Endnotes

Chapter 1
The New England Offshore Environment and the Need for Ocean Planning

1. Exec. Order No. 13547, 75 Fed. Reg. 43023 (July 22, 2010), https://www.whitehouse.gov/files/documents/2010stewardship-eo.pdf.
2. Hauke Kite-Powell et al., *Northeast Ocean Planning Baseline Assessment: Marine Resources, Infrastructure, and Economics*, prepared for the Northeast Regional Planning Body (2016), http://neoceanplanning.org/projects/baseline-assessment/. As is the case with almost any type of data, there are numerous ways to present economic statistics. The baseline assessment summarizes these statistics, and the Plan draws from this summary.

Chapter 2
Ocean Planning in New England

1. Northeast Regional Planning Body, *Framework for Ocean Planning in the Northeast United States* adopted by the Northeast Regional Planning Body in January 2014, http://neoceanplanning.org/wp-content/uploads/2014/02/NE-Regional-Ocean-Planning-Framework-February-2014.pdf.
2. These advisory groups, composed of individuals representing a range of different interests, either previously existed to inform state marine policy or were set up to specifically inform the regional plan. The groups include: in Massachusetts, the Ocean Advisory Commission; in Rhode Island, the stakeholder group set up for the Ocean Special Area Management Plan; and in Maine, the Maine advisors group set up for this effort.
3. Northeast Regional Planning Body, *Northeast Regional Planning Body Charter*, adopted by the Northeast Regional Planning Body in 2013, http://neoceanplanning.org/wp-content/uploads/2014/07/Charter-with-Signatories.pdf.
4. COMPASS, *Scientific Consensus Statement on Marine Ecosystem-Based Management* (COMPASS 2005), http://www.compassonline.org/sites/all/files/document_files/EBM_Consensus_Statement_v12.pdf.

Chapter 3
Regulatory and Management Actions: Regulatory and Management Context

1. National Ocean Council, *Legal Authorities Related to the Implementation of Coastal and Marine Spatial Planning* (National Ocean Council, 2011), https://www.whitehouse.gov/sites/default/files/microsites/ceq/cmsp_legal_compendium_2-14-11.pdf.
2. 30 CFR §§ 320 et. seq. Available at http://www.nap.usace.army.mil/Portals/39/docs/regulatory/regs/33cfr320.pdf.
3. Office for Coastal Management, National Oceanic and Atmospheric Administration, "Federal Consistency," coast.noaa.gov, https://coast.noaa.gov/czm/consistency/.

Chapter 3
Regulatory and Management Actions: Marine Life & Habitat

1. Melanie Steinkamp, *New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30) Implementation* (USFWS, 2008), http://acjv.org/BCR_30/BCR30_June_23_2008_final.pdf.
2. For work group overview, see "Work Groups" at http://neoceanplanning.org/projects/marine-life.
3. For the terms of reference describing the role of the EBM Work Group, see http://neoceanplanning.org/wp-content/uploads/2015/09/EBM-Work-Group-Terms-of-Reference.pdf. For EBM meeting summaries, see "Past Meetings" at http://neoceanplanning.org/events/.
4. The NROC Habitat Classification and Ocean Mapping Subcommittee is supported by the NROC Ocean and Coastal Ecosystem Health Committee. For additional information, see http://northeastoceancouncil.org/committees/ocean-and-coastal-ecosystem-health/.
5. The Marine-life Data and Analysis Team (MDAT) is a collaboration between Duke University, NOAA Northeast Fisheries Science Center, NOAA Centers for Coastal and Ocean Science, and Loyola University.
6. Group core abundance/biomass area maps represent overlays of multiple species core abundance/biomass area maps. Species core abundance/biomass areas are defined as the smallest area containing 50 percent of the predicted abundance/biomass of a species.
7. Marine life work groups held a total of nine meetings in 2014 and 2015. Agendas and meeting materials can be found at http://neoceanplanning.org/projects/marine-life.
8. The Marine Mammals modeling methodology is described at http://neoceanplanning.org/wp-content/uploads/2015/05/MDAT-Final-Work-Plan_Mammals-Turtles.pdf and in Jason J. Roberts et al., Habitat-Based Cetacean Density Models for the US Atlantic and Gulf of Mexico, *Scientific Reports* 6 (2016): 22615. doi: 10.1038/srep22615.
9. The Birds modeling methodology is described at http://neoceanplanning.org/wp-content/uploads/2015/05/MDAT-Final-Work-Plan_Avian.pdf and in Brian P. Kinlan et al., *Modeling At-Sea Occurrence and Abundance of Marine Birds to Support Atlantic Marine Renewable Energy Planning: Phase I Report* (US Department of the Interior, Bureau of Ocean Energy Management, 2016), http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5512.pdf.
10. The Fish mapping methodology is described at http://neoceanplanning.org/wp-content/uploads/2015/05/MDAT-Final-Work-Plan_Fish.pdf.
11. The report can be downloaded at http://neoceanplanning.org/wp-content/uploads/2014/08/Marine-Life-Assessment-Inventory_Draft.pdf.

Chapter 3
Regulatory and Management Actions: Cultural Resources

1. Hauke Kite-Powell et al., *Northeast Ocean Planning Baseline Assessment: Marine Resources, Infrastructure, and Economics*, prepared for the Northeast Regional Planning Body (2016), http://neoceanplanning.org/projects/baseline-assessment/.
2. Ibid.
3. Ibid.

4. This list is not intended to be exhaustive. It focuses on elements of the "historic and cultural resources" topic that are most pertinent to the Northeast Ocean Plan because of their marine focus, link to management through federal statute and regulation, importance in offshore development review, or importance as expressed by stakeholders during the development of the Plan. States also regulate certain historic resources through state law and regulation, found on each state's State Historic Preservation Office (or equivalent) on-line presence.
5. National Working Waterfront Network, "Information for Decision and Policy Makers." wateraccessus.com, http://www.wateraccessus.com/decisionmakers.html.
6. Advisory Council on Historic Preservation, "Section 106 Regulations Summary," achp.gov, http://www.achp.gov/106summary.html.
7. National Preservation Institute, "NEPA and Section 106 of the National Historic Preservation Act," npi.org, http://www.npi.org/nepa/sect106.
8. National Park Service, "National Register of Historic Places Program: Research," nps.gov, http://www.nps.gov/nr/research/.
9. Bureau of Ocean Energy Management and National Oceanic and Atmospheric Administration, "Marinecadastre.gov," marinecadastre.gov, http://marinecadastre.gov/.

