Environmental Assessment –Regulatory Impact Review – Final Regulatory Flexibility Analysis

To Implement Management Measures for the American Lobster Fishery

FEDERAL AMERICAN LOBSTER MANAGEMENT

in the Exclusive Economic Zone

based upon management measures specified in the

INTERSTATE FISHERY MANAGEMENT PLAN

FOR AMERICAN LOBSTER

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NOAA FISHERIES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

December 2014

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List of Acronyms

ACRONYM	DEFINITION
ACA	Atlantic Coastal Act (Short for ACFCMA)
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
ALWTRP	Atlantic Large Whale Take Reduction Plan
ASMFC	Atlantic States Marine Fisheries Commission
BA	Biological Assessment
BO	Biological Opinion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CL	Carapace Length
CPUE	Catch Per Unit Effort
CV	Coefficient of Variation
CZMA	Coastal Zone Management Act
DAS	Days-at-Sea
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
GARFO	Great Atlantic Regional Fisheries Office
GBK	Georges Bank
GOM	Gulf of Maine
ISFMP	Interstate Fishery Management Plan
ITT	Individual Transferable Trap
IUCN	International World Conservation Union
IWC	International Whaling Commission
LCMA	Lobster Conservation Management Area
LCMT	Lobster Conservation Management Team
LobsTAH	Lobster Trap Allocation History
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
Mt	Metric Ton
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
NOI	Notice of Intent
OCC	Outer Cape Cod
OCS	Outer Continental Shelf
PBR	Potential Biological Removal
SNE	Southern New England
STSSN	Sea Turtle Stranding and Salvage Network
USFWS	United States Fish and Wildlife Service
VTR	Vessel Trip Report
YONAH	Years of the North Atlantic Humpback

1.0 Introduction

1.1 Atlantic Coastal Act and Atlantic States Marine Fisheries Commission Management Measures

From Maine through North Carolina, American lobsters are managed under dual state and Federal regulatory authorities, whereby individual states manage the resource within their state waters (0-to-3 nautical miles from the shoreline) and 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). Until the late 1990s, Federal authority to regulate the lobster fishery was controlled by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)[1] and Federal management measures were implemented by the National Marine Fisheries Service (NMFS) through a Fishery Management Plan (FMP) developed by the New England Fishery Management Council[2] and approved by the Federal government.

This began to change in 1993, when Congress passed the Atlantic Coastal Fisheries Cooperative Management Act (Atlantic Coastal Act or Act)[3] facilitating a state-oriented fishery management structure for American lobster and, in practical terms, strengthening the role of an organization known as the Atlantic States Marine Fisheries Commission[4] in the development of management measures for the resource. Since passage of the first Atlantic Coastal Act American lobster regulations in 1999, management measures deemed necessary for the protection of the resource are advanced by the Commission through the use of amendments and addenda to the existing Interstate Fishery Management Plan (ISFMP) for American lobster. The Commission prepares these 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 implement and enforce them. In turn, under the Act, the Federal government is asked to implement management measures for the American lobster fishery that are consistent with and supportive of the actions of the Commission.

Congress's reasons for changing Federal lobster management were straightforward: since approximately 80% of the fishery occurs in state waters, NMFS could not ensure that the Federal FMP, which covered

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[1] 16 U.S.C. §§ 1801-1884, (MSA 2007).

[2] The fishery management council system was established by Congress under the Magnuson-Stevens Fishery Conservation and Management Act by Congress in 1976 (originally called the Fishery Conservation and Management Act) for the purpose of managing fisheries in a newly recognized exclusive economic zone (EEZ) between 3 and 200 miles offshore of the US coastline. Under the Act, eight regional fishery management councils serve as decision-making bodies that develop and recommend specific management measures in the form of fishery management plans, subject to approval and implementation by NMFS.

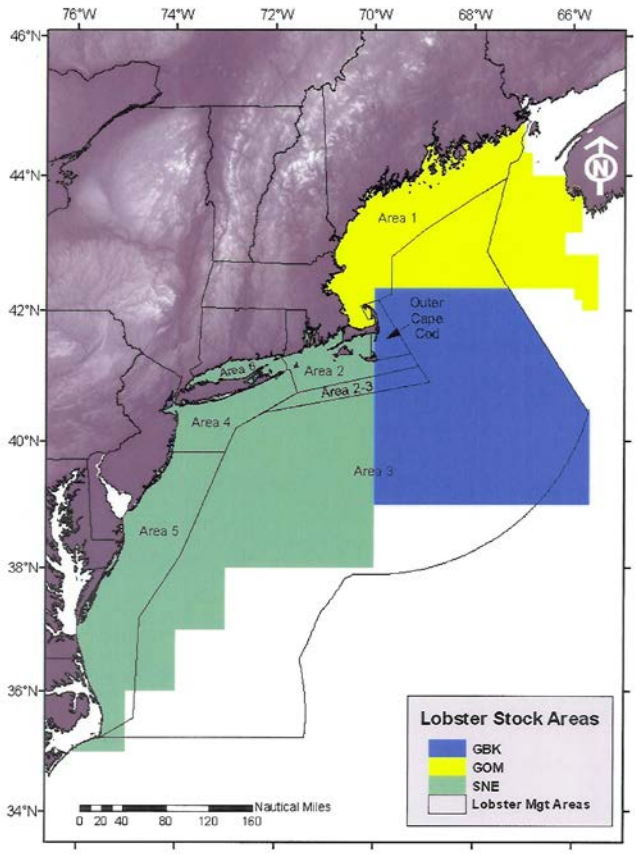
[3] 16 U.S.C. 5101-5109; Title VIII of Pub. L. 103-206, as amended, (ACFCMA 1993).

[4] 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. In a legal sense, the Atlantic Coastal Act did not confer upon the Commission any new authority over state and Federal lobster fishery management. In practical terms, however, that Act provides a means by which states that do not implement necessary management measures approved by the Commission may be subject to a Federal moratorium on fishing activities if, after a deliberative process, the Federal Government determines that the measures are necessary to the conservation of the fishery in question..

only Federal waters, could accomplish the requisite management objectives under the Magnuson-Stevens Act to prevent overfishing. What was needed, and what the Atlantic Coastal Act provided, was a regulatory structure that more realistically reflected the joint state-Federal nature of the resource and the need for cooperative and coordinated management. Under this regime, Federal management of the American lobster fishery thus is largely, though not exclusively, influenced by the management recommendations of the Commission.

One of the most important changes implemented under this new regime was the establishment of seven Lobster Conservation Management Areas (LCMAs or Areas): Area 1 - Inshore Gulf of Maine (GOM); Area 2 - Inshore Southern New England (SNE); Area 3 - Offshore waters; Area 4 - Inshore Northern Mid-Atlantic; Area 5 - Inshore Southern Mid-Atlantic; Area 6 - New York and Connecticut State Waters (primarily Long Island Sound); and Outer Cape Cod (OCC). All state and Federal management efforts since 1997 have been based on this LCMA-focused management structure.

Figure 1: American Lobster Management and Stock Areas[5]



[5] See Stock Assessment Report No. 09-01 (Supplement) of the Atlantic States Marine Fisheries Commission, *"American Lobster Stock Assessment Report for Peer Review,"* 2009, www.asmfc.org, (ASMFC 2009a).

1.2 ASMFC Measures

NMFS has prepared this environmental assessment (EA) to address a number of management measures approved by the Commission for the American lobster fishery in Addenda XVII and XVIII to Amendment 3 to the ISFMP. Through these measures, the Commission sought to address a recruitment failure in the SNE American lobster stock, reduce exploitation of the stock by 10 percent and latent fishing effort, and scale the size of the SNE American lobster fishery to the stock. Consistent with the Atlantic Coastal Act, the Commission has forwarded these measures to NMFS, with a recommendation that Federal regulations to support these measures be promulgated. More specifically, the Commission's recommendations include the following:

Addendum XVII

- Area 2: Mandatory v-notching of egg-bearing female lobster
- Area 3: Minimum carapace size increase to 3 17/32 inches
- Area 4: Mandatory v-notching of egg-bearing female lobster, annual seasonal closure from February 1 through March 31
- Area 5: Mandatory v-notching of egg-bearing female lobster, annual seasonal closure from February 1 through March 31

Addendum XVII also included a seasonal closure for Area 6 (Long Island Sound) from September 8 through November 28. As Area 6 falls entirely within state waters, we are not expected to issue complementary regulations for this Area.

Addendum XVIII

- Area 2 trap allocations reductions: 25 percent reduction the first year, and the by 5 percent each year following over a 5-year period.
- Area 3 trap allocation reductions: 5 percent reduction annually over a consecutive 5-year period.

1.3 Status of the American Lobster Fishery

American lobster (*Homarus americanus*) supports one of the most valuable commercial fisheries in the Northeast United States, with an annual estimated landings reaching near record high levels at 126 million lbs. (57.3 mt), with revenue in excess of $423 million in 2011 (NMFS, 2012). The U.S. lobster resource occurs in continental shelf waters from Maine to North Carolina[6]. A recent peer-reviewed stock assessment for American lobster, prepared in 2005 and published by the Commission in 2006, identified three new biological stock units, delineated primarily on the basis of regional differences in life history parameters, such as lobster distribution and abundance, patterns of migration, location of spawners, and

[6] In addition to American lobster, the United States also has a spiny lobster fishery, which makes up a small percentage of the total U.S. landings. For purposes of this EA, however, it is assumed that total U.S. landings are composed exclusively of American lobster.

the dispersal and transport of larvae. These stock units are the Gulf of Maine (GOM), Georges Bank (GBK), and Southern New England (SNE).[7]

The U.S. lobster fishery is conducted in each of the three stock units -- GOM, GBK, and SNE. While each area has an inshore and offshore component to the fishery, GOM and SNE areas are predominantly inshore fisheries and the GBK area is predominantly an offshore fishery. The GOM stock is primarily fished by fishermen from the states of Maine, Massachusetts, and New Hampshire. The GBK stock is primarily fished by fishermen from Massachusetts and Rhode Island. The SNE stock is primarily fished by fishermen from the states of Connecticut, Massachusetts, New York, and Rhode Island, with smaller contributions from the states of New Jersey, Delaware and Maryland.

Through the late 1970s, total landings for the U.S. lobster fishery were relatively constant, at 14,000 mt. Since then, landings have more than doubled, reaching 37-38,000 mt in 1997-98 and then dropping to 33,000 mt in 2003. These landings are primarily composed of catch from nearshore waters (0 to 12 nautical miles).

GOM supports the largest fishery, constituting 76 percent of the U.S. landings from 1981 to 2007, and 87 percent since 2002. Landings in the GOM were stable between 1981 and 1989, averaging 14,600 mt, then increased dramatically from 1990 (19,200 mt) to 2006 (37,300 mt). Landings averaged 33,000 mt from 2000-2007.

GBK constitutes the smallest portion of the U.S. fishery, averaging 5 percent of the landings from 1981 to 2007. From 1981-2002, landings from the GBK fishery remained stable (averaging 1,300 mt). Landings nearly doubled from 2003-2007, reaching a high of 2,400 mt in 2005, and they have remained high since.

SNE has the second largest fishery, accounting for 19 percent of the U.S. landings between 1981 and 2007. Landings increased sharply from the early 1980s to the late 1990s, reaching a time series high of 9,900 mt in 1997. Landings remained near the time series high until 1999, when the fishery experienced dramatic declines in landings. From 2000 to 2007, landings from the SNE accounted for only 9 percent of the U.S. total for American Lobster, reaching a time series low of 6 percent in 2004. The most recent 2009 Stock Assessment Report concluded that "(t)he American lobster fishery resource presents a mixed picture, with stable abundance for much of the GOM stock, increasing abundance for the GBK stock, and decreased abundance and recruitment yet continued high fishing mortality for the SNE stock."[8]

More specifically, the 2009 stock assessment evaluated the status of the American lobster fishery in terms of stock abundance, fishing mortality, and fishery performance (i.e., fishing effort, as measured by number of traps, landings, mean length of catch, and gross CPUE), measuring these parameters against recommended reference points that include median reference abundance and median exploitation rate thresholds for sexes combined over the fixed time period of 1982-2003 in GOM and GBK and 1984-2003 in SNE. Conclusions about stock status would be determined by comparing the average reference

[7] These units replace previously delineated boundaries, which were the GOM, Georges Bank and Southern New England Outer Shelf (GBS), and South of Cape Cod to Long Island Sound (SCCLIS) stock areas.

[8] See Stock Assessment Report No. 09-01 (Supplement) of the Atlantic States Marine Fisheries Commission, *"American Lobster Stock Assessment Report for Peer Review,"* 2009, www.asmfc.org, (ASMFC 2009a).

abundance and average exploitation rate for sexes combined during the most recent 3 years to stock-specific threshold values.

Based on these reference points, "overfishing" would occur if the average effective exploitation rate during 2005-2007 were higher than the stock-specific median threshold. A stock would be "depleted" if average reference abundance during 2005-2007 fell below the median threshold level. In either of these cases, corrective management action should be implemented. The results of this evaluation are as follows:

Table 1: 2009 Stock Assessment Results for American Lobster by Stock Area[9]

Variable	GOM	GBK	SNE
Effective exploitation			
Effective exploitation threshold	0.49	0.51	0.44
Recent effective exploitation 2005-2007	0.48	0.3	0.32
Effective exploitation below threshold?	YES	YES	YES
Reference abundance			
Abundance threshold	72,030,500	1,912,355	25,372,700
Recent abundance 2005-2007	116,077,000	4,698,670	14,676,700
Abundance above threshold?	YES	YES	NO

The GOM stock is in favorable condition based on the recommended reference points. The stock is above the reference abundance threshold and slightly below the effective exploitation threshold. *Therefore the GOM lobster stock is not depleted and overfishing is not occurring.*

The GBK stock is in a favorable condition based on the recommended reference points. The stock is above the reference abundance threshold and below the effective exploitation threshold. *Therefore the GBK lobster stock is not depleted and overfishing is not occurring.*

The SNE stock is in poor condition based on the recommended reference points. The stock is below the reference abundance threshold and below the effective exploitation threshold. Model runs that incorporated increasing trends (50 percent-100 percent) in natural mortality (*M*) also predicted reference abundance below the median. *Therefore, the SNE lobster stock is depleted but overfishing is not occurring.*

1.3.1 Declaration of and Response to a Recruitment Failure in the Southern New England Lobster Stock

At the Commission's May 2010 Lobster Board meeting, the Commission's Lobster Technical Committee (TC) presented a report on the status of the SNE lobster stock. The report, entitled Recruitment Failure in the Southern New England Lobster Stock (ASMFC, 2010, APPENDIX 1), indicated that the SNE stock is critically depleted and well below the minimum threshold abundance. The report was based on the TC

[9] Ibid.

review of new data from trawl surveys, sea sampling, ventless trap surveys, and young of the year (YOY) indices, which became available after the most recent stock assessment in 2009. That previous assessment concluded that the stock's reproductive capability and abundance continued in a persistent downward trend, with abundance nearing the lowest levels since the early 1980's. In the report to the Commission's Lobster Board, the TC declared that the SNE stock is experiencing recruitment failure due to a combination of environmental factors and continued fishing mortality, which are keeping the stock from rebuilding.

In its recommendations for a management response to the poor stock conditions, the TC's report suggested a five-year moratorium on lobster harvest in the SNE stock area. Although the stock is not overfished and overfishing is not occurring, the TC indicated that even low levels of fishing mortality would exacerbate poor stock conditions and hamper stock rebuilding. The report cited "overwhelming environmental and biological" changes, along with fishing mortality, have a negative impact on the stock's chances of rebuilding. Because a moratorium would halt the collection of fishery-dependent data needed for stock assessments and monitoring, the TC recommended that fishery-independent data collection programs such as trawl surveys and YOY and larval sampling, be intensified during the fishery closure to allow for ample data to monitor the conditions of the stock.

The May 2010 meeting, when the Board first learned of the TC's report on the SNE stock conditions, was the same meeting that NMFS debuted the draft version of an EIS, requesting comments on the alternatives analyzed for a limited entry and Individual Transferable Trap (ITT) Program for the SNE fishery. The Board was so concerned about the TC's report and how to address the dire findings; it requested that NMFS delay any action on the pending limited access and the ITT Program until such time that the Board has sufficiently addressed the poor stock conditions. During the months of May and June 2010, NMFS held public hearings on that draft EIS and solicited comments but heeded the Board's advice to wait for further action on the stock condition before filing a proposed rule.

In July 2010, the Commission held a special meeting of the Board in Rhode Island for the express purpose of consideration of a draft addendum to the Commission's Plan to address the SNE recruitment failure with management options ranging from no action to a fishery moratorium. The meeting was widely attended by members of the lobster industry as well as the media and congressional delegations. The public was given an opportunity to comment on the issue and NMFS provided a summary of how fishery disaster assistance programs work should the states endeavor to seek it from the Federal Government.

In November 2010, the Lobster Board received a report from the Center for Independent Experts (CIE), which served to peer review the TC's previous findings. The report, entitled External Independent Peer Review: Recruitment Failure in Southern New England Lobster Stock, (CIE, October 2010 , APPENDIX 2) largely concurred with the Techincal Committee's factual findings. During this meeting, the TC discussed numerous potential management options, including closed seasons, closed areas, quota-based output controls, trap limits, male-only fisheries, v-notch programs, and changes to the minimum and maximum gauge size. At the meeting's conclusion, the Board considered this advice and then tasked its Plan Development Team to draft management options for Board consideration that would help achieve a reduction in stock exploitation at a 50 percent level and 75 percent level.

The Plan Development Team offered numerous options and in August 2011, the Board incorporated many of these measures into a draft addendum for public comment (draft Addendum XVII). The draft

addendum provides a suite of options that could be used to develop a plan specific to each SNE lobster management area (Areas 2, 3, 4, 5, and 6) to achieve the mandated exploitation reductions by 2013, such as changes to the minimum and maximum carapace sizes, closed seasons, v-notching, and trap reductions.

During the Addendum XVII deliberations, however, the Board thought it best to approach the SNE stock problem in a two-phase approach. The first phase would involve achieving a 10% reduction in exploitation by July 2013. The second phase would be to further reduce exploitation by cutting traps so that the fishery was better scaled to the size of the resource. Part of the rationale for a two phase approach was that the Board wanted to include trap reductions as part of the plan to reduce exploitation, but it could not do so until the Federal Government completed its Limited Access/Trap Transferablity Rulemaking, which was then underway (78 FR 35217; June 12, 2013). While the Board was willing to hold off trap reductions until the Federal Government completed its rulemaking, it noted that broodstock measures did not have to wait for the Federal rule. Consequently, the Board adopted a two phase approach where the first phase could be implemented more immediately without being impacted by the Federal rulemaking. This first phase remained in Addendum XVII, which was formally approved in February 2012. The second phase, which was originally included in earlier versions of Addendum XVII, now became its own addendum (Addendum XVIII) and was ultimately approved seven months later in August 2012.

1.4 Regulatory Setting for American Lobster

From a Federal perspective, lobster management has an unusual construct in that management actions largely emerge through a state-initiated Commission process in which Federal managers act in coordination with the Commission, rather than through unilateral action such as is seen in many other areas of fishery management. On the one hand, this construct is a practical response to the state/Federal jurisdictional realities behind lobster management, since lobster harvests occur primarily within state waters (see also discussion in Section 1.0); on the other hand, it 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, NMFS may reject that option because it is deemed to be inconsistent with the National Standards as articulated under the MSA. Furthermore, as discussed in Chapter 1, when implementing regulations, it is the obligation of Federal lobster managers to ensure that those regulations are compatible with the Commission's ISFMP for lobster. Because management interests can and often do diverge however, not only between the states and the Federal lobster managers but also between the states themselves, finding compatible regulatory approaches to lobster management can be challenging. These challenges are explained in greater detail below.

The Commission's current Lobster Interstate Management Plan was first adopted in December 1997 under Amendment 3 to the ISFMP (see also discussion in Section 1). Amendment 3 established the framework for area management, which in addition to establishing the seven LCMAs, also established industry-based teams, known as Lobster Conservation Management Teams (LCMTs), that were encouraged to develop management programs to suit the needs of the LCMAs while meeting the stock rebuilding objectives established in the ISFMP.

With the approval of Amendment 3, a relatively straightforward approach to lobster management was envisioned: Scientists assess the stock; industry committees recommend preliminary measures to the Lobster Board for consideration addressing assessment findings and the Board, in turn, forwards

appropriate LCMT proposals to TCs to review the industry-proposed measures for scientific integrity. Next, the Commission's Lobster Board synthesizes this information into the Lobster Plan, votes to approve it, then sends it to the states and federal government so that they can implement compatible LCMA-specific regulations. In short, the Commission identifies a singular Plan that the states and NMFS enact in a unified, compatible, and consistent fashion. While this approach may seem straightforward, in reality lobster management is far more nuanced and complicated.

Since the passage of Amendment 3 in 1997, lobster management has evolved into an increasingly complex regulatory environment. Individual states (through the LCMTs, via the Commission) have advanced numerous management measures, some of which are out-of-sync with each other, while the Federal government has struggled to promote regulatory consistency between state and Federal management efforts through its own rule-making processes in response to Commission actions. This, combined with the fragmented nature of state/Federal lobster management and the pace at which new management measures continue to be advanced through the Commission process, has made the perceived need for consistency -- and inability to achieve it -- more acute. In response, NMFS has placed strong emphasis on improving coordination between itself and the states via the Commission. While in many ways there is more coordination than ever as a result, these efforts have so far been unable to keep pace with the myriad of management actions that continue to be advanced. 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 eleven (11) sovereign states and the Federal Government, which is itself sovereign. Each sovereign government has its own laws and authorities that govern what it can do and how it can do it. Further, the Lobster 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 lobster action until the Commission process ends, which in combination with existing detailed federal rulemaking requirements, causes a lag time between when the states create their regulations and when NMFS can create its regulations.[10] Accordingly, while there may be one singular Commission Lobster Plan, in reality there are twelve independent and separate sets of regulations implementing that Plan – one for each state and federal government.[11] In this environment, the

[10] 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. For example, the first Commission transferability program was but one paragraph in Addendum III (Outer Cape Cod – 2002). It became far more evolved in Addendum IV (Area 3 – 2003) and many critical details remained unresolved until the passage of Addendum XII (Transferability – 2008). Another example is the Area 2 limited access plan that was passed in Addendum III (2002), withdrawn in Addendum VI (2005), re-approved in Addendum VII (2006), with foundational details being added in Addendum XII (2008).

[11] In fact, given that the twelve jurisdictions enact regulations for each of the seven (7) separate and distinct lobster management areas, there exists the possibility for dozens of similar, but potentially non-identical lobster management regimes.

challenge to maintain regulatory consistency amongst all twelve sovereigns has become increasingly more intense.

State/Federal regulatory disconnects:

Regulatory consistency across state/Federal jurisdictions is a particular challenge to NMFS due to two unique characteristics of the Federal fishery.

- First, NMFS has territorial jurisdiction -- and thus must be concerned about consistency -- in six (6) of the seven (7) management areas, while the majority of Commission states have territorial jurisdiction over only a single lobster management area (see Table 2, below).[12] As the Commission states have implemented requirements that are increasingly divergent from one another, the ability for NMFS to implement consistent measures across different LCMAs that are also consistent with the Plan approved through the Commission process has become more difficult. Further complicating this effort is the fact that Federal permit holders are allowed to designate multiple management areas on their permit, (subject to whatever regulations exist in those management areas, including regulations that might limit access). Under these conditions, the difficult challenge for NMFS is to achieve consistency with Commission area-specific management measures while maintaining a more holistic approach that considers consistency impacts in all LCMAs over which the Federal government has territorial jurisdiction, and in all LCMAs where Federal permit holders fish, which is to say everywhere in the fishery.

Table 2: State/Federal Territorial Jurisdiction over Management Areas

State / Federal Government	Nearshore Lobster Management Area
Maine	Area 1
New Hampshire	Area 1
Massachusetts	Area 1, 2, Outer Cape Cod
Rhode Island	Area 2
Connecticut	Area 6
New York	Area 4, 6
New Jersey	Area 4, 5
Delaware	Area 5
Maryland	Area 5
Virginia	Area 5
North Carolina	Area 5
NMFS	Area 1, 2, 3, 4, 5, Outer Cape Cod

- A second challenge to consistency that is unique to NMFS involves the nature of so-called "dual permit holders." Dual permit holders are individuals that hold two permits: A state permit

[12] The exceptions are New York and New Jersey, which have territory in just two management areas, and Massachusetts, which has territorial jurisdiction in three areas--although Massachusetts law mandates that its fishers must choose and thus fish in only one of these "near-shore" management areas. (Lobster Management Areas 1, 2, 4, 5 ,6 and Outer Cape Cod are sometimes referred to as "near-shore" management areas because their western boundaries run to the beach and are thus "near the shoreline." Area 3, whose western-most boundary is miles from the coast, is sometimes referred to as the "offshore" management area.)

allowing the person to fish in state waters 0-to-3 nautical miles from shore; and a Federal permit allowing the person to fish in Federal waters beyond 3 nautical miles from shore.[13] Although fishing under two permits, these dual permit holders operate their fishing businesses as a singular entity and the Commission, under Addendum XII provisions, considers their fishing practices and fishing history to be unified and indivisible. This creates further incentive for the involved 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 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 permit holder regulations requires attempted consistency with each of the eleven (11) 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 eleven sets of independently developed and already enacted regulations before it can issue its own regulations.

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 EA are being considered by NMFS.

1.5 Most Restrictive Rule

Given the multi-jurisdictional nature of the lobster fishery described in Section 1.4, there may be times when the states, or the state and Federal Government, have different regulations that apply to the same situation. Such a situation could place the permit holder in a conundrum, e.g., to follow one regulation, the permit holder might run afoul of the other regulation. To avoid such a scenario, the Commission created what is known as the "most restrictive rule." 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.

The "most restrictive rule" is a particularly important governing mechanism in determining the number of taps an individual may fish. There are two reasons for this: First, there may be circumstances where a dual permit holder has a different allocation on the state permit as compared to the federal permit. Under the "most restrictive rule," the dual permit holder would only be allowed to fish the lower of the two differing allocations. Second, there are many times when a permit holders designate multiple LCMAs on their permit. These LCMAs might have different, even competing, regulatory measures such as different trap caps or gauge sizes. Under the "most restrictive rule" the permit holder would have to abide by the more restrictive measures in all areas, e.g., the lowest trap cap and most restrictive gauge size in all designated areas.

[13] 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.

While the "most-restrictive rule" has broad applications in lobster management, for purposes of this EA, its importance relates to two concerns regarding effort control:

- Permit holders who designate multiple LCMAs on their permits could, when combining LCMA allocations, double or triple count the number of traps they have historically fished and in this way proliferate the number of traps in the lobster fishery either through their own fishing practices or through the sale of those allocations to other permit holders;
- Dual permit holders (those possessing both state and Federal permits) can similarly double count their allocations by, for example, selling their Federal permit (and the trap allocation that accompanies it) to another fisherman, then electing to fish in an LCMA without historic participation requirements.

The "most restrictive rule" was passed by the Commission under Amendment 3 in 1997 and in Addendum XII in February 2009. This was followed by Federal Rulemaking (64 FR 68228, December 6, 1999) implementing similar requirements. The "most-restrictive rule" has broad applications in lobster management and was established originally in recognition of the problems that can arise when permit holders become subject to multiple management regimes, be it state/Federal or multi-LCMA regimes. Fundamentally, its purpose is to act as a sort of "compass" by which a permit holder can navigate through seemingly competing management regimes. It does this by requiring that, when a permit holder is governed by multiple management regimes (either dual state/Federal permits or multiple LCMAs), the more restrictive management measure prevails. This rule applies across the spectrum of lobster management requirements, including min/max gauge sizes, vent restrictions, or trap allocations.

2.0 Purpose and Need for this Action

The purpose of this action is to evaluate management alternatives in response to the Commission's recommendations for Federal action in Addendum XVII and Addendum XVIII. This action is needed to respond to the recruitment failure in SNE and maximize the sustainability of the American lobster fishery.

Since Federal management of American lobster occurs in consort with state management, NMFS must take action in response to recently-approved measures that control effort within the lobster fishery. Specifically, the Commission's ISFMP seeks to address a recruitment failure in the SNE American lobster stock, reduce exploitation of the stock by 10 percent, reduce latent fishing effort, and scale the size of the SNE American lobster fishery to the stock as adopted for state management. Commissioners and permit holders alike are concerned that the recruitment failure caused by a combination of environmental drivers and continued fishing mortality is preventing the stock from rebuilding, and have, therefore, initiated action to address these issues.

The management measures analyzed in this EA respond to the Commission's effort control measures in the other LCMAs generally and, in particular, the Commission's recommended SNE management measures.

3.0 Proposed Action and Alternatives

3.1 Background

As discussed in the Introduction, the most recent stock assessment for American lobster resulted in a number of major conclusions**,** two of which are particularly relevant to this action: 1) That portions of the fishery (specifically, the SNE stock unit) were "depleted," as evidenced by reduced stock abundance[14], and, 2) that the number of traps being fished suggests that there is a high level of effort occurring in portions of the fishery.[14] Generally speaking, state and Federal efforts to address these problems include broodstock measures, which focus on abundance and mortality issues and rely on restrictions limiting the size of the lobsters that can be landed so that egg-producing females are protected.

Addendum XVII

The Lobster Board decided to address the SNE lobster stock depletion in a two-phased approach.[15] Phase one, which would remain in Addendum XVII (Appendix 3), would focus on broodstock measures designed to achieve a 10% reduction in exploitation. This first phase would be implemented immediately. Phase two would focus largely on trap reductions designed further facilitate exploitation goals by scaling the fishery to the size of the stock. This second phase would became Addendum XVIII (discussed below) and would be implemented when the Federal Government completed its Area 2 Outer Cape Area limited access/Trap Transfer rule.

Addendum XVII contained the following management measures:

- Area 2: Mandatory v-notching of egg-bearing female lobster. Under this program, all fishers must mark egg-bearing female lobsters by removing a notch from the tail, and return the lobster to the water. All v-notched lobsters encountered must also be returned to the water. Vessels in possession of a v-notched lobster are subject to penalty. This marking will provide protection to breeding lobsters, will ensure the eggs have the opportunity to hatch, and will ensure that the female has the opportunity to breed in future years, as the v-notch will remain through several additional molts.
- Area 3: Minimum carapace size increase to 3 $^{17}/_{32}$ inches
- Area 4: Mandatory v-notching of egg-bearing female lobster, annual seasonal closure from February 1 through March 31
- Area 5: Mandatory v-notching of egg-bearing female lobster, annual seasonal closure from February 1 through March 31

[14] The 2009 American Lobster Stock Assessment states, "(t)he SNE stock is in poor condition based on the recommended reference points," and that portions of the GOM stock unit (statistical area 514) "….continued to experience very high exploitation rates and declines in recruitment and abundance since the last assessment", (ASMFC 2009a).

[15] As previously stated in Section 1.3.1, the Lobster Board wanted to begin addressing the SNE stock depletion quickly using an assortment of measures, including trap reductions. It could not, however, implement trap reductions in Area 2 until the Federal Government finished its Area 2/Trap Transfer rulemaking, which was then in the middle of rulemaking (the DEIS had just been published in May, 2010). Therefore, rather than hold off Addendum XVII, including the brrodstock measures, until the Federal rule was complete, the Board voted in November 2011 to separate the trap reductions into a new addendum (Addendum XVIII) and proceeded with the more readily implementable broodstock measures in Addendum XVII.

Addendum XVII also included a seasonal closure for Area 6 (Long Island Sound) from September 8 through November 28. As Area 6 falls entirely within state waters, and NMFS is not expected to issue complementary regulations for this Area, no additional discussion of Area 6 measures are included.

The Commission forwarded these addenda to NMFS to implement regulations consistent with these measures and complimentary to regulations enacted by the states. The alternatives considered in this EA are organized by area to be consistent with the Commission's recommended measures. This arrangement is carried through the remainder of the EA to consider the impact of each measure individually. However, because the Commission selected a suite of measures to reduce exploitation by 10 percent by Area, it would not be prudent for NMFS to approve a subset of the measures by area, as this approach likely would not achieve exploitation targets and would create inconsistency with the states. Therefore, measures for each area should also be considered as a package.

Addendum XVIII

Addendum XVIII (Appendix 4) reduces traps in Area 2 and Area 3,[16] the two areas that produce the vast majority of SNE lobster stock harvest. Trap cuts are a useful management tool, but their impact is difficult to predict with precision. Notably, the relationship between trap cuts and reduced exploitation is non-linear insofar as a percentage decrease in traps would not necessarily correspond to an equal percentage decrease in exploitation.[17] Accordingly, the TC suggested an iterative approach, i.e., that traps be reduced by some increment, which mangers would monitor and, if necessary, tweak with additional measures at a later date.[18] Addendum XVIII's specific reduction schedule is set forth below:

- Area 2 trap allocations reductions: 25 percent in Year 1, and by 5 percent each year following over a 5-year period;
- Area 3 trap allocation reductions: 5 percent each year for a 5-year period.

The principle difference between the reductions in the two areas is that Area 3 does not have an initial 25% trap cut in Year 1. But the Lobster Board had already cut traps in Area 3 recently – i.e., Addendum IV (January 2004) and Addendum XI (May 2007). As a result, the Board believed that most of the excess trap effort had already been trimmed out of Area 3 and that a large initial Area 3 cut would not be necessary.[19] Not so, however, for Area 2. The Lobster Board feared that Area 2 contained excess dormant trap effort that could threaten SNE recovery efforts if activated. The Board sought an initial 25 percent trap cut in Year 1 to quickly remove this latent effort from the fishery.

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[16] During initial discussions of trap reductions, the Board considered reducing the trap allocations for only the SNE portion of Area 3, as the GOM and GBK American lobster stocks are considered healthy. Area 3 is a single unified area and is not sub-divided by stock area. Consequently, the fishing grounds of many Area 3 fishers straddle multiple lobster stock areas in Area 3. To apply different trap cuts in different stock areas, therefore, would result in a redrawing of Area 3 boundaries and sub-boundaries, something that the Board did not want to do. Ultimately, the Board approved reductions for the entire area, in part due to support for the measure by permit holders fishing in the GOM and GBK, and partly to maintain the competitive balance amongst Area 3 fishers and regulatory consistency for management in Area 3.

[17] "At some point reducing effort will reduce exploitation, but it is not a one-to-one relationship. …[T]here is significant compensatory reaction within gear that is left in. …[Y]ou can often change how you haul any number of ways to adapt to changes in regulations. Comments of Dr. Carl Wilson, Chairman Lobster TC, August 1, 2011. See Lobster Board Meeting Minutes, p. 11 at www.ASMFC.org.

[18] "I think it's impossible to say a 50 percent reduction in traps is going to be a 50 percent reduction in exploitation... What the TC suggested doing [was] …an iterative approach where you start at some very high level; and then if that didn't achieve the exploitation reduction, then you subsequently move from there. Comments of Dr. Carl Wilson, Chairman Lobster TC, March 21, 2011. See Lobster Board Meeting Minutes, p. 29 at **www.ASMFC.org**.

[19] See Lobster Board Meeting Minutes, February 2012 (www.ASMFC.org).

Latent effort is potential effort. In the lobster fishery, it would represent the number of traps that could be fished, but that are not actually being fished. Latency data does not exist but it is believed to be high in Area 2 because Area 2 formerly supported a large number of lobster fishers, many of whom no longer fish given the SNE lobster stock depletion. All of these former lobster fishers have latent trap allocation that could be potentially activated in the future when NMFS start the ITT Program.[20] There is concern about the potential activation of latent effort under an ITT Program because the more latent effort that exists, the more potential that a spike in fishing effort will occur when those dormant traps are transferred (i.e., sold) to an active lobster fisher. Accordingly, removing latency through trap cuts will help scale the fishery to the size of the resource because fishers will have a reduced number of traps that better correlates to the reduced size of the SNE lobster stock. This in turn will reduce fishing pressure on the SNE stock and reduce exploitation. It will also present a leaner, more accurate fishing model thus allowing Board to better manage the stock in later interations of the Lobster Plan.

The Commission forwarded these Addenda to NMFS to implement regulations consistent with these measures and complementary to regulations enacted by the states. The alternatives considered in this EA are organized by Area to be consistent with the Commission's recommended measures. This arrangement is carried through the remainder of the EA to consider the impact of each measure individually. However, because the Commission selected a suite of measures to reduce exploitation by 10 percent by Area, it would not be prudent for NMFS to approve a subset of the measures by Area, as this approach likely would not achieve exploitation targets and would create inconsistency with the states. Therefore, measures for each area should also be considered as a package.

3.1.1 Timing of Concurrent Actions

The Commission has approved a variety of measures through several Addenda that will affect permit holders targeting the SNE American lobster stock, each of which are related, including:

- Limited Entry Programs for Areas 2 and OCC
- ITT Program for Areas 2 and 3
- Trap Reductions for Areas 2 and 3
- Control date for Area 3 Ownership Cap

Accordingly, in an effort to remain consistent with the Commission's measures and with state regulations, NMFS is in different stages of rulemaking for each of these issues. NMFS recently published a final rule (79 Federal Register 19015; April 7, 2014) to implement limited entry programs for Areas 2 and OCC, and approved an ITT Program for Areas 2, 3, and the OCC. In general, the final rule included two strategies to control fishing effort in the American lobster fishery: 1) Limiting the number of lobster

[20] Unfettered trap transferability has the theoretical potential to slightly increase actual effort as unused, latent traps in one business are sold to a different lobster business which could fish them more actively. But, that increase would only be relative to the administratively-created fishery occurring immediately after permit holders are qualified and allocated, a process that was created in April 2014 by the recent Area 2 limited access rule (79 FR 19015) and is currently underway, but not yet complete. This increase in effort would not exist as compared to effort on the water today. Notably, the April 2014 rule's post-qualification/allocation characterization does not represent today's actual effort: It represents actual effort as it existed in the early 2000's. Some of the qualifiers would received an allocation greater than they fished, others smaller than they fished. When the parties transfer traps back and forth to get to their current-day business models, some presently latent traps might become active. But, many of these activated latent traps would be doing nothing more than replacing currently active traps that were not allocated during the allocation process—at most, a zero-sum gain.

permits in a management area, and 2) limiting the number of traps fished by lobster permit holders. More specifically, these measures include the following:

- Measures that would limit the number of **permits**:
    - Cap the number of participants by limiting entry to a Lobster Management Area (proposed for LCMA 2 and OCC).
    - Authorize permits and associated trap allocations only to fishermen and/or vessels with a historic record of fishing in an LCMA.
- Measures that would limit the number of **traps**:
    - Deduct traps from a permit holder's trap allocation, primarily through the implementation of a "conservation tax," applied when Federal permits are sold or "transferred" within the fishery through an ITT Program (discussed below).
    - Cap the number of traps a permit holder with multiple LCMA allocations can fish through the application of the "most-restrictive rule" (discussed above).

The same final rule also implemented an ITT Program to increase the business flexibility of lobster fishers to buy and sell lobster traps, while preserving the conservation benefits found within each LCMA's management program. The ITT Program was initially approved by the Area 2, 3 and Outer Cape LCMTs and is a popular concept within the lobster industry because it would provide a business alternative for permit holders who, for various reasons, may wish to gain economic benefit by selling traps and "scaling down" their business operations. Previously, permit holders in certain LCMAs can transfer their lobster permits and all associated traps with the sale of a vessel, but do not have the option to sell portions of their trap allocation. These approved measures allow permit holders within those LCMAs to transfer blocks of traps without selling their entire trap allocation and permits. As part of this program, with each transfer, the number of traps allowed in the water associated with a specific permit would be permanently reduced by 10 percent (a conservation "tax"). Full implementation of the ITT Program, as described in the final rule approving the program, is contingent upon the completion of a database currently under development by the Commission.

Subsequently, the Commission's approved a series of trap reductions to assist in lobster stock rebuilding, which are, in part, the focus of this EA, and discussed throughout Chapter 3. The lobster industry has indicated that an ITT Program will facilitate their ability to withstand the negative economic impacts of the trap reductions contained in this action, by allowing the purchase of additional traps.

The Commission intended to implement trap reductions in concert with the ITT Program to ensure that the ITT Program can mitigate the negative impacts of trap reductions on lobster fishers. As such, it is cricitcal to coordinate the timing of the ITT Program with the trap cuts. In particular, the trap cuts have to occur before the ITT Program in order to reduce the amount of latent effort available for transfer. Yet, the trap cuts cannot occur too far ahead of the ITT Program or else many lobster fishers would have to fish at untenable levels while waiting for the relief that ITT potentially provides. Complicating this further still, potential ITT transactions will likely require months of administrative work from initiation to final approval, so although the Commission sought to implement the ITT Program at the same time as the trap cuts, practical considerations dictate that the administrative paperwork for a trap transfer start many months before the trap cuts.

Finally, the Commission raised concern about excessive shares, and approved limits on how many permits one entity (individual or corporation) can hold. In response, NMFS issued an ANPR (79 FR 4319; January 27, 2014) to promote awareness of a possible future rulemaking that could limit the number of permits or traps a business entity may own in Area 3, or in any of the Areas, alert interested parties of potential eligibility criteria for future access, and discourage speculative entry into and/or investment in the American lobster fishery while the Commission and NMFS consider if and how participation in the American lobster fishery should be controlled.

3.2 Area 2 Alternatives

3.2.1 Trap Reductions (Preferred Alternative)

This alternative would reduce trap allocations for Area 2 over a 6-year period in Area 2, scheduled in conjunction with the implementation of the ITT Program, but before the transferred trap allocations become effective, consistent with the Lobater Board's Addendum XVIII recommendations. Beginning in Year 1, trap allocations would be reduced by 25 percent. In Years 2-6, trap allocations would be reduced by an additional 5 percent each year. The following table shows an example of the reductions, if an individual started with an 800-trap allocation:

Table 3: Example Area 2 Trap Allocation Reduction

Year	Starting Allocation	% Reduction	New Allocation	# Traps Returned for Conservation
2016 (Year 1)	800	25%	600	200
2017 (Year 2)	600	5%	570	30
2018 (Year 3)	570	5%	541	29
2019 (Year 4)	541	5%	514	27
2020 (Year 5)	514	5%	488	26
2021 (Year 6)	488	5%	464	24

3.2.2 Mandatory V-Notching (Preferred Alternative)

This alternative would require mandatory v-notching and immediate release of egg-bearing female lobster in Area 2 for Federal American lobster permit holders, consistent with the Lobater Board's Addendum XVII recommendations. V-notches must be to the right of the center flipper, as viewed from the rear of the female lobster when the underside of the lobster is down. The v-notch should be made by means of a sharp-bladed instrument, at least ¼ inch and not greater than ½ inch in depth and tapering to a sharp point.

3.2.3 No Action Alternative

The No Action Alternative would not implement trap reductions and/or v-notching measures for Area 2, under Federal regulations. However, states have already enacted regulations consistent with the Commission's recommendations. Under the No Action Alternative, dually-permitted vessels would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or Federal regulations for the Area(s) for which they are permitted). American lobster permit holders with only Federal permits would continue to follow the current regulations and would not be subjected to trap reductions or additional v-notching requirements.

3.3 Area 3 Alternatives

3.3.1 Trap Reductions (Preferred Alternative)

This alternative would reduce trap allocations for Area 3 over a 5-year period in Area 3 scheduled in conjunction with, but before transferred traps become effective, consistent with the Lobater Board's Addendum XVIII recommendations. During each year, trap allocations would be reduced by 5 percent. The following table shows an example of the reductions, if an individual started with a 2000-trap allocation:

Table 4: Example Area 3 Trap Allocation Reduction

Year	Starting Allocation	% Reduction	New Allocation	# Traps Returned for Conservation
2016 (Year 1)	2000	5%	1900	100
2017 (Year 2)	1900	5%	1805	95
2018 (Year 3)	1805	5%	1715	90
2019 (Year 4)	1715	5%	1629	96
2020 (Year 5)	1629	5%	1548	91

3.3.2 Increased Minimum Size (Preferred Alternative)

This alternative would increase the minimum legal carapace length (gauge) for American lobster harvested in Area 3 from 3½ inches to 3 $^{17}/_{32}$ inches, consistent with Lobster Board recommendations in Addendum XVII.

3.3.3 No Action

The No Action Alternative would not implement trap reductions and/or increased minimum size for Area 3 under Federal regulations. However, states have already enacted regulations consistent with the Commission's recommendations. Under the No Action Alternative, dually-permitted vessels would be required to comply with the more restrictive state or Federal regulation under the most restrictive rule. Federal American lobster permit holders without a state lobster license would continue to follow current regulations.

3.4 Area 4 Alternatives

3.4.1 Seasonal Closure (Preferred Alternative)

This alternative would require a seasonal closure to the landing of lobsters from February 1 through March 31, annually in Area 4, consistent with Lobater Board recommendations in Addendum XVII. During that period, vessel owners would have a two-week period to remove lobster pots from the water, and may set lobster pots one week prior to the end of the closed season.

3.4.2 Mandatory V-Notching (Preferred Alternative)

This alternative would require mandatory v-notching and immediate release of legal-sized egg-bearing female lobster in Area 4 for Federal American lobster permit holders, consistent with Lobster Board

recommendations in Addendum XVII. V-notches must be to the right of the center flipper, as viewed from the rear of the female lobster's ventral side. The v-notch should be made by means of a sharp-bladed instrument, at least ¼ inch and not greater than ½ inch in depth and tapering to a sharp point.

3.4.3 No Action Alternative

The No Action Alternative would not approve seasonal closures and/or v-notching measures in Area 4. However, states have already enacted regulations consistent with the Commission's recommendations. Under the No Action, dually-permitted vessels would be required to comply with the most restrictive rule (i.e., comply with the most restrictive state or federal regulations for the area they are permitted). American lobster permit holders with only federal permits would continue to follow the current regulations.

3.5 Area 5 Alternatives

3.5.1 Seasonal Closure (Preferred Alternative)

This alternative would require a seasonal closure of lobster harvesting from February 1 through March 31, annually in Area 5, consistent with Lobater Board recommendations in Addendum XVII. During that period, vessel owners would have a two-week period to remove lobster pots from the water, and may set lobster pots one week prior to the end of the closed season.

3.5.2 Mandatory V-Notching (Preferred Alternative)

This alternative would require mandatory v-notching and immediate release of egg-bearing female lobster in Area 5 for Federal American lobster permit holders, consistent with Lobster Board recommendations in Addendum XVII. V-notches must be to the right of the center flipper, as viewed from the rear of the female lobster when the underside of the lobster is down. The v-notch should be made by means of a sharp-bladed instrument, at least ¼ inch and not greater than ½ inch in depth and tapering to a sharp point.

3.5.3 No Action Alternative

The No Action Alternative would not approve seasonal closures and/or v-notching measures in Area 5. However, states have already enacted regulations consistent with the Commission's recommendations. Under the No Action Alternative, dually-permitted vessels would be required to comply with the most restrictive state or federal regulations for the area in which they are permitted. American lobster permit holders with only federal permits would continue to follow the current regulations.

3.6 Alternatives Considered but Rejected from Further Analysis

As previously discussed, careful timing of trap reductions and the ITT Program is necessary to prevent adverse economic impacts associated with the trap reductions. Three alternatives exist and are described below. Two of the alternatives explore non-concurrent implementation of trap reductions and the trap transferability program; neither meets the objectives of the ISFMP, and are therefore considered, but rejected from further analysis. The third alternative implements trap transferability and trap reductions as

soon as the trap transfer database is fully operational, which could take place during a fishing year (potentially the 2015 fishing year). This alternative further complicates the regulatory setting and is similarly considered but rejected.

3.6.1 Scheduling Trap Reductions Ahead of the ITT Program

Under this first scenario, trap reductions would be implemented well in advance (e.g., approximately 5-6 months) of the ITT Program. One option would be to implement trap reductions by the end of the calendar year (e.g. December 2015 /January 1, 2016), but not implement trap transfers until May 1, 2016. Permit holders would be forced withstand a 5-month period with a drastically reduced allocation, resulting in potential loss of economic opportunity, until additional traps could be required. For permit holders whose business model is predicated on fishing at the trap cap, they would be forced to fish at reduced and presumably unprofitable levels for nearly half the fishing year.

The Commission recommended concurrent timing of trap reductions and the ITT Program to avoid these negative effects. More specifically, because the Commission recommended simultaneous implementation of trap reductions and the ITT Program, and because the states are following the Commission recommendations, NMFS' deviation from that schedule could invite chaos: State and Federal regulations would be out of sync with dual permit holders being faced with inconsistent regulations that changed every few months whenever the state and Federal yearly trap cuts took place; the ITT Program would be stymied as it would be difficult to determine who had what traps when; managers would have difficulty determining how many traps were being fished and enforcement agents might have an impossible task holding individuals accountable. Because this alternative is not consistent with the Commission's recommendations, timing trap reductions well in advance of the ITT Program is not viable, making any alternative other than what has been described in detail in Section 3.5 not viable, and therefore considered but rejected from further analysis.

3.6.2 Scheduling Trap Reductions After the ITT Program

Under this second scenario, trap reductions would be implemented after (e.g., 5-6 months) the ITT Program. For example's sake, if trap transfers were allowed to be fished at the start of FY 2015 (May 1, 2016), we could implement trap reductions 6 months later in November 2016. For those 6 months, vessels would have the opportunity to fish at whatever trap level fit their business model. However, these permit holders would still be subject to trap cuts later in the fishing year and would then have to fish at the reduced levels for the remaining 6 months until the start of the next fishing year when, presumably, they could restore their trap levels through the ITT program. For permit holders whose business model is predicated on fishing at the trap cap, they would be forced to fish at reduced and presumably unprofitable levels for half the fishing year. Further, post-ITT trap cuts might have a chilling effect on the ITT Program, i.e., permit holders may not want to purchase additional allocation if that purchase is going to be cut before it can even be fished for a year. Because of these negative effects, timing trap reductions well in advance of the ITT Program is not a viable alternative, as it is inconsistent with the need of this action to prevent overfishing and maximize the sustainability of the American lobster fishery.

