Endangered Species Act (ESA)
Section 4(b)(2) Report

Critical Habitat for the
North Atlantic Right Whale
(*Eubalaena glacialis*)

December 2015

Prepared by
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office and
Southeast Regional Office

TABLE OF CONTENTS

LIST OF PREPARERS iv
ACRONYMS iv
LIST OF FIGURES v
LIST OF TABLES vi
EXECUTIVE SUMMARY vii
1 INTRODUCTION 1
1.1 Purpose and Structure of Report 3
1.2 Summary of Preliminary ESA Section 3 Determinations 4
1.3 Integrated Natural Resource Plans 11
1.4 Section 4(b)(2) Requirements 12
1.5 Other Laws, Executive Orders, and Policies Applicable to Economic Impact Analysis 14
2. RELEVANT BASELINE INFORMATION 15
2.1 Economic Baseline 15
2.1.1 Northeastern Foraging Habitat, Unit 1 15
2.1.2 Southeastern Calving Habitat, Unit 2 19
2.2 Additional Benefits of the Critical Habitat 22
2.3 Existing Laws and Regulations that May Protect the Critical Habitat Features 23
2.2.1 Federal Laws 23
2.2.2 State Laws and Regulations 28
3. ECONOMIC IMPACTS 28
3.1 Economic Impact Analysis –Incremental (Baseline) Method 29
3.2 Section 7 Impacts 30
3.2.1 Activities that May Trigger Consultation 33
3.2.2 Potential Project Modifications 59
3.2.2.1 Project Relocation 62
3.2.2.2 Project Redesign 62
3.2.2.3 Conditions Monitoring 62
3.2.2.4 Pollution Control Measures 63
3.2.2.5 Timing Restrictions 63
3.2.2.6 Area Restrictions 63
3.3 Estimated Section 7 Costs 63
3.3.1 Administrative Costs 64
3.3.2 Project Modification Costs 66
4 NATIONAL SECURITY IMPACTS 73
5 OTHER RELEVANT IMPACTS 75
5.1 Conservation Benefits 75
5.1.1 Benefits of the Designation to the North Atlantic Right Whale 75
5.1.2 Economic Benefits Associated with Recovery of the North Atlantic Right Whale 76
5.2 Education and Awareness Benefits that May Result from the Designation 78
5.3 Impact on Natural Resource Agencies with Existing Management Plans Benefitting the Essential Features 78
6. SYNTHESIS: IMPACTS OF INCLUDING UNIT 1 AND UNIT 2 IN THE CRITICAL HABITAT DESIGNATION FOR THE NORTH ATLANTIC RIGHT WHALE. 80
6.1 Economic Impacts 80

Economic Impacts within Unit 2 80
6.2 National Security Impacts 81
6.3 Other Relevant Impacts 81
7 DISCRETIONARY EXCLUSION ANALYSIS 82
8 REFERENCES 83
APPENDIX A: DESIGNATED CRITICAL HABITAT UNITS A1
APPENDIX B: FINAL REGULATORY FLEXIBILITY ANALYSIS B1

LIST OF PREPARERS

National Marine Fisheries Service

Greater Atlantic Regional Office, Gloucester, MA.
Southeast Regional Office, St. Petersburg, FL.

ACRONYMS

AFAST	Atlantic Fleets Active Sonar Training
AT	Navy Acceptance Trial
ATON	Aids to Navigation
ASW	Anti-Submarine Warfare Exercises
AUC	Areas Under Consideration
BACT	Best Available Control Technology
BIW	Bath Ironworks
BO	Biological Opinion
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BT	Builders Trial
CAA	Clean Air Act
CAD	Canadian Dollar
CF	Commercial Fisheries
CHAS	Charleston
CHPT	Cherry Point
COE	Cost of Energy
CWA	Clean Water Act
DHS	Department of Homeland Security
DOD	Department of Defense
DWPA	Deepwater Port Act of 1974
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EGU	Electrical Generating Units
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FMP	Fishery Management Plan
FWS	US Fish and Wildlife Service
GHG	Greenhouse Gas
GoM	Gulf of Maine
GSC	Great South Channel
INRMP	Integrated Natural Resource Management Plan
JAX	Jacksonville
LNG	Liquefied Natural Gas
MARAD	Maritime Administration
MMPA	Marine Mammal Protection Act

MPRSA	Marine Protection, Research, and Sanctuaries Act
MSA	Magnuson-Stevens Fishery Management and Conservation Act
MTE	Major Training Event
MWRA	Massachusetts Water Resource Authority
NAVSEA	Naval Sea Systems
NEC	Northeast Channel
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPDES	National Pollution Discharge Elimination System
NSDE	Nova Scotia Department of Energy
OCS	Outer Continental Shelf
ODMDS	Offshore Dredged Material Disposal Site
OPAREA	Operations Area
OMB	Office of Management and Budget
PCTS	Public Consultation Tracking System
PSD	Prevention of Significant Deterioration
RFA	Regulatory Flexibility Act
RHA	Rivers and Harbors Act
ROW	Right of Way
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
RWCH	Right Whale Critical Habitat
SAB	South Atlantic Bight
SAFMC	South Atlantic Fishery Management Council
T&C	Terms and Conditions
TDML	Total Maximum Daily Load
TORPEX	Torpedo Firing Exercises
ULT	Unit-Level Training
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USMC	U.S. Marine Corps
USWTR	Undersea Warfare Training Range
VACAPES	Virginia Capes
VTR	Vessel Trip Report
WTP	Willingness to Pay

LIST OF FIGURES

Figure 1: Comparison of Current Right Whale Critical Habitat to Areas under Consideration for Critical Habitat Designation 11

LIST OF TABLES

Table 1: Revenue (in nominal dollars) from commercial catches within Unit 1, for states that had landings from Unit 1, as estimated from VTR landings 17
Table 2: Total Weight (lbs) of Recreational Catch 2003-2007 (All Ocean Combined)..... 18
Table 3: Total Marine Recreational Fishing Expenditures by State in 2006 (in thousands of nominal U.S. dollars) (NMFS 2006)..... 18
Table4: Total Weight (lbs) of Recreational Catch 2003-2007 (All Ocean Combined) (NMFS 2010b). 21
Table 5: Total Marine Recreational Fishing Expenditures by State in 2008 (in thousands of nominal U.S. dollars) (https://www.st.nmfs.noaa.gov/apex/f?p=160:61, queried on September 28, 2015)). 22
Table 6: Past Formal Consultations on Activities that May Recur in Critical Habitat Unit 1 over a 10-Year Period. 36
Table 7: Past Formal Consultations on Activities that May Recur in Critical Habitat Unit 2 over a 10-Year Period. 36
Table 8: Past Informal Consultations on Activities that May Recur in Critical Habitat Unit 1 over a 10-Year Period. 37
Table 9: Past Informal Consultations on Activities that May Recur in Critical Habitat Unit 2 over a 10-Year Period. 37
Table 10: Matrix of Category of Activities triggering section 7 consultation within Unit 1 and Unit 2 because of potential effects to the essential features for North Atlantic right whale critical habitat versus project modifications that may be required to avoid or minimize effects to the essential features. 61
Table 11: Key Assumptions of Cost Analysis for Projected Section 7 Consideration in the Next 10 Years 64
Table 12: Estimated Per Consultation Administrative Costs of Section 7 Consultations (2013 Nominal US Dollars). 65
Table 13: Estimated Annual Administrative Total Costs of Section 7 Consultation for the North Atlantic Right Whale and Critical Habitat Designation (2013 Nominal US Dollars)..... 65
Table 14: Projected Natural Resources Nominal Prices for 2009 and 2010..... 68
Table 15: Estimated Wholesale Value of Oil and Natural Gas Resources in Critical Habitat Unit 1 in Billions of Nominal 2010 U.S. Dollars..... 68
Table 16: The number of coastal, non-coastal, and out-of-state resident recreational anglers and number of trips taken by mode of transport originating from each State adjacent to Unit 1 in 2009 (NMFS, Fisheries Statistics Division. September 24, 2010). 77

EXECUTIVE SUMMARY

This report documents the National Marine Fisheries Service's (NMFS, hereafter "we") compliance with section 4(b)(2) of the ESA, which requires that when we designate or revise critical habitat we consider the economic impact, impact on national security, and any other relevant impact of specifying any particular area as critical habitat. Section 4(b)(2) also allows, but does not require, us to exclude any particular areas from critical habitat if the benefits of such exclusion outweigh the benefits of inclusion, unless the failure to specify an area as part of critical habitat will result in the extinction of the species. This report documents NMFS's determination whether to consider excluding any particular area from the designated North Atlantic right whale critical habitat based on our consideration of identified impacts. Pursuant to the Regulatory Flexibility Act, we have also prepared a Final Regulatory Flexibility Analysis, which is provided in Appendix B.

The critical habitat for North Atlantic right whales replaces the right whale critical habitat that was designated in 1994 (59 FR 28793, June 3, 1994) with two new, expanded areas. The 1994 critical habitat designation includes portions of Cape Cod Bay and Stellwagen Bank, the Great South Channel (each off the coast of Massachusetts), and waters adjacent to the coasts of Georgia and the east coast of Florida. These areas were determined to provide critical feeding, nursery, and calving habitat for the North Atlantic population of northern right whales. In 2003, we denied a petition to revise the 1994 critical habitat designation, but committed to continuing data analysis to ensure conservation of the species. Subsequently, we listed North Atlantic and North Pacific right whales in 2008 as two separate species under the ESA. Subject to some exceptions, the ESA requires the designation of critical habitat upon issuance of a final listing determination. We received another petition to revise the 1994 critical habitat designation in October 2009. In response to that petition, NMFS indicated its intention to revise the existing 1994 critical habitat designation for northern right whales by continuing the critical habitat rulemaking associated with the 2008 listing (75 FR 61690; October 6, 2010). Therefore, this action follows from the listing of the new species and our response to the 2009 petition. As discussed in more detail below, the rulemaking associated with this impacts analysis could be characterized as either a new designation of critical habitat, or a revision of existing critical habitat. The end result of either type of rulemaking is identification of critical habitat that is designated for the conservation of a species. Thus, for ease of reference, we will refer to this action as a "designation."

In the designation, we identified two areas that contain the physical and biological features essential to the conservation ("essential features") of the North Atlantic right whale. The essential features provide requirements for successful foraging, calving, and calf survival. The specific area where the essential foraging features are located is in the Gulf of Maine and Georges Bank region (Unit 1) and covers a total area of approximately 21,334 nm^2. The specific area containing the calving essential features is off the southeast U.S. coast between North Carolina and Florida (Unit 2) and covers 8,429 nm^2, including an area of 341 nm^2 that was added to the southern boundary of the unit in response to public comments. The areas and essential features are described in further detail in this document, the final rule, and in the Biological Source Document (NMFS, 2015).

The goal of our impacts analysis was to examine the state of the world with and without the designation of critical habitat for the North Atlantic right whale. The "without critical habitat" scenario represents the baseline for the analysis, considering habitat protections already afforded North Atlantic right whales under its federal listing and under other federal, state, and local regulations. Direct impacts of promulgating critical habitat designations result from the application of section 7 consultation requirements of the ESA to proposed actions with a federal nexus that “may affect” critical habitat. ESA section 7 consultation may result in modification to a project to avoid destruction or adverse modification of critical habitat. Such modifications may entail costs to action agencies or project applicants. The added administrative costs of including consideration of critical habitat in ESA section 7 consultations are also considered incremental costs attributable to the designation of critical habitat.

Potential economic impacts of the action consist mainly of two components: administrative costs and the costs of modifying projects to avoid destroying or adversely modifying the critical habitat. These costs may be incurred by NMFS, the action agency, or a third party proposing an activity in areas designated as critical habitat. Based on our analysis, there are categories of federal actions which “may affect” the essential features in the future, but none that will exclusively impact critical habitat. That is, all categories of activities that “may affect” the essential features may also affect the species, and thus would require consultation even in the absence of designated critical habitat. In order to estimate any potential incremental costs of the designation, we attempted to identify whether the potential impacts of any activities would require efforts to specifically avoid adverse modification or destruction of the critical habitat. Any such efforts were considered incremental economic costs of the critical habitat designation. In addition, as stated above, the added administrative costs associated with evaluating impacts to the critical habitat are considered incremental costs of the designation.

Based on our review of past consultations, we have identified six categories of activities that may affect the critical habitat: National Pollution Discharge Elimination System (NPDES) permitting, oil spill response, dredging and spoil disposal, marine construction permitting, construction and operation of energy facilities, and authorization of sand mining or disposal on the Outer Continental Shelf (OCS). The estimated administrative costs for the projected 188 consultations on these federal activities over the next ten-years are expected to total $95,504 per year. Of these six categories, we identified two categories of activities, one under the Environmental Protection Agency’s (EPA’s) jurisdiction and one under the U.S. Coast Guard’s (USCG’s) authority, that may require modifications specifically to avoid adverse modification of the essential features. These activities are Water Quality/NPDES and Oil Spill Response. We are not able to estimate the associated incremental project modification costs for these activities due to the uncertainty of the specific routes of effects of future projects on the species and the essential features and due to a lack of specific information regarding the nature, scope, and timing of future projects.

We have also identified four new (i.e., not previously consulted on) categories of federal activities that may occur in the future and, if they do occur, may affect the essential features. These potential activities are: oil and gas exploration and development activities, offshore alternative energy development activities, directed copepod fisheries, and marine aquaculture. Due uncertainty in timing of these activities and a lack of a consultation history for these four

new categories, we are not able to project annual administrative costs for future consultations. However, we expect any of these consultations would each result in incremental administrative costs for the agencies and applicants involved of $5,080 per action.

Considering the new categories of federal activities in Unit 1, we have determined that potential oil and gas exploration and development and a possible directed copepod fishery may affect both the species and the essential features of critical habitat. We have concluded that while these categories of activities have the potential to affect the essential features and the species, specific project modifications may be required to avoid adversely modifying the critical habitat. Thus, for purposes of this analysis, we consider there to be incremental impacts attributable to the designation of critical habitat We are unable to estimate the costs of associated with potential project modifications at this time due to the lack of past consultation history and any specific or planned federal proposals for these activities.

Considering the new categories of federal activities in Unit 2, we have determined that potential oil and gas exploration and development, offshore alternative energy development activities, and marine aquaculture may affect both the species and the essential features of critical habitat. However, the majority of impacts from oil and gas exploration and development and marine aquaculture are expected to be attributable to the listing rather than the critical habitat designation; thus, for purposes of this analysis, impacts from these activities are not attributed to designation of critical habitat. Offshore renewable and alternative energy related projects may fragment large, continuous areas of the essential features such that Unit 2 is rendered unsuitable for calving right whales. Further, the numerous floating, fixed, and submerged structures, mooring lines, and transmission cables associated with large ocean energy facilities could result in adverse effects to the essential features of Unit 2 by limiting the availability of the essential features such that right whales are not able to select dynamic, optimal combinations of the features necessary for successful calving. We are unable to quantify the incremental impacts at this time due to the lack of past consultation history and any specific or planned federal proposals for these projects. As stated above, however, we expect any of these consultations would each result in incremental administrative costs for the agencies and applicants involved of $5,080 per action.

NMFS reviewed information provided by the Department of the Defense, in particular on the various naval training and testing activities currently conducted within the critical habitat areas. Based on this analysis, we concluded that current military activities as a category would not likely present any routes of effects on the essential features of right whale foraging, and calving and nursery habitat. Therefore, future consultations on military activities are not expected to be focused on critical habitat impacts, and NMFS does not expect to recommend any specific measures to avoid or minimize impacts to critical habitat. Based on this analysis, we conclude the designation will not result in impacts to national security.

Other relevant impacts of the designation include conservation benefits of the critical habitat, both to the species and to society. Because the features that form the basis of the critical habitat are essential to conservation of the North Atlantic right whale, the protection of critical habitat from destruction or adverse modification may at a minimum prevent loss of the benefits currently provided by this species and may contribute to an increase in the benefits of this

species to society in the future. The identification and protection of the essential features of critical habitat and other components of the ecosystem that use or benefit from the essential features may result in continued provision of benefits to the ecosystem and user groups and economic sectors that utilize these habitats or ecosystem components, such as fishing and whale watching. While it is not possible to quantify or monetize the benefits, we believe they are not negligible and would be enhanced as a result of this action.

We have analyzed the economic, national security and other relevant impacts of the critical habitat. While we have utilized the best available information and an approach designed to avoid underestimating impacts, many of the potential impacts are speculative and may not occur in the future. The analysis indicates that there is no particular area within the critical habitat areas where economic impacts would be particularly high or where there would be negative national security impacts. Other relevant impacts include conservation benefits, both to the species and to society. On the basis of our impacts analysis, we are not exercising our discretion to consider excluding any particular areas from the critical habitat.

As required under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996), we considered various alternatives to the critical habitat designation for North Atlantic right whales. The alternatives considered include a no action alternative, the preferred alternative and an alternative which would designate a more expansive area as critical habitat. The alternative of not designating critical habitat would impose no economic, national security, or other relevant impacts, but would not provide any conservation benefit to the species. This alternative was considered and rejected because such an approach would not meet the legal requirements of the ESA and would not provide for the conservation of North Atlantic right whales. Under the preferred alternative, two specific areas that provide foraging and calving functions for the North Atlantic right whale are designated as critical habitat. Relative to the no action alternative, this alternative will likely involve an increase in the complexity of some section 7 consultations and potentially an increase in project modifications required to avoid adverse impacts to critical habitat. In addition to the No Action alternative and the preferred alternative, we considered more expansive boundaries for the proposed critical habitat. In the proposed rule we discussed our preliminary conclusion that these additional areas likely do not contain the physical and biological features of right whale foraging and calving habitat and thus would not meet the statutory definition of critical habitat. We revisited this conclusion for Unit 2 in response to public comments, and moved the southern border to add an area containing the essential features in a portion of the calving season, at times when cow-calf pairs consistently use this area.

Even though we cannot determine relative numbers of small and large entities that may be affected by the designation of critical habitat, there is no indication that affected project applicants would be limited to, nor disproportionately comprised of, small entities. It is unclear whether small entities would be placed at a competitive disadvantage compared to large entities. Potential economic impacts of the action consist mainly of two components: administrative costs and the costs of modifying projects to avoid destroying or adversely modifying the critical habitat. These costs may be incurred by NMFS, the action agency, or a third party proposing an activity in areas designated as critical habitat. The total estimated administrative costs for the projected 188 consultations on these federal activities over the next ten-years are expected to

total $95,504 per year. Third party applicants or permittees would be expected to incur costs associated with participating in the administrative process of consultation along with the permitting federal agency. The average per consultation administrative costs for third parties is approximately $880. Because we have assumed all potential future consultations will be formal this is an overestimation of the costs. This represents our estimate of the potential economic impacts based on the best available information regarding the Federal activities that may be affected by this critical habitat designation (see Appendix B for more details).

1 INTRODUCTION

This report presents the NOAA National Marine Fisheries Service's (NMFS) analysis of impacts of replacing the critical habitat designation that appears at 50 CFR. §226.203 by designating new critical habitat for the North Atlantic right whale (*Eubalaena glacialis*). This action is taken pursuant to section 4 of the Endangered Species Act (ESA). This report describes the applicable laws, court rulings, Executive Orders (E.O.s), and policies, as well as methods used and processes followed for identifying and considering impacts, and for making necessary determinations under section 4(b)(2).

Background

In June 1970, the right whale (*Eubalaena spp.*) was listed as endangered under the Endangered Species Conservation Act, the precursor to the Endangered Species Act (ESA)(35 FR 8495; June 2, 1970). Subsequently, right whales were listed as endangered under the ESA in 1973, and as depleted under the Marine Mammal Protection Act (MMPA) the same year. At the time of this listing, NMFS considered that there were at least two known species of right whales: northern right whales (*Eubalaena glacialis*) and southern right whales (*Eubalaena australis*). At the time of listing, *Eubalaena glacialis* included right whales in the North Atlantic and the North Pacific.

In 1994, NMFS designated critical habitat for the northern right whale (*Eubalaena glacialis*) in the North Atlantic Ocean (59 FR 28793, June 3, 1994). This critical habitat designation includes portions of Cape Cod Bay and Stellwagen Bank, the Great South Channel (each off the coast of Massachusetts), and waters adjacent to the coasts of Georgia and the east coast of Florida. These areas were determined to provide critical feeding, nursery, and calving habitat for the North Atlantic population of northern right whales. This critical habitat was revised in 2006 to include two foraging areas in the North Pacific Ocean– one in the Bering Sea and one in the Gulf of Alaska (71 FR 38277; July 6, 2006).

In 2006, NMFS published a comprehensive right whale status review (NMFS 2006) that concluded genetic data provided support to distinguish three right whale lineages (including the southern right whale) as separate phylogenetic species (Rosenbaum et al. 2000). Rosenbaum et al. (2000) concluded that the right whale should be regarded as the following three separate species:

1. The North Atlantic right whale (*Eubalaena glacialis*);
2. The North Pacific right whale (*Eubalaena japonica*), and;
3. The southern right whale (*Eubalaena australis).*

Based on these findings, NMFS published proposed and final determinations listing right whales in the North Atlantic and North Pacific as separate species under the ESA (71 FR 77704, December 27, 2006; 73 FR 12024, March 6, 2008). Under ESA Section 4(a)(3)(i), the U.S. Secretary of Commerce must, to the maximum extent prudent and determinable, designate critical habitat for a species concurrent with making the determination that that species is endangered or threatened. In April 2008, NMFS, on behalf of the Secretary, changed the

combined listing of right whales in the North Pacific and North Atlantic by listing those two groups of right whales as two separate, new species. Following the new listing determination, NMFS designated critical habitat for the North Pacific right whale in April 2008 (73 FR 19000, April 8, 2008), and continued working on a designation of critical habitat for the North Atlantic right whale.

The ESA states that the Secretary shall, to the maximum extent prudent and determinable, designate critical habitat concurrently with making a determination that a species is endangered or threatened, and that the Secretary of Commerce may from time to time revise critical habitat that already exists for threatened and endangered species (section 4(a)(3)(A)(i) and (ii)). NMFS designated critical habitat for right whales in the North Atlantic in 1994 when they were listed with the right whales in the North Pacific as one species commonly called the "northern right whale." On October 1, 2009, NMFS received a petition to revise the 1994 critical habitat designation for right whales in the North Atlantic. In response, pursuant to section 4(b)(3)(D), NMFS published a combined 90-day finding and 12-month determination on October 6, 2010, that the petition presented substantial scientific information indicating that the requested revision may be warranted, and that we intended to issue a proposed rule to revise critical habitat for the North Atlantic right whale (75 FR 61690). As noted in that finding, the biological basis and analysis for the 1994 critical habitat designation was based on the North Atlantic population of right whales, and we considered that designation to continue to apply to North Atlantic right whales after they were subsequently listed as a separate species in 2008. This rule replaces the 1994 designation for the population of right whales in the North Atlantic Ocean with two new areas of critical habitat for the North Atlantic right whale pursuant to ESA sections 4(a)(3)(A)(i) and 4(b)(3)(D). For ease of reference, we will use the term "designation" or "designate."

It is also important to note that in 1994, when NMFS designated critical habitat for "northern right whales" in the North Atlantic, the agency relied on the definition of "to jeopardize the continued existence" of listed species and a definition of "destruction and adverse modification" of critical habitat. The latter definition has since been struck down in part by several courts and is no longer relied on by the agency. In the 1993 proposed rule to designate critical habitat, the agency stated:

> *Using these definitions, activities that destroy or adversely modify critical habitat also are likely to jeopardize the species. Therefore, the protection provided by a critical habitat designation usually only duplicates the protection provided under the section 7 jeopardy provision. Nevertheless, designation of critical habitat may provide additional benefits to a species in cases where areas outside of the species' current range have been designated. In these cases, it is expected that federal agencies would consult on additional actions occurring in these areas (58 FR 29186, 29187 May 19, 1993).*

The effect of this interpretation was to minimize or erase the impacts of a critical habitat designation. In addition, section 7 consultations relying on that interpretation of the value of critical habitat may not have been as robust as they could have been under a different interpretation.

If we were to rely on an impacts analysis from 1994, and in this report only analyze incremental impacts over and above those from the 1994 designation, we might underestimate impacts from this action because the areas are much larger than the areas designated in 1994. In addition, the essential features of this designation are not identical to those described in the 1994 designation, so an incremental analysis of impacts over and above those from the 1994 designation may not be appropriate. For these reasons, the impacts of this critical habitat are identified and addressed comprehensively as if the 1994 critical habitat designation did not exist. Our classification of impacts as incremental is intended to identify them as impacts over and above the impacts associated with the listing, and not, by contrast, impacts over and above those associated with the 1994 critical habitat designation.

Approach to the analysis

The direct requirements that result from designation of critical habitat are that federal agencies: (1) consult with NMFS on proposed actions that may affect critical habitat; and (2) modify actions as necessary to avoid destroying or adversely modifying critical habitat. Therefore, as the basis for our identification of impacts, we must identify federal activities within or in the vicinity of those areas designated as critical habitat that may affect the essential features thereby triggering consultation under ESA section 7. For purposes of estimating the impacts of section 7 consultations, we use the past consultation history to project consultations expected in the future. In addition, we considered potential new activities that are reasonably likely to occur in the future and that also may affect the critical habitat.

This analysis attempts to identify the subsets of benefits and costs that can be attributed: (1) in part to the critical habitat designation; or (2) exclusively to the critical habitat designation. In other words, we attempted to identify those changes in benefits and costs that are purely incremental (i.e., costs and benefits that occur above and beyond those that stem from the ESA listing of the North Atlantic right whale and other regulatory requirements) versus those that are co-extensive (i.e., those that result from multiple causes, including the critical habitat designation as well as the listing of the species, and as such would be present even in absence of this action due to other regulatory requirements). The predominant source for co-extensive costs is the baseline requirement that federal agencies consult under section 7 to ensure that their actions do not jeopardize the continued existence of the right whale. Some impacts that may be co-extensive are nonetheless considered for purposes of this report to be attributable to the critical habitat designation because the impacts are more likely to result from the designation than from listing of the listed species. In these cases, they are categorized as incremental impacts.

1.1 Purpose and Structure of Report

This report documents NMFS' compliance with section 4(b)(2) of the ESA. This report also documents NMFS' determination whether to exclude any particular area from the designation based on its consideration of identified impacts. Pursuant to the Regulatory Flexibility Act, NMFS has also prepared a Final Regulatory Flexibility Analysis (FRFA), which is provided as Appendix B.

While it has not been possible to provide quantitative estimates for all the projected benefits and costs that may be uniquely attributable to designating North Atlantic right whale critical habitat, this analysis seeks to comprehensively identify (and, wherever practicable, quantify) benefits and costs attributable to the designation. Based on this analysis, the costs expected as a result of this action are likely be small relative to overall project costs, and we expect benefits to accrue to society as a result of the designation action. We expect that this final rule will result in both direct and indirect benefits, with non-consumptive use and non-use values representing a significant component of the benefits derived from the action. These values are described qualitatively in this document because the economic studies needed to quantify those benefits are not available.

The following section briefly describes our determination of the specific areas on which are found the features essential to the conservation of the North Atlantic right whale that meet the definition of critical habitat in section 3 of the ESA. The report then summarizes the section 4(b)(2) requirements, as informed by previous designations and key court rulings, and the requirements of other laws, E.O.s, and policies that are applicable to evaluating the impacts of federal regulatory actions. The regulatory and economic baselines applicable to the impact analyses and prepared in support of the action are then described. Next the economic, national security, and other relevant impacts of the designation within the specific areas are considered. Last, the impacts resulting from the designation are synthesized and our determination is explained with regard to consideration of exclusions.

1.2 Summary of Preliminary ESA Section 3 Determinations

Section 3(5)(A) of the ESA defines critical habitat as:

> (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species. (16 U.S.C. §1532(5)(A)).

The application of this definition for the North Atlantic right whale is described in detail in the Biological Source Document[1], which is incorporated by reference and summarized herein.

The current geographical range of the North Atlantic right whales is limited largely to the western North Atlantic Ocean (i.e., Florida to Canada; NMFS 2014). The geographical area occupied by the North Atlantic right whale at the time of listing in 2008 includes the U.S. waters of the North Atlantic from Florida to the Gulf of Maine, northward to the Bay of Fundy, the Gulf of St. Lawrence and the Scotian shelf, extending to the waters of Greenland and Iceland. While right whales have been sighted in the waters off Norway, the Gulf of Mexico and the Azores, the

[1] See NMFS (2013) North Atlantic Right Whale (*Eubalaena glacialis*) Source Document for the Critical Habitat Designation: A review of information pertaining to the definition of "critical habitat" December 2012. 166 pp.

reports of animals in these areas are rare. Therefore, these areas are not considered to be part of "the geographical area occupied…at the time it is listed" (16 U.S.C. §1532(5)(A)).

Within the species' occupied geographical range, critical habitat is defined as specific areas on which are found the physical or biological features essential to the species' conservation and which may require special management considerations or protection. Conservation is defined in the ESA as meaning "to use, and the use of, all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary" (16 U.S.C. §1532(3)). Features essential to a species' conservation are those features without which the process of conservation would fail, and the species would not achieve recovery. Although features forming the basis of a critical habitat designation must be essential to the species' conservation, the features do not have to be the sole factor required to bring about recovery.

The key conservation objective for the North Atlantic right whale is to increase its abundance throughout its current range. NMFS (2013) has identified several physical and biological features essential to the conservation of the species (hereinafter "essential features") that include physical and biological features related to feeding and calving, nursing and rearing. NMFS has concluded that it is not currently possible to identify the specific physical and biological features that define migratory or breeding habitat. The location of the breeding or mating ground for North Atlantic right whales is unknown, and migration occurs across a wide range of the Atlantic Ocean and does not appear associated with any particular habitat features.

We have identified two specific areas within the geographical area occupied by the species at the time of listing on which are found the physical and biological features that are essential to the conservation of the species. The specific areas where essential features occur encompass most of the Gulf of Maine-Georges Bank region (Unit 1) and a large portion of the South Atlantic Bight (Unit 2). The coordinates and boundaries of the specific areas on which are found the physical and biological features essential to the conservation of the species are provided in detail in NMFS 2014.

Unit 1: Northeastern Foraging Habitat

A key habitat-based conservation objective for this species is facilitating successful feeding by protecting the species' foraging area. We identified one specific area using foraging right whales as a proxy to indicate the location of important feeding areas in the North Atlantic. NMFS identified four physical and biological features within this area that are essential to the conservation of the species because they provide foraging area functions:

(1) The physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate *Calanus finmarchicus* for right whale foraging, namely prevailing currents and circulation patterns, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes;

(2) Low flow velocities in Jordan, Wilkinson, and Georges Basins that allow diapausing *Calanus finmarchicus* to aggregate passively below the convective layer so that the copepods are retained in the basins;
(3) Late stage *Calanus finmarchicus* in dense aggregations in the Gulf of Maine and Georges Bank region; and
(4) Diapausing *Calanus finmarchicus* in aggregations in the Gulf of Maine and Georges Bank regions.

The principal prey items of right whales in the Northwest Atlantic Ocean are adult copepods, most notably *C. finmarchicus*, in dense aggregations. Occurrence of dense copepod patches is an essential biological feature of right whale habitat in New England waters (Watkins and Schevill 1976, Wishner et al. 1988; 1995, Murison and Gaskin 1989, Mayo and Marx 1990, Beardsley et al. 1996, Woodley and Gaskin 1996, Kenney 2001, Baumgartner et al. 2003, Baumgartner and Mate 2003). Right whales feed on copepod aggregations at the surface (such as in Cape Cod Bay: see Mayo and Marx 1990), but foraging at depths where copepod densities are highest is more common (Kenney et al. 1995, Baumgartner and Mate 2003). Dense aggregations of copepods trigger foraging activities in right whales.