Chapter 3

Regulatory and Management Actions: Marine Transportation

1. Kenneth Steve and Julie Parker, *Highlights of Ferry Operators in the United States*, Special Report (US Department of Transportation, 2014), http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/subject_areas/ncfo/highlights.
2. Cruise Lines International Association, "Cruise Lines, Passengers Spent $21 Billion in 2014, Jumping 16 Percent in Four Years and Representing New Peak in US Cruise Industry Expenditures," cruising.org, http://www.cruising.org/about-the-industry/press-room/press-releases/pr/Cruise-Lines-Passengers-Spent-21-Billion-In-2014.
3. Eric Levenson, "Ten Legitimately Fascinating Facts about the Shipping Industry," The Wire, August 12, 2013.
4. "Boston to Begin Dredging in 2017," Journal of Commerce, November 23, 2015, http://www.joc.com/port-news/us-ports/massachusetts-port-authority/boston-begin-dredging-2017_20151123.html.
5. Hauke Kite-Powell et al., *Northeast Ocean Planning Baseline Assessment: Marine Resources, Infrastructure, and Economics*, prepared for the Northeast Regional Planning Body (2016), http://neoceanplanning.org/projects/baseline-assessment/.
6. United States Coast Guard, "Missions," uscg.gov, http://www.uscg.mil/top/missions/.
7. Ports and Waterways Safety Act, 33 USC § 1221, Maritime Transportation Security Acts of 1996 and 2003, 46 USC §§ 53101 et seq.
8. Aids to Navigation Authorized, 14 USC § 81.
9. Domestic Ice Operations, 14 USC § 2, 14 USC § 93, 14 USC § 101, 14 USC § 141.
10. 14 USC § 2, 14 USC § 89, 14 USC § 141.
11. Saving Life and Property, 14 USC § 88.
12. United States Coast Guard, "U.S. Coast Guard Office of Search and Rescue (CG-SAR)," uscg.gov, http://www.uscg.mil/hq/cg5/cg534/.
13. 33 CFR § 6.04-5.
14. Department of Transportation; Organization and Delegation of Powers and Duties; Delegation to the Commandant, United States Coast Guard and Administrator, Maritime Administration, 62 Fed. Reg. 11382 (March 12, 1997) (codified at 49 CFR § 1).
15. Established by the Deepwater Port Act (DWPA) of 1974, 33 USC § 1501 et seq. as amended.
16. Department of Transportation; Organization and Delegation of Powers and Duties, Update of Secretarial Delegations, 68 Fed. Reg. 36496 (June 18, 2003) (codified at 49 CFR § 1), and Department of Transportation; Organization and Delegation of Powers and Duties; Delegation to the Commandant, United States Coast Guard and Administrator, Maritime Administration, 62 Fed. Reg. 11382 (March 12, 1997) (codified at 49 CFR § 1).
17. 33 USC § 1502(9). All currently licensed deepwater ports are designed to import oil or natural gas.
18. 33 USC § 1501(a).
19. 46 USC § 556. Also Section 405 of the Coast Guard and Maritime Transportation Act of 2012, Pub. Law. No. 112-213, Section 405 (December 20, 2012) expanded the short sea transportation program to include the promotion of short sea transportation and use of US-flag vessels, and it permits the development of certain strategies to encourage short sea shipping.
20. Department of Transportation, "Maritime Sustainability Initiatives," transportation.gov, https://www.transportation.gov/mission/sustainability/maritime-sustainability-initiatives.
21. AIS is a maritime navigation safety communications system that provides vessel information, including the vessel's identity, type, position, course, speed, navigational status, and other safety-related information automatically. The USCG operates the nation's AIS network in order to improve security, navigational safety, search and rescue, and environmental protection services. See 33 CFR § 164.
22. 33 CFR § 62.
23. United States Coast Guard, "Nationwide Automatic Identification System," navcen.uscg.gov, http://www.navcen.uscg.gov/?pageName=NAISmain.
24. United States Coast Guard, "Commandant Instruction 16001.1: Waterways Management," uscg.mil, http://www.uscg.mil/directives/ci/16000-16999/CI_16001_1.pdf.
25. United States Coast Guard, "Port Access Route Studies," uscg.mil, http://www.uscg.mil/hq/cg5/cg553/NAVStandards/PARS.asp.
26. United States Coast Guard, "Permitting of Regattas and Marine Parades," uscg.mil, http://www.uscg.mil/directives/cim/16000-16999/CIM_16751_3.pdf.
27. United States Coast Guard, "NVIC-100: Guidance for the Establishment and Development of Harbor Safety Committees Under the Maritime Transportation System (MTS) Initiative," uscg.mil, https://www.uscg.mil/auxiliary/missions/msep/NVIC%20Circular%201-00.pdf.
28. United States Coast Guard, "Bridge Administration Manual," uscg.mil, http://www.uscg.mil/directives/cim/16000-16999/CIM_16590_5C.pdf.

29. United States Coast Guard, "Commandant Instruction 16000.28A: Marine Transportation System Recovery Planning and Operations," uscg.mil, http://www.uscg.mil/directives/ci/16000-16999/CI_16000_28A.pdf.

30. United States Coast Guard, "Local Notice to Mariners," navcen.uscg.gov, http://www.navcen.uscg.gov/?pageName=lnmMain.

31. United States Coast Guard, "Homeport," homeport.uscg.mil, https://homeport.uscg.mil/mycg/portal/ep/home.do.

32. United States Coast Guard, "Marine Safety Information Bulletins," uscg.mil, https://www.uscg.mil/msib/.

33. United States Coast Guard, "Invitation to the '21st Century/Future of Navigation' Feedback Website," navcen.uscg.gov, http://www.navcen.uscg.gov/pdf/Future_of_Navigation_Feedback.pdf.

