impacts. The Council on Environmental Quality (CEQ) has issued regulations specifying the requirements for NEPA documents (40 CFR 1500 – 1508) and NOAA's policy and procedures for NEPA are found in NOAA Administrative Order 216-6. All of those requirements are addressed in this document, as referenced below.

The required elements of an Environmental Impact Statement Assessment (EIS) are specified in 40 CFR 1502.10 and NAO 216-6 Section 5.04b.1. They are included in this document as follows:

- A Cover Sheet
- An Executive Summary
- A table of contents
- The purpose and need for this action - Section 2.2
- The alternatives that were considered – Section 3
- Affected environment – Section 4

- Environmental consequences, including cumulative effects – Section 5
- A list of preparers - Section 6
- The agencies and persons consulted on this action - Section 7
- An index
- Appendices (if any)

8.6.1 Public Scoping

We announced our intent to prepare and EIS for this Jonah crab action on October 13, 2016 (81 FR 70658). The scoping period extended from that date until November 14, 2016. Appendix 4 summarizes the scoping process, comments, and responses to those comments.

8.6.2 Areas of Controversy

This action was developed under the assumption that the action would be mildly controversial. Among measures recommended by the Commission, limiting access to the Jonah crab resource is expected to be the most controversial. In addition, landing disposition requirements, which regulate the claw-only fishery, are also expected to be mildly controversial. During the public comment period, we received one comment raising concern about large whale entanglements. Our best available information, however, suggests that the fishery is largely prosecuted by lobster permit holders using lobster traps who would be obligated to comply with our Atlantic Large Whale take protections. Nevertheless, the proposed rule would mandate large whale protections for all Jonah crab trap fishers, even those without a lobster permit.

8.6.3 Document Distribution

This document is available on the GARFO web page. Announcements of document availability will be made in the *Federal Register* and to the interested parties' mailing list. Copies were distributed to:

US Environmental Protection Agency
EIS Filing Section
Office of Federal Activities
Ariel Rios Building (South Oval Lobby)
Mail Code 2252-A
1200 Pennsylvania Avenue NW
Washington, DC 20460

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8.6.4 Opportunity for Public Comment

This action was developed between 2015 and 2018. The Commission conducted public scoping, including a written comment period and scoping hearing on the Jonah Crab Plan and Addenda I and II. In addition, opportunities for public comment were provided at Lobster Board meetings. We held a public comment period seeking comment on this action between October 13, 2016 and November 14, 2016.

Table 31. Public meetings related to the Jonah Crab Plan and its Addenda

Date	Action	Meeting Type	Location
2/4/2015	Jonah Crab Plan	ASMFC Winter	Alexandria, VA
5/4/2015	Jonah Crab Plan	ASMFC Spring	Alexandria, VA
6/30/2015	Jonah Crab Plan	ASMFC MD Hearing	Ocean Pines, MD
7/6/2015	Jonah Crab Plan	ASMFC ME Hearing	Portland, ME
7/7/2015	Jonah Crab Plan	ASMFC NH Hearing	Portsmouth, NH
7/9/2015	Jonah Crab Plan	ASMFC MA Hearing	New Bedford,
7/9/2015	Jonah Crab Plan	ASMFC RI Hearing	Narragansett, RI
8/4/2015	Jonah Crab Plan	ASMFC Summer	Alexandria, VA
11/2/2015	Addendum I	ASMFC Annual	St. Augustine, FL
2/2/2016	Addendum I	ASMFC Winter	Alexandria, VA
3/14/2016	Addendum I	ASMFC MA Hearing	New Bedford,
3/15/2016	Addendum I	ASMFC MA Hearing	Gloucester, MA
3/16/2016	Addendum I	ASMFC RI Hearing	Narragansett, RI
3/17/2016	Addendum I	ASMFC ME Hearing	Portland, ME
4/4/2016	Addendum I	ASMFC MD Hearing	Ocean City, MD
4/6/2016	Addendum I	ASMFC NY Hearing	East Setauket,
5/2/2016	Addenda I and II	ASFMC Spring Meeting	Alexandria, VA
8/4/2016	Addendum II	ASFMC Summer	Alexandria, VA
10/20/2016	NMFS	NMFS Scoping Hearing	Webinar
10/27/2016	Addendum II	ASMFC Annual	Bar Harbor, ME
12/5/2016	Addendum II	ASMFC NY Hearing	Riverhead, NY
12/6/2016	Addendum II	ASMFC NH Hearing	Portsmouth, NH
12/12/2016	Addendum II	ASMFC MA Hearing	Buzzards Bay,
12/13/2016	Addendum II	ASMFC ME Hearing	Portland, ME
12/14/2016	Addendum II	ASMFC CT Hearing	Old Lyme, CT
12/19/2016	Addendum II	ASMFC RI Hearing	Narragansett, RI
1/31/2017	Addendum II	ASMFC Winter	Alexandria, VA

8.7 Paperwork Reduction Act (PRA)

The purpose of the Paperwork Reduction Act is to reduce the paperwork burden on the public. The Director of the Office of Management and Budget (OMB) has the authority to manage information collection and record keeping requirements in order to reduce paperwork burdens. This authority encompasses the establishment of guidelines and policies and the approval of information collection

requests. The selected management actions in this EIS do contain new collection of information requirements subject to the PRA.