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recommendations, NMFS' deviation from that schedule could invite chaos: State and Federal regulations would be out of sync with dual permit holders being faced with inconsistent regulations that changed every few months whenever the state and Federal yearly trap cuts took place; the ITT Program would stymied as it would be difficult to determine who had what traps when; managers would have difficulty determining how many traps were being fished and enforcement agents might have an impossible task holding individuals accountable. Because this alternative is not consistent with the Commission's recommendations, timing trap reductions well in advance of the ITT Program is not viable, making any alternative other than what has been described in detail in Section 3.5 not viable, and therefore considered but rejected from further analysis.

3.6.3 Scheduling Trap Reductions and ITT Program for Inseason Implementation

Under this third scenario, trap reductions and the trap transferability program would be implemented after the fishing year is already underway. As described in Section 3.1.2, full implementation of the ITT program is contingent upon the completion of a database currently under development by the Commission. While the trap tag database will not be completed by the start of fishing year 2015, it is possible that it could be deployed at some during fishing year 2015, perhaps by September 2015. As recommended, trap reductions would be scheduled for concurrent implementation.

Inseason implementation of the ITT Program and trap reductions would double the annual permitting effort on behalf of NMFS and the states, and double the financial investment by permit holder. Annually, vessels must apply for their permits, which are processed, printed, and mailed as they are submitted, with the majority of permits being renewed in advanced of the May 1 start of the fishing year. In addition to listing the valid permits (i.e., species, area, etc.), these permits also list a maximum trap allocation, factoring in the "most restrictive rule" if permitted in multiple areas. Once permits are issued, a permit holder must order trap tags from an approved vendor, which can be expected to take several weeks to process. Ideally, a permit holder would complete this process in advance of May 1, so that they can continue to fish without interruption by affixing the new fishing year tags to their gear. Inseason implementation of these programs would require state and Federal staff to implement trap reductions, process trap transfer applications, and reissue a second fishing year 2015 permit including these allocation updates. While the ITT Program allows for the transfer of traps, trap tags may not be transferred between vessels because the tags include vessel-specific information. To ensure the correct number of tags is issued to the correct vessel, a second set of trap tags would likely be required, as trap tags help to quantify the amount of gear used in the fishery, partial orders to cover trap transfers would not be feasible, as more tags would be issued than traps fishing. This scenario would unnecessarily double a permit holder's required monetary investment in tags. Having multiple sets of tags issued for one year would also complicate the role of enforcement, and potentially create confusion about requirements. Because of these negative effects, timing trap reductions and the trap transferability program inseason is not a viable alternative as it is inconsistent with the need of this action to prevent overfishing and maximize the sustainability of the American lobster fishery.

While the Commission recommended concurrent timing of trap reductions and the ITT Program to avoid negative effects associated with potential loss of economic opportunity, the Commission also has not recommended inseason implementation of these programs, to avoid the negative effects described above. On August 28, 2014, the Commission's Lobster Trap Allocation History (LobsTAH) Database Working Group met and concluded that the trap transfer database will require additional development. "As the

Working Group has moved forward to address these challenges, fishing year 2015 is an impossible deadline to meet for the trap cuts and trap allocation transfers," and ultimately recommended cutting traps in fishing year 2016. The Working Group did not recommend implementation as soon as the database was operational. The Working Group's timeframe, reported to the Lobster Board without objection on October 28, 2014, should allow sufficient time to finish development, testing and deployment of the database. Cutting traps in fishing year 2016 will also provide adequate time for permit holders to qualify into applicable areas, negotiate and submit an application to participate in the Trap Transfer Program, and receive review and notification from NMFS and its state partner. Because this inseason alternative is not consistent with the Commission's recommendations, timing trap reductions and the ITT Program for inseason implementation is not a viable alternative, making any alternative other than what has been described in detail in Section 3.5 not viable, and therefore considered but rejected from further analysis.

4.0 Affected Environment

Consistent with Section 1502.15 of the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Part 1500), this chapter describes key components of the environment affected by the effort control management alternatives for American lobster.

NMFS is proposing to adopt management measures for the American lobster fishery that aim to improve economic efficiency within the fishery, and address concerns regarding the level of fishing effort in the commercial fishery. This analysis attempts to identify potential adverse effects that overfishing has on biological resources that includes American lobster, protected species, by-catch species, 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 American Lobster fishery, including its biological characteristics;
- Section 4.2 describes other potentially affected commercial fish species, including bycatch and bait fish species;
- Section 4.3 describes the physical environment that could be affected by the proposed action, including lobster habitats and essential fish habitats for federally-managed species;
- Section 4.4 identifies protected species that may be affected by elements of the proposed American lobster management measures; and
- Section 4.5 describes the economic environment of the potentially affected population, as well as the social aspects of the fishing communities potentially affected by the proposed American lobster management measures.

For purposes of this assessment, areas that may be directly or indirectly affected by the alternatives under evaluation include all of the LCMAs within the American lobster fishery, encompassing inshore coastal zone and offshore waters from Maine to North Carolina.

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 American Lobster

4.1.1 Biological Characteristics

The information contained in this section is a summary of the life history and reproductive success of the American lobster. For a more extensive review of the status of American lobster, see the Commission Stock Assessment Report No. 06-03, dated January 2006 (ASMFC 2006a) located at the Commission's website at www.asmfc.org.

The American lobster is a long-lived species known to reach more than 40 pounds (18 kg) in body weight (Wolff 1978). The American lobster 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. The age of lobsters is unknown because all hard parts are shed and replaced at molting, leaving no accreting material for age determinations. Traditionally, scientists estimate the age of lobsters based on size, per-molt growth increments and molt frequencies. Based on this kind of information, Cooper and Uzmann (1980) estimated that the American lobster may live to be 100 years old.

Recent information from European lobster, *H. gammarus* (Addison 1999), indicated a large variation in age at size with seven year classes making up the 85-95 mm size class. Research on aging of lobsters using lipofusion was conducted in the UK on measurements from the eyestalk ganglia (Sheehy and Bannister 2002). Molting was so erratic and protracted that European lobster between 70 and 80 mm CL required at least five years to fully-recruit to legal size (81 mm) in the trap fishery off the UK (Sheehy et al. 1996). These researchers have concluded that changes in lobster body length explained less than 5 percent of the variation in true age in European lobster. Predicted sizes at age were significantly below those estimated from tagging studies, and large animals approached 54 years in age using lipofusion data.

Water temperatures exert significant influence on reproductive and developmental processes of lobster. Huntsman (1923, 1924) found that larvae hatched in water less than 15° C developed much more slowly than those hatched in warmer water. Size at maturity is related to summer water temperatures, *e.g.*, high temperatures enhance maturation at small sizes, and the frequency of molting increases with water temperature (Aiken 1977). Within the range of lobster, water temperatures tend to increase from north to south and tend to range higher inshore than offshore. However, the size increase per molt was shown to be smaller in blue crabs raised in warmer waters (Leffler 1972); and adult lobsters exhibited a smaller size increase per molt in warmer areas (NUSCO 1999) compared to those measured in the U.S. offshore waters (Uzmann et al. 1977, Fogarty and Idoine 1988). Early maturity occurs in relatively warm water

locations in the Gulf of St. Lawrence and inshore southern New England, while in the deeper offshore waters off the northeastern U.S. and in the Bay of Fundy, maturation occurs at larger sizes (Krouse 1973; Aiken and Waddy 1980; Van Engel 1980; Campbell and Robinson 1983; Fogarty and Idoine 1988; Estrella and McKiernan 1989).

Lobsters typically form a brief pair bond for mating. Female lobsters can mate at any molt stage, but their receptivity peaks immediately after molting (Dunham and Skinner-Jabobs 1978; Waddy and Aiken 1990). Mating takes place within 24 hours of molting and usually within 30 minutes (Talbot and Helluy 1995). Eggs (7,000 to 80,000) are extruded and carried under the female's abdomen during the 9 to 12 month incubation period. Hatching and release of larvae occur while eggs are still attached to the female (Talbot and Helluy 1995). 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 over a four month period from May through September, occurring earlier and over a longer period in the southern part of the range.

Smaller lobsters molt more often than larger ones; however, larger females (>120 mm carapace length) can spawn twice between molts, making their relative fecundity greater than females within one molt of legal size (Waddy et al. 1995). Larger lobsters produce eggs with greater energy content and thus, may produce larvae with higher survival rates (Attard and Hudon 1987). Once the eggs mature, prelarvae are released by the female over the course of several days. 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). (See section 3.2 – Description of Physical Environment for more information on lobster habitat selection behavior).

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 CL (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. Clay and mud allow lobsters to excavate burrows up to 1.5 meters long with bowl-like depressions that may shelter several lobsters at a time. However, while gravel and rocky habitat provide ready-made shelters, large sexually mature lobsters are capable of traversing great distances and show at least three different migration behaviors: those that do not migrate; those who migrate seasonally; and those who migrate long distances. Fogarty (1998) calculated that even a modest amount of offshore larvae supplied by larger sexually mature lobsters could add significantly to the resiliency of inshore areas.

Several studies have shown that lobster growth rates decline as food availability and quality decline (Castell and Budson 1974; Bordner and Conklin 1981; Capuzzo and Lancaster 1979). In laboratory studies, greater densities of lobster as well as limited space reduce growth rates (Stewart and Squires 1968; Hughes et al. 1972; Aiken and Waddy 1978; Van Olst et al. 1980; Ennis 1991). Growth rates of smaller lobster seem to be slower when they are in the presence of larger lobster (Cobb and Tamm 1974,

1975). All of these variables have been shown to influence the frequency of molting and/or the length of the molt increments.

The adult American lobster is the largest mobile benthic invertebrate in the North Atlantic. Estrella and Morrissey (1997) reference multiple tagging studies in the offshore (Saila and Flowers, 1968; Cooper and Uzmann, 1971, 1980; Uzmann et. al. 1977; Fogarty et al, 1980; Campbell et al, 1984) and southern nearshore (Morrissey, 1971; Briggs and Muschacke, 1984) areas supporting the movement of large, sexually mature lobster from offshore to inshore areas with the potential for individual lobster from different stocks becoming intermixed. A tagging study in the Outer Cape Area (Estrella and Morrissey, 1997) indicated that lobster recaptured within 200 days of tagging were capable of traveling a notable distance from the point of release. Larger, legal-sized, egg-bearing lobsters were found to travel greater distances (an average of about 26 km) than sublegal individuals (Estrella and Morrissey, 1997).

Estrella and Morrissey (1997) also reference the research of Cooper and Uzmann (1971) and Uzmann et al. (1977) indicating that tagged lobster were observed to move to deep canyon areas in late fall and winter, migrating back to shoaler water in spring and summer. The recapture patterns in these experiments represent movement from Georges Bank and deepwater canyons to the south to areas east of Cape Cod. Estrella and Morrissey (1997) found in their tagging work that tagged lobster exhibited a northerly and westerly movement pattern along the eastern shore of Cape Cod, consistent with the findings of Morrissey (1971) where movements from Eastern Cape Cod into Cape Cod Bay were observed. These studies support the movement and mixing of inshore and offshore lobster stocks. Consequently, this supports the theory that lobster move between stock areas and management areas.

The relatively large size of the American lobster in its niche and large claws make it an important predator. Adult lobsters are omnivorous, feeding largely on crabs, molluscs, polychaetes, sea urchins, and sea stars (Ennis 1973; Carter and Steele 1982; Weiss 1970). Live fish and macroalgae are also part of the natural diet. Lobsters are opportunistic feeders, so their diet varies regionally. In areas where lobster traps are numerous, bait in lobster traps are a substitute for the normal diet but are known to be nutritionally deficient in comparison. Lobster larvae and postlarvae eat zooplankton during their first year (Lavalli 1988). Copepods and decapod larvae are common prey items, but cladocerans, fish eggs, nematodes, and diatoms have been noted.

Factors Affecting Survival

The natural mortality rate in post settlement lobster is generally considered to be low because they are a long-lived species that produce fairly small egg clutches, carry their eggs for months until they hatch, and are not very vulnerable to predation, especially as they become larger. A low and stable natural mortality rate seems less certain for inshore lobster stocks south of Cape Cod (ASMFC 2006a). The dominant source of natural mortality includes predation, disease, and extreme environmental conditions. Predation pressures seem related to size and habitat. The presence of shelter greatly reduces predation mortality (Cobb et al., 1986; Richards, 1992). Mortality due to predation decreases as the lobster grows (Wahle 1992). The effects of disease can be as profound as predation or exploitation (Anderson and Hart, 1979; Hart 1990). A number of animals parasitize lobsters, including protozoa, helmintha, and copepods. Aiken and Waddy (1986) and Sherburne and Bean (1991) reported a cyclical infestation of the ciliate *Mugardia* spp. in lobsters. Eggs are subject to high mortality rates by a nemertean worm, *Pseudocarcinonemertes homari*. A well-known disease that leads to the development of gaffkemia, a fatal infection (Stewart 1980), is caused by the bacteria *Aerococcus viridans*.

External bacteria that digest the minerals in a lobster's shell cause shell disease. Shell disease is believed to be the result of opportunistic bacteria exploiting an injury or poor physiological state of the lobster (Getchell 1989). Ovigerous female lobsters display the highest rate of infection and carapace damage because they molt less frequently and therefore, have older shells. There has been a recent increase in the incidence of shell disease in the southern New England area. The consequences of shell disease on natural mortality are not known. The recent increase in shell disease may also be an indication of stresses in the lobster populations. Laboratory studies have shown that lobster with shell disease can heal themselves by molting out of the diseased shell and replacing it with a new healthy one. However, if the disease-causing bacteria become thick enough to penetrate completely through a lobster's shell, internal lesions lead to a compromised immune system or death. Ecdysone, a hormone that controls the molting process in lobster, has been found at levels well above normal in shell-diseased lobster, indicating that severe cases of the disease may interfere with normal molting and result in early molting (Biggers and Laufer, 2004). Since the disease is most prevalent in egg-bearing females, early molting may cause declines in reproduction.

Lobster are preyed upon by a variety of bottom inhabiting species, including teleost fish, sharks, rays, skates, octopuses, and crabs (Phillips and Sastry, 1980). Larvae are subject to predation in the water column, and postlarvae are vulnerable to mud crabs, cunner, and an array of other bottom-feeding finfish species after settlement. However, once postlarvae are established in shelter, they are thought to be relatively safe from fish predators (Wahle and Steneck 1992) but not necessarily invertebrates, such as burrowing crabs (Lavalli and Barshaw 1986). Mud crabs are abundant throughout the northeast as are green crabs and rock crabs, which are also suspected predators on post-larvae. When not in their burrows, the foraging early benthic phase and larger juvenile lobsters are prey to sculpin, cunner, tautog, black sea bass, and sea raven (Cooper and Uzmann 1980). Atlantic cod, wolffish, goosefish, tilefish, and several species of shark consume lobsters up to 100 mm CL (Cooper and Uzmann 1977; Herrick 1909). With the recovery of the striped bass resource, substantial predation of sublegal lobster by striped bass has been reported. While settling lobsters suffer extraordinarily high predation rates, and pre-recruits and fully-recruited lobsters are subject to predation when foraging, larger lobsters (>100 mm CL) may be immune to predation.

Lobsters and crabs compete for space and food (Richards et al., 1983; Cobb et al., 1986; Richards and Cobb, 1986), though evidence also indicates that rock crabs are a significant food source for the condition, growth and reproduction of lobsters (Gendron, et al 2001). These studies show competition between lobsters and crabs caused a redistribution of individuals. Lobsters that lost space to their competitors also showed an increased mortality. Intra-specific competition among lobsters is well known (O'Neill and Cobb, 1979). Large body size and claw size are particularly important in determining competitive dominance among lobsters selecting shelters. When local population densities increase, larger lobsters diffuse to habitats where total population densities are lower (Steneck 1989; Lawton and Lavalli 1995). Mortalities that result from aggression between lobsters may not represent predation but do represent an additional source of natural mortality.

Interactions with Non-target Species

Several marine fish and shellfish species are incidentally caught in the directed lobster 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

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 lobster trap fishery in Massachusetts Bay and the Gulf of Maine is a seasonal one that directly targets lobster. Bycatch species include various species of crabs (*Cancer spp.*), and unregulated benthic finfish species such as sculpins (*Myoxocephalus spp*.), sea raven (*Hemitripterus americanus*), sea robins (*Prionotus spp*.), wrymouth eel (*Cryptacanthoides maculates*), lumpfish (*Cyclopterus lumpus*), Atlantic tomcod (*Microgadus tomcod*), and windowpane flounder (*Scopthalmus aquosus*). Regulated species such as cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), pollock (*Pollachius virens*), and red hake (*Urophycis chuss*) 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. 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 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. Incidental catch of non-Federally regulated species such as crabs (*Cancer spp.*), 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 50 CFR § 697.21 regardless of whether lobster is the target species. Concerned with the impacts on commercial fishing enterprises from differing management systems, the Mid-Atlantic Fishery Management Council (Mid-Atlantic Council) and the Commission requested that NMFS provide an exemption from the lobster gear requirements to black sea bass fishers in the Mid-Atlantic area, specifically in Lobster Management Area 5. Black sea bass fishermen typically use smaller escape vents in their traps than that required by the Federal lobster regulations and may use as many as 1,500 traps, compared to the maximum lobster trap limit of 1,440 in this management area. Area 5 has historically represented less than 2 percent of total coastwide lobster landings, and these dual permit holders tend to direct their fishing on black sea bass, with lobster as a marketable bycatch. The Mid-Atlantic Council and Commission recommended further that the incidental lobster allowance that applies to non-trap lobster fishermen be applied to exempted black sea bass fishers. In response to these recommendations and after several opportunities for public comment, NMFS published a final rule in the Federal Register on March 13, 2001 (66 FR 14500). This rule allows black sea bass fishers who concurrently hold limited access lobster and limited access black sea bass permits to temporarily request to enter into the Area 5 waiver program, which allows them to participate in a directed black sea bass trap fishery in Area 5 while exempt from the lobster trap gear specifications. While in the waiver program, the vessels are limited to the non-trap lobster possession limits.

In the offshore component of the fishery, Federal lobster vessels direct their trap fishing on lobster. Some bycatch of regulated and non-regulated finfish and shellfish species is known to occur. Specifically, the regulated species mentioned above as well as Atlantic wolf fish (*Anarhicas lupus*), white hake (*Urophycis tenuis*), cusk (*Brosme brosme*), and red fish (*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 therefore may keep lobster as a bycatch for commercial purposes as regulations allow. Due to the depths at which

the red crab fishery is prosecuted, lobsters are not as likely to be encountered in red crab directed trap fishing operations.

4.2 Other Affected Species

4.2.1 Bycatch

The term "bycatch" 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 general, the pots used in commercial lobster fisheries are among the more selective types of fishing gear. As a result, overall *levels* of bycatch in pots are low in lobster fisheries relative to other marine fisheries. The most common types of bycatch in lobster pots are juvenile lobsters and crabs, as well as some bottom fish and other invertebrates. The discard mortality rates (the percentage of discarded animals that die) associated with animals caught in traps is low, particularly when compared against the mortality rates linked with mobile fishing gears such as trawls and dredges.

There is little quantitative information available detailing the composition of bycatch in U.S. or Canadian lobster fisheries. Historically, no U.S. bycatch monitoring program existed for the lobster fishery in the United States or Canada (NMFS 2003; Gendron 2005). In advance of setting at-sea observer coverage for northeast US fisheries for April 2014 through March 2015 using the Standardized Bycatch Reporting Methodology, NMFS initiated a pilot level of observer coverage on lobster vessels to estimate bycatch. Types of fish occasionally caught in lobster traps include tautog, scup, black sea bass, cod, cusk, eels and flounder. 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). In addition to fish, a variety of invertebrates are found in and attached to lobster traps. These include rock crabs, Jonah crabs, red crabs, starfish, urchins, whelks and conchs (ASMFC 1997; Butler 2004; Miller 2005). In Canada, cod and one species of cusk are species of concern, but bycatch rates of these species are low and vary by area. Preliminary information from the 2014 Discard Estimation, Precision, and Sample Size Analyses for 14 Federally Managed Species Groups in the Waters off the Northeastern United States suggests that cod bycatch in the lobster fishery is small, but estimates are imprecise (NMFS 2014), and additional work is needed to determine if lobster traps constitute an important source of cod mortality. At present, no efforts are underway to limit the very small bycatch of these species (Miller 2005; Pezzack 2005). However, given the recent determination that the GOM cod stock is severely depleted, the New England Fishery Management Council intends to work with the Commission, the Lobster Board, and the TC to investigate interactions between lobster traps and groundfish.

Because of the nature of trap fisheries, 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). The number of animals that die after being caught and discarded in the American lobster fishery appears small compared to actual lobster landings.[21]

Jonah Crab

Jonah crab, *Cancer borealis*, is currently an unregulated species in Federal waters. Little is known about the species' biology, distribution, and relative abundance. Also known as the Rock crab and the Bull crab, Jonah crabs are found from Florida to Nova Scotia, mainly in offshore, rocky habitats. Females obtain a carapace width of 100 mm after about eight years, and males reach 130 mm in six to seven years. Individuals larger than 190 mm have not been observed, and it is believed that a terminal molt size might exist (NMFS, 2002).

Jonah crab is a traditional by-catch of the Maine lobster fishery. Jonah crab landings have traditionally been used by lobstermen as a supplement to cover operating expenses. However, due to a recent increase in crab abundance and market demand, it has become profitable for lobstermen to target Jonah crab with lobster traps/pots during times of low lobster landings (generally in the spring). This in turn has led to interest in targeting Jonah crabs year round.

Without an FMP, fishing effort on Jonah crab by trap vessels in Federal waters is only regulated and constrained by trap limits if the vessel possesses a Federal lobster permit. As such, vessels not otherwise restricted by their lobster permit are able to set an unlimited amount of 'crab' trap gear. The industry is concerned that this situation may lead to adverse marine mammal impacts, increased gear conflicts, and a potential for illegal harvest of lobster by non-permitted vessel. NMFS has previously indicated that there is not enough scientific and fisheries information on the crab fishery at this time to justify development of a crab FMP.

Landings of Jonah crab in the Northeastern United States totaled 8.5 million pounds in 2008[22]. Inshore lobster traps/pots caught 13 percent of the total (see Table 5, below).

Table 5: Jonah Crap Landings by Gear Type, FY 2008

Gear Type	Total Pounds Landed	% of Total Pounds Landed
Offshore Lobster Pots and Traps	53,492	0.60%
Inshore Lobster Pots and Traps	1,121,398	13%
Pots and Traps, Conch	40,970	0.40%
Pots and Traps, Other[1]	7,208,801	86%
TOTAL	8,424,661	100.00%

Note: The general Northeast gear code 18, Pots and Traps, includes, but is not limited to, trap and pot gear targeting fish, eel, conch, hagfish, and other/unclassified species. Traps and pots targeting lobster, shrimp, or crab are included in other general gear categories.

Source: Dealer data provided by NMFS, Northeast Region, Analysis & Program Support Division (http://www.st.nmfs.noaa.gov/st1/commercial/index.html).

[21] The general discussion for "by-catch," above, was taken from "*Seafood Watch*," American Lobster-Northeast Region, Final Report, February 2, 2006. All sources as referenced therein (Elliott 2006).

[22] Data on Jonah crab landings may be inaccurate due to frequent misidentification at the docks as well as substantial cash transactions that are never documented.

The ex-vessel value of Jonah crab landings in the Northeast totaled $4,654,830 in 2008.

Red Crab

Deep-sea Red Crab, *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 2000 to 1800 meters (700-5900 feet), reach a maximum carapace width of 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 New England Fishery Management Council (NEFMC), the Secretary of Commerce issued an emergency rule effective May 18, 2001 for management of the red crab fishery in the Exclusive Economic Zone (EEZ) from 35°15.3' North Latitude (the latitude of Cape Hatteras Light, NC) northward to the U.S./Canada border. An 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 January, 2010 NEFMC *Stock Assessment and Fishery Evaluation (SAFE) Report*, overfishing is not considered to be occurring on the Red Crab stock (based on FY 2008 data). To assess whether the stock is considered to be overfished, current data on either stock status or fleet per trap CPUE are necessary. Because none of these data are currently available, stock status with respect to being in an overfished condition cannot be determined at this time.[23]

Of the 879 vessels permitted to fish for red crab in FY2002, 874 vessels had incidental bycatch permits and five had controlled access permits. Traps/pots are the most prevalent primary gear, followed closely by bottom trawls, then dredges.

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

Table 6: Red Crab Landings by Gear Type, FY 2008*

Gear Type	Total Pounds Landed	Percent of Total Pounds Landed
Pots and Traps	2,665,281	96.489%
Bottom Trawl	96,909	3.508%
Midwater Trawl	70	0.003%
TOTAL	2,762,260	100.00%

Source: Dealer data provided by NMFS, Northeast Region, Analysis & Program Support Division.

*1 March 2008 – 28 February 2009

The ex-vessel value of red crab landings in the Northeast totaled roughly $4 million in 2002. More recently, overall landings have decreased from over 4 million lb in 2005 to less than 3 million lb in 2007 and 2008. (NEFMC 2010)

4.2.2 Bait

Bait is used in lobster pots to attract lobsters and is an important component of the lobster fishery. In the United States, Atlantic Herring is the major source of lobster bait, comprising nearly 90% of the bait used in Maine (Seafood Watch 2006).[24] It has been estimated that 50,000-60,000 tons of bait are used in the U.S. lobster fishery annually to yield approximately 35,000 tons of adult lobsters.

Atlantic Herring

According to the Maine Department of Marine Resources, the emergence of large-scale fisheries for herring in the Gulf of Maine, Georges Bank, and southern New England waters is a relatively new occurrence, promoted in large part by demand for bait from the lobster industry. Commercial landings of Atlantic herring are currently between 70,000-100,000 mt, of which roughly 60% (~ 50,000 mt) goes to the lobster baitfish market. (DMR 2004, SW 2006)

Atlantic herring are distributed along the Atlantic coast from North Carolina to the Canadian Maritime provinces in inshore and offshore waters (including in every major estuary from the northern Gulf of Maine to the Chesapeake Bay) to the edge of the continental shelf. They are most abundant north of Cape Cod and become increasingly scarce south of New Jersey (Kelly and Moring, 1986; NEFMC, DRAFT SEIS, 2005)[25]. All life stages of Atlantic herring can be found in high abundance in the Gulf of Maine and in lower abundance in the mid-Atlantic, but only adult herring are found to be abundant south of Narragansett Bay (Reid et al., 1999; Stone et al., 1994; NEFMC, DRAFT SEIS, 2005). Adult herring are common in more northern locations throughout the year, but are more abundant in the fall and winter. Further south, from New York to Chesapeake Bay, they are absent in the summer and never abundant. Juveniles are more common in more northern areas throughout the year and in all locations except Chesapeake Bay in the spring.

Herring is an important species in the food web of the northwest Atlantic. Herring eggs are deposited on the bottom and incubate for about 10 days. They are subject to predation by a variety of demersal fish

[24] The remaining 10% is made up of fish such as porgies, alewives, and redfish (SW 2006).

[25] http://www.asmfc.org/speciesDocuments/herring/fmps/draftAm2forPublicComment.pdf (ASMFC 2006b)

species, including winter flounder, cod, haddock and red hake. Juvenile herring, especially "brit" (age-1 juveniles) are preyed upon heavily due to their abundance and small size.

Atlantic herring is an important prey species for a large number of piscivorous (fish-eating) fish, elasmobranches (sharks and skates), marine mammals and seabirds in the northeastern United States. Unlike other pelagic (open ocean) fishes, such as Atlantic mackerel, herring are smaller and vulnerable to predation over most, if not all, of their life (Overholtz et al., 2000). The major finfish and elasmobranch species that feed heavily on Atlantic herring (or on clupeid species as a group) are Atlantic cod, silver hake, thorny skate, bluefish, goosefish, weakfish, summer flounder, white hake, and – in certain locations and times of year – Atlantic bluefin tuna. Other species that feed on herring are spiny dogfish, Atlantic halibut, red hake, striped bass, dusky shark, and black sea bass.

While the Atlantic herring resource is currently not overfished and overfishing is not occurring (ASMFC 2009b), the current level of abundance and spawning stock biomass has generated competing interests in new and expanded sectors of the herring fishery including: Maintaining traditional use patterns in the fishery, increasing the bait fishery and protecting herring's role as forage in the northwest Atlantic ecosystem. Additionally, the interest in expansion of the fishery has raised concerns about potential overharvest, locally or on the entire stock complex.

Most U.S. commercial catches occur between May and October in the Gulf of Maine, consistent with the peak season for the lobster fishery. In addition, there is a relatively substantial winter fishery in southern New England, and catches from Georges Bank have increased somewhat in recent years.

Landings by the United States averaged about 62,300 mt during 1978-1994, increased to an average of 103,000 mt during 1995-2001, and declined to an average of 95,000 mt during 2002-2005. Landing since 2005 have averaged nearly 90,000 mt. From 1978-82, US landings were about equally split between weir fisheries and purse seines. Though from 1983-92, most US landings were taken by purse seines, more recently, single mid-water and paired mid-water trawling have dominated landings, with purse seining accounting for about 10-15% of the US total from 2000-05. Since 2005, purse seining has increased while pair and single mid-water trawling has decreased, with relative shares as follows: pair trawling, 56%; single mid-water trawling, 12%; and purse seine, 26%.[26]

The majority of harvest in 2007 was taken by commercial fishermen, with total landings in 2008 of nearly 73,000 mt. Of the 2008 total, Massachusetts and Maine accounted for 92% (at 54.6% and 38.1%, respectively), followed by New Jersey (3.8%) and Rhode Island (2.6%).[27]

In February, 2010, the ASMFC Atlantic Herring Section set new specifications for the fishery for the 2010-12 period based on scientific analyses showing that biomass estimates for the fishery had been overestimated by an average of 40% over the last several years. As a result, optimal yield for the fishery was reduced by nearly 54,000 mt below the 2008-09 amount of 145,000 mt. [28]

Processing of Atlantic herring is for lobster bait (salted and barreled, fresh or frozen); sardines (canned) and food export (frozen whole). The shoreside processing sector of the Atlantic herring fishery has expanded substantially in the last few years. Consequently, there is no longer an allocation for foreign at sea processing (joint venture and internal waters processing operations). New herring processing plants

[26] ASMFC, *2008 Review of the Fishery Management Plan for Atlantic Sea Herring*, November, 2009 (ASMFC 2009b).
[27] Ibid.
[28] Feb 4, 2010 ASMFC Press Release, *ASMFC Atlantic Herring Section Sets Specifications for 2010-2012* (ASMFC 2010).

have come on-line in New Bedford and Gloucester, Massachusetts and Cape May, New Jersey. Though the canneries that were once a mainstay of employment in Maine have virtually disappeared, the one remaining cannery is to be renovated so that it becomes a state-of-the-art facility.

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 NOAA Fisheries 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, NC. 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 (GOM) 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 GOM 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 GOM is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The GOM'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 (m), with a maximum depth of 350 m 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 GOM and the North Atlantic Ocean.

High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 m 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 GOM, 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 GOM north of Cape Cod in a narrow band out to a depth of about 60 m. 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 m, except in eastern Maine where a gravel-covered plain exists to depths of at least 100 m. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 m. Sandy areas are relatively rare along the inner shelf of the western GOM, 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 m depth), elongate (161 km wide by 322 km 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 m 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 km/h, and as high as 7 km/h. 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 m deep, where sand is transported on a daily basis by tidal currents, and a low-energy area at depths > 65 m 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 m. 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 km offshore where it transforms to the slope (100 - 200 m 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 m into the shelf, with the exception of the Hudson Shelf Valley that is about 35 m 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 m 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% fines on the slope. On the slope, silty sand, silt, and clay predominate.

The southern New England area (LCMA 2) 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 Lobster Habitats

Juvenile and adult American lobsters occupy a wide variety of benthic habitats from the intertidal zone to depths of 700 meters. They are most abundant in relatively shallow coastal waters. Shelter is a critical habitat requirement for lobsters.

Once released into the water column, the American Lobster larvae remain planktonic for four life-stages before settling to the sea floor (ASMFC 2000). The time larvae spend between hatching and stage IV also varies, largely with the ocean temperature, ranging from approximately 10 days at 23°C to nearly two months at 10°C. During settlement, 4th stage post-larvae exhibit strong habitat selection behavior and

seek small shelter-providing substrates (Hudon 1987; Wahle and Steneck 1991, 1992; Incze et al. 1997; Palma et al. 1999). The highest abundance of newly settled lobster is in cobble beds (Wahle and Steneck 1991; Cobb and Wahle 1994; Palma et al. 1999) but they have been found at low densities in marsh grass root mats in southern New England (Able et al.1988). Young of the year lobster are rare or absent from sediment substrates and eel grass habitats although early benthic phase lobster (sensu Steneck 1989; Wahle and Steneck 1991 for lobster < 40 mm CL) are not.

Early benthic phase lobster are cryptic and quite restricted in habitat use (Wahle and Steneck 1991; Lawton and Lavalli 1995). They usually do not emerge from their shelters until reaching about 25 mm CL (Wahle 1992; Cobb and Wahle 1994). Larger, but still immature, adolescent phase lobster are found on a variety of bottom types, usually characterized by an abundance of potential shelters. Inshore, they are found in greatest abundance in boulder areas (Cooper and Uzmann 1980) but they also seek shelter under large algae such as kelp (Bologna and Steneck 1993). Adolescent-phase lobster also live on relatively featureless substrate where juvenile population densities are generally low (Palma et al.1999). Juvenile densities are high in shallow water, (0-30 ft) on sand, and mud substrate in inshore Massachusetts waters (Estrella, personal communication).

The following description of lobster habitats in the Northeast region of the U.S. (Maine to North Carolina) is based primarily on a report prepared by Lincoln (1998) from a variety of primary source documents. This information has been supplemented by the addition of some more recent research results. Table 7 summarizes information on lobster densities by habitat type. Unless otherwise noted, the information noted below was originally provided by Cooper and Uzmann (1980).

Inshore Lobster Habitats

Estuaries

- *Mud base with burrows* – These occur primarily in harbors and quiet estuaries with low current speeds. Lobster shelters are formed from excavations in soft substrate. This is an important habitat for juveniles, and densities can be very high, reaching 20 animals per square meter.
- *Rock, cobble and gravel* – Juveniles and adolescents have been reported on shallow bottom with gravel and gravely sand substrates in the Great Bay Estuary, NH, on gravel/cobble substrates in outer Penobscot Bay, ME (Steneck and Wilson 1998), and in rocky habitats in Narragansett Bay, RI (Lawton and Lavalli 1995). Densities in Penobscot Bay exceeded 0.5 juveniles and 0.75 adolescents/m^2. According to unpublished information cited by Lincoln (1998), juvenile lobsters in Great Bay prefer shallow bottoms with gravely sand substrates.
- *Rock/shell* – Adult lobsters in the Great Bay Estuary use sand and gravel habitats in the channels but seem to prefer a rock/shell habitat more characteristic of the high temperature, low salinity regimes of the central bay.

Salt Marshes/Peat

Lobster shelters are formed from excavations cut into peat. Reefs form from blocks of salt marsh peat that break and fall into adjacent marsh creeks and channels and seem to provide moderate protection for small lobsters from predators (Barshaw and Lavalli 1988). Densities are high (up to 5.7/m^2).

Kelp beds

Kelp beds in New England consist primarily of *Laminaria longicruris* and *L. saccharina*. Lobsters were attracted to transplanted kelp beds at a nearshore study site in the mid-coast region of Maine, reaching densities that were almost ten times greater than in nearby control areas (Bologna and Steneck 1993). Lobsters did not burrow into the sediment but sought shelter beneath the kelp. Only large kelp (> 50 cm in length) was observed sheltering lobsters and was used in the transplant experiments.

Eelgrass

Lobsters have been associated with eelgrass beds in the lower portion of the Great Bay Estuary in New Hampshire (Short et al. 2001). Eighty percent of the lobsters collected from eelgrass beds were adolescents. Average density was 0.1/m^2, greater than reported by Barshaw and Lavalli (1988). In mesocosm experiments, Short et al. reported that lobsters showed a clear preference for eelgrass over bare mud. This research showed that adolescent lobsters burrow in eelgrass beds, use eelgrass as an overwintering habitat, and prefer eelgrass to bare mud.

Intertidal Zone

Research in Maine has demonstrated the presence of early settlement, postlarval, and juvenile lobsters in the lower intertidal zone (Cowan 1999). Two distinct size classes were consistently present: 3-15 mm CL and 16-40 mm CL. Monthly mean densities during a five-year period ranged from 0-8.6 individuals/m^2 at 0.4 m below mean low water. Preliminary results indicate that areas of the lower intertidal zone serve as nursery grounds for juvenile lobster.

Inshore Rock Types

- *Sand base with rock* – This is the most common inshore rock type in depths > 40 m. It consists of sandy substrate overlain by flattened rocks, cobbles, and boulders. Lobsters are associated with abundant sponges, Jonah and rock crabs. Shelters are formed by excavating sand under a rock to form U-shaped, shallow tunnels. Densities of sub-adult lobsters are fairly high (Table 7).
- *Boulders overlaying sand* – This habitat type is relatively rare in inshore New England waters. Compared to other inshore rocky habitats, densities are low (Table 7).
- *Cobbles* – Lobsters occupy shelters of varying size in the spaces among rocks, pebbles, and boulders. Densities as high as 16 lobsters/m^2 have been observed, making this the most densely populated inshore rock habitat for lobsters in New England.
- *Bedrock base with rock and boulder overlay* – This rock type is relatively common inshore from low tide to depths of 15-45 m. Shelters are formed by rock overhangs or crevices. Encrusting coralline algae and attached organisms such as anemones, sponges,

and mollusks cover exposed surfaces. Green sea urchins and starfish are common. Cunner, tautog, sculpin, sea raven, and redfish are the most abundant fish. Lobster densities are low (Table 7).

- *Mud-shell/rock substrate* – This habitat type is usually found where sediment discharge is low and shells make up the majority of the bottom. It is best described off Rhode Island. Densities are low.

Offshore Lobster Habitats

- *Sand base with rocks* – Although common inshore (see above), this habitat is rather restricted in the offshore region except along the north flank of Georges Bank.
- *Clay base with burrows and depressions* – This habitat is common on the outer continental shelf and slope. Lobsters excavate burrows up to 1.5 m long. There are also large, bowl-like depressions that range in size from 1 to 5 m in diameter and may shelter several lobsters at a time. Minimum densities of 0.001 lobsters/m^2 have been observed in summer (Table 7).
- *Mud-clay base with anemones* – This is a common habitat for lobsters on the outer shelf or upper slope. Forests of mud anemones (*Cerianthus borealis*) may reach densities of 3 or 4 per square meter. Depressions serve as shelter for relatively small lobsters at minimum densities of 0.001/m^2 (Table 7).
- *Mud base with burrows* – This habitat occurs offshore mainly in the deep basins, in depths up to 250 m. This environment is extremely common offshore. Lobsters occupy this habitat, but no density estimates are available.

Submarine Canyons

There are more than 15 submarine canyons that cut into the shelf edge on the south side of Georges Bank. These canyons were first surveyed in the 1930s, but they were not fully explored until manned submersibles were used extensively in the 1980s. Detailed information on canyon habitats for American lobster is available primarily for Oceanographer Canyon but is generally applicable to other major canyons on Georges Bank. These canyons present a diverse group of habitat types. Concentrations of adolescents and adult lobsters are substantially greater in submarine canyons than in nearby areas that are occupied mostly by adults (Cooper et al. 1987). The following information on lobster habitats is extracted from Cooper and Uzmann (1980) and Cooper et al. (1987).

- *Canyon rim and walls* – Sediments consist of sand or semi-consolidated silt with less than 5% overlay of gravel. The bottom is relatively featureless. Burrowing mud anemones are common. Lobster densities are low (Table 7).
- *Canyon walls* – Sediments consist of gravely sand, sand, or semi-consolidated silt with more than 5% gravel. The bottom is relatively featureless. Burrowing mud anemones are common, as are Jonah crabs, ocean pout, starfish, rosefish, and squirrel hake. Lobster densities are a little greater than in substrates that contain less gravel (see above).
- *Rim and head of canyons at base of walls* – Sand or semi-consolidated silt substrate is overlain by siltstone outcrops and talus up to boulder size. The bottom is very rough and is eroded by animals and current scouring. Lobsters are associated with rock anemones, Jonah crabs, ocean pout, tilefish, starfish, conger eels, and white hake. Densities are highly variable but reach up to 0.13 lobsters/m^2 (Table 7).

- *Pueblo villages* – This habitat type exists in the clay canyon walls and extends from the heads of canyons to middle canyon walls. It is heavily burrowed and excavated. Slopes range from 5 to 70 degrees, but are generally >20 and <50 degrees. Juvenile and adult lobsters and associated fauna create borings up to 1.5 m in width, 1 m in height, and 2 m or more in depth. Lobsters are associated with Jonah crabs, tilefish, hermit crabs, ocean pout, starfish, and conger eels. This habitat may well contain the greatest densities of lobsters found offshore.

Table 7: American Lobster Habitats and Densities

Habitat	**Lobster Densities (nos/square meter)**	**Lobster Sizes (carapace length = CL)**	**Source**
ESTUARIES			
Mud base with burrows	Up to 20	Small juveniles	Cooper & Uzmann 1980
	< 0.01	Adults	Cooper & Uzmann 1980
Rock, cobble & gravel	> 0.5	Juveniles	Steneck & Wilson 1998
	> 0.75	Adolescents	Steneck & Wilson 1998
Rock/shell			
PEAT	Up to 5.7		Barshaw & Lavalli 1988
KELP BEDS	1.2-1.68	Adolescents (51-61 mm)	Bologna & Steneck 1993
EEL GRASS	< 0.04	Juveniles and adolescents	Barshaw & Lavalli 1988
	0.1	80% adolescents	Short et al. 2001
INTERTIDAL ZONE	0-8.6	Juveniles and adolescents	D. Cowan 1999
INSHORE ROCK TYPES			
Sand base with rock	3.2	Avg 40 mm	Cooper & Uzmann 1980
Boulders overlaying sand	0.09-0.13		Cooper & Uzmann 1980
Cobbles	Up to 16		Cooper & Uzmann 1980
Bedrock base with rock and boulder overlay	0.1-0.3		Cooper & Uzmann 1980
Mud-shell/rock substrate	0.15		Cooper & Uzmann 1980
OFFSHORE			
Sand base with rock	Not available	Not available	
Clay base with burrows and depressions	Minimum 0.001		Cooper & Uzmann 1980
Mud-clay base with anemones	Minimum 0.001	50-80 mm in depressions	Cooper & Uzmann 1980
SUBMARINE CANYONS			
Canyon rim and walls	0-0.0002	Adolescents and adults	Cooper et al. 1987
Canyon walls	Up to 0.001	Adolescents and adults	Cooper et al. 1987
Rim and head of canyons and at base of walls	0.0005-0.126	Adolescents and adults	Cooper et al. 1987
Pueblo villages	0.0005-0.126	Adolescents and adults	Cooper et al. 1987

Note: For this table, Juvenile lobsters are < 40 mm CL; adolescents 40-70 mm CL; adults >70 mm CL.

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 managed under the authority of the Magnuson-Stevens Fishery Conservation and Management Act. Because 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 following table for those federally-managed species and life stages in the region that inhabit the seafloor in depths are areas that could be adversely affected by the lobster fishery .

Full descriptions and maps of EFH for each species and life stage are available at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html, 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.

Table 8. EFH descriptions for life stages of federally-managed species in the Greater Atlantic Region that are potentially vulnerable to the adverse effects of lobster pots

Species	Life Stage	Depth (meters)	Bottom Type
American plaice	juvenile	45 - 150	Fine grained sediments, sand, or gravel
American plaice	adult	45 - 175	Fine grained sediments, sand, or gravel
Atlantic cod	juvenile	25 - 75	Cobble or gravel
Atlantic cod	adult	10 - 150	Rocks, pebbles, or gravel
Atlantic halibut	juvenile	20 - 60	Sand, gravel, or clay
Atlantic halibut	adult	100 - 700	Sand, gravel, or clay
Atlantic herring	eggs	20 – 80	Attached to gravel, sand, cobble or shell fragments, and macroalgae
Atlantic sea scallops	juvenile/adult	18 - 110	Cobble, shells, gravelly sand, and sand
Atlantic wolffish	eggs	40 - 240	Rocky substrates in “nests”
Atlantic wolffish	juvenile/adult	40 - 240	Range from rocky to soft substrates
Barndoor skate	juvenile/adult	l0 - 750, mostly < 150	Mud, gravel, and sand
Black sea bass	juvenile	1 - 38	Rough bottom, shellfish and eelgrass beds, manmade structures in sandy-shelly areas, offshore clam beds, and shell patches
Black sea bass	adult	20 - 50	Structured habitats (natural and manmade), sand and shell substrates preferred
Clearnose skate	juvenile	0 – 500, mostly < 111	Soft bottom and rocky or gravelly bottom

Species	Life Stage	Depth (meters)	Bottom Type
Haddock	juvenile	35 - 100	Pebble and gravel
Haddock	adult	40 - 150	Broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches
Little skate	juvenile/adult	0 - 137, mostly 73 - 91	Sandy or gravelly substrate or mud
Longfin squid	eggs	<50	Egg masses attached to rocks, boulders and vegetation on sand or mud bottom
Monkfish	juvenile/adult	25 - 200	Sand, rocks, gravel, and mud
Ocean pout	eggs	<50	Generally sheltered nests in hard bottom in holes or crevices
Ocean pout	juvenile	< 50	Close proximity to hard bottom nesting areas
Ocean pout	adult	< 80	Smooth bottom near rocks or algae
Pollock	juveniles	0 - 250	Aquatic vegetation, sand, mud, or rocks
Pollock	adult	15 – 365	Bottom habitats (not specified)
Red hake	juvenile	< 100	Shell fragments, including areas with an abundance of live scallops
Red hake	adult	10 - 130	In sand and mud, in depressions
Redfish	juvenile	25 - 400	Silt, mud, or hard bottom
Redfish	adult	50 - 350	Silt, mud, or hard bottom
Scup	juvenile	(0 - 38)	Sands, mud, mussel, and eelgrass beds
Scup	adult	(2 -185)	Various substrate types
Silver hake	juvenile	20 – 270	All substrate types
Smooth skate	juvenile/adult	31 – 874, mostly 110 - 457	Soft mud (silt and clay), sand, broken shells, gravel and pebbles
Summer flounder	juvenile	Inshore in shallow water	On mud but prefer mostly sand; found in the lower estuaries in flats, channels, salt marsh creeks, and eelgrass beds
Summer flounder	adult	Shallow to 500 ft	Not specified
Thorny skate	juvenile/adult	18 - 2000, mostly 111 - 366	Sand, gravel, broken shell, pebbles, and soft mud
Tilefish	juvenile/adult	76 - 365	Rough bottom, small burrows, and sheltered areas; substrate rocky, stiff clay, human debris

Species	Life Stage	Depth (meters)	Bottom Type
White hake	juvenile	5 - 225	Seagrass beds, mud, or fine grained sand
White hake	adult	5 - 325	Mud or fine-grained sand
Windowpane flounder	juvenile	1 – 100	Mud or fine-grained sand
Windowpane flounder	adult	1 – 75	Mud or fine-grained sand
Winter flounder	juvenile	0 - 50	Mud or fine-grained sand
Winter flounder	adult	1 - 100	Mud, sand, and gravel
Winter skate	juvenile/adult	0 - 371, mostly < 111	Sand and gravel or mud
Witch flounder	juvenile	50 - 450 to 1500	Fine grained substrate
Witch flounder	adult	25 - 300	Fine grained substrate
Yellowtail flounder	juvenile/adult	20 - 50	Sand or sand and mud

Source: NEFMC 1998

4.4 Protected Resources

There are numerous species which inhabit the environment within the management unit of American lobster that are afforded protection under the Endangered Species Act of 1973 (ESA; i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA). Eighteen are classified as endangered or threatened under the ESA, while the remaining species are protected by the provisions of the MMPA.

The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531–1534) establishes protection and conservation of threatened and endangered species and the ecosystems upon which they depend. The ESA is administered by the USFWS and NMFS. Under the ESA, an “endangered species” is defined as any species in danger of extinction throughout all or a significant portion of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. Section 7 of the ESA requires that all Federal agencies consult with the USFWS or NMFS, as applicable, before initiating any action that could affect an ESA-listed species.

Under the ESA, the NMFS has the responsibility to determine whether the proposed management measures would adversely affect federally listed threatened or endangered species and their critical habitat. If, upon review of existing data, it is determined that these species or habitats may be affected by the proposed measures, a Biological Assessment (BA) must be prepared to identify the nature and extent of adverse impacts, and recommend measures that would avoid the habitat or species or reduce potential impacts to acceptable levels.

The BA would be used in the consultation process as a basis for determining whether the adverse effects are likely to jeopardize the continued existence of any listed species or adversely affect their critical habitats. After consultation, the NMFS would issue a Biological Opinion (BO) expressing their opinion about the potential for impacts to occur. If their opinion is that the proposed measures would not likely

jeopardize any listed species or their designated critical habitat, they may also issue an incidental take statement as an exception to the prohibitions in the ESA. If it is determined that no federally listed (or proposed) species or their designated critical habitat would be affected, no further action is necessary.