34. United States Coast Guard, "NVIC-100: Guidance for the Establishment and Development of Harbor Safety Committees Under the Maritime Transportation System (MTS) Initiative," uscg.mil, https://www.uscg.mil/auxiliary/missions/msep/NVIC%20Circular%201-00.pdf.

Chapter 3

Regulatory and Management Actions: Commercial & Recreational Fishing

1. Hauke Kite-Powell et al., *Northeast Ocean Planning Baseline Assessment: Marine Resources, Infrastructure, and Economics*, prepared for the Northeast Regional Planning Body (2016), http://neoceanplanning.org/projects/baseline-assessment/.

2. Ibid.

3. National Marine Fisheries Service, *Fisheries of the United States 2014* (2015), http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/FUS2014.pdf.

4. National Marine Fisheries Service, *Fisheries of the United States 2013* (2014), http://www.st.nmfs.noaa.gov/commercial-fisheries/fus/fus13/index.

5. See http://www.nefmc.org/management-plans for a brief description of these fisheries and sources of further information.

6. Less than four knots is the speed threshold used for vessels reporting in the multi-species fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

7. Less than four knots is the speed threshold used for vessels reporting in the monkfish fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

8. Less than four knots is the speed threshold used for vessels reporting in the herring fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

9. Less than five knots is the speed threshold used for vessels reporting in the scallop fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

10. Less than four knots is the speed threshold used for vessels reporting in the surf clam/ocean quahog fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

11. Less than four knots is the speed threshold used for vessels reporting in the squid fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

12. Less than four knots is the speed threshold used for vessels reporting in the mackerel fishery as an indicator of vessels engaging in fishing activity rather than transit activity.

13. Industrial Economics Inc., *Technical Documentation for the Vertical Line Model* (2014), http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/eis2013/march_2014_draft_vl_model_documentation.pdf.

14. See http://neoceanplanning.org/projects/commercial-fishing/ for a further description and results of this preliminary project.

15. Bureau of Ocean Energy Management, *Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585*, boem.gov, http://www.boem.gov/Fishery-Survey-Guidelines.

16. Bureau of Ocean Energy Management, *Development of Mitigation Measures to Address Potential Use Conflicts between Commercial Wind Energy Lessees/Grantees and Commercial Fishermen on the Atlantic Outer Continental Shelf*, boem.gov, http://www.boem.gov/OCS-Study-BOEM-2014-654/.

17. Bureau of Ocean Energy Management, *Guidelines for Proving Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585*, boem.gov, http://www.boem.gov/Social-and-Economic-Conditions-Fishery-Communication-Guidelines/.

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Regulatory and Management Actions: Recreation

1. Hauke Kite-Powell et al., *Northeast Ocean Planning Baseline Assessment: Marine Resources, Infrastructure, and Economics*, prepared for the Northeast Regional Planning Body (2016) http://neoceanplanning.org/projects/baseline-assessment/.

2. Ibid.

3. National Park Service, "National Park Service Visitor Use Statistics," irma.nps.gov, https://irma.nps.gov/Stats/.

4. Point 97, SeaPlan, and the Surfrider Foundation, *Characterization of Coastal and Marine Recreational Activity in the US Northeast*, prepared for the Northeast Regional Planning Body (2015), http://neoceanplanning.org/wp-content/uploads/2015/10/Recreation-Study_Final-Report.pdf.

5. Northeast Regional Planning Body, "Recreation and Tourism," neoceanplanning.org, http://neoceanplanning.org/projects/recreation/.

6. Kite-Powell et al., *Northeast Ocean Planning Baseline Assessment: Marine Resources, Infrastructure, and Economics.*

7. Ibid.

8. Point 97, SeaPlan, and the Surfrider Foundation, *Characterization of Coastal and Marine Recreational Activity in the US Northeast.*

9. Ibid.

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Regulatory and Management Actions: Energy & Infrastructure

1. Northeast Gas Association, "The Role of LNG in the Northeast Natural Gas (and Energy) Market," northeastgas.org, http://www.northeastgas.org/about_lng.php.
2. ISO New England, "Key Grid and Market Stats," iso-ne.com, http://www.iso-ne.com/about/what-we-do/key-stats/resource-mix.
3. Department of Energy, "Offshore Wind Advanced Technology Demonstration Projects," energy.gov, http://energy.gov/eere/wind/offshore-wind-advanced-technology-demonstration-projects.
4. Marc Schwartz et al., Assessment of Offshore Wind Energy Resources for the United States (National Renewable Energy Laboratory, 2010), http://www.nrel.gov/docs/fy10osti/45889.pdf.
5. Department of Energy, "Maine Deploys First US Commercial, Grid-Connected Tidal Energy Project," energy.gov, http://energy.gov/articles/maine-deploys-first-us-commercial-grid-connected-tidal-energy-project.
6. Bureau of Ocean Energy Management, "2017-2022 OCS Oil and Gas Leasing Program," boem.gov, http://www.boem.gov/Five-Year-Program-2017-2022/.
7. Department of Energy, "Natural Gas Regulation," energy.gov, http://energy.gov/fe/services/natural-gas-regulation.
8. Bureau of Ocean Energy Management, "Explore More Than 40 Years of Environmental Studies Program Ocean Science," marinecadastre.gov, http://marinecadastre.gov/espis/#/.
9. Department of Energy, "Tethys," http://tethys.pnnl.gov/.
10. Bureau of Ocean Energy Management, "BOEM Fact Sheet: Wind Energy Commercial Leasing Process," boem.gov, http://www.boem.gov/Commercial-Leasing-Process-Fact-Sheet/.
11. Bureau of Ocean Energy Management, "National and Regional Guidelines for Renewable Energy Activities," boem.gov, www.boem.gov/National-and-Regional-Guidelines-for-Renewable-Energy-Activities.