Typical zooplankton sampling is too broad-scale in nature to detect patches of these densities, and directed studies employing fine-scale sampling cued by the presence of feeding right whales are the only means of doing this (Mayo and Marx 1990). Accordingly, there may be no obvious correlation between the abundance and distribution of copepods (as measured by broad-scale oceanographic sampling) and the distribution of right whales. Therefore, NMFS has utilized foraging right whales as a proxy to indicate the location of important feeding areas in the North Atlantic. Right whales feed daily during spring and summer. Studies have consistently found an association between right whale feeding behavior and dense copepod aggregations documented by sampling around feeding groups of whales (Mayo and Marx 1990, Baumgartner et al. 2003, 2003b). Aggregations of right whales in areas of high latitudes such as the Gulf of Maine, Bay of Fundy and Roseway Basin can be used as a reliable indicator of the presence of suitable aggregation of prey, and thus of feeding behavior by the whales. In the North Atlantic, an analysis of sighting data by NMFS indicated that a density of four or more right whales per 100 nm^2 was a reliable indicator of a persistent feeding aggregation (Clapham and Pace 2001).[2] This density threshold has been used to implement management measures to reduce the risk of right whales becoming entangled in fishing gear or struck by vessels. Right whale feeding and habitat studies show that right whales focus their foraging activities in areas where physical oceanographic features (e.g., water depths, currents and mixing fronts) concentrate copepods (Wishner et al. 1988, Mayo and Marx 1990, Murison and Gaskin 1989, Baumgartner et al. 2003, Jiang et al. 2007).

In addition to dense aggregations of late stage *C. finmarchicus* copepods, deep ocean basins within the Gulf of Maine (i.e., Jordan, Wilkinson and Georges Basins) provide refugia habitat for diapausing *C. finmarchicus* populations essential to the conservation of the North Atlantic right whale.

[2] Clapham and Pace (2001) developed the protocol for determining the whale density and residency indicative of feeding behavior for the Dynamic Area Management (DAM) program.

The oceanographic conditions of the deep ocean basins where diapausing copepods aggregate are conducive to low flow velocities. The high lipid content of late stage copepods helps keep these animals neutrally buoyant such that, in their resting state, they remain below the convective mixed layer (Visser and Jónasdóttir 1999). Within the low velocity environments of the deep ocean basins, the neutrally buoyant copepods passively aggregate below the convective mixed layer (Lynch et al. 1998, Visser and Jónasdóttir 1999, Baumgartner et al. 2003, Pace and Merrick 2008). Johnson et al. (2006) concluded that copepods that can stay below basin sill depths are retained within the deep ocean basins.[3]

In addition, the combination of prevailing physical oceanographic features present within the Gulf of Maine-Georges Bank region, namely currents and circulation patterns, bathymetric features (such as basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes interact to distribute, aggregate and retain *C. finmarchicus* in concentrations necessary to support right whale foraging and energetic requirements.

Unit 1 is located nearshore and offshore the northeastern U.S. in the Gulf of Maine-Georges Bank region (see Appendix A for boundaries). It includes a total area of 21,334 nm^2.

We have determined the essential features for Unit 1 may require special management considerations and protections, as they may be negatively impacted by activities that directly affect the abundance or availability of these features. The following four broad categories of potential future activities are likely to result in negative impacts to the essential features and their ability to support the conservation of North Atlantic right whales:

1. Zooplankton Fisheries: Directed fisheries for *Calanus* copepods have been conducted in various regions of the world's oceans. Commercial interest in the potential to utilize *C. finmarchicus* as a feed source for aquaculture production has intensified in recent years (NMFS 2014). Zooplankton fisheries targeting *C. finmarchicus* populations would result in the direct removal of the essential features of Unit 1, (i.e., dense aggregations of late stage *Calanus* copepod and/or diapausing copepods).

2. Effluent from Outfalls: Several municipalities have waste facilities that discharge into the Gulf of Maine. Increased nutrient input from outfall effluent may affect the phytoplankton community structure, enhancing nuisance and/or less desirable species that potential could result in changes in productivity thereby affecting the distribution of high density patches of *C. finmarchicus* populations essential to the conservation of right whales. The discharge of municipal effluents into the Gulf of Maine-Georges Bank region could have an adverse impact on late stage *C. finmarchicus* in dense aggregations in that region, as well as diapausing *C. finmarchicus* in aggregations in Jordan, Wilkinson, and Georges Basins.

---

[3] Sill depth is the maximum depth at which there is horizontal exchange between an ocean basin and the waters of the open ocean. The restricted exchange of waters between the open ocean and waters below the sill depth in deep ocean basins contributes to the retention of *C. finmarchicus* in these areas.

3. Exposure to Petroleum Products: Oil and gas exploration, development, and petroleum transportation activities have the potential to affect the essential features of Unit 1. These essential features are late stage *C. finmarchicus* copepods in dense aggregations and diapausing *C. finmarchicus* aggregations in Jordan, Wilkinson, and Georges Basins in the Gulf of Maine and Georges Bank region. Exposure to petroleum can kill marine organisms, reduce their fitness through sub-lethal effects, and potentially disrupt the structure and function of marine communities and ecosystems. The biological effects of oil pollution include both acute and chronic affects. Oil in the marine environment has the potential to affect copepod density in a number of ways. These include direct mortality of both adult and juvenile and larval life stages due to acute exposure, sub-lethal effects to both adult and juvenile life stages due to acute and chronic exposure and indirect impacts to other organisms composing the pelagic ecosystem such as phytoplankton community structure, thereby impacting the forage base of copepods.

4. Global Climate Change: There are a number of potential ways that global climate change may affect marine ecosystems including the essential features of Unit 1. The potential effects of climate change include shifts in productivity, biomass, and species composition of zooplankton which could impact the foraging success of right whales. There is a close link between right whale foraging and the physical forcing processes that concentrate prey in the oceanic environment (Kenney *et al.* 2001). Inter-annual, decadal, and longer time-scale variability in climate can alter the distribution and biomass of prey available to right whales. The predicted increase in water temperatures, combined with other factors such as increased precipitation and runoff, may alter seasonal stratification in the northeast coastal waters. Increased stratification of the water column in the Gulf of Maine region could affect copepod abundance and densities by limiting and/or preventing the exchange of surface and nutrient rich deep water. Increased stratification could affect primary and secondary productivity by altering the composition of phytoplankton and zooplankton (Mountain 2002). This in turn might affect the abundance and distribution of patches of *C. finmarchicus* that support right whale foraging behavior and energetic requirements.

   Potential climate change-induced changes to the physical oceanographic features that create the low-energy environments present within deep ocean basins could also affect diapausing *C. finmarchicus* populations. The hydrographic conditions of the deep basins where aggregations of diapausing copepods are found are conducive to low flow velocities. These low velocity environments allow the neutrally buoyant, high lipid content copepods to passively aggregate below the convective mixed layer and be retained for a period of time (Lynch *et al*. 1998, Visser and Jónasdóttir 1999, Baumgartner *et al.* 2003, Pace and Merrick 2008). It is possible that climate-related changes to the physical oceanographic features could affect the conditions that create the low energy environment that enable retention of copepod populations within deep ocean basins.

   In addition, climate change might alter the Gulf of Maine and Georges Bank region's physical oceanographic conditions, namely prevailing currents and circulation patterns, oceanic fronts, density gradients, and temperature regimes that combine to distribute and

aggregate *C. finmarchicus* for right whale foraging in that region. For example, potential changes to the physical oceanographic features could result in increased stratification of the water column in the Gulf of Maine region, which could affect the retention and subsequent emergence and distribution of diapausing copepod source populations in the deep ocean basins.

Unit 2: Southeastern Calving Habitat

A key habitat-based conservation objective for this species is facilitating successful calving by protecting the species' single known calving area. NMFS identified a specific calving, nursing and rearing area from available right whale cow-calf pair sightings data coupled with results from two predictive habitat models. NMFS identified three physical features within these areas that are essential to the conservation of the species because they provide calving area functions:

1. calm sea surface conditions of Force 4 or less on the Beaufort Wind Scale,
2. sea surface temperatures from 7°C to 17°C, and
3. water depths of 6 to 28 m.

These features simultaneously co-occur over large contiguous areas of ocean waters during the months of November through April (the total square mileage of the area being designated as critical calving habitat for right whales is 8,427 nm^2). When these features are available, they are selected by right whale cows and calves in dynamic combinations that are suitable for calving, nursing, and rearing; the optimal combinations of the features vary depending on factors such as weather and age of the calves.

Unit 2 is located nearshore and offshore the southeastern U.S., extending from Cape Fear, North Carolina south to approximately 27 nm below Cape Canaveral, Florida. This area is located within and beyond the waters of Brunswick County, North Carolina; Horry, Georgetown, Charleston, Colleton, Beaufort, and Jasper Counties, South Carolina; Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden Counties, Georgia; and Nassau, Duval, St. Johns, Flagler, Volusia, and Brevard Counties, Florida (see Appendix A for boundaries).

The essential features for Unit 2 may require special management considerations or protection. The essential features may be negatively impacted by activities that directly affect the preferred range of these features, by activities that limit the availability of the essential features to right whale cows and calves, or by activities that interrupt large contiguous areas of these features within the specific area (e.g., activities that limit the "selectability" of the optimal combinations of the essential features).

Human activities and environmental conditions could adversely affect the essential features and their ability to support conservation of endangered North Atlantic right whales by causing:

- loss of the preferred ranges of the essential features,
- fragmentation of large contiguous areas of the essential features, or
- loss of the "selectibility" of dynamic, optimal combinations of the essential features.

These effects may result from changes in water temperatures associated with global climate change and modification of the contiguousness of the features over large areas or of the selectibility of optimal combinations of the essential features throughout the calving season by permanent or long duration activities. In Unit 2, the following three broad categories of potential future activities could result in negative impacts to the essential features and their ability to support conservation of North Atlantic right whales.

1. Offshore energy development: Depending on the size, scale, and configuration of alternative technologies used for offshore energy production, installation and operation of these technologies in Unit 2 may fragment large, continuous areas of the essential features such that Unit 2 is rendered unsuitable for calving right whales. Further, the numerous floating, fixed, and submerged structures, mooring lines, and transmission cables associated with large ocean energy facilities could result in adverse effects to the essential features of Unit 2 by limiting selectibility of optimal areas necessary for successful calving.

2. Large-scale offshore aquaculture operations: Large-scale offshore aquaculture generally involves the placement of large arrays or fields of individual net-pens. The construction and operation of large-scale offshore aquaculture facilities within the specific area have the potential to affect the selectibility and availability of the dynamically distributed essential features of calving habitat. Availability of the essential features may be limited by the construction of large arrays or fields of permanent structures that may act as physical barriers and prevent or limit the ability of right whale mothers and calves to use the essential features.

3. Global climate change: The essential features of right whale calving habitat also may be negatively impacted by global climate change. Negative impacts include a direct upward shift in the range of sea-surface temperature values available in the specific area, the potential that in the future the preferred temperature range (7°C to 17°C) may no longer be available, may be reduced in range or periodicity, or may not be available in the optimal combinations of all the essential features. Additionally, changes in weather patterns due to global climate change may alter sea surface conditions within the specific area for right whale calving such that the area capable of providing dynamic, optimal combinations of the essential features is reduced and the ability of the specific area to support the key conservation objective of facilitating successful calving is reduced.

At the present time, no areas outside the occupied range have been identified as being essential to the conservation of the North Atlantic right whale. Therefore, areas outside the geographical area occupied by the species at the time of listing are not included in the designation.

The 1994 designation is geographically smaller than the areas currently under consideration for designation as critical habitat.

1994 Right Whale Critical Habitat areas:
Great South Channel RWCH: 2,440 nm^2
Cape Cod Bay RWCH: 485 nm^2

Coastal GA & FL RWCH: 1,611 nm^2

2016 Right Whale Critical Habitat areas:
Unit 1 (Northeast): 21,334 nm^2
Unit 2 (Southeast): 8,427 nm^2

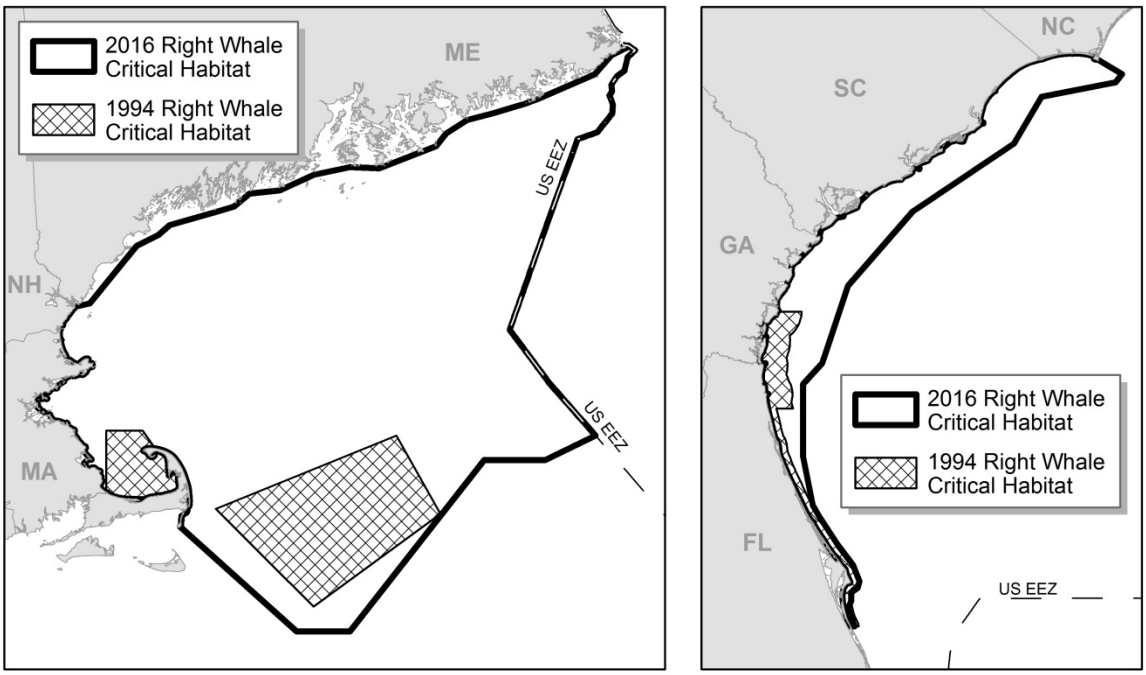

Figure 1: Comparison of 1994 Right Whale Critical Habitat to Areas Being Designated under the Final Rule

In addition, the 1994 critical habitat designation had a somewhat different description of essential physical and biological features. The new final designation is more explicit about what the essential features are and where they occur as well as why they are essential to the conservation of the species.

1.3 Integrated Natural Resource Plans

Section 4(a)(3)(B) prohibits designating as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense (DOD), or designated for its use, that are subject to an integrated natural resources management plan (INRMP), if we determine that such plans provide a benefit to the listed species (16 U.S.C. §1533(a)(3)(B)). The legislative history to this provision explains:

> *"The conferees would expect the [Secretary] to assess an INRMP's potential contribution to species conservation, giving due regard to those habitat protection, maintenance, and improvement projects and other related activities specified in the plan that address the particular conservation and protection needs of the species for which critical habitat would otherwise be proposed. Consistent with current practice, the Secretary would establish criteria that would be used to determine if an INRMP*

benefits the listed species for which critical habitat would be proposed" (Conference Committee report, 149 Cong. Rec. H. 10563 (November 6, 2003)).

NMFS has determined, based on a review of information provided by DOD that, within Units 1 and 2, there are no military lands with INRMPs that provide a benefit to the North Atlantic right whale. We have therefore concluded that within critical habitat Units 1 and 2 there are no military lands ineligible for designation as critical habitat pursuant to section 4(a)(3)(B) (Memo to the Record, Colligan June 17, 2013). DOD did not dispute these findings.

1.4 Section 4(b)(2) Requirements

This section describes the statutory requirements of determining the impacts of designating areas as critical habitat. The interpretation of the statute is informed by previous designations and key court opinions discussed in the sections that follow.

Statutory Language and Consideration of Potential Impacts of Designation

Section 4(b)(2) of the ESA states:

> *The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) of this section on the basis of the best scientific data available and after taking into consideration the economic impact, impact on national security, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned (16 U.S.C. §1533(b)(2)).*

Impacts result from a critical habitat designation primarily through section 7 of the ESA (16 U.S.C. §1536). Section 7(a)(2) requires each federal agency to consult with NMFS (or the Fish and Wildlife Service (FWS), as applicable) to insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or destroy or adversely modify the designated critical habitat of listed species. Federal agencies are required to enter into consultation with either NMFS or FWS whenever a proposed action "may affect" listed species or designated critical habitat. If a proposed federal action is likely to destroy or adversely modify critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the proposed action that would avoid destruction or adverse modification of critical habitat. This is different from considering impacts to the continued existence of a listed species where NMFS must recommend implementation of an RPA to avoid jeopardy. If "take" might occur, then NMFS must identify in an Incidental Take Statement those Reasonable and Prudent Measures (RPM) and their implementing terms and conditions (T&Cs) to minimize the amount or extent of take. Thus, impacts that may result from section 7 consultations for projects that may affect both the species and its critical habitat include administrative costs of performing the

consultation, costs of modifications to the proposed action in order to implement RPAs as well as any RPMs and T&Cs, and secondary costs to local or regional economies that result from the project modification. In addition, because critical habitat features found in the specific areas within the species' geographical range, and those areas outside the species' range, are by definition "essential to the conservation" of the species, conservation benefits to the listed species would be expected to result when the consultation process avoids destruction or adverse modification of critical habitat, or avoids lesser adverse effects to critical habitat that may not rise to the level of adverse modification. Adverse impacts to other components of the ecosystem may similarly be avoided through consultation and implementation of RPAs to avoid destruction or adverse modification of critical habitat.

Aside from the protections provided through section 7, the ESA imposes no requirements or limitations on any entities or individuals as a result of critical habitat designation. Benefits to the listed species and its critical habitat may nonetheless result from a designation if state or local governments voluntarily enact protective legislation or regulations to complement the ESA protections. Similarly, a designation may raise public awareness and sensitivity to the status of listed species and the importance of designated critical habitat areas for conservation. As a result, individuals or other entities may voluntarily modify their activities to avoid harm to the species or habitat, or contribute to conservation efforts.

Regulatory Requirements

Prior to finalizing a critical habitat designation, joint NMFS-FWS regulations at 50 CFR 424.19 direct us to consider the probable economic, national security, and other relevant impacts of the designation upon proposed or ongoing activities. The regulations state that we may consider impacts at a scale that we determine to be appropriate and must "compare the impacts with and without the designation" (i.e., conduct an 'incremental analysis'; 50 CFR 424.19(b)). The impacts may be qualitatively or quantitatively described (50 CFR 424.19(b)).

NMFS may exclude particular areas that otherwise meet the definition of critical habitat from a designation if it is determined that the benefits of exclusion outweigh the benefits of including particular area(s), and the exclusion will not result in the species' extinction. This step is entirely discretionary and does not require exclusion in any circumstances (50 CFR 424.19(c)).
In a recent challenge, a court explicitly rejected the contention that a balancing test is required to conduct the required consideration of impacts. The court also held that the ESA section 4(b)(2)'s process to exclude habitat from a designation based on economic impacts is discretionary. Based on the plain meaning of ESA section 4(b)(2), even if NMFS decided to balance the benefits and determined the economic benefits of habitat exclusion would outweigh the benefits of critical habitat designation, the agency is still not obligated to exclude the area from designation. Finally, similar to previous opinions by courts in other circuits, the court held that ESA section 4(b)(2) does not provide any standard by which to judge an agency's decision not to exclude any area from critical habitat designation. As a result, the Administrative Procedure Act does not allow for court review of this agency action, which is committed to agency discretion by law. Building Industry Ass'n of the Bay Area v U.S. Department of Commerce, 2012 WL 6002511 (N.D. Cal. 2012).

1.5 Other Laws, Executive Orders, and Policies Applicable to Economic Impact Analysis

The consideration of impacts from a critical habitat designation is subject to other laws, E.O.s, and policies beyond the ESA. For example, the Regulatory Flexibility Act (RFA; 5 U.S.C. §601 *et seq.*) establishes a requirement that agencies shall endeavor, consistent with the objectives of a proposed rule and applicable statutes, to fit regulatory requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. The RFA does not contain decision criteria *per se*; rather, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of a proposed action to ensure that the agency considers alternatives that minimize expected significant adverse impacts of the rule on substantial numbers of small entities, while meeting the goals and objectives of the proposed action. We have conducted a RFA analysis for this designation (see Appendix B).

Executive Order (E.O.) 12866, Regulatory Planning and Review, provides guidance to federal agencies on the development and analysis of regulatory actions. The overarching regulatory philosophy established by E.O. 12866 is:

> *Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages, distributive impacts, and equity), unless a statute requires another regulatory approach.*

E.O. 12866 includes a list of 12 principles for regulatory program planning and development of individual proposed rules that agencies should adhere to, to the extent permitted by law and where applicable. These principles include identification of market failures or other problems intended to be addressed by the regulation, and whether existing regulations or laws have created or contributed to the problem to be addressed. If applicable, agencies are directed to identify non-regulatory alternatives to address the problem. Where regulations are necessary or required by law, agencies should design regulations in the most cost-effective manner available to achieve the regulatory objective and that impose the least burden on society. All costs and benefits of proposed regulations should be assessed. If feasible, agencies should specify performance objectives rather than behavior or compliance requirements. Agencies are directed to seek the views of appropriate state, local, and tribal officials if such would be significantly or uniquely

affected by a proposed rule. Regulations must not be inconsistent, incompatible, or duplicative with other federal regulations, and must be simply drafted and easy to understand.

Office of Management and Budget (OMB) guidance to federal agencies on implementing E.O. 12866 states that good regulatory analyses include three basic elements: (1) a statement of the need for the proposed action; (2) an examination of alternative approaches; and (3) an evaluation of benefits and costs of the proposed action and the main alternatives (OMB Circular A-4, Sept. 17, 2003). Further, OMB Circular A-4 states that proper evaluation of the benefits and costs of regulations requires: explaining how the actions required by the rule are linked to the expected benefits; identifying an appropriate baseline; and identifying the expected undesirable side-effects and ancillary benefits of the proposed rule. These regulatory principles have been integrated into the development of this 4(b)(2) impacts analysis to the extent consistent with the mandatory duty to designate critical habitat, as defined in the ESA.

2. RELEVANT BASELINE INFORMATION

In this report the impacts of the critical habitat designation are evaluated in terms of the benefits and costs of the action measured against a relevant baseline. We cannot utilize the existing 1994 critical habitat designation as part of the baseline in this report given the differences in the essential features, the smaller geographic areas of impact, and the insufficient information available on impacts of the 1994 designation, all of which could lead to a misleading estimate of impacts. Instead we have chosen to take a more comprehensive view and analyze the impacts of the designation as a whole, as if the 1994 critical habitat designation does not exist. To provide a context for the analysis, data are presented on activities occurring within the critical habitat areas. This provides an economic background for the analysis. We then present available information on the baseline benefits of the essential features identified as the basis for the critical habitat, and then discuss existing laws and regulations that may protect the essential features.

2.1 Economic Baseline

This subsection summarizes economic information for the particular areas in which activities may be affected by the critical habitat designation. Understanding the current types and levels of economic activity in these particular areas provides context for evaluating the importance of impacts resulting from the action. The baseline is defined as the best assessment of the world absent the critical habitat. However, the 1994 critical habitat designation has been in place for approximately 19 years, and it is not possible to determine whether or to what extent its designation may have contributed to the baseline economic activity in the area. Note that establishment of the baseline scenario does not imply that no change in current conditions will take place, since the economy will change even in the absence of regulation (US EPA, 2010). This section summarizes economic activity for the particular areas in which activities may be affected by the designation.

2.1.1 Northeastern Foraging Habitat, Unit 1

Unit 1 consists of the Gulf of Maine and Georges Bank Region in the northeast U.S. and protects the foraging habitat of the North Atlantic right whale. The Gulf of Maine (GoM) is a large semi-

enclosed basin along the northeast coast of the United States bounded by the coasts of Maine and New Hampshire, as well as Massachusetts from Cape Cod northward. To the north, the GoM is bounded by the coastlines of New Brunswick and Nova Scotia, Canada. The GoM includes Massachusetts and Cape Cod Bays and the Bay of Fundy. The waters of the GoM are isolated from the Northwest Atlantic Ocean by Georges and Browns Banks and Nantucket Shoals. These banks are relatively shallow with average depth ranges between 20 and 60 m, with some areas as shallow as 5 m. Georges Bank, in particular, acts to separate the GoM waters from the warmer Gulf Stream waters. The Northeast Channel (NEC) and Great South Channel (GSC) connect the GoM to the waters of the northwest Atlantic Ocean.[4] The bathymetry of the central GoM is dominated by three large, deep basins: Jordan and Georges Basins to the northeast and east respectively and Wilkinson Basin in the southwest. As discussed, these deep water basins serve as refugia habitat for diapausing copepods, which serve as source populations for the annual recruitment of copepods to the GoM population (NMFS 2014, Davis 1987, Meise and O'Reiley 1996, Lynch et al. 1998, Johnson et al. 2006).

The GoM has a complex and highly variable circulation regime due to varying inflow from the Atlantic Ocean, interactions between the eastern and western Maine coastal currents, freshwater inflow, and temperature fluctuation. The oceanographic features of the GoM are very dynamic, with strong currents, sharp frontal gradients and high mixing rates. The GoM circulation is strongly influenced by its topography, with counterclockwise flow over Georges, Jordan and Wilkinson Basins and clockwise circulation over Georges and Brown Banks and Nantucket Shoals (Smith 1989, Brown and Irish 1992, Bisgani and Pettigrew 1994). These physical features, which show high degrees of temporal and spatial variability, have a large effect on the distribution, retention, abundance and population dynamics of zooplankton populations within the GoM including *C. finmarchicus* (Durbin 1997).

Commercial Fishing Activity

Commercial fishing is the largest revenue generating activity occurring within the critical habitat area. The copepod, *Calanus finmarchicus* is a keystone species in the Gulf of Maine-Georges Bank ecosystem, serving as a principal prey item of numerous species of fish and marine mammals, including the North Atlantic right whale. Given the role of *Calanus finmarchicus* in the Gulf of Maine-Georges Bank ecosystem as a prey item for numerous species of commercially valuable species of fish, its protection will result in the preservation and improvement of these functions and values.

Data on existing commercial fisheries are presented to provide baseline economic information. Revenue estimates are provided rather than economic values, as economic values (or profits) require estimates of cost for each of the gear types that may be used, which are not known at this time. Theoretically, in order to estimate the baseline net benefits associated with commercial fisheries, we would sum consumer surplus and producer surplus gained from commercial fishing markets. A theoretically correct measure of consumer surplus would be the total willingness to

[4] The NEC is a 230 m deep channel situated between the eastern edge of Georges Bank and Browns Bank connecting the Gulf of Maine with the deeper waters of the Atlantic Ocean. The SEC, a secondary, shallower connection to the Atlantic, is located between Nantucket Shoals and the western edge of Georges Bank and is only about 75 m deep.

pay for fish in a given time period, minus the market price the consumer actually paid for the fish. A theoretically correct measure of producer surplus would be the total revenue received from selling fish in a given time period, minus the total costs associated with producing the fish (economic profit). However, estimation of total costs would involve estimating cost for each of the gear types that may be used and that is not known at this time. We present information on commercial fishing revenue, recognizing that revenues likely overestimate producer surplus gained from commercial fisheries and provide a lower bound estimate of consumers' willingness to pay (WTP).

Vessel Trip Report (VTR) data and Commercial Fisheries (CF) data were used to provide revenue estimates in the area. CF data was used to calculate an average monthly price by state and species. VTR records for all gear types that had latitude and longitude values within the area were included.

Although the best scientific data are used, we conclude the estimate of fishing revenue based on the VTR is an underestimate for the following reasons:

- Vessels that have only a federal lobster permit do not have to provide VTRs;
- Vessels that only have state fishing permits do not have to provide VTRs; and,
- VTR records missing latitude and longitude values may have been inside the area.

As shown in Table 1, all the coastal states in the Northeast and Mid-Atlantic, except Delaware and Maryland, have landed fish caught within the area on which are found the essential features of right whale foraging habitat during 2003-2007.[5] In nominal terms (i.e., not adjusted for inflation), fishermen received revenues between $162 million and $233 million from fish caught within the area on which are found the essential right whale foraging habitat features. Massachusetts accounted for the majority of this value, with Maine a distant second.

Table 1: Revenue (in nominal dollars) from commercial catches within Unit 1, for states that had landings from Unit 1, as estimated from VTR landings

State	2003	2004	2005	2006	2007
ME	47,478,959	46,551,932	46,619,198	42,918,509	33,578,609
NH	12,959,269	14,506,763	14,808,375	13,410,764	12,124,343
MA	121,702,011	98,431,816	154,903,630	151,119,986	152,361,259
RI	2,014,399	1,862,430	5,801,426	3,722,627	3,501,917
CT	93,604	141,947	918,266	937,768	824,744
NY	58,331	41,758	76,667	86,521	97,314
NJ	1,237	1,783	3,792,019	731,446	2,698,900
VA	41,097	-	6,060,498	417,529	1,804,218
NC	359	216	136,053	-	-
Total	**184,349,266**	**161,538,646**	**233,116,132**	**213,345,152**	**206,991,304**

Recreational Fisheries

[5] The critical habitat area covers the Gulf of Maine as well as the northern edge of Georges Bank. Adjacent state waters in Massachusetts and New Hampshire are included, while some of Maine's state waters are excluded.

As noted, *Calanus finmarchicus* is a keystone species in the GoM/Georges Bank ecosystem that serves as a principal prey item of numerous species of fish and marine mammals including the North Atlantic right whale. Given its role in the GoM/Georges Bank ecosystem as a prey item for numerous species of recreationally valuable species of fish, its protection will result in the preservation and improvement of these functions and values. While recreational fishing does not generate revenue from landings, there may be revenue involved with the tourist/sport industry surrounding recreational fishing, and there is still an economic value associated with the catch recorded on these trips. The theoretically correct measure of the economic value derived from recreational fishing would be the willingness to pay for a fishing trip within Unit 1. The theoretically correct measure of consumer surplus for a recreational fishing trip in Unit 1 would be the willingness to pay for a recreational fishing trip in Unit 1 minus the amount the individual actually paid to take the recreational fishing trip. Note that estimation of this WTP would involve specifying the relevant attributes of the trip, which likely include the diversity of species caught, the quantity of each species caught, whether or not the fishing trip was a "catch and eat" experience or a "catch and release" experience, and opportunities to view marine life while fishing. Values for recreational fishing are typically estimated indirectly through revealed preference methodology, which looks at expenditures in related markets such as travel costs, or directly through stated preference methodology.

Total weight of recreational catch landed by state during 2003-2007 are presented in Table 2 below. Unlike commercial fisheries, it is generally assumed that most fish caught recreationally in critical habitat Unit 1 are landed in one of these neighboring states. It is recognized, however, that these records may reflect fish caught outside Unit 1, but landed in one of these states. In this regard, the numbers in Table 2 most likely reflect an overestimate of the recreational catch from the designated area.

Table 2: Total Weight (lbs) of Recreational Catch 2003-2007 (All Ocean Combined)

State	2003	2004	2005	2006	2007
ME	448,400	969,923	967,733	521,703	1,244,607
MA	9,982,316	9,046,673	10,356,741	10,442,705	4,887,164
NH	1,146,540	808,319	1,507,431	1,601,613	1,393,380
Total	**11,577,256**	**10,824,915**	**12,831,905**	**12,566,021**	**7,525,151**

Values for total expenditure by marine recreational fisherman in 2006 by state adjacent to Unit 1 is presented below in Table 3.

Table 3: Total Marine Recreational Fishing Expenditures by State in 2006 (in thousands of nominal U.S. dollars) (NMFS 2006).

State	Total Expenditure ($)[1]	Lower Bound ($)[2]	Upper Bound ($)[3]
MA	771,359	381,029	1,219,154
ME	193,314	31,581	358,341
NH	61,922	30,814	93,135
Total	**833,788**	**443,424**	**1,312,988**

[1] Total trip expenditures were developed by multiplying mean trip expenditures by category by total annual effort in

each stratum (state, mode, two-month period, and residency status).