A paperwork reduction act analysis, including a revised Form 83i and supporting statement will be submitted to OMB along with the proposed rule for this action. The reporting requirements may be applicable to the permitting and reporting options. This action would create a new collection for the Jonah crab fishery. This action would require Jonah crab harvesters to request permits to continue their harvest of Jonah crabs, requires some if not all harvesters to report their landings through the federal vessel trip report, and requires all dealers to report landings. A paperwork reduction act analysis, including a revised Form 83i and supporting statement will identify the expected increase in the public reporting burden, by annual response hours, and an estimated annual cost to the public.

8.8 Coastal Zone Management Act (CZMA)

The principal objective of the CZMA is to encourage and assist states in developing coastal management programs, to coordinate state activities, and to safeguard regional and national interest in the coastal zone. Section 307(c) of the CZMA requires federal activity affecting the land or water uses or natural resources of a state's coastal zone to be consistent with that state's approved coastal management program, to the maximum extent practicable. On XXXX, **NMFS provided a copy of the proposed rule, the draft environmental assessment (if requested), and a consistency determination to the state coastal management agency in every state with a federally-approved coastal management program whose coastal uses or resources are affected by these Jonah crab management measures.** Each state has 60 days in which to agree or disagree with the determination regarding consistency with that state's approved coastal management program. If a state fails to respond within 60 days, the state's agreement will be presumed.

8.9 Information Quality Act (IQA)

8.9.1 Utility of Information Product

The document includes a description of the alternatives and the reasons for selecting the proposed management measures. The proposed measures are intended to meet the conservation and management goals of the Jonah Crab Plan, consistent with the ACA and the Magnuson-Stevens Act National Standards. This document utilizes the best available information to evaluate the potential impacts of the alternatives considered. The *Federal Register* notice that announces the availability of this draft EIS will be made available in printed publication and on the NMFS GARFO web site. This document provides metric conversions for all measurements.

The intended users of the information are individuals involved in the Jonah crab fishery, such as fishermen, vessel owners and operators, dealers, and processors. This draft EIS addresses measures for implementation in the Jonah crab fishery. The document is based on current information available and will be subject to public comment through proposed rulemaking as required under the Administrative Procedures Act.

The proposed rule will be made available to the public as a publication in the *Federal Register* and, the final EIS and final rule will also be made available in hard copy format and on the NMFS GARFO web site.

8.9.2 Integrity of Information Product

All electronic information disseminated by the NOAA adheres to the standards set out in Appendix 3, "Security of Automated Information Resources" OMB Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

8.9.3 Objectivity of Information Product

The draft EIS falls under the Natural Resource Plan category. In preparing the documents, NMFS must comply with the requirements of the Atlantic Coastal Act; the Regulatory Flexibility Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Data Quality Act, the National Standards of the Magnuson-Stevens Act, the National Environmental Policy Act (NEPA), Executive Order 13132 (Federalism), Executive Order 12866 (Regulatory Planning), and other applicable laws.

The document has been developed to comply with all applicable National Standards, including National Standard 2. National Standard 2 states that management measures shall be based upon the best scientific information available. Despite current data limitations as discussed in this document, the conservation and management measures proposed to be implemented are based upon the best scientific information available. This information includes NMFS and state landings data, permit data, and results of private studies. The specialists who worked with these data are familiar with the most recent analytical techniques and with the available data and information relevant to the Jonah crab fishery.

The proposed policy choices *(i.e.*, management measures) to be implemented are supported by the available scientific information, and, in cases where information was unavailable, proxy reference points are based on observed trends in the lobster fishery. The management measures are designed to meet the conservation maintain effort at existing levels, prevent expansion of the fishery, and therefore prevent overfishing while maintaining sustainable levels of fishing effort to ensure a minimal impact on fishing communities. The supporting materials and analyses used to develop the measures are contained in the document, and to some degree in previous environmental assessments as noted in this document.

The review process for this regulatory action involves the Northeast Fisheries Science Center, the Greater Atlantic Regional Fisheries Office, and NMFS headquarters. The Center's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, coastal migratory resources, population biology, and the social sciences. Review by Greater Atlantic Regional Fisheries Office staff is conducted by those with expertise in fisheries management and policy, habitat protection, protected species, and compliance with applicable law. Final approval and clearance of the document is conducted by staff at NMFS headquarters and the Department of Commerce.

8.10 Regulatory Flexibility Act (RFA)

The following sections contain analyses of the effect of the proposed action on small entities in accordance with Section 603(b) of the RFA.

8.10.1 Basis and Purpose for Rule

The need and purpose of the actions are set forth in Section 2.2 of this document and are incorporated herein by reference. A description of the action, the reason for consideration, and its legal basis are contained in Sections 2 and 3 of this draft EIS. The proposed management measures would affect small

entities engaged in several different aspects of the Jonah crab fishery. The vast majority of affected entities include Federal lobster permit holders, with emphasis on those fishing in Southern New England.

8.10.2 Description of the Reasons Why Action by NMFS is Being Considered

Recent data indicate that Jonah crab landings have increased dramatically in the past 15 years. To ensure that the stock is sustainably harvested, the Commission initiated the Interstate Fishery Management Plan for Jonah Crab, as well as Addenda I and II to the plan to implement coastwide regulations. The Commission recommended that federal government to implement measures consistent with its plan. To the extent practicable, we aim to implement regulations consistent with Commission recommendations, and those promulgated by our partner states.

8.10.3 The Objectives and Legal Basis for the Preferred Alternative

The objective of the proposed action is to begin sustainable management of the Jonah crab fishery in federal waters, recognizing that federal management occurs in consort with state management.

The purpose of the proposed measures is to manage the federal Jonah crab fishery in a manner consistent with:

- The Atlantic Coastal Act,
- the National Standards of the Magnuson-Stevens Act,
- the Jonah Crab Plan,
- states laws and regulations,
- and other applicable federal laws.