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Regulatory and Management Actions: Aquaculture

1. George LaPointe, *NROC White Paper: Overview of the Aquaculture Sector in New England*, prepared for the Northeast Regional Planning Body (2014), http://neoceanplanning.org/wp-content/uploads/2013/12/Aquaculture-White-Paper.pdf. Dollars are estimated for the 2010-2011 time period.
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3. National Marine Fisheries Service, *Marine Aquaculture Strategic Plan FY 2016-2020* (2016), http://www.nmfs.noaa.gov/aquaculture/docs/aquaculture_docs/noaa_fisheries_marine_aquaculture_strategic_plan_fy_2016-2020.pdf.
4. United States Government Accountability Office, *Offshore Marine Aquaculture: Multiple Administrative and Environmental Issues Need to Be Addressed in Establishing a US Regulatory Framework* (US Government Accountability Office, 2008), http://www.gao.gov/products/GAO-08-594.
5. National Science and Technology Council Committee on Science, Interagency Working Group on Aquaculture, *National Strategic Plan for Federal Aquaculture Research (2014-2019)* (National Science and Technology Council, 2014), https://www.whitehouse.gov/sites/default/files/microsites/ostp/NSTC/aquaculture_strategic_plan_final.pdf.
6. National Marine Fisheries Service, "Welcome to the Office of Aquaculture," nmfs.noaa.gov, http://www.nmfs.noaa.gov/aquaculture/.
7. National Marine Fisheries Service, *Marine Aquaculture Strategic Plan FY 2016-2020*.
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9. Northeast Regional Aquaculture Center, "About the Northeast Regional Aquaculture Center," agresearch.umd.edu, http://agresearch.umd.edu/nrac/about.
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14. National Marine Fisheries Service, "Biological Opinions (ESA Section 7)," nmfs.noaa.gov, http://www.nmfs.noaa.gov/pr/consultation/opinions.htm.

Chapter 3

Regulatory and Management Actions: Offshore Sand Resources

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2. Jerry M. Melillo, Terese (T.C.) Richmond, and Gary W. Yohe, eds., *Climate Change Impacts in the United States: The Third National Climate Assessment* (US Global Change Research Program, 2014), http://nca2014.globalchange.gov/downloads.
3. US Army Corps of Engineers, "Continuing Authorities Program," nae.usace.army.mil, http://www.nae.usace.army.mil/Missions/PublicServices/ContinuingAuthoritiesProgram.aspx.
4. Bureau of Ocean Energy Management, "Explore More Than 40 Years of Environmental Studies Program Ocean Science," marinecadastre.gov, http://marinecadastre.gov/espis/#/.

Chapter 3

Regulatory and Management Actions: Restoration

1. Kimberly A. Lellis-Dibble, Katherine E. McGlynn, and Thomas E. Bigford, *Estuarine Fish and Shellfish Species in US Commercial and Recreational Fisheries: Economic Value as an Incentive to Protect and Restore Estuarine Habitat* (National Marine Fisheries Service, 2008), http://www.habitat.noaa.gov/pdf/publications_general_estuarinefishshellfish.pdf.
2. Joint Ocean Commission Initiative, *Charting the Course: Securing the Future of America's Oceans*, (2013), http://www.jointoceancommission.org/policypriorities/Reports/charting-the-course.aspx.
3. Projects are generally eligible for federal funding through restoration programs if they are not being used as mitigation of impacts of another project.

Chapter 4

Plan Implementation

1. 33 CFR § 325.1(b) states: "The district engineer will establish local procedures and policies including appropriate publicity programs which will allow potential applicants to contact the district engineer or the regulatory staff element to request pre-application consultation. Upon receipt of such request, the district engineer will assure the conduct of an orderly process which may involve other staff elements and affected agencies (federal, state, or local) and the public. This process should be brief but thorough so that the potential applicant may begin to assess the viability of some of the more obvious potential alternatives in the application." In New England, the USACE includes pre application meetings as a topic in its Guide for Permit Applicants.
2. US Army Corps of Engineers New England District, *Guide for Permit Applicants*, http://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/PermitGuide.pdf.
3. A cooperating agency under NEPA is an agency (which can include a federal, state, or local agency) with jurisdiction by law or special expertise on an environmental issue that should be addressed in an environmental impact statement. A lead agency, where appropriate, shall seek the involvement of a cooperating agency in developing information and environmental analyses. See https://ceq.doe.gov/nepa/regs/40/40p3.htm for more information.
4. Bureau of Indian Affairs, "Frequently Asked Questions," bia.gov, http://www.bia.gov/FAQs/. The exact nature of these obligations varies across tribes.
5. Environmental Protection Agency, "Region 1 Tribal Program," epa.gov, https://www.epa.gov/tribal/region-1-tribal-program#tribes.
6. State coastal management programs have lists of federal license or permit authorities that are subject to state CZMA review (federal consistency review). To review listed activities that are located outside of a state's coastal zone, a state must describe (and NOAA must approve) a geographic location description of such activities, unless on timely request, and based on asserted coastal effects, the state receives project-specific authorization from NOAA to review the project. For additional information, see David Kaiser, *The Coastal Zone Management Act and Regional Ocean Plans: A Discussion Paper*, available at http://neoceanplanning.org/wp-content/uploads/2015/10/CZMA-Discussion-Paper.pdf.
7. Each federal agency has administrative and/or regulatory guidance that describes how it engages in NEPA review. *See A Citizen's Guide to the NEPA*, published by the Council on Environmental Quality, available at https://ceq.doe.gov/nepa/Citizens_Guide_Dec07.pdf. See also *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, available at https://ceq.doe.gov/nepa/regs/40/40p3.htm.
8. New England Regional Dredging Team, "Organizations," nerdt.org, http://nerdt.org/organizations-2/.
9. Kaiser, *The Coastal Zone Management Act and Regional Ocean Plans: A Discussion Paper*
10. The Northeast RPB Charter was signed by each RPB member at the beginning of the regional ocean planning process and is available at http://neoceanplanning.org/wp-content/uploads/2014/07/Charter-with-Signatories.pdf. A change in RPB membership does not require execution of a new charter; new members will be asked to sign. A nonfederal member may withdraw by providing written notice to RPB co-leads. Withdrawal from this charter by a federal member requires notice to the federal co-chair and subsequent concurrence by the National Ocean Council.
11. NERACOOS is part of the US Integrated Ocean Observing System network and is an interagency and non-federal partnership. It serves data and synthesis products related to ocean climate, wind, and wave forecasts; real-time buoy data; water-level forecasts; and many other topics. NERACOOS staff participated in the Portal Working Group and collaborate on data products. More information about NERACOOS is available at www.neracoos.org.
12. National Oceanic and Atmospheric Administration, "Northeast Shelf Integrated Ecosystem Assessment," noaa.gov, http://www.noaa.gov/iea/regions/northeast/index.html.
13. The OHI is a quantitative, repeatable, comprehensive approach to assessing the health of the ocean and is intended to inform decision–making by measuring multiple metrics of ecosystem condition using existing data and information. More background on the Ocean Health Index is available at http://www.oceanhealthindex.org/