Whale Watching

In addition to commercial and recreational fisheries, whale watching is a significant economic activity that occurs within Unit 1. Such activity may occur during a commercial whale watching trip, or while engaging in recreational fishing or boating. A theoretically correct measure of the baseline economic value of whale watching activity in the commercial whale watching market would be an estimate of the sum of consumer surplus and producer surplus that whale watching within the designated critical habitat area for Unit 1 yields. Consumer surplus would be estimated by calculating the difference between the WTP of individuals for a recreational whale watching trip, and the actual fee paid by individuals for such a whale watching trip. Producer surplus would be estimated by the difference between the fees whale watching operators receive for providing a recreational whale watching trip minus the total costs associated with providing such a recreational whale watching trip. Given the data and resources available, we are not able to provide a theoretically valid baseline economic value of whale-watching activity in Unit 1.

However, we know that in 2008, direct expenditure on whale watching trips in New England was about $35 million, and when indirect expenditures are included ($91 million), the total number increases to $126 million (O'Connor et al. 2009). The 2009 report estimated that direct expenditure on whale watching trips in New England in 2008 was about $35 million, while indirect expenditures were $91 million (in February 2009 US dollars). The report defined "direct expenditure" as expenditure on whale watching tickets, and "indirect expenditure" as expenditure by the participant that supports the whale watch trip, such as accommodation, transport and food costs not included in the ticket price. The average whale watching trip is a four hour boat based trip, with a $40 ticket price for adults and a $30 ticket price for children. Direct expenditures on whale-watching trips can be loosely interpreted as an overestimate of producer surplus. Indirect expenditures can be viewed as a proxy for whale watchers' WTP; it is likely an underestimate.

In 2008, an estimated 910,000 tourists went on boat-based whale watching trips from ports in Massachusetts, Maine, New Hampshire, and Rhode Island. The main species viewed included large cetacean species fin whale, humpback whale, minke whale, North Atlantic right whale and small cetacean species including Atlantic white-sided dolphin and harbor porpoise (O'Connor et al. 2009). We do not have data that indicates what percentage of these trips was taken in Unit 1 of the critical habitat area.

2.1.2 Southeastern Calving Habitat, Unit 2

The South Atlantic Bight (SAB) extends roughly from Cape Hatteras, North Carolina, to West Palm Beach, Florida. The SAB continental shelf varies from 40 to 140 km wide, with a shallow bathymetric slope. The inner shelf of the SAB, bounded by the 20 m isobath, is characterized mainly by a coastal low-salinity frontal zone resulting from the interaction between freshwater discharges, tidal mixing, and wind forcing (Chen 2000). The specific area designated for Unit 2 of right whale critical habitat for calving extends from Cape Fear, North Carolina south to approximately 27 nm below Cape Canaveral, Florida (NMFS 2015). This area is located within

and beyond the waters of Brunswick County, North Carolina; Horry, Georgetown, Charleston, Colleton, Beaufort, and Jasper Counties, South Carolina; Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden Counties, Georgia; and Nassau, Duval, St. Johns, Flagler, Volusia Counties, and Brevard Counties, Florida. All of the coastal counties of South Carolina and Georgia border the critical habitat area. The port cities of Charleston, South Carolina, Savannah, Georgia, Jacksonville, Florida, and Cape Canaveral, Florida are located within these counties. Details on the boundaries of Unit 2 are provided in Appendix A.

Tourism is among the largest contributors to the economies of Brunswick County, North Carolina; Horry County, South Carolina (Myrtle Beach), Beaufort County, South Carolina (Hilton Head); McIntosh County, Georgia, Camden County, Georgia; Nassau County, Florida (Fernandina Beach), and St. Johns County, Florida (St. Augustine), in particular. For example, in 2008 tourism had a $392 million impact on the Brunswick County, North Carolina economy (Brunswick County Planning and Community Development 2010). In South Carolina, 38 percent of all the state's hotels are located in Horry County (Horry County Finance Department 2009).

The combined populations of all nineteen counties have been increasing over the last 10 years. Increasing populations typically result in increases in construction (e.g., housing, infrastructure). "Construction" was among the top employment sectors for the region bordering the calving critical habitat area.

Commercial Fishing Activity

The above tourism data (Brunswick County Planning and Community Development 2010, Horry County Finance Department 2009) are compiled from the U.S. Census Bureau. Census data often underreport certain groups of people, including coastal communities and fishing communities (Jepson et al. 2007). Commercial and recreational fishing is a component of the economy reliant in part on the ecosystem services provided by the resources within designated critical habitat Unit 2 for right whale calving. The sea surface temperatures, water depths, and atmospheric conditions of the SAB provide for abundant fish species diversity. As such, there are several coastal communities within and adjacent to Unit 2 that have substantial fishing activity (Jepson et al., Undated and NMFS 2002). These communities include areas around Wilmington and Wrightsville Beach, North Carolina, and areas south along the Atlantic Coast to Ponce Inlet, Florida. In the communities of North Carolina, target species for commercial fishing consist of snapper-grouper complex species, coastal pelagic species, and shrimp. Additionally, there are several recreational fishing tournaments that occur throughout the year. In South Carolina, most federal fishing permits are for king or Spanish mackerel and snapper-grouper complex species. State fishing permits are mainly saltwater, with the rest consisting of shellfish, trawler, and crab pot permits. Murrell's Inlet is known as "The Seafood Capital of South Carolina." Commercial fishing in Georgia generally targets shrimp, including rock shrimp, king mackerel, and snapper grouper. In Florida, where tourism generates a large part of the economic revenue for coastal communities, the majority of fishing permits are for coastal pelagic and snapper-grouper charter boats. The following table shows commercial fisheries landing data for the counties located within Unit 2. For Unit 2, commercial fishing represents a combined average annual value of $145,851,644 from 2003-2007 (Table 4).

Table 4: Non-confidential commercial fisheries revenue (in nominal dollars) based on annual landings data. [6]

State	2003	2004	2005	2006	2007
NC	84,925,717	79,703,107	64,890,190	70,120,841	82,284,748
SC	20,990,849	18,347,865	17,454,138	16,786,580	16,017,420
GA	13,685,304	14,374,108	13,464,688	11,534,281	11,330,644
FL*	33,111,351	39,978,292	35,489,022	42,001,701	42,767,374

*FL East Coast only

Recreational Fisheries

As discussed for Unit 1, while recreational fishing typically does not generate revenue from landings (there may be revenue involved with the tourist/sport industry surrounding recreational fishing[7]), there is economic value associated with the catch recorded on these trips. The theoretically correct measure of the economic value derived from recreational fishing would be the willingness to pay for a fishing trip in Unit 2. The theoretically correct measure of consumer surplus derived from recreational fishing would be the willingness to pay for a recreational fishing trip minus the amount the individual actually paid to take the recreational fishing trip. Note that estimation of this WTP would involve specifying the relevant attributes of the trip, which likely include the diversity of species caught, the quantity of each species caught, whether or not the fishing trip was a "catch and eat" experience or a "catch and release" experience, and opportunities to view wildlife (marine life) while fishing. Values for recreational fishing are typically estimated indirectly through revealed preference methodology, which looks at expenditures in related markets, such as travel costs, or directly through stated preference methodology.

Total weight of recreational catch landed in the states of North Carolina, South Carolina, Georgia, and Florida during 2003-2007 combined are presented below in Table 5. Unlike commercial fisheries, it is generally assumed that most fish caught recreationally within Unit 2 are landed in a neighboring state. Because the available recreational catch data are for the entire state (and for the Atlantic coast of Florida) it is recognized that these records include fish caught outside Unit 2.[8] In this regard, the numbers in Table 5 most likely reflect an overestimate of the recreational catch from Unit 2, particularly for North Carolina and Florida. Table 6 provides total expenditure by marine recreational fisherman in 2008 for the states of North Carolina, South Carolina, Georgia, and Florida.

Table 5: Total Weight (lbs) of Recreational Catch 2003-2007 (All Ocean Combined) (NMFS 2010b).

State	2003	2004	2005	2006	2007
NC	6,604,420	6,532,728	9,100,119	7,834,435	9,986,485

[6] These data are available from NOAA NMFS Office of Science and Technology, Commercial Fisheries Statistics (https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/annual-landings/index). Data were queried on 21 September 2015.

[7] Recreational fishing includes all fishing deemed not to be commercial fishing including party and charter boats, shore casting, personal pleasure craft and all other forms of as long no sale of fish is involved.

[8] Unit 2 includes only small portions of North Carolina and Florida.

SC	942,361	1,347,078	966,662	1,114,450	2,291,026
GA	482,788	211,084	330,762	168,663	309,067
East FL	12,535,225	10,383,736	8,538,435	10,824,764	12,031,895
Total	**20,564,794**	**18,474,626**	**18,935,978**	**19,942,312**	**24,618,473**

Table 6: Total Marine Recreational Fishing Expenditures by State in 2008 (in thousands of nominal U.S. dollars) (https://www.st.nmfs.noaa.gov/apex/f?p=160:61, queried on September 28, 2015)).

State	Total Expenditure ($)
NC	1,842,315
SC	528,068
GA	292,049
East FL	4,817,384
Total	**7,479,816**

2.2 Additional Benefits of the Critical Habitat

Describing the benefits and values of the essential features is important to a complete impact analysis, given the focus of critical habitat designation on the avoidance of destruction or adverse modification of the habitat to promote recovery of the endangered North Atlantic right whale. Each federal agency's duty to insure its actions are not likely to destroy or adversely modify critical habitat by adversely affecting the essential features in Units 1 and 2 can have direct and indirect benefits to human society. These benefits derive from the services provided by these habitat features and the roles they play in the ecosystem. Because the essential features of the critical habitat designation already exist, the current services provided by these features are appropriately considered as part of the baseline. However, it is important to note that the designation may increase the probability that these features will persist into the future. These services are normally classified as public goods and not fully captured in commercial markets, but they can be a valuable resource for local communities and adjacent ecosystems.

Summary of Additional Benefits, Unit 1

In addition to the measures of commercial fishing, recreational fishing, and whale watching activities in Unit 1 discussed above, whose benefits flow at least in part from the existence of the essential features, other baseline benefits are provided by the essential features. While the benefits provided by these features should be included as part of the baseline, such benefits are challenging to articulate definitively, and cannot be quantified with available information. For Unit 1, both the habitat itself as it currently exists in the status quo scenario, as well as the copepod population currently supported, may provide significant benefits, including use of the critical habitat itself for recreational or educational purposes. These benefits may include the study of the copepod population, and the role of copepod populations role in preserving trophic food chain and overall ecosystem stability. As noted, copepods, *Calanus finmarchicus*, are a keystone species in the GoM/Georges Bank ecosystem, serving as a principal prey item of numerous species of fish and marine mammals including the North Atlantic right whale. There may be significant non-use values, such as existence and bequest values, for the critical habitat and its copepod population. However, at this time, we do not have any quantitative measures of the potential baseline benefits. Subsequently, we cannot provide a theoretically valid quantitative

measure of the total baseline benefits associated with the critical habitat in Unit 1. Nonetheless, we believe these baseline benefits do exist, and we have therefore described them qualitatively and provided some quantitative measures associated with activities in Unit 1, recognizing that these measures are not theoretically correct measures of the total economic value of Unit 1.

Summary of Additional Benefits, Unit 2

Baseline benefits of Unit 2 include commercial fishing and recreational fishing activities, as discussed above. Additional baseline benefits provided by the essential features are more challenging to quantify. Unit 2 may also provide non-consumptive use benefits, such as recreational or educational activities. Additional non-use benefits (such as existence and bequest values) also may be significant related to the critical habitat's support of right whale birthing and rearing of calves. However, at this time, we do not have any quantitative measures of these baseline benefits associated with the essential features contained within Unit 2. Nonetheless, we believe these essential features provide economic benefit to the area, and we therefore describe them qualitatively and provide some quantitative measures associated with activities occurring within Unit 2. We recognize that these measures are incomplete in assessing the total economic value of Unit 2 under the baseline scenario.

2.3 Existing Laws and Regulations that May Protect the Critical Habitat Features

We next evaluated existing laws and regulations to determine the existing protections of the essential features identified for the North Atlantic right whale. Numerous existing federal and state laws and regulations directly and indirectly protect the North Atlantic right whale and the physical and biological features essential for the conservation of the species. In order to determine the incremental impact of designating critical habitat, we analyzed the overlap between the requirements of existing laws and the protections provided to the essential features of critical habitat: the greater the overlap, the less the incremental cost of the critical habitat designation. As discussed below, federal agencies implementing existing laws routinely perform, or require through issuance of permits, conservation efforts to protect right whales that may also protect the essential features of the critical habitat.

2.2.1 Federal Laws

Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.)

Currently, marine habitats that support the North Atlantic right whale receive some level of protection through the Section 7 consultation for the listed species. We routinely evaluate impacts to habitat during ESA section 7 consultations to determine whether an action may result in "harm," which is defined by the ESA as a type of "take." Habitat impacts will constitute "harm" to the species when the impacts are expected to result in actual injury or death of a right whale by, among other things, "impairing essential behavioral patterns," such as feeding, breeding, or rearing young (50 CFR §222.102). In the absence of designated critical habitat, habitat impacts would be addressed through Section 7 to determine whether the impacts are likely to result in take of whales and if so, whether the impacts are likely to jeopardize the continued existence of the species by appreciably reducing its likelihood of both survival and

recovery in the wild (50 CFR §402.02). Lesser impacts to habitat that constitute incidental take of the species could be minimized through RPMs identified in biological opinions. In contrast, essential features identified in critical habitat designations are protected specifically from destruction or adverse modification through the Section 7 consultation, based on the effects on the habitat's ability to conserve the listed species. There are no other designated critical habitat areas for listed species under NMFS' jurisdiction that overlap with the designated critical habitat for the North Atlantic right whale. NMFS recently designated critical habitat for the Northwest Atlantic Ocean DPS of loggerhead sea turtles (79 FR 39855, July 10, 2014). Units of migratory habitat, winter habitat, and nearshore reproductive habitat overlap Unit 2 for right whale calving. The essential features for these loggerhead habitats include waters sufficiently free of obstructions to allow turtle transit through the surf zone and outward toward open water; waters with minimal manmade structures that could promote predators (i.e., nearshore predator concentration caused by submerged and emergent offshore structures, disrupt wave patters; water temperatures above 10°C during the colder months of November through April; and water depths between 20 and 100 meters. Thus, protection of loggerhead critical habitat could provide some protection to identified essential features of right whale critical habitat.

The additional benefits of designating critical habitat will ensure the essential features will continue to provide ecological function for the conservation of the North Atlantic right whale. In addition to the habitat protections provided by the ESA, the following laws also generally provide natural resource protection relevant to right whale habitat and right whales directly.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) established a moratorium on the taking of marine mammals in U.S. waters. It defines "take" to mean "to hunt harass, capture, or kill" any marine mammal or attempt to do so. Additionally, it is stated that "[i]n particular, efforts should be made to protect essential habitats, including the rookeries, mating grounds, and areas of similar significance for each species of marine mammal from the adverse effect of man's actions" (Findings and Declaration of Policy; 16 U.S.C. 1361). Therefore, the MMPA requires the development of conservation plans for marine mammal species designated as "depleted" with each plan having "the purpose of conserving and restoring the species or stock to its optimum sustainable population. The Secretary shall model such plans on recovery plans required under section 4(f) of the Endangered Species Act of 1973 (16 U.S.C. 1533(f))". Recovery plans under the ESA often include provisions for protecting key habitats, such as those necessary for feeding, breeding, rearing, or nursing. Conservation plans serve as guidance for reasonable actions that the best available science indicates are required to recover and/or protect marine mammal species designated as depleted.

Magnuson-Stevens Fishery Management and Conservation Act (MSA): Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act strengthened the ability of NMFS and the Regional Fishery Management Councils to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. Every fishery management plan developed under the MSA is required to describe and identify essential fish habitat (EFH) for the covered fishery, and to minimize to the extent practicable

adverse effects on such habitat caused by fishing (16 U.S.C. §1853(a)(7)). The MSA defines essential fish habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (16 U.S.C. §1802(10)). The MSA establishes a consultation process designed to protect EFH. The MSA requires all federal agencies to consult with NMFS regarding actions they authorize, fund, or undertake, or propose to authorize, fund or undertake, that may adversely affect EFH. NMFS recommends measures the agency can take to conserve EFH, and the federal agency must respond in writing describing measures the agency proposes to avoid, mitigate or offset the adverse impacts on EFH, or explain its reasons for proposing to proceed inconsistently with NMFS' recommendations (16 U.S.C. §1855(b)). These recommendations may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from actions or proposed actions authorized, funded, or undertaken by that agency.

Unit 1: Northeastern Foraging Habitat

Both the New England and Mid-Atlantic Fishery Management regions have fishery management plans (FMPs) for the geographic area encompassed by Unit 1. Fifty-nine species protected by 14 FMPs encompass the entirety of Unit 1. The essential features for right whale foraging are not specifically identified as EFH in any FMP. Therefore, while some of the conservation measures recommended to protect EFH for managed species in Unit 1 may have some indirect benefit to the essential features of right whale foraging habitat, none are directly intended to protect these features.

Unit 2: Southeastern Calving Habitat

The habitat areas outside of state waters in southeast Unit 2 used by right whales for calving are managed for fishing interests by the South Atlantic Fishery Management Council (SAFMC) and EFH has been identified for a total of 88 species covered by 8 FMPs. EFH designations for various federally managed species encompass the entirety of Unit 2; however, the essential features for right whale calving are not specifically covered by any of these EFH designations (e.g., marine/offshore pelagic habitat). Therefore, the essential features of Unit 2 do not necessarily directly benefit from the basic level of protection under the Magnuson-Stevens Act requirement to minimize impacts to EFH resources.

Clean Water Act

The Clean Water Act (CWA) establishes a comprehensive federal framework for improving and maintaining surface water quality by regulating discharges of pollutants into the waters of the United States, including the territorial sea, and all navigable waters used presently or in the past for interstate or foreign commerce, and subject to the ebb and flow of the tide. The potential impact of pollution on right whales is unknown. There is currently no evidence for significant contaminant-related problems in baleen whales (O'Shea and Brownell 1994). The existing data support the view that the lower trophic levels at which right whales feed should result in lower levels of contaminant accumulation than would be expected in many odontocetes, which typically show concentrations that differ from those of baleen whales by an order of magnitude (O'Shea and Brownell 1994). Sewage and industrial effluent are sources of nutrients that may

adversely affect the features essential for the conservation of the species. Again, increased nutrient input from point and non-point discharges may alter the phytoplankton community structure, enhancing nuisance and/or less desirable forage species that result in decreased productivity and/or changes in the distribution/abundance (especially changes to high density patches) of *C. finmarchicus* populations that are essential to the conservation of the species.

National Pollution Discharge Elimination System permits (NPDES) issued under section 402 of the CWA are required for all discharges to surface waters of the United States from point sources such as municipal wastewater plants and industrial facilities, including facilities on the outer continental shelf such as oil drilling platforms. NPDES permits contain numeric limits on specific pollutants and are an integral part of the CWA's strategy for achieving water quality. EPA authorizes states to implement NPDES permitting programs based on specific criteria. EPA retains oversight of state permitting activities, including the ability to object to issuance of particular permits and to issue substitute permits. EPA acts as the NPDES permitting authority for point sources in states that do not have approved programs. The States of Maine, North Carolina, South Carolina, Georgia, and Florida have fully approved NPDES permitting programs, whereas Massachusetts and New Hampshire do not.

Section 303 of the CWA requires states and tribes to develop and adopt water quality standards that meet the broad goals of the CWA for individual water bodies under their jurisdictions. All applicable standards must be at least as stringent as those recommended by the EPA; however, states may choose to make standards more stringent. The Environmental Protection Agency (EPA) must approve state or tribal water quality standards, or promulgate substitute standards. Water quality standards protect designated uses of water bodies, such as drinking water supply, recreational use, or aquatic life. Water quality criteria may also be established, which are pollutant-specific limits, or descriptions of conditions of a water body, necessary to achieve or maintain designated uses. EPA publishes recommended water quality criteria for specific designated uses; states and tribes must adopt corresponding criteria that are at least as protective as EPA's recommendations. States and tribes are required to monitor and report on the conditions of their water bodies; those not meeting established water quality standards due to pollutants are termed "impaired waters." Under the CWA, nutrients, among other things, are considered a pollutant. States are required to develop strategies to meet established water quality standards for their impaired waters by, among other things, developing Total Maximum Daily Loads (TMDLs) for pollutants that EPA must approve. In federal waters, those standards promulgated by EPA will apply.

The CWA does not establish direct federal regulatory authority over nonpoint sources of pollution, though nonpoint source discharges are the most significant sources of pollution overall in the United States. Nonpoint sources can include atmospheric deposition of pollutants into water bodies and commonly includes sediments and nutrients. Under section 319 of the CWA, EPA can provide federal grants to states with EPA-approved nonpoint source pollution management programs. Finally, section 401 of the Act requires that federal agencies issuing permits or licenses under certain provisions of the CWA obtain state certification that the activity will not cause or contribute to violation of the relevant state water quality standards for the water body at issue. Section 401 applies to NPDES permits issued by EPA and to section 404 permits issued by the USACE.

The CWA provides indirect protection to the essential features of both Units 1 and 2. In Unit 1 the essential foraging features, specifically dense aggregations of late-stage *C. finmarchicus* and diapausing copepods in deep ocean basins, are protected from outfall effluent that may change the phytoplankton community structure, enhancing nuisance and/or less desirable forage species that result in decreased productivity and/or changes in the distribution/densities (especially changes to high density patches) of *C. finmarchicus* populations. The CWA also provides potential protection to the essential temperature feature for calving right whales in Unit 2 by restricting thermal loads that may change the water temperature from the preferred temperature range for calving female right whales.

Rivers and Harbors Act

The Rivers and Harbor Act (RHA) provides some protection against possible adverse effects on the essential features in Unit 1 due to inadvertent shipping accidents, including vessel groundings, that might result in discharges of oil or other pollutants. Under the RHA the USCG establishes and operates aids to maritime navigation, including aids to assist vessels from running aground. In addition, the U.S. Army Corps of Engineers (USACE) issues permits for construction of structures in or affecting navigable waters of the United States. Several aids to prevent ship groundings are maintained and operated within both Unit 1 and Unit 2 of the designation. The RHA provides some protection against physical destruction of natural resources; however, individual essential features for both units of right whale critical habitat are not specifically protected. Limited protection is afforded under the RHA to the essential features under the public interest test of the Act, which requires the USACE to consider the adverse impacts to listed species and their critical habitats.

National Marine Sanctuaries, and National Parks, Monuments, and Wildlife Refuges

The National Marine Sanctuaries Act (16 USC §§ 1431 et seq.) authorizes the Secretary of Commerce to designate any discrete area as a national marine sanctuary and promulgate regulations implementing the designation (16 USC §1433). NOAA National Ocean Service (NOS) manages and protects the Sanctuaries for their habitats, ecological value, threatened and endangered species, and historic, archeological, recreational and aesthetic resources.

Unit 1: Northeastern Foraging Habitat

Stellwagen Bank National Marine Sanctuary was established in 1992 to "conserve, protect and enhance the biological diversity, ecological integrity and cultural legacy of the sanctuary while facilitating compatible use." Sanctuary resources are protected under various federal regulations and guidelines. In June 2010, the Sanctuary published a final Sanctuary Management Plan. The Sanctuary Management Plan serves as a non-regulatory policy framework for addressing the issues facing the Sanctuary over the next five years. The Sanctuary Management Plan provides the foundation for restoring and protecting the Sanctuary's ecosystem; details the human pressures that threaten the qualities and resources of the Sanctuary; and recommends actions that should be taken to better manage the area and resources. While not specifically identified in the Plan, the essential foraging features are provided some measure of protection by the Sanctuary

Management Plan framework that outlines the activities that are allowed or prohibited to manage potentially harmful activities in the Sanctuary.

Unit 2: Southeastern Calving Habitat

Gray's Reef National Marine Sanctuary off the coast of Georgia is one of the largest near-shore "live-bottom" reefs of the southeastern United States. Within the approximately 22 square mile sanctuary (about 14,000 acres) the following activities are prohibited: alteration of the seabed; use of wire fish traps, bottom trawls, and explosives; damage to or removal of bottom formations and other natural or cultural resources; and discharge of substances or materials. Regulations also prohibit the taking of any invertebrates including lobsters, forbid anchoring in the sanctuary and control the types of fishing gear that may be used in the Sanctuary. While not specifically identified in the plan, protection to individual essential features may be afforded through the Sanctuary's prohibitions on dredging, drilling, construction, and use of underwater explosives.

2.2.2 State Laws and Regulations

States adjacent to the critical habitat units have jurisdiction over waters extending from the shoreline out to 3 nautical miles (approx. 6 km or 3.5 statute miles). These protections extend into Unit 1 through the laws of Massachusetts, New Hampshire, and Maine. Each of these states has adopted laws and regulations to protect living marine resources, including the essential right whale foraging features. These measures include various permit requirements intended to avoid or minimize individual and cumulative impacts to marine waters. For example, under section 401 of the Clean Water Act, each state administers a 401 Water Quality Certification Program. The 401 review ensures that an activity that can result in the discharge of pollutants complies with state Water Quality Standards.

States adjacent to Unit 2 (North Carolina, South Carolina, Georgia, and Florida) also have laws and regulations for the protection of marine resources, including the habitat of the North Atlantic right whale as state boundaries extend to approximately 30 nm (approx. 56 km or 35 statute miles) offshore. Aside from water quality standards and other programs to control or reduce point- and non-point source pollution in state waters, none of the states bordering Unit 2 have laws or regulations specific to the protection of the right whale critical habitat essential features.

3. ECONOMIC IMPACTS

The following section identifies economic impacts that may result from the critical habitat designation. As discussed above, economic impacts result primarily through implementation of ESA section 7 consultations with federal agencies to ensure that their proposed actions are not likely to destroy or adversely modify designated critical habitat. The impacts resulting from consultations are the focus of this section. Both positive and negative impacts[9] are identified

[9] As noted, consideration of economic impacts can include both positive and negative (Home Builders Ass'n of No. Calif. et al., v. USFWS, 2006 U.S. Dist. LEXIS 80255 at 45-46 (E.D. Cal., Nov. 1, 2006)).

(these terms are used interchangeably with benefits and costs, respectively). Impacts are evaluated in quantitative terms where feasible, but qualitative appraisals are used where that is more appropriate to particular impacts based on data availability. The impacts discussed in this section are primarily economic costs (negative impacts) of consultation; though some discussion of the environmental benefits of implementing project modifications through the section 7 consultation process is included, conservation benefits of consultation, including economic benefits of conservation, are discussed under Other Relevant Impacts below.

We consider each unit in total as a particular area for this analysis. The ESA does not define what "particular areas" means in the context of section 4(b)(2), or the relationship of particular areas to "specific areas" that meet the statute's definition of critical habitat. Because there is no biological basis to subdivide the specific areas on which are found the essential features characteristic of right whale foraging and calving habitat into smaller units, the entire two areas were treated as separate "particular areas" for the initial consideration of impacts of designation.

We begin with a brief overview of relevant court rulings and other important guidance regarding methods for economic impact analyses.

3.1 Economic Impact Analysis –Incremental (Baseline) Method

As discussed previously (in Section 1.4), the joint NMFS-FWS regulations at 50 CFR 424.19 direct us to conduct an "incremental analysis" by considering the probable economic impacts with and without the designation and to describe the impacts either qualitatively or quantitatively. Thus, the goal of our impacts analysis was to examine the state of the world with and without the designation of critical habitat for the North Atlantic right whale. The "without critical habitat" scenario represents the baseline for the analysis, considering habitat protections already afforded North Atlantic right whales under its Federal listing and under other Federal, State, and local regulations.

Additional Guidance

Other cases and federal government guidance are relevant to the analysis of economic impacts resulting from critical habitat designations. For example, the Statement of Regulatory Philosophy and Principles in E.O. 12866, Regulatory Planning and Review, states in part:

> *"In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider."*

E.O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." E.O. 12866 defines "significant regulatory action" as an action that is likely to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

OMB Circular A-4 (2003) provides additional explanation:

> *"Benefit-cost analysis is a primary tool used for regulatory analysis. Where all benefits and costs can be quantified and expressed in monetary units, benefit-cost analysis provides decision makers with a clear indication of the most efficient alternative, that is, the alternative that generates the largest net benefits to society…"*
>
> *"It will not always be possible to express in monetary units all of the important benefits and costs. When it is not, the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate. In such cases, you should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis."*
>
> *"A complete regulatory analysis includes a discussion of non-quantified as well as quantified benefits and costs…When there are important non-monetary values at stake, you should also identify them in your analysis so policymakers can compare them with the monetary benefits and costs."*

Cases reviewing critical habitat impacts analyses have applied principles similar to those of the OMB guidance, for example: all important costs and benefits should be included in an impacts analysis (See, e.g., Center for Biological Diversity v. Bureau of Land Management, 422 F. Supp. 2d 1155, 1153 (N.D. Cal. 2006) (FWS' impacts analysis was improperly unbalanced in ignoring available data in the record regarding economic benefits of designation)); and important impacts that can only be evaluated in non-monetary metrics can be included in the analysis (See, e.g., Home Builders Ass'n of No. Calif. et al, 2006 U.S. Dist. LEXIS 80255 (E.D. Cal., Nov. 1, 2006) (FWS properly determined that monetizing the benefits of designation was infeasible and that benefits were best expressed in biological terms)).

3.2 Section 7 Impacts

The ESA requires that federal agencies consult with NMFS on proposed actions that "may affect" designated critical habitat. Through the consultation process, NMFS suggests modifications to the proposed actions as necessary to avoid destroying or adversely modifying critical habitat. As previously discussed, consultations may result in economic impacts to federal agencies and proponents of proposed actions. There are five possible scenarios:

(1) Proposed action would have no effect on listed species, but would likely affect the essential features of critical habitat – cost of consultation "wholly incremental"
(2) Proposed action more likely to affect essential features than affect the listed species—costs of consultation "incremental"
(3) Proposed action equally likely to affect listed species and essential features—costs of consultation considered "co-extensive"
(4) Proposed action more likely to affect listed species than affect essential features—costs of consultation not considered incremental
(5) Proposed action likely to affect listed species, but not likely to affect essential features—costs are not considered incremental

Of these scenarios, (1) and (2) would result in additional costs attributable to the designation of critical habitat. In the case of (3), where a proposed action is equally likely to affect listed species and essential features of critical habitat, the consultation would be required regardless of the critical habitat designation. However, incorporating consideration of potential critical habitat features into these consultations would result in an increase in workload, which has associated incremental costs. Our analysis of the relevant federal actions demonstrated that a consultation on any project that has the potential to affect both the species and the features is not likely to recommend unique project modifications to specifically address the features, as discussed below; therefore there are no incremental project modification costs for activities in category (3). Scenarios (4) and (5) also result in consultations that would be required regardless of the critical habitat designation and would not result in any incremental costs. In our analysis below, we did not identify any potential future federal actions that would only affect essential features of critical habitat and not the listed species. Therefore, we found no wholly incremental impacts that may result from the designation of critical right whale habitat in Units 1 and 2.

Overview of Section 7 Consultation Process

Section 7(a)(2) of the ESA requires federal agencies (action agencies) to consult with NMFS whenever activities they fund, authorize, or carry out may affect a listed species or designated critical habitat. In some cases, consultations will involve only NMFS and another federal agency, such as the USACE. Often consultations will also include a third party involved in projects with a federal nexus, such as private applicants conducting activities that require a federal permit, or public or private entities receiving federal funding.

During section 7 consultation, NMFS, the action agency, and, if applicable, the private permittee or grantee, communicate in an effort to minimize potential adverse effects on the species and/or critical habitat. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species affected, the activity and methods proposed, the potential effects to the species and designated critical habitat and the parties involved. If an action agency determines that an activity "may affect" the listed species or its habitat, then one of two types of section 7 consultations may occur: informal or formal consultation.

Informal Consultation:

The informal consultation process is designed to identify and avoid potential adverse impacts at an early stage in the planning process. Informal consultations (1) identify adverse effects and suggest ways to avoid them, (2) resolve project conflicts or differences of opinion between the Services and the action agency or applicant as to the nature and extent of adverse effects, (3) provide the action agency with opportunities for carrying out conservation activities pursuant to section 7(a)(1), and (4) help monitor cumulative effects on a species or ecosystem. No formal consultation is required if the action agency finds, with the Services written concurrence that the proposed action "may affect, but is not likely to adversely affect" listed species or critical habitat. This finding can be made only if all of the reasonably expected effects of the proposed action will be beneficial, insignificant, or discountable. The action agency must request concurrence, in writing, from the Service for this finding.