The legal basis for the proposed action is the Jonah Crab Plan and promulgating regulations at § 697.

8.10.4 Description and Estimate of the Number of Small Entities

The RFA requires agencies to assure that decision makers consider disproportionate and/or significant adverse economic impacts of their proposed regulations on small entities. The Regulatory Flexibility Act Analysis (RFAA) determines whether the proposed action would have a significant economic impact on a substantial number of small entities. This section provides an assessment and discussion of the potential economic impacts of the proposed action, as required of the RFA.

The initial regulatory flexibility analysis (IRFA) is designed to assess the impacts that various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize adverse impacts. Under the RFA, an agency does not need to conduct an IRFA or final regulatory flexibility analysis (FRFA) if a certification can be made that the proposed rule, if adopted, will not have a significant adverse economic impact on a substantial number of small entities.

The purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of the various alternatives contained in the proposed rulemaking and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the regulatory documents and applicable statutes.

The proposed action would implement regulations affecting commercial fishing activities (North American Industry Classification System (NAICS) code 11411), seafood dealers (NAICS code 424460), and operators of party/charter businesses (NAICS code 487210). Because each of these activities has their own size standard under the RFA consideration of the number of regulated entities and the potential economic impacts of the proposed action is discussed below for each NAICS code.

8.10.4.1 Commercial Fishing NAICS code 11411

The proposed action would implement a minimum size, limits on the retention of Jonah crab claws-only, and prohibit retention of egg-bearing females. Each of these measures would affect anyone with either a federal limited access trap or non-trap permit. However, while lobster trap harvesters would be allowed an unlimited amount of Jonah crab per trip, harvesters using non-trap gear would be subject to an incidental harvest limit per trip. For RFA purposes only, NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR § 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. The determination as to whether the entity is large or small is based on the average annual revenue for the three years from 2014 through 2016.

The entity definition used by the Social Sciences Branch uses only unique combinations of owners. That is, entities are combined if they have a shared owner. Section 3 of the Small Business Act (SBA) defines affiliation as: Affiliation may arise among two or more persons with an identity of interest. Individuals or firms that have identical or substantially identical business or economic interests (such as family members, individuals or firms with common investments, or firms that are economically dependent through contractual or other relationships) may be treated as one party with such interests aggregated (13 CFR 121.103(f)). Ownership information is included as part of the annual permit application required to renew any limited access permits or apply for any open access permits. Permit renewal does not apply to a person who does not currently own a fishing vessel, but who has owned a qualifying vessel that has sunk, been destroyed, or transferred to another person, must apply for and receive a “confirmation of history” (CPH) if the fishing and permit history of such vessel has been retained lawfully by the applicant. Issuance of a valid CPH preserves the eligibility of the applicant to apply for a permit for a replacement vessel based on the qualifying vessel's fishing and permit history at a subsequent time. Because CPH permits are not subject to annual renewal the ownership data based on the permits held does not contain information on CPH permits. As of January 2018, there were 421 federal lobster permits in CPH. If activated, these permits would be eligible to harvest Jonah crabs. As such, they would be considered a regulated entity but because there are no sales records or ownership information it is not possible to ascertain whether or not any given CPH permit is part of an affiliated ownership group.

Affiliated entities based on reported ownership information on the 2016 permit application were used to ascertain the number of affiliated regulated entities that were associated with at least one limited access lobster permit. During 2016 there were 2,377 limited access lobster permits included in the ownership data base, of which, 640 held only a non-trap permit, 1,597 held only a trap permit, and 140 held both a trap and a non-trap gear permit. After applying the principles of affiliation, the total number of regulated entities in 2016 was 2,026, of which, 2,018 had gross receipts from all fishing activity less than $11 million based on sales reported through the NMFS dealer data and 8 entities that had combined gross sales by all affiliated permitted vessels that exceeded $11 million. Note that the number of regulated entities is less than the number of permitted vessels because some affiliated ownership groups own more than one permit; although the overwhelming majority of ownership groups (1,847) are associated with only one limited access lobster permit. As previously noted in the draft environmental impact statement for this proposed action, the number of large entities may be under estimated to the extent that lobster sales to specific vessels may not be fully captured in NMFS dealer reports.

Table 32. Summary of average gross sales, number of regulated entities and lobster sales by entity size

	Number of Entities	Mean Gross Sales ($1,000's)	Standard Deviation ($1,000's)	Mean Lobster and Jonah Crab Sales ($1,000's)	Standard Deviation ($1,000's)
Large Entities	8	21,562	2,491		
Non-Participating Large Entities	4	21,729	346		
Participating Large Entities	4	21,395	1,567	6,984	10,185
Small Entities	2,018	387	775		
Non-Participating Small Entities	609	564	1,192		
Participating Small Entities	1,409	311	478	220	242

Average gross sales for the 8 large entities were $21.6 million (Table 32). Half of these large entities had no reported sales of either lobster or Jonah crab through the NMFS dealer data. Of the 4 large entities that did have reported lobster and/or Jonah crab sales through NMFS dealer data, gross sales of lobster/Jonah crab averaged nearly $7 million; accounting for 32.6 percent of gross sales from all species.

Average gross sales for the 2,018 small regulated entities were $387 thousand in 2016. On average, gross sales for the 609 small entities that did not have any reported sales from either lobster or Jonah crab was 82 percent higher than the 1,409 small entities that did report sales from lobster and/or Jonah crab. For these 1,409 small entities, earnings from lobster/Jonah crab averaged 71 percent of total gross receipts from all sources of commercial fishing activity.