Chapter 5

Science and Research Priorities

1. Ecosystem services are the benefits that people obtain from the structure and function of ecosystems, and they include provisioning services (e.g., food), regulating services (e.g., climate), cultural services (e.g., aesthetic value), and supporting services (e.g., nutrient cycling). For more information, see http://www.millenniumassessment.org.
2. The Federal Geographic Data Committee endorsed CMECS in May 2012 (FGDC-STD-018-2012). CMECS provides a comprehensive national framework for organizing information about coasts and oceans and their living systems. For more information on CMECS see https://coast.noaa.gov/digitalcoast/publications/cmecs.
3. For more information on coordination of mapping efforts, see https://catalog.data.gov/dataset/u-s-federal-mapping-coordination.

APPENDIX 1: PRIMARY FEDERAL LAWS

This appendix provides summaries of some of the federal laws mentioned in this Northeast Ocean Plan. It is not intended to be exhaustive for all laws that relate to management of ocean resources or activities; it focuses on those federal statutes that are most directly linked to the topics discussed in the Plan. Included in this appendix is information for geographic areas in the Northeast that are already designated and managed under federal law (such as national wildlife refuges, and national park units). Federal agencies provide much greater detail at the links provided, from which these summaries are drawn.

National Environmental Policy Act

https://ceq.doe.gov/

The National Environmental Policy Act (NEPA) requires federal agencies to assess environmental effect(s) on the human environment prior to making decisions on whether to move forward with a proposed action. Federal agencies analyze the potential environmental impacts of a proposed federal action through a categorical exclusion, environmental assessment, or environmental impact statement (EIS). NEPA requires federal agencies to prepare an EIS if the proposed action is likely to have significant environmental effects. NEPA and its implementing regulations (40 CFR §§ 1500 – 1508) provide that development of an EIS include opportunities for public review and comment, and consideration of a range of reasonable alternatives, including evaluation of impacts resulting from the alternatives. In addition, NEPA and its implementing regulations mandate coordination and collaboration among federal agencies and direct federal agencies to coordinate with states and tribes. NEPA is administered by individual federal agencies (each agency has developed its own NEPA implementing regulations) in concert with guidance from the Council on Environmental Quality, which oversees NEPA implementation broadly. Each federal agency develops its own implementing procedures to integrate NEPA into its existing programs and activities. See 42 USC §§ 4321 et seq. and 40 CFR §§ 1500–1508.

Coastal Zone Management Act

https://coast.noaa.gov/czm/act/

The Coastal Zone Management Act (CZMA) promotes the sustainable development of the nation's coasts by encouraging states and territories to balance the conservation and development of coastal resources using their own management authorities. The act provides financial and technical assistance incentives for states to manage their coastal zones consistent with the guidelines of the act. States with federally approved coastal management programs have the authority under the act to review—for consistency with the enforceable policies under the approved program—federal actions that have reasonably foreseeable effects on the uses or resources of a state's coastal waters (this process is termed "federal consistency review"). Federal actions include federal agency activities, federal license or permit activities, Bureau of Ocean Energy Management (BOEM) outer continental shelf plan approvals, and federal funding to state and local governments for activities with coastal effects. See 16 USC §§ 1451 et seq.

Outer Continental Shelf Lands Act

http://www.boem.gov/Governing-Statutes/

The Outer Continental Shelf Lands Act (OCSLA) grants the Secretary of the Interior (Secretary) authority for the administration of mineral exploration and the development of the outer continental shelf (OCS), defined generally as all submerged lands seaward of state submerged lands and waters (in the Northeast, seaward of three miles offshore) that are under US jurisdiction and control. The act provides guidelines for implementing an OCS oil and gas exploration and development program and empowers the secretary to grant leases for the extraction of marine minerals (including sand and gravel) and oil and gas to the highest-qualified responsible bidder on the basis of sealed competitive bids. The Secretary may negotiate noncompetitive agreements for sand, gravel, and shell resources for shore protection, for beach or wetlands restoration projects, or for use in construction projects funded, in whole or in part, or authorized by the federal government. Planning and leasing OCS activities are conducted primarily by BOEM (43 USC §§ 1331 et seq.) During the course of these activities, BOEM coordinates with other federal agencies (and states and tribes) as required by OCSLA, NEPA, and other statutes. As amended by the Energy Policy Act of 2005, the OCSLA also authorizes BOEM to issue leases, easements, and rights-of-way for renewable energy development on the OCS. BOEM promulgated regulations in 2009 that provide a detailed structure for implementation of the OCS Renewable Energy Program (42 USC § 13201 et seq.). The OCSLA also establishes an environmental studies program to develop information needed for assessment and management of impacts on the human, marine, and coastal environments affected by activities authorized by the act. Additionally, the US Geological Survey (USGS) provides indirect support to the Department of the Interior's management activities through its basic mission to examine the geological structure, mineral resources, and products of the national domain which, offshore, includes the exclusive economic zone (EEZ). See 43 USC §§ 1865 et seq.

Deepwater Port Act

http://www.marad.dot.gov/ports/office-of-deepwater-ports-and-offshore-activities/ and http://www.uscg.mil/hq/cg5/cg522/cg5225/

The Deepwater Port Act authorizes and regulates the location, ownership, construction, and operation of deepwater ports (defined as a nonvessel, fixed, or floating manmade structure that is used as a port or terminal for the loading, unloading, or handling of oil or natural gas for transportation to a state) in waters seaward of state jurisdiction, sets requirements for the protection of marine and coastal environments from adverse effects of such port development, and promotes safe transport of oil and natural gas from such locations. The Department of Transportation, through the Maritime Administration, authorizes activities under the act in close consultation with the United States Coast Guard (USCG), which has delegated authority to process applications, conduct environmental reviews, and manage other technical aspects of application review. See 33 USC §§ 1501 et seq. and 46 USC §§ 2101 et seq.