Under the authority of the MMPA of 1972 (16 U.S.C. 1361 et seq.), the Secretary of Commerce is responsible for the protection of all marine mammals except walruses, polar bears, sea otters, manatees, and dugongs, which are the responsibility of the Secretary of the Interior. These responsibilities have been delegated to NMFS and the USFWS, respectively, and include providing overview and advice to regulatory agencies on all Federal actions that might affect these species.

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. Under Section 3 of the MMPA, "take" is defined as "harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill any marine mammal." "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure marine mammal stock in the wild; or has the potential to disturb marine mammal stock in the wild by disrupting behavioral patterns, including migration, breathing, nursing, breeding, feeding, or sheltering. In cases where U.S. citizens are engaged in activities, other than fishing, that result in "unavoidable" incidental take of marine mammals, the Secretary of Commerce can issue a "small take authorization." The authorization can be issued after notice and opportunity for public comment if the Secretary of Commerce finds minor impacts. The MMPA requires consultations with NMFS if impacts on marine mammals are unavoidable. The following list of species, protected either by the ESA, the MMPA, or the Migratory Bird Act of 1918, may be found in the environment used by American lobster (Pinniped and cetacean species considered present in the action area based on NOAA Marine Mammal Health and Stranding Response Program Database):

Cetaceans

Species	Status
North Atlantic right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sperm whale (*Physeter macrocephalus*	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Northern bottlenose whale (*Hyperoodon ampullatus*)	Protected
Beaked whale (*Ziphius and Mesoplodon spp*.)	Protected
Pygmy or dwarf sperm whale (*Kogia spp*.)	Protected
False killer whale (*Pseudorca crassidens*)	Protected
Melonheaded whale (*Peponocephala electra*)	Protected
Rough-toothed dolphin (*Steno bredanensis*)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala spp*.)	Protected
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected
Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella spp*.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected
White-beaked dolphin (*Lagenorhynchus albirostris*)	Protected
Harbor porpoise (*Phocoena phocoena*)	Protected

Pinnipeds

Species	Status
Harbor seal (*Phoca vitulina*)	Protected
Gray seal (*Halichoerus grypus*)	Protected
Hooded seal (*Cystophora cristata*)	Protected
Harp seal (*Phoca groenlandicus*)	Protected
Ringed seal (*Phoca hispida*)	Protected
Bearded seal (*Erignathus barbatus*)	Protected

Sea Turtles

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

Fish

Species	Status
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Atlantic sturgeon (*Acipenser oxyrinchus*)	
Gulf of Maine DPS	Threatened
New York Bight DPS	Endangered
Chesapeake Bay DPS	Endangered
Carolina DPS	Endangered
South Atlantic DPS	Endangered
Cusk (*Brosme brosme*)	Candidate
Dusky Shark (*Carcharhinus obscurus)*	Candidate

Critical Habitat Designations

Species	Area
Atlantic Salmon (*Salmo salar*)	GOM

Candidate species are those petitioned species that NMFS is actively considering for listing as endangered or threatened under the ESA. Candidate species also include those species for which NMFS has initiated an ESA status review through an announcement in the *Federal Register*.

Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed project. NMFS has initiated review of recent stock assessments, bycatch information, and other information for these candidate and proposed species. The results of those efforts are needed to accurately characterize recent interactions between fisheries and the candidate/proposed species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information reviews. Please note that once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10).

Many of the protected species that occur in the New England and Mid-Atlantic waters have never been observed as bycatch in the lobster trap/pot fishery, nor have they been documented as killed by lobster trap/pot gear in the stranding records. Based on this information, detailed species accounts are given below for endangered, threatened or protected species that are likely to be incidentally taken in the lobster trap/pot fishery. The remaining non ESA-listed species that are not likely to be affected will not be discussed further in this statement.

4.3.1 Species Potentially Affected

North Atlantic Right Whale

The North Atlantic right whale (*Eubalaena glacialis*) is listed as endangered under the ESA and is among the most endangered large whale species in the world. Two populations, an eastern and a western, are typically recognized (IWC, 1986). However, animals are sighted so infrequently in the eastern Atlantic, it is unclear whether a viable population still exists (NMFS, 1991a). This analysis focuses on the western North Atlantic population of right whales, which occurs in the proposed action area.

North Atlantic right whales are one of the most intensely studied cetacean species. Yet, despite decades of conservation measures, the population remains at low numbers. Fewer than 200 females are estimated in the population (Best et al. 2001). As of 2009, there were only an estimated 97 breeding females (Schick et al. 2009). Modeling work using data collected through the mid-1990s indicated that if the conditions that existed at that time were to continue, western North Atlantic right whales would be extinct within 200 years (Caswell et al. 1999).

The total number of North Atlantic right whales is estimated to be at least 444 animals (Waring et al. 2013). The minimum rate of annual human-caused mortality and serious injury to right whales averaged 3.0 mortality or serious injury incidents per year during 2006 to 2010 (Waring et al. 2011). Of these, fishery interactions resulted in an average of 1.8 mortality or serious injury incidents per year, all in U.S. waters. The potential biological removal (PBR) level for this stock is 0.9 animals per year (Waring et al. 2011). PBR is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (MMPA Sec. 3. 16 U.S.C. 1362) (Wade and Angliss 1997).

North Atlantic right whales have a wide distribution that overlaps with U.S. and Canadian commercial fishing grounds in the western Atlantic as well as shipping traffic to and from numerous ports. Coastal areas frequented by right whales are heavily developed. North Atlantic right whales generally occur west of the Gulf Stream, from the southeast U.S. to Canada (e.g., Bay of Fundy and Scotian Shelf) (Kenney 2002; Waring et al. 2009). They are not found in the Caribbean and have been recorded only rarely in the Gulf of Mexico. North Atlantic right whales are abundant in Cape Cod Bay between February and April (Hamilton and Mayo 1990; Schevill et al. 1986; Watkins and Schevill 1982) and in the Great South Channel in May and June (Kenney et al. 1986; Payne et al. 1990). North Atlantic right whales also frequent Stellwagen Bank and Jeffrey's Ledge, as well as Canadian waters including the Bay of Fundy and Browns and Baccaro Banks, in the spring through fall. The distribution of right whales in summer and fall seems linked to the distribution of their principal zooplankton prey (Winn et al. 1986). Calving occurs in the winter months in coastal waters off of Georgia and Florida (Kraus et al. 1988). Mid-Atlantic waters are used as a migratory pathway from the spring and summer feeding/nursery areas to the winter calving grounds off the coast of Georgia and Florida.

In terms of abundance, an exact count of right whales in the western North Atlantic cannot be obtained.

Based on a census of individual whales using photo-identification techniques, a total of 425 individually recognized whales were known to be alive during 2009. Whales identified by this date included 20 of the 39 calves born during that year. Thus adding the 19 calves not yet catalogued brings the minimum number alive in 2009 to 444 (Waring et al. 2013). Previous estimates using the same method with the added assumption of mortality for those whales not seen in 7 years, a total of 299 right whales was estimated in 1998 (Kraus et al. 2001), and a review of the photo-ID recapture database on July 6, 2010, indicated that 396 individually recognized whales were known to be alive during 2007 (Waring et al. 2011). Because this 2009 review was a nearly complete census, it is assumed this estimate represents a minimum population size. The minimum number alive population index for the years 1990-2009 suggests a positive and slowly accelerating trend in numbers. These data reveal a significant increase in the number of catalogued whales alive during this period. Mean growth rate for the period was 2.6% (Waring et al. 2013).

Ship strikes and fishing gear entanglements are the principal factors believed to be retarding growth and recovery of western North Atlantic right whales population. Data collected from 1970 through 1999 indicate that anthropogenic interactions in the form of ship strikes and gear entanglements are responsible for a minimum of two-thirds of the confirmed and possible mortality of non-neonate right whales. Johnson et al. (2005) noted that any part of the gear (buoy line, groundline, floatline, and surface system line) creates a risk for entanglement. Several aspects of right whale behavior may contribute to this high entanglement frequency.

Of 31 recorded right whale entanglement events examined between 1993 and 2002, 24 (77.4 percent) involved animals with gear in the mouth (some included other points of gear attachment on the body as well) and 16 (51.6 percent) were entangled only at the mouth (Johnson et al. 2005). This suggests that a large number of entanglements occur while right whales feed, since open mouth behavior is generally associated with feeding only. Although the sample size was small for cases in which the point of gear attachment and the associated gear part could be examined, Johnson et al. (2005) reported that two out of three right whale floating groundline entanglements and six out of eight vertical line entanglements (buoy line and surface system lines) involved the mouth (note that some of these cases may have involved other body parts as well). In addition, three buoy line entanglement events involved the tail; the entanglement of one of these animals additionally involved groundline.

Right whales feed by swimming continuously with their mouths open, filtering large amounts of water through their baleen and capturing zooplankton on the baleen's inner surface. A study of right whale foraging behavior in Cape Cod Bay conducted by Mayo and Marx (1990) revealed that right whales feeding at the surface had their mouths open for approximately 58 minutes of each hour. Also, feeding right whales exhibited increased turning behavior and a convoluted path once they had found a sufficiently dense patch of zooplankton on which to feed. This behavior differed significantly from that of traveling whales, who swam in relatively straight paths with their mouths closed. In addition, socializing whales (two or more whales at the surface occasionally making physical contact) exhibited even more twisted paths than feeding whales. Socializing was often associated with rolling and lifting the flippers above the water's surface, behaviors that may add to entanglement risk, especially from buoy line and surface system lines.

Goodyear (1996) studied well-known right whale feeding areas (Cape Cod/Massachusetts Bay, Great South Channel, and the Bay of Fundy) and reported that feeding behavior varies based on the location of prey. Right whales spend a substantial amount of time feeding below the surface in the Bay of Fundy,

where no surface feeding activities were observed. In order to meet their metabolic needs, right whales must feed on dense aggregations of copepods. Right whales received most of their food energy (approximately 91.1 percent) during deep dives (average depth of 134 meters), with the remainder (approximately 9.9 percent) occurring through surface feeding. Right whales spend about one-third of their time surface feeding in the Cape Cod/Massachusetts Bay and Gulf of Maine areas, which may increase entanglement risk from buoy line and surface system lines during the times they visit these areas (December to May). While in the Great South Channel (April to June), right whales spend approximately 10 percent of the time feeding at the surface and 90 percent of the time feeding at lower depths. Not included in these numbers is one right whale that was entangled in both buoy line and groundline on the tail.

Humpback Whale

The North Atlantic humpback whale (*Megaptera novaeangliae*) is listed as an endangered species under the ESA. A Recovery Plan has been published and is in effect (NMFS 1991b).

In the western North Atlantic, humpback whales calve and mate in the West Indies during the winter and migrate to northern feeding areas during the summer months. Calves are recruited to the feeding grounds of their mothers in a practice referred to as maternal philopatry (Clapham and Mayo 1987; Katona and Beard 1990). In the Gulf of Maine, sightings are most frequent from mid-March through November between 41 degrees north and 43 degrees north, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffrey's Ledge, and peak in May and August (CETAP 1982). Studies have matched 27 percent of the individuals on the Canadian Scotian Shelf to the Gulf of Maine population (Clapham et al. 2003) and one study identified a Gulf of Maine whale as far away as west Greenland (Katona and Beard 1990). Small numbers of individuals may be present in New England waters year-round, including the waters of Stellwagen Bank (Clapham et al. 1993). They feed on a number of species of small schooling fishes, particularly sand lance, mackerel, and Atlantic herring, by targeting fish schools and filtering large amounts of water for their associated prey. Humpback whales have also been observed feeding on krill (Wynne and Schwartz 1999).

The overall North Atlantic population, derived from genetic taggind data collected by the Years of the North Atlantic Humpback (YONAH) project on breeding ground was estimated to be 4,894 males and 2,804 females, or 7,698 individuals. Photographic mark-recapture analyses from the YONAH project gave an ocean-basin-wide estimate of 11,570 animals during 1992/1993 and an additional genotype-based analysis yielded a similar but less precise estimate of 10,400 whales (95% c.i. = 8,000-13,600) (Waring et al. 2013). As part of a large-scale assessment called More of North Atlantic Humpbacks (MoNAH) project, extensive sampling was conducted on humpbacks in the Gulf of Maine/Scotian Shelf region and the primary wintering ground on Silver Bank during 2004-2005. These data are being analyzed along with additional data from the Gulf of Maine to estimate abundance and refine knowledge of the North Atlantic humpback whales' population structure. The work is intended to update the YONAH population assessment. The most recent line-transect survey, which did not include the Scotian Shelf portion of the stock, produced an estimate of abundance for Gulf of Maine humpback whales of 331 animals (CV=0.48) with a resultant minimum population estimate for this stock of 228 animals. The line-transect based Nmin is unrealistic because at least 500 uniquely identifiable individual whales from the GOM stock were seen during the calendar year of that survey and the actual population would have been larger because re-sighting rates of GOM humpbacks have historically been <1. Using the minimum count from at least 2 years prior to the year of a stock assessment report allows time to resight whales known to be alive prior

to and after the focal year. Thus the minimum population estimate is set to the 2008 mark-recapture based count of 823 (Waring et al. 2013).

Population modeling, using data obtained from photographic mark-recapture studies, estimates the growth rate of the Gulf of Maine stock to be 6.5% for the period 1979-1991 (Barlow and Clapham 1997). More recent analysis for the period 1992-2000 estimated lower population growth rates ranging from 0 percent to 4.0 percent, depending on calf survival rate (Clapham *et al.* 2003 in Waring *et al.* 2011). However, it was unclear whether the apparent decline in growth rate is a biased result due to a shift in distribution documented for the period 1992-1995, or whether the population growth rates truly declined due to high mortality of young-of-the-year whales in U.S. Mid-Atlantic waters (Waring et al. 2011). Zerbini et al. (2010) reviewed various estimates of maximum productivity rates for humpback whale populations, and, based on simulation studies, they proposed that 11.8% be considered as the maximum rate at which the species could grow. Despite the uncertainty accompanying the more recent estimates of observed population growth rate for the Gulf of Maine stock, the maximum net productivity rate was assumed to be 6.5% calculated by Barlow and Clapham (1997) because it represents an observation greater than the default of 0.04 for cetaceans (Barlow et al. 1995) but is conservative in that it is well below the results of Zerbini et al. (2010) (Waring et al. 2013). The PBR for the Gulf of Maine stock of humpback whale is 2.7 whales per year (Waring *et al.* 2013).

As is the case with other large whales, the major known sources of anthropogenic mortality and injury of humpback whales are commercial fishing gear entanglements and ship strikes. Sixty percent of Mid-Atlantic humpback whale mortalities that were closely investigated showed signs of entanglement or vessel collision (Wiley et al. 1995). Between 1992 and 2001, at least 92 humpback whale entanglements and 10 ship strikes were recorded. Many carcasses also washed ashore or were spotted floating at sea for which the cause of death could not be determined. Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that at least 48 percent -- and possibly as many as 78 percent -- of the Gulf of Maine stock of humpback whales exhibit scarring caused by entanglement. These estimates are based on sightings of free-swimming animals that initially survive the encounter. Because some whales may drown immediately, the actual number of interactions may be higher. Decomposed and/or unexamined animals (e.g., carcasses reported but not retrieved or necropsied) represent “lost data”, some of which may relate to human impacts (Waring et al. 2009).

Johnson et al. (2005) noted that any part of the gear (buoy line, groundline, floatline, and surface system line) creates a risk for entanglement. Johnson et al. (2005) also reported that of the 30 humpback whale entanglements examined in the study, 16 (53 percent) involved entanglements in the tail region and 13 (43 percent) involved entanglements in the mouth (note that in both cases, some entanglements included other points of gear attachment on the body). Although the sample size was small for cases in which the point of gear attachment and the associated gear part could be examined, two out of two floating groundline entanglements and four out of seven buoy line entanglements involved the mouth.[29] In

[29] Note that one humpback whale was entangled in both buoy line and groundline and was placed in both categories.

addition, five out of seven buoy line entanglements and three out of four gillnet floatline entanglements involved the tail (Johnson et al. 2005).[30]

Based on studies of humpback whale caudal peduncle scars, Robbins and Mattila (2000) reported that calves had a lower entanglement risk than yearlings, juveniles, and mature whales; the latter three maturational classes exhibited comparable levels of high probability scarring. Based on these data, as well as evidence that animals acquire new injuries when mature, the authors concluded that actively feeding whales may be at greater risk of entanglement. In any case, juveniles seemed to be at the most risk, possibly due to their relative inexperience.

Humpback whales employ a variety of foraging techniques, which differ from right whale foraging behavior, but which may create entanglement risk (Hain et al. 1982 and Weinrich et al. 1992). One such technique is lunge feeding, in which the whale swims toward a patch of krill or small fish, then lunges into the patch with its mouth agape. The flippers may aid in concentrating the prey or in maneuvering. Another feeding method, called "flick-feeding," involves flexing the tail forward when the whale is just below the surface, which propels water over the whale's head, temporarily disorienting its prey. The whale then swims with its mouth open, through the wave it created. A third foraging strategy is bubble feeding, in which whales swim upwards, while blowing nets or clouds of bubbles, in a spiral under a concentration of prey. This creates a barrier through which the disoriented fish cannot escape. The whales then swim up through the bubble formation, engulfing their prey. These techniques demonstrate that humpback whales commonly use their mouths, flippers, and tails to aid in feeding. Thus, while foraging, all body parts are at risk of entanglement.

Fin Whale

In 1976, the IWC's Scientific Committee proposed seven stocks for North Atlantic fin whales (*Balaenoptera physalus*): (1) North Norway, (2) West Norway-Faroe Islands, (3) British Isles-Spain and Portugal, (4) East Greenland-Iceland, (5) West Greenland, (6) Newfoundland- Labrador, and (7) Nova Scotia (Perry et al., 1999). However, it is uncertain whether these boundaries define biologically isolated units (Waring et al. 2009).

The present IWC scheme defines the North Atlantic fin whale stock off the eastern coast of the U.S., north to Nova Scotia, and east to the southeastern coast of Newfoundland as a single stock (Donovan 1991). However, information suggests some degree of separation within this population. A number of researchers have suggested the existence of fin whale subpopulations in the North Atlantic based on local depletions resulting from commercial whaling or genetics data (Mizroch and York 1984; Bérubé et al. 1998). Photo identification studies in western North Atlantic feeding areas, particularly in Massachusetts Bay, have shown a high rate of annual return by fin whales, both within years and between years, suggesting some level of site fidelity (Seipt et al. 1990).

This particular stock is considered strategic because the fin whale is listed as endangered under the ESA. A Recovery Plan for fin whales is currently awaiting legal process (Waring et al. 2009).

[30] Note that the entanglements in buoy line exceed the total of seven because some animals were entangled in multiple locations on their body (e.g., both the mouth and the tail).

Fin whales inhabit a wide range of latitudes between 20 to 75 degrees north and 20 to 75 degrees south (Perry et al. 1999). Like right and humpback whales, fin whales are believed to use high latitude waters primarily for feeding, and low latitude waters for calving. However, evidence regarding where the majority of fin whales winter, calve, and mate is still scarce. Clark (1995) reported a general pattern of fin whale movements in the fall from the Labrador/Newfoundland region, south past Bermuda and into the West Indies, but neonate strandings along the U.S. Mid-Atlantic coast from October through January suggest the possibility of an offshore calving area (Clark 1995; Hain et al. 1992).

The predominant prey of fin whales varies greatly in different areas depending on what is locally available (IWC 1992). In the western North Atlantic, fin whales feed on a variety of small schooling fish (e.g., herring, capelin, and sand lance) as well as squid and planktonic crustaceans (Wynne and Schwartz 1999).

Various estimates have been provided to describe the current status of fin whales in western North Atlantic waters. One method used the catch history and trends in Catch Per Unit Effort (CPUE) to obtain an estimate of 3,590 to 6,300 fin whales for the entire western North Atlantic (Perry *et al.* 1999). Hain *et al.* (1992) estimated that about 5,000 fin whales inhabit the Northeastern U.S. continental shelf waters. The 2012 Stock Assessment Report (SAR) gives a best estimate of abundance for fin whales in the western North Atlantic of 3,522 (CV = 0.27). However, this estimate must be considered extremely conservative in view of the incomplete coverage of the known habitat of the stock and the uncertainties regarding population structure and whale movements between surveyed and unsurveyed areas (Waring *et al*. 2013). The minimum population estimate for the western North Atlantic fin whale is 2,817 (Waring *et al.* 2013). However, there are insufficient data at this time to determine population trends for the fin whale (Waring *et al.* 2013). The PBR for the western North Atlantic fin whale is 5.6.

Information on the abundance and population structure of fin whales worldwide is limited. NMFS recognizes three fin whale stocks in the Pacific for the purposes of managing this species under the MMPA: Alaska (Northeast Pacific), California/Washington/Oregon, and Hawaii. Reliable estimates of current abundance for the entire Northeast Pacific fin whale stock are not available. Stock structure for fin whales in the southern hemisphere is unknown and there are no current estimates of abundance for southern hemisphere fin whales.

Like right whales and humpback whales, anthropogenic mortality of fin whales includes entanglement in commercial fishing gear and ship strikes. Of 18 fin whale mortality records collected between 1991 and 1995, four were associated with vessel interactions, although the primary cause of mortality was not known. From 1996 to July 2001, there were nine observed fin whale entanglements and at least four ship strikes. Experts believe that fin whales are struck by large vessels more frequently than any other cetacean (Laist et al. 2001).

Fin whales exhibit lunge feeding techniques near the ocean surface, similar to humpback whales. Fin whales typically approach a prey patch horizontally, sometimes rapidly turning or rolling on their side inside a prey patch (Watkins and Schevill 1979). Fin whales have also been observed feeding below the surface and fairly close to the bottom in about 15 to 20 meters of water. Entanglement data from 1997 through 2003 indicate few records of fin whale entanglement events (Kenney and Hartley, 2001; Hartley et al. 2003; Whittigham et al. 2005a; Whittingham et al. 2005b). Based on this information, fin whales seem to encounter gear less often than right and humpback whales. This statement is also supported by fin

whale catalogs curated by College of the Atlantic and the Center for Coastal Studies, both of which contain records identifying fin whales that lack entanglement-related scarring.

Sei Whale

The range of sei whales (*Balaenoptera borealis*) extends from subpolar to subtropical and even tropical marine waters; however, the species is most commonly found in temperate waters (Perry et al. 1999). Based on past whaling operations, the IWC recognized three stocks in the North Atlantic: (1) Nova Scotia; (2) Iceland-Denmark Strait; and (3) Northeast Atlantic (Donovan 1991; Perry et al. 1999). Mitchell and Chapman (1977) suggested that the sei whale population in the western North Atlantic consists of two stocks, a Nova Scotian Shelf stock and a Labrador Sea stock. The Nova Scotian Shelf stock includes the continental shelf waters of the Northeast Region, and extends northeastward to south of Newfoundland. The IWC boundaries for this stock are from the U.S. east coast to Cape Breton, Nova Scotia and east to 42°00'W longitude (Waring et al. 2009).

Sei whales became the target of modern commercial whalers in the late 19th and early 20th century after stocks of other whales, including right, humpback, fin, and blues, had already been depleted. Sei whales were taken in large numbers by Norway and Scotland from the beginning of modern whaling (NMFS, 1998a). Small numbers were also taken off of Spain, Portugal, and West Greenland from the 1920s to 1950s (Perry et al. 1999). In the western North Atlantic, a total of 825 sei whales were taken on the Scotian Shelf between 1966 and 1972, and an additional 16 were taken by a shore-based Newfoundland whaling station (Perry et al. 1999). The species continued to be exploited in Iceland until 1986 even though measures to stop whaling of sei whales in other areas had been put into place in the 1970s (Perry et al. 1999). There is no estimate for the abundance of sei whales prior to commercial whaling. Based on whaling records, approximately 14,295 sei whales were taken in the entire North Atlantic from 1885 to 1984 (Perry et al. 1999).

Sei whales winter in warm temperate or subtropical waters and summer in more northern latitudes. In the North Atlantic, most births occur in November and December, when the whales are on their wintering grounds. Conception is believed to occur in December and January. Gestation lasts for 12 months, and calves are weaned at between 6 and 9 months, when the whales are on the summer feeding grounds (NMFS 1998a). Sei whales reach sexual maturity between 5 and 15 years of age. The calving interval is believed to be 2 to 3 years (Perry et al. 1999).

Sei whales occur in deep water throughout their range, typically over the continental slope or in basins situated between banks (NMFS 1998a). In the northwest Atlantic, the whales travel along the eastern Canadian coast in autumn on their way to the Gulf of Maine and Georges Bank, where they occur in winter and spring. Within the Northeast Region, the sei whale is most common on Georges Bank, including the Great South Channel, and into the Gulf of Maine/Bay of Fundy region during spring and summer. Individuals may range as far south as North Carolina. It is important to note that sei whales are known for inhabiting an area for weeks at a time, then disappearing for years or even decades. This has been observed in many areas, including in the southwestern Gulf of Maine in 1986, but the basis for this phenomenon is not clear.

Although sei whales may prey upon small schooling fish and squid in the Northeast Region, available information suggests that calanoid copepods are the primary prey of this species. There are occasional influxes of sei whales farther into Gulf of Maine waters, presumably in conjunction with years of high copepod abundance inshore. Sei whales are occasionally seen feeding in association with right whales in

the southern Gulf of Maine and in the Bay of Fundy, although there is no evidence of interspecific competition for food resources. There is very little information on natural mortality factors for sei whales. Possible causes of natural mortality, particularly for young, old, or otherwise compromised individuals, are shark attacks, killer whale attacks, and endoparasitic helminthes (Perry et al. 1999).

The abundance estimate of 357 sei whales (CV=0.52), was derived from a line-transect sighting survey conducted during 12 June to 4 August 2004 by a ship and plane that surveyed 10,761 km of trackline in waters north of Maryland (38ºN)(Waring et al. 2013). This estimate is best available for the Nova Scotia stock of sei whales, but must be considered extremely conservative because all of the known range of this stock was not surveyed, and because of uncertainties regarding population structure and whale movements between surveyed and unsurveyed areas. An abundance estimate of 207 (CV=0.62) sei whales was obtained from an aerial survey conducted in August 2006 which covered 10,676 km of trackline in the region from the 2000-m depth contour on the southern edge of Georges Bank to the upper Bay of Fundy and to the entrance of the Gulf of St. Lawrence (Waring et al. 2013). An abundance estimate of 357 (CV=0.52) sei whales was generated from a shipboard and aerial surveyconducted during June-August 2011 (Palka 2012). The aerial portion that contributed to the abundance estimate covered 5,313 km of tracklines that were over waters from north of New Jersey and shallower than the 100-m depth contour, through the U.S. and Canadian Gulf of Maine and up to and including the lower Bay of Fundy (Waring et al. 2013). The minimum population estimate for this sei whale stock is 236 (Waring et al. 2013). Current and maximum net productivity rates are unknown for this stock. A population trend analysis has not been done for this species (Waring *et al.* 2013). The PBR for the Nova Scotia stock sei whale is 0.5 animals. Entanglement is not known to greatly affect this species in the U.S. Atlantic, possibly because sei whales typically inhabit waters farther offshore than most commercial fishing operations, or perhaps because any entanglements that do occur in offshore areas are less likely to be observed.

Minke Whale

The minke whale (*Balaenoptera acutorostrata*) is not listed as endangered or threatened under the ESA, although the species is protected under the MMPA. The total fishery-related mortality and serious injury for this stock does not exceed PBR (see below). Therefore, this is not considered a strategic stock.

Minke whales off the eastern coast of the United States are considered to be part of the Canadian east coast population, which inhabits the area from the eastern half of Davis Strait south to the Gulf of Mexico. Spring and summer are times of relatively widespread and common occurrence, and during this time minke whales are most abundant in New England waters. During fall, there are fewer minke whales in New England waters, while during winter, the species seems to be largely absent (Waring et al. 2009). Records hint at a possible winter distribution in the West Indies and in mid-ocean south and east of Bermuda (Mitchell 1991). As with several other cetacean species, the possibility of a deep-ocean component to distribution exists but remains unconfirmed.

Minke whales reach sexual maturity between 5 and 7 years of age (NAMMCO 1998). Most mature females become pregnant every year. Mating occurs in the late winter; after a gestation period of 10 months, calves are born in the lower latitudes of the range (Martin et al. 1990).

Multiple population estimates are available for portions of minke whale habitat, but the recent abundance estimate for this stock is 20,741 (CV=0.30) minke whales. This is the estimate derived from the Canadian Trans-North Atlantic Sighting Survey (TNASS) in July-August 2007 and is considered best because,

while it did not cover any U.S. waters, the survey covered more of the minke whale range than the other surveys reported here (Waring et al, 2013). During 2006 to 2010, the average annual minimum detected human-caused mortality and serious injury was 5.0 minke whales per year (2.6 (0.46) minke whales per year from observed U.S. fisheries, 1.0 minke whales per year (unknown CV) from U.S. fisheries using strandings and entanglement data, 1.0 (unknown CV) from Canadian fisheries using strandings and entanglement data, and 0.4 per year from U.S. ship strikes (Waring et al. 2013). PBR for this stock is 162 animals per year (Waring et al. 2013).

Based on Waring et al. (2009), fishing gear entanglements account for the majority of the human-caused mortalities of minke whales. Like the other large whale species discussed, feeding behavior may be an important factor that contributes to entanglement risk. Minke whales in the Northwest Atlantic typically feed on small schooling fish, such as sand lance, herring, cod, and mackerel (Ward 1995). The whales may follow the movements of their prey and subsequently swim closer to shore and to heavy concentrations of fishing gear, making them more susceptible to entanglements. Studies conducted in the Bay of Fundy and Gulf of St. Lawrence indicated that minke whales feed by displaying surface lunges and rolling (Sears et al. 1981; Haycock and Mercer 1984). In contrast, a study conducted on minke whales in Cape Cod Bay and Massachusetts Bay showed a lack of surface feeding behavior (Murphy 1995). It is likely, however, that large whales may encounter gear in any part of the water column.

The majority of documented minke whale entanglements reported by Waring et al. (2009) resulted in the death of the animal. Waring et al. (2009) report the mouth and tail stock/fluke regions to be a common entanglement location for those minke whales that were seriously injured or killed.

Harbor Seal

The harbor seal (Phoca vitulina) is not listed as endangered or threatened under the ESA, although the species is protected under the MMPA. Although PBR cannot be determined for this stock, the level of human-caused mortality and serious injury in the U.S. Atlantic EEZ is believed to be low relative to the total stock size; therefore, this is not a strategic stock.

The harbor seal is found in all nearshore waters of the Atlantic Ocean above 30 degrees latitude (Waring et al. 2009). In the western North Atlantic they are distributed from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally the Carolinas (Boulva and McLaren 1979; Gilbert and Guldager 1998). It is believed that the harbor seals found along the U.S. and Canadian east coasts represent one population (Waring et al. 2009). Harbor seals are year-round inhabitants of the coastal waters of eastern Canada and Maine, and occur seasonally along the southern New England and New York coasts from September through late May. However, breeding and pupping normally occur in waters north of the New Hampshire/Maine border, although breeding occurred as far south as Cape Cod in the early part of the twentieth century. Since passage of the MMPA in 1972, the observed count of seals along the New England coast has been increasing. Coast-wide aerial surveys along the Maine coast were conducted in May/June 1981, 1986, 1993, 1997, and 2001 during pupping (Gilbert and Stein 1981; Gilbert and Wynne 1983, 1984; Kenney 1994; Gilbert and Guldager 1998; Gilbert et al. 2005). However, estimates older than 8 years are deemed unreliable (Wade and Angliss 1997), and should not be used for PBR determinations. Therefore, there is no current abundance estimate for harbor seals. The 2001 survey, conducted in May/June, included replicate surveys and radio tagged seals to obtain a correction factor for animals not hauled out. The corrected estimate (pups in parenthesis) for 2001 was 99,340 (23,722). The 2001 observed count of 38,014 is 28.7% greater than the 1997 count.

Increased abundance of seals in the Northeast region has also been documented during aerial and boat surveys of overwintering haul-out sites from the Maine/New Hampshire border to eastern Long Island and New Jersey (Payne and Selzer 1989; Rough 1995; Barlas 1999; Schroeder 2000; deHart 2002).

Incidental takes of harbor seals have been recorded in groundfish gillnet, bottom trawl, herring purse seine, halibut tub trawl, and lobster fisheries (Gilbert and Wynne 1985 and 1987; Waring et al. 2009). Mortalities involving the herring purse seine, halibut tub trawl, and lobster fisheries are reportedly rare. The Northeast multispecies sink gillnet fishery is responsible for the majority of harbor seal fishery takes on the East Coast of the United States. This fishery is located in the Gulf of Maine and in Southern New England. There were 658 harbor seal mortalities observed in the Northeast sink gillnet fishery between 1990 and 2010, excluding 3 animals taken in the 1994 pinger experiment (NMFS unpublished data) but including one animal taken in a hanging ratio experiment. Williams (1999) aged 261 harbor seals caught in this fishery from 1991 to 1997, and 93 percent were juveniles (i.e.. less than 4 years old). Estimated annual mortalities (CV in parentheses) from this fishery were 332 (0.33) in 1998, 1,446 (0.34) in 1999, 917 (0.43) in 2000, 1,471 (0.38) in 2001, 787 (0.32) in 2002, 542 (0.28) in 2003, 792 (0.34) in 2004, 719 (0.20) in 2005, 87 (0.58) in 2006, 92 in 2007, 243 (0.41) in 2008, 516 (0.28) in 2009, and 461 (0.30) in 2010.

No harbor seals were taken in observed Mid-Atlantic coastal gillnet fishery trips during 1993–1997, or 1999–2003. Two harbor seals were observed taken in 1998, 1 in 2004, 2 in 2005, 1 in 2006, 0 in 2007, 2 in 2008, 2 in 2009, and 6 in 2010. Using the observed and experimental takes, the estimated annual mortality (CV in parentheses) attributed to this fishery was 0 in 1995–1997 and 1999–2003, 11 in 1998 (0.77), 15 (0.86) in 2004, 63 (0.67) in 2005, 26 (0.98) in 2006, 0 in 2007, 88 (0.74) in 2008, 47 (0.68) in 2009, and 89 (0.41) in 2010. Average annual estimated fishery-related mortality attributable to this fishery during 2006–2010 was 50 (CV =0.34) harbor seals.

One harbor seal mortality was observed in the Northeast bottom trawl fishery in 2010. The estimated annual fishery-related mortality and serious injury attributable to this fishery has not been generated. Until this bycatch estimate can be developed, the average annual fishery-related mortality and serious injury for 2006–2010 is calculated as 0.2 animals (1 animal every 5 years).

Additional sources of mortality for harbor seals include boat strikes, entrainment in power plant intakes (12-20 per year), oil contamination, shooting (around salmon aquaculture sites and fixed fishing gear), storms, abandonment by the mother, and disease (Katona et al. 1993).

Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*) was listed as threatened under the ESA on July 28, 1978, but is considered endangered by the International World Conservation Union (IUCN). Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. The loggerhead sea turtle is the most abundant species of sea turtle in U.S. waters. They commonly occur in the U.S. throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. Loggerhead sea turtles are found in Virginia foraging areas as early as April, but are not usually found on the most northern foraging grounds in the Gulf of Maine until June. The large majority leave the Gulf of Maine by mid-September, but some may remain in Mid-Atlantic and Northeast waters until late fall. During November and December, loggerheads appear to concentrate in nearshore and southerly areas influenced by warmer Gulf Stream waters off North Carolina. Summer nesting usually occurs in the lower latitudes.

Genetic analyses conducted since the last 5-year review indicate there are five demographically independent groups in the Western North Atlantic, corresponding to nesting beaches found in Florida and Mexico. The primary metric used to evaluate trends in global loggerhead populations are counts of beach nests, many of which occur in areas outside U.S. waters. Given that loggerhead nest counts have generally declined during the period 1989-2005, NMFS & USFWS (2007b) concluded that loggerhead turtles should not be delisted or reclassified and should remain designated as threatened under the ESA. However, the review also concluded that available information indicates that an analysis and review of the species should be conducted in the future to determine if application of the Distinct Population Segment policy under the ESA is warranted for the species. Additionally, the Center for Biological Diversity and the Turtle Island Restoration Network filed a petition to reclassify loggerhead turtles in the North Pacific Ocean as a distinct population segment (DPS) with endangered status and designate critical habitat under the ESA (72 FR 64585; November 16, 2007). Critical habitat for loggerhead sea turtles was proposed in July 2013 (78 FR 43005). While this petition is geared toward the North Pacific, the possibility exists that it could affect status in other areas. NMFS concluded that the petition presented substantial scientific information such that the petition action may be warranted, and has since published a final rule (76 FR 58868; September 22, 2011) after requesting comment, available at: http://www.nmfs.noaa.gov/pr/pdfs/fr/fr76-58868.pdf. In this final rule, we determined that determined that the loggerhead sea turtle is composed of nine DPSs that constitute ‘‘species’’ that may be listed as threatened or endangered under the ESA. We listed four DPSs as threatened and five as endangered under the ESA. We will propose to designate critical habitat for the two loggerhead sea turtle DPSs occurring within the United States in a future rulemaking.

The Second Revision of the Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea turtle (*Caretta caretta*) was published in December 2008 (NMFS and USFWS 2008). The Loggerhead Recovery Team conducted a detailed analysis of threats to assist in prioritizing recovery actions. The highest priority threats, adjusted for relative reproductive values for each life stage/ecosystem, include bottom trawl, pelagic longline, demersal longline, and demersal large mesh gillnet fisheries; legal and illegal harvest; vessel strikes; beach armoring; beach erosion; marine debris ingestion; oil pollution; light pollution; and predation by native and exotic species.

Currently, there are no population estimates for loggerhead sea turtles in any of the ocean basins in which they occur. However, a recent loggerhead assessment prepared by NMFS states that the loggerhead adult female population in the western North Atlantic ranges from 20,000 to 40,000 or more, with a large range of uncertainty in total population size (SEFSC 2009).

As part of the Atlantic Marine Assessment Program for Protected Species , line transect aerial abundance surveys and turtle telemetry studies were conducted along the Atlantic Coast in the summer of 2010. The Atlantic Marine Assessment Program for Protected Species is a multi-agency initiative to assess marine mammal, sea turtle, and seabird abundance and distribution in the Atlantic. Aerial surveys were conducted from Cape Canaveral, Florida to the Gulf of St. Lawrence, Canada. Satellite tags on juvenile loggerhead turtles were deployed in two locations: off the coasts of northern Florida to South Carolina (n=30) and off the New Jersey and Delaware coasts (n=14). As presented in NMFS NEFSC (2011), the 2010 survey found a preliminary total surface abundance estimate within the entire study area of about 60,000 loggerhead turtles (CV=0.13) or 85,000 if a portion of unidentified hardshelled sea turtles were included (CV=0.10). Surfacing times were generated from the satellite tag data collected during the aerial survey period, resulting in a 7 percent (5 to -11 percent inter-quartile range) median surface time in the

South Atlantic area and a 67 percent (57 to 77 percent inter-quartile range) median surface time to the north. The calculated preliminary regional abundance estimate is about 588,000 loggerhead turtles along the U.S. Atlantic coast, with an inter-quartile range of 382,000 to 817,000 loggerhead turtles (NMFS NEFSC 2011). The estimate increases to approximately 801,000, with an inter-quartile range of 521,000-1,111,000 loggerhead turtles when based on known loggerhead turtles and a portion of unidentified turtle sightings. The density of loggerheads was generally lower in the north than the south; based on number of turtle groups detected, 64 percent were seen south of Cape Hatteras, North Carolina, 30 percent in the southern Mid-Atlantic Bight, and 6 percent in the northern Mid-Atlantic Bight. Although they have been seen farther north in previous studies (*e.g.*, Shoop and Kenney 1992), no loggerheads were observed during the aerial surveys conducted in the summer of 2010 in the more northern zone encompassing Georges Bank, Cape Cod Bay, and the Gulf of Maine. These estimates of loggerhead abundance over the U.S. Atlantic continental shelf are considered very preliminary. A more thorough analysis will be completed pending the results of further studies related to improving estimates of regional and seasonal variation in loggerhead surface time (by increasing the sample size and geographical area of tagging) and other information needed to improve the biases inherent in aerial surveys of sea turtles (*e.g.*, research on depth of detection and species misidentification rate). This survey effort represents the most comprehensive assessment of sea turtle abundance and distribution in many years. Additional aerial surveys and research to improve the abundance estimates are anticipated in 2011-2014, depending on available funds.

Anthropogenic factors that impact hatchlings and adult females on land, or the success of nesting and hatching include: beach erosion, beach armoring, and nourishment; artificial lighting; beach cleaning; beach pollution; increased human presence; recreational beach equipment; vehicular and pedestrian traffic; coastal development/construction; exotic dune and beach vegetation; removal of native vegetation; and poaching. An increased human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, feral hogs, dogs, and an increased presence of native species (*e.g.*, raccoons, armadillos, and opossums) which raid nests and feed on turtle eggs (NMFS and USFWS 2007a, 2008).

Loggerheads are affected by a completely different set of anthropogenic threats in the marine environment. These include oil and gas exploration, coastal development, and transportation; marine pollution; underwater explosions; hopper dredging; offshore artificial lighting; power plant entrainment and/or impingement; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; poaching; and fishery interactions. A 1990 National Research Council (NRC) report concluded that for juveniles, sub-adults, and breeders in coastal waters, the most important source of anthropogenic caused mortality in U.S. Atlantic waters was fishery interactions.

Loggerhead turtles are captured and injured or killed in interactions with a variety of fishing gear, including shrimp trawl, gillnet, longline, dredge, pound net, pot/trap, and hook and line fisheries. The average annual bycatch estimate of loggerhead sea turtles from 2000-2004 (based on the rate from 1994-2004) over FMP groups identified by the Greater Altantic Regional Fisheries Office (GARFO) was 411 turtles, with an additional 77 estimated bycatch events unassigned.

There have been three entanglements of loggerhead turtles reported in lobster gear. One loggerhead turtle was reported dead in New Jersey in July 1983; one loggerhead turtle was reported as released alive in New York in August 1987; and one loggerhead turtle was reported dead, entangled by the right flipper, in a pot line located in New Jersey in July of 1991. In addition, the Sea Turtle Stranding and Salvage

Network (STSSN) database reveals that from 1980 to 2000, there was one loggerhead turtle alive and entangled in lobster gear in Massachusetts (SEFSC STSSN database). More recent data (2002-2008), has recorded confirmed reports of eight loggerhead entanglements in vertical line gear. Four of those entanglements were confirmed to be caused by whelk pots, and one confirmed to be from crab fisheries. Gear from three of the loggerhead entanglements was never identified.

Leatherback Sea Turtle

Leatherback sea turtles (*Dermochelys coriacea*) were listed as endangered under the ESA on June 2, 1970. Leatherback turtles are the largest of the living turtles and are distinct from other sea turtle species because of its rubber-like, flexible carapace. Like the loggerhead, the leatherback is also circumglobal. In the northwestern Atlantic, the leatherback turtle's range extends from Cape Sable, Nova Scotia, south to Puerto Rico and the U.S. Virgin Islands. Nesting occurs from February through July at sites located from Georgia to the U.S. Virgin Islands. During the summer, leatherbacks tend to be found along the east coast of the U.S. from the Gulf of Maine south to the middle of Florida.

The leatherback sea turtle population was estimated at approximately 115,000 adult females globally in 1980 (Pritchard 1982). By 1995, this global population of adult females was estimated to have declined to 34,500 (Spotila et al. 1996). However, the most recent population size estimate for the North Atlantic alone is a range of 34,000 to 94,000 adult leatherback turtles (Turtle Expert Working Group, TEWG 2007). Thus, there is substantial uncertainty with respect to global population estimates of leatherback sea turtles.

Seven leatherback sea turtle populations or groups of populations were identified by the Leatherback TEWG as occurring within the Atlantic. These are: Florida, North Caribbean, Western Caribbean, Southern Caribbean, West Africa, South Africa, and Brazil (TEWG 2007). In the U.S., the Florida Statewide Nesting Beach Survey program has documented an increase in leatherback nesting numbers from 98 nests in 1988 to between 800 and 900 nests in the early 2000s (NMFS and USFWS 2007b). An analysis of Florida's index nesting beach sites from 1989-2006 shows a substantial increase in leatherback nesting in Florida during this time, with an annual growth rate of approximately 1.17 (TEWG 2007). The TEWG reports an increasing or stable trend for all of the seven populations or groups of populations with the exception of the Western Caribbean and West Africa.

Poaching is not known to be a problem for U.S. nesting populations. However, numerous fisheries that occur in both U.S. state and Federal waters are known to negatively impact juvenile and adult leatherback sea turtles. Leatherbacks have been documented interacting with longline, trap/pot, trawl, and gillnet fishing gear. Of the Atlantic sea turtle species, leatherbacks seem to be the most vulnerable to entanglement in fishing gear, particularly with trap/pot fishing gear. This susceptibility may be the result of their body type (large size, long pectoral flippers, and lack of a hard shell), and their attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, and perhaps to the lightsticks used to attract target species in longline fisheries. Leatherbacks entangled in fishing gear generally have a reduced ability to feed, dive, surface to breathe, or perform any other behavior essential to survival (Balazs 1985). In addition to drowning from forced submergence, they may be more susceptible to boat strikes if forced to remain at the surface, and entangling lines can constrict blood flow resulting in tissue necrosis.

The American lobster fishery has been verified as the gear/fishery involved in 29 leatherback entanglements in the Northeast Region between 2002-2008 (STDN 2009). All of the 29 entanglements

involved vertical lines of the lobster gear. Other major threats facing the leatherback sea turtle in the Atlantic Ocean include marine pollution (including ingesting marine debris), development and erosion of nesting beach sites, and vessel strikes.

4.3.2 Species Not Likely to Be Affected

Several ESA-listed species, while their distribution overlaps to some degree with the management unit of the lobster trap/pot fishery, are not likely to be affected by the fishery since the fishery does not typically operate in areas where these species occur or the gear used is not known to affect the species. These species include Atlantic sturgeon, shortnose sturgeon, the Gulf of Maine Distinct Population of Atlantic Salmon, hawksbill sea turtles, green sea turtles, Kemp's ridley sea turtles, blue whales, and sperm whales.

Atlantic Sturgeon

A status review for Atlantic sturgeon was completed in 2007 which indicated that five distinct population segments (DPS) of Atlantic sturgeon exist in the United States (ASSRT 2007). On October 6, 2010, NMFS proposed listing these five DPSs of Atlantic sturgeon along the U.S. East Coast as either threatened or endangered species (75 FR 61872 and 75 FR 61904). Final listing rules were published on February 6th, 2012 (77 FR 5880 and 75 FR 5914). The GOM DPS of Atlantic sturgeon has been listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon have been listed as endangered. Atlantic sturgeon from any of the five DPSs could occur in areas where the American lobster fishery operates.

Atlantic sturgeon is an anadromous species that spawns in relatively low salinity, river environments, but spends most of its life in the marine and estuarine environments from Labrador, Canada to the Saint Johns River, Florida (Holland and Yelverton 1973, Dovel and Berggen 1983, Waldman et al. 1996, Kynard and Horgan 2002, Dadswell 2006, Atlantic Sturgeon Status Review Team (ASSRT) 2007). Tracking and tagging studies have shown that sub-adult and adult Atlantic sturgeon that originate from different rivers mix within the marine environment, utilizing ocean and estuarine waters for life functions such as foraging and overwintering (Stein et al. 2004a, Dadswell 2006, ASSRT 2007, Laney et al. 2007, Dunton et al. 2010).

Fishery-dependent data as well as fishery-independent data demonstrate that Atlantic sturgeon use relatively shallow inshore areas of the continental shelf; primarily waters less than 50 m deep (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). The data also suggest regional differences in Atlantic sturgeon depth distribution with sturgeon observed in waters primarily less than 20 m in the Mid-Atlantic Bight and in deeper waters in the Gulf of Maine (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). Information on population sizes for each Atlantic sturgeon DPS is very limited. Based on the best available information, NMFS has concluded that bycatch, vessel strikes, water quality and water availability, dams, lack of regulatory mechanisms for protecting the fish, and dredging are the most significant threats to Atlantic sturgeon.

Since the ESA listing of Atlantic sturgeon, the NEFSC has completed new population estimates using data from the Northeast Area Monitoring and Assessment (NEAMAP) survey (Kocik et al. 2013). Atlantic sturgeon are frequently sampled during the NEAMAP survey. NEAMAP has been conducting trawl surveys from Cape Cod, Massachusetts to Cape Hatteras, North Carolina in nearshore waters at depths up to 18.3 meters (60 feet) during the fall since 2007 and depths up to 36.6 meters (120 feet) during the spring since 2008 using a spatially stratified random design with a total of 35 strata and 150

stations per survey. The information from this survey can be directly used to calculate minimum swept area population estimates during the fall, which range from 6,980 to 42,160 with coefficients of variation between 0.02 and 0.57 and during the spring, which range from 25,540 to 52,990 with coefficients of variation between 0.27 and 0.65. These are considered minimum estimates because the calculation makes the unlikely assumption that the gear will capture 100% of the sturgeon in the water column along the tow path. Efficiencies less than 100% will result in estimates greater than the minimum. The true efficiency depends on many things including the availability of the species to the survey and the behavior of the species with respect to the gear. True efficiencies much less than 100% are common for most species. The NEFSC's analysis also calculated estimates based on an assumption of 50% efficiency, which reasonably accounts for the robust, yet not complete sampling of the Atlantic sturgeon, oceanic temporal and spatial ranges, and the documented high rates of encounter with NEAMAP survey gear and Atlantic sturgeon. For this analysis, NMFS has determined that the best available scientific information for the status of Atlantic sturgeon at this time are the population estimates derived from NEAMAP swept area biomass (Kocik et al. 2013) because the estimates are derived directly from empirical data with few assumptions. NMFS has determined that using the median value of the 50% efficiency as the best estimate of the Atlantic sturgeon ocean population is most appropriate at this time. This results in a total population size estimate of 67,776 fish, which is considerably higher than the estimates that were available at the time of listing. This estimate is the best available estimate of Atlantic sturgeon abundance at the time of this analysis. The Commission has begun work on a benchmark assessment for Atlantic sturgeon to be completed in 2014, which would be expected to provide an updated population estimate and stock status. The Commission is currently collecting public submissions of data for use in the assessment: http://www.asmfc.org/press_releases/2013/pr20AtlSturgeonStockAssmtPrep.pdf.