The ownership database used to estimate the number of small and large commercial fishing affiliated entities is based on annual aggregated data that does not account for the differences the proposed action would have on limited access trap gear permits and limited access non-trap gear permits. The following provides a separate analysis of the number of regulated vessels that participate in the lobster trap and lobster non-trap fisheries. The potential economic impacts on these two gear sectors is also discussed separately.

8.10.4.1.1 Affected Regulated Trap Gear Entities

Dealer data are the primary source of data used to estimate gross receipts for purposes of size class determination. Although dealer data is the best available source of revenues earned from commercial fishing, it is prone to missing gear information, which is needed to estimate the number of affected trap gear entities. For this reason, vessel trip reports (VTRs) are used to estimate the number of affected participating lobster trap gear entities. As previously noted, a significant number of vessel owners possess only a limited access lobster permit and are not subject to mandatory reporting. For this reason, the analysis based on vessel owners that do possess at least one other permit for which VTRs are mandatory is representative of the fleet of limited access lobster trap permit holders.

The number of permitted limited access trap vessels that reported one or more lobster trap trips from 2014-2016 ranged from 400 in 2014 to 412 in 2016 (Table 33). None of these vessels relied exclusively on Jonah crab. About 62 percent of these vessels exclusively reported landing lobster while 38 percent of vessels reported landing both lobster and Jonah crab. In terms of lobster trap trips, 87 percent of VTR

records reported landing lobster with no Jonah crab. Less than 1 percent of trips reported landing Jonah crab and no lobster, and 12 percent to 13 percent of trips reported landing both lobster and Jonah crab.

Table 33. Summary of Lobster Trap Effort and Number of Affected Entities

	2014	2015	2016
Trips			
Lobster Only	86.7%	87.7%	87.1%
Jonah Crab Only	0.5%	0.4%	0.4%
Lobster and Jonah Crab	12.8%	11.9%	12.5%
Permits			
Lobster Only	252	251	258
Jonah Crab Only	0	0	0
Lobster and Jonah Crab	148	160	154

Since VTR data do not include price information, the vessels that reported trap gear landings were selected and merged with calendar year 2016 dealer data to ascertain the relative importance of lobster and Jonah crab in total fishing revenue. These vessels were further categorized according to the years in which Jonah crab were reported through dealer data as having been landed. This distinguishes between the relative importance of Jonah crab to gross receipts among vessels that landed Jonah crab in each year from that of vessels that did not.

Among vessels that reported landing both Jonah Crab and lobster on calendar year 2016, revenues from lobster represented an average of 73.1 percent of total commercial fishing receipts while the revenue share for Jonah crab averaged 14.4 percent of total fishing revenue (Table 34). However, the revenue shares of lobster and Jonah crab differed depending on the number of years of sustained participation in harvesting Jonah crab. For example, among vessels that did not report landing Jonah crab through dealer data during 2014 or 2015, Jonah crab was 5 percent of total commercial fishing revenue. The Jonah crab revenue share for vessels that reported Jonah crab revenue in 2014 and in 2016 but not in 2015 was 1 percent. By contrast, the importance of Jonah crab revenue increases with sustained participation as the average Jonah crab revenue share was 8.7 percent among vessels that landed Jonah crab in consecutive years 2015 and 2016 and increased to an average of 18.5 percent for vessels that landed Jonah crab in all year from 2014 to 2016.

Table 34. Summary of Calendar Year 2016 Revenue Shares for Lobster and Jonah Crab by Jonah Crab Participation Category

Participation Category	Revenue Share
All Permits	
Lobster Share	73.1%
Jonah Crab Share	14.4%
2016-only	
Lobster Share	78.9%
Jonah Crab Share	5.0%
2014 and 2016	
Lobster Share	99.0%
Jonah Crab Share	1.0%
2015 and 2016	
Lobster Share	75.5%
Jonah Crab Share	8.7%
2014, 2015, 2016	
Lobster Share	69.3%
Jonah Crab Share	18.5%

8.10.4.1.2 Economic impacts on regulated Trap Gear Entities

The proposed action would not impose any possession limits on limited access lobster trap vessels but would affect the quantity of Jonah crabs that would be harvestable by imposing a minimum size, restricting possession of egg-bearing females, and possibly affecting the ability to retain Jonah crab claws-only. The effect, however, is anticipated to be limited given that the market currently demands a Jonah crab that meets the minimum size requirements. As previously discussed, this minimum size also helps to ensure that egg-bearing females are not retained. There is no quantitative data on catch composition or disposition that would make a reliable quantitative estimate of the economic impacts of any of these measures possible. The analysis presented in Table 34 demonstrate that the economic impacts will differ among vessels with higher dependence on Jonah crab and will have relatively little impact on vessels that do not. However, it is also true that the vast majority of lobster permit holders are either dually permitted (i.e., issued both a federal and state permit) or otherwise subject to a state's lobster and Jonah crab regulations. Accordingly, most all federal permit holders will be required to comply with the proposed measures even if NMFS does not implement these measures. In other words, these federal permit holders will be obligated to comply with these measures and responsibilities attendant to their state permit regardless of whether these same measures are also required under their federal permit. These considerations aside, the following provides a qualitative evaluation of the potential short and longer-term economic impacts.

The economic impacts associated with a minimum size can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters. Affording protections to juvenile crabs may minimize a harvest's profits in the short term, but this potential reduction is expected to be slight due to current market demands. Restricting harvest to crabs that have had the

opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability.