Marine Protection, Research and Sanctuaries Act

https://www.epa.gov/laws-regulations/summary-marine-protection-research-and-sanctuaries-act

The Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 generally prohibits (1) transportation of material from the United States for the purpose of ocean dumping, (2) transportation of material from anywhere for the purpose of ocean dumping by US agencies or US-flagged vessels, and (3) dumping of material transported from outside the United States into the US territorial sea. A permit is required to deviate from these prohibitions. Under Title I, sometimes referred to as the Ocean Dumping Act, the standard for permit issuance is whether the dumping will "unreasonably degrade or endanger" human

health, the marine environment, or economic potential. For some materials, ocean dumping is prohibited. The Environmental Protection Agency (EPA) and the US Army Corps of Engineers (USACE) jointly administer the MPRSA's program regulating the disposal of dredged material into ocean waters. The USACE is authorized to issue permits for dredged material disposal, applying standards developed by EPA (the Ocean Dumping Criteria) and subject to EPA review and concurrence. The EPA is authorized to designate appropriate disposal sites and to issue permits for dumping of material other than dredged material. See 16 USC §§ 1431 et seq. and 33 USC §§ 1401 et seq.

Clean Water Act, Discharge of Dredged and Fill Material (Section 404)

http://www.epa.gov/cwa-404/section-404-permit-program

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged or fill material into waters of the United States, including wetlands, without a permit. Such discharges may be authorized only when there is no alternative that is less damaging to the aquatic environment and when various other standards are met. The impact of dredged or fill material on the aquatic ecosystem is determined in consultation with federal resource agencies that have subject matter jurisdiction to evaluate potential impacts to resources or aspects of the aquatic ecosystem such as the following:

Physical

- Substrate

Biological

- Threatened and endangered species
- Fish, crustaceans, mollusks, and other aquatic organisms in the food web
- Other wildlife (resident and transient mammals, birds, reptiles, and amphibians)

Special aquatic sites

- Sanctuaries and refuges
- Wetlands (saltmarsh)
- Vegetated shallows (sea grasses)
- Mudflats
- Coral reefs

An applicant must demonstrate efforts to avoid and minimize potential adverse impacts, and, where relevant, must provide compensation for any remaining, unavoidable impacts through activities to restore or create wetlands. EPA and the USACE jointly administer the Section 404 program; permits are issued by the USACE, applying standards developed by EPA (the 404[b][1] Guidelines) and subject to concurrence from EPA.[1] See 33 USC §§ 1251 et seq. See also the Public Interest Review, described later in this appendix.

Clean Water Act, Permits for Point Source Discharges of Pollutants (Sections 301, 402 and 403)

https://www.epa.gov/npdes

Discharges of pollutants from point sources to waters of the United States and the oceans are generally prohibited unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. (See 33 USC §§ 1311[a] and 1342.) NPDES permits impose limits on, and monitoring requirements for such point source discharges. Many, but not all, states have been authorized to administer the NPDES program and issue the permits for point source discharges to waters under their jurisdiction, including the territorial seas extending three miles from shore. Where a state has not been so authorized, EPA issues the NPDES permits for point source discharges to the state's waters. Furthermore, EPA issues the NPDES permits for discharges to waters seaward of the territorial seas for point sources other than from a vessel or other floating craft being used as a means of transportation. Permits for discharges to waters under state jurisdiction ("internal" waters and waters of the territorial seas) must include requirements ensuring satisfaction of state water quality standards. In addition, any permit for discharges to the territorial sea, contiguous zone, or the ocean must comply with EPA's Ocean Discharge Criteria. See 33 USC §§ 1311(b)(1)(C), 1341, and 1343.

Clean Air Act,

https://www.epa.gov/clean-air-act-overview

Clean Air Act (CAA) requirements for emission limitation and reduction are generally implemented requirements through permits from the EPA and other federal agencies. Included in project review are the applicable regulations of the nearest adjacent coastal state to the location of the project, as well as the location of any associated construction activities. For offshore projects, the permit process includes a review of the project design (e.g., the equipment, fuels, or pollutant-containing materials to be used at the project) and consideration of the source and size of any emissions (e.g., whether certain vessel-based emissions are included and whether the project is a major source for certain pollutants). Depending on the project design and applicable law (e.g., state requirements), sources of air emissions from new projects may include construction activities, operation of stationary equipment once the project is built, and vessels associated with operation of the project. See 42 USC §§ 85 et seq.

Rivers and Harbors Act (Section 10)

http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/FederalRegulation.aspx

Section 10 of the Rivers and Harbors Act (RHA) prohibits the unauthorized obstruction of navigable waters of the United States or on the OCS. Construction of any structure, excavation, or placement of fill in US navigable waters, including the OCS, is prohibited without a permit from USACE. See 303 USC §§ 403 et seq. See also the Public Interest Review section, below.

Public Interest Review

The decision by the USACE whether to issue a permit under the Clean Water Act, Section 404, or the Rivers and Harbors Act, Section 10, above, is based in part on "an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest." The review addresses a range of natural, cultural, social, economic, and other considerations, including, generally, "the needs and welfare of the people," and balances the "benefits which reasonably may be expected to accrue from the proposal" against the "reasonably foreseeable detriments" in a way that reflects the "national concern for both protection and utilization of important resources." A permit will be granted if the proposed project is not contrary to the public interest and meets other legal requirements. See 33 USC §§ 401 et seq., 33 USC § 1344; 33 USC § 1413, and 33 CFR § 320.4(a).

[1] Note that other provisions of the Clean Water Act are relevant to coastal and ocean management activities informed by this Plan.

Ports and Waterways Safety Act

https://www.uscg.mil/hq/cg5/cg531/LMR/APLMRI/AppG.pdf

The Ports and Waterways Safety Act (PWSA) provides for the establishment, operation, and maintenance of vessel traffic services, control of vessel movement, establishment of requirements for vessel operation, and other port safety controls. Specific to navigation, the act requires that the USCG conduct studies to provide safe access routes for vessel traffic in waters under US jurisdiction. In doing so, the USCG considers all waterway uses to assess the impacts on navigation from a specific project, to periodically assess navigation safety for specific federally designated waterways, and to assess risk in a port, port approaches, or region of significance. See 33 USC §§ 1221 et seq.