Atlantic sturgeon from any of the five DPSs could occur in areas where the American lobster fishery operates, however, the species has not been captured in gear targeting American lobster (Stein et al. 2004a, ASMFC 2007, NMFS 2012), thus, this species is not considered further in this EA.

Shortnose Sturgeon

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They can be found in rivers along the western Atlantic coast from St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (*i.e.*, south of Chesapeake Bay), while some northern populations are amphidromous (NMFS 1998b). Since the lobster trap/pot fishery does not operate in or near the rivers where concentrations of shortnose sturgeon are most likely found, it is highly unlikely that the lobster trap/pot fishery will affect shortnose sturgeon.

Atlantic Salmon

The wild populations of Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River are listed as endangered under the ESA. Juvenile salmon in New England rivers typically migrate to sea in May after a 2 to 3 year period of development in freshwater streams, and remain at sea for 2 winter seasons before returning to their U.S. natal rivers to spawn. Results from a 2001-2003 post-smolt trawl survey in Penobscot Bay and the nearshore waters of the Gulf of Maine indicate that Atlantic salmon post-smolts are prevalent in the upper water column throughout this area in mid to late May. Therefore, commercial fisheries deploying small mesh active gear (pelagic trawls and purse seines within 10-m of the surface) in nearshore waters of

the Gulf of Maine may have the potential to incidentally take smolts. However, it is highly unlikely that the lobster trap/pot fishery will affect the Gulf of Maine DPS of Atlantic salmon given that operation of the lobster trap/pot fishery does not occur in or near the rivers where concentrations of Atlantic salmon are likely to be found and lobster trap/pot gear operates in the ocean at or near the bottom rather than near the surface.

Blue Whale

Blue whales do not regularly occur in waters of the U.S. Exclusive Economic Zone (EEZ) (Waring et al. 2002). In the North Atlantic, blue whales are most frequently sighted in the St. Lawrence from April to January (Sears 2002). No blue whales were observed during the Cetacean and Turtle Assessment Program (CETAP) surveys of the mid- and north Atlantic areas of the outer continental shelf (CETAP 1982). Calving for the species occurs in low latitude waters outside of the area where the lobster trap/pot fishery operates. Blue whales feed on euphausiids (krill) (Sears 2002) which are too small to be captured in lobster fishing gear. Given that the species is unlikely to occur in areas where the lobster fishery operates, and given that the operation of the lobster fishery will not affect the availability of blue whale prey or areas where calving and nursing of young occurs, the lobster fishery is not expected to affect blue whales.

Sperm Whale

Sperm whales regularly occur in waters of the U.S. Exclusive Economic Zone (EEZ). However, the distribution of the sperm whale in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring et al. 2007). In contrast, the American lobster fishery operates in continental shelf waters. The average depth of sperm whale sightings observed during the CETAP surveys was 1,792m (CETAP 1982). Female sperm whales and young males almost always inhabit waters deeper than 1000m and at latitudes less than 40° N (Whitehead 2002). Sperm whales feed on larger organisms that inhabit the deeper ocean regions (Whitehead 2002). Calving for the species occurs in low latitude waters outside of the area where the American lobster fishery operates. Given that sperm whales are unlikely to occur in areas (based on water depth) where the American lobster fishery operates, and given that the operation of the American lobster fishery will not affect the availability of sperm whale prey or areas where calving and nursing of young occurs, the continued operation of the American lobster fishery is not likely to affect sperm whales.

Hawksbill Sea Turtle

The hawksbill turtle is uncommon in the waters of the continental U.S. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America. Hawksbills feed primarily on a wide variety of sponges, but also consume bryozoans, coelenterates, and mollusks. The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands. There are accounts of hawksbills in south Florida and individuals have been sighted along the east coast as far north as Massachusetts; however, east coast sightings north of Florida are rare (NMFS 2009). Since operation of the lobster trap/pot fishery would not occur in waters that are typically used by hawksbill sea turtles, it is highly unlikely that its operations would affect this turtle species.

Kemp's Ridley Sea Turtle

The Kemp's ridley is one of the least abundant of the world's sea turtle species. In contrast to loggerhead, leatherback, and green sea turtles, which are found in multiple oceans of the world, Kemp's ridleys typically occur only in the Gulf of Mexico and the northwestern Atlantic Ocean (USFWS and NMFS 1992). Foraging areas documented along the U.S. Atlantic coast include Charleston Harbor, Pamlico Sound (Epperly et al. 1995), Chesapeake Bay (Musick and Limpus 1997), Delaware Bay, and Long Island Sound (Morreale and Standora 1993). Adult Kemp's ridleys are found in the coastal regions of the Gulf of Mexico and southeastern U.S., but are typically rare in the northeastern U.S. waters of the Atlantic (TEWG 2000).

Like other turtle species, the severe decline in the Kemp's ridley population appears to have been heavily influenced by a combination of exploitation of eggs and impacts from fishery interactions. Currently, anthropogenic impacts to the Kemp's ridley population are similar to those discussed above for other sea turtle species. Takes of Kemp's ridley turtles have been recorded by sea sampling coverage in the Northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries. There is no documentation of Kemp's ridley sea turtles being incidentally taken by the lobster trap/pot fishery, therefore it is unlikely that this operation would affect this turtle species.

Green Sea Turtle

In the western Atlantic, green sea turtles range from Massachusetts to Argentina, including the Gulf of Mexico and Caribbean (Wynne and Schwartz 1999). Green sea turtles occur seasonally in Mid-Atlantic and Northeast waters such as Chesapeake Bay and Long Island Sound (Musick and Limpus 1997; Morreale and Standora 1998; Morreale et al. 2005), which serve as foraging and developmental habitats. As with the other sea turtle species, incidental fishery mortality accounts for a large proportion of annual anthropogenic mortality outside the nesting beaches. Sea sampling coverage in the pelagic driftnet, pelagic longline, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green sea turtles. There is no documentation of green sea turtles being incidentally taken by the lobster trap/pot fishery, therefore this species is unlikely to be affected.

Atlantic Salmon Critical Habitat

Coincident with the June 19, 2009 ESA listing, NMFS designated critical habitat for the endangered GOM DPS of Atlantic salmon (74 FR 29300; June 19, 2009) (Figure 3). Designation of critical habitat is focused on the known primary constituent elements within the occupied areas of a listed species that are deemed essential to the conservation of the species. Within the GOM DPS, the primary constituent elements for Atlantic salmon are: 1) sites for spawning and rearing, and 2) sites for migration (excluding marine migration; although successful marine migration is essential to Atlantic salmon). NMFS was not able to identify the essential features of marine migration and feeding habitat or their specific locations at the time that the critical habitat was designated. While there is potential for lobster fishing activity to occur within estuaries in the GOM DPS of Atlantic Salmon, the placement of lobster traps and trawls is expected to allow adequate passage for migrating salmon. Likewise, the associated fishing activities (i.e. hauling gear and vessel movements) are not expected to alter water chemistry or physical attributes to levels that would affect migration patterns of smolts or adult salmon.

4.5 Human Communities/Social-Economic Environment

Overview

American lobster is one of the most valuable commercial fisheries in the United States.[31] Despite this, available data (see discussion below) indicate that profit margins for lobster fishers are declining: even while the value of American lobster at times may rise, the costs associated with lobster fishing are rising at a higher rate and this has reduced the income of those who participate in the fishery.

For purposes of this analysis, the economic environment for a lobster fisher can be seen as driven by both macro and micro incentives. At the macro level, a fisher is concerned with whether the regional value of the catch is high enough to want to take on the economic burdens associated with being an active participant in the fishery. At the micro level, a fisher must weigh the potential revenue from the catch against the substantial costs of operating within the fishery (including the risks associated with exposure to volatile regional economies, such as has been seen in recent years). In general, these costs include: the boat, bait, traps, rope, fuel, and overhead. Whether an individual can realize a sufficient profit margin after these costs and revenues have been factored will, for purposes of this analysis, suggest whether those fishers currently participating in the lobster fishery will have incentives to continue to participate in the SNE American lobster fishery.

Put another way, traps fished is but one of many variables impacting lobster business profitability. Operating costs, such as the cost of the boat, bait, rope, fuel and overhead, might impact the profitability as much as the number of traps fished. A business's fishing power will increase with more traps, but so too will the costs associated with maintaining, baiting and tending higher trap levels. The profitability associated with a permit holder's trap allocation becomes even more critical once the annual schedule of trap cuts commences as required under the Commission's Plan. For those fishers who do not fish their entire allocation, the pending trap cuts may simply remove latent traps that are not being fished. In other words, if a person is only actively fishing 75% of his or her allocation, then a 25% cut to that allocation might have little or no impact to the fishing operation (although loss of that unused allocation might prevent the person from earning profits as a seller in the ITT Program). For example, some permit holders order a full allotment of trap tags despite having no intention of actually placing the traps in the water (e.g. speculation), or if placed in the water the traps may not be baited or actively fished (e.g. holding ground). Conversely, if active traps are cut from a lobster fisher's allocation, fishers may attempt to recoup the loss in fishing power by fishing the remaining traps more aggressively, i.e., baiting and tending them more often. Still, for a certain unknown group of fishers – particularly those fishing at maximum trap levels - the trap reductions will involve active traps that will negatively impact the profitability of the business although the degree of impact cannot be stated with precision given the numerous other variables affecting business profitability. This impact, however, can potentially be mitigated by trap transfers. Specifically, impacted lobster fishers have the potential to replenish their allocations by purchasing allocation from another lobster fisher. This would involve an unknown cost to the purchaser. At present, ITT is new and the market is presently unknown. Common sense suggests, however, that the trap allocation supply should at least be equal to demand, given that SNE stock failure has deflated lobster effort in the area and created latency. See Table 15 and 16: Federal Trap Vessels in

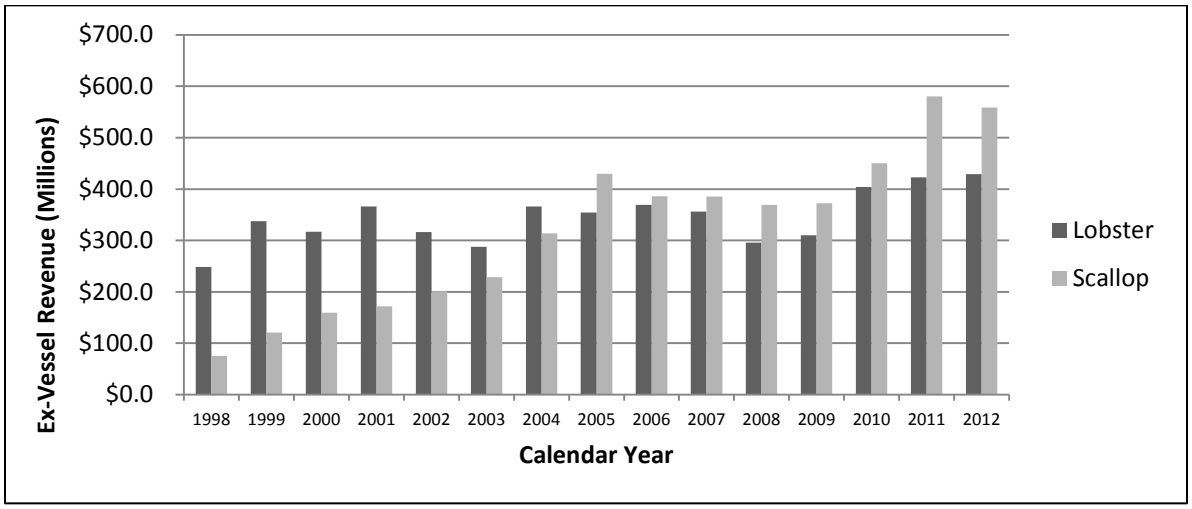
[31] (NMFS Office of Science and Technology, 2009).

LCMA 2 and 3 by State since 2000 (Section 4.5.4 below). Indeed, this potential latency is a principle motivator for this action.

4.5.1 Recent Trends

From 1998 to 2004 American lobster was the highest value fishery in the Northeast region ranging between $250 million and $366 million (Chart 1). In comparison, over the same period, scallop revenues grew steadily from $76 million to $316 million. Since 2005, annual revenues from the scallop fishery have exceeded those from the lobster fishery.

Chart 1: Annual Lobster and Scallop Fishery Revenues (1998-2012)



Lobster landings ranged from a low of 71.2 million pounds in 2001 to a time series high of 149.5 million pounds in 2012 (Table 9). Despite landings that exceed those in 2001 by 50 percent, 2012 revenues only exceeded those in 2001 by 15 percent, because the 2012 price per pound had dropped by more than $2 over the time period (Table 9). By contrast, landings in 2007 and 2008 were nearly identical but the landed value of lobster fell by $60 million as the price per pound fell from $4.42 in 2007 to $3.73 per pound in 2008. The price of lobster has continued to decline since 2007, reaching a low of $2.87 per pound in 2012. Despite annual price declines , lobster revenues have improved since 2008 due to an increase in landings from 79.3 million pounds in 2008 to 149.5 million pounds in 2012.

Table 9: Landings and Inflation Adjusted Value and Price per Pound – 1998 - 2012[a]

Year	Value (millions)	Landings (millions)	Price per Pound
1998	$248.4	79.5	$3.12
1999	$337.3	88.6	$3.81
2000	$316.9	86.6	$3.66
2001	$365.8	71.2	$5.14
2002	$316.3	85.1	$3.72
2003	$287.8	73.4	$3.92
2004	$366.3	89.3	$4.10
2005	$354.3	87.3	$4.06
2006	$369.3	91.7	$4.03
2007	$355.9	80.6	$4.42
2008	$295.5	79.3	$3.73
2009	$310.2	100.5	$3.09
2010	$403.9	117.5	$3.44
2011	$422.9	126.3	$3.45
2012	$429.2	149.5	$2.87

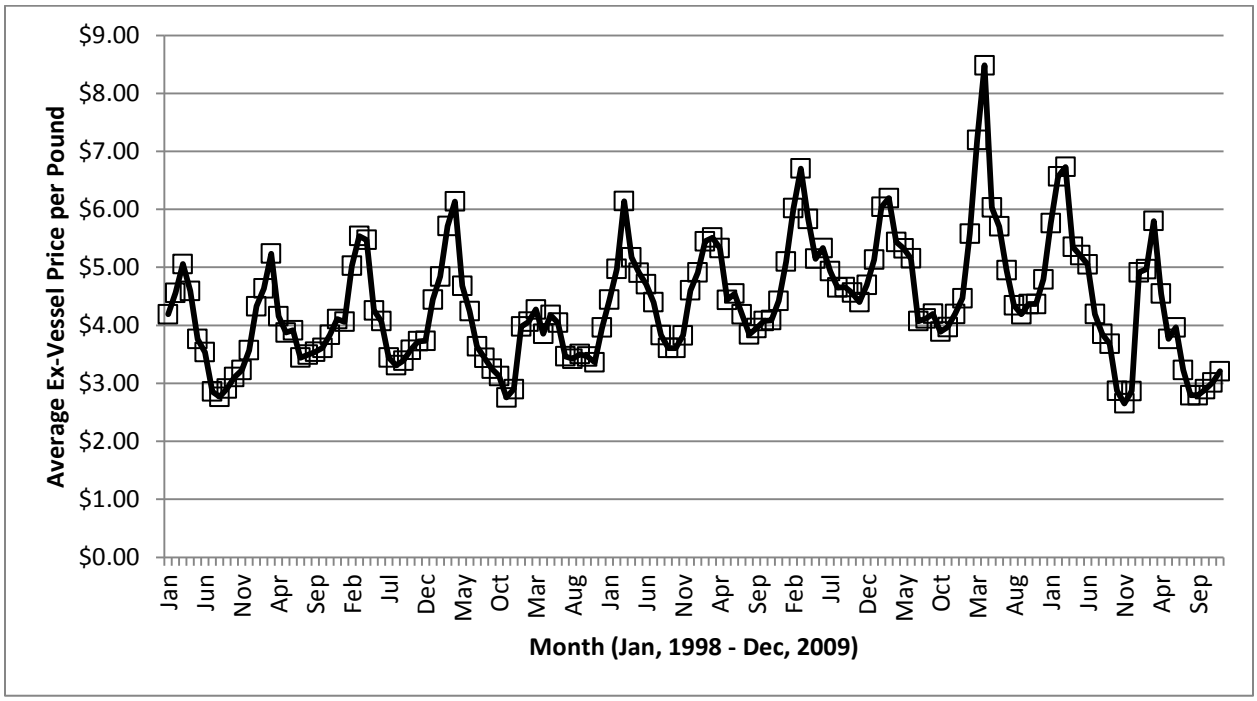
[a] Base year = 2012

Lobster prices typically follow a seasonal pattern corresponding with peaks and valleys in landings. Prices tend to be highest during late winter and early spring months when available supplies are low and lower during the summer and fall when supplies are high (Chart 2). The fall months correspond with a period of high landings and reduced demand for live lobster. In the past a substantial portion of the excess supply of lobster harvested during the fall were sold to Canadian processors or pound operators. This available market tends to keep ex-vessel prices higher than they would be if this market were not available which turned out to be the case in October, 2008. That is, much of the source of credit used by Canadian processors to purchase raw material came from banks in Iceland which effectively collapsed causing a drop in the ex-vessel price to $2.87 in October, 2008. Prices remained below $3.00 per pound in both November and December, 2008. Prices were again in the sub-$3.00 per pound during much of this past late summer early fall months of 2009.

The reasons for the decline in ex-vessel prices are partially rooted in the collapse of Icelandic banks in 2008, which are an important source of financing for Canadian lobster processors – a sector which routinely purchases and processes about half of the Maine lobster harvest each year and ships it worldwide to restaurants, cruise lines and supermarkets (CNN, 2009). Without financing from the Icelandic banks, Canadian processors lacked the capital to purchase Maine lobster, cutting the largest

market for Maine lobstermen and processors. Domestic markets were also diminished as poor economic conditions in the U.S. limited the purchasing power of U.S. consumers on expensive seafood choices such as lobster, despite record low retail prices. Lobster fishermen were further affected by high costs of bait and fuel, which added to the expense of lobster fishing and decreased profits because revenues were reduced by low wholesale prices (CNN, 2009). Lobster prices typically follow a seasonal pattern corresponding with peaks and valleys in landings. Prices tend to be highest during late winter and early spring months when available supplies are low, and during the summer and fall, prices tend to be lower when supplies are high (Chart 2). The fall months correspond with a period of high landings and reduced demand for live lobster. In the past a substantial portion of the excess supply of lobster harvested during the fall were sold to Canadian processors or pound operators. This available market tends to keep ex-vessel prices higher than they would be if this market were not available. The loss of capital to Canadian processors due to the collapse of the Icelandic banks caused a drop in the ex-vessel price to $2.87 in October 2008. Prices remained below $3.00 per pound in November and December 2008 and in the sub-$3.00 per pound range during much of the late summer and early fall months of 2009.

Chart 2: Monthly Average Price per Pound for American Lobster (1998-2009 YTD)



4.5.2 Lobster Fishery Economic Characteristics in SNE

The SNE American lobster fishery is conducted by fishermen from Connecticut, Massachusetts, New York, and Rhode Island, with smaller contributions from New Jersey, Delaware, and Maryland, and states further south (Table 10: Characterization of the 2012 Trap Fishery Permits by State). As discussed in Addendum XVII, little economic data has been collected on the SNE fishery, making it difficult to characterize this portion of the fishery. A concurrent action qualifying trap allocations for Areas 2 and the Outer Cape, and implementing a trap transferability program included an in-depth analysis of lobster

trap fishermen operating in Areas 2 and 3, based on a stratified, random survey conducted by GMRI, using data as recent as 2008 (GMRI, 2008). That information is incorporated here by reference.

Table 10: Characterization of the 2012 Trap Fishery Permits by State

State	Total 2012 Total Permits	2012 Total Area Trap holders	2012 Active Permits	Area 1 Active Permits	Area 2 Active Permits	Area 3 Active Permits	Area 4 Active Permits	Area 5 Active Permits	Area 6 Active Permits	Area OCC Active Permits
ME	1,332	1,283	1,220	1,218	0	4	0	0	0	0
NH	92	72	49	38	0	11	0	0	0	0
MA	730	469	358	269	46	23	0	0	0	21
RI	201	166	115	3	91	25	0	0	0	1
CT	27	23	6	0	2	0	1	0	5	0
NY	87	48	18	1	8	4	13	0	7	1
NJ	184	86	36	2	1	4	25	10	0	0
DE	8	7	4	0	0	0	0	4	0	0
MD	10	7	6	1	0	1	0	5	0	0
VA	46	7	1	0	0	1	0	0	0	0
NC	31	5	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0	0
FL	2	2	0	0	0	0	0	0	0	0
Totals	**2,750**	**2,175**	**1,813**	**1,532**	**148**	**73**	**39**	**19**	**12**	**23**

The SNE fleet is primarily comprised of "small vessels (22' to 42') that made day trips in near shore waters (less than 12 miles) (ASMFC 2012a)." A description of the SNE commercial fishery in Addendum XVII indicates that 623 total permit holders, out of a universe of 1,486 permits that were eligible to land lobster, reported landings in 2009. The estimated total number of traps reported fished for the SNE stock unit only includes data from Connecticut, Massachusetts, Rhode Island, and New York. Data are not available for states south of New Jersey.

In addition to being authorized to fish for lobster through a limited access permit (and additional area trap qualifications), state and federal commercial lobster fishers must purchase a trap tag that must be affixed to each lobster trap deployed. Trap tag eligibility is another method for estimating the number of traps that were fished. Massachusetts and Rhode Island lobster permit holders were eligible to order the majority of tags authorized for SNE (Areas 2-5), while permit holders in the remainder of SNE were authorized for far fewer trap tags (Table 111).

Table 11: 2012 Trap Tag Order Summary

State	Trap Tags Authorized	Trap Tags Ordered†	Area 1 Tags*	Area 2 Tags*	Area 3 Tags*	Area 4 Tags*	Area 5 Tags*	Area 6 Tags*	Area OCC Tags*
ME	975,526	911,532	909,830	0	3,102	0	0	0	0
NH	45,673	53,632‡	36,840	0	16,792	0	0	0	0
MA	279,977	286,622	217,110	23,674	34,115	0	0	0	11,732
RI	103,811	107,835	2,452	67,351	41,364	0	0	0	772
CT	5,209	5,160	0	1,700	0	880	0	4,280	0
NY	16,487	14,162	800	5,388	3,126	10,184	0	5,005	800
NJ	39,179	35,806	1,100	800	6,149	26,907	6,497	0	0
DE	3,930	4,109	0	0	0	0	4,764	0	0
MD	5,856	5,275	400	0	1,215	0	4,060	0	0
VA	858	943	0	0	943	0	0	0	0
NC	0	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0
FL	0	0	0	0	0	0	0	0	0
Totals	**1,476,506**	**1,371,444**	**1,168,532**	**98,913**	**106,806**	**37,971**	**15,321**	**9,285**	**13,304**

†"Trap Tags Ordered" may exceed "Trap Tags Authorized" because any permit holder may order an additional 10% tags in excess of their trap allocation as replacement tags.
*Note: "Tags" numbers will not correlate with the numbers for "Trap Tags Ordered" due to individual permit holders having permits that enable them to fish more than one area at any one time. For example, if a permit holder is authorized to fish 800 traps and holds permits for Areas 2 and 3, those 800 traps will contribute to both the Area 2 and Area 3 "Tags" columns but will be counted once in "Trap Tags Ordered" column.
‡NH trap tags ordered is higher than the number authorized because of a conservation equivalent Authorized by the Commission

Commercial landings in the SNE stock increased sharply from the early 1980s to the late 1990's, reaching a time series high of 9,935 metric tons in 1997. Landings remained near time series highs until 1999, then declined dramatically back to levels observed in the early 1980's. Four out of the five lowest levels of lobster landings in the SNE stock have occurred since 2003 (ASMFC 2012a). Based on 2010 data, (Table 12), Rhode Island landed the largest proportion of SNE lobster, followed by New York (25%), Connecticut (15%), Massachusetts (14%), and New Jersey/Delaware/Maryland/Virginia (9%) in descending order (ASMFC 2012a). The majority of landings from SNE have been harvested from Areas 3 and 2, followed by Areas 4 and 5.

Table 12: 2010 SNE Landings by Area (in pounds)

State	Area 2	Area 3	Area 4	Area 5
MA*	449,574	240,361	0	0
RI	1,035,983	1,194,353	56	0
CT	16,056	269	0	0
NY**	11,005	164,251	80,659	0
NJ^	0	238,778	519,907	9,031

* A small portion of MA SNE landings are in OCC
**NY landings are based on ACCSP reconciliation which includes all gear types
^ NJ data are from 2009

As described in Table 13, the total value of the SNE fishery in 2010 was $18,718,509. Areas 2 and 3 landed the largest proportion of the total value for the SNE fishery. Very little economic data have been collected in SNE in recent years which make it difficult to assess the economic impacts of management measures on the fishery.

Table 13: 2010 Ex-vessel value of SNE landings (in dollars)

State	All SNE (Including LCMA 6)	Area 2	Area 3	Area 4	Area 5
MA*	$2,994,836	$1,928,672	$1,031,147	$0	$0
RI	$9,307,164	$4,323,035	$4,983,895	$234	$0
CT	$1,453,279	$66,472	$1,114	$0	$0
NY**	$2,565,638	$300,965	$395,035	$186,992	$135,413
NJ^	$2,397,592	TBD	TBD	TBD	TBD
	$18,718,509	$6,619,144	$6,411,191	$187,226	$135,413

*A portion of MA landings are from the area 2/3 overlap therefore those are only accounted for in the total $ of SNE ex vessel
**NY ex vessel $s and landings by month and LCMA from SAFIS were used to determine the $/lb by area, this was then applied to ACCSP reconciled landings (which include all gear types) by month and LCMA to estimate the ex vessel $
^ NJ data are from 2009

4.5.3 Social Environment

The social environment discussion below examines the social and cultural setting of the communities potentially affected by the proposed SNE management measures. Potentially affected communities were identified by first looking at the distribution of lobster fishers (trap vessels) across the relevant states and management areas, then identifying the towns in which those lobster license holders reside and, finally, identifying the counties in which those towns are located. Within each county, social and cultural characteristics of the towns with the strongest participation in the American Lobster fishery were used as a proxy for the county as a whole. 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.

4.5.4 Location of the Commercial Lobster Industry

This section describes the historical participation in the commercial lobster industry from 2000 to 2012 at the state and local level in order to identify where geographically the most active parts of the industry are located. The data used for this analysis is based on the information available data from fishing years 2000 through 2012. Following this discussion, the analysis considers the social profiles of the most active communities identified; it is assumed that these communities are potentially most affected by the proposed management measures for American Lobster. Beginning at the state level, the American Lobster fishery breaks down by state and across LCMAs as indicated in the tables, below.

Tables 14, 15, 16, and 17 use best-available Federal permit data to provide some initial insight into the shifting presence of the lobster industry, geographically speaking, within LCMAs 2, 3, 4 and 5 since 2000, both in terms of absolute numbers of participants (measured by number of vessels permitted), and how this participation breaks down by state. While these data provide a useful starting point for an analysis, they have a number of practical limitations that are noted below.

Table 14: Federal Trap Vessels in LCMA 2 by State

A2					
	2000	**2004**	**2007**	**2009**	**2012**
CT	12	16	16	17	15
MA	253	204	176	161	132
ME	71	68	22	15	15
NH	10	12	11	7	6
NJ	10	24	28	25	27
NY	33	43	42	35	29
RI	215	201	169	161	154
Other	2	7	7	6	4
Totals	606	575	471	427	382

Table 15: Federal Trap Vessels in LCMA 3 by State

A3					
	2000	**2004**	**2007**	**2009**	**2012**
CT	3	4	2	2	1
MA	173	43	34	40	38
ME	393	18	6	7	11
NH	32	13	10	11	12
NJ	67	16	9	10	8
NY	23	10	5	4	4
RI	93	43	39	33	35
Other	22	3	4	3	3
Totals	806	150	109	110	112

Table 16: Federal Trap Vessels in LCMA 4 by State

LCMA 4					
	2000	**2004**	**2007**	**2009**	**2012**
CT	7	4	5	4	3
MA	33	0	0	0	0
ME	16	0	0	0	0
NJ	92	44	40	42	42
NY	52	24	20	21	20
RI	39	1	1	0	0
Other	5	1	2	3	2
Totals	244	74	68	70	67

Table 17: Federal Trap Vessels in LCMA 5 by State

LCMA 5					
	2000	**2004**	**2007**	**2009**	**2012**
DE	13	11	9	8	7
MA	28	2	1	1	1
MD	5	7	8	7	6
ME	15	1	0	0	0
NJ	74	22	22	25	24
NY	12	5	1	1	0
RI	9	0	1	1	1
VA	4	4	4	3	4
Other	8	4	3	2	2
Totals	168	56	49	48	45

First, while the data presented is the best available, it is best viewed as an approximation of industry participation in the lobster fishery. Exact figures are not available. Further, a true understanding of industry participation is not possible without considering the behavior of fishermen in relation to the management constraints in which they operate. Under Federal regulations, vessel owners are required to designate which Areas they will be fishing in on their yearly permit applications. However, under past Federal regulations, permit holders in Areas 2 and OCC could to elect into these Areas. A recent final rule[32] approved a limited access program in Areas 2 and OCC, capping and controlling the amount of effort in these areas. The number of permits is expected to be reduced following the qualification process that is currently underway, as occurred when limited access programs were implemented in Areas 3, 4 and 5 in 2003. Therefore, there was little incentive for fishers to limit themselves in terms of the areas in which their permits would allow them to fish and, as a result, many if not most fisherman simply "checked off" multiple Areas, regardless of whether they intend to actually fish in those Areas. This has created a sort of "dual reality," whereby participation "on paper" may be substantially different from the "true" level of participation. Looking at the data (Table 15), this effect is evident in Area 3: in 2000, 393 and 173 vessels from Maine and Massachusetts, respectively, designated Area 3 on their permits; once a limited-access program was implemented in 2003 (68 FR 14902, March 27, 2003), however, those numbers plummeted to 18 and 43, and fell even further, to 6 and 34, by 2007. The number of lobster permit holders electing Area 3 remained relatively stable from 2008 to 2012. Since individual fishermen qualified into Area 3 according to their documented historic participation, it can be argued that in the years following the Area 3 limited access program, the numbers more accurately reflect actual fishing effort in that Area, even historically speaking, compared to the much higher numbers recorded for 2000. This same "dual reality" would also apply in Areas 2, 4, and 5. Further, as regulations have, more recently, become more complex with area-specific measures, the Most Restrictive rule created a disincentive to elect multiple areas, as introduced in Section 1.5.

[32] National Marine Fisheries Service (2014)

Given these limitations, it is most relevant to consider the participant data in absolute terms and in terms of change over time, rather than as exact numbers. Using this approach, based on the relative number of trap vessels across states, the data show in general that, in Areas 2 and 3, Massachusetts and Rhode Island are the major participants (both historically and based on the most recent 2012 data), followed by New York and New Jersey. Similarly, in Areas 4, New Jersey and New York are the major participants (both historically and based on the most recent 2012 data), followed by Connecticut. Finally, in Areas 5, New Jersey is the major participant (both historically and based on the most recent 2012 data), followed by Delaware and Maryland. Further, overall participation has been declining among the major participants across all LCMAs, with participation in LCMA 3 showing the most dramatic decrease over the 8-year period from 2000 to 2007.

Charts 3, 4, 5, and 6 graphically illustrate the data presented in Table 14, 15, 16, and 17 for the distribution of vessels across states from 2000-2012 for Areas 2, 3, 4, and 5. Overall the results support what NMFS would intuit is occurring across lobster management areas. In Areas 2 and 3, for example, one would expect the contiguous states to have the largest number of participants, in this case, Massachusetts and Rhode Island, because of the day-boat nature of the fishery (as described earlier). Further, in Massachusetts and Rhode Island, the number of participants has declined over time, most likely due to the influence of the Most-Restrictive Rule (see Section 1.5) and, for LCMA 3, the implementation of a limited access program at the state level, combined with restrictions on gauge size and other broodstock protection measures that were implemented during this period, discouraging its use by some fishers.

Chart 3: # LCMA 2 Trap Vessels by State (2000-2012)

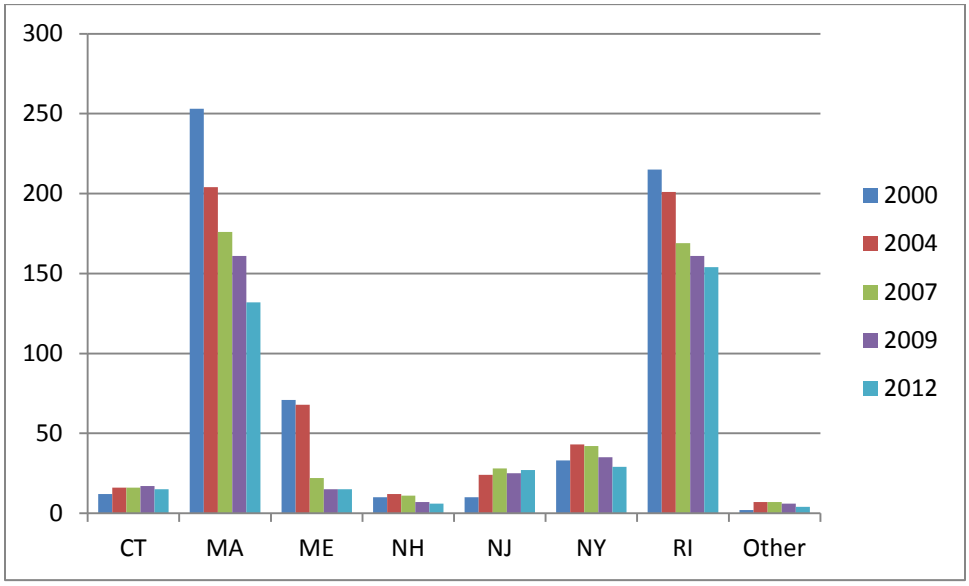


Chart 4: # LCMA 3 Trap Vessels by State (2000-2012)

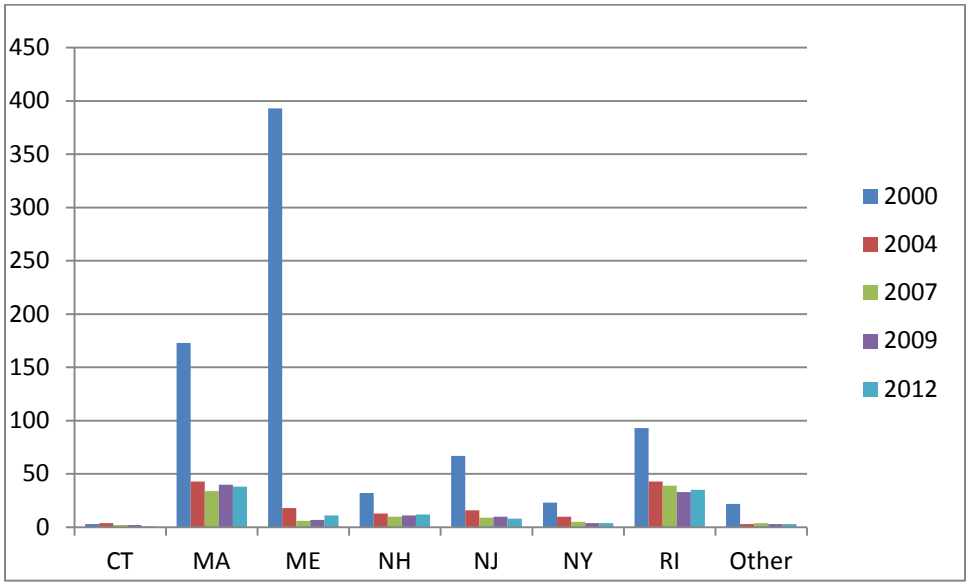


Chart 5: # LCMA 4 Trap Vessels by State (2000-2012)

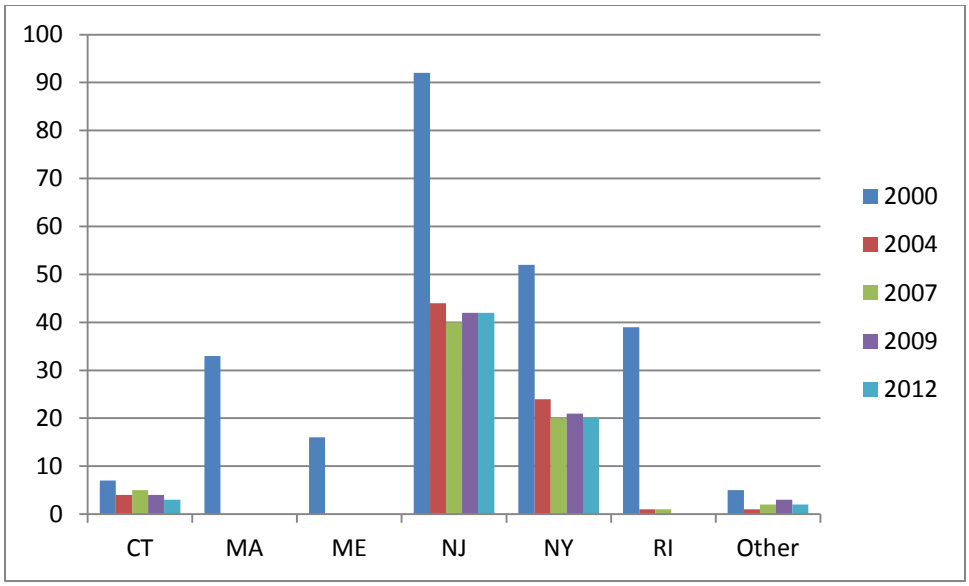
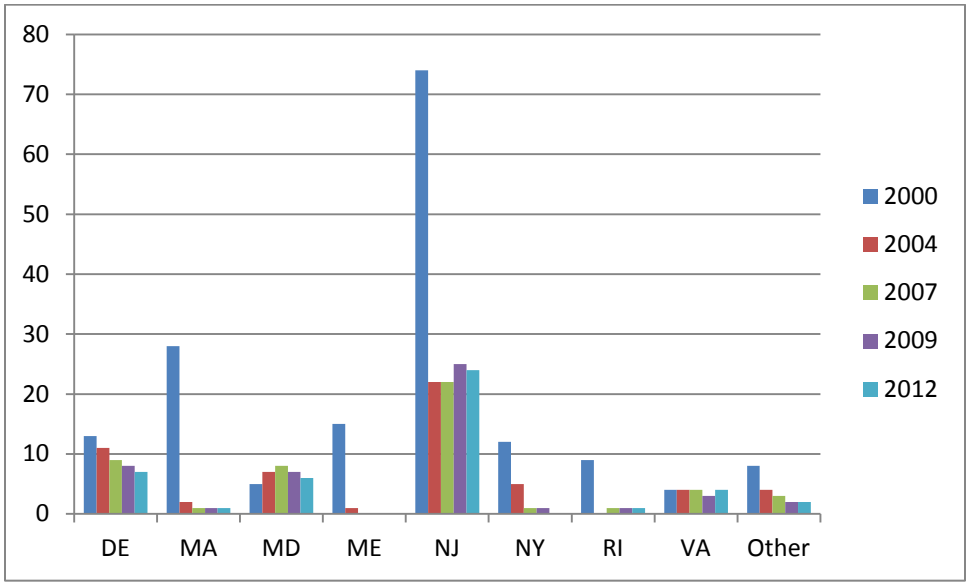


Chart 6: # LCMA 5 Trap Vessels by State (2000-2012)



While these results begin to characterize the commercial lobster fishery, they tell only about the size of the industry over time; making the link between the number of vessels (i.e., licenses) and the amount of fishing effort is more difficult.

As with industry participation, there is no readily available data that precisely measures fishing effort within the American Lobster fishery. One cannot, for example, assume that an individual fisher who purchases 800 traps actually fishes all of those traps, and there is no official record keeping of what is actually fished. Given this lack of information, NMFS considered trap tag[33] data by state and LCMA from 2000-2012 as a proxy for fishing effort. In using this data, we acknowledge that trap reductions do not fully equate with an equal or proportionate reduction in fishing effort; we believe, however, that, in gross terms, data showing trends in trap tags purchased over time is useful in combination with other indicators to demonstrate existing conditions within the lobster fishery.

The trap tag data show that, concurrent with a significant reduction in the number of vessels participating in the lobster fishery from 2000-2007, the number of trap tags purchased for LCMA 2 also declined across all states by a dramatic 50-to-82% over the same time period. Important to consider, however, is that this reduction to a large degree reflects the more accurate accounting of fishing effort that could take place once the Most Restrictive Rule (see Section 1.5) was implemented in 2004. Further, Massachusetts implemented state-level requirements that only those permit holders who landed their catch within the state could qualify for trap tags. These measures together helped to eliminate a significant degree of the "dual reality" conditions describe earlier, where the level of effort "on paper" was more than the actual level of effort taking place. In this context, the decline in trap tags purchased represent a certain amount of reduction in effort (unquantifiable) combined with more accurate accounting (also unquantifiable).

[33] A "trap tag" is a marker tag permanently attached to the trap bridge or central crossmember of a lobster trap, identifying permit number, permit year, authorized management area and/or trap number.

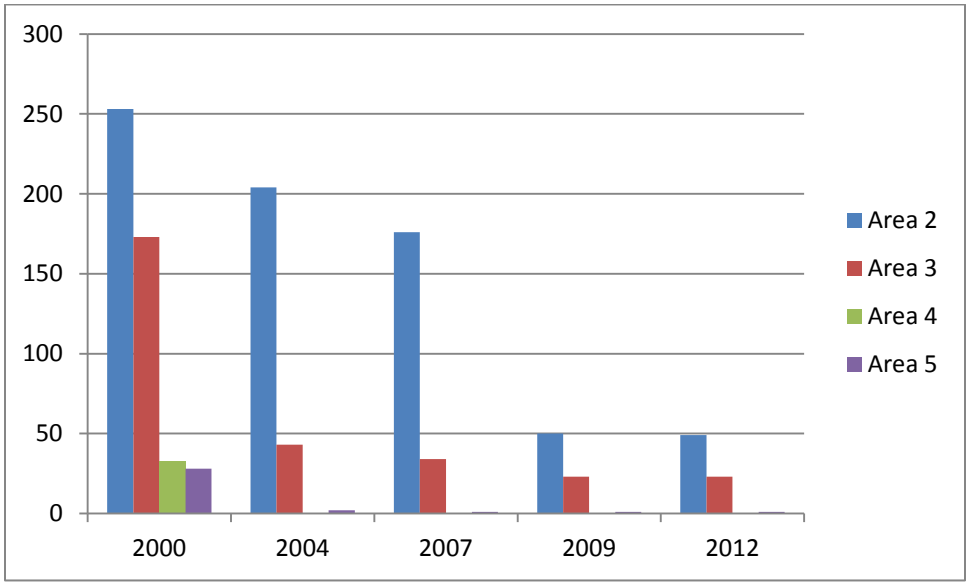
Trap tag purchases for Area 3 also show declines of 62 percent to 73 percent from 2000-2007 for Massachusetts and Rhode Island, respectively. These declines were largely driven by the implementation of a Federal limited access program for LCMA 3 (68 FR 14902, March 27, 2003), combined with the Most Restrictive rule. The numbers for the later 2004-2007 years are also thus a more accurate reflection of actual fishing effort (a conclusion supported by the relatively strong correlation between the number of vessels electing Area 3 and the number of vessels purchasing trap tags, as well as the number of trap tags authorized and the number of trap tags purchased).

The following section analyzes industry participation in the American Lobster fishery state-by-state and, within each state, county-by-county for each Area.

Massachusetts

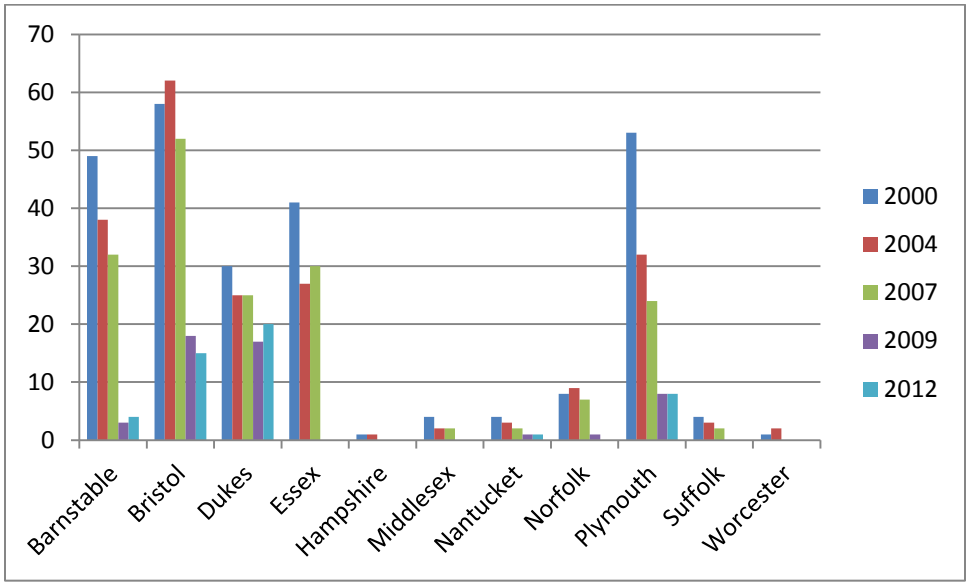
In Massachusetts, overall participation in the American Lobster fishery has declined across all Areas between 2000-2012, with the most dramatic decline occurring in LCMA 3 (Chart 7). In general, these data are consistent with the impact one would expect to see following the implementation of the Most Restrictive Rule and, for LCMA 3 in particular, a Federal limited access program in 2004.

Chart 7: Total # MA vessels in LCMA 2, 3, 4, and 5 (2000-2012)



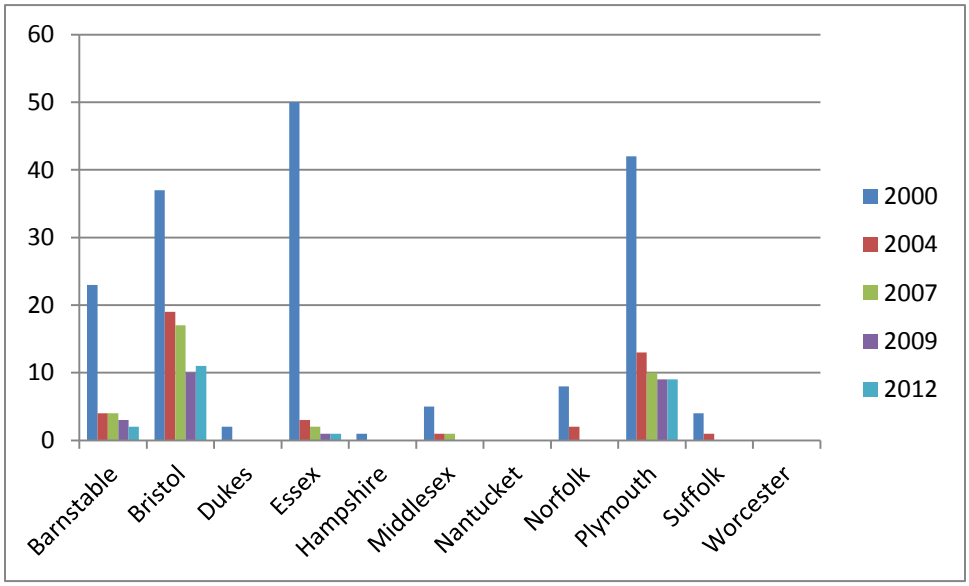
At the county level, 11 Massachusetts counties participated in the American lobster fishery at some level from 2000-2012. Within LCMA 2, as depicted in Chart 8, Barnstable, Bristol, Dukes, Essex, and Plymouth comprised 90 percent of the total participation in 2000 (participation from the other six counties was at less than 3 percent each of the total). Of the top five counties participating, Bristol and Plymouth experienced the largest change over the 12-year period from 2000-2012, with Bristol increasing by 8 percent and Plymouth decreasing by 4 percent by 2012. Change in participation for the other top counties fluctuated between one-to-two percent over the same period.

Chart 8: Total # LCMA 2 Vessels by MA County (2000-2012)



Within Area 3, as depicted in Chart 9, Barnstable, Bristol, Essex, and Plymouth comprised 88 percent of the total participation in 2000. Of these four counties, Bristol's level of participation rose from 21 percent in 2000 to 48 percent by 2012, while Essex's participation level dropped from 29 percent to 4 percent during the same period. The top four counties, Barnstable, Bristol, Essex, and Plymouth, all experienced dramatic declines from 2000 to 2012 in the number of permitted vessels from those counties electing in A3, a result that largely reflects the Limited Access Program that was implemented there during this time period, as well as the other possible reasons identified above. At the same time, Bristol County's percentage share of the total nearly doubled, from 21 to 48 percent, though the number of vessels shrunk from 37 to 11 during this time period. In Plymouth County, the percentage share of the total number of vessels changed from 24 percent to 39 percent, while in absolute terms, the number of vessels shrunk from 42 to 9.