The economic impacts associated with landing disposition requirements can be expected to be mixed. Harvesters would be able to retain, sell, and profit from the whole Jonah crabs and a varying amount of claws. Placing restrictions on the landings of claw could negatively impact some harvester's profitability, particularly in areas where the landing of claws is more prevalent. Allowing a regulated harvest could have positive impacts in the short term. In the longer term, restricting claw harvest would help to ensure a more stable long-term population, which would likely have positive impacts on a harvester future ability to catch and sell Jonah crabs. Allowing a larger, regulated claw harvest could, in the long term, threaten the sustainability of the Jonah crab stock, which would likely have negative impacts on a harvester future ability to catch and sell Jonah crabs.

The economic impacts associated with broodstock protection measures can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters. While returning egg-bearing crabs to the ocean when first caught may result in a small decrease of revenue in the short term, but this revenue is not lost, as the crab could be caught and retained after she extrudes her eggs. That short-term financial negative, however, must be balanced by the positive of returning a crab known to be successfully breeding, back to the sea to reproduce another year, potentially resulting in more harvestable Jonah crabs in the future. Therefore, restricting harvest to crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability.

8.10.4.1.2 Affected Regulated Non-Trap Gear Entities

As previously noted, the ownership data used to determine the number of affected entities is based on aggregated dealer data. Because the proposed action would affect limited access lobster non-trap permits, VTR data were used to determine the number of participating vessels that would be affected by the proposed action. The proposed action would impose the same size limit and prohibition on possession of egg-bearing female lobsters that would be imposed for trap-gear but would also include a possession limit that would be equal to 50 percent of the total weight of fish on-board not to exceed 1,000 Jonah crabs. Because the average weight of landed Jonah crabs is not known, the analysis was based on comparing the result of applying the incidental catch limit (50 percent of the total weight of kept catch) to the VTR reported landed catch of Jonah crabs.

During calendar years 2014-2016, the number of limited access lobster non-trap permit holders was 647 in 2014 and 660 in 2016 (Table 35). These vessels took a reported total of between 30 to 34 thousand trips each year. The distribution resulting from applying the incidental harvest definition for all of these trips is shown in Table 36. The median value of this distribution ranged from a high of 1,175 pounds in 2014 to a low of 1,046 pounds in 2015. Comparing the incidental harvest definition to the VTR reported weight of Jonah crab results in an estimated average number of affected trips of 145 trips ranging from a high of 180 trips in 2015 to a low of 115 trips in 2014. This is about 0.5 percent of the total number of trips taken by limited access lobster non-trap trip permitted vessels (Table 35). The total number of regulated entities that would be affected by at least one trip where harvested Jonah crabs would be constrained by the Jonah crab incidental harvest limit ranged from 11 to 15 vessels from 2014 to 2016.

Table 35. Affected Regulated Non-trap Permits

	2014	2015	2016
Number of Reporting Permits	647	659	660
Number of Affected Permits	11	15	12
Number of trips	30,865	31,192	33,891
Trips Landing Jonah Crab	502	608	413
Jonah Crab Above Limit	115	180	139

Table 36. Distribution of Affected Regulated Non-trap Permits

	2014	2015	2016
5th Percentile	51	55	68
25th Percentile	297	295	300
Median	1,175	1,046	1,130
75th Percentile	4,240	4,160	4,085
95th Percentile	19,084	17,862	17,858

8.10.4.1.2 Economic impacts on regulated Non-Trap Gear Entities

As was the case for the economic impacts of the proposed action measures for entities using trap gear to harvest Jonah crab, no data are available to provide a reliable estimate of economic impacts of the proposed action on entities than harvest Jonah crab using non-trap gear. The biological information presented in Section 4.1.1 provides information on various aspects related to the shell width of Jonah crabs but does not include any information on the average weight of harvested Jonah crab, which is minimally needed to estimate the impact of the possession limit on non-trap gear harvesters. The economic impacts associated with an incidental definition can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time, which would ultimately benefit harvesters and their communities. Implementing an incidental definition could result in a small loss of revenue to incidental harvesters; the impact is qualified as slight because incidental harvest is expected to be merely a fraction of targeted catch. In the long-term however, ensuring that incidental harvesters do not increase effort on Jonah crabs is likely to ensure the long-term sustainability of the population, and, therefore, all harvester's long-term profitability. The additional impacts of the minimum size and prohibition on possession of egg-bearing females would be qualitatively similar to that described in Section 8.10.4.1.2.

8.10.4.2 Seafood Dealer NAICS code 424460

The proposed action would require dealers purchasing Jonah crabs from Federal commercial harvesters to submit dealer reports on purchases of Jonah crab from harvesting vessels. The SBA size standard for seafood dealers is 100 employees.

8.10.4.2.1 Number of Regulated Seafood Dealers

NMFS requires a federal dealer permit to purchase seafood from a federally permitted commercial vessel. This also requires that dealers report all purchases of fish and/or shellfish from any vessel including state-waters only vessels. This means that any dealer issued a federal dealer permit would be regulated under the proposed action. However, since NMFS does not require reporting of the number of people employed by seafood dealers it is not possible to directly ascertain how many of these regulated entities are large

and how many are small. However, County Business Patterns (CBP) data are available from the U.S. Census Bureau that provides information by NAICS code on total employment, total number of establishments, and number of establishments by employment size class by State and county. Although, the CBP data cannot be linked to NMFS dealer permit data the employment size class distribution can be used to approximate the proportion of establishments that may employ 100 or more people. The most recent year CBP data were available from the Census Bureau was 2015 so NMFS dealer permit data for 2015 was also used to estimate the number of regulated entities.