National Historic Preservation Act (Section 106)

http://www.achp.gov/work106.html

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties. Effects to districts, sites, buildings, structures, and objects listed in the National Register of Historic Places are considered; properties not listed on the National Register are evaluated against the National Park Service's published criteria, in consultation with the State Historic Preservation Officer and/or a Tribal Historic Preservation Officer and any federally recognized Indian tribe that may attach religious or cultural importance to them. If an agency makes an assessment that its actions will cause an adverse effect to a historic property, it initiates a consultation process that typically results in a memorandum of agreement (MOA) that outlines measures that the agency will take to avoid, minimize, or mitigate the adverse effects. See 54 USC §§ 306108 et. seq.)

Magnuson-Stevens Fishery Conservation and Management Act

http://www.nmfs.noaa.gov/sfa/laws_policies/msa/

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) establishes national standards for fishery conservation and management in US waters. The act created eight regional fishery management councils (including the New England Fishery Management Council) composed of state and federal officials and fishing industry representatives who prepare and amend fishery management plans for certain fisheries requiring conservation and management.

Once a council develops a fishery management plan (FMP) (or an amendment to an existing FMP) and its management measures, National Marine Fisheries Service (NMFS) reviews the council's recommendations and approves and adopts the recommendations into federal regulations, provided they are consistent with other federal laws such as NEPA, Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act (MBTA), Endangered Species Act (ESA), Administrative Procedures Act, Paperwork Reduction act, CZMA, Data Quality Act, and Regulatory Flexibility Act. Other agencies become involved in issues related to fisheries management pursuant to existing authorities. For example, to address potential impacts to birds, turtles, and marine mammals, the US Fish and Wildlife Service (USFWS) and NMFS work with partners to study potential measures that could be effective at reducing impacts to species that are protected under applicable federal law such as the ESA. Additionally, under MSA the USCG has responsibilities related to commercial fishing vessel safety and supporting a sustainable fishery by ensuring compliance with the Magnuson-Stevenson Act. This act also applies to aquaculture of federally managed species in federal waters, and the New England Fishery Management Council (NEFMC) may develop fishery management plans for aquaculture."

In addition to provisions that address fisheries science and management, the act requires that fishery management plans identify protection and conservation measures and essential fish habitat (EFH) for each managed species. An EFH is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH regulations are intended to minimize, to the extent practicable, adverse effects of fishing and nonfishing activities on EFH. EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, is identified as a habitat area of particular concern (HAPC). An HAPC is characterized by at least one of the following criteria:

- The importance of the ecological function provided by the habitat
- The extent to which the habitat is sensitive to human-induced environmental degradation
- Whether, and to what extent, development activities are, or will be, stressing the habitat type
- The rarity of the habitat type

Federal agencies must consult with NMFS in the review of potential impacts of their actions on EFH and HAPC when they authorize, fund, or undertake an action that may adversely affect EFH. In response, NMFS provides conservation recommendations to avoid, minimize, mitigate, or otherwise offset those adverse effects. See 16 USC §§ 1801 et seq.

Public Law 538, 77th Congress, Chapter 283, 2nd Session, 56 Stat. 267 as amended by Public Law 721, 81st Congress, approved August 19, 1950

http://www.asmfc.org/files/pub/CompactRulesRegs_Feb2016.pdf

This public law, as amended, created the Atlantic States Marine Fisheries Commission (ASMFC), a body composed of representatives from the coastal states from Maine to Florida and Pennsylvania. The ASMFC serves as a deliberative body that, working in collaboration with NMFS and USFWS, coordinates the conservation and management of nearshore fishery resources including marine, shell, and diadromous species. The principal policy arenas of the ASFMC include interstate fisheries management, habitat conservation, and law enforcement. Whereas the fishery management councils created under the Magnuson-Stevens Act focus their management efforts on federal waters, the ASMFC's management focus is on resources in states' waters. Because of this distinction, the ASMFC generally manages different species than the fishery management councils, though some resources are jointly managed by the ASMFC and one of the East Coast councils. The Atlantic Coastal Fisheries Cooperative Management Act (http://www.asmfc.org/uploads/file/ACFCMA.pdf) authorizes the Secretary of Commerce to monitor and enforce states' compliance with mandatory provisions of interstate fishery management plans developed by the ASMFC.

Endangered Species Act

http://www.fws.gov/endangered/laws-policies/ and http://www.nmfs.noaa.gov/pr/laws/esa/

The Endangered Species Act (ESA) provides for the conservation of species that are endangered or threatened, and the conservation of ecosystems on which they depend. The USFWS or NMFS determine the species that are endangered or threatened ("listed species"), designate "critical habitat," and develop and implement recovery plans for listed species.

Critical habitat is defined in the ESA as a specific geographic area that contains habitat features essential for the survival and recovery of a listed species, and which may require special management considerations or protections. Critical habitat consists of "the specific areas within the geographical area occupied by the species, at the time it is listed . . . 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 protection." These features include:

- Space for individual and population growth and for normal behavior
- Cover or shelter
- Food, water, air, light, minerals, or other nutritional or physiological requirements
- Sites for breeding and rearing offspring
- Habitats that are protected from disturbances or are representative of the historical geographical and ecological distributions of a species

A critical habitat designation does not establish a preserve or refuge. Section 7 of the ESA requires that federal agencies consult with either USFWS or NMFS to ensure that any action authorized, funded, or carried out by an agency is not likely to jeopardize the continued existence of a listed species or result in the adverse modification or destruction of critical habitat designated for such species. See 16 USC §§ 1531 et seq.

Marine Mammal Protection Act

http://www.nmfs.noaa.gov/pr/laws/mmpa/

The Marine Mammal Protection Act (MMPA) provides for the protection of all marine mammals. NMFS and USFWS share authority under the act; NMFS is responsible for the protection of whales, dolphins, porpoises, and seals. The Act prohibits, with limited exceptions, broadly defined impacts to, or interactions involving, marine mammals. Exceptions can be made through permitting actions for "incidental" impacts from commercial fishing and other nonfishing activities, for scientific research, and for licensed institutions such as aquaria and science centers. NMFS can authorize incidental impacts if it finds that such impacts will have a negligible impact on the species or stock(s) and specifies conditions related to permissible impacts, mitigation, monitoring, and reporting. NMFS is required to consult with the Marine Mammal Commission in its decision-making. See 16 USC §§ 1361 et seq.