Chart 9: Total # LCMA 3 Vessels by MA County (2000-2012)



A limited number of vessels were permitted to fish in Area 4 and 5 during the time period displayed above. As seen in Charts 5 and 6, some vessels were permitted for Areas 4 and 5 in 2000. These permits have since not been issued. One general conclusion can be made from these data: for some counties, the numbers of vessels *as a percentage of the total* have not changed significantly from 2000-2012, even though in absolute terms it may look like a large number of vessels have left the fleet. This is the case for Plymouth County, where in LCMA 2, the percentage of the total number of vessels in Massachusetts electing Area 2 declined from 21 percent to 17 percent from 2000-to-2012, while the absolute number of vessels dropped from 53 to 8, or 85 percent, during this time period.

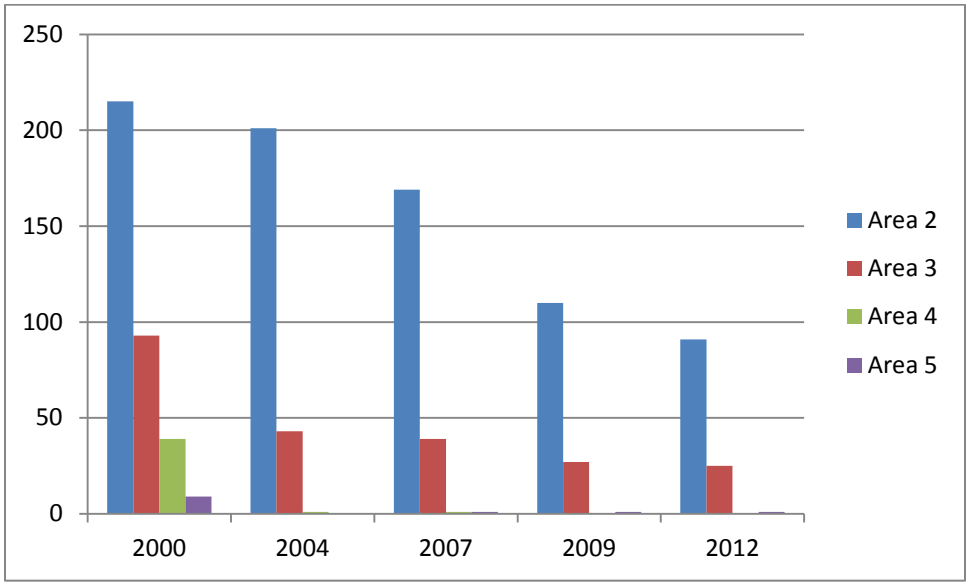
A number of reasons may account for the loss of fishing vessels within a fleet and the data available are not robust enough to identify specifically how many vessels left for which reasons. Potential reasons, unquantifiable here, include:

- More restrictive regulations that create a disincentive to stay in the industry:
    - Most Restrictive Rule (requiring that a vessel owner abide by the more restrictive trap allocation of the LCMAs in which he/she fishes); and
    - broodstock measures, such as gauge limit size, etc.
- Owners transfer out of one LCMA and into another.
- Aging fishers decide to retire from the industry.
- More accurate accounting as a result of Most Restrictive Rule and, in the case of LCMA3, the move to a Federal Limited Access Program within LCMA 3, both of which helped to close the "gap" between what the size of the industry looked like "on paper" versus how many vessels were actually fishing in elected management areas.

Rhode Island

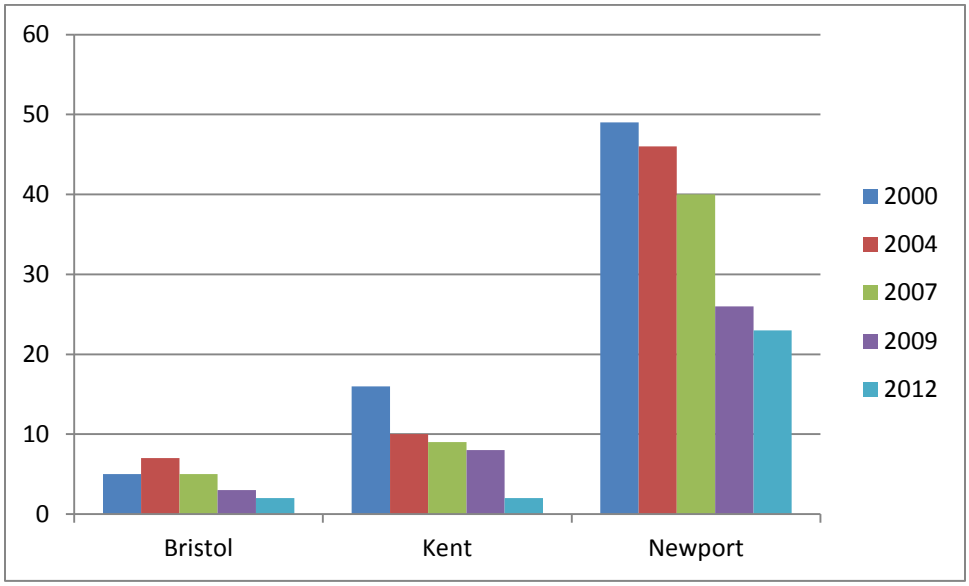
For Rhode Island, participation in LCMA 2 dominates across all time periods relative to LCMA 3, 4, or 5. Further, LCMA 2, LCMA 3 showed moderate-to-significant decline in participation during the 2000-to-2012 period.

Chart 10: Total # RI Vessels in LCMAs 2, 3, 4, 5 (2000-2012)



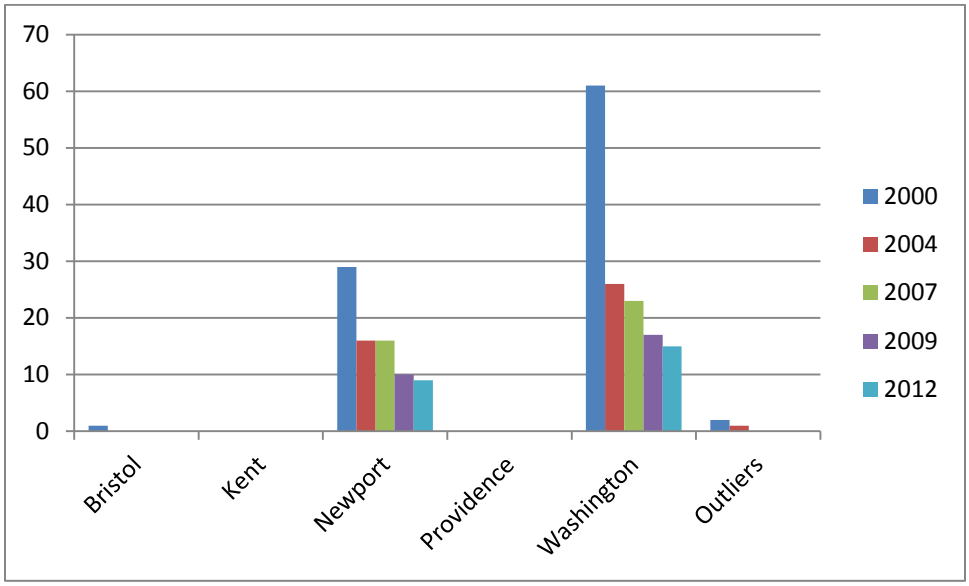
At the county level, five counties--Bristol, Kent, Newport, Providence, and Washington--participated in the American Lobster fishery at some level from 2000-2012. Within LCMA 2, Newport and Washington counties comprised 88 percent of the total participation in 2000 (participation from the other four counties ranged from 1-7 percent of the total) and that percentage remained nearly constant over the 2000-to-2012 period. For the two top Rhode Island counties, Newport and Washington, the absolute number of vessels electing to fish in the LCMA 2 (Chart 11) dropped moderately over the 2000-2012 period (from 49-23 and 140-63, respectively).

Chart 11: Total # LCMA 2 Vessels by RI County (2000-2012)



In LCMA3, Newport and Washington counties remained the dominant players, though they shifted their weight between each other +/- 7 to 10 percent from 2000-2012. However, that number dropped dramatically in Newport and Washington, from 29-9 and 61-15, in contrast to a much smaller decline of 7 percent relative to the total Rhode Island fishery during this time period (Chart 12).

Chart 12: Total # LCMA 3 Vessels by RI County (2000-2012)

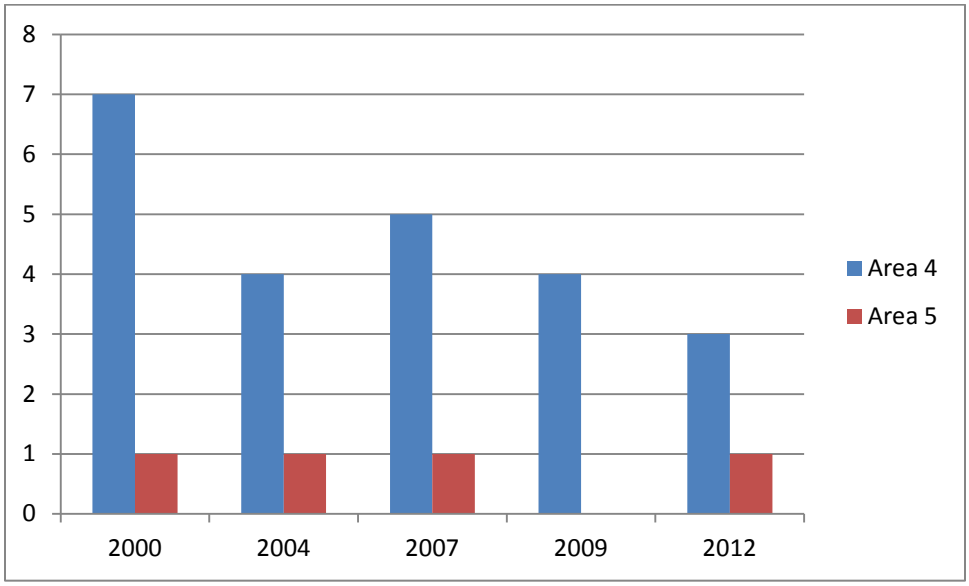


Again, a limited number of vessels were permitted to fish in Area 4 and 5 during the time period displayed above. As seen in Charts 5 and 6, some vessels were permitted for Areas 4 and 5 in 2000. These permits have since not been issued.

Connecticut

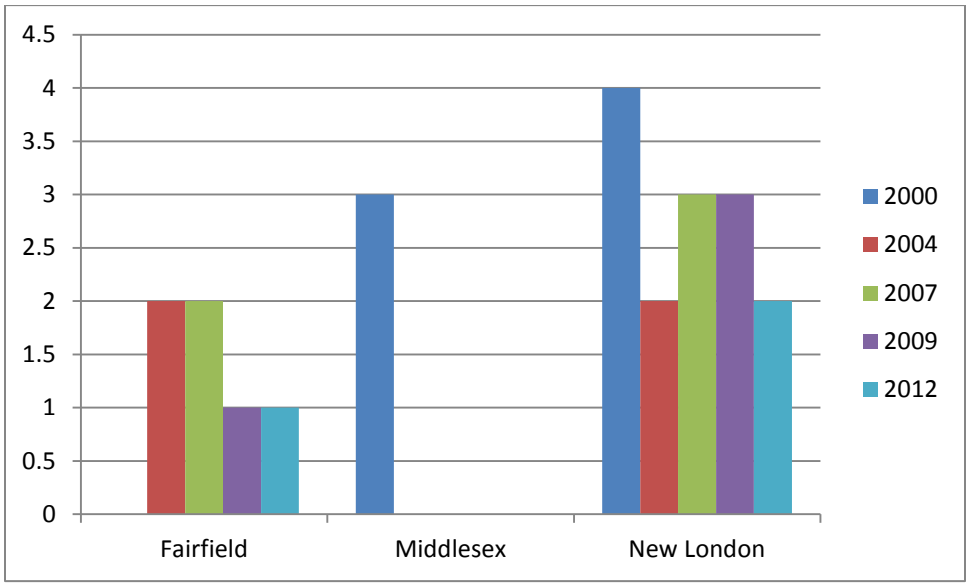
In Connecticut, overall participation in the American Lobster fishery has declined across all Areas between 2000-2012, with the most dramatic decline occurring in LCMA 4. In general, these data are consistent with the impact one would expect to see following the implementation of the Most Restrictive Rule. Because of its proximity to Area 6, which encompasses the entirely of Long Island Sound, many Connecticut permits include Area 6 designations.

Chart 13: Total # CT Vessels in LCMAs 4 and 5 (2000-2012)



At the county level, three counties—Fairfield, Middlesex, and New London--participated in the American Lobster fishery at some level from 2000-2012. Within LCMA 4, New London has included the majority of permit holders throughout the time series, comprising approximately 60 percent of permits in 2000, up to 66 percent of permits in 2012. Participation in Fairfield has dropped by half, and participation in Middlesex County has been eliminated

Chart 14: Total # LCMA 4 Vessels by CT County (2000-2012)

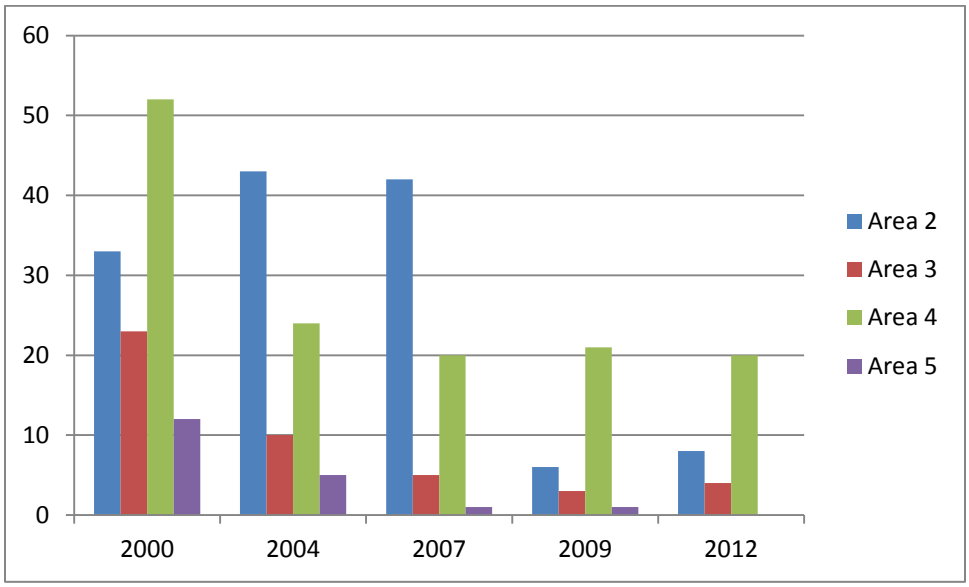


One permit, from New London County, has qualified to participate in Area 5. This permit has been issued in the majority of years during the time series.

New York

For the New York fishery overall, what stands out is the shift in participation away from LCMAs 3, 4, and 5 following the implementation of a Limited Access Program there in 2004, into LCMAs 2 which shows rising levels of participation over the 2000-2012 period.

Chart 15: Total # NY Vessels in LCMAs 2, 3, 4, 5 (2000-2012)



Suffolk County is by far the largest participant across all LCMAs, representing from 50-100% of the NY fishery at any one time during the 2000-2012 period.

In terms of absolute numbers of vessels, the most notable change occurred in LCMA 3 (Chart 16), which decreased from 16 to 4 over the 12-year period (2000-2012)--a 75 percent drop. This is consistent with the changes noted above that took place in the NY fishery following the implementation of a Limited Access Program for LCMA 3. A similar decrease is noted in Area 4 (Chart 18), with the number of permits being issued dropping by half. Participation in Area 5 from New York vessels has ceased during the time series (Chart 19). Also consistent is the increase from 2000 to 2007 in vessels that occurred in the other LCMA 2, as boats migrated to other management areas once NMFS implemented a limited access program in LCMA 3 (Charts 16 and 17). Since then, the Commission implemented a limited access program in LCMA 2. In LCMA 2, the number of vessels decreased from 33 to 8 over a 5-year period—a 75 percent drop.

Chart 16: Total # LCMA 3 Vessels by NY County (2000-2012)

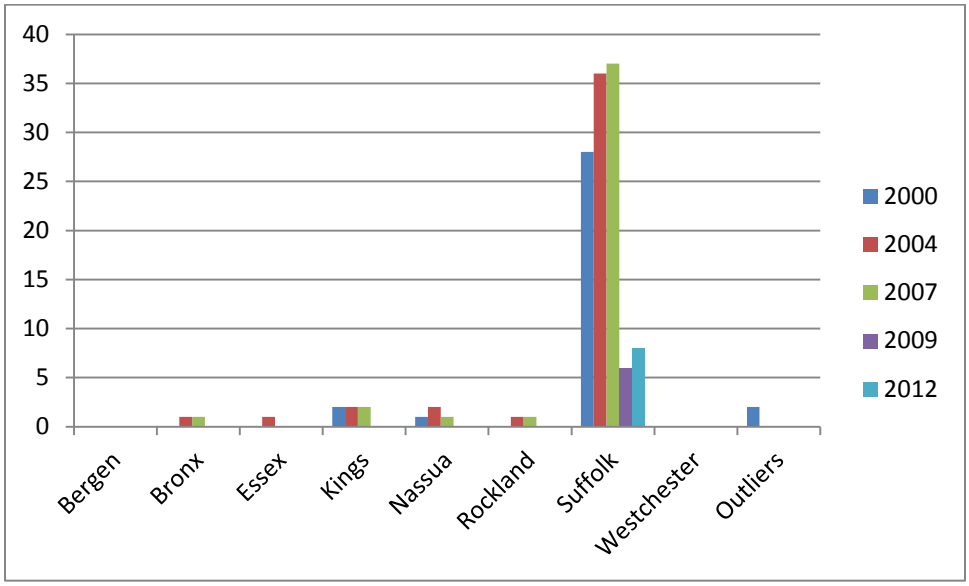


Chart 17: Total # LCMA 3 Vessels by NY County (2000-2012)

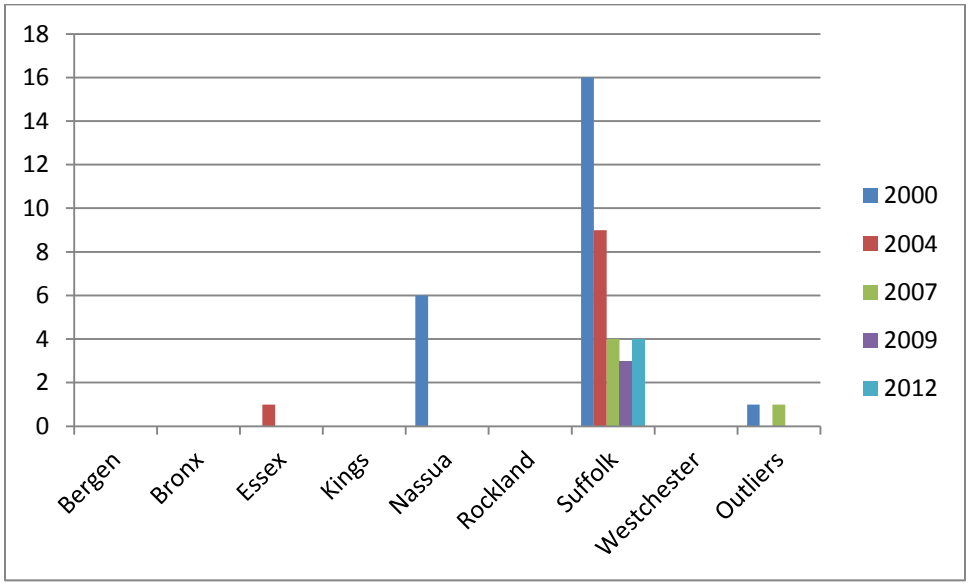


Chart 18: Total # LCMA 4 Vessels by NY County (2000-2012)

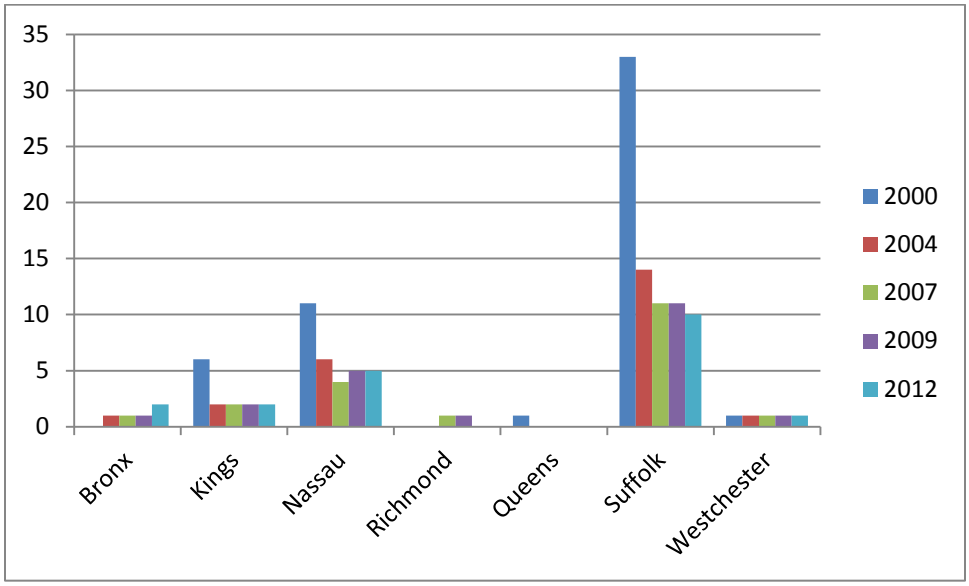
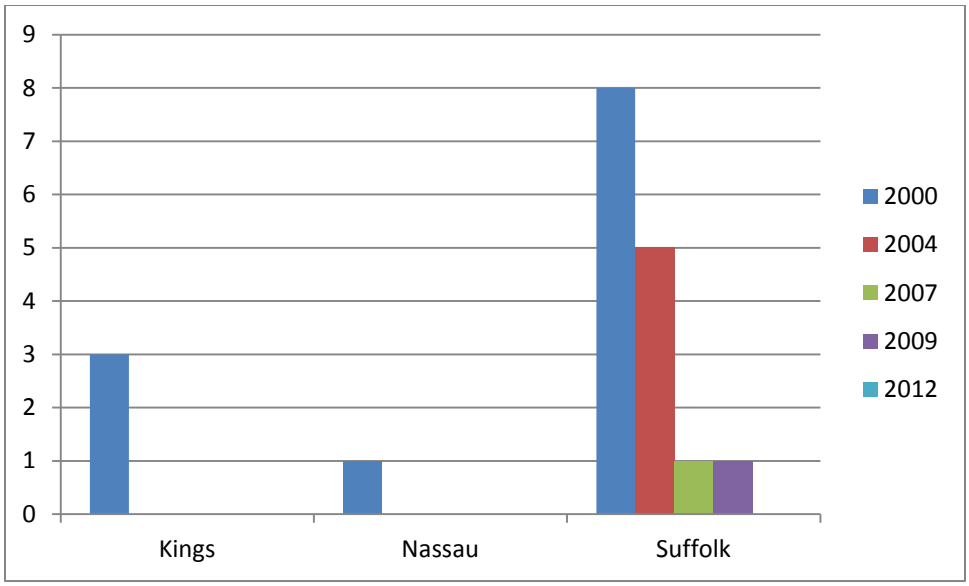


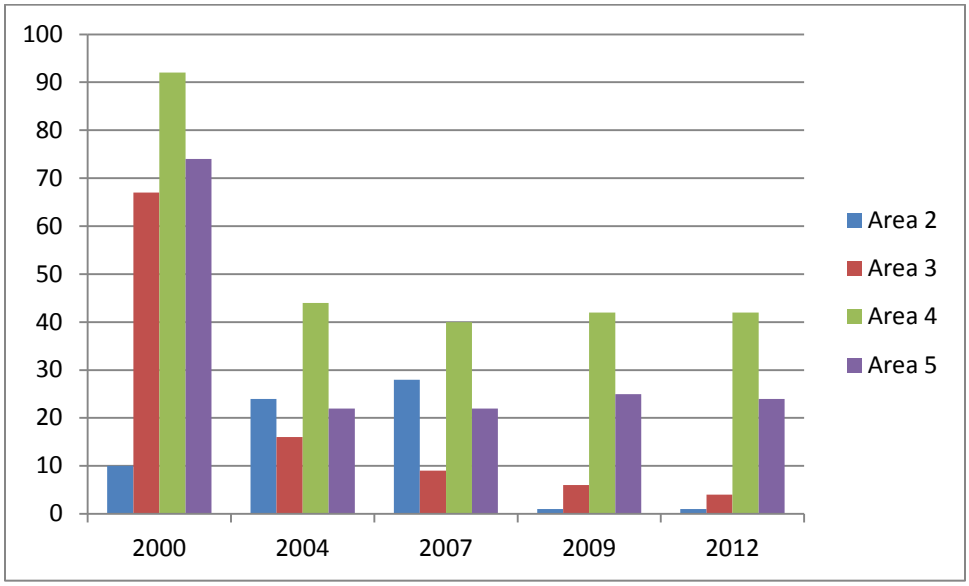
Chart 19: Total # LCMA 5 Vessels by NY County (2000-2012)



New Jersey

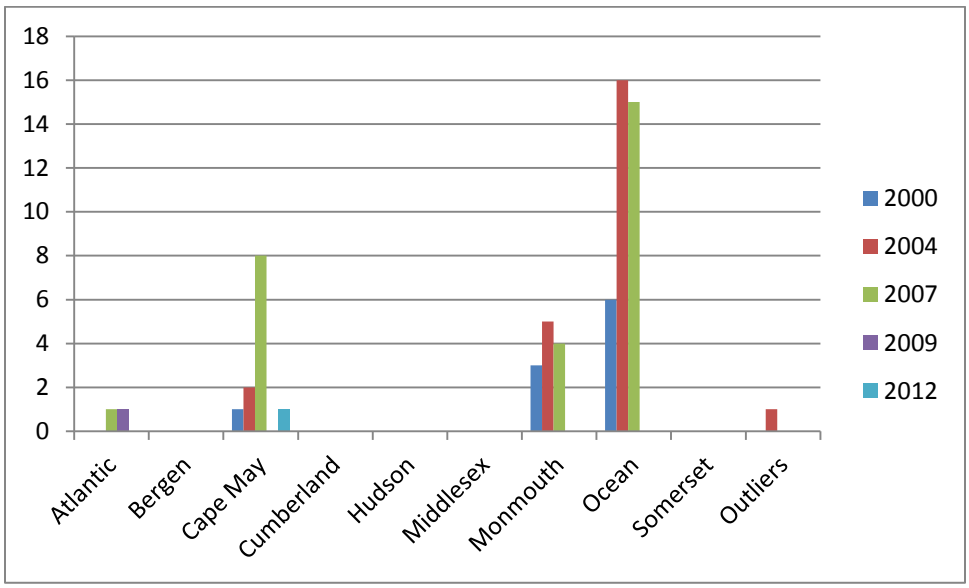
For the New Jersey fishery overall, Federal data shows a larger historic participation in Areas 4 and 5. It also indicates a shift in participation away from LCMA 3, following the implementation of a limited access program there in 2004, and into LCMA 2 from 2000-2012 (Chart 20). The number of vessels decreased since 2007 for LCMAs 2. In absolute numbers, the permits issued in all four areas has decreased during the time series.

Chart 20: Total # NJ Vessels in LCMAs 2, 3, 4, and 5 (2000-2012)



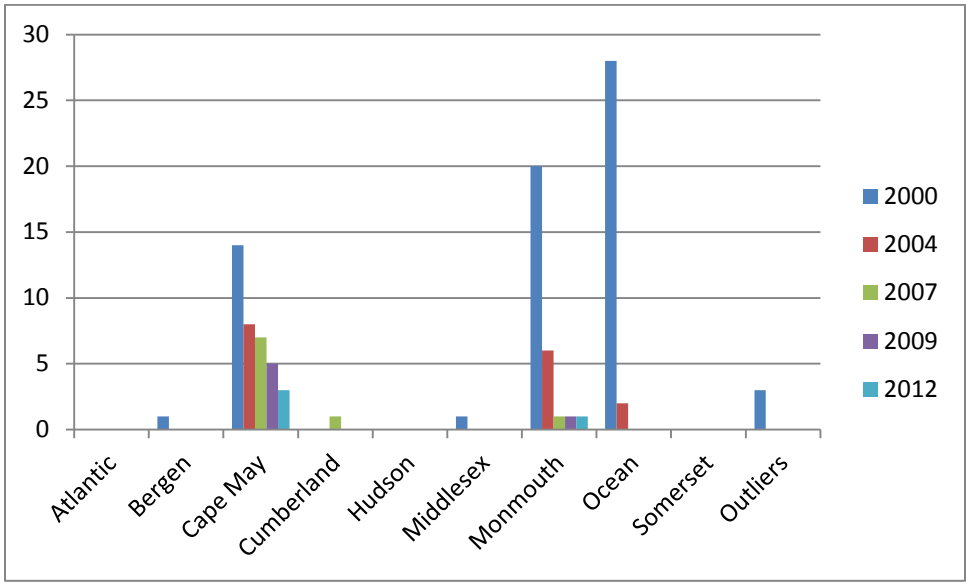
At the county level, of the nine New Jersey counties participating from 2000-2012, there are three dominant players across all LCMAs: Cape May, Monmouth, and Ocean. Of these, Ocean County dominates in LCMA 2, followed Cape May and Monmouth counties, which reversed positions with each other during the 8-year period from 2000-2007. Consistent with the trends described above for New York, Federal permit data shows that Ocean County had the strongest representation in LCMAs 2, while losing the highest number of vessels in LCMA 3 from 2000-2007 (Charts 21 and 22).

Chart 21: Total # LCMA 2 Vessels by NJ County (2000-2012)



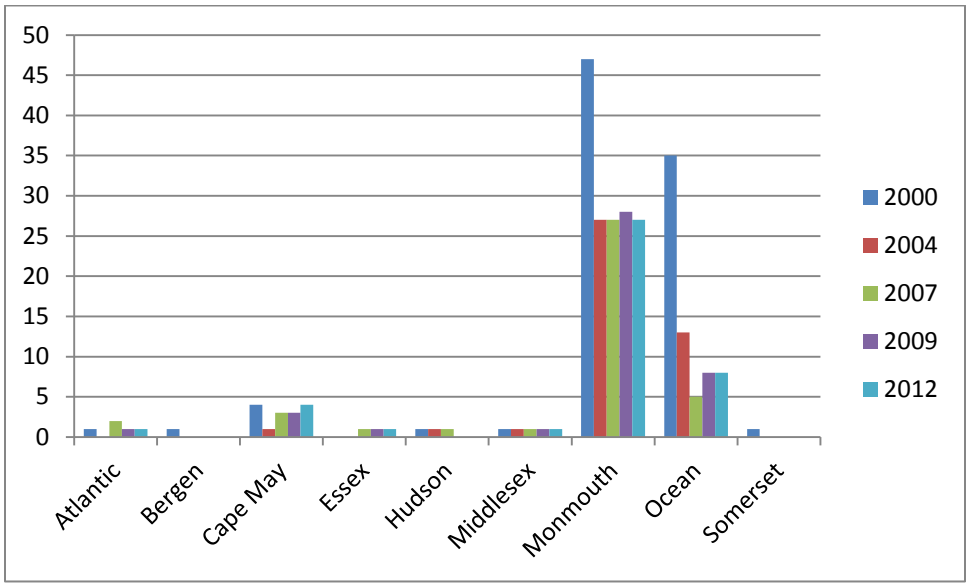
As mentioned above, similar to New York, New Jersey's participation in LCMA 3 dropped by a precipitous 94 percent from 2000-2012, following the implementation of a Limited Access program in that management area (Chart 22). With only 4 NJ vessels left in the LCMA 3 fishery by 2012 (down from 67 in 2000 to 4 in 2012), 3 of those resided in Cape May County.

Chart 22: Total # LCMA 3 Vessels by NJ County (2000-2012)



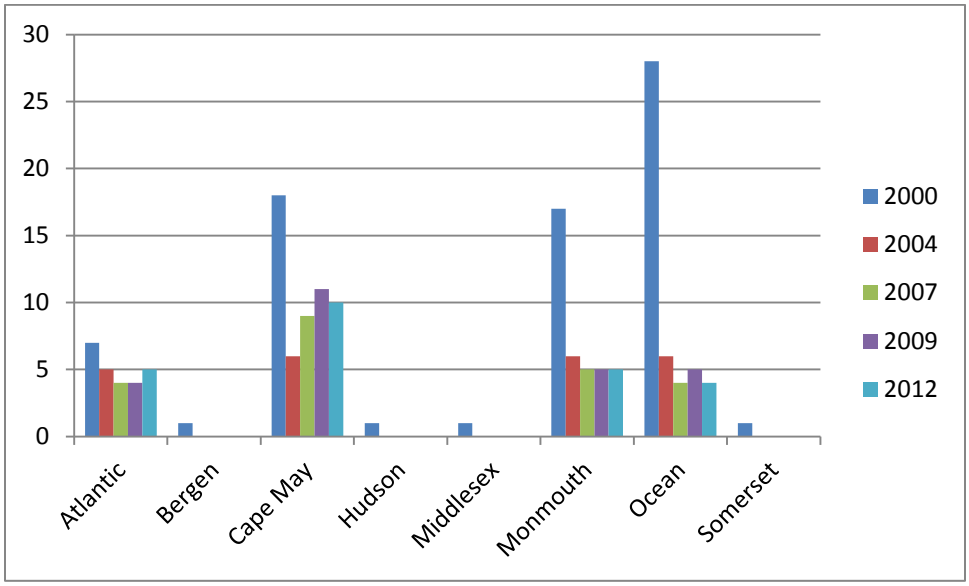
Historic participation has been greater in Areas 4 and 5, than Areas 2 and 3, largely due to proximity of these areas to New Jersey Ports. Monmouth County dominates in Area 4, followed by Ocean County, with limited participation from other counties. A decrease in permits is noted between 2000 and 2004, following the implementation of a Limited Access program in this management area, however, since that time, participation has remained relatively constant.

Chart 23: Total # LCMA 4 Vessels by NJ County (2000-2012)



Ocean County dominated in Areas 5 in 2000, followed by Cape May, Monmouth, and Atlantic counties, but has since been replaced by Cape May County. A decrease in permits is noted between 2000 and 2004, following the implementation of a Limited Access program in this management area, however, since that time, participation has remained relatively constant.

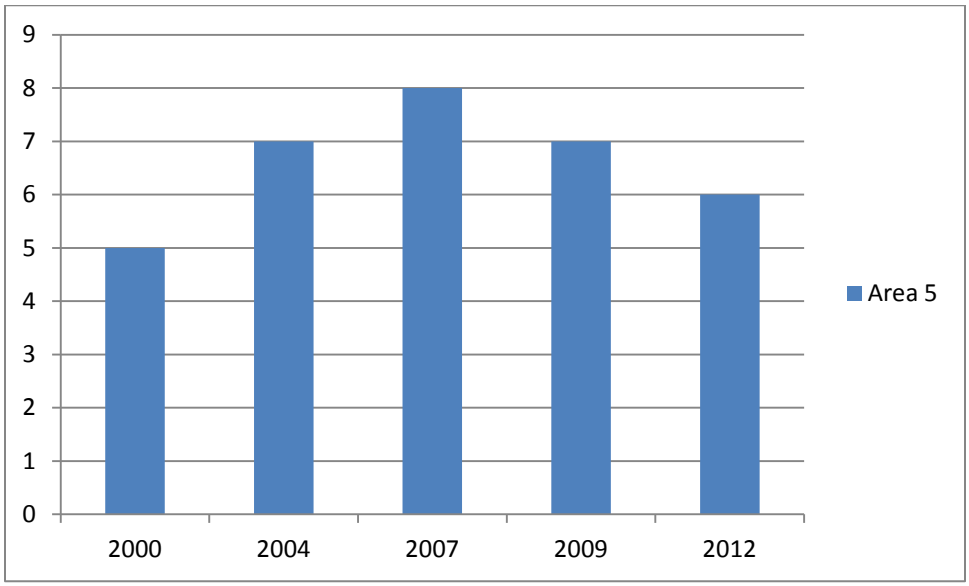
Chart 24: Total # LCMA 5 Vessels by NJ County (2000-2012)



Maryland

For the Maryland fishery overall, Federal data shows participation only in Area 5, largely due to proximity of these areas to New Jersey Ports. Participation, measured by the number of permits issued, has remained constant, as compared with other states. At the county level, two counties, Worcester and Wicomico, participated from 2000-2012, dominated by Worcester County. Since 2009, permits have only been issued to vessels from Worcester County.

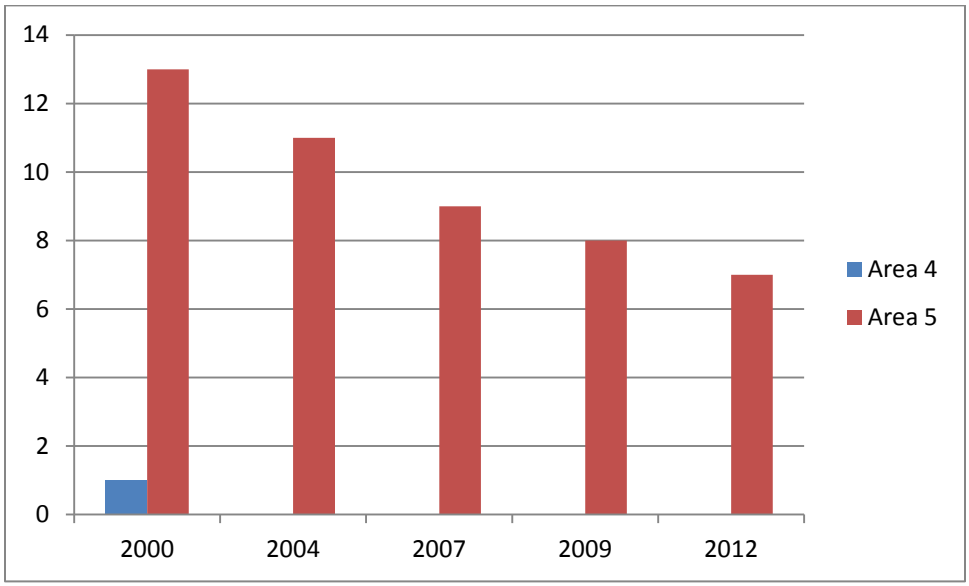
Chart 25: Total # MD Vessels in LCMA 5 (2000-2012)



Delaware

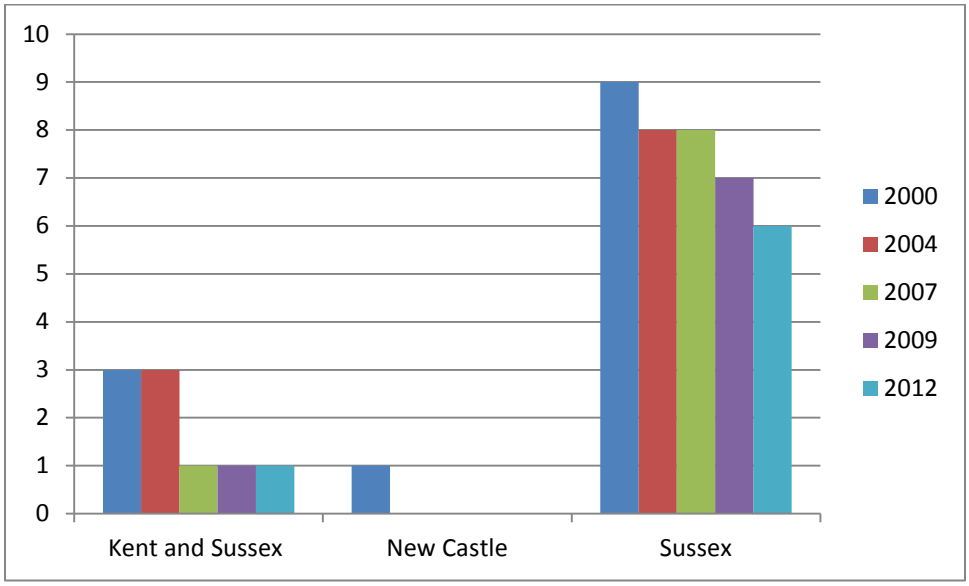
For the Delaware fishery overall, Federal data shows historic participation in both areas 4 and 5, but only recent participation in Area 5 (Chart 26). Following the Limited Access program in Area 4, participation was eliminated. The number of permits issued for Area 4 to Delaware vessels has steadily dropped during the time series, with only half the number of permits issued in 2012 compared to 2000 (7 compared to 13).

Chart 26: Total # DE Vessels in LCMAs 4 and 5 (2000-2012)



Sussex County dominated in Areas 5 during the time series (Chart 27), followed by a city that straddles Kent and Sussex counties. Participation in New Castle County was eliminated following the implementation of the Limited Entry program in Area 5.

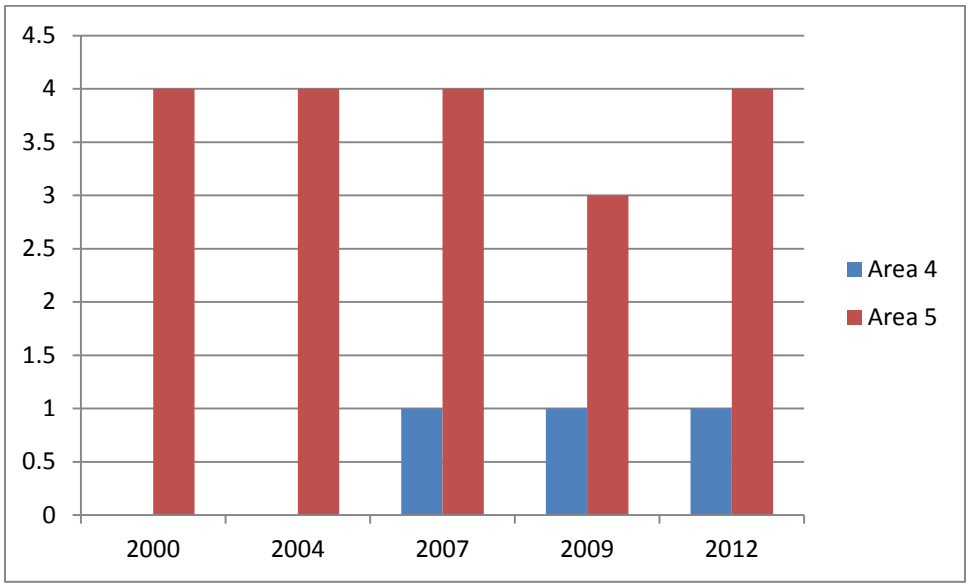
Chart 27: Total # LCMA 5 Vessels by DE County (2000-2012)



Virginia

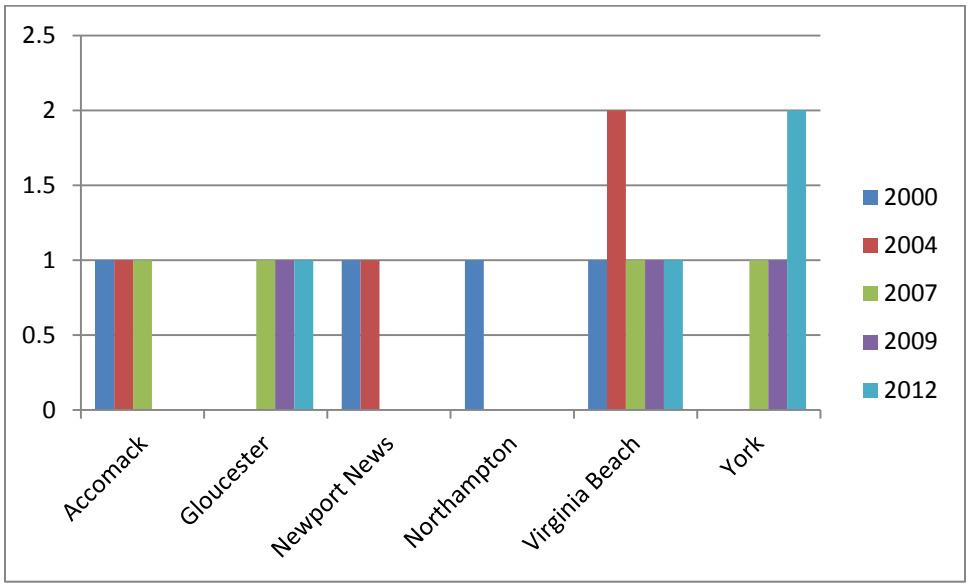
For the Virginia fishery, Federal data shows historic participation only in Area 4, with more recent participation in Area 5 (Chart 28). Participation, measured by the number of permits issued, has remained constant, as compared with other states, similar to Maryland.

Chart 28: Total # VA Vessels in LCMAs 4 and 5 (2000-2012)



In Area 4, the single permit issue to a Virginia vessel is from Accomack County. For Area 5, participation has been relatively even between Accomack, Gloucester, and York counties (the cities of Newport News and Virginia Beach (which are independent and unaffiliated with Virginia counties), indicate participation in the Area 5 fishery.

Chart 29: Total # LCMA 5 Vessels by VA County (2000-2012)



Top Counties - Conclusions

Based on the analysis above, the following counties from Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Maryland, Delaware, and Virginia are the most active in the American Lobster fishery across LCMAs 2, 3, 4, and 5 from 2000-2012:

Table 18: Most Active Counties by State in the American Lobster Fishery (2000-2012)

State	Counties
Massachusetts	Barnstable, Bristol, Dukes, Essex, Plymouth
Rhode Island	Newport, Washington
Connecticut	New London
New York	Suffolk
New Jersey	Ocean, Monmouth, Cape May
Maryland	Worcester
Delaware	Sussex
Virginia	York

Social and Cultural Setting

Describing the social and cultural setting of the fishing communities potentially affected by the proposed American Lobster management measures necessarily requires some subjective analysis because the existing social science research focusing on these issues is either incomplete or unavailable. Where practicable, this analysis has been combined with objective data. It should be noted, however, that many of the standard demographic measures (e.g., median age, types of employment, race) mask what are arguably the most salient attributes of the potentially affected lobster fishing community from a social standpoint, attributes for which little or no hard data exists. Nonetheless, some standard measures are presented herein so as to provide information regarding these communities as they relate to each other and to the states in which they reside. Keeping these limitations in mind, some important examples of what U.S. Census statistics do not reveal about the potentially affected communities are as follows:

- **Current lobster license holders are, in general, an older population:** Available social science research, while not limited to the communities identified here, has shown that the American Lobster fishers are overall an older population, with many license holders curtailing their time "on the water" and considering themselves near retirement. U.S. Census Bureau median-age statistics do not capture this information.
- **The importance of commercial lobster fishing (and commercial fishing overall) to the social environment is under-represented in the available data**: Employment statistics hide the level of commercial fishing within a statistical area (e.g., state, town, county) under broad headings, such as "self-employed" or "agriculture, forestry, fishing and hunting, and mining."
- **Commercial lobster fishing plays a key role in the current social environment of many of the affected fishing communities:** Intuitively, one might argue that a sound economic base has an important influence on the social well-being of a community. For many of the towns identified with the most active commercial lobster industry, lobster ranks among the top-three in value of commercial landings relative to other fisheries, suggesting that this commercial fishery has a high relative importance to the current local economic and social well-being of those communities.

- **"Gentrification" within many existing fishing port communities along the east coast of the United States competes with the commercial fishing industry for needed real estate and infrastructure:** Seaport towns are considered prime real estate for residential and tourist development, which often compete against the commercial fishing industry's need for mooring space and land-based infrastructure.

For this analysis, the city or town within each of the counties identified above that has the strongest participation in the American lobster fishery (i.e., with the greatest number of permit holders) has been used as a proxy to represent the county as a whole and each one is evaluated for certain social and cultural characteristics. These characteristics include demographics (population, median age, education, ethnic origin) and cultural attributes (such as the regular occurrence of community events and attractions that celebrate the historic presence of the local fishing industry; social/cultural organizations that help to provide social support and services to the affected fishing communities; and gentrification, meaning that pressure within the town to convert port areas traditionally dedicated to fishing to another competing use, such as residential development, has been noted).[34] Demographic information comes from the U.S. Census Bureau, while information used to identify cultural attributes comes from the NMFS's Northeast Fisheries Science Center, "*Community Profiles for the Northeast US Fisheries*."[35]

[34] See "Guidelines for Assessment of the Social Impact of Fishery Management Actions," (NMFS 2002b).

[35] See website for Community Profiles: http://www.nefsc.noaa.gov/read/socialsci/community_ profiles/.