Formal Consultation:

A formal consultation is required if the action agency or NMFS determines that a proposed action is likely to adversely affect a listed species or designated critical habitat. Formal consultations determine whether a proposed agency action is likely to jeopardize the continued existence of a listed species (jeopardy) or destroy or adversely modify critical habitat (adverse modification), through a biological opinion. Opinions determine the amount or extent of anticipated incidental take expected to result from an action determined not likely to jeopardize listed species.

Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants. The costs of both formal and informal consultations are important components of the economic impacts. The section 7 consultation process may also result in modifications to a proposed project either during informal consultation, prior to entering the formal consultation process, or during the course of the formal consultation process. Project modifications implemented prior to the formal consultation process, through mutual agreement between NMFS and the action agency regarding appropriate conservation measures, may achieve harm avoidance and preclude the need for entering the formal consultation process.

Alternatively, as part of the formal consultation process, project modifications agreed upon by the action agency and the applicant may be included in the project descriptions as harm avoidance measures, or may be included in NMFS' biological opinion on the proposed action as RPMs to reduce the impact of take of the species. NMFS' consultation regulations specify that RPMs, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration and timing of the action and may only involve minor changes (50 CFR § 402.14(i)(2)).

In cases where NMFS determines that a project or activity is likely to jeopardize the continued existence of the species and/or destroy or adversely modify its designated critical habitat, NMFS' biological opinion will include RPAs to the proposed project that avoid jeopardy of the listed species or the destruction or adverse modification of designated critical habitat. By definition, RPAs must be consistent with the intended purpose of the action and capable of being

implemented consistent with the action agency's legal authority and jurisdiction, and be economically and technologically feasible (50 CFR §402.02). All of these project modifications have the potential to impose some direct costs to the action agency and/or the applicant.

Consultation Impacts for North Atlantic Right Whale Critical Habitat

Designation of critical habitat for the North Atlantic right whale could potentially trigger consultation costs in three circumstances:

(1) A new consultation is necessary to address both the listed species and the designated critical habitat,;
(2) A new consultation is required solely because of the critical habitat designation; or
(3) An existing consultation must be re-initiated to include the designated critical habitat.

The analysis of whether the critical habitat designation results in incremental costs involves two steps:

Step 1: Identify action agencies and types of activities that may have direct or indirect effects in the critical habitat areas (If there is "no effect" on the essential features, then consultation is not required, and the activity would not incur any incremental costs; such activities, therefore, do not enter into this impact analysis).

Step 2: Determine whether a proposed action affects or is likely to affect primarily the listed species, primarily the essential features of critical habitat, or both equally. If the proposed action affects primarily listed right whales or affects both listed right whales and essential features equally, the project modification costs are not attributable to the critical habitat designation, and are considered co-extensive. In such cases, only administrative costs associated with conducting the consultation on the critical habitat would be included in our impacts analysis. On the other, if the proposed action affects primarily the essential features, both the administrative and project modification costs would be attributable to the critical habitat designation and would be considered incremental impacts of the designation.

3.2.1 Activities that May Trigger Consultation

The first step in this part of the analysis was to identify the types of federal activities that may have direct or indirect effects on the essential features in the critical habitat units. As part of this analysis, a query of NMFS's Public Consultation Tracking System (PCTS) was conducted to identify past activities requiring ESA section 7 consultations that occurred within or have the potential to impact the essential features within Units 1 and 2. This technique has been used in previous evaluations of critical habitat designations to produce a reasonable estimation of future federal actions that may require section 7 consultation. The PCTS database contains information dating from 1997 to present. We limited our retrospective analysis and predictions of future

activities that may affect the essential features to a 10-year time horizon due to difficulty in estimating activities and costs beyond these timeframes. Our database extrapolation was limited to the geographic area of the critical habitat units (i.e., the GoM/Georges Bank region, and portions of the SAB).

There is an extensive consultation history for the geographic areas comprising critical habitat Units 1 and 2. The PCTS database differentially documented informal and formal consultations up to 2006, resulting in different timespans of data for evaluation by consultation type. As a result, in order to estimate the number and type of consultations expected in the next 10 years consistently across the critical habitat areas, we examined 10 years of PCTS data for formal consultations and 3 ½ years for Unit 1 and 4 years for Unit 2 for informal consultations. The numbers for informal consultations were then scaled up to 10 years. Only consultations with the status of "complete" were considered. The location of the action area for each consultation was geo-referenced to determine whether or not the activity and/or the impact occurred in the geographic areas being designated as critical habitat. This analysis provided a comprehensive list of the number and category of activities that had occurred previously in the area on which are found the essential features. Subsequent to the initial analysis, we also evaluated whether new or novel types of activities occurred up to 2013 that were not captured in the initial analysis, to ensure we have fully considered all potential types of future federal activities and their possible impacts to the essential features. With the exception of the relicensing of two nuclear power plants[10], we did not identify any additional categories of federal actions. As the result of public comments on the February 20, 2015 proposed rule to revise right whale critical habitat in the north Atlantic (80 FR 9314), we implemented a second search for sand extraction permitting activities on the Outer Continental Shelf and federal activities that may have direct or indirect effects on the essential features in Unit 2 from Daytona, Florida to just south of Melbourne (the area retained from the 1994-designated critical habitat, but not analyzed as part of the proposed rule).

In addition to the query of the PCTS database, we also contacted federal agencies to determine whether there are any new categories of activities that might not be reflected in the consultation history, but which are anticipated in the next 10 years. Based on these inquiries there were no new categories identified beyond those already reflected in the PCTS analysis. While not specifically identified by the action agencies as *likely* to occur, we identified five categories of

---

[10] On May 17, 2012, we concluded an informal consultation with the Nuclear Regulatory Commission (NRC) on the relicensing of the Pilgrim Nuclear Power Plant Station (PNPPS) located in Plymouth Massachusetts. The consultation concluded that the relicensing and continued operation of the PNPPS was not likely to adversely affect any NMFS-listed species and would have no effect on right whale critical habitat. The operations permit authorizes an additional 20 years of operation of the PNPPS until June 2032 at which point it has to be decommissioned.

On October 10, 2012, we completed an informal consultation with NRC, on the proposed relicensing of the Seabrook Nuclear Power Station (SBNPS) located in Seabrook, New Hampshire. We concurred with the NRC's determination that the continued operation of the SBNPS is not likely to adversely affect any listed species including the North Atlantic right whale. We stated that, based on our review of the best available information, that any effect on the zooplankton population, including the copepod, *C. finmarchicus* is extremely unlikely and therefore any effect to foraging right whales is extremely unlikely. NRC has not made a licensing decision yet, but if they do issue a renewed operating license for the SBNPS it would authorize 20 years of operation beyond the existing expiration (until March 15, 2050)

activities that have not occurred in the past but could occur in the future based on publicly available planning documents and analyses, and which would have the potential to affect the essential features. These are identified and discussed below.

3.2.1.1 Categories of Past Federal Activities that May Recur in Critical Habitat

To summarize our analysis, we first queried PCTS and contacted federal agencies to identify the activities that may have effects in Units 1 and 2 (Tables 7-10). We then identified which of these categories of activities "may affect" the essential features (and which features). The next step of our analysis focused on whether an activity would primarily affect the species, the essential features of the critical habitat, or both equally. If the proposed actions affect primarily listed whales or affect both listed whales and essential features equally, the administrative and project modification costs are not attributable solely to critical habitat designation. In these circumstances, the added administrative costs associated with addressing critical habitat were considered incremental impacts of the designation. However, as discussed in more detail in the descriptions of each future federal action below, there would be no incremental project modification costs for consultations with co-extensive impacts, because the projects were not considered likely to require unique project modifications to specifically address impacts to the features. If instead the proposed actions affect primarily the essential features, the actions were considered to require specific modifications to avoid effects on the essential features. In these cases, the administrative and project modification costs were considered attributable to the critical habitat designation and thus were treated as incremental impacts of the designation.

We gathered information following the methodology outlined above and have presented it in Tables 7-10. The information is arranged according to whether the activities required formal or informal consultation in the past, due to effects to right whales or other listed species in the action area.

Of the types of past consultations that "may affect" some or all of the essential features in either unit, we determined that no activities would solely affect the essential features. That is, all categories of the activities identified would also require consultation for potential impacts to the listed species.

Ten different federal entities implemented or approved different categories of activities in the areas covered by Units 1 and 2 that required consultations in the past. Six categories of activities implemented by four federal entities were identified as having the potential to affect the essential features:

1. Water Quality/NPDES (Unit 1);
2. Oil Spill Response (Unit 1);
3. Dredging and Spoil Disposal (Unit 2);
4. Marine Construction Permitting; including Restoration and Artificial Reef Placement (Unit 2);
5. Energy – LNG (Unit 1); and
6. Sand Extraction, Outer Continental Shelf (Unit 2)

Two categories of activities, one under EPA's jurisdiction, and one under the USCG's authority were determined as likely to require project modifications to address adverse modification of the critical habitat. These activities are (1) Water Quality/NPDES and (2) Oil Spill Response.

The numbers of consultations in the tables below are projected over a 10-year period based on the numbers in the PCTS database.

Table 7: Past Formal Consultations on Activities that May Recur in Critical Habitat Unit 1 over a 10-Year Period.

Category	Agency	Total # of Consultations	May Affect Critical Habitat	May Affect the Species	More likely to affect critical habitat than the species
Fishery Management	NMFS	19	--	19	
Research	NMFS	25	--	25	
Water Quality/NPDES	EPA	1	1	1	1
Military Operations	DOD (Navy)	1	--	1	
Beach Nourishment	USACE	3		3	
Energy – LNG	Maritime Administration	3	3	3	
Total Number of Formal Consultations for Unit 1		**52**	**4**	**52**	**1**

Table 8: Past Formal Consultations on Activities that May Recur in Critical Habitat Unit 2 over a 10-Year Period.

Category	Agency	Total # of Consultations	May Affect Critical Habitat	May Affect the Species	More likely to affect critical habitat than the species
Dredging	USACE	6	6	6	
	DOD	1	1	1	
Construction permitting	USACE	2	2	2	
Sand Extraction/OCS	BOEM	1	1	1	
Fisheries Management	NMFS	9	--	9	
Research[11]	NMFS	2	--	2	
	DOD (USAF)	1	--	1	
Military Operations	NASA	1	--	1	
	DOD (Navy; USAF)	3	--	3	
Transportation – Ship / Vessel / Aircraft Operation	DOD (Navy)	2	--	2	
Total Number of Formal Consultations for Unit 2		**28**	**10**	**28**	**0**

[11] NMFS conducts research and issues permits for various research activities. NMFS also issues grants for fisheries research, and authorizes experimental fishing activities.

Table 9: Past Informal Consultations on Activities that May Recur in Critical Habitat Unit 1 over a 10-Year Period.

Category	Agency	Total # of Consultations Over 3 ½ Years	Total # of Consultations Over 10 Years[12]	May Affect Critical Habitat	May Affect the Species	More likely to affect critical habitat than the species
Fisheries Management	NMFS	101	289	--	289	
Research[13]	NMFS	37	106	--	106	
Permit / Monitoring	NOS	2	6	--	6	
Water Quality – NPDES	EPA	7	20	20	20	20
Military Operations	DOD (Navy)	4	11	--	11	--
Dredging and Disposal	USACE	4	11	--	11	--
Oil Spill Response	USCG	2	6	6	6	6
Total Number of Informal Consultations for Unit 1		**157**	**449**	**26**	**449**	**26**

Table 10: Past Informal Consultations on Activities that May Recur in Critical Habitat Unit 2 over a 10-Year Period.

Category	Agency	Total # of Consultations Over 4 Years	Total # of Consultations Over 10 Years	May Affect Critical Habitat	May Affect the Species	More likely to affect critical habitat than the species
Dredging	USACE	15	38	38	38	
Construction permitting[14]	USACE	40	101	101	101	
	USAF	1	3	3	3	
Sand Extraction/OCS	BOEM	1	3	3	3	
Beach Nourishment	USACE	1	3	3	3	
Fisheries Management	NMFS	5	13	--	13	
Research[15]	NMFS	6	18	--	18	
Transportation – Ship / Vessel / Aircraft Operation	DOD (Navy)	1	3	--	3	
Ocean –Geotechnical Survey	NOAA	5	13	--	13	
	USACE	1	3	--	3	
Total Number of Informal Consultations for Unit 2		**77**	**173**	**148**	**200**	**0**

12 Partial values were rounded up to the nearest whole number.

13 NMFS conducts research and issues permits for various research activities. NMFS also issues grants for fisheries research, and authorizes experimental fishing activities.

14 "Construction permitting" includes projects classified as "Waterway – Boat/Dock/Pier" and "Restoration and Artificial Reef Placement" in PCTS.

15 NMFS conducts research and issues permits for various research activities. NMFS also issues grants for fisheries research, and authorizes experimental fishing activities.

Below we discuss in detail how we determined whether a category of activity that may recur in the critical habitat units in the future would in the first instance have no effect on critical habitat features, or has the potential to affect ("may affect") critical habitat. Then we explain how we determined whether a category of activity that may affect critical habitat would primarily affect the species or the essential features of the critical habitat.

We note that the conclusions below are predictions based on past experience and projects, and may not be applicable to future specific projects. Future consultations will consider the specific scope and nature of federal activities and their potential to adversely affect the essential features.

3.2.1.1.1 U.S. Army Corps of Engineers (USACE)

The USACE is responsible for granting permits for activities in navigable waterways, including federal waters of the Atlantic Ocean, under section 404 of the CWA and section 10 of the RHA. The USACE civil works divisions also undertake projects to maintain navigation channels and water infrastructure, conduct environmental restoration, and maintain flood control. The types of activities that are expected to be the subject of consultation with the USACE are:

(1) Dredging and dredge spoil disposal (Units 1 and 2)
(2) Construction projects (Units 1 and 2)
(3) Restoration and artificial reef placement (Unit 2)
(4) Beach Nourishment (Unit 2)

Based on historical data, we anticipate 146 consultations over the next 10 years with the USACE on activities conducted in the right whale critical habitat areas. In Unit 1, the types of activities that are expected to be the subject of consultation with the USACE are: maintenance dredging and dredge spoil disposal and dredging of sand for beach nourishment projects. In Unit 2, the categories of activities that are expected to be the subject of future consultations with the USACE are dredging and dredge spoil disposal, construction permitting[16] and beach nourishment projects. Below we explain our judgment that none of these consultations will result in incremental impacts that are attributable to the critical habitat designation beyond administrative costs of conducting consultations.

3.2.1.1.1.1 Dredging and Dredge Spoil Disposal

Dredging is the removal of material from the bottom of water bodies, and is most commonly done to create, deepen, widen, or maintain navigation channels, anchorages, or berthing areas. Dredging may also involve the disposal of dredged material into a marine environment at an offshore dredged material disposal site (ODMDS). Each site is managed under a required dredged material monitoring and management plan that assesses the health and well-being of the site and surrounding environment (USEPA 2004). The USACE periodically uses 17 ODMDSs that are located within the boundaries of the critical habitat designation. In Unit 1, these are: 1. Massachusetts Bay- Active (first used 1976; last used 2013); 2. Cape Arundel- Inactive (first

[16] As noted, construction permitting includes projects classified as waterway – boat/dock/pier and restoration and artificial reef placement in PCTS.

used 1976; last used 2009); 3. Portland- Active (first used 1979; last used 2013); and 4. St. Helena Island- Inactive (first used 1977; last used 1984). In Unit 2, the ODMDSs are: 1. Wilmington- Active (first used 1978; last used 2008); 2. Wilmington Harbor- Inactive (first used 1976; last used 1992); 3. New Wilmington- Active (first used 2002; last used 2013); 4. Georgetown Harbor- Active (first used 1976; last used 2006); 5. Charleston- Active (first used 1976; last used 2013); 6. Port Royal Harbor, North- Inactive (first used 1976; last used 1995); 7. Port Royal Harbor, South- Inactive (first used 1977; last used 1998); 8. Port Royal- Active (first used 1999; last used 1999); 9. Savannah- Active (first used 1976; last used 2013); 10. Brunswick Harbor- Active (first used 1976; last used 2013); 11. Fernandina Beach- Active (first used 1976; last used 2013); 12. Jacksonville- Active (first used 1976; last used 2013); and 13. St. Augustine Harbor #1 (first used 1976; last used 1977).

Dredging and dredge spoil disposal can result in a number of potential environmental effects including increased turbidity, disturbance of benthic communities, water quality degradation, re-suspension of contaminants and toxins. Dredging is most often conducted to deepen, widen or maintain navigation corridors, anchorages, or berthing areas. It is also conducted to mine sand that is used as fill for land reclamation and other construction projects such as pipeline construction. Dredging for navigation purposes often involves disposal of dredge spoil material within the marine environment. Dredging and disposal also produces mechanical effects (i.e., physical disturbance), turbidity, and sedimentation effects in the marine environment.

Disposal of dredged material is regulated under the CWA and the Marine Protection, Research, and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Ban Act (33 U.S.C. § 1251 and 1401 et seq.). Dredge material must be compatible with natural sediments at the disposal site and not likely to disrupt or degrade natural habitats and/or biotic communities (USEPA 2005). In addition, disposal of contaminated dredged material is prohibited under the MPRSA (USEPA 2005).

Unit 1: Northeastern Foraging Habitat

We have not identified any routes of effects from dredging related activities to the essential foraging features based on our review of past actions that involved dredging. The discharge of dredge material in the marine environment would likely have ephemeral effects given prevailing currents that would rapidly disperse sediment plumes at depths where the essential foraging features are not present.

Unit 2: Southeastern Calving Habitat

Dredging and disposal produces mechanical effects (i.e., physical disturbance), turbidity, and sedimentation effects in the marine environment. Dredging may also involve the disposal of dredged material into a marine environment at an ODMDS. The vessel traffic associated with these activities may affect the species. The physical disturbance effects of these activities may affect the essential features of water depth; however, it is not likely that dredging and disposal will occur at such a scale that Unit 2 will be rendered unsuitable to calving right whales. We conclude that the effects of these activities are more likely to require modifications to avoid

affecting the listed species than the essential features. Therefore, project modification costs stemming from consultation are not considered attributable to the action.

The physical changes to right whale critical habitat resulting from dredging and dredge spoil disposal could affect the essential feature of water depth in Unit 2. Other impacts from dredging and disposal such as vessel traffic, noise, and sedimentation would be associated with take of the species. In order for any dredging or disposal activity to physically change depth to render critical habitat unsuitable to calving right whales in Unit 2, the scale of that activity would be so extreme and concentrated, and involve so many dredge vessels operating simultaneously, it would likely be found to result in take of the species. Based on past consultations involving dredging and use of the ODMDSs, we do not think an action of this magnitude is feasible, let alone likely. Dredge material disposal at the scale of past consultations would be more likely to require project modifications to avoid vessel strike impacts to the whales. Therefore, no unique project modifications are expected for impacts to critical habitat from these activities.

3.2.1.1.1.2 Beach Nourishment

Beach nourishment includes placement of sandy material on a beach through overland hauling or dredging and placement of offshore sand deposits. Vessels transiting between offshore borrow pits and the beach may affect the species. Sand mining can produce mechanical effects (i.e., physical disturbance), turbidity, and sedimentation effects in the marine environment.

Unit 1: Northeastern Foraging Habitat

Within Unit 1, we do anticipate future consultations for USACE-permitted beach nourishment activities over the next 10 years, based on past consultation history. However, we have we have not identified any routes of effects from these activities to the essential foraging features. The discharge of dredge material in the marine environment would likely have ephemeral effects given prevailing currents that would rapidly disperse sediment plumes at depths where the essential foraging features were not present.

Unit 2: Southeastern Calving Habitat

Within Unit 2, the physical disturbance effects of beach nourishment activities may affect the essential features of water depth; however, it is not likely that this will occur at such a scale that Unit 2 will be rendered unsuitable to calving right whales. We concluded that the effects of beach nourishment activities are more likely to require project modifications to avoid affecting the species than the essential features, and that no unique modifications would be required to avoid affecting the essential features. Therefore, the project modification costs associated with the consultations for these activities are considered co-extensive and are not considered attributable to the critical habitat.

The essential feature of water depth for right whale critical habitat in Unit 2 is depths between 6 to 28 meters. Beach nourishment activities involve the placement of sand on the coastal beaches in water depths less than 6 meters. The primary risk to right whales from beach nourishment is vessel strike. We expect any project modification to beach renourishment activities would focus

on reducing the risk of vessel strike. Therefore there would be no additional unique project modifications to address impacts to critical habitat from beach renourishment activities.

3.2.1.1.1.3 Marine Construction Projects Permitted by USACE: (Ports, Terminals, Harbors, or Marinas; Docks and Piers; Oil and Gas Pipelines; Cables; Restoration and Artificial Reef Placement)

Dredging and disposal may occur in conjunction with marine construction activities, including the construction and expansion of ports, terminals, harbors, marinas, docks, and piers. The effects of these dredging and disposal activities on the essential features in Units 1 and 2 are discussed above in Section 3.2.1.1.1.2. The construction of undersea oil and gas pipelines or the laying of cable typically requires the excavation and backfilling of a trench to lay the pipeline or cable. The USACE issues permits for habitat restoration and creation of artificial reefs that involve the placement of decommissioned vessels or concrete reef-like structures on the sea floor for the purpose of enhancing fishing opportunities and increasing reef fish habitat. Marine construction projects permitted in the past have also involved vessel traffic and equipment collision impacts to listed species, noise impacts, and impacts to benthic habitats covered by new structures.

Unit 1: Northeastern Foraging Habitat

Within Unit 1, there is no consultation history related to marine construction activity within the area on which are found the essential foraging features.

Unit 2: Southeastern Calving Habitat

Construction-associated dredging or disposing of material may affect both the listed species and essential features within Unit 2 and is discussed above. Construction-associated machinery and vessel traffic associated with these projects is expected to impact the listed species but not the essential features. The essential feature of water depth could be affected by ditching to lay cable, or the placement of structures to create artificial reefs that would change bathymetry, may affect the essential features of water depth. The essential calving and nursing features of Unit 2 include water depths between 6 and 28 meters. The placement of artificial reefs may affect the depth profile and therefore affect this essential feature. However, it is not likely that marine construction permitted under the CWA or RHA will occur at such a scale that water depth in Unit 2 will be rendered measurably unsuitable to calving right whales. If it did, it is likely such effects would be determined to constitute take of the species, and project modifications would be required under the jeopardy prong. No unique project modifications would be expected to address these effects to critical habitat. Vessel traffic associated with marine construction projects is more likely to affect the species than the essential features.

3.2.1.1.2 Department of Defense (DOD) - Military Operations, Training and Transportation

The DOD conducts various training and testing operations within both Units 1 and 2. These activities include various ship, vessel and aircraft operations in and over coastal and offshore

waters. In addition to consulting our PCTS database to realize historic consultations, we contacted DOD services for input on potential consultations to facilitate our analysis. Information we received from DOD was also considered in our analysis of national security impacts, which is presented in Section 4 of this document. In this section we summarize activities and operations we expect to consult on in the future and that may affect North Atlantic right whales or their critical habitat.

The Department of the Navy (Navy) operates and maintains test and training ranges, air and water operation areas, special use airspace, and military training routes throughout the waters of the Atlantic Ocean as part of testing, training, and live-fire exercises related to national security (Figure 3).

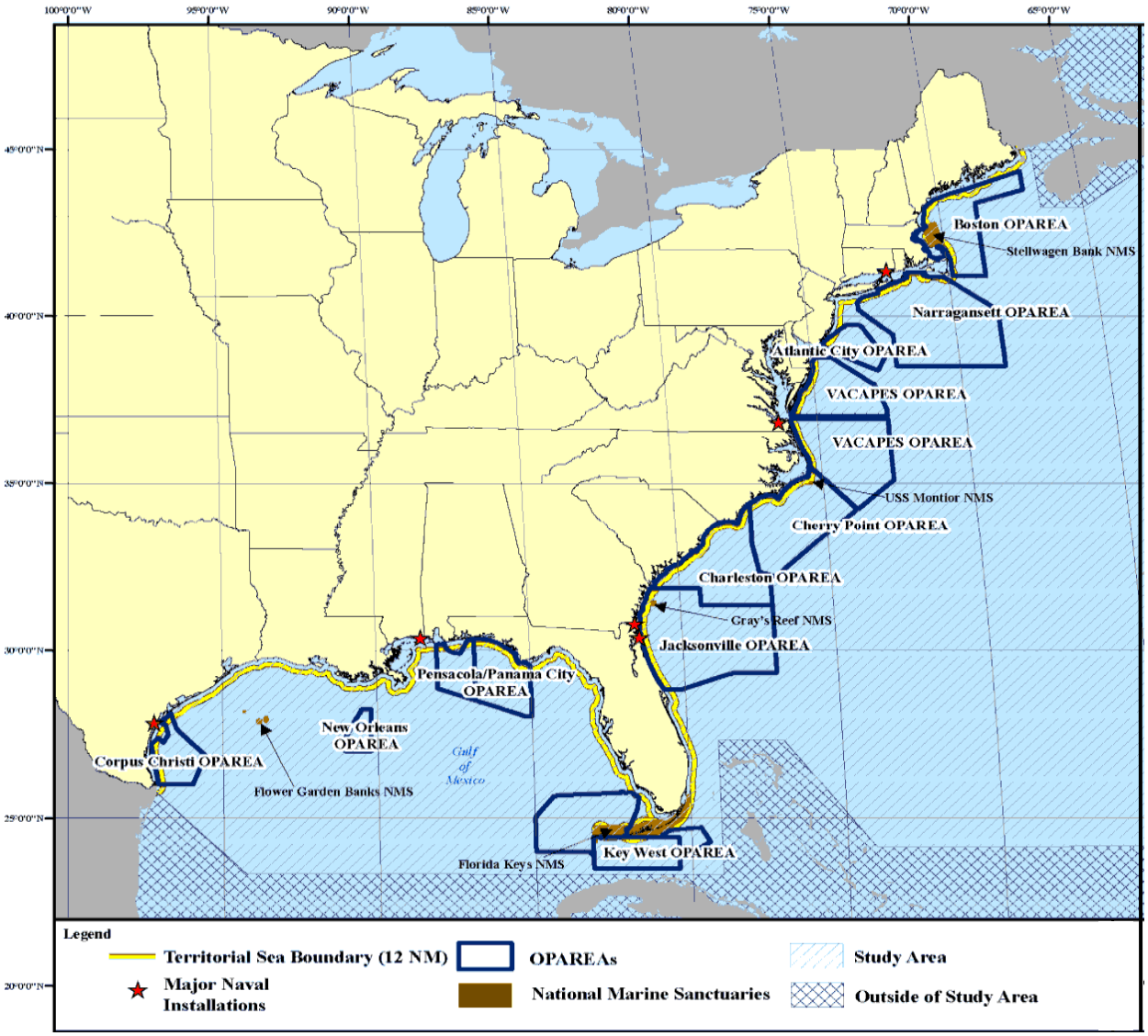

Figure 3: OPAREAS (source: US Navy)

These military operation areas and range complexes exist along the east coast of the U.S. within the areas designated as critical habitat for the North Atlantic right whale. These include:

- Jacksonville Range Complex (includes the Charleston, SC Operation Area);
- Cape Canaveral Air Force Station
- Cherry Point (CHPT) Range Complex
- Undersea Warfare Training Range;
- Virginia Capes (VACAPES) Range Complex;
- Narragansett OPAREA;
- Boston Complex OPAREA

Descriptions of the military training activities conducted by the Navy are provided at:

- Jacksonville Range Complex EIS/OEIS (includes the Charleston, SC operation area): http://www.jacksonvillerangecomplexeis.com/otherresources.aspx#Final
- Undersea Warfare Training Range EIS/OEIS: http://projects.earthtech.com/USWTR/EIS/FOEIS-EIS_2009/FOEIS-EIS_2009.htm
- Atlantic Fleets Active Sonar Training (AFAST) EIS/OEIS (includes the Atlantic City, Narragansett Bay and Boston Operation Areas): http://afasteis.gcsaic.com/docs.aspx
- East Coast Biological Evaluation: http://www.vacapesrangecomplexeis.com/Documents/BE_Final_090808.pdf and the Addendum: http://www.vacapesrangecomplexeis.com/Documents/Three_EC_Rng_Cmplxs_BE_Addendum_(Feb_09)_with_attachments.pdf

Exclusively within Unit 2, the Navy and the U.S. Marine Corps (USMC) conduct integrated training activities throughout the area on which are found the essential calving features. These training activities focus on amphibious and maritime activities and involve the use of amphibious ships, surface ships, submarines and involve the amphibious landing of marines, armor and material.

Unit 1: Northeastern Foraging Habitat

<u>The Department of the Navy</u>

Naval activities and exercises regularly occur within the specific area on which are found the essential features of right whale foraging habitat. These activities include naval vessel sea trials; torpedo firing exercise (TORPEX); unit level training activities; anti-submarine warfare exercises (ASW); and ordnance training exercises. Naval activities that occur within the Boston OPAREA include torpedo firing exercises (TORPEX) and sea trials of guided missile destroyers constructed at Bath Ironworks (BIW) in Bath, Maine on the Kennebec River. These activities have been the subject of previous ESA section 7 consultations between the Navy and NMFS with NMFS concluding that TORPEX and sea trials are not likely to adversely affect ESA listed species under NMFS' jurisdiction. These previous consultations resulted in the Navy implementing a variety of mitigation measures to reduce the potential of these exercises to

adversely affect endangered and threatened species under NMFS' jurisdiction, including the North Atlantic right whale.

Torpedo Firing Exercises (*TORPEX*)

The Navy conducts torpedo-firing exercises (TORPEX) at specific locations in waters east of Cape Cod, Massachusetts in the Great South Channel (GSC). In the late 1980s and early 1990s, the Navy designated five areas known as TORPEX locations A, B, C, D and E. These five locations are located approximately 15 nmi east to 65 nmi southeast of Cape Cod in the Cape Cod OPAREA. These sites were first used for torpedo exercises in 1991. Since that time, the locations have been used one to three times per year. The locations range in depth from 200 to 600 feet and lie at the southern limits of the Boston OPAREA. The locations are entirely or in part within Unit 1 of the critical habitat designation.

The Navy has consulted with NMFS on several occasions on the potential impacts of TORPEXs on threatened and endangered species and designated critical habitat. Previous consultations concluded that torpedo testing in the GSC was "not likely to adversely affect" listed species and critical habitat including the North Atlantic right whale, a determination contingent upon adherence to specific mitigation measures agreed to by the Navy and NMFS that would be included in each test plan and adhered to during testing. The torpedoes utilized in TORPEX are not equipped with live warheads but instead sensors equipped to analyze the performance of the torpedo. Therefore, as currently performed, we have not identified any routes of effects to copepods or the oceanographic features that distribute or aggregate them. Thus, we do not anticipate that TORPEXs would have an effect on the essential foraging features of Unit 1.

Sea Trials of Naval Vessels

As discussed above, Navy activities that occur within the Boston OPAREA also include sea trials of guided missile destroyers constructed at BIW in Bath, Maine. After destroyers are built, they undergo sea trials to ensure that all systems function as intended. Sea trials involve testing all aspects of the ship's operational capabilities; however, only the propulsion plant demonstration (i.e., full power and endurance runs) and tests involving the use of active sonar have the potential to affect listed species. Other tests involve verifying on-board systems such as lighting, ventilation, and electrical systems.

In general, a sea trial consists of the newly constructed destroyer departing from BIW and transiting through the GoM to the Navy's CGULL OPAREA, approximately 80 nm southeast of the GSC, past the continental shelf break. Along the transit route to the CGULL OPAREA, the vessel tests various sonar systems during this transit. Once the vessel reaches the CGULL OPAREA, various combat systems tests are conducted. All ordnance being released during the sea trial is inert. As such, no explosives are detonated, either in air or in the water.

In addition, the sea trial also involves testing the vessels' propulsion systems. This involves an endurance run (outbound) where the ship runs at 27 knots for a total of 2 hours and a full power run (inbound) where the ship runs at speeds in excess of 30 knots for a total of 4 hours, during which propulsion shafts, steering, and reduction gears are tested.