During 2015, there were 750 federal dealer permits issued to dealers in Northeast region states ranging from a high of 221 dealer permits in Maine to a low of 6 dealer permits in Delaware (Table 37). According to 2015 CBP data, there were 803 dealer establishments in Greater Atlantic Region states that employed a total of 8,118 people. For Maine, New Hampshire, Massachusetts, and Rhode Island, the CBP number of establishments ranged from 52 percent to 66 percent lower than the number of federal permits issued to dealers in those states. By contrast, the number of CBP establishments was approximately equal to the number of federal permits in both Delaware and New Jersey but was substantially higher in all other states in the Mid-Atlantic region.

The number of CBP establishments by employment size class demonstrate that the overwhelming majority of establishments (796 of 803) employ fewer than 100 employees. In fact, 86 percent of seafood dealer establishments in Greater Atlantic Region states employ less than 19 people. This suggests that the seafood dealer sector is dominated by businesses that are considered small entities for purposes of the RFA.

Table 37. Number of Regulated Seafood Dealers and Employment Size Distribution for 2015

				CBP Number of Establishments by Employment Size Class						
State	Federal Permits	CBP Establishments	CBP Employment	1-4	5-9	10-19	20-49	50-99	100-249	250-499
ME	221	146	1123	89	28	13	13	2	1	0
NH	17	9	108	3	3	1	2	0	0	0
MA	204	129	1808	57	26	17	20	7	2	0
RI	51	28	182	13	7	8	0	0	0	0
CT	12	20	211	9	2	5	4	0	0	0
NY	100	275	2056	178	38	31	23	4	1	0
NJ	85	78	784	43	10	15	7	2	1	0
DE	6	6	54	4	0	1	1	0	0	0
NC	42	59	1187	27	10	10	8	3	0	1

8.10.4.2.2 Economic Impacts on Regulated Seafood Dealers

Due to the dealer reporting requirements that already include reporting of Jonah crab including mandatory reporting for federally permitted lobster dealers the proposed action would not change any of the dealer reporting requirements that already exist. Furthermore, the states have already implemented such requirements, little to no change is expected in the number of dealers that would require a federal dealer permit or the information that these dealers would need to submit.

8.10.4.3 Party/Charter NAICS code 487210

The proposed action would implement a prohibition on recreational possession of egg-bearing female Jonah crabs and would implement a 50-crab per person per day possession limit. Although these measures would apply to recreational Jonah crab catch, it would require that party/charter operators be held responsible for any violations of these measures when taking passengers for-hire. The most likely party-charter activity that would be affected is operators that offer dive trips for lobster. The small business size standard is $7.5 million.

8.10.4.3.1 Number of Regulated Party/Charter Entities

Since any given permit and its affiliated permits may earn revenue from both commercial and for-hire activities, for purposes of the RFA classification of each affiliated entity is based on the fishing activity (commercial or for-hire) that generates highest gross receipts. Based on the 2016 ownership data, there were 406 permits associated with a total of 359 affiliates. Of these affiliates, 328 (91 percent) were associated with only one permit. All 359 affiliated entities had gross sales below the small business size standard of $7.5 million. Average annual gross receipts for the 2014-2016 calendar years are shown in Table 38.

Table 38. Average gross receipts for 359 affiliated for hire small entities

	2014	2015	2016
Average Total Receipts	$143.9	$146.5	$156.3
Average For Hire Receipts	$142.9	$145.8	$155.1

8.10.4.3.2 Economic Impacts on Small Party/Charter Entities

In a general sense, the economic impacts associated with recreational broodstock protection measures can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time, which would ultimately benefit harvesters and their communities. Affording protections to actively reproducing crabs may limit a recreational harvester's personal enjoyment from the ability to fish for and retain some crabs, resulting in a negative impact. However, restricting harvest to crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term enjoyment.

The economic impacts associated with a recreational catch limit can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time, which would ultimately benefit harvesters and their communities. Any restriction set on the recreational catch of a species has the potential to limit a harvester's personal enjoyment from the ability to fish for and retain some crabs, resulting in a negative impact. However, such protections ensuring that recreational harvesters do not do not exceed approved limit will ensure the long-term sustainability of the population, and, therefore, all harvester's long-term enjoyment.

Ultimately the impact on party/charter operators depends on the extent to which either the prohibition on retaining egg-bearing female crabs or the harvest limit affects the demand for taking a party/charter trip. Jonah crab are most likely to be caught on party/charter trips that use dive gear. During calendar year 2014 to 2016, the total number of reported party/charter trips using dive gear ranged from a low of 37 trips in 2016 to a high 64 trips during 2015. Of these trips, Jonah crab were kept on a cumulative 3-year

total of 9 trips. Thus, the available data suggests that Jonah crab are infrequently landed on party/charter trips, which means that the proposed action would have relatively little impact on small party/charter entities.

8.10.5 Economic Impacts of the Proposed Rule on Small Entities

No absolute dollar or quantity threshold exists to establish criteria for significance of economic impacts. However, NMFS and Small Business Administration guidelines suggest that *disproportionality* and *profitability* as the primary drivers of significance. *Disproportionality* is calculated as the distribution of impacts over large and small entities. This is important to determine whether the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities. *Profitability* is the magnitude of these impacts. Because unknown vessel-level costs are not explicitly reported, vessel and affiliate profits are unknown and total revenues are used as a proxy for profitability. Significance of economic impacts depends on both the change in revenues and the concentration of those changes on entities classified as "small." A *substantial number* is not explicitly defined, but NMFS guidelines suggest a *de minimis* criteria, subject to the context of the fishery.