Table 19: State & County Social/Cultural Data – 2005-2007

	Demographic Data				Cultural Attributes			
	Population (est.)	Median Age	% with High School Education or Greater (2)	% non-white population	Noted Presence of Cultural Attributes Related to Fishing Industry (3)	Noted Institutional Presence Related to Fishing Industry (3)	Rank Value of Lobster Fishery Relative to Other Fisheries (3)	Noted Gentrification Issues (3)
Massachusetts	6,437,759	38	88%	17%				
Essex	731,841	39	88%	16.8%				
Gloucester	27,858	50	91%	2.7%	Yes	Yes	2	Yes
Barnstable	223,574	46	94%	5.5%				
Chatham	6625 (1)	54 (1)	93% (1)	4.0%	Yes	Yes	3	Yes
Bristol	543,146	38	79%	10.0%				
New Bedford	93,812	36	64%	24.5%	Yes	Yes	5	Yes
Dukes	14,987 (1)	41 (1)	90% (1)	9.3%				
Chilmark	843 (1)	46 (1)	98%	2.3%	Yes	Yes	1	Yes
Plymouth	488,878	39	91%	13.2%				
Scituate	17,863 (1)	41 (1)	96% (1)	3.3%	Yes	Yes	2	Yes
Rhode Island	1,048,319	37	78%	15%				
Washington	128,000	40	93%	4.2%				
Wakefield	8,468	37	90%	10%	Yes	Yes	Unknown	Unknown
Newport	82,000	43	90%	3.3%				
Little Compton	3,593	44	80%	1.3%	Yes	Yes	3	Unknown
New York (1)	18,976,457	36	79%	32%				
Suffolk	128,000	40	89%	4.2%				

Montauk (1)	3,851	39	84%	11%	Yes	Yes	7 (2006)	Yes
New Jersey (1)	8,414,350	37	82%	27%				
Cape May	97,724	47	87%	18%				
Cape May (1)	4,034	47	88%	25%	Yes	Yes	6	Unknown
	(1) 2000 data							
	(2) Persons 25 years or older							
	(3) see http://www.nefsc.noaa.gov/read/socialsci/community_profiles/ for e for community profiles: .							

5.0 Impacts of Proposed Alternatives

5.1 Introduction

Section 5.1 reviews the alternatives that are the subject of this evaluation, establishes criteria for evaluating the impact of each alternative on the VECs identified in Section 4, and discusses impacts. This section identifies impacts associated with management alternatives for each area, as well as a No Action Alternative.

This analysis considers impacts to 5 VECs:

Target species: For the purpose of this analysis, the target species VEC includes the SNE American lobster stock managed under the Commission's ISMFP. 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, consistent with other recent federal lobster actions. Section 4.2 describes the current condition of these stocks.

Physical Environment: For the purpose of this analysis the physical environment VEC consists of EFH in all of the LCMAs 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 the SNE American lobster fishery. Section 4.4 describes the current condition of these protected resources.

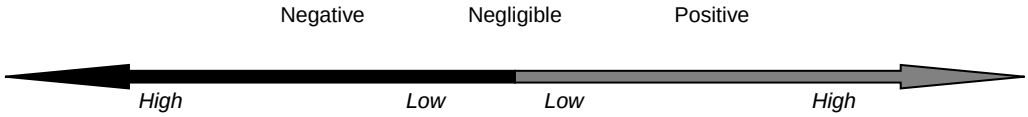
Human communities and the Social-Economic Environment: This VEC includes impacts to people's way of life, traditions, and communities. These social and economic impacts may be driven by changes in

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 EA evaluates the potential impacts using the criteria outlined in Table 20. Impacts from all alternatives are judged relative to the baseline conditions, as described in Section 4, and compared to each other.

Table 20: Criteria to Evaluate Potential Impacts

Impact Definition			
	Direction		
VEC	**Positive (+)**	**Negative (-)**	**Negligible (Negl)**
Allocated target species, other landed species, and protected resources	Actions that increase stock/population size	Actions that decrease stock/population size	Actions that have little or no positive or negative impacts to stocks/populations
Physical Environment/ Habitat/EFH	Actions that improve the quality or reduce disturbance of habitat	Actions that degrade the quality or increase disturbance of habitat	Actions that have no positive or negative impact on habitat quality
Human Communities	Actions that increase revenue and social well-being of fishermen and/or associated businesses	Actions that decrease revenue and social well-being of fishermen and/or associated businesses	Actions that have no positive or negative impact on revenue and social well-being of fishermen and/or associated businesses
Impact Qualifiers:			
Low (L, as in low positive or low negative)	To a lesser degree		
High (H; as in high positive or high negative)	To a substantial degree		
Likely	Some degree of uncertainty associated with the impact		



5.2 Impact Assessment

5.2.1 Area 2 Alternatives

5.2.1.1 Trap Reductions

As discussed in greater detail in Section 3.2.1, the Commission recommended trap reductions, with a 25 percent trap reduction in year 1, followed by 5 percent trap reductions in each of the next 5 years, in an attempt to scale the fishery to the size of the SNE American lobster stock.

The impact of trap reductions is difficult to assess with precision. As stated earlier in Section 3.1, trap cuts do not have a linear relationship with exploitation and it is not expected that a 50% decrease in Area 2 traps will correspond to a 50% reduction in stock exploitation. As noted by the Lobster Board TC duing Addendum XVII and XVIII deliberations, fishers can compensate for reduced traps by fishing the existing traps harder. Further, the Area 2 fishery was oversaturated with trap effort and thus an unknown percentage of the reduction would likely involve latent traps. The trap cuts, however, are not intended to reduce exploitation by 50%, but instead are intended to scale the fishery to the reduced SNE stock size, which when coupled with other measures (e.g. Addendum XVII broodstock measures), will reduce exploitation levels by 50%, or at least align the fishery so that mangers will be able to more easily reach the 50% goal in future iterations.

Impacts to target species, other affected species, and protected resources are likely to be low positive to positive. Because lobster fisher's effort is limited by the number of traps allocated, and trap limits are decreasing, this is likely to have a positive biological impact on the target species, American lobster, and other affected species. This measure will help scale the fishery to the reduced size of the resource, and address a recruitment failure that is preventing the SNE stock from rebuilding.

Fewer traps also have a positive impact on bycatch. Specfically, lower trap numbers may also decrease the bycatch of non-target species, and the need for bait, decreasing the pressures on these species, resulting in a low positive impact. In general, the traps used in commercial lobster fisheries are among the more selective types of fishing gear. Consequently, overall levels of bycatch in traps are low in lobster fisheries relative to other marine fisheries, and 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). The most common types of bycatch in lobster traps are juvenile lobsters and crabs. Types of fish occasionally caught in lobster traps include tautog, scup, black seas bass, cod, cusk, eels and flounder. A variety of invertebrates is found in and attached to lobster traps, including Jonah and rock crabs, red crabs, starfish, urchins, whelks and conchs (ASMFC, 1997, Butler, 2004, Miller, 2005). The discard mortality rates (the percentage of discarded animals that die) associated with animals caught in traps is low, particularly when compared against the mortality rates linked with mobile fishing gears such as trawls and dredges. To mitigate the bycatch mortality of lobster and other species in lost trap gear (ghost gear), Federal lobster regulations mandate that each lobster trap include a biodegradable ghost panel, a rectangular opening not less than 3 ¾ inches (9.53 cm) by 3 ¾ inches (9.53 cm) in the outer parlor of the trap, to allow lobsters and other species to escape ghost gear (see § 697.21(d)(1)). The number of animals that die after being caught and discarded in the American lobster fishery appears small compared to actual lobster landings. A decrease in the number of traps deployed could reduce the number

of interactions with protected resources, as fewer traps, and vertical lines in the water would be deployed, reducing the potential for entanglements, resulting in a low positive impact.

Impacts to the physical environment/habitat/EFH would be positive, due to the minimal impact of trap gear on habitat and the fact that trap numbers in the area would be reduced. While there have been few studies (Eno et al, 2001) on the effect of lobster traps on the ocean floor, available information suggests trap gear, including the lobster traps used in the commercial lobster fishery, tend to have limited long-term adverse impacts on the seafloor habitat, particularly when compared with mobile fishing gears such as trawls and dredges (Morgan and Chuenpagdee 2003, NEFSC 2002, Ocean SAMP 2010).

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to be low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time, which would ultimately benefit fishers and their communities. Fewer traps could decrease catch of American lobster to some small, but unquantifiable degree. This could result in less income for American lobster fishers in this Area, but that amount is not known. However, trap reductions could reduce a permit holder's expenses (i.e., bait, fuel, rope, trap tags, etc.), resulting in a more streamlined business model. Some businesses may be able to weather trap reductions through these decreased business costs. Further, not all lobster businesses fish their full allocation and for many businesses, the trap cuts may only be to unused, latent traps. Unfortunately, data on actual traps fished are not kept and the percentage of unused allocation is not known. To mitigate trap reductions, a permit holder could also chose to tend their remaining traps more often in an attempt to trap more lobsters and recover income lost from the trap reductions. When considered in conjunction with the ITT Program, permit holders remaining in the fishery may be able to transfer in traps up to their original trap cap (i.e., transfer in traps to make up for traps lost through trap reductions). Though this will require capital, the ability to acquire additional traps may help another set of permit holders compensate for trap reductions. Finally, the permit holders who elect to leave the fishery and transfer out traps will be compensated immediately by those purchasing traps.

There is also a potential that permit holders from smaller, more isolated ports may be disproportionately affected by trap reductions. Consider the two permit holders with Area 2 permits in Bristol County, RI, compared to the 20 permit holders with Area 2 permits in Dukes County, MA. The two RI permit holders could be considered isolated, and may have limited access to the transfer market, in comparison to the 20 permit holders in Dukes County, who may be able to negotiate trap transfers with relative ease at the docks, in town, etc. This example becomes more extreme as the geographical distances increases from Area 2. Consider neighboring Connecticut, which had approximately 20 Area 2 permits issued in FY 2012. Following the implementation of the limited access program in Area 2, the number of permits issued to vessel from Connecticut is likely to be drastically reduced, based on the qualification criteria. The remaining handful of permits could experience even greater isolation than the two Bristol County, RI permit holders, having even fewer permits in close proximity to negotiate transfers. Geographic isolation is expected to increase in states south of Connecticut, as even fewer Area 2 permits will qualify. The trap transfer program, however, is new and participant behavior and response is unknowable at this point. For more information on the trap transfer final rule, please refer to Section 5.3.2 Past, Present and Reasonably Foreseeable Cumulative Actions, and Section 5.3.5 Cumulative Effects Analysis.

5.2.1.2 Mandatory V-Notching

As discussed in greater detail in Section 3.2.2, the Commission recommended requiring mandatory v-notching and immediate release of legal-sized egg-bearing female lobster in Area 2 for Federal American lobster permit holders, effective May 1, 2014.

Impact to target species is expected to be low positive. While the retention of egg-bearing females has previously been prohibited, this measure will afford an unquantifiable number of reproducing female American lobster with additional protection, allowing them to reproduce in subsequent years while the v-notch remains visible on the tail. Ensuring additional protection for female lobsters will help address the recruitment failure, allowing the SNE stock to rebuild.

Impacts to the physical environment/habitat/EFH, other affected species, and protected resources are likely to be negligible, as this measure only affects the retention of lobster after gear is deployed and hauled. This measure does not change the amount of gear in the water or where it can be fished, and therefore will have a negligible impact to habitat. Similarly, as this alternative does not affect the use of gear, bait, or the catchability of other stocks, this measure will have a negligible impact on non-target species. Finally, impacts on protected resources are also expected to be negligible, given that this alternative does not regulate the amount of gear in the water, but instead requires discarding of females after gear is deployed and hauled. This alternative does not specifically address marine mammal or protected resource issues and does not change existing regulations for vertical lines or ground lines used with lobster trap gear. All Federal lobster permit holders continue to be bound by all existing Federal measures in place to protect marine mammals and protected species, including gear configuration requirements.

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. While the retention of egg-bearing female lobsters has been prohibited, this alternative would prevent the retention of those v-notched female lobsters during times or seasons when no eggs are present, resulting in lost revenues and a low negative impact to human communities in the short-term.

5.2.1.3 No Action

Under the No Action Alternative for Area 2, trap reductions and v-notching of egg-bearing female lobsters would not be required by Federal regulation. American lobster permit holders with only federal permits would continue to follow the existing Federal regulations, however, given that most Federally-permitted 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 Area 2 alternatives. The impacts of the No Action on target species, other affected species, and protected resources would be consistent with the alternatives described in Sections 5.2.1.1 and 5.2.1.2. The impacts of the No Action on the physical environment would be negligible to positive, based on magnitude of trap reductions.

The No Action would result in significant inconsistency between state and Federal regulations, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Further,

inconsistencies would likely also create additional confusion about applicable regulations for permit holders, resulting in overall negative impacts to human communities.

5.2.2 Area 3 Alternatives

5.2.2.1 Trap Reductions

As discussed in greater detail in Section 3.3.1, the Commission recommended trap reductions, with a 5 percent trap reduction in each year for 5 years, in an attempt to scale the fishery to the size of the SNE American lobster stock. While Area 3 encompasses all three American lobster stocks (i.e., GOM, GBK, and SNE), the Commission, with industry support, approved measures to reduce all Area 3 trap allocations, as discussed in Section 3.1.

Impacts to target species, other affected species, and protected resources are likely to be low positive to positive. As discussed in earlier Section 3.1 and in Section 5.2.1.1 (above), there is not a 1:1 corelation between traps fished and lobster caught; some lobster grounds are so oversaturated with traps that trap numbers could be reduced without a reduction in catch. Area 3, however, has previously undergone multiple trap cuts in years past and the fishery is not believed to be oversaturated with traps. Nor is Area 3 believed to have a high degree of latent effort. Accordingly, this alternative is likely to have a positive impact on the target species, American lobster, and other affected species. This measure will help scale the fishery to the reduced size of the resource, and address a recruitment failure that is preventing the SNE stock from rebuilding. As Area 3 expands north through GBK and GOM, those American lobster stocks will likely also see positive biological results of these trap reductions, which apply to all Area 3 permit holders, allowing the fishery to avoid the negative impacts that would result from different trap levels within the same LCMA. As summarized in Section 5.2.1.1, impacts to other affected species and protected resources are likely to be low positive, due to fewer traps being deployed.

Impacts to the physical environment/habitat/EFH would be positive, due to the minimal impact of trap gear on habitat and the fact that trap numbers in the area would be reduced. While there have been few studies (Eno et al, 2001) on the effect of lobster traps on the ocean floor, available information suggests trap gear, including the lobster traps used in the commercial lobster fishery, tend to have limited long-term adverse impacts on the seafloor habitat, particularly when compared with mobile fishing gears such as trawls and dredges (Morgan and Chuenpagdee 2003, NEFSC 2002, Ocean SAMP 2010).

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. Fewer traps could conceptually decrease catch of American lobster by permit holders remaining in the fishery, resulting in less income for American lobster fishers in this Area, but that amount is not known. However, trap reductions could reduce a permit holder's expenses (i.e., bait, fuel, rope, trap tags, etc.), resulting in a more streamlined business model. Some businesses may be able to weather trap reductions through these decreased business costs. Further, not all lobster businesses fish their full allocation and for many businesses, the trap cuts may only be to unused, latent traps. Unfortunately, data on actual traps fished are not kept and the percentage of unused allocation is not known. To mitigate trap reductions, a permit holder could also chose to tend their remaining traps more often in an attempt to trap more lobsters and recover income lost from the trap reductions. When considered in conjunction with trap transferability, permit holders remaining in the fishery may be able to

transfer in traps up to their original trap cap (i.e., transfer in traps to make up for traps lost through trap reductions). Though this will require capital, the ability to acquire additional traps may help another set of permit holders compensate for trap reductions. Finally, the permit holders who elect to leave the fishery and transfer out traps will be compensated immediately by those purchasing traps.

There is also a potential that permit holders from smaller, more isolated ports may be disproportionately affected by trap reductions. Consider the one permit holder with Area 3 permits in Essex County, MA, compared to the 15 permit holders with Area 3 permits in Washington County, RI. The one MA permit holder could be considered isolated, by the number of permits issued by county. These two permit holders may have limited access to the transfer market, in comparison to the 15 permit holders in Washington County, who may be able to negotiate trap transfers with relative ease at the docks, in town, etc. Consider neighboring Connecticut, which had 1 Area 3 permit issued in FY 2012. This permit holder is likely to experience even greater isolation than the one Essex County, MA permit holder, who still has 23 other permit holders with whom to negotiate within the state. Geographic isolation is expected to increase in states south of Connecticut, as even fewer Area 3 permits are issued. The trap transfer program, however, is new and participant behavior and response is unknowable at this point. For more information on the trap transfer final rule, please refer to Section 5.3.2 Past, Present and Reasonably Foreseeable Cumulative Actions, and Section 5.3.5 Cumulative Effects Analysis.

5.2.2.2 Revised Minimum Size

As discussed in Section 3.3.2, the Commission recommended revising the minimum size (gauge) from 3 ½ inches (8.89 cm) to 3 17/32 inches (8.99 cm), which was estimated to result in a harvest reduction, and allow for increased egg production.

Impacts to target species are expected to be positive. This alternative requires lobsters below 3 17/32 inches (8.99 cm) to be returned to the water, reducing harvest and allowing lobsters below the minimum size additional time to reproduce before retained as catch. Lobsters are known to be larger, on average, in the offshore fishery. NEFSC 2004 trawl survey data as presented in the most recent American lobster stock assessment indicate that the GBK component of the offshore lobster fishery is comprised, on average, of a larger lobster than the GOM and SNE stock components. Specifically, the median size of male and female lobster observed in the GOM and SNE was 8 cm, or approximately 3 3/20 inches. In contrast, the GBK female lobster median size was approximately 11.5 cm, or roughly 4 19/36 inches, with male median size just short of 100 mm, or 3 15/16 inches (ASMFC 2006a). Both male and female lobster median sizes in SNE and GOM stock components fall below the revised minimum size of 3 17/32 inches (8.99 cm). Gauge increases can benefit the lobster resource by allowing “smaller” lobsters additional time to remain in the population before being harvested, with more opportunity to reproduce, thus increasing egg production. Both male and female lobster median sizes in the GBK stock component according to this data are well above the ultimate Area 3 minimum size of 3 17/32 inches (8.99 cm), and will likely be afforded less protection from these measures. Increasing the minimum size, therefore, will afford additional protections for lobster, help to address the recruitment failure, and allow the SNE stock to rebuild.

Impacts to the physical environment/habitat/EFH, other affected species, and protected resources are likely to be negligible, as this measure only affects the retention of lobster after gear is deployed and hauled. This measure does not change the amount of gear in the water or where it can be fished, and

therefore will have a negligible impact to habitat. Similarly, as this alternative does not affect the use of gear, bait, or the catchability of other stocks, this measure will have a negligible impact on non-target species. Finally, the impacts on protected resources is also expected to be negligible, given that this alternative does not regulate the amount of gear in the water, but instead requires discarding of lobsters after gear is deployed and hauled. This alternative does not specifically address marine mammal or protected resource issues and do not change existing regulations for vertical lines or ground lines used with lobster trap gear. All Federal lobster permit holders continue to be bound by all existing Federal measures in place to protect marine mammals and protected species, including gear configuration requirements.

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. An increase in the minimum size would reduce the numbers of lobsters available to be landed, estimated by the Commission at a loss of 4.4% harvest reduction (ASMFC 2012a), or an approximately 75,000 pound reduction in landings, based on data presented in Table 11. If the harvest reduction corresponds linearly with a reduction in revenue, a loss of approximately $300,000 could result, based on revenue information presented in Table 12. These lobsters, however, are not lost to the fishery: they add to the spawning stock biomass and further, would be legally catchable the next year.

5.2.2.3 No Action

Under the No Action Alternative for Area 3, trap reductions would not be required by Federal regulation and the current minimum size for lobster retained. American lobster permit holders with only federal permits would continue to follow the existing Federal regulations, however, given that most Federally-permitted 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 Area 2 alternatives. The impacts of the No Action on target species, other affected species, and protected resources would be consistent with the alternatives described in Sections 5.2.2.1 and 5.2.2.2. The impacts of the No Action on the physical environment would be negligible to positive, based on magnitude of trap reductions.

The No Action would result in significant inconsistency between state and Federal regulations, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Further, inconsistencies would likely also create additional confusion about applicable regulations for permit holders, resulting in overall negative impacts to human communities.

5.2.3 Area 4 Alternatives

5.2.3.1 Seasonal Closure

As discussed in greater detail in Section 3.4.1, the Commission recommended a seasonal closure to the landing of lobsters from February 1 through March 31, annually in Area 4.

Impacts to target species, other affected species, and protected resources are all likely to be low positive to positive. Removal of traps during the closed season would decrease fishing pressure on American lobster, during the period of the closure. This would likely have a positive impact on the target species, and is intended to help the SNE stock rebuild. Similarly, fewer traps may also decrease the bycatch of

non-target species, and the need for bait, decreasing the pressures on these species, resulting in low positive impact on non-target species, as described in Section 5.2.1.1. A decrease in the number of traps deployed could reduce the risk of entanglement, as fewer traps and vertical lines will be utilized. Compatible state and federal regulations would reduce the likelihood of inshore trap fishing effort shifting in the Federal waters of this Area, or into adjacent Areas. That is, if state and federal closures were disconnected, fishers could simply take the traps in state waters and dump them over the line into federal waters during the state closure and vice versa during the federal closure. The result could lead to a saturation of traps and gear along the state/federal border that would increase gear conflict and gear loss resulting in an increase in ghost gear, as well as an increased potential for marine mammal interaction. Compatibly timed state/federal closures reduce such impacts.

Impacts to the physical environment/habitat/EFH would be negligible, due to the minimal impact of trap gear on habitat and the fact that the beneficial effects on benthic habitats would be temporary, lasting only for two months.

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. During a seasonal closure, where traps are prohibited from the area, it could be expected that the lobster industry fishing in Area 4 will lose income, leading to overall negative impacts. However, in a study entitled "Potential Impact of Seasonal Closures in the U.S. Lobster Fishery," Cheng and Townsend concluded that "closures for extended periods (such as August to November) might increase gross revenues modestly;" however, shorter closures would likely not have the same impact. In addition, the closures approved by the Commission would take place in winter months, when effort and landings have historically been lower than during the summer months. Given the relatively short duration and timing of the seasonal closures approved by the Commission, and the trend noted by Cheng and Townsend, it is expected that seasonal closures will, conservatively, have a negligible impact on human communities.

5.2.3.2 Mandatory V-Notching

As discussed in greater detail in Section 3.4.2, the Commission recommended requiring mandatory v-notching and immediate release of legal-sized egg-bearing female lobster in Area 2 for Federal American lobster permit holders, effective May 1, 2014.

Impact to target species is expected to be low positive. While the retention of egg-bearing females has previously been prohibited, this measure will afford an unquantifiable number of reproducing female American lobster with additional protection, allowing them to reproduce in subsequent years while the v-notch remains visible on the tail. Ensuring additional protection for female lobsters will help address the recruitment failure, allowing the SNE stock to rebuild. Because we cannot quantify the amount of protection this measure will afford, it can conservatively be expected to have low positive impacts.

Impacts to the physical environment/habitat/EFH, other affected species, and protected resources are likely to be negligible, as this measure only affects the retention of lobster after gear is deployed and hauled. This measure does not change the amount of gear in the water or where it can be fished, and therefore will have a negligible impact to habitat. Similarly, as this alternative does not affect the use of gear, bait, or the catchability of other stocks, this measure will have a negligible impact on non-target

species. Finally, impacts on protected resources are also expected to be negligible, given that this alternative does not regulate the amount of gear in the water, but instead requires discarding of females after gear is deployed and hauled. This alternative does not specifically address marine mammal or protected resource issues and do not change existing regulations for vertical lines or ground lines used with lobster trap gear. All Federal lobster permit holders continue to be bound by all existing Federal measures in place to protect marine mammals and protected species, including gear configuration requirements.

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. While the retention of egg-bearing female lobsters has been prohibited, this alternative would prevent the retention of those v-notched female lobsters during times or seasons when no eggs are present, resulting in lost revenues and a low negative impact to human communities in the short-term.

5.2.3.3 No Action

Under the No Action Alternative for Area 4, a seasonal closure and v-notching of egg-bearing female lobsters would not be required. States would be required to enact regulations consistent with the Commission's recommendations. American lobster permit holders with only federal permits would continue to follow the existing Federal regulations, however, given that most Federally-permitted 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 Area 4 alternatives. The impacts of the No Action on target species would be low positibe and consistent with the alternatives described in Sections 5.2.3.1 and 5.2.3.2. The impacts of the No Action on physical environment, other affected species, and protected resources would be negligible and consistent with the alternatives described in Sections 5.2.3.1 and 5.2.3.2.

The No Action would result in significant inconsistency between state and Federal regulations, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Further, inconsistencies would likely also create additional confusion about applicable regulations for permit holders, resulting in overall low negative impacts to human communities.

5.2.4 Area 5 Alternatives

5.2.4.1 Seasonal Closure

As discussed in greater detail in Section 3.4.1, the Commission recommended a seasonal closure to the landing of lobsters from February 1 through March 31, annually in Area 5.

Impacts to target species, other affected species, and protected resources are all likely to be low positive to positive. Removal of traps during the closed season would decrease fishing pressure on American lobster, during the period of the closure. This would likely have a positive impact on the target species, and is intended to help the SNE stock rebuild. Similarly, fewer traps may also decrease the bycatch of non-target species, and the need for bait, decreasing the pressures on these species, resulting in low positive impact on non-target species, as described in Section 5.2.1.1. A decrease in the number of traps

deployed could reduce the risk of entanglement, as fewer traps and vertical lines will be utilized. Compatible state and federal regulations would reduce the likelihood of inshore trap fishing effort shifting in the Federal waters of this Area, or into adjacent Areas. That is, if state and federal closures were disconnected, fishers could simply take the traps in state waters and dump them over the line into federal waters during the state closure and vice versa during the federal closure. The result could lead to a saturation of traps and gear along the state/federal border that would increase gear conflict and gear loss resulting in an increase in ghost gear, as well as an increased potential for marine mammal interaction. Compatibly timed state/federal closures reduce such impacts.

Impacts to the physical environment/habitat/EFH would be negligible, due to the minimal impact of trap gear on habitat and the fact that the beneficial effects on benthic habitats would be temporary, lasting only for two months.

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. During a seasonal closure, where traps are prohibited from there area, it could be expected that the lobster industry fishing in Area 4 will lose income, leading to overall negative impacts. However, in a study entitled "Potential impact of Seasonal Closures in the U.S. Lobster Fishery," Cheng and Townsend concluded that "closures for extended periods (such as August to November) might increase gross revenues modestly;" however, shorter closures would likely not have the same impact. In addition, the closures approved by the Commission would take place in winter months, when effort and landings have historically been lower than during the summer months. Given the relatively short duration and timing of the seasonal closures approved by the Commission, and the trend noted by Cheng and Townsend, it is expected that seasonal closures will, conservatively, have a negligible impact on human communities.

5.2.4.2 Mandatory V-Notching

As discussed in greater detail in Section 3.5.2, the Commission recommended requiring mandatory v-notching and immediate release of legal-sized egg-bearing female lobster in Area 2 for Federal American lobster permit holders, effective May 1, 2014.

Impact to target species is expected to be low positive. While the retention of egg-bearing females has previously been prohibited, this measure will afford an unquantifiable number of reproducing female American lobster with additional protection, allowing them to reproduce in subsequent years while the v-notch remains visible on the tail. Ensuring additional protection for female lobsters will help address the recruitment failure, allowing the SNE stock to rebuild. Because we cannot quantify the amount of protection this measure will afford, it can conservatively be expected to have low positive impacts.

Impacts to the physical environment/habitat/EFH, other affected species, and protected resources are likely to be negligible, as this measure only affects the retention of lobster after gear is deployed and hauled. This measure does not change the amount of gear in the water or where it can be fished, and therefore will have a negligible impact to habitat. Similarly, as this alternative does not affect the use of gear, bait, or the catchability of other stocks, this measure will have a negligible impact on non-target species. Finally, impacts on protected resources are also expected to be negligible, given that this alternative does not regulate the amount of gear in the water, but instead requires discarding of females

after gear is deployed and hauled. This alternative does not specifically address marine mammal or protected resource issues and does not change existing regulations for vertical lines or ground lines used with lobster trap gear. All Federal lobster permit holders continue to be bound by all existing Federal measures in place to protect marine mammals and protected species, including gear configuration requirements.

Impacts to human communities and the social-economic environment are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. While the retention of egg-bearing female lobsters has been prohibited, this alternative would prevent the retention of those v-notched female lobsters during times or seasons when no eggs are present, resulting in lost revenues and a low negative impact to human communities in the short-term.

5.2.4.3 No Action

Under the No Action Alternative for Area 5, a seasonal closure and v-notching of egg-bearing female lobsters would not be required. States would be required to enact regulations consistent with the Commission's recommendations. American lobster permit holders with only federal permits would continue to follow the existing Federal regulations, however, given that most Federally-permitted 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 Area 5 alternatives. The impacts of the No Action on target species would be low positibe and consistent with the alternatives described in Sections 5.2.4.1 and 5.2.4.2. The impacts of the No Action on physical environment, other affected species, and protected resources would be negligible and consistent with the alternatives described in Sections 5.2.4.1 and 5.2.4.2.

The No Action would result in significant inconsistency between state and Federal regulations, increasing the difficultly to achieve management, administrative and enforcement objectives as a result. Further, inconsistencies would likely also create additional confusion about applicable regulations for permit holders, resulting in overall low negative impacts to human communities.

5.3 Cumulative Effects Analysis

5.3.1 Introduction

The Council on Environmental Quality (CEQ) and agency policy (NOAA Administrative Order 216-6) require a cumulative effects assessment (CEA) as part of an EIS or EA. 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 CEA is to integrate into the impact analyses, the combined effects of many actions over time that would be missed if each action were evaluated separately. CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action from every conceivable perspective but rather, the intent is to focus on those effects that are truly meaningful.

This section 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 CEA:

1. American lobster resource;
2. other affected species;
3. physical environment and essential fish habitat (EFH);
4. protected resources; and
5. human communities (includes economic and social effects on the fishery and fishing communities).

Temporal Scope of the VECs

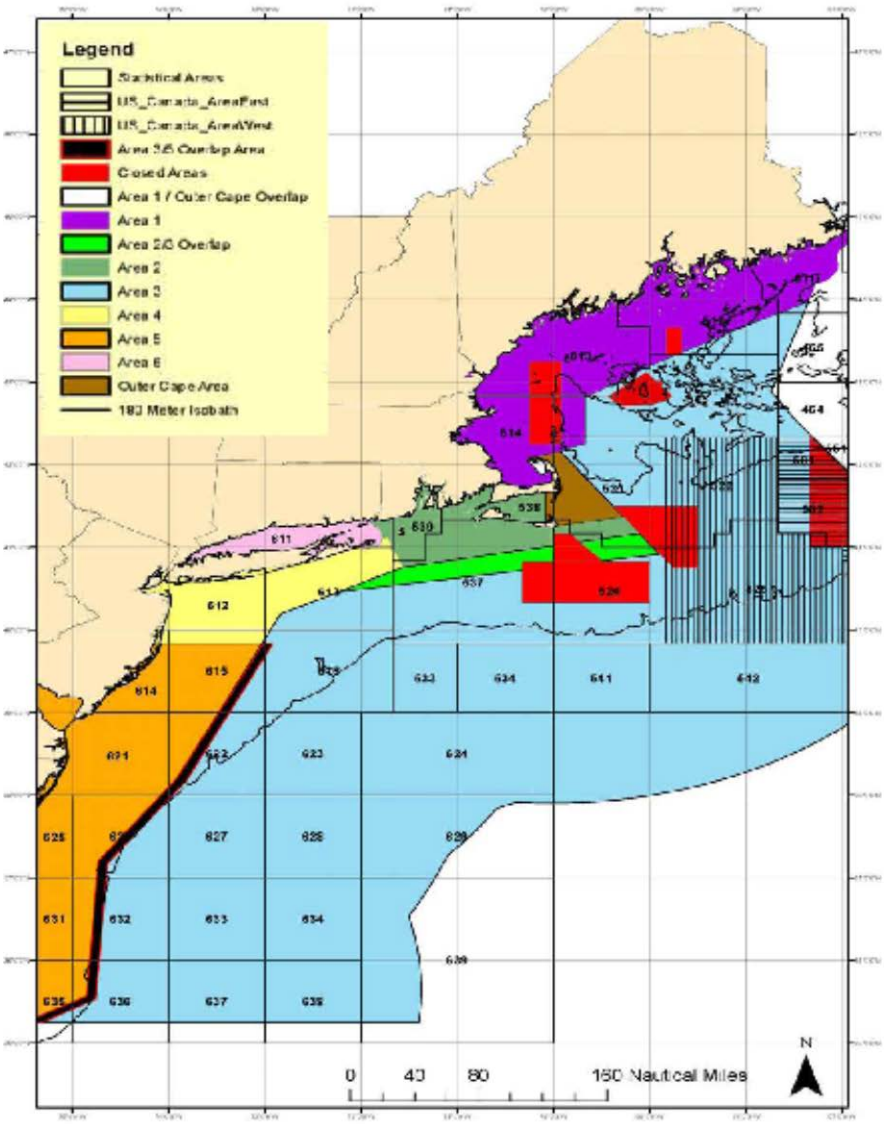
While the effects of historical fisheries are considered, the temporal scope of past and present actions for the American lobster resource, non-target species, and physical environment is primarily focused on actions that have taken place since 1997-- the year that Amendment 3 to the American Lobster ISFMP establishing the framework for area management was first established—to 2019 (approximately 5 years into the future). This period was chosen because of the relatively high frequency with which the Commission's Lobster Board adopts new addenda to the ISFMP; 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 lobster management are unknown.

Geographic Scope of the VECs

The geographic scope of the analysis of impacts to the American lobster resource, and other affected species encompass Federal waters of all American Lobster LCMAs 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 American lobster 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 bordering the range of the American lobster fishery (Section 4.4) from the U.S.-Canada border to, and including, North Carolina.

Figure 2: American Lobster Biological Stock Units and Management Areas



Analysis of Total Cumulative Effects

The cumulative effects assessment of an EA 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 21 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 stocks managed under this ISFMP 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 20.

5.3.2 Past, Present, and Reasonably Foreseeable Cumulative Actions

Federal waters that comprise the American lobster fishery also support many other non-lobster 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 and 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 lobster-related resources.

Table 21: Summary of Effects on VECs from Past, Present, and Reasonably Foreseeable Future ISFMP and Other Fishery Related Actions

Actions	American lobster Resource	Habitat/EFH	Protected Resources	Human Communities	Non-Target species (and other fisheries)
Past and Present Fishing Actions					
Original Lobster FMP; Commission ISFMP and subsequent Amendments and Addenda to the ISFMP (1991 to present): Established commercial management measures	+	+	+	+	+
American lobster broodstock protection measures to address Addenda II and III to Amendment 3 of the ISFMP 2006: Increased minimum carapace length and escape vent size in all LCMAs except Area 1. Implemented maximum size in Areas 4 and 5. Established Area 3/5 overlap zone and clarified other regulations	+	NEGL	NEGL	+	+
Area 3 Lobster Broodstock Protection Measures and Trap Reductions – Final Rule 2007: Annual trap reductions through 2010; min. carapace size increase to 3 ½" by 2008; escape vent size increase in 2010	+	NEGL	Low +	Short Term: - to + Long Term: +	NEGL
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.	+	NEGL to low +	+	- 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.	NEGL	NEGL	+	Low -	NEGL

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	+	NEGL	+	NEGL	+
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	+	NEGL	+	+	+
Reasonably Foreseeable Future Fishing Actions					
Modifications to the trap transfer program in LCMAs 2 and 3: Considers additional adjustments to the transfer program, including a conservation tax, aggregate trap caps, and ownership caps. Industry and the Commission raised concern that previously latent effort could be cheaply purchased and become activated, which would create additional pressure on the lobster stock, as well as the fishing businesses currently operating in the area. Accordingly, the Commission approved Addendum XXII in October 2013, which recommended that the states and NMFS limit the number of traps that any one individual or entity may own. As part of this action, NMFS established a control date (January 27, 2014) 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
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, Phase 2 is reconsidering closures put in place to protect EFH and groundfish mortality in the Northeast Region.	Likely Low+	Likely +	Unknown - Pending	Unknown - Pending	Unknown - Pending

Commission lobster management is not a static process; new issues are always arising. Often, by the time the Commission completes one part of its Lobster 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 address the poor condition of the SNE American lobster resource. While briefly summarized above, additional discussion on the interconnection of these actions is also necessary to fully describe the cumulative effects of the past, present, and reasonably foreseeable actions.

Limiting Access into the Lobster Fishery

The concept of controlling lobster fishing effort by limiting access to historical fishers is not new. Specifically, in 1994, NMFS generally limited access into the Federal lobster fishery to those who could document participation in the fishery before 1991 (59 FR 31938 – June 21, 1994). Years later, in August 1999, the Commission passed Addendum 1, which limited access to LCMAs 3, 4 and 5 to only those who could document fishing history in those LCMAs. Subsequent Commission addenda similarly attempt to control effort by limiting access to other LCMAs (see Table 22).

Table 22: Limited Entry and Individual Trap Transferability

LCMA	Commission Action[36]	Corresponding Federal Action
EEZ	March 1994 - Amendment 5[37]	June 21, 1994 (59 FR 31938)
LCMA 6	1995 – by State action	Not Applicable in Federal Waters
LCMA 3	August 1999 – Addendum 1	March 2003 (68 FR 14902)
LCMA 4	August 1999 – Addendum 1	March 2003 (68 FR 14902)
LCMA 5	August 1999 – Addendum 1	March 2003 (68 FR 14902)
LCMA OCC	February 2002 – Addendum III	April 2014 (79 FR 19015)
LCMA 2	December 2003 – Addendum IV[38]	April 2014 (79 FR 19015)
LCMA 3	March 2004 – Addendum V	April 2014 (79 FR 19015)
LCMA 2	February 2005 – Addendum VI	April 2014 (79 FR 19015)
LCMA 2	November 2005 – Addendum VII	May 10, 2005 (70 FR 24495)
LCMA 2	October 2006 – Addendum IX	April 2014 (79 FR 19015)
All LCMAs	February 2009 – Addendum XII	April 2014 (79 FR 19015)
LCMA OCC	May 2008 – Addendum XIII	April 2014 (79 FR 19015)
LCMA 3	May 2009 – Addendum XIV	April 2014 (79 FR 19015)
LCMA 1	November 2009 – Addendum XV	June 12, 2012 (77 FR 32420)
LCMA 3	February 2013 – Addendum XIX	Under Analysis (ITT modifications)
LCMA 2	August 2013 – Addendum XXI	Under Analysis (ITT modifications)
LCMA 3	October 2013 – Addendum XXII	Under Analysis (ITT modifications)

[36] All Addenda can be found at www.asmfc.org, under Interstate Fisheries Management, American Lobster.

[37] New England Fishery Management Council document. This action occurred prior to the 1999 transfer of Federal lobster management to the Commission under the Atlantic Coastal Act.

[38] Addendum IV was rescinded in Addendum VI and then revised and approved in Addenda VII and XII.

Limited Access Criteria

In limiting access since approval of Amendment 3 in 1997, the Commission has used a similar step-by-step approach in all of the LCMAs. First, participants are qualified based upon their ability to document a history of fishing within the LCMA; second, those who qualify are allocated some number of traps within a given management area, based upon their ability to document the level of past fishing effort in the LCMA.[39] Moreover, for three of the LCMAs (LCMAs 2, 3, and the Outer Cape) the Commission has introduced and approved a third step, individual transferable trap (ITT) programs, in which permit holders can transfer full or partial trap allocations among themselves.

NMFS initiated the public scoping process for this action following action by the Commission with the approval of Addendum I in August, 1999. Addendum I was in response to Commission actions that established LCMTs and tasked those LCMTs to develop management programs suited to the needs of the LCMA while meeting the targets in the ISFMP. Following TC review of the plans, in Addendum I, the Board initiated a program directed towards controlling effort and began the process to establish historical participation and transferable trap programs that has evolved over several Commission addenda. In response to the Board action, on September 1, 1999, NMFS published an ANPR (64 FR 47756) notifying Federal permit holders that regulatory actions in the lobster fishery may involve further restrictions on access to LCMAs.

In follow up to additional Commission action in Addenda II and III, on September 5, 2002 (67 FR 56800), NMFS published a Notice of Intent (NOI) to prepare an EIS to evaluate Commission recommendations to limit future access in several LMCAs, including LCMA 3 and the OCLMA. This and subsequent NOIs included information on the proposed regulatory action; requested public comments on the scope of the EIS; and provided information on how the public could submit comments by mail, hand delivery, facsimile, or electronic means. Following Commission revisions to several relevant LCMA LAP/ITT provisions in Addenda IV through VI, NMFS published a ANPR/NOI on May 10, 2005 (70 FR 24495) of its intent to move forward with regulatory actions based upon the redesigned LAP/ITT provisions in the ISFMP. A summary of the public scoping comments received and how they were addressed in the draft EIS can be found in Appendix 15 of that document. On October 31, 2005, the Commission approved Addendum VII that further refined certain LAP/ITT in LCMA 2. However, the follow up implementation of the LAP/ITT measures at the state level identified additional problems that resulted in further evaluation of the plans by the Lobster Board in 2006 and 2007. Based on the delays, NMFS continued to work within the Commission process and updated Federal lobster permit holders of NMFS' intention to take complementary action. (See Appendix 13 to the draft EIS, Notice to American Lobster Permit holders, dated June 12, 2007). Ultimately, the Board action resulted in additional refinements to the ISFMP relative to this action, outlined in Addendum IX, Addenda XII through XIV, and Addenda XIX, XXI, and XXII (see Table 21).

In May 2010, NMFS notified the public that it was holding public meetings and seeking comments on the draft EIS (75 FR 23245, May 3, 2010). During the 60-day comment period, six public hearings were held from Maine to southern New Jersey to elicit comments from the public and provide them with

[39] Through various addenda to the ISFMP for American lobster, history-based effort control plans based on fishery performance have been enacted by NMFS (LCMAs 1, 3, 4, and 5) and states (MA in Outer Cape Cod; NY and CT for LCMA 6; and MA, RI, CT,& NY for LCMA 2). .

information on the alternatives evaluated in the draft EIS. During this time, the Commission commented and requested that NMFS not take action until the Commission's Lobster Board craft its plan to respond to the SNE Recruitment Failure. The Lobster Board's response plan finally became known in February 2012 and August 2012 with the passage of Addenda XVII and XVIII, respectively. The Lobster Board also refined its Trap Transferability Program in Addendum XIX (February 2013), Addendum XXI (August 2013), and Addendum XXII (October 28, 2013). NMFS therefore renewed its focus on its rulemaking in June 2013 by publishing proposed regulations for the LAP/ITT (78 FR 35224, June 12, 2013).

Before NMFS could publish its draft EIS in May 2010, the Commission was already deliberating upon and approving addenda that would amend, add to and modify its ITT program. After NMFS published its draft EIS, the Commission approved still more addenda with more recommended measures, and further addenda remain under development. Regardless, however, the Commission has adopted these measures into its Lobster Plan and the states have implemented the measures into regulation. As such, their mere existence at the state level potentially impacts NMFS' decision-making process in its present action. These additional addenda are set forth below.

Addendum XIV (May 2009)

Addendum XIV relates to LCMA 3 management measures. It sought to cap traps in LCMA 3 at 2,000 traps, such that permit holders with trap allocations below 2,000 could build up to 2,000 traps, but no higher. The status of the LCMA 3 trap cap remained in flux thereafter as the LCMA 3's LCMT and Commission deliberated upon it in later Addenda. NMFS's Proposed Rule suggested a 1,945 trap cap simply because that was the existing Federal LCMA 3 trap cap at the time, although NMFS noted that Commission trap cap discussions were ongoing and that NMFS might alter its suggested cap after the Commission reached a final decision. The Commission did so in August 2013 in Addendum XXI, which reaffirmed the 2,000 trap LCMA 3 cap. Addendum XXI is discussed in more detail immediately below.

Addendum XIV also established a trap transfer tax of 20 percent, although Addendum XIX amended this transfer tax to 10-percent in February 2013. NMFS's Final Rule for the trap transfer program (April 7, 2014, 79 FR 19015) implemented a 10-percent transfer tax for all partial trap allocation transfers.

Addendum XXI (August 2013)

Addendum XXI modified the Commission's ITT Program by rescinding Addendum XII's requirement that transferred traps maintain eligibility for only a single LCMA and relinquish any multi-LCMA history. NMFS's Proposed Rule suggested that a trap's multi-LCMA history be relinquished upon transfer, although NMFS's rationale was largely based on a desire to be consistent with the Commission Plan which, at the time of the Proposed Rule, allowed only single LCMA history to be maintained upon transfer. Additionally, Addendum XXI established a single ownership cap which allows the accumulation of 800 traps in excess of the 800-trap active trap cap. Under this provision any permit holder (individual or corporation) may not own in excess of 1,600 LCMA 2 traps at any given time, although those who held more than the cap prior to December 2003, may maintain those traps currently held. The intent is to allow a permit holder to activate "banked" traps to adjust for mandated trap cuts. The Addendum invoked a sunset clause, whereby the single ownership cap will expire two years after the last trap reduction as specified in Addendum XVIII, when the LCMA 2 trap cap will revert to the historical 800-trap active cap. Among other measures, Addendum XXI also reaffirmed the LCMA 3 active trap cap at 2,000 traps with that cap lowering yearly for a 5-year period.

Addendum XXII (October 2013)

Addendum XXII further modified the Commission's ITT Program in LCMA 3 by adopting single and aggregate ownership trap caps. Specifically, the Addendum adopted a single ownership trap cap that allows an LCMA 3 lobster fisher to acquire traps in excess of the active trap cap. The Addendum adopts a schedule for reductions in the single ownership cap as trap levels are reduced on an annual basis under the Commission's Addendum XVIII trap reduction schedule. For each year of the reduction in active traps, the excess traps may be activated to provide a buffer against trap cuts. After the fifth and final year of the LCMA 2 trap cuts the active trap cap will be 1,584 traps with a single ownership cap of 1,800 traps.

Additionally, to prevent the excess consolidation of traps in LCMA 3, the Commission opted to cap traps rather than permits. The Addendum caps the aggregate number of LCMA 3 traps that any one permit holder may own at no more than 5 times the single ownership cap. (A permit holder would need to have multiple permits to exceed the single ownership cap). Called the aggregate ownership cap, permit holders would be restricted to this limit. However, if a permit holder exceeded the aggregate ownership cap prior to an established control date published by NMFS, they may retain those traps, but may not accrue any additional traps.

American Lobster Resource

The cumulative impacts of past, present, and reasonably foreseeable future management actions have resulted in effort reductions and additional protection for broodstock in the American lobster fishery. These measures have supported a healthy American lobster fishery in the GOM, and are intended to rebuild the SNE American lobster stock. Any future action to limit the bycatch of GOM cod in the American lobster fishery would likely limit effort, and therefore have positive impact on American lobster. In general, the actions in the foreseeable future are expected to have positive impacts on the American lobster resource overall. In summary, the cumulative impacts of past, present and reasonably foreseeable future actions are positive impacts for the American lobster resource.

Non-target Species and Other Fisheries

Actions taken by the Commission in the ISFMP for American lobster in the past and present are mostly positive on non-target species. Gear restrictions have limited the need for bait, and afforded protection for smaller-sized 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.

Physical Environment and EFH

As previously discussed, available information suggests trap gear, including the lobster traps used in the commercial lobster fishery, tend to have limited long-term adverse impacts on the seafloor habitat, particularly when compared with mobile fishing gears such as trawls and dredges. Therefore, the cumulative impacts of past and present actions is negligible to low positive. Future actions are expected to continue the same trend. In summary, the cumulative impacts of past, present and reasonably foreseeable future actions are negligible to low positive impact for the physical environment/EFH.

Protected Species

Whales, dolphins, and porpoises are the primary protected species impacted by the American lobster fishery. The ISFMP for American lobster has, in past and present actions, capped the number of vessels

and trap and subsequently reduced trap allocations. Together, these measures have had a positive impact on protected species. Future actions are expected to continue these trends. Overall, the cumulative impacts of past, present and reasonably foreseeable future actions are low positive for protected resources, due to reduced gear interactions with cetaceans.

Human Communities

All actions taken under the ISFMP for American lobster have had effects on human communities. 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 trap transferability could mitigate any potentially negative impacts of trap reductions. Similarly, approving a measure to cap trap ownership could address the potential for the consolidation. However, as the SNE lobster stock recovers, past and present measures are likely to have a long-term positive impact on human communities, as the fishery 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 negative to positive for human communities.

Non-fishing 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. Because inshore and coastal areas support essential egg, larval and juvenile American lobster habitats, it is likely that the potential threats to inshore and coastal habitats are of greater importance to the species than threats to offshore habitats. It is also likely that these inshore activities will continue to grow in importance in the future. There is more and more evidence that changes in water quality resulting from increasing acidification and water temperature could have potentially negative cumulative impacts on the American lobster resource and fishery. Rising water temperatures in southern New England (SNE) are considered to be one factor responsible for the LIS lobster die-off in the late 1990s (Pearce and Balcom, 2005), and the increased incidence of shell disease (Glenn and Pugh, 2006). Further, a long-term warming trend in nearshore SNE waters since 1999 is identified as one of the environmental drivers responsible for the poor condition of the SNE lobster stock (ASMFC TC, 2010). Regardless of the management actions taken to address fishing exploitation on the depleted SNE lobster stock, continued increases in water temperatures in the Northeast Shelf Ecosystem could affect lobster distribution and physiology and could increase the incidence of shell disease, which could result in changes in the condition of the stocks 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 American Lobster resource, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of these VECs to the impacts 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.