The Navy has consulted with NMFS on three occasions over the course of the last several years (April 2007, January 2008, and February 2008) on sea trials of naval vessels constructed at BIW. NMFS concluded, based on the analysis that all effects of the proposed project, if adverse, will be insignificant or discountable, that these sea trials were not likely to adversely affect any listed species under NMFS jurisdiction. The only anticipated effects of the sea trial on listed species were potential acoustic harassment from mid-frequency active sonar activities and ship strikes or other direct interaction with exercise components (e.g., released ordnance). The potential for a ship to collide with a whale or sea turtle exists wherever these species and ships overlap in distribution. The Navy has implemented a number of mitigation measures to reduce the potential for sea trials to affect listed species, including right whales. These measures include reduced vessel speeds, consulting NOAA aerial survey sighting data prior to various exercises and utilizing marine mammal observers.

We are unable to identify any routes of effects from naval sea trials to the essential features in Unit 1 and therefore there are no incremental impacts associated with the designation.

United States Coast Guard (USCG)

The USCG's response states that their surface and air assets routinely operate, exercise and transit through the areas under consideration for designation as critical habitat. The USCG also notes that its vessels and personnel also periodically participate in joint training on Navy training ranges off the U.S. east coast. The USCG's response states that they consider it unlikely that its exercises, operations and training associated with National and Homeland Security, separately or in aggregate, would affect the essential foraging features in Unit 1. We are unable to identify any routes of effect from USCG exercise, operations and training to the essential features in Unit 1 and, therefore, there are no impacts. The USCG' role in oil spill response is addressed below.

Unit 2: Southeastern Calving Habitat

The Department of the Navy

The Navy noted in its response that the proposed critical habitat areas for the North Atlantic right whale could potentially impact Navy testing activities conducted by several air and water operational areas (OPAREAs) in the Southeast, including the Jacksonville (JAX) OPAREA, Undersea Warfare Training Range (USWTR), and Charleston (CHAS) OPAREA. These OPAREAs overlap the geographic area of Unit 2, and the activities conducted within these OPAREAS occur within the area on which are found the essential calving features for the North Atlantic right whale.

A bulk of the naval activities occurring in both JAX and CHAS OPAREAs includes unit-level training (ULT) and major training events (MTE). ULT events typically occur close to shore and consist of high-volume, short-duration training events by individual ships, submarines, and aircraft. These events occur on a daily basis throughout the year. Similarly, MTE occur close to shore; however, these events occur less frequently (i.e., several times a year versus daily).

The Navy identified several specific training activities within the Southeast that may be affected by the critical habitat rulemaking. These activities include mine neutralization training using either divers or remotely operated vehicles (ROVs), maritime security operations certification conducted during ULTs and MTEs, and vessel transit. These activities have been described in previous ESA Section 7 consultations between the Navy and NMFS (1997 JAX OPAREA; January 2009 Atlantic Fleets Active Sonar Training; June 2009 East Coast non-sonar training). These consultations resulted in the Navy implementing a variety of mitigation measures to reduce the potential of training exercises to adversely affect the North Atlantic right whale.

Based on the descriptions of these activities provided by the Navy and in previous ESA Section 7 consultations, we could not identify any routes of effects of navy testing, training, and operational activities within Unit 2 on the preferred ranges of sea surface roughness, sea surface temperatures, or water depths. We do not believe these activities will result in lowering or raising the available value ranges for these features. We also believe these activities will not limit the availability of the essential features such that right whales are not able to select dynamic, optimal combinations of the features necessary for successful calving. NMFS has not identified any routes of effects to the essential features in Unit 2. We do not anticipate recommending project modifications to avoid or minimize potential impacts to the essential features for right whale critical calving habitat. Therefore the impacts are attributable solely to the species and therefore the listing itself.

United States Coast Guard

Military training and operational activities conducted by the USCG within Unit 2 include normal, non-emergency operations such as maritime search and rescue, drug and illegal immigrant interdiction, prevention of illegal fishing, and maintaining maritime law enforcement. The USCG is also responsible for maintaining safe navigation in the waters of the U.S. To accomplish this goal, they install and maintain aids to navigation (ATONs) including channel lights, buoys and permanent pilings. These activities facilitate the safe navigation of various ocean-going vessels including those transporting petroleum products thereby helping to reduce the risk of major oil spills that might impact the essential features.

The USCG noted the proposed designation could potentially impact the USCG's ability to both train for and execute its missions within the geographic areas of critical habitat; however, the USCG concluded that it is unlikely that the exercises, operations, and training associated with National and Homeland Security, separately or in aggregate, would adversely affect the essential calving features in Unit 2.

Based on the description of activities conducted by the USCG within Unit 2, we did not identify any routes of effects of current USCG vessel and air operations on the preferred ranges of sea surface roughness, sea surface temperatures, or water depths, in that these activities will not result in lowering or raising the available value ranges for these features. We also believe that these activities will not limit the availability of the essential features such that right whales are not able to select dynamic, optimal combinations of the features necessary for successful calving. We have concluded that, any impacts on USCG activities will be due primarily to the species' listing.

3.2.1.1.3 U.S. Coast Guard Oil Spill Response Activity

The USCG is also responsible for implementing the Oil Pollution Act by responding to oil spills and to vessel groundings that present the risk of an oil spill. An oil spill due to vessel groundings could impact the species or the essential features. The USCG's response to this type of event, rather than the oil spill itself, would trigger consultation with NMFS under section 7 of the ESA. The USCG typically conducts an emergency consultation with NMFS to reduce impacts to listed species during cleanup activities.

Unit 1: Northeastern Foraging Habitat

The application of large volumes of oil dispersants in response to an oil spill could negatively impact dense aggregations of *C. finmarchicus* upon which right whales feed, as well as the diapausing *C. finmarchicus* populations that serve as sources of the forage base. Oil spill dispersants do not actually reduce the total amount of oil entering the environment. Dispersants change the chemical and physical properties of oil, thereby changing the oil's transport, fate, and potential effects. The goal of dispersant use is to increase the amount of oil that physically mixes into the water column. By increasing the dispersion of oil into the water column, dispersants increase the potential exposure of sensitive water-column organisms to spilled oil. The use of dispersants, therefore, may increase the potential risk to vulnerable organisms in the water column (e.g. *C. finmarchicus*) (NRC 2005). The mechanisms by which the application of oil dispersants might negatively impact the essential biological features in Unit 1 are the same as those discussed in detail in the Biological Source Document (NMFS 2014). The acute and chronic effects of exposure to oil dispersants may cause immediate or delayed mortality of *C. finmarchicus* due to chemical or physical properties of the oil dispersants as well as petroleum or its byproducts.

The impacts of oil dispersants on the essential biological foraging features would be relatively localized and temporary (see below for further discussion). The affects could also impact all life stages of *C. finmarchicus* including larval life stages that are particularly vulnerable to acute as well as chronic impacts due to exposure to oil dispersants and petroleum and its byproducts.

Due to the localized and the temporary nature of the impact of both acute and chronic effects, oil dispersants, while having the potential to affect the essential features and the species, the application of large volumes of oil dispersants has the potential to affect the features more due to the acute biological effects.

3.2.1.1.4 U.S. Environmental Protection Agency (EPA)

Under the Clean Water Act, the EPA is responsible for promulgating water quality criteria, reviewing state water quality standards, listing impaired water bodies, issuing – or delegating authority to the states for – National Pollutant Discharge Elimination System (NPDES) permits, and approving or establishing Total Maximum Daily Loads (TMDLs) from pollution point and non-point sources for waterbodies. Sewage and industrial effluent are sources of nutrients, sediments, turbidity, and contaminants that may adversely affect the features essential for the

conservation of the species. Two components of discharges from land are nitrogen and phosphorus (nutrients). Nutrification (excess nutrients) from ocean outfall discharges contribute to algal and bacteria blooms that might alter the ecological community structure including the current phytoplankton assemblage thereby altering the forage base of zooplankton, including aggregations of *Calanus finmarchicus*.

Unit 1: Northeastern Foraging Habitat

Based on past consultation history, municipal wastewater disposal projects have the potential to affect both the essential features and the species. However, we have concluded that the greater impacts would be expected to be to the essential features rather than the species. Therefore, we conclude that these impacts are attributable to the critical habitat designation and that the impacts are therefore incremental. Several municipalities have waste treatment facilities that discharge into the geographic area of Unit 1. These inputs may affect the essential features for right whale foraging as outfall effluent may change the phytoplankton community structure, enhancing nuisance and/or less desirable forage species that result in decreased productivity and/or changes in the distribution/densities (especially changes to high density patches) of *C. finmarchicus* populations that are essential to the conservation of the species.[17]

Within Unit 1, we project a total of 21 consultations with EPA over the next 10 years related to their implementation of the CWA that may affect the essential biological feature of dense aggregation of copepods.

In addition to the above activities, EPA has issued National Pollution Discharge Elimination System (NPDES) permits for wastewater discharges related to the construction and operation of deepwater LNG ports in state and federal waters of Massachusetts Bay. We discuss these permits below in conjunction with the Maritime Administration permitting of offshore liquid natural gas (LNG) terminals.

3.2.1.1.5 National Oceanic and Atmospheric Administration (NOAA)

Among other things, NOAA is responsible for managing designated lands and aquatic areas specifically for wildlife and natural resource use and conservation. Specifically, NOAA is responsible for National Marine Sanctuaries, National Estuarine Research Reserves, and some National Monuments. The development of management plans, and often implementing regulations, is required for each of these protected areas. Protected area resource management plans are diverse in the activities that they regulate for the protection of marine and other natural

[17] In 1993, prior to the ten year consultation time horizon used in this analysis, NMFS completed a formal consultation with the EPA on the potential adverse effects of the Boston Harbor Sewer Outfall Project on North Atlantic right whales. NMFS issued a biological opinion on the Massachusetts Water Resource Authority (MWRA) project which analyzed the impact of increased nutrient input into the Massachusetts Bay and Cape Cod Bay from this new system. Concerns included potential changes to the phytoplankton community structure, including enhancement of nuisance and/or less desirable forage species that result in decreased productivity and/or changes in the distribution/densities of *Calanus finmarchicus* populations essential to the conservation of right whales. Due to these potential impacts, NMFS issued several conservation recommendations, including a comprehensive monitoring program, which were included as conditions of the MWRA permit.

resources. Overall, impacts to the species would arise from direct human uses of the protected area, such as whale watching, recreational boating, and fishing.

3.2.1.1.5.1 National Ocean Service

The Office of National Marine Sanctuaries, part of NOAA's National Ocean Service (NOS), manages specially designated areas of the nation's oceans and Great Lakes that contain unique habitats; threatened and endangered species; and historic, archeological, recreational, and esthetic resources. Stellwagen Bank National Marine Sanctuary and Gray's Reef National Marine Sanctuary are within the geographic areas of Units 1 and 2.

Unit 1: Northeastern Foraging Habitat

Within Unit 1, we project six consultations with NOS over the next 10 years on permit and monitoring related activities. Based on past consultation history we have not identified any routes of effects by which these activities may affect the essential foraging features.

Unit 2: Southeastern Calving Habitat

Within Unit 2, we did not have a consultation history from which to estimate future consultations, nor did we identify any routes by which NOS activities may affect the essential features for calving right whales

3.2.1.1.5.2 National Marine Fisheries Service

NMFS develops and approves Fisheries Management Plans (FMPs), which implement various conservation and management regulations. FMPs are designed to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of each fishery. NMFS conducts research and issues permits for various research activities. NMFS also issues grants for fisheries research, and authorizes experimental fishing activities.

Unit 1: Northeastern Foraging Habitat

Based on a review of the past consultation history, we conclude that neither commercial nor recreational fishery-related activities are expected to affect the essential features of right whale foraging habitat with the exception of a directed copepod fishery. Previous formal fishery-related consultations considered the effects of the proposed action on critical habitat as it was designated in 1994. These past consultations were originally triggered solely by consideration of potential effects to right whales themselves, not by potential impacts to designated critical habitat, as it was then designated. Past fishery-related consultations concluded that the action was not likely to adversely modify or destroy designated critical habitat.

Available scientific data, including that cited in past formal consultations, indicates that neither mobile nor fixed fishing gears, with the exception of a potential directed copepod fishery, have the potential to affect the essential biological foraging features of Unit 1. Current fishing gear and techniques do not affect aggregations of copepods. Copepods are extremely small organism (approximately the size of a grain of rice) that would readily pass through the mesh of trawl gear and not be affected by fixed gear. Further, the depth at which mobile gear is utilized minimizes the potential for these fisheries to interact with or disrupt the dense concentrations of copepods

or overwintering populations that are essential to the conservation of right whales. In addition, current fishing-related activities do not have any potential to affect the essential physical oceanographic features in Unit 1.

In addition to fishery management activities NMFS conducts and also issues permits for various research activities. NMFS issues grants for fisheries research, and authorizes experimental fishing activities. Based on past consultation history we have not identified any routes of effects from these activities to the essential foraging features.

Unit 2: Southeastern Calving Habitat

Based on past consultation history we have concluded that this category of activity will not affect the essential calving and nursery features.

3.2.1.1.6 The Maritime Administration (MARAD; Department of Transportation)

The Maritime Administration (MARAD) is an agency within the U.S. Department of Transportation. Under the Deepwater Port Act of 1974 (DWPA) as amended by the Maritime Transportation Security Act of 2002, MARAD is the delegated authority for implementing the Deepwater Port Licensing Program for construction and operation of offshore liquefied natural gas (LNG) and oil receiving port facilities. MARAD works with federal, state, and local agencies to ensure a comprehensive and efficient deepwater port licensing process. The DWPA details the procedures for issuing licenses by the Secretary of Transportation and prohibits issuing licenses without the approval of the Governors of the adjacent coastal states. The Secretary of Transportation is required to establish environmental review criteria consistent with the National Environmental Policy Act procedures.

Unit 1: Northeastern Foraging Habitat

We have concluded that offshore liquefied natural gas terminal projects have the potential to affect both the species and the essential features. We have concluded that the greater impacts are expected to the species rather than the essential features. Previous consultations on offshore LNG terminals constructed within the geographic area of Unit 1 concluded that the projects were not likely to result in jeopardy to right whales or the destruction or adverse modification of critical habitat. The routes of effects to right whales include potential ship strikes, noise associated with operation of the port and the noise of construction.

Potential routes of effects on copepods include impingement and entrainment in the ballast water and cooling water intakes at the port site as well as thermal plumes. The best available scientific information, derived from recent modeling, indicates that population level effects of zooplankton/copepods removal due to entrainment due to LNGs operations would be indistinguishable from natural variability (NMFS 2007, Robert Kenney personal communication in letter to NMFS, October 11, 2011). Regarding possible thermal impacts, NMFS concluded in previous biological opinions that the effects of thermal plumes on the species would be insignificant given that they are believed to dissipate rapidly and are reduced to only 0.10°C

above ambient sea water temperature at a distance of 1640 ft (500 m) downdrift from the point of discharge.

Any potential project modifications that might be recommended to avoid impacts to the essential features would be subsumed by prey-related project modifications to avoid impacts to whales. In order to avoid impacts to the animals you would have to avoid impacts to their food. Therefore any potential project modifications to avoid impacts to copepods would also be needed to avoid impacts to right whales themselves. There could be additional project modifications needed to avoid impacts to whales from threats such as ship strikes.

Because we conclude that activities associated with offshore liquid natural gas facilities may affect both the species and the essential features but are more likely to affect the species, we only attribute administrative consultation costs to the designation.

3.2.1.1.7 Bureau of Ocean Energy Management (BOEM)

The Marine Minerals Program (MMP) within BOEM is responsible for managing non-energy minerals (primarily sand and gravel) on the OCS. The Bureau leases OCS sand along the Atlantic coast and must conduct a review of all environmental impacts through the National Environmental Policy Act (NEPA) process, by developing either an Environmental Assessment or Environmental Impact Statement. Based on the NEPA analysis, mitigation measures and other stipulations are included in the MOA or lease to protect physical, biological, and cultural resources. These stipulations often include the following: dredging window constraints, dredge location constraints, vessel speed restrictions, lighting requirements, equipment requirements, monitoring requirements for threatened and endangered species, and buffers surrounding cultural resources and hard-bottom habitat. We expect consultations on various sand borrowing projects associated with: (1) Hurricane recovery initiatives (2) Beach nourishment projects and (3) Building site augmentation.

Based on historical data, we anticipate four consultations over the next 10 years with the BOEM MMP on sand extraction authorization activities on the Outer Continental Shelf within Unit 2. Below we explain our judgment that none of these consultations will result in incremental impacts that are attributable to the critical habitat designation beyond administrative costs of conducting consultations.

Unit 1: Northeastern Foraging Habitat

We have not identified any routes of effects from sand borrowing related activities to the essential foraging features based on our review of past actions that involve OCS sand extraction permitting activities. Extracting sediments would have little to no effects on *C. finmarchicus* and discharge of dredge material in the marine environment would likely have ephemeral effects given prevailing currents that would rapidly disperse sediment plumes at depths where the essential foraging features are not present.

Unit 2: Southeastern Calving Habitat

Trailing suction hopper dredges (TSHD) are the most common type of equipment for beach restoration and coastal protection projects that use OCS sand because of the water depth, project size, oceanographic conditions, etc. of typical borrow areas (Michel et al. 2013). A cutterhead suction dredge (CSD) may also be used. A CSD excavates the material for removal and create a slurry that is pumped into a 76 cm (30 inch) pipeline for transport to the placement or disposal site. Regardless of dredge type, dredging results in the direct removal of sediment and benthic habitat Dredging produces mechanical effects (i.e., physical disturbance), turbidity, and sedimentation effects in the marine environment. Dredging may also involve the disposal of dredged material into a marine environment at an ODMDS. The vessel traffic associated with these activities may affect the species. The physical disturbance effects of these activities may affect the essential features of water depth; however, it is not likely that dredging and disposal will occur at such a scale that Unit 2 will be rendered unsuitable to calving right whales. We conclude that the effects of these activities are more likely to require modifications to avoid affecting the listed species than the essential features. Therefore, project modification costs stemming from consultation are not considered attributable to the action.

The physical changes to right whale critical habitat resulting from dredging and dredge spoil disposal could affect the essential feature of water depth in Unit 2. Other impacts from dredging and disposal such as vessel traffic, noise, and sedimentation would be associated with take of the species. In order for any dredging or disposal activity to physically change depth to render critical habitat unsuitable to calving right whales in Unit 2, the scale of that activity would be so extreme and concentrated, and involve so many dredge vessels operating simultaneously, it would likely be found to result in take of the species. Based on past consultations involving sand borrowing, dredging and use of the ODMDSs, we do not think an action of this magnitude is feasible, let alone likely. Dredge material disposal at the scale of past consultations would be more likely to require project modifications to avoid vessel strike impacts to the whales. Therefore, no unique project modifications are expected for impacts to critical habitat from these activities.

3.2.1.2 Future Categories of Activities that May Trigger Consultations

In addition to the categories of federal activities discussed above for which we have a past consultation history, we identified four categories of activities that have not occurred in the designated areas in the past but may occur in the future and which have the potential to affect the essential features. These potential new federal activities are:

A. Oil and gas exploration and development activities (Unit 1),
B. Directed copepod fisheries (Unit 1),
C. Offshore alternative energy development activities (Unit 2), and
D. Marine aquaculture (Unit 2).

The following sections describe these categories of potential new federal activities that would trigger consultations if they are proposed within the boundaries of critical habitat. We then analyze whether these activities may primarily affect the species or the essential features. There was no consultation history on these activities from which to estimate the numbers of, or size or scope of, future consultation.

3.2.1.2.1 Oil and Gas Exploration and Development Activities

The Bureau of Ocean Energy Management (BOEM), a bureau in the U.S. Department of the Interior, is the federal agency that manages development of the nation's mineral resources on the Outer Continental Shelf. Functions include: Oil and gas and other mineral leasing, lease and exploration plan administration, environmental studies, resource evaluation, economic analysis and the Renewable Energy Program.

As stated in the Biological Source Document (NMFS 2014), there is growing interest in diversifying domestic energy sources, including offshore oil and gas exploration and production, exploration and development of techniques for mining mineral deposits from the continental shelf, and development and production of offshore energy alternatives in the Atlantic Ocean (e.g., wind farms, wave energy conversion) (e.g., see DOE 2008, DOE 2009, or http://www.whitehouse.gov/issues/energy-and-environment, last visited March 27, 2012). Oil and gas exploration and production can result in the release of oil into the marine environment via spills from wells, vessels, and well and pipeline blowouts.

Unit 1: Northeastern Foraging Habitat

As discussed below, the discharge of petroleum into the marine environment has the potential to affect both the essential features and the listed species; the impacts would be expected to affect primarily the essential features. These impacts therefore are attributable to the critical habitat designation and are considered incremental costs of the designation. We are unable to quantify the incremental impacts at this time due to the lack of past consultation history and any specific project proposals.

Within Unit 1 the essential biological features are dense aggregations of late stage copepods and diapausing copepods within deep ocean basins. Oil and gas exploration and development within Unit 1 has the potential to adversely affect the essential foraging features. Exposure to petroleum can kill marine organisms, reduce their fitness through sub-lethal effects, and potentially disrupt the structure and function of marine communities and ecosystems. The biological effects of oil pollution include both acute and chronic affects.

Oil in the marine environment has the potential to affect copepod density in a number of ways. Potential effects include direct mortality of both adult and juvenile and larval life stages due to acute exposure; sub-lethal effects to both adult and juvenile life-stages due to acute and chronic exposure; and indirect impacts to other organisms composing the pelagic ecosystem, such as phytoplankton community structure, thereby impacting the forage base of copepods. Pollution, as well as vessel traffic and noise, associated with oil and gas exploration and development may also affect the species directly. Because oil and gas activities may affect both the features and the species, costs due to consultation could be co-extensive. However, to avoid underestimating costs, we reviewed whether the costs would be due more to effects on essential features or the whales themselves. We have concluded that consideration of effects to the features would be the primary driver of the consultation. The biological source document (NMFS 2014) provides a detailed description of the potential effects of petroleum on the essential foraging features. Therefore, impacts that may result from these consultations are treated as incremental and attributed to the designation for purposes of this analysis.

Currently, there is no oil or natural gas exploration or development activity within Unit 1. The GoM/Georges Bank region has been under a moratorium since the early 1980s. There is reason to believe that oil or natural gas exploration and development may occur in Unit 1 in the future. There is economic interest to open up new domestic sources for oil and gas exploration and development, including on OCS lands within the boundaries of the specific areas on which the essential features of Unit 1 are found.

Because of the existing moratorium on oil and gas development in both critical habitat units, there are no records in NMFS' consultation history for oil and gas exploration and development projects occurring within either unit of right whale critical habitat. The Energy Information Administration has projected that the demand for natural gas will increase by 2.4 percent per year through 2030.[18] This increase in demand will likely drive global energy prices up, increasing the incentive for the U.S. to develop domestic sources of natural gas and oil. Given these considerations and the potential for lifting the moratorium[19] on OCS oil and gas exploration and development within the critical habitat, it is possible that such development may occur in the future. While we are unable to predict how many section 7 consultations may result from projects of this type over the next 10 years, we do expect this activity to impact the essential features.

Unit 2: Southeastern Calving Habitat

Similar to Unit 1, the discharge of petroleum into the marine environment has the potential to affect the listed species. Occasional oil and gas spills or leaks can occur during both construction and operation of oil and gas production facilities. Frequent vessel traffic also is associated with construction and operation of these facilities. Spills, leaks, and the risk of vessel strike may affect the species.

Adverse effects to both right whales and the essential calving features of unit 2 are dependent on the scope of future proposals. The BOEM presently implements a 50-mile no-leasing buffer from the Georgia, South Carolina, and North Carolina coastlines for oil and gas leasing and the buffer is being proposed for 2017-2022[20]. No oil and gas leases are planned off Florida through 2022. Based on the available information, we do not anticipate that oil producing structures will be constructed or operated within Unit 2 and there will be no effects from these activities on the essential features of calving critical habitat.

Given the duration, 50-mile no-leasing buffer from the coastline, and activities associated with oil and gas exploration and development; we conclude potential effects are likely to primarily affect the species rather than essential features of critical habitat. Activities such as vessel support would require consultation for effects to the species and therefore, any consultations resulting from future oil and gas exploration and development activities will be a co-extensive

---

18 Energy Information Administration - Official Energy Statistics from the US. Government, "Natural Gas Supply and Demand STEO" http://www.eia.doe.gov/oiaf/forecasting.html, accessed 3/3/09

19 The current moratorium is due to expire in 2017 in U.S. waters within Unit 1.

20 http://www.boem.gov/Five-Year-Program-2017-2022/

cost of the species' listing. We do not expect any project modifications for impacts to critical habitat from these activities.

3.2.1.2.2 Copepod Fisheries

Unit 1: Northeastern Foraging Habitat

As discussed in the Biological Source Document (NMFS 2014), it is possible that the GoM and Georges Bank region could support a zooplankton fishery in the future. A directed copepod fishery has the potential to affect both the essential features of the critical habitat and the listed species. Many studies have detailed that the copepod (*C. finmarchicus*) is the primary prey of the North Atlantic right whale; its removal in large amounts anticipated from a directed copepod fishery would have a direct and immediate effect on the copepod feature and right whales.

Right whales, one of the earth's largest animals, rely on copepods, which are about the size of a grain of rice, in a very short, efficient food chain. The direct removal of large amounts of *C finmarchicus* would result in an immediate impact to both the essential feature itself as well as the species. As discussed below, calving rates have been correlated to shifts in the relative abundance of *C. finmarchicus* due to climatic variability due to changes in North Atlantic Oscillation (NAO). Given that significant declines in calving rates and the associated impacts to the species have resulted from the natural variability of the NAO, it is reasonable to conclude that the removal of large quantities of *C. finmarchicus* due to a directed copepod fishery would result in an immediate impact to foraging right whales meeting their energetic requirements necessary for the conservation of the species.

Efficient feeding on prey with high nutritional value is essential to the conservation of the North Atlantic right whale. Efficient feeding is not only important to meet the day-to-day caloric needs of individual right whales, but is important to achieve the overall goal of conservation because of the apparent correlation between the abundance and caloric richness of copepods and the calving rates for right whales. If food is not available at the necessary densities or nutritional value, then right whales would be unable to obtain sufficient energy to successfully complete their long migrations, reproduce, and/or (for lactating females) successfully rear their progeny.

An examination of right whale calving rates provides evidence of the importance of dense aggregations of late stage *C. finmarchicus* to the conservation of the species. Female right whales need adequate nutritional resources to meet the physical demands of gestation and lactation (Kraus et al. 2007). As the principal prey source of right whales, *C. finmarchicus* abundance may play a key role in determining conditions favorable for right whale reproduction (Greene and Pershing 2004).

Kenney et al. (2001) suggested that variability in prey abundance may affect the reproductive success of the species. Research has correlated *C. finmarchicus* abundance and right whale calving rates. Greene et al. (2003) linked right whale calving rates to changes in the North Atlantic Oscillation and concurrent changes in the abundance of *C. finmarchicus*. Greene et al. (2003) hypothesized that impacts to right whales due to climate variability is primarily related to changes in *C. finmarchicus* populations. To explore this hypothesis, Greene et al. (2003)

examined right whale calving rate patterns since the early 1980s. These researchers found that major multi-year declines in right whale calving rates have tracked major multi-year declines in *C. finmarchicus* abundance since 1982.

Greene et al. (2003) found that calving rates were relatively stable from 1982 to 1992, with a mean rate of 12.4 ± 0.9 (standard error (SE)) calves per year. These researchers note that the stable calving rates were consistent with the relatively high abundance of *C. finmarchicus* observed during the 1980s. From 1993 to 2001, right whale calving rates exhibited two major, multi-year declines, with the mean rate dropping and becoming much more variable at 11.2 ± 2.7 (SE) calves per year. Greene et al. (2003) found that these declines coincided with the two precipitous drops in *C. finmarchicus* abundance observed during the early and late 1990s.

By focusing their foraging efforts on the energetically rich late stage *C. finmarchicus* right whales are able to maximize their energy intake. If sufficient densities of late stage become unavailable to feeding right whales, it is uncertain if the remaining developmental stages of *C. finmarchicus* and other prey species (independent of abundance) could provide right whales with the required energetic densities to meet their metabolic and reproductive demands (Kenney et al. 1986, Payne et al. 1990). Baumgartner et al (2007) note that right whales cannot efficiently filter feed on the smaller larval stages (i.e., nauplii) and early copepodite stages of *C. finmarchicus*. In addition, right whales do not feed exclusively on *C. finmarchicus*. Researchers have documented right whales foraging on the copepods *Pseudocalnus* and *Centropages typicus* as well as barnacle larvae (Mayo and Marx 1990 in Baumgartner et al. 2007). These observers noted, however that right whales quickly ceased foraging on these zooplankton assemblages indicating that the prey was likely not suitable (Baumgartner et al. 2007).

A directed copepod fishery would likely target vast areas of Unit 1 searching for commercially viable concentrations of adult, late stage *C. finmarchicus*, depriving right whales of their principle prey. A directed copepod fishery targeting *C. finmarchicus* would remove large amounts of copepods, rendering significant areas unsuitable for right whale foraging. Right whales would have to expend more energy searching for other suitable food patches. The additional foraging and transiting behavior could expose right whales to additional threats such as ship strikes and gear entanglements.

There are a range of potential management options that might be considered and/or implemented to regulate a copepod fishery. These management alternatives could range from a total ban of any directed copepod harvest to some type of regulated harvest (e.g., catch quotas, temporal and spatial requirements, gear restrictions). Currently, there are no proposals to conduct a copepod fishery within Unit 1 or within the GoM/Georges Bank region, and this activity remains very speculative; therefore, it is difficult to identify any potential recommendations or to quantify any associated costs of project modifications. Therefore, we could not estimate incremental project modification costs attributable to the designation of critical habitat.

3.2.1.2.3 Offshore Renewable/Alternative Energy Development

In 2009, BOEM (then the Minerals Management Service) published final regulations (74 FR 19638; April 29, 2009) to establish a program to grant leases, easements, and rights-of-way (ROW) for renewable energy project activities on the OCS, as well as certain previously

unauthorized activities that involve the alternate use of existing facilities located on the OCS. These regulations were developed to ensure the orderly, safe, and environmentally responsible development of renewable energy sources on the OCS. The USACE is responsible also for permitting any structures built on leases, easements, and ROW for renewable energy project activities on the OCS.

Our consultation history is limited for offshore renewable or alternative energy projects that occur within the geographic area within Units 1 and 2. We conducted one formal consultation with BOEM for the Cape Wind Energy Project in Nantucket Sound, Massachusetts, and one formal consultation with ACOE and BOEM for the Deepwater Wind project in Block Island Sound, Rhode Island, both of which are outside of Unit 1. Since 2005, NMFS provided the USACE with EFH recommendations and technical assistance for several wind energy (e.g., Long Island Offshore Wind Park LLC) and tidal current energy (e.g., Natural Currents Energy Services LLC Woods Hole tidal energy project) projects in the Atlantic Ocean. An increase in the number of proposed offshore renewable or alternative energy production projects is possible over the next 10 years.

Unit 1: Northeastern Foraging Habitat

There is no consultation history regarding offshore renewable or alternative energy development for the area on which are found the essential foraging features in Unit 1. During the preparation of the biological source document (NMFS 2014), we determined that offshore wind farms would have no routes of adverse effects to the essential physical and biological features of right whale foraging habitat.

Unit 2: Southeastern Calving Habitat

Depending on the scope of future proposals, construction and operation of offshore alternative or renewable energy production facilities could result in adverse effects to both North Atlantic right whales and essential features in Unit 2.[21]

Increased vessel traffic transiting to and from construction sites, as well as noise generated during construction and operation may adversely affect North Atlantic right whales. The numerous floating, fixed, and submerged structures, mooring lines, and transmission cables associated with large ocean energy facilities could result in entanglement of whales.