Available data are not sufficient to quantify the economic impacts of the proposed action measures for regulated commercial fishing entities or regulated party/charter small entities. In both of these case the short term impacts are expected to be adverse for small commercial fishing entities. The magnitude of these adverse impacts is uncertain and likely minimal given that management measures were selected to match market demands and cap effort at current levels. No adverse economic impacts on regulated seafood dealers are expected since the requirement to report Jonah crab landings creates no regulatory or new reporting burden that does not already exist. Nevertheless, because of the uncertainty in economic impacts on commercial fishing and party/charter small entities an IRFA has been prepared.

8.10.6 Alternatives which Minimize any Significant Economic Impact of Proposed Action on Small Entities

Due to the expected high rate of dual permitting and that the states are already compliant with these measures, the majority of federal vessels must already abide by these requirements, and therefore have already been impacted. For those vessels not dually permitted, several measures which regulate the harvest of Jonah crabs (minimum size, broodstock protections, etc.) can be expected to have a limited economic impact on permit holders because market preferences encompass these measures. Because the proposed regulations are consistent with Commission recommendations and current state regulations, alternative measures would likely create inconsistencies and regulatory disconnects with the states and would therefore, likely worsen potential economic impacts.

8.10.7 Reporting, Recordkeeping and Other Compliance Requirements

This action contains several new reporting and recordkeeping requirements that would involve costs to vessels and dealers intending to land or purchase Jonah crabs. Vessels would be required to obtain a permit that authorizes the retention and sale of Jonah crabs and may be required to report catch via the federal vessel trip report. Dealers wishing to purchase Jonah crabs would be required to obtain a federal Jonah crab permit and report their purchases weekly, as required for other federally managed species.

8.10.8 Duplication, Overlap or Conflict with other Federal Rules

This action does not duplicate, overlap, or conflict with any other federal laws.

8.11 Executive Order 12866

The purpose of E.O 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be "significant." Section 8.11 of this document represents the Regulatory Impact Review (RIR), which includes an assessment of the costs and benefits of the Proposed Action in accordance with the guidelines established by E.O. 12866. The analysis included in the RIR shows that this action is not a "significant regulatory action" because it will not affect in a material way the economy or a sector of the economy. 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.
>
> (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.
>
> (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.

A more detailed discussion of economic impact is provided in Section 5. The discussion to follow provides a summary of those findings.

8.11.1 Objectives

The objective of the preferred alternatives is to manage the Jonah crab fishery in a manner that maximizes resource sustainability, recognizing that federal management occurs in consort with state management. To achieve this purpose, this draft EIS analyzes recently-approved state management measures to address achieve similar results for the Jonah crab fishery, as approved by the Commission in the Jonah crab Plan and Addenda I and II.

8.11.2 Description

A description of the entities affected by this action, specifically the stakeholders of the Jonah crab resource, is provided in Section 4.5 of this document.

8.11.3 Problem Statement

The need and purpose of the actions analyzed in this draft EIS are set forth in Section 2.2 of this document and are incorporated herein by reference.

8.11.4 Analysis of Alternatives

This section analyzes each proposed alternative of this action as mandated by EO 12866. The focus is on the expected impacts of each proposed measure. Much of this information is captured already in the detailed human communities impacts analyses of Section 5 of this document. This RIR will summarize and highlight the major findings of the economic and social impacts analysis provided in Section 5 of this document, as mandated by EO 12866.

When assessing net benefits and costs of the regulations, it is important to note that the analysis focuses on producer surplus only, namely the impacted fishing businesses. Consumer surplus is not expected to be affected by any of the regulatory changes proposed in this, given the large supply of domestic and foreign seafood imports. It is also important to note that much of the analysis included in the RIR is qualitative given the nature of the proposed regulation, available data, and uncertainty of outcomes.

8.11.4.1 Commercial Permitting

The economic impacts associated with permitting Jonah crab harvesters are varied and difficult to quantify, but can be expected to be slightly negative in the short term, but overall positive in the long term because the measures are expected to improve stock conditions over time, which would ultimately benefit harvesters and their communities. It is expected to cost potential permit holders 30 minutes to complete an application and find and submit the necessary supporting documentation. Further, the cost of copying and mailing these materials is estimated at no more than $2 per application. Once qualified, annual costs associated with permit renew are estimated at 45 minutes to complete an initial vessel application and approximately 30 minutes to complete a permit renewal application. Costs associated with these applications result from mailing and are estimated at approximately 50 cents. In the long term, approving a permitting program minimizes the risk that the stock could be overfished in the future. This could ultimately ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability.

8.11.4.2 Commercial Minimum Size

The economic impacts associated with a minimum size are varied and difficult to quantify, but can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters and their communities. Affording protections to juvenile crabs may minimize a harvest's profits in the short term, but this potential reduction is expected to be slight due to current market demands. Restricting harvest to crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability. Put another way, a crab below the minimum size are not lost to the fishery; they add to the spawning stock biomass and further, would be legally catchable the next year.