Table 23: Summary of Non-fishing Impacts Applicable to this Action

Action	Description	Impacts on Lobster Resource	Impacts on Bycatch Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Lobster Industry
Port maintenance	Dredging of wetlands, coastal, port and harbor areas for port maintenance	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**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	**Potentially Negative** Reduced habitat quality	**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	**Potentially Indirect Negative** Localized decreases in habitat quality	**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	**Potentially Indirect Negative** Localized decreases in habitat quality	**Potentially Positive** Beachgoers generally like sand
	Expansion of port facilities, vessel operations and	**Potentially Indirect Negative**	**Potentially Indirect Negative**	**Potentially Direct Negative**	**Potentially Indirect Negative**	**Potentially Mixed**

Marine transportation	recreational marinas	Localized decreases in habitat quality	Localized decreases in habitat quality	Reduced habitat quality	Localized decreases in habitat quality	Positive for some, potential displacement for others
Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines, utility lines and cables	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Potentially Direct Negative** Reduced habitat quality	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects
Atlantic Large Whale Take Reduction Measures	Gear and area restrictions on lobster fishing to reduce takes of whales in lobster gear.	**Uncertain-Neutral** Not likely to affect lobster resource	**Uncertain-Neutral** 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 cetaceans	**Potentially Negative** Some short and long-term economic impacts to industry may occur to comply with new gear requirements
1999 Long Island Sound Lobster Die-off	Die-off of lobster due primarily to lobster parasite (*Paramoeba* spp.), brought on or exacerbated by other environmental stressors.	**Direct Negative** – Resulted in lobster mortality	**Neutral - Uncertain**	**Neutral - Uncertain**	**Neutral - Uncertain**	**Direct Negative** – Resulted in short-term and unquantifiable long-term economic losses
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 and VA)	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Uncertain** Dependent on mitigation effects	**Uncertain** Dependent on mitigation effects
	Transportation of natural gas via tanker	**Uncertain**	**Uncertain**	**Potentially Direct Negative**	**Uncertain**	**Uncertain-Likely Positive**

Liquefied Natural Gas (LNG) terminals (within 5 years)	to terminals located offshore and onshore	Dependent on mitigation effects	Dependent on mitigation effects	Localized decreases in habitat quality possible, but potential no fishing zone could create refuge.	Dependent on mitigation effects	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
Economic Recession, Loss of Markets	Global economic recession and severe weakening of Canadian export market have decreased ex-vessel prices and increased operating costs for lobstermen.	**Neutral** Lobstermen will not likely change fishing style and may wait for economic factors to re-adjust	**Neutral** Lobstermen will not likely change fishing style and may wait for economic factors to re-adjust	**Neutral** Lobstermen will not likely change fishing style and may wait for economic factors to re-adjust	**Neutral** Lobstermen will not likely change fishing style and may wait for economic factors to re-adjust	**Negative** High operating costs and reduced prices will negatively impact businesses and communities with major reliance on lobster
Rising Water Temperature	A long-term warming trend in nearshore SNE waters since 1999	**Negative** One of the environmental drivers responsible for the poor condition of the SNE lobster stock	**Uncertain**	**Uncertain**	**Uncertain**	**Negative** Poor condition of the SNE lobster stock results in economic loses for lobstermen

Table 24 summarizes the effects of past, present and reasonably foreseeable future actions on the VECs from this action.

Table 24: 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
American Lobster	**Positive** There is evidence of stresses on parts of the resource from low recruitment and abundance and the impact of commercial lobster fishing. Commercial and industrial development activities can contribute to degradation of physical habitat. Impacts on lobster resources from these actions are largely mitigated through Federal and state regulatory oversight.	**Positive** Current regulations limit participation in the fishery to historic levels in an attempt to manage for sustainable stocks.	**Positive** These broodstock measures in SNE will combine with effort control measures, capping fishing effort (should both be approved) to reduce stress on the resource; potential management action for SNE lobster stock based on '09 assessment.	**Positive** The American lobster resource is expected to rebuild through current and future management
Physical Environment/ Habitat/EFH	**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	**Positive** Combined effects of past fishery actions have reduced effort and thus interactions with protected resources	**Positive** Current regulations continue to control effort, thus reducing opportunities for interactions	**Positive** Future regulations will likely control effort and decrease interactions through gear modifications	**Positive** Continued effort controls along with past regulations will likely help stabilize protected species interactions

Human Communities	**Mixed** From 1998-2004, American Lobster was the highest value fishery in NE 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. 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.[40]	**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 associated with the lobster industry likely to continue. On-going regulatory actions, 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 and/or rebuild fisheries in the long term. Sustainable resources should support viable communities and economies which is an overall benefit to the fishery.
Non-Target 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

[40] http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

5.3.3 Baseline Conditions for Resources and Human Communities

For the purposes of a cumulative effects assessment, the baseline conditions for resources and human communities is considered the present condition of the VECs plus the combined effects of the past, present, and reasonably foreseeable future actions. Table 25 summarizes the added effects of the condition of the VECs (i.e., status/trends from Section 5.2.2) and the sum effect of the past, present and reasonably foreseeable future actions (from Table 24 above). The resulting CEA 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 26.

Table 25: Cumulative Effects Assessment Baseline Conditions on the VECs

VEC	Status/Trends, Overfishing	Status/Trends, Overfished	Combined Effects of Past, Present Reasonably Foreseeable Future Actions	Combined CEA Baseline Conditions
SNE American Lobster Resource	No	YES	**Positive -**The American lobster resource is expected to rebuild through current and future management	**Positive -** The SNE American lobster resource is overfished but not experiencing overfishing. Stocks are being managed to address the overfished status.
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 is under development.	**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. These species are also afforded protection under the Marine Mammal Protection Act.		**Positive** – reduced gear encounters through gear modifications and additional management actions taken under the MMPA.	**Positive** – reduced gear encounters through gear modifications and additional management actions taken under the MMPA.
Human Communities	The American lobster fishery remains one of the highest valued fisheries in the U.S.		**Positive -** Sustainable resources should support viable communities and economies	**Positive -** Sustainable resources should support viable communities and economies
Non-Target 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	**Positive –** long term: Regulatory actions taken over time have reduced fishing effort and with the addition, stocks are expected to rebuild in the future.

5.3.4 Summary Effects of this Action

The alternatives contained in this action can be divided between the Areas they affect, as seen in Table 26 (summary of impacts from action – for a complete discussion of impacts please see Section 5.0 of document). In general, the adoption of all of these measures will benefit the American lobster resource because they are designed to rebuild the SNE American lobster stock. These measures are also likely to have a positive impact on non-target species. Overall the measures are expected to have negligible impacts on protected resources or habitat when compared to the No Action alternative. The specifications are likely to have negative impacts on communities in the short term, but as stock biomass increases communities should benefit from larger future catches.

Table 26: Summary of Impacts Expected on the VECs

Management Measure		VECs				
		Managed Resources	**Non-target Species**	**Habitat Including EFH**	**Protected Resources**	**Human Communities**
Area 2	**Trap Reductions**	**Positive-** will help scale the fishery to the size of the resource	**Low Positive-** fewer traps may decrease the bycatch of non-target species and reduce the need for bait	**Negligible-** measures are not expected to create additional impacts to EFH	**Low Positive-** a decrease in traps could reduce the number of interactions with protected resources	Short Term **Low Negative** Long Term **Positive-** Trap reductions could decrease the catch of American lobster from Area 2, resulting in reduced income for fishers in this Area. A rebuilt stock, however, could support a more robust future fishery.
	Mandatory V-Notching	**Low Positive –** Continues rebuilding of this stock	**Negligible-** measures are not expected to create additional impacts to non-target species	**Negligible-** measures are not expected to create additional impacts to EFH	**Negligible-** measures are not expected to create additional impacts to protected resources	Short Term **Low Negative** Long Term **Positive-** Mandatory v-notching would prohibit the retention of v-notched females, resulting in reduced economic income in this Area. A rebuilt stock, however, could support a more robust future fishery.
Area 3	**Trap Reductions**	**Positive-** will help scale the fishery to the size of the resource	**Low Positive-** fewer traps may decrease the bycatch of non-target species and reduce the need for bait	**Negligible-** measures are not expected to create additional impacts to EFH	**Low Positive-** a decrease in traps could reduce the number of interactions with protected resources	Short Term **Low Negative** Long Term **Positive-** Trap reductions could decrease the catch of American lobster from Area 2, resulting in reduced income for fishers in this Area. A rebuilt stock, however, could support a more robust future fishery.
	Reduced Minimum Size	**Positive –** Continues rebuilding of this stock	**Negligible-** measures are not expected to create additional impacts to non-target species	**Negligible-** measures are not expected to create additional impacts to EFH	**Negligible-** measures are not expected to create additional impacts to protected resources	Short Term **Low Negative** Long Term **Positive-** would reduce the minimum size, decreasing the number of lobsters available for harvest, and income resulting from that harvest

Area 4	**Seasonal Closure**	**Positive –** Continues rebuilding of this stock	**Low Positive-** seasonal removal of traps may decrease the bycatch of non-target species and reduce the need for bait	**Negligible-** measures are not expected to create additional impacts to EFH	**Low Positive-** seasonal removal of traps could reduce the number of interactions with protected resources	Short Term **Low Negative** Long Term **Positive-** Seasonal removal of traps could decrease the catch of American lobster from Area 4, resulting in reduced income for fishers in this Area. A rebuilt stock, however, could support a more robust future fishery.
	Mandatory V-Notching	**Low Positive –** Continues rebuilding of this stock	**Negligible-** measures are not expected to create additional impacts to non-target species	**Negligible-** measures are not expected to create additional impacts to EFH	**Negligible-** measures are not expected to create additional impacts to protected resources	Short Term **Low Negative** Long Term **Positive-**Mandatory v-notching would prohibit the retention of v-notched females, resulting in reduced economic income in this Area. A rebuilt stock, however, could support a more robust future fishery.
Area 5	**Seasonal Closure**	**Positive –** Continues rebuilding of this stock	**Positive-** seasonal removal of traps may decrease the bycatch of non-target species and reduce the need for bait	**Negligible-** measures are not expected to create additional impacts to EFH	**Positive-** seasonal removal of traps could reduce the number of interactions with protected resources	Short Term **Low Negative** Long Term **Positive-**Seasonal removal of traps could decrease the catch of American lobster from Area 5, resulting in reduced income for fishers in this Area. A rebuilt stock, however, could support a more robust future fishery.
	Mandatory V-Notching	**Positive –** Continues rebuilding of this stock	**Negligible-** measures are not expected to create additional impacts to non-target species	**Negligible-** measures are not expected to create additional impacts to EFH	**Negligible-** measures are not expected to create additional impacts to protected resources	Short Term **Low Negative** Long Term **Positive-**Mandatory v-notching would prohibit the retention of v-notched females, resulting in reduced economic income in this Area. A rebuilt stock, however, could support a more robust future fishery.

5.3.5 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 MSA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, **the overall cumulative effects of the preferred alternative on all VECs should yield neutral 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 alternative, 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 26 provides as a summary of likely cumulative effects found in the management alternatives contained in this action. The CEA baseline that, as described above in Table 25, 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.

American lobster Resource

As noted in Table 26, the combined impacts of past federal fishery management actions have rebuilt have had a generally positive impact on the American lobster resource. Several past actions have resulted in the implementation of trap allocations and broodstock protection measures such as minimum and maximum size increases and more restrictive v-notch definitions which serve to protect sexually mature lobsters and foster egg production. This proposed action may sustain efforts to protect lobster stocks by implementing additional broodstock protection measures in additional areas, and scale the fishery to the size of the stock through trap reductions; consequently, these alternatives are expected to have a positive impact on the American lobster 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 American lobster resource, for the purposes of NEPA.**

Non-Target Species

As noted in Table 26, the combined impacts of past federal fishery management actions have been relatively positive, as limitations on the number of traps fished 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. Trap reductions, as previously discussed, and seasonal closures would be expected to limit interactions with non-targets species. Other alternatives are expected to have a negligible impact on non-target species. Overall, continued management of American lobster will also control catch of non-target species. **Therefore, the cumulative effects of this action should yield neutral to non-significant low positive impacts on non-target species, for the purposes of NEPA.**

Protected Resources

As noted in Table 26, the combined impacts of past federal fishery management actions have had positive 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 nearly every lobster management area. Although some latent trap fishing effort remains, it will likely be reduced over time as area-specific trap fishery management programs evolve.

The cap on traps and vessels has benefitted protected species by lowering the risk of entanglement, especially for large whales, in lobster trap gear. Trap gear modifications such as sinking groundline and potential modifications to vertical lines under development will provide protections to large whales and other protected species that interact with the lobster trap fishery. Overall, the lobster management and whale protection measures implemented over time have had a positive net effect on protected species. Trap reductions and closed area measures included in this action are expected to have a positive net effect on protected species. In terms of reasonably foreseeable future actions, there are several protected resource related actions that may have positive effects on protected resources. 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 neutral to non-significant positive impacts, for the purposes of NEPA.**

Habitat, Including EFH

As noted in Table 26, the combined impacts of past federal 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 EFH. 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. The combined impacts of past Federal fishery management actions have reduced trap fishing effort on lobster, and therefore have been positive for habitat protection. This action would, among other measures, further reduce trap allocations, and is expected to have a negligible to low positive impact. Overall, the combination of past, present, and future actions is expected to reduce 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 neutral to non-significant positive impacts on habitat and EFH, for the purposes of NEPA.**

Human Communities

As noted in Table 26 the past federal fishery management actions have implemented limited entry programs to cap and control fishing effort on American lobster, and broodstock measures designed to protect sexually mature lobsters and foster egg production. From 1998-2004, American Lobster was the highest value fishery in NE 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. As discussed in greater detail in Section 1.5, 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 (Table 27).

There are several EFH, protected resources 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 neutral, some positive and some negative (Table 27). In addition, the effects of non-fishing activities on the fishery-related businesses and communities are mostly potentially negative (Table 23).

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 positive cumulative impacts on the fishery-related businesses and communities, for the purposes of NEPA.**

Table 27: Summary of Cumulative Effects of the Preferred Alternative

	American Lobster Resource	**Physical Habitat/EFH**	**Protected Resources**	**Human Communities**	**Non-Target Species & Other Fisheries**
Direct/Indirect Impacts of Preferred Alternative	Positive	Neutral to Positive	Neutral to Positive	Potentially Positive to Potentially Negative	Neutral to Potentially Positive
Combined Cumulative Effects Assessment Baseline Conditions	Positive	Mixed	Positive	Positive	Short term Negative Long term Positive
Cumulative Effects	Non-significant Positive	Non-significant Neutral to Positive	Non-significant Neutral to Positive	Non-significant Potentially Positive	Non-significant Neutral to Positive

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7.0 Persons and Agencies Consulted

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

8.0 Compliance with Other Applicable Laws and Executive Orders

8.1 Atlantic Coastal Act

Presently, American lobster regulations are issued under the Atlantic Coastal Fisheries Cooperative Management Act in Title 50 of the Code of Federal Regulations, Part 697. The lobster 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 lobster ISFMP. The measures evaluated in this EA are in keeping with the Atlantic Coastal Act regulatory standard to develop compatible regulations to the Commission's lobster ISFMP, and, as stated in section 6.4.1, be 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. By itself, the proposed management actions would not end overfishing and restore stocks of American lobster, but are part of and would complement an ongoing long-term management strategy to achieve these purposes (NMFS 1999). The degree to which the selected management actions would limit fishing effort and associated lobster mortality is difficult to state with precision. Nevertheless, it is anticipated that broodstock measures, in association with trap reductions, when combined with other lobster management measures, would increase the overall effectiveness of those measures in achieving ISFMP objectives and ultimately end overfishing and rebuild stocks of American lobster under National Standard 1. Additional lobster management measures in both state and Federal waters would be needed in the future in accordance with the resource management requirements addressed by the ISFMP to end resource overfishing.

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 scientific review and associated approval by state and Federal lobster scientists through the Commission's Lobster TC. For example, the 2009 Commission Stock Assessment Report, provides the basic underpinnings of the proposed action. In addition, recent NMFS vessel, permit, dealer and observer data is incorporated in the assessment of impacts for this action. Further, the proposed measures address the management and policy guidance provided by the scientists on the Lobster Stock Assessment Review Panel regarding the measures recommended for facilitating the assessment and sustainability of the lobster resource.

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. NMFS believes that the proposed action illustrates the consistency and coordination sought by this National Standard. The three stock areas for American lobster are being managed, throughout the range of the population from Maine to North Carolina, through an area management approach in coordination with state jurisdictional management and Federal management through the Commission's ISFMP and complementary Federal regulations. The measures associated with this action support the coast-wide management program for the American lobster resource.

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. NMFS believes that the proposed action illustrates the consistency and coordination sought by this National Standard. This purpose of this action is to focus on an individual stock, the SNE lobster stock, and to coordinate management to address the recruitment failure identified by the Commission's TEchincal Committee.

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 within the impacted LCMA 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 lobster industry through its LCMT program, and take into account the social and economic distinction among the nearshore and offshore EEZ fisheries. NMFS

gave great consideration to the expertise of the LCMTs, whose membership is appointed by the involved states, and who were presumed to have intimate knowledge of how their proposal would affect their state's fishery. Further, despite a dearth of information due to the lack of mandatory harvester reporting, 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.

Federal vessels fishing in Areas 2, 3, 4, and 5 from several states may be impacted by the proposed action; however the intent of the proposed measures would be to implement management measures for the SNE stock, consistent with Commission recommendation, and regulations already implemented by the affected states. These proposed measures are intended to be consistent within each impacted LCMA and, although not a mirror-image of state regulations, support the Commission's plan by seeking to apply a consistent management regime across all involved Federal vessels within each LCMA.

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. Broodstock measures are intended to allow the SNE American lobster stock to rebuild, and in the long-term, stabilize the fishery and 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 takes into account the variations in fisheries, fishery resources, and catches, in consultation with the Commission and industry groups through coordination with LCMTs, and among the inshore and offshore EEZ fisheries. Industry involvement through the ISFMP process ensures flexibility in management of the fisheries, and fishery resource over seven management areas. Additionally, the proposed measures enact the recommendations of the scientists of the American Lobster Stock Assessment Peer Review Panel which advised that such measures be implemented to facilitate the management and sustainability of the lobster 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, the action, consistent with the Commission's plan, is intended scale the SNE American lobster fishery to the size of the resource. The proposed measures are consistent with scientific advice and the advice of the SNE American lobster stock through a variety of management measures. NMFS examination of available data showed no incongruence with that expectation. Sustained participation of communities and consideration of economic impacts is facilitated through the ISFMP's area management provisions, which allow fishing communities to participate in, and provide public comment on, proposed management measures. Specifically, the proposed management actions developed in consultation with the Commission and the lobster industry through the LCMTs, and take into account the social and economic distinction among the nearshore and offshore EEZ fisheries. NMFS gave great consideration to the expertise of the LCMTs, whose membership is appointed by the involved states, and who were presumed to have intimate knowledge of how their proposal would affect their state's and community's fishery.

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 will likely reduce fishing effort in SNE, in an attempt to scale the fishery to the size of the resource. Therefore, the proposed action 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. The selected management actions 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)

Section 7 of the ESA states that any project authorized, funded, or conducted by any Federal agency should not "… jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined … to be critical." For this EA, NMFS is required to consult with applicable programs within NMFS to determine whether any federally listed or proposed endangered or threatened species or their designated critical habitats occur within the areas affected by the proposed measures. If it is determined that these species or habitats might be affected by the proposed measures, "formal" consultation must take place and a Biological Assessment (BA) must be prepared to identify the nature and extent of effects and recommend measures that would avoid or reduce potential effects on the species. The BA would be used for determining whether the effects would be adverse and, if so, whether they might jeopardize the existence of any listed species. After consultation, NMFS would issue a Biological Opinion (BO) on the potential for jeopardy. If the opinion is that the project is not likely to jeopardize any listed species, the Agency may also issue an incidental take statement as an exception to the takings prohibitions in Section 9 of the ESA.

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 ISFMP for American lobster. For further information on the potential impacts of the proposed management action, see Sections 5.1.3, 5.1.4, 5.1.5 and 5.1.6.

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 May 27, 2014. 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 mandatory v-notching and reduced minimum size, are also not expected to adversely impact EFH. Additional measures, including trap reductions and seasonal

closures may have a positive effect on habitat. Therefore, any potential changes in fishing effort due to these measures would likely be negligible.

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)

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

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

   The proposed action is not expected to jeopardize the sustainability of any target species that may be affected by the action. The intent of the proposed action is to reduce lobster trap fishing effort through trap reductions, seasonal closures, mandatory v-notching, and an increased mimimum size. Although fishing mortality cannot be directly linked to trap effort, the proposed action would likely have positive impacts on the lobster resource by helping to scale the fishery to the size of the SNE stock and continue rebuilding of the stock. The biological impacts of the proposed action on the target species are analyzed in Section 5.2.

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

   The proposed action is not expected to jeopardize the sustainability of any non-target species that may be affected by the action. The proposed action is consistent with the objectives of the Commission's ISFMP for American lobster. The proposed action would result in fewer traps and implement seasonal closures which may decrease the bycatch of non-target species and reduce the need for bait. This would have a low positive impact on non-target species. Other measures (mandatory v-notching and an increased mimimum size) would have a negligible impact on non-target species (Section 5.2).

3) **Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat EFH as defined under the Magnuson-Stevens Act and identified in FMPs?**

The proposed action is not expected to cause damage to the ocean, coastal habitats, and/or EFH. The proposed action would reduce the number of lobster traps implement seasonal closures and is not expected to create additional impacts to EFH. Other measures (mandatory v-notching and an increased mimimum size) would have a neglidgible impact to EFH (Section 5.2).

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

This proposed American lobster action is not expected to impact adversely public health or safety. In reducing the number of lobster traps, requiring v-notching, or having seasonal closures, the proposed action would allow the lobster trap fishery to continue in a relatively consistent manner which would not affect safety at sea.

5) **Can the proposed action be reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species?**

The proposed action is not expected to adversely impact protected species, marine mammals or critical habitat of such species. A decrease in traps as a result of the proposed action and seasonal closures could reduce the number of interactions with protected resources and would have low positive impacts on endangered or threatened species, marine mammals and the critical habitat of such species. Other measures (mandatory v-notching and an increased mimimum size) would have a neglidgible impact on endangered or threatened species, marine mammals and the critical habitat of such species(Section 5.2).

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

No. The proposed action would not have a substantial impact on biodiversity or ecosystem function within the affected area. The proposed action would reduce the number of lobster traps in the fishery and implement other broodstock meansures and would not increase the potential for negative impacts on biodiversity or ecosystem function.

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

Significant social or economic impacts are not interrelated with natural or physical environmental effects. The proposed action would potentially provide some positive biological effects by protecting the lobster resource from negative impacts associated with trap fishing effort. Trap reductions, mandatory v-notching, seasonal closure and an increased mimimum size could decrease the catch of American lobster, resulting in reduced income for fishers in this area. However, a rebuilt stock could support a more robust future fishery.

8) **Are the effects on the quality of the human environment likely to be highly controversial?**

The proposed action is not expected to be highly controversial. As a preliminary matter, the science upon which this action is based, such as the most recent lobster stock assessment, has been peer reviewed, accepted by the lobster management board, and is straight-forward and non-controversial. This action was requested by the Commission and is consistent with the manner in which the Commission's ISFMP has, over the last decade, moved to limit trap fishing effort in all management areas for the purposes of lobster conservation and industry stabilization. In addition, these measures have already been implemented by the member states and the vast majority of Federal permit holders are already subject to these restrictions by virtue of their state lobster permit.

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

There are shipwrecks present in areas,where the lobster trap fishery is prosecuted. However, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is not likely that the proposed action would result in substantial impacts to unique areas.

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

No. The proposed action would reduce lobster traps as well as implement other measures such as seasonal closures, v-notching and minimum sizes in order to continue SNE lobster stock rebuilding. The proposed action would not substantially change the current fishing practices so the overall character of the fishery is not expected to change. Therefore, there are no unknown or unique risks associated with the implementation of the proposed action.

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

The proposed action is not expected to result in cumulatively significant impacts. As described in further detail in Section 5.3 - Cumulative Impacts Assessment, the proposed measures are not expected to result in a change in fishing activity or fishing effort, or to significantly impact lobster landings.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Although there are shipwrecks present in areas where fishing occurs, including some registered on the National Register of Historic Places, vessels try to avoid fishing too close to wrecks due to the possible loss or entanglement of fishing gear. Therefore, it is not likely that the proposed action would adversely affect the historic resources.

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

No. The proposed action is not expected to result in the introduction or spread of non-indigenous species because it would not result in any vessel activity outside the current extent of the fishery or change traditional fishing practices.

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

The proposed action is not likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. This action follows a decade of similar programs adopted into the ISFMP and implemented in Federal waters to provide for a sustainable lobster resource.

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

The proposed action is not expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The proposed action has been found to be consistent with other applicable laws (Section 8).

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

The proposed action is not expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species. As stated in Section 5.3, the impact on resources encompassing the lobster resource and non-target species is expected to be minimal.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for this action, it is hereby determined that the proposed action will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

John K. Bullard
Regional Administrator
Greater Atlantic Regional Fisheries Office, NMFS

12/16/14
Date

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 environmental assessment do not contain new collection-of-information requirements subject to the PRA.

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 June 17, 2014, **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 lobster management measures.** Each state had 60 days in which to agree or disagree with the determination regarding consistency with that state's approved coastal management program. If a state failed to respond within 60 days, the state's agreement was 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 ISFMP, 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 EA will be made available in printed publication and on the NMFS GARFO web site at www.greateratlantic.fisheries.noaa.gov. This document provides metric conversions for all measurements.

The intended users of the information are individuals involved in the American lobster fishery, such as fishermen, vessel owners and operators, lobster dealers, and processors. This EA addresses measures for implementation in the American lobster 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 was made available to the public as a publication in the Federal Register and, the final EA and final rule will also be made available in hard copy format and on the NMFS GARFO web site at www.greateratlantic.fisheries.noaa.gov.

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 EA 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 dealer weighout and permit data, and the most current stock assessment available. 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 lobster 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 survey data. The management measures are designed to meet the

conservation goals and objectives of the ISFMP, to prevent overfishing, and to rebuild this resource, 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 Northeast Regional 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 Northeast Regional 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 EA. The proposed management measures would affect small entities engaged in several different aspects of the lobster fishery. The affected entities include Federal lobster permit holders fishing in SNE, specifically Areas 2, 3, 4, and 5.

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

Recent data indicate that the SNE American lobster stock, which includes all or part of six Areas, is at a low level of abundance and is experiencing persistent recruitment failure, caused by a combination of environmental factors and continued fishing mortality. To address the poor condition of the SNE stock, the Commission adopted Addenda XVII and XVIII to Amendment 3 of the ISFMP, approving a combination of trap cuts and broodstock measures. The Commission Lobster Board's Plan Development Team has confirmed that the affected states have already issued regulations that are compliant with Addendum XVII measures. 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 reduce fishing exploitation and reduce latent effort in the trap fishery to scale the fishery to the size of the SNE lobster stock. The legal basis for the proposed action is the ISFMP for American lobster 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 final regulatory flexability analysis (FRFA) 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 initial regulatory flexability analysis (IRFA) or 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 recent addition of vessel owner information to the permit data allows us to better define fishing "businesses." The vessel ownership data identifies all the individual people who own fishing vessels. Vessels can be grouped together according to common owners, which can then be treated as a fishing business, for purposes of RFA analyses. Revenues summed across all vessels in the group and the activities that generate those revenues form the basis for determining whether the entity is a large or small business. Ownership data are available for those potentially impacted by the proposed action from 2010 onward.

The RFA recognizes and defines three kinds of small entities: small businesses; small organizations; and small governmental jurisdictions. The Small Business Administration (SBA) size standards define whether a business entity is small and, thus, eligible for Government programs and preferences reserved for "small business" concerns. Size standards have been established (and recently modified) for all for-profit economic activities or industries in the North American Industry Classification System (NAICS). Designations of large and small entities were attached based on each **entities' three-year average** landings. For entities landing a plurality of revenue in shellfish (NAICS 111412), the threshold for "large" is $5.0 million. For entities landing a plurality of revenue in finfish (NAICS 111411), the threshold for "large" is $19.0 million. The number of directly regulated entities for purposes of analyzing the economic impacts and describing those that are small businesses is selected based on permits held. Since this proposed regulation applies only to the businesses which hold permits in 4 areas managed by the conservation measures being amended, only those business entities are evaluated. Business entities that do not own vessels with directly regulated permits are not described.

There are 379 distinct entities identified as directly regulated entities in this action, those that held permits in Areas 2, 3, 4 or 5, or some combination. There were 373 entities that were classified as "small," while the remaining 6 were classified as "large." All 6 of the large businesses were designated as shellfish. Until further guidance is provided, for RFA analyses, business entities are classified into the SBA defined categories based on which activity, in the most recent year, produced the greatest gross revenue. An advantage of this approach is that entities are defined as large or small one time for the duration of a year, maintaining action to action consistency. As far as determining whether a business is large or small, once its major activity is determined (based on 2012) the average total revenue from all activities over the most **recent three years (2010-2012)** is applied against the appropriate threshold.

Of the 373 small entities, 180 are considered a shellfish business, 121 are considered a finfish business, 3 are considered a for-hire business, and 69 could not be identified as either because even though they had a lobster permit (in 1,2,3 or 4) they had no earned revenue from fishing activity. Because they had no revenue in the last 3 years, they would be considered small by default, but would also be considered as latent effort.

The entity definition used by the Social Sciences Branch uses only unique combinations of owners. That is, entities are not combined if they have a shared owner. Section 3 of the 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)).

No absolute dollar or quantity threshold exists to establish criteria for significance of economic impacts. However, NMFS and SBA 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.

Although available data are limited to make a definitive determination, a comparison of lobster revenue dependence by large vs. small entities can be used to highlight the potential for disproportionate impacts. The average annual percent of total ex-vessel revenue earned from lobsters compared to their total ex-vessel revenue is specified by business entity in T**able 28.**

Table 28. Number of Potential Business Entities Affected by Percent of Total Average Annual Gross Revenue Derived from Lobster Landings (2010-2012)

	Total Average Annual Gross Revenue Derived from Lobster Landings (as % of total)						
Business entity type	<5	5-9	10-19	20-29	30-39	40-49	>50
Shellfish- small							180
Shellfish-large							6
Finfish- small	71	7	14	10	10	9	0

The dependence on lobsters is not higher for small entities (in relative terms) than for large entities. This would suggest that a substantial number of small entities are not at a significant competitive disadvantage. However, the fact that there are a greater number of small entities in total should be highlighted. Given the nature of the proposed rule, impacted vessels (both large and small) may be able to reallocate effort to minimize impacts. In sum, few entities in the fishery are considered large and the impact on large entities is distributed similarly to the impacts on small entities.

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. The ownership data based on the permits held does not contain information on CPH permits. A total of 23 CPH's exist for lobster Areas 2 , 3, and 4: 8 for Area 1, 9 for Area 3, and 6 for Area 4. One CPH qualifies for a permit in Area 2 and 3, while one CPH qualifies in all 3 of these Areas.

While considering the number of affected entities, it is also worth noting that the vast majority of permit holders are either dually permitted (i.e., issued both a federal and state permit) or otherwise subject to a state's lobster 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.[41]

8.10.5 Economic Impacts of the Proposed Rule on Small Entities

The economic impacts of the proposed trap cuts and broodstock measures cannot be quantified with any meaningful precision. The economic viability of a lobster business is not simply dependent on the amount of lobster harvested, but is also dependent on the cost of resources expended to harvest lobster (such as fuel, bait, boat mortgages, etc.). Information about the costs is not collected and, therefore, is not available for this analysis. Even if the information were available, human factors, such as skill of the captain, decisions on when and where to fish, and when to bring the harvest to market so impact lobster economics that quantification would still not be possible. Nevertheless, a qualitative analysis of potential economic impacts is both possible and helpful to better understand the impacts of the proposed rule.

This EA includes measures that can be split into two categories: Trap cuts, which include scheduled cuts to a permit holder's trap allocations in Areas 2 and 3, and broodstock measures, which include mandatory v-notching, seasonal closures, and a reduced minimum size for Areas 2, 3, 4, and 5. For additional information on these measures, and the rationale for each, please refer to Section 3.2 above.

Due to the expected high rate of dual permitting and because the states are already compliant with the broodstock measures, the majority of vessels must already abide by these requirements, and therefore have already been impacted. However, for those vessels not dually permitted, broodstock measures can be expected to have a limited economic impact to permit holders, though the exact amount is difficult to quantify. Impacts from mandatory v-notching in Areas 2, 4, and 5 are expected to have a low negative impact 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 fishers and their communities. While the retention of egg-bearing female lobsters is prohibited, mandatory v-notching would require all lobstermen in fishing in Areas 2, 4, and 5 to v-notch all egg-bearing lobsters they encounter. Although this would result in a time burden, it would likely increase the prevalence of v-notched, and therefore, illegal, lobsters that are caught, resulting in a potential, but unquantifiable loss in revenues. The v-notch

[41] The Commission's Lobster Plan recommended that the states and NMFS implement what is now known as the Most Restrictive Rule in their regulations. See Amendment 3, Section 3.2.1 (December 1997). Specifically, the Most Restrictive Rule allows lobster fishers to fish in multiple management areas and/or multiple jurisdicitions (such as in state waters or in the EEZ), but in so doing, the fisher must comply with the most restrictive management measures of all the areas fished. NMFS' Most Restrictive Regulation is set forth at 50 CFR 697.3 and 697.4.

would likely remain until the lobster next molted (probably one year later), which would likely prevent the lobster from being harvested for one year's time if the lobster is re-caught. Notching and returning the lobster to the sea when first caught will not result in any lost revenues because the lobster would only be notched if it were caught with extruded eggs, which in itself requires return to the sea. It would only result in lost revenues if it is later re-caught absent eggs with the v-notch (likely by a fisher other than the fisher who originally performed the notching) and returned to the sea. That financial negative, however, must be balanced by the positive of returning a lobster known to successfully breed, back to the sea to reproduce another year, potentially resulting in more harvestable lobster in the future.

For the reasons discussed above, the impacts of seasonal closures on Federal lobster fishers in Areas 4 and 5 are also expected to be low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time, which would ultimately benefit fishers and their communities. During a seasonal closure, where traps are prohibited from the area, it could be expected that the lobster industry fishing in Area 4 and 5 will lose income, leading to overall negative impacts. These closures, however, are timed to take place during the winter season when few lobsters are traditionally caught and gear is minimally tended. In fact, many lobster fishers may already remove some or all of their gear during this period, although this specific data is not collected. The short duration of these closures, which fall outside the peak lobster harvesting season, may also ease some of this impact.

Finally, a change to the minimum size in Area 3 is expected to have a low negative impact in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time, which would ultimately benefit fishers and their communities. An increase in the minimum size would reduce the numbers of lobsters available to be landed in the year of the gauge change, estimated by the Commission as a 4.4% harvest reduction, or an approximately 75,000-pound reduction in landings, based on data presented in Table 11 of the EA. If the harvest reduction corresponds linearly with a reduction in revenue, a loss of approximately $300,000 could result, based on revenue information presented in Table 12 of the EA. These lobsters, however, are not lost to the fishery: They add to the spawning stock biomass and could contribute to egg production and stock rebuilding. Further, these individuals would be legally catchable the next year as these lobsters would be expected to grow to legal size in the next year's molt.

Trap reductions for Areas 2 and 3 can be expected to have a greater economic impact, though again, the exact amount is difficult to quantify. Measures included in this proposed rule would reduce the allocation of every Area 2 permit holder by 50 percent over a 6-year period, and would reduce the allocation of every Area 3 permit holder by 25 percent over a 5-year period. Based on Area 2 data presented in the EA, 148 permit holders elected Area 2 on their FY 2012 permit. A total of 118,400 traps could have been fished in FY 2012, assuming each permit holder fished in Area 2 with the maximum allocation of 800 traps. Trap tag data, however, indicate that approximately 99,000 trap tags were ordered for Area 2. The number of tags ordered, while less than the maximum currently allowed, exceeds the number of traps that will be allowed following the 50% trap reduction (i.e., 59,200 traps). Permit holders, therefore, may lose access to approximately 40,000 traps, or approximately 40 percent of what was fished in FY 2012. In other words, some percentage of cut traps (possibly 10%) are not being fished and would thus amount to a non-impactful paper reduction. If so – and it cannot be stated with certainty because such data are not collected – then the 25% trap reduction in the first year might only reflect a 15% overall reduction in traps being fished, with the remaining 10% reduction involving traps that are latent. Similarly, based on data

presented in this EA, 73 permit holders were issued Area 3 permits in FY 2012. A total of 141,985 traps could have been fished in FY 2012, assuming each permit holder fished in Area 3 with the maximum allocation of 1,945 traps (Area 3 permit holders are bound by trap allocations that are permit specific). Trap tag data, however, indicate that approximately 107,000 trap tags were ordered for Area 3. The number of tags ordered, while less than the maximum currently allowed, only slightly exceeds the number of traps that will be allowed following trap reductions (i.e., 106,488 traps). While the trap reductions scheduled for Area 3 will reduce allocations by 25 percent, it can be assumed that these trap reductions will also have some impact on permit holders.

Regardless of the percentage of actual versus latent traps reduced, for those fishers fishing at the trap cap, the trap reductions will reduce actively fished traps and will thus be more impactful. The degree of impact, however, cannot be calculated with precision because lobster catch does not directly correspond to the number of traps fished and net income does not directly correspond to the number of lobster caught. For example, trap reductions could reduce a permit holder's expenses (i.e., bait, fuel, rope, trap tags, etc.), resulting in a more streamlined business model. Some businesses might compensate for a smaller allocation by fishing those remaining traps harder, e.g. tending them more often, using a higher quality bait, etc. Further, not all lobster businesses fish their full allocation and for many businesses, the trap cuts may only be to unused, latent traps. Unfortunately, data on actual traps fished are not kept and the percentage of unused allocation is not known. When considered in conjunction with trap transferability (discussed in greater detail in Section 3.1.2 of the EA), permit holders remaining in the fishery may be able to transfer in (buy) traps up to their original trap cap (i.e., purchase additional traps on an annual basis to make up for traps lost through trap reductions). Though this will require capital, the ability to acquire additional traps may help permit holders compensate for trap reductions. The permit holders who elect to leave the fishery and transfer out (sell) traps will be compensated immediately by those purchasing traps.

In addition to these considerations, there is also the potential for permit holders from smaller, more isolated ports to be disproportionately affected by trap reductions. Specifically, the relative isolation of these permit holders may hamper their ability to readily participate in the trap transfer market and mitigate against the trap cut impacts. Consider the two permit holders with Area 2 permits in Bristol County, RI, compared to the 20 permit holders with Area 2 permits in Dukes County, MA. The two RI permit holders could be considered isolated, and may have limited access to the transfer market (i.e., find trap sellers or buyers), in comparison to the 20 permit holders in Dukes County, who may be able to negotiate trap transfers with relative ease at the docks, in town, etc. This example becomes more extreme as the geographical distances increase from Area 2, especially as geographic isolation is expected to increase following the qualification of Area 2 permits. The trap transfer program, however, is new and participant behavior and response is unknowable at this point.

In the absence of action (i.e., the no action alternatives identified in the EA) broodstock measures and trap cuts would not be implemented by NMFS. In other words, the Federal lobster regulations will not adopt these measures, although the vast majority of Federal permit holders would still have to abide by these measures as a result of their state permit. Trap allocations would remain the same, and v-notching, minimum size changes, and seasonal closures, as described in this proposed rule, would not be implemented. In such a scenario, the most likely economic impact would be a dilution in profitability for current and future participants in the lobster fishery. Maintaining exploitation at current levels on a depleted SNE stock may prevent the stock from rebuilding to sustainable levels, reducing catch and

therefore income from current and future trips, and ultimately impacting a permit holder's ability to access the resource in the future.

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 broodstock measures, the majority of Federal vessels must already abide by these requirements, and therefore have already been impacted. For those vessels not dually permitted, broodstock measures can be expected to have a limited economic impact to permit holders. 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. Therefore, no alternatives to broodstock measures are considered.

Because the Trap Transfer Program may ease economic impacts of trap reductions and provide added additional business flexibility, we propose to implement trap reductions at roughly the same time, or as close as possible, as the Trap Transfer Program, as recommended by the Commission. In other words, we have timed the trap reductions so that fishers will be able to activate their transferred traps moments after their allocation is reduced. In this way, fishers will not have to fish with reduced traps while waiting for their transferred traps to become allocated. This could mitigate the impacts of the trap reductions because fishers would be able to transfer traps based on their reduced allocation, prior to the cuts becoming effective. This way, they could buy traps before the cuts take effect and minimize the impacts to their businesses resulting from the trap reductions. To further mitigate trap reductions, a permit holder could also choose to tend his or her remaining traps more often in an attempt to harvest more lobsters and recover income lost from the trap reductions. When considered in conjunction with trap transferability, permit holders remaining in the fishery may be able to transfer in traps up to their original trap cap (i.e., transfer in traps to make up for traps lost through trap reductions). Though this will require capital, the ability to acquire additional traps may help another set of permit holders compensate for trap reductions. Finally, the permit holders who elect to leave the fishery and transfer out traps will be compensated immediately by those fishers purchasing traps.

Given the novelty of trap transferability, it is unclear how much time will be needed for trap sellers and buyers to meet and propose transfers, for Federal and state agencies to meet, reconcile, and approve the proposed transfers, and for permits and trap tag orders to reflect the approved transfer. Consequently, it might prove challenging for all permit holders to participate and complete their desired trap transfer transactions in this first year Given the novelty of the program, we thought it in the best interests of the industry to allow extra time before cutting traps. This will give both the managers and industry time to implement the program. For this reason, we have decided to implement the trap cuts on April 30th 2015 and trap transfers on May1st 2016.

As discussed in this EA, we considered, but rejected two other alternatives, where trap reductions are theoretically approved out-of-sync (i.e., either before or after) with trap transfers. Under either of these scenarios, some permit holders would be prevented from participating in the Trap Transfer Program following trap cuts, resulting in potential loss of economic opportunity, until additional traps could be required. For permit holders whose business model is predicated on fishing at the trap cap, they would be forced to fish at reduced and presumably unprofitable levels for nearly half the fishing year. Because

these alternatives may increase economic impacts, the measures proposed in this action are the alternatives which minimize any significant economic impact.

8.10.7 Reporting, Recordkeeping and Other Compliance Requirements

This action contains no new collection-of-information, reporting, or recordkeeping requirements.

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 5.2. The discussion to follow provides a summary of those findings.

8.11.1 Objectives

The objective of the preferred alternatives is to manage the American lobster fishery in a manner that maximizes resource sustainability, recognizing that Federal management occurs in consort with state management. To achieve this purpose, this EA analyzes recently-approved state management measures to address poor stock conditions and persistent recruitment failure of the SNE American lobster stock, as approved by the Commission in Addenda XVII and XVIII to Amendment 3 of the ISFMP.

8.11.2 Description

A description of the entities affected by this action, specifically the stakeholders of the SNE American lobster 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 EA are set forth in Section 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, combining measures that are proposed in multiple areas. Much of this information is captured already in the detailed economic impacts and social impacts analyses of Sections 7.4 and 7.5 of this document. This RIR will summarize and highlight the major findings of the economic and social impacts analysis provided in Section 5.2 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 Trap Reductions

The economic impacts associated with trap reductions in Areas 2 and 3 are varied and difficult to quantify, but can be expected to be low 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 fishers and their communities. Fewer traps could conceptually decrease catch of American lobster by permit holders remaining in the fishery, resulting in less income for American lobster fishers in this Area, but that amount is not known. However, trap reductions could reduce a permit holder's expenses (i.e., bait, fuel, rope, trap tags, etc.), resulting in a more streamlined business model. Some businesses may be able to weather trap reductions through these decreased business costs. Further, not all lobster businesses fish their full allocation and for many businesses, the trap cuts may only be to unused, latent traps. Unfortunately, data on actual traps fished are not kept and the percentage of unused allocation is not known. To mitigate trap reductions, a permit holder could also choose to tend their remaining traps more often in an attempt to trap more lobsters and recover income lost from the trap reductions. When considered in conjunction with trap transferability, permit holders remaining in the fishery may be able to transfer in traps up to their original trap cap (i.e., purchase additional traps to make up for traps lost through trap reductions). Though this will require capital, the ability to acquire additional traps may help another set of permit holders compensate for trap reductions. Finally, the permit holders who elect to leave the fishery and transfer out (sell) traps will be compensated immediately by those purchasing traps.

8.11.4.2 Increased Area 3 Minimum Size

The economic impacts associated with a revised minimum size in Area 3 are varied and difficult to quantify, but can be expected to low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. An increase in the minimum size would reduce the numbers of lobsters available to be landed, estimated by the Commission to be a 4.4% harvest reduction[42], or an approximately 75,000-pound reduction in landings, based on data presented in Table 11. If the harvest reduction corresponds linearly with a reduction in revenue, a loss of approximately $300,000 could result, based on revenue information presented in Table 12. These lobsters, however, 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 Seasonal Closures

The economic impacts associated with seasonal closures in Areas 4 and 5 are varied and difficult to quantify, but can be expected to be low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. During a seasonal closure, where traps are prohibited from the area, the lobster industry fishing in Area 4 could lose income, leading to overall negative impacts. However, in a study entitled "Potential impact of Seasonal Closures in the U.S. Lobster Fishery," Cheng and Townsend concluded that "closures for extended periods (such as August to November) might increase gross revenues modestly;" however, shorter closures would likely not have the same impact. In addition, the closures approved by the Commission would take place in winter months, when effort and landings have historically been lower than during the summer months. Given the relatively short duration and timing of the seasonal closures approved by the Commission, and the trend noted by Cheng and Townsend, it is expected that seasonal closures will, conservatively, have a low negative economic impact.

8.11.4.4 V-Notching

The economic impacts associated with mandatory v-notching of female lobsters in Areas 2, 4, and 5 are varied and difficult to quantify, but can be expected to be low negative in the short term, but overall positive in the long term given that the measures are expected to improve stock conditions over time which would ultimately benefit fishers and their communities. While the retention of egg-bearing female lobsters is prohibited, this alternative would prevent the retention of those v-notched female lobsters during times or seasons when no eggs are present, resulting in lost revenues.

8.11.4.5 Alternative Timing For Trap Reductions

Given the novelty of trap transferability, it is unclear how much time will be needed for trap sellers and buyers to meet and propose transfers, for Federal and state agencies to meet, reconcile, and approve the proposed transfers, and for permits and trap tag orders to reflect the approved transfer. Consequently, it might prove challenging for all permit holders to participate and complete their desired trap transfer

[42] Addendum XVII

transactions in this first year, which might take on added importance given the proposed trap reductions on April 30, 2015. Therefore, we are requesting comment in the proposed rule on the proposed April 30, 2015, trap cut date and whether alternative dates, including later dates, such as a 1-year delay, might better advance lobster management objectives. Should the Commission and our state partners suggest a delay and/or alternative approach agree with these considerations, we would develop an alternative formally analyzing these impacts. At present, however, such an alternative fails to accomplish the stated objectives of the rule, insofar as unilateral divergence from the Commission's recommendations would create regulatory disconnects with the states and potentially undermine the Lobster Plan.

8.11.4.6 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 fishers and enforcement, resulting in an ineffective management program. The inconsistency could compromise the effectiveness of the Commission's measures in reducing fishery exploitation and rebuilding the SNE stock. If the stock continues to decline then lobster fishers could experience sub-optimal or reduced revenues due to continued poor stock condition.

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. At $429.3 million in 2012, the landed value of American lobster was among the highest valued species landed in the Greater Atlantic region. Although the relative contribution of the EEZ component has varied over time, it has averaged between 15 percent and 20 percent of domestic landings. On average, lobsters landed in the EEZ tend to be larger than lobsters landed in state waters. 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 EA 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.

9.0 References

59 Federal Register 31938. National Marine Fisheries Service (NMFS), "American Lobster Fishery; Final Rule," (21 June 1994), pp. 31938-31955.

64 Federal Register 47756. National Marine Fisheries Service (NMFS), "Advance notice of proposed rulemaking; consideration of a control date for the American lobster fishery," (1 September 1999), pp. 47756-47758.

64 Federal Register 68228. National Marine Fisheries Service (NMFS), "American Lobster Fishery; Final Rule," (6 December 1999), pp. 68228- 68262.

66 Federal Register 14500. National Marine Fisheries Service (NMFS), "American Lobster Fishery; Final Rule," (13 March 2001), pp. 14500-14502.

67 Federal Register 56800. National Marine Fisheries Service (NMFS), "Advance Notice of Proposed Rulemaking (ANPR), Notice of Intent (NOI) to combine rulemaking and prepare an Environmental Impact Statement (EIS); request for comments," (5 September 2002), pp. 56800-56804.

68 Federal Register 14902. National Marine Fisheries Service (NMFS), "American Lobster Fishery; Final Rule," (27 March 2003), pp. 14902-14932.

70 Federal Register 24495. National Marine Fisheries Service (NMFS), "Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery; Advanced Notice of Proposed Rulemaking (ANPR), Notice of Intent (NOI) to combine rulemaking and prepare an Environmental Impact Statement (EIS); request for comments," (10 May 2005), pp. 24495-24497.

72 Federal Register 64585. National Marine Fisheries Service (NMFS), "Listing Endangered and Threatened Wildlife and Designating Critical Habitat; 90–day Finding for a Petition to Reclassify the Loggerhead Turtle in the North Pacific Ocean as a Distinct Population Segment with Endangered Status and to Designate Critical Habitat," (16 November 2007), pp. 64585-64587.

74 Federal Register 29300. National Marine Fisheries Service (NMFS), "Endangered and Threatened Species; Designation of Critical Habitat for Atlantic Salmon (*Salmo salar*) Gulf of Maine Distinct Population Segment; Final Rule," (19 June, 2009), pp. 29300-29341.

79 Federal Register 19015. National Marine Fisheries Service (NMFS), Atlantic Coastal Fisheries Cooperative Management Act Provisions; American Lobster Fishery; Final Rule (April 7, 2014), pp 19015-19027.