The essential calving features of Unit 2 also may be adversely affected. Dredging and dredge spoil disposal that occurs in conjunction with construction activities have the same general environmental effects on the essential features as described for the USACE above. Installation of cable on the ocean floor typically requires the excavation and backfilling of a trench to lay the

[21] In North Carolina two sites (Wilmington West and Wilmington East) are being considered for commercial wind leases. (BOEM website) - these two locations are in the footprint of proposed Unit 2 In Georgia - BOEM is processing an application to lease 3-11 nautical miles off the coast of Tybee Island, Georgia for installation and operation of a meteorological tower and/or buoy. This location is also within the footprint proposed for unit 2. NMFS provided technical assistance to BOEM on 8/7/13 (species lists provided). We received a consultation request received on 2/12/14.

cable. The types of excavation and backfilling activities associated with the installation of cable results in the discharge of dredge and fill materials and associated turbidity plumes. These effects are not likely to result in a reduction of the ability of Unit 2 to provide for the key conservation objective.

Depending on the size, scale, and configuration of alternative technologies used for offshore energy production, installation and operation of these technologies in Unit 2 may fragment large, continuous areas of the essential features such that Unit 2 is rendered unsuitable for calving right whales. Further, the numerous floating, fixed, and submerged structures, mooring lines, and transmission cables associated with large ocean energy facilities could result in adverse effects to the essential features of Unit 2 by limiting the availability of the essential features such that right whales are not able to select dynamic, optimal combinations of the features necessary for successful calving. At some point the cumulative impact of many mooring buoys/wind leases could impact "selectability" of feature combination to a point where it impacts the critical habitat. We concluded that offshore alternative energy development is likely to affect both the species and the essential features, but has the potential to affect the features more than the species. Therefore, the costs associated with future consultations resulting from these potential activities are treated as incremental impacts of this designation of critical habitat for purposes of this analysis. Because there are no records in NMFS's consultation history for offshore renewable or alternative energy projects occurring within Unit 2, we are unable to a) predict how many section 7 consultations may result from projects of this type over the next 10 years or b) calculate the projected incremental costs resulting from this action.

3.2.1.2.4 Aquaculture

NMFS is one of the primary agencies charged with permitting and overseeing ocean aquaculture. NMFS' Aquaculture Program is guided by the policy objectives in the National Aquaculture Act of 1980 and the U.S. Department of Commerce Aquaculture Policy. The program is also guided by national fisheries and ocean legislation, including the Magnuson-Stevens Fishery Conservation and Management Act, the Coastal Zone Management Act, the Endangered Species Act, and the Marine Mammal Protection Act. USACE also is responsible for permitting the placement and construction of aquaculture facilities under section 10 of the Rivers and Harbors Act.

Unit 1: Northeastern Foraging Habitat

We have not identified any routes of effects from potential future aquaculture activity on the essential features in Unit 1. There is a variety of types of aquaculture practiced in the northeastern U.S. including waters in proximity to Unit 1 including mariculture (seaweed), shellfish (e.g., oyster and mussels) and finfish (e.g., Atlantic salmon). Currently the vast majority of commercial aquaculture sites are located in inshore-coastal state waters, in protected embayments. While there are small discharges of excess feed and fish waste associated with finfish netpen aquaculture, there is no comparison between the magnitude of these discharges to the types and volume of wastewater discharge associated with municipal outfalls (e.g., the MWRA Boston Outfall discharges ~ 220 million gallons per day of effluent into Mass Bay). Finfish aquaculture relies on clean, well flushed tidal waters to maintain the health of the fish in the netpens. Permit conditions associated with current finfish aquaculture in Maine requires

routine monitoring of the benthic environment to ensure no environmental degradation occurs as a result of the netpen. In recent years, improved finfish aquaculture techniques continue to result in reductions of excess feed. Currently most netpen sites use cameras to monitor feeding of the fish which shut of feeding when the fish stop feeding. This results in the further reduction of excess nutrients entering the vicinity of netpen sites to even more insignificant levels.

Unit 2: Southeastern Calving Habitat

Large-scale offshore aquaculture generally involves the placement of a large arrays or fields of individual net-pens. The construction and operation of large-scale offshore aquaculture facilities within the geographic area of Unit 2 have the potential to affect the species as well as the essential features of calving habitat..

Construction and operation of offshore aquaculture facilities require vessels transiting to and from construction sites, and construction of the facility generates noise. Once constructed, the net-pens have the numerous floating, fixed, and submerged structures, as well as mooring lines and cables. All of these activities and structures have the potential to take right whales through vessel strike, entanglement or harassment. In addition, infectious diseases, fish waste, and feed waste could negatively impact the health of North Atlantic right whales.

Availability of the essential features within the critical habitat could be restricted by the large arrays or fields of structures that may act as physical barriers and prevent or limit the ability of right whale mothers and calves to select the proper combination of essential features suitable for calving, rearing and nursing. However, as mentioned above, these physical barriers would already potentially require project modifications to address take of right whales. We concluded that placement and construction of large-scale offshore aquaculture facilities are likely to require project modifications to address entanglement and other effects to the species, and we do not anticipate unique project modifications for potential impacts to the essential features. We also expect impacts from construction of the net-pens to be localized and temporary and conclude these effects are not likely to result in a reduction of the ability of Unit 2 to provide for the key conservation objective of supporting successful calving.

3.2.2 Potential Project Modifications

This section provides a general description of the types of project modifications that NMFS may recommend through section 7 consultations to reduce or avoid adverse effects to the essential features of designated critical habitat. The activities for which project modifications are considered are limited to those identified in the previous sections as having the potential for greater impacts to the features than the species. In Unit 1 these include activities related to oil and gas exploration and development, wastewater discharge and other activities which could impact water quality, and the use of dispersants due to an oil spill. In Unit 2, the incremental activities identified are those related to offshore renewable and alternative energy development.

A single project is unlikely to require all of the project modifications identified for a specific category of activity (current or future). For example, municipal wastewater outfalls or process water discharge associated with oil and gas exploration and development may require only

conditions monitoring to ensure the project does not have adverse effects and no modifications or relocation may be required.

In the following section, we discuss the general categories of project modifications that might be recommended in consultations regarding impacts to critical habitat. Tables 11 and 12 provide matrices of the activities that would trigger section 7 consultations in Unit 1 and Unit 2 because they may adversely affect the essential features, and the categories of potential project modifications that might be recommended to avoid or minimize adverse effects to essential foraging and calving habitat features. Where possible, examples are provided of potential project modifications as they relate to specific essential features within Unit 1 and Unit 2.

Table 11: Matrix of Category of Activities triggering section 7 consultation within Unit 1 and Unit 2 because of potential effects to the essential features for North Atlantic right whale critical habitat versus project modifications that may be required to avoid or minimize effects to the essential features.

Project Modification	WaterQuality/NPDES (Unit 1)	Offshore Oil & Gas Exploration & Development (Unit 1)	Offshore Alternative Renewable Energy Development (Unit 2)	Oil Spill Response (Unit 1)
Action Agency	EPA	BOEM/USACE	USACE/BOEM	USCG
Project Relocation	X	X	X	
Project Redesign	X	X	X	
Conditions Monitoring	X	X	x	X
Pollution Control Measures	X	X		X
Timing Restrictions	X	X	X	X
Area Restrictions	X	X	X	X

3.2.2.1 Project Relocation

In many cases a proposed project will have direct impacts on some or all of the essential features given the project footprint within the geographic area of the critical habitat. In such circumstances, NMFS might recommend that the project be relocated to completely avoid all impacts to the essential features. Project relocation may not always be feasible and therefore it would not be required. On the other hand, relocation may be the simplest and most certain project modification to reduce or avoid effects to the essential features. Relocation is also a potential project modification to avoid impacts to the species. The cost of project relocation would be dependent on the specific project and the circumstances of the new project location. Project relocation might be recommended to address potential impacts to the essential features associated with NPDES programs, offshore oil and gas exploration and development and offshore alternative renewable energy development.

3.2.2.2 Project Redesign

In some cases, NMFS may suggest redesigning a proposed project to avoid or minimize anticipated impacts on some or all of the essential features. For example, in Unit 1, it is possible that NMFS might recommend modifications to a project design to avoid or minimize adverse effects to the essential biological features due to the impacts of outfalls or oil and gas exploration and development activities. In Unit 2, proposed alternative energy facilities may affect the availability of the essential features such that right whales are not able to select dynamic, optimal combinations of the features necessary for successful calving. With a redesign of the configuration, dimensions, or density of the array of structures necessary for these operations, impacts to the essential features may be reduced. Similar to project relocation, redesigning the proposed project may not always be feasible and might not meet the definition of an RPA; therefore it would not automatically be a requirement if the essential features were to be impacted by a proposed federal action. Project redesign also is a potential project modification to avoid impacts to the species. The cost of project redesign would be dependent on the specific project and the circumstances of the new project's routes of effect on the species and the essential features. Project redesign might be recommended to address potential impacts to the essential features associated with NPDES programs, offshore oil and gas exploration and development, and offshore alternative renewable energy development.

3.2.2.3 Conditions Monitoring

Many projects may have indirect effects on some or all of the essential features. For example, the essential features could be affected by nutrients carried downstream from areas adjacent to critical habitat. To ensure that the essential features are not adversely affected by projects such as these, the essential features and environmental conditions should be monitored. The specific parameters monitored will depend on the specifics of the project. We have required this modification for projects that impact the listed species; many regulatory authorities also require various monitoring programs if marine resources are in the footprint of proposed actions. In Unit 1, it is possible that NMFS may recommend monitoring of outfalls or oil and gas development to avoid or minimize adverse effects to the essential biological features. For example, in Unit 2, NMFS may recommend monitoring for alternative energy development activities to avoid or minimize adverse effects to essential features. Costs of requiring conditions monitoring as a project modification will vary with project size, location, duration, and distance from shore.

Conditions monitoring might be recommended to address potential impacts to the essential features associated with NPDES programs, offshore oil and gas exploration and development, offshore alternative renewable energy development, and oil spill response activities.

3.2.2.4 Pollution Control Measures

NMFS might recommend project modifications to avoid adverse impacts on critical habitat features resulting from the discharge of pollutants. For example, NMFS might recommend requiring certain pollution controls for projects that require a discharge permit into the geographic area of critical habitat. For example, NMFS might recommend measures to control and limit the discharge of "produced water" during oil and gas exploration activities including possible alternative means of disposal of this water. Discharges into the North Atlantic right whale's habitat may result in adverse effects on the essential features, which could decrease food resources for this species. Pollution control measures might be recommended to address potential impacts to the essential features associated with NPDES programs, offshore oil and gas exploration and development, and oil spill response activities.

3.2.2.5 Timing Restrictions

Within the geographic area of right whale critical habitat, NMFS might recommend seasonal restrictions for certain activities to reduce or minimize adverse effects to the essential features. For example, in Unit 1, NMFS might recommend restricting the application of large volumes of dispersants used for oil spill response at specific times of the year when copepods are most sensitive or vulnerable to the effects of hydrocarbons and dispersant compounds. In Unit 2, NMFS might restrict activities to times of the year when the essential features are not present in dynamic combinations that are suitable for calving and, nursing (i.e., May through October). Timing restriction measures might be recommended to address potential impacts to the essential features associated with NPDES programs, offshore oil and gas exploration and development, offshore alternative renewable energy development, and oil spill response activities.

3.2.2.6 Area Restrictions

Within the geographic areas of right whale critical habitat, NMFS might recommend restrictions on where certain activities may occur to reduce or minimize adverse effects to the essential features. For example, in Unit 2, NMFS might recommend area restrictions to avoid impacts to the essential features for locations of activities, such as where alternative energy facilities may be installed and operated. Area restrictions might be recommended to address potential impacts to the essential features associated with NPDES programs, offshore oil and gas exploration and development, offshore alternative renewable energy development, and oil spill response activities (e.g., use of dispersants).

3.3 Estimated Section 7 Costs

The costs associated with ESA section 7 include two main components, administrative and project modification. Administrative costs arise due to consultations between agencies from the designation of critical habitat. Project modification costs include potential material, labor, and opportunity costs borne by agencies or third parties to modify certain physical structures or processes within the designated critical habitat area. Section 3.3.1 evaluates the administrative

costs associated with consultations, while Section 3.3.2 evaluates the project modification costs resulting from the consultations.

Certain assumptions were made in considering the economic impact of section 7 consultation and project modification implementation. Table 12 presents a summary of key assumptions applied to this analysis.

Table 12: Key Assumptions of Cost Analysis for Projected Section 7 Consideration in the Next 10 Years

Key Assumption	Effect on Cost
The presence of other listed species or designated critical habitat has no influence on consultation.	+
Section 7 consultation history from the previous 10 years is indicative of consultations likely in the next 10 years.	?
We assume that all projected categories of future actions that may affect primarily the essential features rather than the species will require formal consultations.	+

3.3.1 Administrative Costs[22]

In Table 13 and 14 our estimates take into consideration the level of effort by NMFS, the action agency, and the applicant (or other third party) during consultations, as well as the varying complexity of consultations. Formal consultations are assumed to involve a medium to high level of complexity. Costs associated with these consultations include the administrative costs associated with conducting the consultation, such as the cost of time spent in meetings, preparing letters, and in some cases, developing a biological assessment and biological opinion, identifying and designing RPMs, and so forth. For this impacts report, we estimated per-project administrative costs based on IeC 2014. That impacts report estimates administrative costs for different categories of consultations as follows: 1) new consultations resulting entirely from critical habitat designation; 2) new consultations considering only adverse modification (unoccupied habitat); 3) re-initiation of consultation to address adverse modification; and 4) additional consultation effort to address adverse modification in a new consultation. Given that all the consultations we project to result from this rulemaking will be co-extensive consultations on new actions that would be evaluating impacts to the whales as well as impacts to critical habitat, the administrative costs would all be in category 4 above.

As noted, to avoid underestimating impacts, we assume that all projected categories of future actions that may adversely affect the essential features will require formal consultations. Therefore, we combined the numbers of past formal and informal consultations to estimate the total number of future consultations and their associated costs. Effort costs associated with formal consultations are presented in Table 14. When NMFS engages in formal consultation regarding a particular activity, the cost of the consultation is expected to be approximately $1,400. The cost of the action agency's effort is expected to be $1,600, and the cost of a third party's effort (if applicable) is expected to be approximately $880. The action agency or the third party may bear the costs of biological assessment preparation, depending on the specifics of the consultation.

[22] This section was adapted in part from Industrial Economics "Economic Analysis of Critical Habitat Designation of Marine Habitat for the Northwest Atlantic Ocean Distinct Population Segment of the Loggerhead Sea Turtle Draft Report" July 2013

Table 13: Estimated Per Consultation Administrative Costs of Section 7 Consultations (2013 Nominal US Dollars).

	Costs to				
	NMFS	**Action Agency**	**Third Party**	**Biological Assessment**	**Total Cost**
Formal Consultations	$1,400	$1,600	$880	$1,200	$5,080

As discussed, we have projected consultations to be required for five categories of activities and concluded that there would be an incremental administrative costs associated with those consultations. Costs estimates per consultation are provided in Table 13. Table 14 reports estimated administrative costs for those consultations we can reasonably project to occur [over the next 10 years] and that have the potential to affect both the species and the designated critical habitat.

Table 14: Estimated Annual Administrative Total Costs of Section 7 Consultation for the North Atlantic Right Whale and Critical Habitat Designation (2013 Nominal US Dollars)[23]

	Est. # Consultations Annually	Costs to				
		NMFS	**Action Agency**	**Third Party**	**Biological Assessment**	**Total Annual Cost**
Formal Consultations	18.8	$ 26,320	$ 30,080	$ 16,544	$ 22,560	$ 95,504

The above estimates from Table 14 represent a total cost of section 7 consultations associated with activities for which we have a consultation history and that may affect both the species and critical habitat.

As discussed, we also identified four categories of potential, future federal activities. An estimate of the annual administrative costs for consultations on these activities could not be estimated due the speculative nature of some activities (e.g., copepod fishery) and the lack of information about the number and location of potential activities.

---

23 Table 14 does not reflect annual administrative costs for section 7 consultations that may be required due to potential future new categories of activities, for which we do not have consultation history. We are unable to estimate the number of projected section 7 consultations, and their associated costs, for such possible new categories of activities, due to uncertainty about their number, nature, scope, and scale. However, we would expect the per-project administrative costs for these activities to be the same as those above in Table 13.

3.3.2 Project Modification Costs

Because potential project modifications recommended during a section 7 consultation are dependent on the specific project and the circumstances of the new project's routes of effect on the species and the essential features, an estimate of the average cost or range of costs resulting from these recommendations cannot be reasonably made at this time. Given the difficulty in predicting the precise scope and location of future actions with a federal nexus requiring consultation and the resultant difficulty in predicting future project modifications, producing a reliable estimate of the total section 7 costs of the critical habitat designation is not possible. Depending on the nature, scope, and timing of the future activity, a variety of project modifications could be required to avoid or minimize impacts to critical habitat. In the following sections, we have identified potential project modification costs associated with the activities identified in the review of our consultation. In addition, we have identified potential project modification costs for the categories of future activities that were not present in our consultation history but which we project may occur in the critical habitat areas in the next 10 years and if they do occur, have the potential to affect the critical habitat features.

Unit 1: Northeastern Foraging Habitat

It is not possible to predict with certainty all possible project modifications costs that might be required to avoid or minimize impacts to critical habitat. However, we have identified some potential costs that would be associated with various potential recommendations to avoid or minimize adverse impacts to the essential features of right whale foraging habitat.

Oil and Gas Exploration and Development

Oil and gas development could be affected by the designation of critical habitat if operational and project modifications were required to avoid or minimize adverse effects to the essential features. Potential project modifications that might be recommended to address potential impacts to the essential features include project relocation, project redesign, conditions monitoring, pollution control measures, timing restrictions and area restrictions. Such modifications could increase costs thereby reducing profits and decreasing economic efficiency. In this specific situation, given that there is currently no oil or natural gas development in the area, it is more difficult to determine specific costs associated with such development and the designation of critical habitat. Estimating economic impacts of the critical habitat designation with regard to oil and gas development requires consideration of the costs to implement modifications to avoid or minimize impacts to the essential features. The costs of potential project modifications could potentially range from a decrease in profits to a total economic loss in the event the activity was prohibited or recommended project modification costs resulted in making such development uneconomical.

Given that there is no current development, and given past prohibitions on development, it is difficult to provide specific estimates of a baseline level of economic activity to evaluate potential impacts to profits and efficiency. However, other similar projects and government estimates may provide some insights.

A Department of the Interior report projects a substantial amount of energy available for development. In 2006, the BOEM conservatively estimated that the North Atlantic Region's OCS, the area between New Jersey and Maine (an area encompassing all of Unit 1), contains 570 million barrels of oil and 7.2 trillion cubic feet of natural gas.[24] This amount represents about half of the undiscovered technically recoverable oil and gas resources for the entire Atlantic OCS, about 6.6 percent of the oil and 14.9 percent of the natural gas resources in the Alaskan OCS.[25] The Nova Scotia Department of Energy (NSDE) is very active in granting offshore energy development leases in areas north of this region in Canadian waters. NSDE estimates that the Georges Bank Offshore Oil deposits contain about 1 billion barrels of oil and about 5.3 trillion cubic feet of natural gas.[26] It is important to note that the Georges Bank area is only a part of the North Atlantic Region considered in the report, although 1/6 of the Georges Bank lies outside of waters under U.S. jurisdiction in Canadian waters. There is strong evidence to suggest quantities of natural resources appropriate to sustain significant economic activity exist within the specific area on which are found the essential foraging features.

We attempt to quantify the economic value of these natural resources below in Tables 15 and 16 using information provided by the BOEM and NSDE. Table 16 uses these data to show an estimate of the possible value for the oil and gas natural resources in the specific area on which are found the essential features for foraging habitat, indicating that there are resources of significant economic value in the area.

---

24 U.S Department of Interior, Minerals Management Services "Planning Area Resources Addendum to Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2006" Available at http://www.mms.gov/revaldiv/PDFs/NA2006BrochurePlanningAreaInsert.pdf, Accessed March 3rd, 2009

25 *Ibid.* Percentages taken from the technically recoverable Oil and Gas resources available in the Alaskan OCS, as reported by the MMS.

26 Nova Scotia Department of Energy "Nova Scotia's Georges Bank Offshore Oil Deposits" Available at http://www.gov.ns.ca/energy/oil-gas/offshore/georges-bank.asp, Accessed March 3rd, 2009

Table 15: Projected Natural Resources Nominal Prices for 2009 and 2010[27]

Energy Type	Year	
	2009	2010
Crude Oil Prices	$43.14	$54.50
Natural Gas Prices	$4.42	$5.07

Notes:
1. Oil prices are in nominal dollars per barrel and are for crude of the grade West Texas Intermediate
2. Natural Gas prices are in nominal dollars per thousand cubic feet and are for average wellhead pricing

Table 16: Estimated Wholesale Value of Oil and Natural Gas Resources in Critical Habitat Unit 1 in Billions of Nominal 2010 U.S. Dollars[28]

Energy Type	Low	Note	High	Note
Natural Gas	$22.39	1	$36.40	2
Oil	$31.07	3	$45.42	4

Notes:
1. NSDE estimates that the Natural Gas resources in the Georges Bank area to be 5.3 trillion cubic feet of natural gas. Since approximately 1/6 of the Georges Bank area falls outside the US (and thus the Critical Habitat area), we estimate (based on the NSDE) that there is 4.41 trillion cubic feet of natural gas in the US (and Critical Habitat portion) segment of the Georges Bank area. Using the price data in table 6, we arrive at an estimate of the value of this natural gas. As the US segment of the Georges Bank area is only a portion of the designated CH area this represents a low estimate for the value of natural gas present.
2. BOEMRE estimates that the Natural Gas Resources in the North Atlantic Region (an area spanning the Gulf of Maine to New Jersey, and including the U.S. portion of the Georges Bank area and the entire designated Critical Habitat Area) are 7.18 trillion cubic feet of natural gas. As above we estimate a value for these resources. The represents a high estimate for the resources in the Critical Habitat area.
3. BOEMRE estimates that the oil resources in the North Atlantic Region are 570 million barrels of oil - from this we derive a low estimate for the value of the oil resources in and around the critical habitat area.
4. NSDE estimates that the Georges Bank area (an area of which the US portion is a subset of the North Atlantic Region presented by BOEMRE) contains 1 billion barrels of oil. Using the same method as in '1' we get that the US. Segment of the Georges Bank has an estimated 830 million barrels of oil and thus come to the above estimated value of these natural resources.

A complete ban on the extraction of these natural resources in the geographical area of critical habitat would not necessarily be required to avoid or minimize adverse effects to essential features of critical habitat. Therefore, the designation of critical habitat for North Atlantic right whales would not likely result in the loss of the economic values projected in Table 16, but rather only a portion. In essence, the changes in economic surplus would be no greater than the value of the natural resources in the critical habitat area (an estimate of which is given in Table 16), and would most likely be well below the total value.

---

27 Energy Information Administration - Official Energy Statistics from the US. Government, "Oil (Petroleum) Pricing STEO – Table 2: US. Energy Prices" Available at http://tonto.eia.doe.gov/cfapps/STEO_Query/steotables.cfm?tableNumber=8&periodType=Annual&startYear=2004&startMonth=1&startMonthChanged=false&startQuarter=1&startQuarterChanged=false&endYear=2010&endMonth=12&endMonthChanged=false&endQuarter=4&endQuarterChanged=false&noScroll=false&loadAction=Apply+Changes, Accessed March 4, 2009

28 U.S Department of Interior, Minerals Management Services. "Planning Area Resources Addendum to Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2006" Available at http://www.mms.gov/revaldiv/PDFs/NA2006BrochurePlanningAreaInsert.pdf, Accessed March 3rd, 2009, Nova Scotia Department of Energy. "Nova Scotia's Georges Bank Offshore Oil Deposits" available at http://www.gov.ns.ca/energy/oil-gas/offshore/georges-bank.asp, Accessed March 3rd, 2009 and Table 1.

NMFS believes that in the event of a proposal for oil and natural gas exploration and development, particular measures may need to be taken to avoid adverse effects to essential features. Potential impacts to essential features are always project and site-specific. A single exploratory well within or adjacent to critical habitat would likely have fewer and more restricted impacts compared to a production well with several point-source discharges with both chronic and acute impacts to the essential features.

One possible recommendation might be for changes in the disposal methods of "produced water." During offshore oil or gas production, water from the reservoir is pumped to the surface, treated to separate free oil and then either injected back into the reservoir or discharged overboard – this is known as produced water.[29] Under current environmental protection laws, the amount of produced water allowed to be released into the marine environment is regulated. Despite this fact, produced water is still the largest single wastewater stream in oil and gas production.[30] If additional protection were required, some cost to the oil or gas producer would be incurred from re-injecting the produced water back into the reservoir or disposing of it in some other manner that reduces or eliminates the discharge of produced water into the marine environment.

It is difficult to come to an estimate of abatement costs for this type for pollution control for two reasons. First, exact information about such costs is proprietary.[31] Second, there are a number of technologies still in development for reducing this type of pollution and costs estimates from these are speculative. There is, however, some information available about such costs. In 2000, the United Kingdom began to implement project modifications to reduce oil released into the marine environment as a result of produced water. Projects ranged in cost from $70,000 for minor plant improvements to $21 million for drilling a dedicated disposal well.[32] Such numbers help to understand the range of costs involved with reducing pollution from produced water. It was also determined that the average cost per ton of oil (from produced water) abated was approximately $350,000.[33]

Water Quality/NPDES

Municipal outfall effluent discharges may adversely affect the essential biological features of right whale foraging habitat. As discussed, increased nutrient input from outfall effluent may change the phytoplankton community structure, enhancing nuisance and/or less desirable forage species that result in decreased productivity and/or changes in the distribution/densities (especially changes to high density patches) of *Calanus finmarchicus* populations essential to the conservation of right whales.

---

29 The National Academic Press. Oil and the Sea III: Inputs, Fates and the Effects. Washington, DC 2003. p. 71

30 *Ibid.*

31 Oil & Gas UK – Industry Issues – Production Operations. Available at: http://www.oilandgas.org.uk/issues/operations/production_discharges.cfm, Accessed March 3rd, 2009

32 *Ibid.* Monetary values converted to U.S. dollars using exchange rates as of March 11, 2009.

33 *Ibid.* Monetary value converted to U.S. dollars using exchange rates as of March 11, 2009.

In 2000, the Massachusetts Water Resource Authority (MWRA) implemented a new ocean outfall system 9.5 miles offshore, in Massachusetts Bay as part of a Boston Harbor Cleanup program. This system upgraded the previously primary sewage treatment to secondary treatment, reduced industrial contaminants, and eliminated sewage sludge discharge into Boston Harbor (USGS 2007). Despite improvement to Boston Harbor itself, this project has relocated an estimated 350 million gallons of treated effluent per day into the oceanic waters that feed into Cape Cod Bay (PCCS 2005, USCG 2007). Concerns have been raised about the affect this discharge may have on water quality including potential impacts on *Calanus finmarchicus* populations essential to the conservation of right whales. Currently, MWRA is involved in monitoring the outfalls into the Harbor.

NMFS has recommended that outfalls still be monitored in the Boston Harbor to facilitate detection of any adverse modification of critical habitat that was designated in 1994 for Northern right whales. The MWRA's 2010 fiscal year budget allocates $2.4 million for the Harbor and Outfall Monitoring Program.[34] The total cost of the MWRA outfall monitoring program would not be attributable to the critical designation for the North Atlantic right whale. In the future, some undeterminable portion of the total outfall monitoring program costs of outfalls generally would be attributable to both the listing of North Atlantic right whale and critical habitat. However, as previously discussed, to avoid underestimating costs, we have concluded that in the future, consultation costs on discharges from outfalls would be attributable primarily to the critical habitat designation. Because potential project modifications recommended during a Section 7 consultation are dependent on the specific project and the circumstances of the new project's routes of effect on the species and the essential features, an estimate of the average cost or range of costs resulting from these recommendations cannot be reasonably made at this time. Potential project modifications that might be recommended to address potential impacts to the essential features include project relocation, project redesign, conditions monitoring, pollution control measures and timing restrictions. The projected water quality activities include 20 smaller water quality related consultations which would have smaller project modification costs as compared to those associated with much larger MWRA project.

Oil Spill Response Activities

NMFS might recommend restrictions on the application of large volumes of oil dispersants used for spill response at specific times of the year when copepods are most sensitive or vulnerable to the effects of hydrocarbons and dispersant compounds. Other potential project modifications that might be recommended to address potential impacts to the essential features include conditions monitoring, pollution control measures, timing and area restrictions.

Unit 2: Southeastern Calving Habitat

Offshore Renewable and Alternative Energy Production

[34] Massachusetts Water Resource Authority. Proposed Fiscal Year 2010 CURRENT EXPENSE BUDGET. March 2009 p.III-25 available at: http://www.mwra.state.ma.us/annual/ceb/fy10proposed/document.pdf

Construction of offshore alternative or renewable energy production facilities could result in adverse effects to both North Atlantic right whales and their critical habitat. Offshore alternative energy production includes, but is not limited to, wind farms and wave energy buoy arrays. Increased vessel traffic transiting to and from construction sites, as well as noise generated during construction and operation may adversely affect North Atlantic right whales. Depending on the scope of future proposals, adverse effects to the essential calving features of Unit 2 are possible from the construction and operation of renewable and alternative energy facilities.

Depending on the size, scale, and configuration of alternative technologies used for offshore energy production, installation and operation of these technologies in Unit 2 may fragment large, continuous areas of the essential features such that Unit 2 is rendered unsuitable for calving right whales. Further, the numerous floating, fixed, and submerged structures, mooring lines, and transmission cables associated with large ocean energy facilities (e.g., wave energy buoy arrays) could result in adverse effects to the essential features of Unit 2 by limiting the availability of the essential features such that right whales are not able to select dynamic, optimal combinations of the features necessary for successful calving.

In the following analysis, we use the example of offshore wind energy production to estimate potential costs resulting from project modifications that may be recommended during Section 7 consultations to avoid or minimize adverse effects to the essential features for right whale calving habitat. Offshore wind energy is the most developed of alternative offshore energy production technologies, and has the most readily available information concerning costs of large-scale construction and operation. While offshore wind energy production facilities are not the only technologies available, they are the best example for which we have available data.

Offshore wind development has been limited to waters shallower than 30 m in the North and Baltic Seas (Musial and Butterfield 2004). Areas between 5 nm and 50 nm off the coast of the United States contain about 907 gigawatts (GW) of wind potential, of which little more than 10 percent (or 98 GW) is over shallow water (depth of less than 30 m); the remaining 810 GW of offshore wind resource is over water 30 m and deeper (Ibid.).

Typically, turbines in a wind farm are spaced 500 to 1000 m (1,640 to 3,281 ft, or 0.3 to 0.6 miles) apart and have blades that at their lowest point are at least 20 m (66 ft) above the water (Snyder and Kaiser 2009). For offshore wind projects, the cost of installation accounts for approximately 20 percent of the total cost and construction and installation of the turbine foundations account for another 20 percent of capital cost (Snyder and Kaiser 2009). Additionally, operation and maintenance costs make up a larger proportion of the overall components of the cost-of-energy (COE) (Fingersh et al. 2006). This is likely due to the costs of accessing offshore wind farms and maintaining turbines in operating condition (Snyder and Kaiser 2009).

Snyder and Kaiser (2009) summarized several wind energy analyses and estimated that construction costs for wind farms built between 2001 and 2007 ranged from $1,462 to $3,125/kW. If we take the hypothetical wind farm used in Musial and Butterfield (2004), which consists of a nominal 500-MW (500,000 kW) wind plant composed of 100 machines, each with a 5-MW rating, and multiply that output by the range of construction costs presented by Snyder

and Kaiser (2009), then the estimated construction cost for a typical wind farm ranges anywhere from $7.31 million to $1.6 billion. Operation and maintenance costs over time are additional.

Depending on the size, scale, and configuration of a potential wind farm, the installation and operation of an array of wind turbines may fragment large, continuous areas of the essential features such that Unit 2 is rendered unsuitable for calving right whales. Therefore, potential project modifications may be recommended during a Section 7 consultation including project relocation or project redesign. Recommending relocation of a proposed wind farm may result in increased costs per kilowatt (kW). These increased costs may stem from increased distance from shore, increased water depths, or different environmental conditions at the alternative site, each of which may drive up construction, installation, or operation and maintenance costs. Recommending a redesign of the proposed project may include measures such as reducing the density of the array of turbines in the project area or reducing the size of the turbines (to reduce the associated noise). Recommending reductions in the density of turbines within the project area may result in reduced construction costs because fewer turbines would need installation. Additionally, larger turbines (with greater energy output) could potentially be installed to offset the reduction in the number of turbines installed, mitigating the potential cost impacts of the recommended redesign. Recommending a reduction in the size of the turbines installed could result in decreased energy output, and therefore represent lower projected revenues from the proposed wind farm.