8.11.4.3 Commercial Landing Disposition

The economic impacts associated with landing disposition requirements are varied and difficult to quantify, but can be expected to be mixed. Under this alternative, harvesters would be able to retain, sell, and profit from the whole Jonah crabs and a varying amount of claws. Placing restrictions on the landings of claw could negatively impact some harvester's profitability, particularly in areas where the landing of claws is more prevalent. Allowing a regulated harvest could have positive impacts in the short term. In the longer term, restricting claw harvest would help to ensure a more stable long-term population, which would likely have positive impacts on a harvester future ability to catch and sell Jonah crabs. Allowing a larger, regulated claw harvest could, in the long term, threaten the sustainability of the Jonah crab stock, which would likely have negative impacts on a harvester future ability to catch and sell Jonah crabs/

8.11.4.4 Commercial Broodstock Protection

The economic impacts associated with broodstock protection measures are varied and difficult to quantify, but can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters and their communities. Affording protections to actively reproducing crabs may minimize a harvest's profits in the short term. However, restricting harvest to crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term profitability.

8.11.4.5 Commercial Incidental Definition

The economic impacts associated with an incidental definition are varied and difficult to quantify, but can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters and their communities. Implementing an incidental definition could result in a small loss of revenue to incidental harvesters; the impact is qualified as slight because incidental harvest is expected to be merely a fraction of targeted catch. In the long-term however, ensuring that incidental harvesters do not increase effort on Jonah crabs is likely to ensure the long-term sustainability of the population, and, therefore, all harvester's long-term profitability.

8.11.4.6 Commercial Incidental Limits

The economic impacts associated with incidental trip limits are varied and difficult to quantify, but can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters and their communities. Implementing incidental catch limits could result in a small loss of revenue to incidental harvesters; the impact is qualified as slight because incidental harvest is expected to be merely a fraction of targeted catch. In the long-term however, ensuring that incidental harvesters do not increase effort on Jonah crabs is likely to ensure the long-term sustainability of the population, and, therefore, all harvester's long-term profitability.

8.11.4.7 Commercial Harvester Reporting

The economic impacts associated with dealer permitting and reporting requirements are varied and difficult to quantify, but can be expected to have no impact. While the lobster fishery currently does not have mandatory federal vessel trip reporting requirements, a large subset of lobster vessels fishing in Southern New England have other permits that require the completion of trip reports. Reporting requirements for these harvesters include all species retained and discarded. Because the majority of Jonah crab landings, at present, are generated from Southern New England where reporting rates are higher, no impacts are expected to result from mandatory harvester reporting on Jonah crab harvesters.

8.11.4.8 Commercial Dealer Permitting and Reporting

The economic impacts associated with dealer permitting and reporting requirements are varied and difficult to quantify, but can be expected to have no impact. Due to the overlap with the lobster fishery, that already has mandatory dealer permitting and reporting requirements and the fact that the states have already implemented such requirements, little to no change is expected in the number of dealers that would require a federal dealer permit or the information that these dealers would need to submit.

8.11.4.9 Recreational Broodstock Protection

The economic impacts associated with recreational broodstock protection measures are varied and difficult to quantify, but can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters and their communities. Affording protections to actively reproducing crabs may limit a recreational harvester's personal enjoyment from the ability to fish for and retain some crabs, resulting in a negative impact. However, restricting harvest to crabs that have had the opportunity to reproduce is likely to ensure the long-term sustainability of the population, and, therefore, a harvester's long-term enjoyment.

8.11.4.10 Recreational Catch Limits

The economic impacts associated with a recreational catch limit is varied and difficult to quantify, but can be expected to slight negative in the short term, but overall slight positive in the long term given that the measures are expected to maintain sustainable stock conditions over time which would ultimately benefit harvesters and their communities. Any restriction set on the recreational catch of a species has the potential to limit a harvester's personal enjoyment from the ability to fish for and retain some crabs, resulting in a negative impact. However, such protections ensuring that recreational harvesters do not do not exceed approved limit will ensure the long-term sustainability of the population, and, therefore, all harvester's long-term enjoyment.

8.11.4.11 No Action

This option will maintain the status quo and would be inconsistent with the measures taken by the states as mandated under the Commission's Plan. Federal permit holders with state licenses would be required to abide by the more restrictive state regulations but that would be dependent upon whether the states have complied with the Plan and have implemented and are enforcing the measures. Despite the most restrictive requirement, the inconsistency between the state and federal regulations would likely cause confusion for harvesters and enforcement, resulting in an ineffective management program. The inconsistency could compromise the effectiveness of the Commission's measures in ensuring the sustainability of the Jonah crab fishery.

8.11.5 Determination of Significance

The Preferred Alternatives are not predicted to have an adverse impact on fishing vessels, purchasers of seafood products, ports, recreational anglers, and operators of party/charter businesses in excess of $100 million. For comparison, the value for Jonah crab fishery peaked at approximately $13 million in 2014. Although the relative contribution of the EEZ component has varied over time, it has increased from approximately 6.5 million to over 13 million pounds in recent years. This means that in terms of value the EEZ share of value is likely higher than the landings share. Nevertheless, the combined estimated impact of proposed federal action is expected to be far less than $100 million on an annual basis and would not be considered a significant action for purposes of E.O. 12866.

8.14 Executive Order 13211

E.O. 13211, which became effective on May 18, 2001, addresses "actions concerning regulations that significantly affect Energy supply, distribution, or use". To the extent permitted by law, an agency is obligated to prepare a Statement of Energy Effects for those matters identified as a significant energy

action. According to E.O. 13211, "significant energy action" means "any action by an agency that promulgates or is expected to lead to the promulgation of a final rule or regulation: (1) That is a significant regulatory action under Executive Order 12866 or any successor order, and; (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy. Based on these criteria, the proposed regulatory actions identified in this draft EIS do not require a Statement of Energy Effects, since these regulatory actions are not likely to have a significant adverse effect on the supply, distribution, or use of energy.

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