Able, K.W., K.L. Heck, M.P. Fahay, and C.T. Roman. (1988). Use of salt-marsh peat reefs by small juvenile lobsters on Cape Cod, Massachusetts. Estuaries,11:83–86.

Addison, J.T. (1999). Overview of Lobster stock assessment in the United Kingdom. Pp. 86-90 in U.S./Canadian Lobster Summit II, Lobster Stock Assessment: Towards Greater Understanding, Collaboration and Improvement. A New England Aquarium Aquatic Forum. 99-2. (M. Farrey, M. Mooney-Seus and H. Tausig, eds.), New England Aquarium Press.

Aiken, D.E. (1977). Molting and growth in decapod crustaceans with particular reference to the lobster (*Homarus americanus*). Div. Fish. Oceanogr. Circ. (Aust. CSIRO) No. 7, pp. 41-73.

Aiken, D.E., and Waddy, S.L. (1978). Space, density and growth of lobster (*Homarus americanus*). Proc. Annu. Meet.-World Maric. Soc. 9, 461-467.

Aiken, D.E. and Waddy, S.L. (1980). Reproductive biology in the biology and management of lobsters. (J.S. Cobb and B.F. Phillips eds.), Vol. I, p. 275.

Aiken, D.E., and Waddy, S.L. (1986). Environmental influence on recruitment of American lobster (*Homarus americanus*): a perspective. Can. J. Fish Aquat. Sci. 43:2258-2270.

Anderson, J.R. and Hart, R.M. (1979). Population biology of infectious disease. Part 1. Nature 280:361-367.

Atlantic Coastal Fisheries Cooperative Management Act (ACFMCA). (1993). 16 U.S.C. § 5101-5109; Title VIII of Pub. L. 103-206, as amended. Can also be found at: http://www.asmfc.org/legislation/ACFCMA.pdf.

Atlantic States Marine Fisheries Commission (ASMFC). (1997). Amendment 3 to the Interstate Fisheries Management Plan for American Lobster. Fishery Management Report No. 29 of the ASMFC. December, 1997.

Atlantic States Marine Fisheries Commission (ASMFC) (2000). American Lobster Stock Assessment Report. NO. 00-01.

Atlantic States Marine Fisheries Commission (ASMFC). (2006a). American Lobster Stock Assessment Report for Peer Review. Stock Assessment Report No. 06-03 (Supplement). Can also be found at: http://www.asmfc.org/speciesDocuments/lobster/annualreports/stockassmtreports/americanLobsterStockAssessmentReport06.pdf.

Atlantic States Marine Fisheries Commission (ASMFC). (2006b). Amendment 2 to the Interstate Fishery Management Plan for Atlantic Herring. Fishery Management Report No. 45 for the ASMFC. March 2006.

Atlantic States Marine Fisheries Commission Technical Committee (ASMFC TC). 2007. Special Report to the Atlantic Sturgeon Management Board: Estimation of Atlantic sturgeon bycatch in coastal Atlantic commercial fisheries of New England and the Mid-Atlantic. August 2007. 95 pp.

Atlantic States Marine Fisheries Commission (ASMFC). (2009a). American Lobster Stock Assessment Report for Peer Review. Stock Assessment Report No. 09-01 (Supplement). Can also be found at: http://www.asmfc.org/speciesDocuments/lobster/annualreports/stockassmtreports/2009LobsterStockAssessmentReport.pdf.

Atlantic States Marine Fisheries Commission (ASMFC). (2009b). 2008 Review of the Fishery Management Plan for Atlantic Sea Herring (*Clupea harengus harengus*). Prepared by the Atlantic Sea Herring Plan Review Team. Board Approved November 2009.

Atlantic States Marine Fisheries Commission (ASMFC). (2010). News Release: ASMFC Atlantic Herring Section Sets Specifications for 2010-2012. For Immediate Release February 4, 2010.

Atlantic States Marine Fisheries Commission Technical Committee (ASMFC TC). (2010). Technical Committee Report: *Recruitment Failure in the Southern New England Lobster Stock.* April 2010.

Atlantic States Marine Fisheries Commission (ASMFC). (2012a). Addendum XVII to Amendment 3 to the Interstate Fishery Management Plan for American Lobster: Southern New England Management Measures. February 2012.

Atlantic States Marine Fisheries Commission (ASMFC). (2012b). Addendum XVIII to Amendment 3 to the Interstate Fishery Management Plan for American Lobster: Southern New England Reductions in Fishing Capacity for Lobster Convervation Management Area 2 and 3. August 2012.

ASSRT (Atlantic Sturgeon Status Review Team). 2007. Status review of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). National Marine Fisheries Service. February 23, 2007. 188 pp.

Attard, J., and Hudon C. (1987). Embryonic development and energetic investment in egg production in relation to size of female lobster (*Homarus americanus*). Can. J. Fish Aquat. Sci. 44:1157- 1164.

Balazs, G.H. (1985). Impact of ocean debris on marine turtles: entanglement and ingestion. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-54:387-429.

Barlas, M.E. (1999). The distribution and abundance of harbor seals (*Phoca vitulina concolor)* and gray seals (*Halichoerus grypus*) in southern New England, winter 1998-summer 1999. M.A. thesis. Graduate School of Arts and Sciences, Boston University, Boston, MA. 52 pp.

Barlow, J., S.L. Swartz, T.C. Eagle and P.R. Wade 1995. U.S. marine mammal stock assessments: Guidelines for preparation, background, and a summary of the 1995 assessments. NOAA Tech. Memo. NMFS-OPR-6. 73 pp.

Barlow, J., and P.J. Clapham. (1997). A new birth- interval approach to estimating demographic parameters of humpback whales. Ecology, 78: 535-546.

Barshaw, D.E. and Lavalli, K.L. (1988). Predation upon postlarval lobsters *Homarus americanus* by cunners *Tautogolabrus adspersus* and mud crabs *Neopanope sayi* on three different substrates: eelgrass, mud, and rock. Mar. Ecol. Progr. Ser. 48: 119-123.

Best, P.B., Bannister, J.L., Brownell, Jr., R.L., and Donovan, G.P. (eds.). (2001). Right whales: worldwide status. J. Cetacean Res. Manage. (Special Issue). 2. 309pp.

Biggers, W.J., and Laufer, H. (2004). Identification of juvenile hormone-active alkylphenols in the lobster *Homarus americanus* and marine sediments. Biol Bull Woods Hole, 206: 13-24.

Bologna, P.A. and R.S. Steneck. (1993). Kelp beds as habitat for American lobster *Homarus americanus*. Mar. Ecol. Progr. Ser. 100:127-134.

Bordner, C.E. and Conklin, D.E. (1981). Food consumption and growth of juvenile lobsters. Aquaculture 24:285-300.

Boulva, J. and I.A. McLaren. (1979). Biology of the harbor seal, *Phoca vitulina*, in eastern Canada, Bull. Fish. Res. Bd. Can. 200:1-24.

Briggs, P.T. and F.M. Mushacke. (1984). The American lobster in western Long Island Sound: movement, growth and mortality. N.Y. Fish and Game J. 31(1):21-37.

Butler, M. (2004). Center for Coastal Studies. M. Elliott: email correspondence.

Campbell, A. (1986). Migratory movements of ovigerous lobsters. *Homarus americanus*, Tagged off Grand Manan, Eastern Canada. Can. J. Fish. Aquat. Sci 43:2197-2205.

Campbell A., Graham, D.E., MacNichol, H.I., and Williamson, A.M. (1984). Movements of tagged lobsters released on the continental shelf from Georges Bank to Baccaro Bank, 1971-73. Can. Tech. Rep. Fish. Aquat. Sci. 1288, 16p.

Campbell, A. and Robinson, D.G. (1983). Reproductive potential of three American Lobster, *Homarus americanus* stocks in Canadian Maritimes. Can. J. Fish. Aquat. Sci. 40:1958-1967.

Campbell, A., and Stacko, A.B. (1985). Movement of tagged American lobsters, *Homarus americanus* off southwestern Nova Scotia. Can. J. Fish. Aquat. Sci. 42:229-238.

Capuzzo, J.M. and. Lancaster, B.A. (1979). The effects of diet on the growth energetics of postlarval lobsters *Homarus americanus*. Woods Hole Oceanogr. Inst. Tech.Rep. WHOI-79-55.

Carter, J.A., and Steele, D.H.. (1982). Attraction to and selection of prey by immature lobsters *Homarus americanus*. Can. J. Zool. 60:326-336.

Castell, J.D. and. Budson, S.D. (1974). Lobster nutrition: The effect on *Homarus americanus* of dietery protein levels. J. Fish. Res. Board Can. 31:1363-1370.

Caswell, H., M. Fujiwara, and S. Brault. (1999). Declining survival probability threatens the North Atlantic right whale. Proc. Nat. Acad. Sci. 96: 3308-3313.

CETAP. (1982). A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the USA outer continental shelf. Cetacean and Turtle Assessment Program, University of Rhode Island. Final Report #AA551-CT8-48 to the Bureau of Land Management, Washington, DC, 538 pp.

Clapham, P., S., and C.A. Mayo. (1987). Reproduction and recruitment of individually identified humpback whales, *Megaptera novaeangliae,* observed in Massachusetts Bay, 1979-1985. Can. J. Zool. 65: 2853-2863.

Clapham, P., J., L.S. Baraff, C.A. Carlson, M.A. Christian, D.K. Mattila, C.A. Mayo, M.A. Murphy, and S. Pittman. (1993). Seasonal occurrence and annual return of humpback whales, *Megaptera novaeangliae,* in the southern Gulf of Maine. Can. J. Zoo. 71: 440- 443.

Clapham, P., Barlow, J., Bessinger, M., Cole, T., Mattila, D., Pace, R., Palka, D., Robbins, J. and Seton, R. (2003). Abundance and demographic parameters of humpback whales from the Gulf of Maine, and stock definition relative to the Scotian Shelf. Journal of Cetacean Research and Management,Vol. 5:13-22.

Clark, C.W. (1995). Application of U.S. Navy underwater hydrophone arrays for scientific research on whales. Reports of the International Whaling Commission 45: 210-212.

Coastal Zone Management Act of 1972. (2006). 16 U.S.C. §1451-1465 as amended by the Coastal Zone Protection Act of 1996, Pub L. 104-150. Can also be found at: http://coastalmanagement.noaa.gov/about/czma.html#section302.

Cobb, J.S. and Tamm, G.R. (1974). Social conditions increase intermolt period in juvenile lobsters. J. Fish. Res. Board Can. 32:141-143.

Cobb, S., and Wahle, R. (1994). Early life history and recruitment processes of clawed lobsters. Brill, E.J., Crustaceana. 67:1- 25.

Cobb, J.S., Wang, D., Richards, R.A., and Fogarty, M.J. (1986). Competition among lobsters and crabs and its possible effects in Narragansett Bay, Rhode Island. In N. Pacific Workshop on stock assessment and management of invertebrates. Edited by Jamieson, G.S. and Boume, N. Can. Spec. Publ. Fish. Aquat. Sci. 92:282-290.

Cooper, R.A., Shepard, A., Valentine, P., Uzmann, J.R., and Hulbert, A. (1987). Pre and post drilling benchmarks and monitoring data of ocean floor fauna, habitats, and contaminant loads on Georges Bank and its submarine canyons. NOAA Symp. Ser. For Undersea Res. 2:17-48.

Cooper R.A. and Uzmann, J.R. (1971). Migration and growth of deep-sea lobster, *Homarus americanus*. Science (Wash. D.C.) 171:288-290.

Cooper, R.A. and Uzmann, J.R. (1977). Ecology of juvenile and adult clawed lobsters, *Homarus americanus*, *Homarus gammarus*, and *Nephrops norvegicus*. Div. Fish Oceanogr. Circ. (Aust., CSIRO) 7: 187-208.

Cooper, R.A. and Uzmann, J.R. (1980). Ecology of juvenile and adult *Homarus americanus*. Pp. 97-142 in: The Biology and Management of Lobsters (J.S. Cobb and B.F. Phillips, eds.), Vol. II. Academic Press, New York.

Council on Environmental Quality (CEQ) Regulations for Implementing NEPA. (1969). 40 C.F.R. §1500-1508. Can also be found at: http://www.nepa.gov/nepa/regs/ceq/toc_ceq.htm.

Cowan, D.F. (1999). Method for assessing relative abundance, size distribution, and growth of recently settled and early juvenile lobsters (*Homarus americanus*) in the lower intertidal zone. J. Crust. Biol. 19(4):738-751.

Dadswell, M. 2006. A review of the status of Atlantic sturgeon in Canada, with comparisons to populations in the United States and Europe. Fisheries 31: 218-229.

Davis, M.W. (2002). Key Principles for Understanding Fish Bycatch Discard Mortality. Canadian Journal of Fisheries and Aquatic Sciences, 59: 1834-1843.

DeHart, P.A.P. (2002). The distribution and abundance of harbor seals (*Phoca vitulina concolor)* in the Woods Hole region. M.A. thesis. Graduate School of Arts and Sciences, Boston University, Boston, MA. 88 pp.

Donovan, G.P. (1991). A review of IWC stock boundaries. Rep. Int. Whal. Comm., Spec. Iss. 13:39-63.

Dovel, W. L. and T. J. Berggren. (1983). Atlantic sturgeon of the Hudson River estuary, New York. New York Fish and Game Journal 30: 140-172.

Dunham, P.W. and Skinner-Jacobs, D. (1978). Intermolt mating in the lobster, *Homarus americanus*. Mar. Behav. Physiol. 5:209-214.

Dunton, K.J., A. Jordaan, K.A. McKown, D.O. Conover, and M.G. Frisk. 2010. Abundance and distribution of Atlantic sturgeon (Acipenser oxyrinchus) within the Northwest Atlantic Ocean determined from five fishery-independent surveys. Fish. Bull. 108:450-465.

Elliott, Matthew. (2006). Seafood Watch. Seafood Report. American Lobster, *Homarus americanus*. Northeast Region. Final Report February 2, 2006. Monterey Bay Aquarium.

Endangered Species Act of 1973, 16 U.S.C. §1531-1544. (1973). Can also be found at: http://www.nmfs.noaa.gov/pr/pdfs/laws/esa.pdf.

Ennis, G.P. (1973). Food, feeding, and condition of lobsters, *Homarus americanus*, throughout the seasonal cycle in Bonavista Bay, Newfoundland. J. Fish. Res. Board Can. 230:1905-1909.

Ennis, G.P. (1991). Annual variation in egg production in a Newfoundland population of the American lobster, *Homarus americanus*. In Crustacean Issues Edited by F.R. Schram, Vol. 7, Crustacean Egg Production, A. Wenner and A. Kuris eds., pp. 291-299. Balkema, Rotterdam, The Netherlands.

Eno, NC, MacDonald DS, Kinnear JAM, Amos SC, Chapman CJ, Clark RA, Bunker FStPD, Munro C. (2001). Effects of crustacean traps on benthic fauna. ICES Journal of Marine Science 58: 11-20.

Environmental Review Procedures for Implementing the National Environmental Policy Act. (1999). NOAA Administrative Order Series 216-6. Can also be found at: http://www.nepa.noaa.gov/NAO216_6.pdf.

Epperly, S.P., J. Braun, and A. Veishlow. (1995). Sea turtles in North Carolina waters. Conservation Biology 9(2):384-394.

Estrella, B.T. and McKiernan, D.J. (1989). Catch-per-unit-effort and biological parameters from the Massachusetts coastal lobster, *Homarus americanus* resource: Description and Trends. NOAA Technical Report. NMFS 81, 21 pp.

Estrella, B.T. and Morrissey, T.D. (1997). Seasonal movement of offshore American lobster, *Homarus americanus*, tagged along the eastern shore of Cape Cod, Massachusetts. Fishery Bulletin 95:466-476(1997) 11 pp.

Fogarty, M. J. (1998). Implications of migration and larval interchange in American lobster stocks, spatial structure and resilience in Proceedings of the North Pacific Symposium on Invertebrate Stock Assessment and Management. Edited by G.S. Jamieson and A. Campbell. Can. Spec. Publ. Fish. Aquat. Sci. 125:273-283.

Fogarty, M.J., Borden, D.V.D. and Russell, H.J. (1980). Movements of tagged American lobster, *Homarus americanus*, off Rhode Island. Fish. Bull. 78:771-780.

Fogarty, M.J. and Idoine, J.S. (1988). Application of a yield and egg production model based on size to an offshore American lobster population. Trans. Am. Fish. Soc. 117:350-362.

Gendron, L. (2005). DFO Science, Fisheries biologist. M. Elliott. Quebec: phone conversation.

Gendron, L., P. Fradette, G. Godbout. (2001). The importance of rock crab (*Cancer irroratus*) for growth, condition and ovary development of adult American lobster (*Homarus americanus*), J. Exp. Mar. Biol. Ecol. 262, pp. 221-241.

Getchell, R.G. (1989). Bacterial shell disease in crustaceans: a review. J Shellfish Research 8(1): 1-6.

Gilbert, J.R., and J.L. Stein. (1981). Harbor seal populations and marine mammal fisheries interactions, 1981. Contract NA-80-FA-C-00029. NMFS, Northeast Fisheries Science Center, Woods Hole, MA. Annual report. 35 pp.

Gilbert, J.R., and N. Guldager. (1998). Status of harbor and gray seal populations in northern New England, Final Report to NMFS, NEFSC, Woods Hole, MA, Coop. Agree. 14-16-009-1557, 13 pp.

Gilbert, J.R. and K.M. Wynne (1983). Harbor seal populations and marine mammal-fisheries interactions, 1982. Contract NA-80-FA-C-00029 NMFS, Northeast Fisheries Science Center, Woods Hole, MA. 43 pp.

Gilbert, J.R., and K.M. Wynne (1984). Harbor seal populations and marine mammal fisheries interactions, 1983. Contract NA-80-FA-C-00029. Third annual report. NMFS, Northeast Fisheries Science Center, Woods Hole, MA. 52 pp.

Gilbert, J.R., and K.M. Wynne. (1985). Harbor seal populations and fisheries interactions with marine mammals in New England. Interim report. NOAA NA-84-EAC-00070, NMFS, NEFSC, Woods Hole, MA, 15 pp.

Gilbert, J.R., and K.M. Wynne. (1987). Marine mammal interactions with New England gillnet fisheries, Final Report Contract No. NA-84-EAC-00070, NMFS, NEFSC, Woods Hole, MA, 21 pp.

Gilbert, J.R., G.T. Waring, K.M. Wynne and N. Guldager. (2005). Changes in abundance and distribution of harbor seals in Maine, 1981-2001. Mar. Mamm. Sci. 21: 519-535.

Glenn, R. P. and T. L. Pugh. 2006. Epizootic shell disease in American lobster (Homarus americanus) in Massachusetts coastal waters: interactions of temperature, maturity, and intermolt duration. J. Crust. Bio. 26(4) 639-645.

Goodyear, J.D. (1996). Significance of feeding habits of North Atlantic Right Whales based on studies of diel behaviour, diving, food ingestion rates, and prey. Ph.D. Dissertation; University of Guelph, Canada.

Gulf of Maine Research Institute (GMRI). (2008). Taking the Pulse of the Lobster Industry: A Socioeconomic Survey of New England Lobster Fishermen. Eds. Laura Taylor Singer and Daniel S. Holland. Can also be found at: http://www.gmri.org/upload/files/gmri_lobster_report_lores.pdf.

Hain, J.H.W., G.R. Carter, S.D. Krauss, C.A. Mayo, and H.E. Winn. (1982). Feeding behavior of the humpback whale, *Megaptera Novaeangliea*, in the western North Atlantic. Fishery Bulletin: 80(2):259-268.

Hain, J.H.W., M.J. Ratnaswamy, R.D. Kenney, and H.E. Winn. (1992). The fin whale, *Balaenoptera physalus*, in waters of the northeastern United States continental shelf. Reports of the International Whaling Commission 42: 653-669.

Hamilton, P.K., and C.A. Mayo. (1990). Population characteristics of right whales (*Eubalaena glacialis*) observed in Cape Cod and Massachusetts Bays, 1978-1986. Reports of the International Whaling Commission, Special Issue No. 12: 203-208.

Harding, G.C., and Trites, R.W. (1989). A further elaboration on dispersal of *Homarus americanus* larvae in the Gulf of Maine from Browns Bank, in response to comments by D.S. Pezzack. Can. J. Fish. Aquat. Sci. 46:1077-1078.

Hart, B.L. (1990). Behavioral adaptations to pathogens and parasites: five strategies. Neuroscience and Biobehavioral Reviews 14: 273-294.

Hartley, D., A. Whittingham, J. Kenney, T. Cole, and E. Pomfret. (2003). Large Whale Entanglement Report 2001. Report to the National Marine Fisheries Service, updated February 2003. 61 pp.

Haycock, C.R. and S.N. Mercer. (1984). Observations and notes on the abundance and distribution of cetaceans in the Eastern Bay of Fundy near Brier Island, Nova Scotia, in August and September 1984. Unpublished report.

Herrick, F.H. (1909). Natural history of the American lobster. Bulletin of the U.S. Fish Commission. 29: 149-408.

Holland, B.F., Jr., and G.F. Yelverton. (1973). Distribution and biological studies of anadromous fishes offshore North Carolina. Division of Commercial and Sports Fisheries, North Carolina Dept. of Natural and Economic Resources, Special Scientific Report No. 24. 130pp.

Hudon, C. (1987). Ecology and growth of post-larval and juvenile lobster, *Homarus americanus*, off Isle de la Madeleine (Quebec). Can J. Fish. Aquat. Sci. 44: 1855-1869.

Hughes, J.T., Sullivan, J., and Schlesser, R.A. (1972). Enhancement of lobster growth. Science 177:1110-1111.

Huntsman, A.G. (1923). Natural lobster breeding. Bull. Of the Biological Board of Canada. 5:1-11.

Huntsman, A.G. (1924). Limited factors for marine animals 2: resistance of larval lobster to extremes of temperature. Can. Biol. Fisheries. 2:91-93.

Incze, L. S., Wahle, R. A., and Cobb, J. S. (1997). Quantitative relationships between postlarval production and benthic recruitment in lobsters, *H. americanus*. Marine and Freshwater Research 48, 729–44.

International Whaling Commission (IWC). (1986). Report of the Workshop on the Status of Right Whales. Reports of the International Whaling Commission (Special Issue 10): 1-33.

International Whaling Commission (IWC). (1992). Report of the comprehensive assessment special meeting on North Atlantic fin whales. Rep. Int. Whal. Comm 42:595-644.

Johnson, A., Salvador, G., Kenney, J., Robbins, J., Kraus, S., Landry, S., and Clapham, P. (2005). Fishing gear involved in entanglements of right and humpback whales. Mar. Mamm. Sci. 21(4): 635-645.

Katona, S. K., and J. A. Beard. (1990). Population size, migrations and feeding aggregations of the Humpback Whale, *Megaptera novaeangliae*, in the western North Atlantic Ocean. Rep. Int. Whal. Comm (special issue 12): 295-305.

Katona, S.K., V. Rough and D.T. Richardson. (1993). A field guide to whales, porpoises, and seals from Cape Cod to Newfoundland. *Smithsonian Institution Press*: Washington, DC, 316 pp.

Kelly, K.H. and J.R. Moring. (1986). Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic) – Atlantic herring. U.S. Fish Wildl. Serv. Biol. Rep. 82 (11.38). 22 p.

Kenney, R.D. (2002). North Atlantic, North Pacific and Southern Right Whales. pp. 806-813, In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals. Academic Press, San Diego, CA.

Kenney, R.D., M.A.M. Hyman, R.E. Owen, G.P. Scott, and H.E. Winn. (1986). Estimation of prey densities required by Western North Atlantic right whales. Mar. Mamm. Sci. 2(1): 1-13.

Kenney, J., and D. Hartley. (2001). Draft large whale entanglement summary 1997-2001. Large whale entanglement report 2002. Report to the National Marine Fisheries Service, updated October 2001.

Kocik J, Lipsky C, Miller T, Rago P, Shepherd G. (2013). An Atlantic Sturgeon Population Index for ESA Management Analysis. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-06; 36 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Kraus, S.D., M.J. Crone, and A.R. Knowlton. (1988). The North Atlantic right whale. Pages 684-98 in W.J. Chandler, ed. Audbon wildlife report 1988/1989. Academic Press, San Diego, CA.

Kraus, S.D., P.K. Hamilton, R.D. Kenney, A.R. Knowlton, and C.K. Slay. (2001). Reproductive parameters of the North Atlantic right whale. J. Cetacean Res. Manage. 2: 231-236.

Krouse, J.S. (1973). Maturity, sex ratio, and size composition of the natural population of American lobster, *Homarus americanus*, along the Maine coast. Fishery Bull. 71:165-173.

Kynard, B. and M. Horgan. 2002. Ontogenetic behavior and migration of Atlantic sturgeon, Acipenser oxyrinchus oxyrinchus, and shortnose sturgeon, A. brevirostrum, with notes on social behavior. Environmental Behavior of Fishes 63: 137-150.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet, M. Podesta. (2001). Collisions between ships and whales. Marine Mammal Science, 17(1):35-75.

Laney, R.W., J.E. Hightower, B.R. Versak, M.F. Mangold, W.W. Cole Jr., and S.E. Winslow. 2007.

Lavalli, K.L. (1988). Food capture in post-larval lobsters. Amer. Zool. 28(4):154A.

Lavalli, K.L. and Barshaw, D.E. (1986). Burrows protect postlarval lobsters *Homarus americanus* from predation by the non-burrowing cunner *Tautoglolabrus adspersus*, but not from the burrowing mud crab *Neopanope taxani*. Mar. Ecol. Prog. Ser. 32:13-16.

Lawton, P. and Lavalli, K.L. (1995). Postlarval, juvenile, adolescent and adult ecology in Biology of the lobster, *Homarus americanus*. Edited by: Factor, J.R. Pgs: 47 – 88 Academic Press, Inc.

Leffler, C.W. (1972). Some effects of temperature on the growth and metabolic rate of juvenile blue crabs, *Callinectes sapidus*, in the laboratory. Marine Biology 14:104-110.

Lincoln, D. (1998). Lobsters on the edge-essential lobster habitats in New England. Report prepared for Greenlite Consultants, Newton Highland, MA.

Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA). (2007). 16 U.S.C. § 1801-1884; Pub. L. No. 94-265 as amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, Pub. L. No. 109-479. Can also be found at: http://www.nero.noaa.gov/sfd/ MSA_amended_20070112_FINAL.pdf.

Martin, A.R., G.P. Donovan, S. Leatherwood, et al. (1990). Whales and Dolphins, Bedford Editions Ltd., London, pp. 192, 1990.

Mayo, C. and M. Marx. (1990). Surface foraging behaviour of the North Atlantic Right Whale, *Eubalaena glacialis*, and associated zooplankton characteristics. Canadian Journal of Zoology, 68:2214-2220.

Miller, R. (2005). Department of Fisheries and Oceans, fisheries biologist. M. Elliott: phone conversation.

Mitchell, E.D. (1991). Winter Records of the Minke Whale *(Balaenoptera acutorostrata* Lacepede 1804) in the Southern North Atlantic, Rep. Int. Whal. Commn., 41:455-457.

Mitchell, E., and D.G. Chapman. (1977). Preliminary assessment of stocks of northwest Atlantic sei whales *(Balaenoptera borealis*). Reports of the International Whaling Commission, Special Issue No. 1:117-120.

Mizroch, S.A. and A.E. York. (1984). Have pregnancy rates of Southern Hemisphere fin whales, *Balaenoptera physalus*, increased? Reports of the International Whaling Commission, Special Issue No. 6:401-410.

Morgan, Lance E., R. Chuenpagdee. (2003). Shifting Gears: Addressing the Collateral Impacts of Fishing Methods in U.S. Waters. PEW Science Series. Island Press, Washington, D.C.

Morreale, S.J. and E.A. Standora. (1993). Occurrence, movement, and behavior of the Kemp's ridley and other sea turtles in New York waters. Final Report April 1988 – March 1993. for the New York State Department of Wildlife Conservation Return a Gift Wildlife Program. Contract #C001984. 70pp.

Morreale, S.J., and E.A. Standora. (1998). Early life stage ecology of sea turtles in northeastern U.S. waters. NOAA Technical Memorandum NMFS-SEFSC-413:1-49.

Morreale, S.J., C.F. Smith, K. Durham, R.A. DiGiovanni, Jr., and A.A. Aguirre. (2005). Assessing health, status, and trends in northeastern sea turtle populations. Interim report. Sept. 2002 - Nov. 2004. Gloucester, Massachusetts: National Marine Fisheries Service.

Morrissey, T.D. (1971). Movements of tagged American lobster, *Homarus americanus*, liberated off Cape Cod, Massachusetts. Trans. Am. Fish. Soc. 100(1):117-120.

Murphy, Margaret A. (1995). Occurrence and group characteristics of minke whales, *Balaenoptera acutorostrata*, in Massachusetts Bay and Cape Cod Bay. Fishery Bulletin, 93:577-585.

Musick, J.A., and C.J. Limpus. (1997). Habitat utilization and migration in juvenile sea turtles. Pages 137-164 in P.L. Lutz and J.A. Musick, eds. The Biology of Sea Turtles. Boca Raton, Florida: CRC Press.

National Environmental Policy Act of 1969. (1969). 42 U.S.C. §4321-4347. Can also be found at: http:// ceq. hss.doe.gov/nepa/regs/nepa/nepaeqia.htm.

National Marine Fisheries Service (NMFS). (1991a). Final recovery plan for the North Atlantic right whale (*Eubalaena glacialis*). Prepared by the Right Whale Recovery Team for the NMFS, Silver Spring, Maryland. 86 pp.

National Marine Fisheries Service (NMFS). (1991b). Final Recovery Plan for the Humpback Whale, *Megaptera novaeangliae*. Office of Protected Resources. Can also be found at: http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_humpback.pdf.

National Marine Fisheries Service (NMFS). (1998a). Unpublished. Draft recovery plans for the fin whale (*Balaenoptera physalus*) and sei whale (*Balaenoptera borealis*). Prepared by R.R. Reeves, G.K. Silber, and P.M. Payne for the National Marine Fisheries Service, Silver Spring, Maryland. July 1998.

National Marine Fisheries Service (NMFS). (1998b). Final Recovery Plan for the Shortnose Sturgeon, *Acipenser brevirostrum*. Shortnose Sturgeon Recovery Team. December 1998. Can also be found at: http://sero.nmfs.noaa.gov/pr/esa/Sturgeon/Stn%20Sturgeon/sns%20recovery%20plan.pdf.

National Marine Fisheries Service (NMFS). (2002a). Final Supplemental Environmental Impact Statement (FEIS) Regulatory Impact Review and Regulatory Flexibility Analysis, Federal Lobster Management in the Exclusive Economic Zone. Northeast Region. October 30, 2002.

National Marine Fisheries Service (NMFS). (2002b). Guidelines for Assessment of the Social Impact of Fishery Management Actions. Can also be found at: http://www.nmfs.noaa.gov/sfa/reg_svcs/Council%20stuff/council%20orientation/2009%20Training/Website%20Files%20Training/Tab%20V%20%20Social%20Science/Handouts/Tab%20V1.GuidelinesAssessmentSocialImpact.pdf.

National Marine Fisheries Service (NMFS). (2003). Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs [final draft report], National Marine Fisheries Service: 94.

National Marine Fisheries Service (NMFS). (2009). Hawksbill Turtle (*Eretmochelys imbricate*). Available at http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm.

National Marine Fisheries Service. (2012). Endangered Species Act Section 7 Consultation on the Continued Implementation of Management Measures for the American Lobster Fishery [Consultation.No.F/NER/2012/01456] http://www.nero.noaa.gov/prot_res/section7/NMFSsignedBOs/2012AmericanLobsterBiOpFINAL080312.pdf

National Marine Fisheries Service. (2013). Final Environmental Impact Statement for Proposed Effort Control Measures for the American Lobster Fishery. Greater Atlantic Region. December 2013.

National Marine Fisheries Service. (2014). 2014 Discard Estimation, Precision, and Sample Size Analyses for 14 Federally Managed Species Groups in the Waters off the Northeastern United States. National Marine Fisheries Service. NEFSC Reference Document 14-05. April 2014. Can also be found at: http://nefsc.noaa.gov/publications/crd/crd1405/crd1405.pdf.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). (2007a). Loggerhead Sea Turtle (*Caretta caretta*) 5 year review: summary and evaluation. National Marine Fisheries Service, Silver Spring, Maryland. 65 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). (2007b). Leatherback Sea Turtle (*Dermochelys coriacea*) 5 year review: summary and evaluation. National Marine Fisheries Service, Silver Spring, Maryland. 79 pp.

National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). (2008) Recovery Plan for the Northwest Altantic Polulation of the Loggerhead Sea turtle (*Caretta caretta*), Second Revision. National Marine Fisheries Service, Silver Spring, Maryland.

New England Fishery Management Council (NEFMC). (1998). Omnibus Essential Fish Habitat Amendment 1. Volume 1. October 7, 1998.

New England Fishery Management Council (NEFMC). (2002). Fishery Management Plan for Deep-Sea Red Crab (*Chaceon quinquedens*). Volume I. March 2002.

New England Fishery Management Council (NEFMC). (2010). Deep-Sea Red Crab 2010 Fishing Year Specifications (March 1, 2010-February 28, 2011) and Stock Assessment and Fishery Evaluation (SAFE) Report. January 6, 2010. Can also be found at: http://www.nefmc.org/crab/.

North Atlantic Marine Mammal Commission (NAMMCO). (1998). Report of the Working Group on the Role of Minke Whales, Harp Seals and Hooded Seals in North Atlantic Ecosystems. In: NAMMCO Annual Report 1997, NAMMCO, Tromsø, Norway, pp. 125-146.

Northeast Fisheries Science Center (NEFSC). (2002). Northeast Region Essential Habitat Steering Committee Workshop on the Effects of Fishing Gear on Marine Habitats off the Northeastern United States. October 23-25, 2001. Boston, Massachusetts. Northeast Fisheries Science Center Reference Document 02-01.

Northeast Fisheries Science Center (NEFSC). (2008). Community Profiles for the Northeast U.S. Fisheries. By Patricia M. Clay, Lisa L. Colburn, Julia Olson, Patricia Pinto da Silva, Sarah L. Smith, Azure Westwood, and Julie Ekstrom. November 24, 2008. Can also be found at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

Northeast Fisheries Science Center (NEFSC). (2011). Preliminary summer 2010 regional abundance estimate of loggerhead turtles (*Caretta caretta*) in northwestern Atlantic Ocean continental shelf waters. Northeast Fish Sci Cent Ref Doc. 11-03; 33 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at: http://www.nefsc.noaa.gov/publications/crd/crd1103/1103.pdf.

Northeast Utilities Service Company (NUSCO). (1999). Lobster studies. Pp. 11-34 in Monitoring the Marine Environment of Long Island Sound at Millstone Nuclear Power Station. Waterford, Connecticut. Annual Report 1998.

O'Neill, D.J. and Cobb, J.S. (1979). Some factors influencing the outcome of shelter competition in lobsters (*Homarus americanus*). Mar. Behav. Physio. 6:33-45.

Overholtz, WJ; Link, JS; Suslowicz, LE. (2000). Consumption of important pelagic fish and squid by predatory fish in the northeastern USA shelf ecosystem with some fishery comparisons. ICES J Mar Sci 57: 1147-1159.

Palma, A.T., Seneck, R.S. and Wilson, C. (1999). Settlement-driven, multiscale demographic patterns of large benthic decapods in the Gulf of Maine. J. Exp. Mar. Biol. Ecol. 241:107-136.

Payne, P.M., D.N. Wiley, S.B. Young, S. Pittman, P.J. Clapham, and J.W.Jossi. (1990). Recent fluctuations in the abundance of baleen whales in the southern Gulf of Maine in relation to changes in selected prey. Fish. Bull. 88 (4): 687-696.

Payne, P.M. and L.A. Selzer. (1989). The distribution, abundance and selected prey of the harbor seal, *Phoca vitulina concolor*, in southern New England. Mar. Mamm. Sci. 5(2): 173-192.

Pearce, J., and N. Balcom. (2005). The 1999 Long Island Sound lobster mortality event: Findings of the Comprehensive Research Initiative. Journal of Shellfish Research 24:691-697.

Perry, S.L., D.P. DeMaster, and G.K. Silber. (1999). The Sperm Whale In: The great whales: History and status of six species listed as endangered under the U.S. Endangered Species Act of 1973. Mar. Fish. Rev. Special Edition. 61(1): 59-74.

Pezzack, D. (2005). Department of Fisheries and Oceans, fisheries biologist. M. Elliott: phone conversation.

Phillips, B.F., and Sastry, A.N. (1980). Larval ecology In The biology and management of lobster. Edited by: J.S. Cobb and B.F. Phillips, Vol. 2, pp.11-57. Academic Press, New York.

Pritchard, P.C.H. (1982). Nesting of the leatherback turtle, *Dermochelys coriacea*, in Pacific, Mexico, with a new estimate of the world population status. Copeia 1982: 741-747.

Reid, R.N., L.M. Cargnelli, S.J. Griesbach, D.B. Packer, D.L. Johnson, C.A. Zettin, W.W. Morse and P.L. Berrien. (1999). Essential Fish Habitat Source Document: Atlantic herring, *Clupea harengus*, life history and habitat characteristics. NOAA Technical Memorandum. NMFS-NE-126.

Richards, R.A. (1992). Habitat selection and predator avoidance: ontogenetic shifts in Habitat use by the Jonah crab Cancer borealis. J. Exp.Mar.Biol.Ecol. 156:187-197.

Richards, R.A., and Cobb, J.S. (1986). Competition for shelter between lobsters (*Homarus americanus*) and jonah crabs (*Cancer borealis*): effects of relative size. Can.J.Fish.Aquat.Sci. 43:250-2258.

Richards, R.A., Cobb, J.S., and Fogarty, M.J. (1983). Effects of behavioral interactions on the catchability of American lobster, *Homarus americanus* and two species of Cancer crabs. Fish. Bull. 81:51-60.

Robbins, J., and D. Mattila. (1999). Monitoring entanglement scars on the caudal peduncle of Gulf of Maine humpback whales. Report to the National Marine Fisheries Service. Order No. 40EANF800288. 15 pp.

Robbins, J., and D. K. Mattila. (2000). Monitoring entanglement scars on the caudal peduncle of Gulf of Maine humpback whales: 1997-1999. Center for Coastal Studies. Order number 40ENNF900253. 24 p.

Rough, V. (1995). Gray seals in Nantucket Sound, Massachusetts, winter and spring, 1994. Final report to Marine Mammal Commission. Contract T10155615 28 pp.

Saila, S.B., and Flowers, J.M. (1968). Movements and behavior of berried female lobsters displaced from offshore areas to Narragansett Bay, Rhode Island. J. Cons. Perm. Int. Explor. Mer 31(3):342-351.

Schevill, W.E., W.A. Watkins, and K.E. Moore. (1986). Status of *Eubalaena glacialis* off Cape Cod. Reports of the International Whaling Commission, Special Issue No. 10: 79-82.

Schick, Robert S., P.N. Halpin, A.J. Read, C.K. Slay, S.D. Kraus, B.R. Mate, M.F. Baumgartner, J/J. Roberts, B.D. Best, C.P. Good, S.R. Loarie, J.S. Clark. (2009). Striking the right balance in right whale conservation. NRC Research Press Website at cjfas.nrc.ca. J21103.

Sea Turtle Disentanglement Network (STDN). (2009). Northeast Region Sea Turtle Disentanglement Network Summary of Entanglement/Disentanglement Data from 2002-2008. Unpublished report compiled by NMFS NERO. 11 pp.

Sears, R., F.W. Wenzel, and J.M. Williamson. (1981). Behavior and distribution observations of Cetacea along the Quebec north shore (Mingan Islands), summer-fall 1981. Unpublished report, Mingan Island Cetacean Study, Montreal, 72 pp.

Sears, R. (2002). Blue whale, *Balaenoptera nusculus*. Pages 112-116 in W.F. Perrin, B. Wursig, and J.G.M. Thewissen, eds. Encyclopedia of Marine Mammals. San Diego: Academic Press.

Seipt, I., P.J. Clapham, C.A. Mayo, and M.P. Hawvermale. (1990). Population characteristics of individually identified fin whales, *Balaenoptera physalus*, in Massachusetts Bay. Fish. Bull. 88:271-278.

Sheehy, M.R.J., Shelton, P.M.J., Wickins, J.F., Belchier, M. and E. Gaten. (1996). Ageing in the European lobster, *Homarus gammarus* by the lipofuscin in its eyestalk ganglia. Mar. Ecol Prog. Ser. 143:99-111.

Sheehy, M.R.J. and Bannister, R.C.A. (2002). Year-class detection reveals climatic modulation of settlement strength in the European lobster, *Homarus gammarus*. Can. J. Fish. Aquat. Sci. 59:1132-1143.

Sherburne, S.W. and Bean, L.L. (1991). Mortalities of impounded and feral Maine lobsters, *Homarus americanus*, caused by protozoan ciliate, Mugardia, with initial prevalence data from ten locations along the Maine coast and one offshore area. J. Shell. Res. 10(2):315-326.

Shoop, C.R., and R.D. Kenney. (1992). Seasonal distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetological Monographs 6:43-67.

Short, F.T., Matso, K., Hoven, H.M., Whitten, J., Burdick, D.M., and Short, C.A. (2001). Lobster use of eelgrass habitat in the Piscataqua River on the New Hampshire/Maine border, USA. Estuaries 24(2):277-284.

Schroeder, C.L. (2000). Population status and distribution of the harbor seal in Rhode Island waters. M.S. thesis. University of Rhode Island, Kingston, RI. 197 pp.

Southeast Fisheries Science Center (SEFSC). (2009). An assessment of loggerhead sea turtles to estimate impacts of mortality reductions on population dynamics. NMFS SEFSC Contribution PRD-08/09-14. 45 pp.

Spotila, J.R., A.E. Dunham, A.J. Leslie, A.C. Steyermark, P.T. Plotkin and F.V. Paladino. (1996). Worldwide population decline of *Dermochelys coriacea*: are leatherback turtles going extinct? Chelonian Conservation and Biology 2: 209-222.

Stein, A. B., K. D. Friedland, and M. Sutherland. (2004a). Atlantic sturgeon marine bycatch and mortality on the continental shelf of the Northeast United States. North American Journal of Fisheries Management 24: 171-183.

Stein, A.B., K. D. Friedland, and M. Sutherland. 2004b. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. Transaction of the American Fisheries Society 133:527-537.

Steneck, R.S. (1989). The ecological ontogeny of lobsters: in situ studies with demographic Implications. In Proc. Lobster Life History Workshop, Edited by: I. Kornfield. Orono, ME. 1:30-33.

Steneck, R.S. and Wilson, C. (1998). Why are there so many lobsters in Penobscot Bay? Pp. 72-75 in: Rim of the Gulf – Restoring Estuaries in the Gulf of Maine (D.D. Platt, ed.), The Island Institute, Rockland, ME.

Stewart, J.E. (1980). Diseases In The biology and management of lobsters Vol. 1. Physiology and Behavior. Edited by J.S. Cobb and B.F. Phillips. Pgs. 301-344. Academic Press, New York.

Stewart, J.E. and Squires, H. J. (1968). Adverse conditions as inhibitors of ecdysis in the lobster, *Homarus americanus*. J. Fish Res. Board Can. 25:1763-1774.

Stone, S.L.,T.A. Lowery, J.D. Field, C.D.Williams, D.M. Nelson, S.H. Jury, M.E. Monaco and L. Andreasen. (1994). Distribution and abundance of fishes and invertebrates in Mid-Atlantic estuaries. ELMR Rep. No. 12. Silver Spring, Maryland: NOAA/NOS Strategic Environmental Assessments Division.

Talbot, P. and Helluy, S. (1995). Reproduction and embryonic development, In The biology of the lobster. J. Factor, ed. Pp. 177-216. Academic Press.

Turtle Expert Working Group (TEWG). (2000). Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-444:1-115.

Turtle Expert Working Group (TEWG). (2007). An assessment of the leatherback turtle population in the Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-555, 116 pp.

U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). (1992). Recovery plan for the Kemp's ridley sea turtle (*Lepidochelys kempii*). St. Petersburg, Florida: National Marine Fisheries Service. 40 pp.

Uzmann, J.R, Cooper, R.A. and Pecci, K.J. (1977). Migration and dispersion of tagged lobsters, *Homarus americanus* on the New England continental shelf. NOAA Tech. Rep. NMFS SSRF-705.

Van Engel, W.A. (1980). Maturity and fecundity in the American lobster, *Homarus americanus*. A review. Can. Tech. Rep. Fish. Aquat. Sci. 932:51-58.

Van Olst, J.C., Carlberg J.M. and Hughes, J.T. (1980). Aquaculture. In The Biology and Management of Lobsters, J.S. Cobb and B.F. Phillips eds., Vol. 2, pp. 333- 384. Academic Press, New York.

Waddy, S.L. and Aiken, D.E. (1990). Intermolt insemination, an alternative mating strategy for the American lobster. Can. J. Fish. Aquat. Sci. 47:2402-2406.

Waddy, S.L., Aiken, D.E. and deKleijn, D.P.V. (1995). Control of growth and Reproduction In The biology of the lobster. J. Factor, ed. Pp. 217-266. Academic Press.

Wade, P. R., and R. P. Angliss. (1997). Guidelines for assessing marine mammal stocks: Report of the GAMMS Workshop, April 3-5, 1996, Seattle, Washington. NOAA Tech Memo NMFS-OPR-12. US DOC, Washington, DC. 93pp.

Wahle, R.A. (1992). Body-size dependent anti-predator mechanisms of the American lobster. Oikos, 65:52- 60.

Wahle, R.A. and Steneck, R.S. (1991). Recruitment habitats and nursery grounds of the American lobster, *Homarus americanus*: A demographic bottleneck? Mar. Ecol. Prog Ser. 69, 231-243.

Wahle, R.A. and Steneck, R.S. (1992). Habitat restrictions in early benthic life: Experiments on habitat selection and it situ predation with the Amercian lobster. J. Exp. Mar. Biol. Ecol. 157:91-114.

Waldman, J. R., J. T. Hart, and I. I. Wirgin. (1996). Stock composition of the New York Bight Atlantic sturgeon fishery based on analysis of mitochondrial DNA. Transactions of the American Fisheries Society 125: 364-371.

Ward, Nathalie. (1995). Stellwagen Bank: A Guide to the Whales, Sea Birds, and Marine Life of the Stellwagen Bank National Marine Sanctuary. pp. 157-158. Down East Books. Camden, ME.

Waring, G.T., Josephson, E., Fairfield-Walsh, C.P. and Maze-Foley, K (eds). (2007). U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2007. *NOAA Tech. Mem.* NMFS-NE-194:

Waring, G.T., E. Josephson, K. Maze-Foley, P.E. Rosel (eds.). (2009). U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2009. NOAA Tech Memo NMFS NE 213; 528 p.

Waring, G.T., E. Josephson, K. Maze-Foley, P.E. Rosel (eds.). (2011). U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2011. NOAA Tech Memo NMFS NE 211:1-319.

Waring, G.T., E. Josephson, K. Maze-Foley, P.E. Rosel Rosel (eds.). (2013). U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2013. NOAA Technical Memorandum NOAA-NE-223. http://www.nmfs.noaa.gov/pr/sars/pdf/ao2012.pdf.

Watkins,W. A., and W. E. Schevill. (1979). Aerial observations of feeding behavior in four baleen whales, *Eubalaena glacialis*, *Balaenoptera borealis*, *Megaptera novaeangliae*, *Balaenoptera physalus*. J. Mammal. 60(1): 155-163.

Watkins, W.A., and W.E. Schevill. (1982). Observations of right whales (*Eubalaena glacialis*) in Cape Cod waters. Fish. Bull. 80(4): 875-880.

Weinrich, M. T., M. R. Schilling, and C. R. Belt. (1992). Evidence of aquisition of a novel feeding behaviour: lobtail feeding in humpback whales, *Megaptera novaeangliae*. Anim. Behav. 44: 1059-1072.

Weiss, H.M. (1970). The diet and feeding behavior of the lobster, *Homarus americanus*, In Long Island Sound Ph.D. Dissertation. University of Connecticut, Storrs.

Whitehead, H. (2002). Estimates of the current global population size and historical trajectory for sperm whales. Mar. Ecol. Prog. Ser. 242:295-304.

Whittingham, A., D. Hartley, J. Kenney, T. Cole, and E. Pomfret. (2005a). Large whale entanglement report 2002. Report to the National Marine Fisheries Service, updated March 2005.

Whittingham, A., M. Garron, J. Kenney, and D. Hartley. (2005b). Large whale entanglement report 2003. Report to the National Marine Fisheries Service, updated June 2005.

Wiley, D.N., R.A. Asmutis, T.D. Pitchford, and D.P. Gannon. (1995). Stranding and mortality of humpback whales, *Megaptera novaengliae*, in the mid-Atlantic and southeast United States, 1985-1992. Fish. Bull., U.S. 93:196-205.

Winn, H.E., C.A. Price, and P.W. Sorensen. (1986). The distributional biology of the right whale (*Eubalaena glacialis*) in the western North Atlantic. Reports of the International Whaling Commission, Special Issue No. 10:129-138.

Wolff, T. (1978). Maximum size of lobsters (*Homarus*) (*Decapoda, Nephropidae*). Crustaceana. 34:1-14.

Wynne, K. and Schwartz, M. (1999). Guide to marine mammals and turtles of the U.S. Atlantic and Gulf of Mexico. Rhode Island Sea Grant, Narragansett. 115pp.

Zerbini, A.N., P.J. Clapham and P.R. Wade 2010. Assessing plausible rates of population growth in humpback whales from life-history data. Mar. Biol. 157(6):1225–1236.