Because potential project modifications recommended during a section 7 consultation are dependent on the specific project and the circumstances of the new project's routes of effect on the species and the essential features, an estimate of the average cost or range of costs resulting from these recommendations cannot be reasonably made at this time. Additionally, as stated in Snyder and Kaiser (2009), "The capital costs of offshore wind farms is governed by conditions unique to the structure, site contractor…as well as the prevailing environmental, engineering, market, operational, and regulatory conditions at the time of the operation. The unique nature of the offshore operations and construction objectives drives the variability observed and can only be partially explained through factor analysis." Potential project modifications that might be recommended to address potential impacts to the essential features include project relocation, project redesign and timing and area restrictions.

4 NATIONAL SECURITY IMPACTS

As noted, section 4(b)(2) of the ESA requires NMFS to take into consideration the impact on national security of specifying any particular area as critical habitat. Previous critical habitat designations have recognized that impacts to national security result if a designation would trigger future Section 7 consultations because a proposed military activity may affect the physical or biological features essential to the listed species' conservation. Anticipated interference with mission-essential training, testing, or unit readiness, either through delays caused by the consultation process or through expected requirements to modify the action to prevent adverse modification of critical habitat, has been identified as a negative impact of critical habitat designations (See, e.g., *Proposed Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover*, 71 FR 34571 at 34583, June 15, 2006, and *Proposed Designation of Critical Habitat for Southern Resident Killer Whales*, 69 FR 75608 at 75633, Dec. 17, 2004). These past designations also recognized that national security impacts resulting from the designation depend on whether future consultations would be required under the jeopardy standard, regardless of the critical habitat designation, and whether the designation would add new burdens beyond those related to the jeopardy consultation.

As previously discussed, we did not identify military training or operational activities that would affect the essential features for foraging or calving right whales (see Section 3.2.1.1.2). It is not anticipated that military activities will result in adverse effects to the essential features within either critical habitat units, thus the designation will not result in section 7 consultation costs or project modifications, and will have no impact on national security. A summary of our correspondences with DOD services and the Department of Homeland Security (DHS) is presented below.

On September 21, 2009, NMFS sent a letter to the Navy requesting information on potential impacts related to the designation of critical habitat for the North Atlantic right whale. While the Navy provided some information, they were unable to provide details of potential national security impacts in the absence of more detailed information regarding the areas under consideration as right whale critical habitat. The Navy did identify several particular areas that they stated would involve impacts to national security if consultation and project modifications were required to avoid impacts to critical habitat. The Navy did state that significantly enlarging the 1994 critical habitat footprint area would have national security implications.

In November 2010, NMFS contacted the Navy, the USMC, the Department of the Air Force (USAF) the Department of the Army (Army), the USCG and the DHS, and provided them with the specific areas under consideration as right whale critical habitat and more complete descriptions of the essential features under consideration. NMFS received responses from the Navy and the USMC (combined response) as well as the USCG, the DHS and the USAF.

In its response, the USCG stated that it considered it unlikely that its operations, exercises, and training associated with National and Homeland Security, separately or in aggregate would affect or adversely modify the essential features of critical habitat. USCG activities include search and rescue, drug and illegal migrant interdiction, fishing regulation enforcement, maritime law enforcement activities and operating as a joint service in consort with the DOD during time of war or as directed by the President. The DHS response addressed the relationship of homeland

security to national security. DHS noted that National Security and Homeland Security functions are managed by different agencies in the federal government and are funded separately and typically address different threat scenarios and theaters. DHS's reply stated that laws and regulations written prior to the creation of the Department of Homeland Security do not reflect this duality, and may narrow consideration to National Security interests without fully addressing Homeland Security concerns both as a stand-alone function and as an element of comprehensive approach to National Security. DHS stated that as a result, agency determinations and policies might fail to fully account for Homeland Security. DHS did not identify any specific national security impacts associated with the designation.

The USAF noted in its reply that while the proposed critical habitat areas are heavily used for flight operations, restrictions on flight operations are not currently imposed within the boundaries of the 1994 designated critical habitat for right whales. Based on our analysis USAF flights in the area are not likely to affect the essential features; therefore, there would be no need for consultations or project modifications and the critical habitat designation will not impact USAF operations.

On January 24, 2011, NMFS received a combined Navy and USMC response. In this response the Navy stated that, after thorough review, they had concluded that current testing and training activities will not affect the essential physical and biological features of right whale feeding and calving critical habitat. Within geographic areas of both Unit 1 and Unit 2, Navy activities include naval vessel sea trials; torpedo firing exercises (TORPEX); unit level training activities; anti-submarine warfare exercises (ASW); and ordnance training exercises.

5 OTHER RELEVANT IMPACTS

Other critical habitat designations have identified three broad categories of other relevant impacts: conservation benefits, both to the species and to society; impacts on governmental or private entities that are implementing existing management plans that provide benefits to the listed species; and educational and awareness benefits. As discussed below, large whales, including the North Atlantic right whale, currently provide a range of benefits to society. Because these benefits currently exist, we do not interpret them as resulting from the critical habitat designation per se. However, because the features that form the basis of the critical habitat designation are essential to conservation of the listed species, the protection of critical habitat from destruction or adverse modification may at minimum prevent loss of the benefits currently provided by the species and may contribute to an increase in the benefits the species provides to society in the future.

Where possible, the benefits of critical habitat designation should be described on an area-by-area basis to provide the best available information to evaluate the impacts of designating critical habitat for the North Atlantic right whale. Data are not available to quantify or monetize the benefits, so the benefits are described qualitatively.

5.1 Conservation Benefits

The primary goal of the critical habitat provisions of the ESA is to protect critical habitat from destruction or adverse modification by federal activities and, therefore, enhance the potential for species recovery. This is accomplished through the designation of areas that contain the identified essential features. Hence, the designation of critical habitat is focused on conservation of the listed species. In addition to contributing to recovery of the endangered North Atlantic right whale, benefits associated with project modifications required through section 7 consultation would include avoiding the destruction or adverse modification of the essential features and the ecosystem functions they provide. The benefits described below are partially co-extensive benefits because they will result from both listing and critical habitat designation, as well as a variety of existing laws and regulations. The protection of the essential features alone will not bring about the species' recovery. However, because these features are essential to the conservation of the species, protecting them is expected to maintain and potentially increase benefits provided by these species. Though economic benefits of the designation are discussed above in Section 2.1, we discuss the potential benefits of the designation here as well, because they flow from the conservation of the North Atlantic right whale and preservation of the copepod essential feature.

5.1.1 Benefits of the Designation to the North Atlantic Right Whale

By definition, the essential features are "essential to the conservation" of the species; in other words, conservation of the species as defined in the ESA is not possible without the presence and protection of the features. We connect the essential features of North Atlantic right whale critical habitat to the recovery of this species by designating features essential for foraging and calving. Thus, preventing the destruction or adverse modification of designated critical habitat provides for the conservation of right whales, and the benefits of the species and their habitat can be expected at minimum to persist (not to diminish) as the right whales increase in abundance.

Benefits of the right whales may also be expected to increase as a result of conservation, given the reasonable assumption that local abundance and density of this species leads to increased non-consumptive enjoyment of the species, such as whale watching activities.

5.1.2 Economic Benefits Associated with Recovery of the North Atlantic Right Whale

Other critical habitat designations have described the conservation benefits of designation in terms of biological or ecological metrics and with qualitative descriptions of societal use values, due to limited reliable information on the monetary value of these benefits. The economic value of right whales can be estimated in part by such metrics as increased visitation and user enjoyment measured by the value of whale watching activities. Whale watching is a significant economic activity that occurs within Unit 1. Such activity may occur during a commercial whale watching trip, or while engaging in recreational fishing or boating. While we are unable to give an economic baseline value of whale-watching activity in Unit 1, we know that in 2008, direct expenditure on whale watching trips in New England was about $35 million. When indirect expenditures are included ($91 million), the total number increases to $126 million (O'Connor et al. 2009). Direct expenditures on whale-watching trips can be loosely interpreted as an overestimate of producer surplus. Indirect expenditures can be viewed as a proxy for whale watchers' WTP; it is likely an underestimate. In 2008, an estimated 910,000 tourists went on boat-based whale watching trips from ports in Massachusetts, Maine, New Hampshire, and Rhode Island. The main species viewed included large cetacean species fin whale, humpback whale, minke whale, North Atlantic right whale and small cetacean species including Atlantic white-sided dolphin and harbor porpoise (O'Connor et al. 2009). We do not have data that indicates what percentage of these trips was taken in Unit 1 of the critical habitat area.

We conclude that non-negligible economic benefits will result from the designation of critical habitat because the protection of the critical habitat from destruction or adverse modification is expected at minimum to assist in preventing the loss of existing benefits that North Atlantic right whales provide to society, and may contribute to an increase in such benefits in the future. The critical habitat designation for right whales is focused on the species' recovery to the point at which ESA protections are no longer necessary. Existence value reflects the utility the public derives from the knowledge that species continue to exist. As discussed, these values are not described in this document, as the economic studies needed to quantify those benefits are not available.

5.1.3 Economic Benefits of Preventing Loss of the Essential Foraging Features

As discussed, commercial fishing is the largest revenue generating activity occurring within the critical habitat area (see Table 1, Section 2.1 Economic Baseline)). The features characteristic of right whale foraging habitat that are essential to the conservation of the North Atlantic right whale are a combination of both biological and physical oceanographic features. These are: (1) the physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate *Calanus finmarchicus* for right whale foraging, namely prevailing currents and circulation patterns, bathymetric features (basins, banks, and

channels), oceanic fronts, density gradients, and temperature regimes; (2) low flow velocities in Jordan, Wilkinson, and Georges Basin that allow diapausing *Calanus finmarchicus* to aggregate passively below the convective layer so that the copepods are retained in the basins; (3) late stage *Calanus finmarchicus* in dense aggregations in the Gulf of Maine and Georges Bank region; and (4) diapausing *Calanus finmarchicus* in aggregations in the Gulf of Maine and Georges Bank region. The copepod *Calanus finmarchicus* is a keystone species in the GoM Georges Bank ecosystem serving as principal prey for numerous species of fish as well as marine mammals including the North Atlantic right whale. Activities within the designated areas include both consumptive (e.g., commercial and recreational fishing) and non-consumptive (e.g., wildlife viewing) activities, some or all of which are dependent to some extent on the existence of copepods. A number of economically valuable commercial and recreational fisheries occur within the geographic area of Unit 1. The Marine Recreational Fisheries Statistics Survey estimates more than 2.49 million recreational anglers took approximately 773,112 saltwater fishing trips throughout Unit 1 during 2009. These trips were primarily conducted using private or rental vessels (Table 2). Because it is a primary food source for commercially and recreationally valuable species of fish such as cod, haddock, herring and mackerel, conservation of *C. finmarchicus* will benefit commercial and recreational fisheries. Because the essential foraging features create the conditions necessary to aggregate the dense concentrations of copepods that are necessary to meet the energetic requirements of the North Atlantic right whale the protection of these features will preserve the benefits they provide directly to the species but also to the ecosystem as a whole.

Table 20: The number of coastal, non-coastal, and out-of-state resident recreational anglers and number of trips taken by mode of transport originating from each State adjacent to Unit 1 in 2009 (NMFS, Fisheries Statistics Division. September 24, 2010).

State	Number of Recreational Anglers	Mode of Transport	Number Trips
Maine	453,318	Party Boat	10,419
		Private / Rental Vessel	14,275
		Charter	2,715
New Hampshire	134,381	Party	55,669
		Private / Rental Vessel	298,609
		Charter	9,354
Rhode Island	320,396	Party Boat	5,196
		Private / Rental Vessel	14,459
		Charter	4,396
Connecticut	531,341	Party Boat	521
		Charter	1,246
Massachusetts	1,053,717	Party Boat	29,998
		Private / Rental Vessel	298,609
		Charter	27,646

TOTAL	**2,493,153**	**773,112**

5.1.3 Economic Benefits of Preventing Loss of the Essential Calving Features

The economic benefits of preventing loss of the essential calving features in Unit 2 are directly tied to the recovery of the North Atlantic right whale. These economic benefits are discussed above in Section 5.1.2. As mentioned in the Biological Source Document (NMFS 2014), we have determined that the North Atlantic right whale cannot be recovered without the essential calving features we have identified in our rulemaking. The essential calving features identified for the North Atlantic right whale critical habitat designation are especially tied to the recovery of this species, because it provides the appropriate habitat necessary for increasing the species' population size. Therefore, without protecting the essential calving features, the economic benefits associated with recovery of the species will not be provided.

5.2 Education and Awareness Benefits that May Result from the Designation

Potential benefits for education and awareness arising from the critical habitat designation result when non-federal government entities or members of the general public responsible for or interested in North Atlantic right whale conservation, change their behavior or activities when they become aware of the designation and the importance of the critical habitat areas and features. Designation of critical habitat raises the public's awareness that there are special considerations that may need to be taken within the area. Similarly, state and local governments may be prompted to carry out programs to complement the critical habitat designation and benefit the North Atlantic right whale. Those programs would likely result in additional impacts of the designation. However, it is impossible to quantify the beneficial effects of the awareness gained or the secondary impacts from state and local programs resulting from the critical habitat designation.

5.3 Impact on Natural Resource Agencies with Existing Management Plans Benefitting the Essential Features

Numerous other critical habitat designations have evaluated the impacts of designation on relationships with, or the efforts of, private and public entities that are involved in management or conservation efforts benefiting listed species. Impacts analyses for some of these previous designations found that the additional regulatory layer of a designation could negatively impact the conservation benefits provided to the listed species by existing or proposed management or conservation plans. For example, NMFS has previously considered the impacts of designation on Indian tribal sovereignty and participation in conservation activities for 13 Evolutionarily Significant Units of Pacific Salmon (*Oncorhynchus* spp.) and Steelhead *(O. mykiss)* in Washington, Oregon, and Idaho (69 FR 74572, 74622; Dec. 14, 2004). FWS has considered the impacts of designation on private entities that have entered into Habitat Conservation Plan agreements under the ESA, and federal, state or local conservation plans implemented under a variety of legal authorities for the San Bernardino Kangaroo Rat *(Dipodomys merriami parvus)* and Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon (e.g., 72 FR 33808, June 19, 2007; 72 FR 30279, May 31, 2007). One court held that this type of impact is a permissible interpretation of "other relevant impacts" under section 4(b)(2)

(Center for Biological Diversity et al., v. Dept of the Interior, 240 F. Supp. 2d 1090, 1105 (D. Ariz. 2003) and stated,

> *"It is certainly reasonable to consider a positive working relationship relevant, particularly when that relationship results in the implementation of beneficial natural resource programs, including species preservation."*

Similar to national security impacts, impacts on entities responsible for natural resource management or conservation plans that benefit listed species or the functioning of those plans, depend on the type and number of section 7 consultations that may result from the critical habitat designation in the areas covered by the plans.

There are two existing resource management areas that will likely require section 7 consultation in the future, when the responsible federal agencies revise their management plans or associated regulations, or implement management actions: Stellwagen Bank and Gray's Reef National Marine Sanctuaries, which are both managed by NOS. Future consultations regarding Stellwagen Bank and Gray's Reef National Marine Sanctuaries likely would be driven by potential impacts to the right whales; thus, these consultations would occur even in the absence of the designation, and incremental impacts from this designation, including impacts on NOS's implementation of its management functions, are not expected. As discussed above, existing management plans and associated regulations protect existing marine resources, and do not specifically protect the essential features for purposes of conserving North Atlantic right whales and facilitating successful calving. Thus, the critical habitat designation may provide unique benefits for this species, beyond the benefits provided by existing management plans.

6. SYNTHESIS: IMPACTS OF INCLUDING UNIT 1 AND UNIT 2 IN THE CRITICAL HABITAT DESIGNATION FOR THE NORTH ATLANTIC RIGHT WHALE.

As discussed, the ESA requires that in proposing to designate or revise critical habitat we take into consideration the economic, national security, and other relevant impacts of designating any particular area as critical habitat. Because the ESA does not specify methods or criteria for the consideration of impacts, the agency has considerable discretion in evaluating the various impacts and in deciding whether to exclude any particular area.

6.1 Economic Impacts

Economic Impacts in Unit 1

As discussed, there are three categories of “current” federal actions – those for which we have a past consultation history and which are expected to recur in the future -- which "may affect" the essential features in the geographical area of Unit 1 (NPDES permitting, oil spill response, and LNG facilities). There are no categories of current activities that will solely affect the essential features; all categories of current activities that “may affect” the essential features may also affect the species. We estimate a total of 30 consultations over the next 10 years for these activities and total administrative costs of $152,400. While EPA’s regulation of water quality, including pollution discharges through NPDES permitting, and the USCG’s oil spill response activities may affect both the species and essential features, these activities are more likely to affect the essential features than the species. We concluded that the administrative and project modification costs associated with conducting section 7 consultations on 21 EPA and 6 USCG actions over the next 10 years in Unit 1 are attributable to the critical habitat designation. Project modification costs for these activities remain speculative and could not be estimated. .

There is one new category of “future” federal activity that may result in incremental impacts to the essential foraging habitat features: oil and gas exploration and development. Because we do not have a consultation history on this activity, we are unable to estimate the number of projected section 7 consultations, and their associated costs, due to uncertainty about the nature, scope, and scale of categories of future activities.

Economic Impacts within Unit 2

As discussed, there are two categories of current federal actions which "may affect" the essential features in the geographical area of Unit 2 (dredging and spoil disposal and permitting of marine construction). All categories of current activities that “may affect” the essential features may also affect the listed species. However, we did not identify any current activities that were more likely to have impacts attributable to the essential features than the species. We estimate a total of 158 consultations over the next 10 years for these activities and total administrative costs of $802,640.

Of the four new categories of future activities that may affect the essential features, all may also affect the species. One category of future activities would result in incremental impacts to the essential features of calving habitat: offshore renewable and alternative energy development. Because we do not have a consultation history for this activity, we are unable to estimate the number of projected section 7 consultations, and their associated costs, due to uncertainty about the nature, scope, and scale of categories of future activities.

6.2 National Security Impacts

As discussed above in section 4, we concluded there would be no national security impacts associated with the designation of right whale critical habitat in either Unit 1 or Unit 2.

6.3 Other Relevant Impacts

We identified several types of positive conservation benefits expected to result from the designation of critical habitat in both Unit 1 and Unit 2. Because the physical and biological features underpinning the critical habitat are by definition "essential to the conservation" of the species, conservation benefits to the listed species would be expected to result when the section 7 consultation process avoids destruction or adverse modification of critical habitat, or avoids lesser adverse effects to critical habitat that may not rise to the level of adverse modification. The critical habitat designation for right whales is focused on the species' recovery so that the protections of the ESA are no longer necessary. Existence value reflects the utility the public derives from the knowledge that species continue to exist. In Unit 1, copepods are an essential element of the ecosystem and serve as a food source for a wide variety of marine species, including commercially important fish species. Designation and protection of critical habitat could result in project modifications that avoid adverse impacts to critical habitat and would benefit other components of the ecosystem.

As discussed, there is the potential for education and awareness benefits arising from the designation of right whale critical habitat. These benefits result when states or local governments, or members of the public, change their behavior or activities when they become aware of the designation and the importance of the critical habitat areas and features.

7 DISCRETIONARY EXCLUSION ANALYSIS

Based on the above consideration of positive and negative impacts of including Units 1 and 2 in the critical habitat designation, we do not exercise our discretion to exclude all or any part of these units from the designation on the basis of these impacts.

Section 4(b)(2) of the ESA provides the Secretary with broad discretion to exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless it is determined, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned. The agency has considerable discretion in evaluating the various impacts and determining how the impacts will be used in deciding whether to exclude any particular area. Based on our consideration of impacts above, we are not excluding any particular areas from the critical habitat designation based on economic, national security or other relevant impacts.

We have analyzed the economic, national security, and other relevant impacts of designating critical habitat. While we have utilized the best available information and an approach designed to avoid underestimating impacts, many of the potential impacts are speculative and may not occur in the future. Our conservative identification of potential incremental economic impacts indicates that any such impacts would be very small, resulting from very few (less than 17) federal section 7 consultations annually. Further, the analysis indicates that there is no particular area within the units designated as critical habitat where economic impacts would be particularly high or concentrated. No impacts to national security are expected. Other relevant impacts include conservation benefits of the designation, both to the species and to society. Because the features that form the basis of the critical habitat designation are essential to the conservation of North Atlantic right whales, the protection of critical habitat from destruction or adverse modification may at minimum prevent loss of the benefits currently provided by the species and may contribute to an increase in the benefits of these species to society in the future. While we cannot quantify nor monetize the benefits, we believe they are not negligible and would be an incremental benefit of this designation. Moreover, our analysis indicates that all potential future section 7 consultations on impacts to critical habitat features would also be conducted for the projects' potential impacts on the species, resulting in at least partial co-extensive impacts of the designation and the baseline listing of the species. Therefore, we have concluded that there is no basis to exclude any particular area from the critical habitat units.

8 REFERENCES

Baumgartner, Mark, Tim V.N. Cole, Phillip J. Clapham, and Bruce R. Mate. 2003. North Atlantic right whale habitat in the lower Bay of Fundy and on the SW Scotian Shelf during 1999-2001. Marine Ecology Progress Series. 264: 137-154.

Baumgartner, M. F. , Mayo , C. A. , and Kenney , R. D. 2007. Enormous carnivores, microscopic food, and a restaurant that's hard to find. In "The Urban Whale: North Atlantic Right Whales at the Crossroads" (S. D. Kraus and R. M. Rolland , eds.) , pp. 138 – 171 . Harvard University Press, Cambridge, MA

Baumgartner, M.F. and B.R. Mate. 2003. Summertime foraging ecology of North Atlantic right whales. Marine Ecology Progress in Series 264:123–135.

Beardsley, Robert C., Ari W. Epstein, Changsheng Chen, Karen F. Wishner, Michael C. Macaulay, and Robert D. Kenney. 1996. Spatial variability in zooplankton abundance near feeding right whales in the Great South Channel. Deep Sea Research II. 43(7-8): 1601-1625.

Bigelow HB 1927. Physical oceanography of the Gulf of Maine. Bull Bur Fish Wash 40:511–1027.

Brown, W. S., and J. D. Irish, 1992: The annual evolution of geostrophic flow in the Gulf of Maine. J. Phys. Oceanogr., 22, 445–473.

Brunswick County Planning and Community Development. 2010. Brunswick County Mini Data Book, Winter 2010. Downloaded on October 19, 2012 from: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCEQFjAA&url=http%3A%2F%2Fwww.brunswickcountync.gov%2FPortals%2F0%2Fbcfiles%2Fplanning%2Fplan_Brunswick_County_Mini-Data_Book.pdf&ei=0OKGUJG2DKXWygGz24AQ&usg=AFQjCNFWVQ4x8rMgdj4H65j7NosAnrmkmA&cad=rja

Clapham, Phillip J. and Richard M. Pace. 2001. Defining triggers for temporary area closures to protect right whales from entanglements: issues and options. NEFSC Ref. Doc 01-06.

Davis, C.S. 1987 Zooplankton life cycles "In: Backus, R.H., Bourne, D.W. (Eds.), Georges Bank. MIT Press, Cambridge, MA" p. 254-267.

Durbin EG (1997) Zooplankton dynamics of the Gulf of Maine and Georges Bank region. In: Wallace GT, Braasch EF (eds.) Proc Gulf of Maine Ecosystem Dynamics Scientific Symp Workshop. RARGOM Rep 97–1. Regional Association for Research on the Gulf of Maine, Hanover, NH, p 53–68.

Durbin EG, Runge JA, Campbell RG, Garrahan PR, Casas MC, Plourde S. 1997. Late fall–early winter recruitment of Calanus finmarchicus on Georges Bank. Mar Ecol Prog Ser 151:103–114.

Fingersh L., M. Hand, and A. Laxson. 2006. Wind Turbine Design Cost and Scaling Model. National Renewable Energy Laboratory Technical Report. NREL/TP-500-40566, December 2006. Available electronically at http://www.osti.gov/bridge.

Gerber, R.P. 2000. An identification manual to the coastal and estuarine zooplankton of the Gulf of Maine region from Passamaquoddy Bay to Long Island Sound. Acadia Productions, Brunswick, Maine.

Horry County Finance Department. 2009. Comprehensive Annual Financial Report: June 30, 2009. Downloaded last on October 26, 2012 from : http://www.horrycounty.org/forms/finance/CAFR/2009cafr_complete.pdf

Industrial Economics (IEc). 2013. Economic Analysis of Critical Habitat Designation of Marine Habitat for the Northwest Atlantic Ocean Distinct Population Segment of the Loggerhead Sea Turtle Draft Report. July 11, 2013, 217 pp.

Jepson, M., Kitner, K., Pitchon, A., Wicke Perry, W., and Stoffle, B. Undated. Potential Fishing Communities in the Carolinas, Georgia and Florida: An effort in baseline profiling and mapping. Available at: http://www.safmc.net/science-and-statistics/pdf/FishingCommunityReport.pdf

Jiang M, Brown MW, Turner JT, Kenney RD, Mayo CA, Zhang Z, Zhou M. 2007. Springtime transport and retention of *Calanus finmarchicus* in Massachusetts and Cape Cod Bays, USA, and implications for right whale foraging. Mar Ecol Prog Ser. 349:183-197.

Johnson, Catherine, James Pringle, and Changsheng Chen. 2006. Transport and retention of dormant copepods in the Gulf of Maine. Deep-Sea Research II. 53: 2520–2536.

Kenney, Robert D., 2001. Anomalous 1992 spring and summer right whale (*Eubalaena glacialis*) distributions in the Gulf of Maine. J Cetacean Res Manage. (Spec Issue) 2: 209–223.

Kenney, Robert D., 2011. Personal communication in letter to NMFS from Excelerate Energy, October 11, 2001.

Kenney, Robert D., Howard E. Winn, and Michael Macaulay. 1995. Cetaceans in the Great South Channel, 1979-1989: right whale (*Eubalaena glacialis*). Continental Shelf Research. 15(4/5): 385-414.

Kenney, Robert D., Charles A. Mayo, and Howard E. Winn. 2001. Migration and foraging strategies at varying spatial scales in western North Atlantic right whales: a review of hypotheses. J. CETACEAN RES. MANAGE. (SPECIAL ISSUE) 2: 251-260.

Lynch, Daniel R., Wendy C. Gentleman, Dennis J. McGillicuddy, and Cabell S. Davis. 1998. Biological/ physical simulations of *Calanus finmarchicus* population dynamics in the Gulf of Maine. Marine Ecology Progress Series. 169: 189-210.

Marshall SM, Orr AP. 1955. The biology of a marine copepod, Calanus finmarchicus (Gunnerus). Oliver & Boyd, Edinburgh.

Mayo, Charles. A. and Marilyn K. Marx. 1990. Surface behavior of the North Atlantic right whale, Eubalaena glacialis, and associated zooplankton characteristics. Canadian J. of Zoology. 68(10): 2214-2220.

Meise, C. J. and J.E. O'Reilly. 1996. Spatial and seasonal patterns in abundance and age-composition of *Calanus finmarchicus* in the Gulf of Maine and on Georges Bank: 1977-1987. Deep Sea Research II. 43(7-8):1473-1501.

Michel, J., A.C. Bejarano, C.H. Peterson, and C. Voss 2013. Review of Biological and Biophysical Impacts from Dredging and Handling of Offshore Sand. U.S. Department of the Interior, Bureau of Ocean Energy Management, Herndon, VA. OCS Study BOEM 2013-0119. 258 pp.

Moore, J. C. and E. Clark. 1963. Discovery of right whales in the Gulf of Mexico. Science 141(3577): 269.

Mountain DG. 2002. Potential consequences of climate change for the fish resources in the MidAtlantic region. In: McGinn NA, editor. Fisheries in a changing climate. Bethesda (MD): American Fisheries Society, Symposium 32.

Murison, L.D. and D.E. Gaskin. 1989. The distribution of right whales and zooplankton in the Bay of Fundy, Canada. Canadian J. of Zoology. 67(6): 1411-1420.

Musial W, Butterfield S. 2004. Future for offshore wind energy in the United States: preprint. In: Energy Ocean 2004. Palm Beach FL. Available at: http://www.nrel.gov/docs/fy04osti/36313.pdf

National Marine Fisheries Service (NMFS). 2006. "The Economic Contribution of Marine Angler Expenditures in the United States, 2006. NOAA Technical Memorandum NMFS-F/SPO-94. pp. 85, 103, 112.

NMFS 2006. Review of the Status of the Right Whales in the North Atlantic and North Pacific Oceans. Prepared by NOAA. National Marine Fisheries Service (NMFS). 68 pp.

NMFS, 2007. Endangered Species Act Section 7 Consultation Biological Opinion. Reinitiation of consultation on issuance of license to Northeast Gateway Energy Bridge, LLC by MARAD to construct, own, and operate an LNG deepwater port. F/NER/2007/07653. November 30, 2007.

NMFS 2010. Southeast Fisheries Science Center Commercial Fisheries Statistics Query. Query conducted September 2010.

NMFS 2010b. Recreational Fisheries Statistics Queries. Query conducted on September 20, 2010.

NMFS 2015. North Atlantic Right Whale (*Eubalaena glacialis*) Source Document for the Critical Habitat Designation: A review of information pertaining to the definition of "critical habitat" December 2013. 166 pp.

National Research Council (NRC). 1975. Petroleum in the Marine Environment. National Academy Press, Washington, D.C.

National Research Council (2005). Oil Spill Dispersants: Efficacy and Effects. Washington, DC: The National Academies Press, 400 pp.

Newcombe CP, Jensen JO. 1996. Channel suspended sediment and fisheries: A synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16(4):693-727.

NOAA. 2008. Offshore Aquaculture in the United States: Economic Considerations, Implications & Opportunities. Available at: http://aquaculture.noaa.gov/pdf/econ/econ_rpt2_all.pdf

O'Connor, S., Campbell, R., Cortez, H., & Knowles, T. 2009. Whale Watching Worldwide: tourism numbers, expenditures and expanding economic benefits, a special report from the International Fund for Animal Welfare, Yarmouth MA, USA, prepared by Economists at Large. p. 228

O'Shea, T.J. & Brownell, R.L. Jr (1994) Organochlorine and metal contaminants in baleen whales: a review and evaluation of conservation implications. Science of the Total Environment, 154, 179–200.

Pace, R. M. and R. L. Merrick. 2008. Northwest Atlantic Ocean Habitats Important to the Conservation of North Atlantic Right Whales (*Eubalaena glacialis*) National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Woods Hole, Massachusetts, Northeast Fisheries Science Center Reference Document 08-07

PCCS (2005). Effects of Boston Outfall on the Marine Community of Cape Cod Bay, Provincetown Center for Coastal Studies March 7, 2005

Rosenbaum, H.C, R.L. Brownell Jr., M.W. Brown, C. Schaeff, V. Portway, B.N. White, S. Malik, L.A. Pastene, N.J. Patenaude, C.S. Baker, M. Goto, P.B. Best, P.J. Clapham, P. Hamilton, M. Moore, R. Payne, V. Rowntree, C.T. Tynan and R. DeSalle. 2000.

Worldwide genetic differentiation of *Eubalaena*: questioning the number of right whale species. Molecular Ecology 9:1793-1802.SAFMC and NMFS 2002

Snyder, B. and M.J. Kaiser. 2009. Ecological and economic cost-benefit analysis of offshore wind energy. Renewable Energy 34: 1567–1578.

USGS (2007) Processes Influencing the Transport and Fate of Contaminated Sediments in the Coastal Ocean, Boston Harbor and Massachusetts Bay, Circular 1302. U.S. Department of the Interior, U.S. Geological Survey, Michael H. Bothner and Bradford Butman, editors. Prepared in cooperation with the Massachusetts Water Resources Authority, U.S. Coast Guard, and Woods Hole Oceanographic Institution

Visser, A. W. and S. H. Jonasdittir 1999. Lipids, buoyancy and the seasonal vertical migration of *Calanus finmarchicus*. Fisheries Oceanography, 8(Suppl 1): 100-106.

Watkins WA, Schevill WE (1976) Right whale feeding and baleen rattle. J Mammal 57:58–66.

Wilson, C.B. 1932. Copepods of the Woods Hole region. Bull. U.S. Nat. Hist. Mus. 158: 635 pp + 41. pl.

Wishner, Karen F., E. Durbin, A. Durbin, M. Macaulay, H. Winn, R. Kenney. 1988. Copepod patches and right whales in the Great South Channel off New England.Bulletin of Marine Science. 43(3):825-844.

Wishner, Karen F., Jill R. Schoenherr, Robert Beardsley, and Changsheng Chen. 1995. Abundance, distribution and population structure of the copepod Calanus finmarchicus in a springtime right whale feeding area in the southwestern Gulf of Maine. Continental Shelf Research. 15(4/5): 475-507.

Woodley TH, Gaskin DE. 1996. Environmental characteristics of North Atlantic right and fin whale habitat in the lower Bay of Fundy, Canada. Can J Zool. 74: 75–84.

APPENDIX A: DESIGNATED CRITICAL HABITAT UNITS

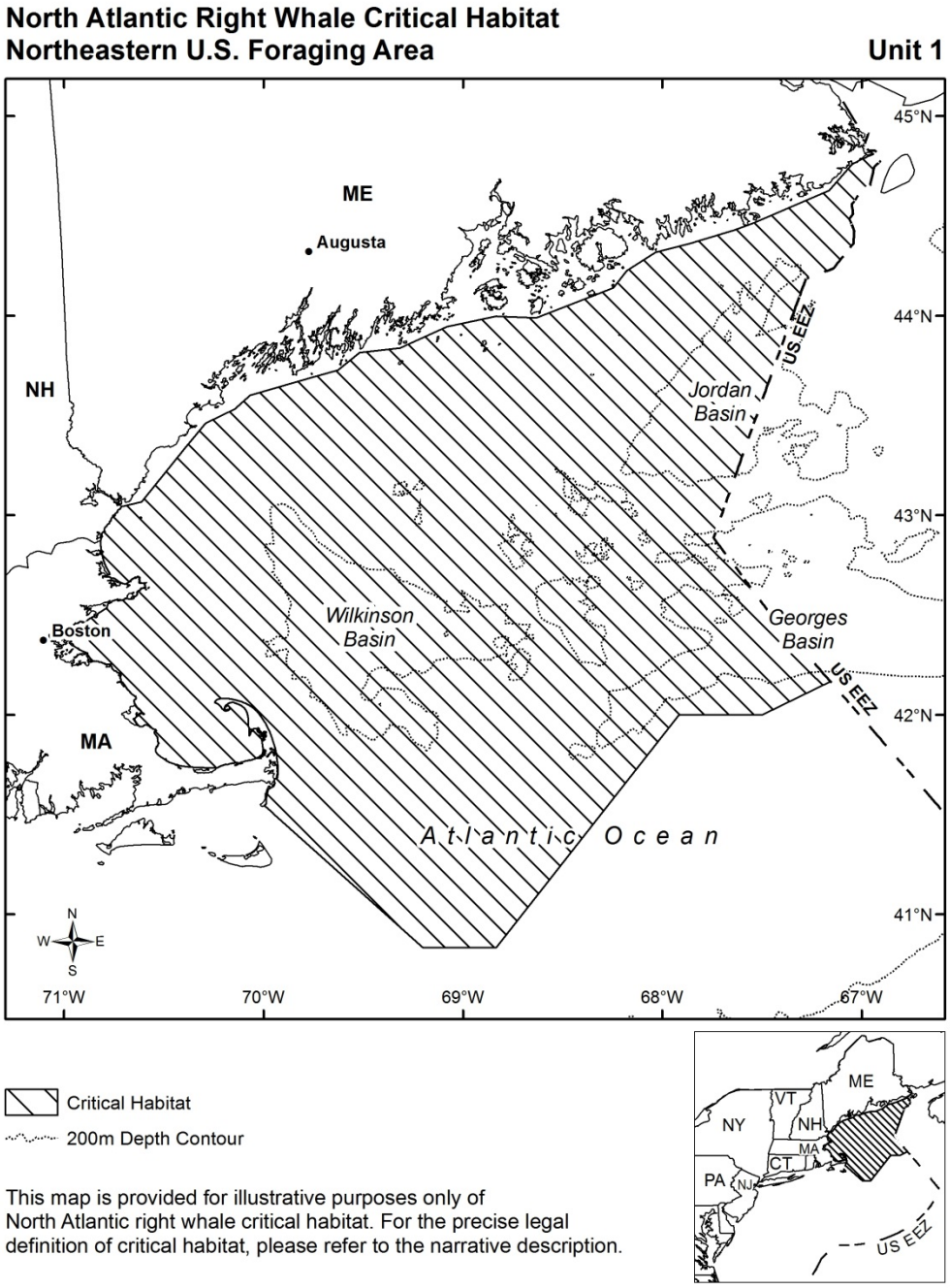

Figure A-1: Unit 1: Specific areas on which the essential features of North Atlantic right whale foraging habitat are found

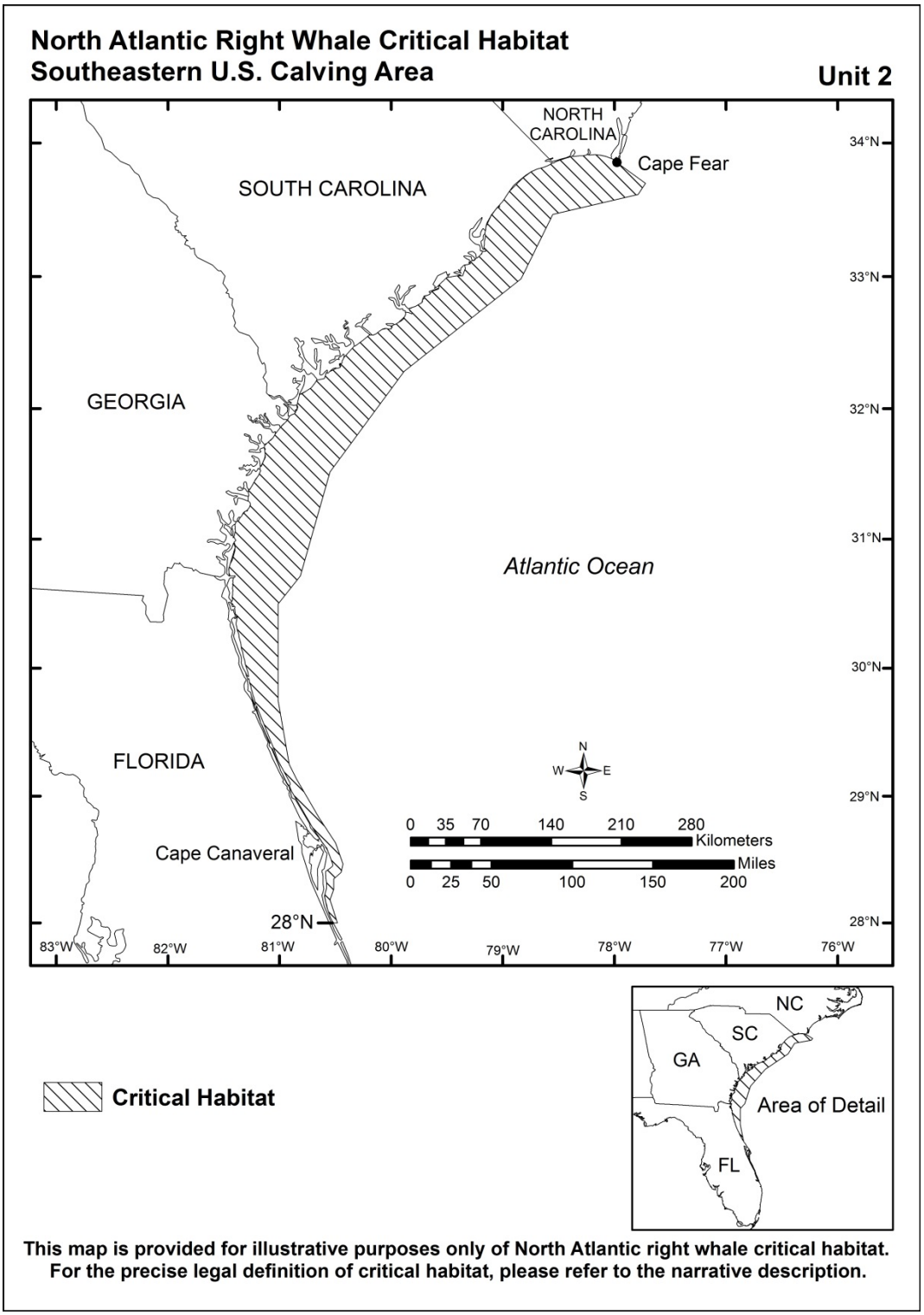

Figure A-2: Unit 2: Southeastern Calving Critical Habitat for North Atlantic Right Whales.

APPENDIX B: FINAL REGULATORY FLEXIBILITY ANALYSIS

Introduction

The Regulatory Flexibility Act (RFA) establishes the principle that agencies shall endeavor, consistent with the objectives of specific rules and applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. The RFA does not contain any decision criteria; instead, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of alternatives to the proposed action and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the proposed action and applicable statutes. The following Final Regulatory Flexibility Analysis (FRFA) has been prepared pursuant to section 604 of the RFA.

According to the RFA, a FRFA must contain the following information:

(1) a statement of the need for, and objectives of, the rule;

(2) a statement of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a statement of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

(3) the response of the agency to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration in response to the proposed rule, and a detailed statement of any change made to the proposed rule in the final rule as a result of the comments;

(4) a description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

(5) a description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

(6) a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

Our analysis of these factors is based on the impacts analysis developed in the Section ESA 4(b)(2) Report.

1. Statement of the need for, and objectives of, the rule

This rule is needed in order to comply with the ESA's requirement to designate critical habitat to the maximum extent prudent and determinable when species are listed as threatened or endangered, and to respond to a petition to revise critical habitat for right whales in the North Atlantic. The objectives of this action are to help conserve endangered North Atlantic right whales by identifying critical habitat areas, consistent with the best available scientific information, that contain the physical and biological features essential to the conservation of the species and which may require special management considerations or protection. Once designated, this critical habitat can be protected through the ESA Section 7 consultation process in which NMFS and federal action agencies review the effects of federal actions on the survival and recovery of North Atlantic right whales. NMFS originally designated critical habitat for right whales in the North Atlantic in 1994 when they were listed with the right whales in the North Pacific as one species commonly called the "northern right whale." However, in April 2008, NMFS changed the way right whales were listed under the ESA by recognizing North Atlantic right whales and North Pacific right whales are two separate species. As NMFS was developing a proposed rule to designate critical habitat for the newly listed species of North Atlantic right whales, on October 1, 2009, NMFS received a petition to revise the 1994 critical habitat designation for right whales in the North Atlantic. In response, pursuant to Section 4(b)(3)(D), NMFS published a combined 90-day finding and 12-month determination on October 6, 2010, that the petition presented substantial scientific information indicating that the requested revision may be warranted, and that we intended to issue a proposed rule regarding critical habitat for the North Atlantic right whale (75 FR 61690). As noted there, because the biological basis and analysis for the 1994 critical habitat designation was based on the North Atlantic population of right whales, that analysis and designation applies to the North Atlantic right whales as they were subsequently listed as a separate species in 2008, and would remain legally valid and applicable until it is replaced through the completion of ongoing rulemaking. The purpose of this rule is to replace the 1994 designation for the population of right whales in the North Atlantic Ocean with two new areas of critical habitat for the North Atlantic right whale pursuant to ESA sections 4(a)(3)(A)(i) and 4(b)(3)(D).

2. Significant issues raised by public comments in response to the initial regulatory flexibility analysis, assessment by agency, and changes to proposed rule as result of such comments

NMFS published a proposed rule to designate two new areas of critical habitat and requested public comment (80 FR 9314, February 20, 2015). NMFS received 261 letters and general comments on the proposed rule and its supporting analysis. In addition, we received a total of 21,035 form letters and two petitions with thousands of signatures.

None of these comments focused specifically on the Initial Regulatory Flexibility Analysis presented in the Draft Section 4(b)(2) Report (July 2014). However, one comment expressed concern that we did not evaluate the potential economic impact of the proposed designation on ferry operators, the majority of whom are classified as small business or entities according to the commenter.

We did not identify the coastal ferry services as a small business that might be impacted by this rule, because we concluded that transiting vessels, whether military, civilian, or commercial do

not impact the essential foraging features of critical habitat. As a result, there will be no impact to the operation of ferries as a result of the designation of critical habitat and, as such, no impacts to small business entities. We did not amend the rule or our analysis as a result of this comment (Comment 64 in the preamble to the Final Rule).

We received a number of comments concerning the location of the southern boundary of the proposed revised calving area critical habitat in Unit 2. These comments included a number of requests to keep the southern boundary for the proposed revised critical habitat the same as current critical habitat designated in 1994. These comments guided the formulation of the new preferred Alternative—Alternative 4. The analysis in the Section 4(b)(2) Report was updated to reflect this change to the Unit 2 boundaries.

3. Response of Agency to any comments filed by Chief Counsel for Advocacy of the Small Business Administration

Prior to the publication of the proposed rule and the Initial Regulatory Flexibility Analysis (IRFA, July 2014), the Chief Counsel of the Small Business Administration (SBA) provided several comments concerning the analysis regarding small entities and the impacts to these entities. The SBA stated that the Regulatory Flexibility Act requires an IRFA to identify the number and type of small businesses that may be affected. Because the potentially affected industries were identified, SBA recommended that NMFS research whether Census information may be available that would aid in identifying the number of small businesses as well as the impact the estimated costs could have on their yearly income and revenue. To address this comment, we solicited public comments through the proposed rule on all aspects of the proposed action including impacts to small businesses. We also directly consulted with the members of the Atlantic Large Take Reduction Team (ALWTRT), which includes industry representatives. However, no new information became available to alter our analysis, and no additional comments were received. In addition, the available Census data were not informative such that we could further refine our analysis of the number and type of small entities that may be affected by this rule.

SBA also stated that there did not appear to be any basis for concluding in our IRFA that potential project modifications that may be required to avoid adverse modification of critical habitat are unit costs such that total project modification costs would be proportional to the size of the project, and therefore it is not unreasonable to assume that larger entities would be involved in implementing the larger projects with proportionally larger project modification costs. SBA asked us to consider whether the modification costs are similar regardless of the size of the project, which could lead to proportionally larger costs for small projects than for larger projects. To respond in part to this comment, we noted that the particular statement referenced in the IRFA did not indicate an absolute conclusion, but instead indicated we were making what can be considered a ‘reasonable assumption.’ A more detailed discussion of the nature and type of impacts to small entities is presented in the section below.

Lastly, SBA asked how the agency came to the conclusion that the maximum, estimated, annualized, administrative cost to third parties of $33,696 - some portion of which could be borne by small entities - won’t have a significant effect on small entities if we aren’t clear on the

relative number of small entities that will be affected. To help address this question, we clarified in the IRFA and the proposed rule that this amount represents the cost to NMFS, other federal agencies, and third parties, combined. The total estimated annualized cost to third parties is $14,256, and the estimated cost for development of Biological Assessments (BA), which may be borne at least in part by third parties, is $19,440. The maximum total the annualized administrative cost to third parties is thus $33,696, some portion of which could be borne by small entities. Specific explanation in support of our conclusion that small entities are unlikely to be disproportionately affected is provided in the section below.

4. Description and estimate of the number of small entities to which the rule may apply

The Small Business Administration has established size standards for all for-profit economic activities or industries in the North American Industry Classification System (13 C.F.R. §121.201). 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. In 2007, the SBA, in recognition that changes in industry structure and the federal marketplace since its last overall review had rendered the size standards for some industries in need of revision, began a comprehensive review of its size standards. The SBA has subsequently been reviewing the size standards for groups of related industries on a sector by sector basis and revising the standards as appropriate (78 Fed. Reg. 37398, June 20, 2013; 78 Fed. Reg. 77343, December 23, 2013; 79 Fed. Reg. 33467, June 12, 2014).

The critical habitat rule does not directly apply to any particular entity, small or large. The rule would be implemented through ESA Section 7(a)(2), which requires that federal agencies insure, in consultation with NMFS, that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or destroy or, as relevant to this rule, destroy or adversely modify critical habitat. Consultations may result in economic impacts to federal agencies and proponents of proposed actions. Those economic impacts may be in the form of administrative costs of participating in a Section 7 consultation and, if the consultation results in required measures to protect critical habitat, project modification costs. As discussed in the Section 4(b)(2) Report, which serves as the basis for this FRFA, we determined that six types of federal actions that have occurred in the critical habitat areas in the past could result in incremental impacts from section 7 consultations related to the critical habitat. These activities are: Clean Water Act water quality/NPDES related actions implemented by the EPA; oil spill response actions by the USCG; dredging and spoil disposal implemented or permitted by the USACE; marine construction permitting by the USACE, including restoration and artificial reef placement; offshore energy regulation by BOEM; and authorization of sand extraction on the Outer Continental Shelf by BOEM. We project that 188 actions in these categories will be implemented over the next 10 years. However, we also determined that these activities would not require consultation solely due to impacts to critical habitat; these activities would require consultation due to impacts to the whale themselves, even in the absence of designated critical habitat. Additionally, we identified four categories of activities that have not occurred in the critical habitat areas in the past but, based on available information and discussions with action agencies, may occur in the future. If they do occur, these activities may adversely affect the essential features. These projected activities are: oil and gas exploration and development activities, directed copepod fisheries, offshore alternative energy development activities, and

marine aquaculture. As with past or ongoing federal activities in the critical habitat areas, these four categories of projected future actions may trigger consultation because they have the potential to adversely affect both the essential features and the whales themselves. However, we could not project the number of actions in these categories that would occur in the future, due to the lack of a consultation history or concrete plans by action agencies to implement these activities. Three categories of future activities were judged as being likely to have incremental impacts due to critical habitat impacts that would require project modifications, above and beyond any modifications required to address impacts to the whales: oil and gas exploration and development activities (Unit 1), directed copepod fishery (Unit 1), and offshore alternative or renewable energy activities (Unit 2). Consequently, costs of project modifications required through section 7 were considered to be incremental impacts of the designation.

We applied the conservative assumption that all future activities that may affect the essential features will require formal consultations. Based on analyses conducted by Industrial Economics, Inc. (Industrial Economics 2014), we project that each formal consultation will result in the following additional costs to address critical habitat impacts: $1,400 in NMFS' costs; $1,600 in action agency costs; and $880 in third party (e.g., permittee) costs, if applicable. Administrative costs for the projected number of formal consultations representing incremental costs of the critical habitat designation were estimated in the proposed rule to total approximately $82,296 per year. Based on the addition of 22 consultations that may occur as a result of the expanded Unit 2 area, the incremental administrative costs of the critical habitat designation are now expected to total approximately $95,504 per year. The rule, implemented through ESA section 7(a)(2) consultations, may indirectly affect small businesses, small nonprofit organizations, and small governmental jurisdictions that engage in the 10 categories of activities listed above, through accrual of administrative costs ($880 per action). Small entities that engage in water quality/NPDES related actions, oil spill response activities, oil and gas exploration and development activities, directed copepod fisheries, offshore alternative energy development activities, and marine aquaculture activities authorized or funded by a federal agency that may affect the essential features could also incur costs in the way of project modifications necessary to avoid destroying or adversely modifying critical habitat. As we discuss in the 4(b)(2) report, it isn't possible for us to estimate what these costs might be, individually or collectively. The rule may also indirectly benefit small entities that benefit from or strive for the protection of the essential features, such as fishing operations and whale watch companies.

We do know from the consultation record that applicants for federal permits or funds have included small entities. However, our consultation tracking database does not track the identity of past permit recipients or whether the recipients were small entities; therefore, it does not provide a basis to estimate the number of small businesses that may be indirectly affected by this rule. It is also difficult to estimate the number of small entities that may be affected indirectly by this rule due to a lack of specific information regarding the nature, scope, and timing of future projects that would undergo section 7 consultations.

Unit 1 – Gulf of Maine-Georges Bank Region

Commercial fishing is the largest revenue generating activity occurring within critical habitat Unit 1. However, commercial fishing is not identified as an activity for which project

modifications might be necessary. As discussed previously, fishing operations may benefit from this rule and the protection of copepods, a feature of designated critical foraging habitat, that Section 7 consultations may provide. SBA defines a small business in the commercial fishing sector as a firm with receipts (gross revenues) of up to $20.5 million. As such, virtually all current fishing operations in the eastern U.S. are small businesses. In 2014, based on a review of the number of active fishing vessels and dealers and trips landed in Maine, New Hampshire, Massachusetts, or Rhode Island in the Gulf of Maine Region, we have determined that there are 8,094 fishing vessels that meet the definition of small business entities. These numbers provide an estimate of the total number of vessels engaged in the harvest of seafood within Unit 1 that may benefit from this rule.

With regard to a potential copepod fishery, this rule could affect small businesses if fishermen choose to prosecute a copepod fishery in the future as virtually all fishing interests in Unit 1 are considered small businesses under the SBA small business entity size standards. Currently, there are no proposals to conduct a copepod fishery within Unit 1; nor have there been any in the past. Therefore, we have no basis to estimate the number of vessels that would be classified as small business entities in a copepod fishery.

Other small business entities include the approximately 55-70 whale-watching companies that operate within Unit 1. While these small businesses may benefit indirectly from the rule and the protection of essential critical habitat features section 7 consultations would provide in support of the conservation of endangered right whales, vessel approach regulations prohibit the targeting of right whales by these whale watching operations. Neither current fishing operations nor whale watching companies would be negatively affected by this action as their activities were not identified as having the potential to affect the features. There is the potential for some unquantifiable positive benefit to accrue to these small businesses as a result of the preservation and maintenance of the ecosystem benefits associated with the essential foraging features.

In Unit 1, another group of potentially impacted small entities is small municipalities. A review of the section 7 consultation history indicates that we have consulted with the U.S. Environmental Protection Agency (EPA) on small governmental jurisdictions' (population less than or equal to 50,000) municipal wastewater discharges adjacent to the area under consideration for designation as critical habitat. Based on our review of past consultation history we are projecting a total of 2l consultations over the next 10 years involving primarily small municipalities and NPDES/Water Quality activities. Any small municipality that proposes to discharge pollutants to waters of the United States must obtain a discharge permit from EPA or their appropriate state environmental protection agency, depending on which agency administers the permit program, to ensure compliance with the Clean Water Act. The section 7 consultation requirement applies to the EPA's, but not state agencies', authorization of discharges that may affect listed species and critical habitat. Of the states bordering Unit 1, EPA administers the discharge permit program only in Massachusetts and New Hampshire; therefore, consultations with EPA would be required for municipal discharges only from those two states. Thus, the number of small municipalities that might be impacted would be equal to or less than the 21 predicted to be involved in consultations from all states bordering Unit 1, over the next 10 years.

We have determined that this rule will not likely have an impact on small business entities engaged in oil and gas exploration and development or have a disproportionate impact on them compared to large entities. The SBA small entity size standards for oil and gas extraction establish an employee threshold of 500 individuals or less as a small business entity. Currently no specific or planned oil and gas exploration and development activities for this activity in Unit 1 as it is under an oil and gas exploration and development moratorium. Furthermore, business entities involved in offshore oil and gas exploration are generally large scale business entities as the technological capabilities to engage in offshore oil and gas development require large amounts of capital for these types of endeavors.

We have also determined this rule will not have any impact on small business entities engaged in oil spill response activities related to the at-sea use of oil dispersants. The SBA small entity size standards for environmental remediation services establish an employee threshold of 500 individuals or less as a small business entity. Furthermore, entities that are involved in offshore emergency oil spill response are generally either governmental agencies and/or large scale business entities. For example, the USCG is responsible for implementing the Oil Pollution Act including emergency oil spill responses responding to oil spills. The type of platform assets (e.g., aerial, vessel) and technological capabilities necessary to respond to an oil spill in the marine involvement, specifically the application of oil dispersants, require large amounts of capital for these types of endeavors.

Unit 2 - Southeastern Calving Habitat

In Unit 2, the only category of activity that might potentially impact small entities through requirements and costs of project modifications necessary to avoid destroying or adversely modifying critical habitat is offshore energy development (e.g., wind energy firms). The SBA revised the size standards for 13 industries in the North American Industry Classification system (NAICS) Sector 22, Utilities. Relevant to this action, the revised SBA classification now categorizes the small business entity for wind electric power generation as any firm with 250 employees or less. We are unable to quantify the incremental impacts at this time due to the lack of past consultation history and any specific or planned federal proposals for these projects. Thus, we would only be speculating in estimating the number of potential projects in this category that may require consultation due to critical habitat impacts over the next 10 years, and further speculating in predicting the number of small entities that might be involved.

It is unclear whether small entities would be placed at a competitive disadvantage compared to large entities. Because the costs of many potential project modifications that may be required to avoid adverse effects to the essential features of critical habitat are unit costs such that total project modification costs would be proportional to the size of the project, it is not unreasonable to assume that larger entities would be involved in implementing the larger projects with proportionally larger project modification costs. In addition, though it is not possible to determine the exact cost of any given project modification resulting from consultation, the smaller projects most likely to be undertaken by small entities would likely result in relatively small modification costs. Finally, many of the modifications identified to reduce the impact of a project on critical habitat may be a baseline requirement either due to the ESA listing of the species or under another regulatory authority, notably the Clean Water Act.

As noted, however, third party applicants or permittees would be expected to incur costs associated with participating in the administrative process of consultation along with the permitting federal agency. The average per consultation administrative costs for third parties is approximately $880. Because we have assumed all potential future consultations will be formal this represents an overestimation of the costs.

5. Description of projected reporting, record-keeping, and other compliance requirements of the rule, and professional skills necessary for the preparation of any report or record

There are no record-keeping or reporting requirements associated with the rule. Similarly, there are no other compliance requirements in the rule. There are no professional skills necessary for preparation of any report or record.

6. Description of steps agency has taken to minimize significant economic impact on small businesses, and the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected

We considered the effect to small businesses throughout our analysis and, as stated above, there will be no significant economic impact to small businesses. We have thus not made any changes from the proposed rule that would minimize significant economic impacts on small entities. As stated above, we expect many small entities to benefit from this rule. We also estimate the average per consultation administrative costs for third parties, some of which may be small entities, is approximately $880. It is unlikely that the rule will significantly reduce profits or revenue for small businesses. Although it is not possible to determine the exact cost of any given project modification resulting from consultation, the smaller projects most likely to be undertaken by small entities would likely result in relatively small modification costs.

In the IRFA (July 2014), we considered the alternative of not proposing new critical habitat for the North Atlantic right whale. We rejected this alternative because we determined designating critical habitat for the North Atlantic right whale listed in 2008 was prudent and determinable, and the ESA requires critical habitat designation at the time of listing in that circumstance. Also, new scientific information has become available since the 1994 designation that supports expansion of the foraging and calving habitat areas.

In the IRFA, we also analyzed the proposed rule's preferred alternative. This alternative, would have expanded calving habitat to the north and east compared to the 1994 designation, but it would not have included a portion of the 1994 designation that extends approximately 27 nm south of Cape Canaveral, Florida. However, in response to public comments on our proposal, we reviewed the best available scientific information again. We rejected what we had called the preferred alternative in the proposed rule, because we believe the available data show consistent and predictable presence of right whale mother-calf pairs in this southern area, during the months the habitat models predict presence of all the essential features. The features here may require special management considerations or protections for the same reasons as the rest of Unit 2: because of possible negative impacts from activities and events of offshore energy development,

large-scale offshore aquaculture operations, and global climate change. These activities and their potential broad-scale impacts on the essential features are discussed in detail in the Biological Source Document (NMFS 2014). For these reasons, we agreed with the commenters that the southern boundary of the calving area critical habitat should be moved southward from where we proposed.

To evaluate and consider the economic impacts of including this area in the designation, we followed the same methodology described in the proposed rule (80 FR 9314, February 20, 2015) and in the draft Section 4(b)(2) Report. Similar to the proposed Unit 2 area, NMFS identified three categories of activities that have occurred and are likely to recur in the future and have the potential to affect the essential features in the expanded Unit 2 area: U.S. Army Corps of Engineers (USACE) maintenance dredging or permitting of dredge and disposal activities under the Clean Water Act, USACE permitting of marine construction, including shoreline restoration and artificial reef placement under the Rivers and Harbors Act and/or Clean Water Act, Bureau of Ocean Energy and Management permitting of sand and gravel extraction under the Outer Continental Shelf Lands Act.

Additionally, we identified two categories of activities that have not occurred in the expanded Unit 2 area in the past but based on available information, may occur in the future. The projected activities are offshore alternative energy development and marine aquaculture. If these activities occur, they may adversely affect the essential features. In the proposed rule (80 FR 9314, February 20, 2015), we described our justification for determining relative levels of impacts (i.e., incremental, or co-extensive) for all of these activities. We repeated that process, to consider the impacts of adding the southern extension to the designation. Based on our analysis of past consultation history we project that over the next ten years, there will be 22 consultations, or about two consultations per year, in this area which may affect the features of critical habitat. Ten of these projects would involve dredging and/or disposal by the U.S. Army Corps of Engineers and one dredging/disposal project by the U.S. Air Force. Eight projects would involve permitting of marine construction or artificial reef placement by the U.S. Army Corps of Engineers, and three projects would involve permitting of marine construction by the U.S. Air Force. Thus, adding the southern extension would involve one additional federal agency but no additional federal actions that are different from those that will be conducted in the rest of Unit 2. As discussed in the Section 4(b)(2) Report, these activities are only expected to involve incremental administrative costs of consultation, as a result of this designation. Annual administrative costs for these projected consultations is $10,160 (at $5,080 per consultation – see the Economics Impact section in the final rule and the Section 4(b)(2) Report for background information on the costs for conducting consultations).

Relative to projected, new activities, we do not expect any of the 4 future activities identified in the Section 4(b)(2) Report to be implemented in the southern extension area, given its proximity to shore and available information about where and how these activities might be implemented (http://www.boem.gov/Florida/ and http://www.boem.gov/Five-Year-Program/). NMFS is not aware of any other future new federal activity that may be implemented in the southern extension area. Thus, the chosen alternative is not expected to impose any additional burden on small entities than did the proposed rule's preferred alternative.

Consequently, at this time NMFS is extending Unit 2 further to the south to include a portion of the 1994-designated critical habitat. NMFS finds this is supported because: (a) Garrison (2007) and Good (2008) confirm the presence of the essential features of critical habitat in the area for at least a portion of the right whale calving season; (b) we confirmed mother-calf pairs were sighted in the area most frequently when the essential features are expected to be in that area; and (c) multiple mother-calf pairs consistently and predictably occur in this expanded area.

Finally, in the IRFA we also considered an alternative in which the boundaries of both Unit 1 and Unit 2 would be expanded compared to the proposed rule's preferred alternative. Specifically, under the expanded alternative, Unit 1 would encompass additional right whale sightings within the Gulf of Maine-Georges Bank region (particularly inshore waters along the coasts of Maine, New Hampshire and Massachusetts) and it would be expanded south and east of the southern boundary of proposed Unit 1 (south and east of Cape Cod). The expanded alternative would also have extended Unit 2 boundaries south of Cape Canaveral, Florida, similar to the 1994 calving critical habitat. As discussed above, in response to public comments, we chose in the final rule to extend Unit 2 boundaries south of Cape Canaveral, Florida, as considered in this alternative. However, for Unit 1, we rejected this alternative to expand Unit 1 boundaries closer inshore in the Gulf of Maine-Georges Bank region and south and east of Cape Cod. We rejected the expansion of Unit 1 boundaries because, based on the best available scientific information, we determined that the essential features of foraging habitat were not present in those areas. We considered the nature and number of additional consultations that may be required to address impacts to critical habitat given the extended calving area. The addition of this area did not change our assessment of impacts to small entities.