Migratory Bird Treaty Act

http://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php

The Migratory Bird Treaty Act (MBTA) implements four treaties (with Canada, Mexico, Japan, and Russia) that provide for international protection of migratory birds. Under the act, broadly defined impacts to, or interactions involving, migratory birds are prohibited. USFWS can issue permits that authorize falconry, raptor propagation, scientific collecting, and other specified and limited activities, but the act makes no provisions for the authorization of "incidental" impacts associated with other management and development activities. See 16 USC §§ 703 et. seq.

National Marine Sanctuaries Act

http://sanctuaries.noaa.gov/about/legislation/; also see http://stellwagen.noaa.gov regarding Stellwagen Bank

The National Marine Sanctuaries Act (NMSA) authorizes the Secretary of Commerce to designate discrete areas of the marine environment as national marine sanctuaries to protect distinctive natural and cultural resources. The primary objective of the act is protection of sanctuary resources; a secondary objective is facilitation of all public and private uses that are compatible with resource protection. Regulations for management and protection of sanctuary resources are at 15 CFR § 922. Section 304 of the act requires interagency consultation between the Office of National Marine Sanctuaries (ONMS) and federal agencies taking actions that "may affect" the resources of a sanctuary (in the Northeast, Stellwagen Bank). See 16 USC §§ 1431 et seq.

National Park Service Units

http://www.nps.gov/index.htm

The National Park Service Organic Act of 1916 created the National Park Service (NPS) and gave NPS the responsibility for managing National Park System units. The purpose of national parks broadly is to "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." In the Northeast, there are several units of the NPS system, including Acadia National Park, Boston Harbor Islands National Recreation Area, Cape Cod and Fire Island National Seashores, and a variety of national historic landmarks, sites, and parks. These units are managed according to their establishing legislation, the NPS Organic Act, and unit-specific management plans. See 54 USC §§ 100101 et seq.

National Wildlife Refuges

http://www.fws.gov/refuges/

The organic act for the system of national wildlife refuges is the National Wildlife Refuge System Administration Act. Generally, management of individual wildlife refuges is dictated by the statute, executive order, or administrative action creating the unit, with purposes thus ranging from narrow definitions to broad statements. The National Wildlife Refuge System Improvement Act of 1997 required that each refuge develop a comprehensive conservation plan. See http://www.fws.gov/northeast/refuges/planning/index.html for a status of the plans for Northeast refuges. See also 16 USC §§ 668 et seq.

National Estuary Program

http://www.epa.gov/nep

Under section 320 of the Clean Water Act, the EPA oversees implementation of the National Estuary Program, the goal of which is to improve the quality of "estuaries of national importance." There are six National Estuary Programs in New England, covering Casco Bay; the Piscataqua Region (including Great Bay and the New Hampshire coastal embayments); Massachusetts Bays (including Massachusetts and Cape Cod Bays); Buzzards Bay; Narragansett Bay; and Long Island Sound. Human activities within these estuaries are managed through a comprehensive conservation and management plan (CCMP). The CCMP serves as a blueprint to guide future decisions and actions and addresses a wide range of environmental protection issues, including, for example, water quality, habitat, fish and wildlife, pathogens, land use, and introduced species. See 33 USC § 1330.

National Estuarine Research Reserves

http://nerrs.noaa.gov/

Created under the Coastal Zone Management Act, the National Estuarine Research Reserve (NERR) system includes several units in the Northeast. The purpose of designating these areas is for research and for the protection of estuarine systems, generally focusing on stewardship, research to aid conservation and management, training on the use of local data for management, and education. Management plans for each reserve guide future decisions and actions. See 16 USC §§ 1461.

APPENDIX 2: ADDITIONAL INFORMATION FOR CHAPTER 3 OCEAN RESOURCES AND ACTIVITIES

Chapter 3 of this Northeast Ocean Plan (Plan) discusses the extensive data on the Northeast Ocean Data Portal (Portal) that provides a regional perspective of ocean resources and activities. However, there are many other sources of information that may need to be considered in decision–making. This Plan does not attempt to identify every source, but this appendix lists and briefly describes programs and data sources that Regional Planning Body (RPB) agencies identified as particularly relevant for use in supplementing the map and data products in the Plan.

For their planning areas, the Massachusetts Ocean Plan and Rhode Island Ocean Special Area Management Plan (SAMP) provide information across all of the topics in Chapter 3. The Rhode Island Ocean SAMP is available at http://seagrant.gso.uri.edu/oceansamp/, and the Massachusetts Ocean Plan is at http://www.mass.gov/eea/waste-mgnt-recycling/coasts-and-oceans/mass-ocean-plan/. An additional federal source of spatial information, much of which is also served by the Northeast Ocean Data Portal, is the multipurpose Marine Cadastre, available at http://marinecadastre.gov/.

This appendix is organized into five sections corresponding to five of the resources and activities of Chapter 3: marine life and habitat, cultural resources, marine transportation, commercial and recreational fishing, and recreation.

MARINE LIFE & HABITAT

Atlantic Marine Assessment Program for Protected Species
http://www.nefsc.noaa.gov/psb/AMAPPS/

The Atlantic Marine Assessment Program for Protected Species (AMAPPS) is a collaborative project between the National Oceanic and Atmospheric Administration (NOAA), US Fish and Wildlife Service (USFWS), Bureau of Ocean Energy Management (BOEM), and the US Navy to better characterize the distribution and abundance of marine mammals, sea turtles, and seabirds along the Atlantic coast, and it represents an important source of new marine life observations for improving existing marine life products. Furthermore, AMAPPS data are being collected with the intention of informing future environmental assessments and stock assessments, and to provide baseline data for future monitoring efforts in coastal and offshore environments.

Environmental Sensitivity Index data products
http://response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html

NOAA is currently updating Environmental Sensitivity Index (ESI) data products along areas of the Atlantic coast affected by Hurricane Sandy (from Maine to South Carolina). ESI maps contain information about coastal and marine biological resources such as birds, shellfish beds, marshes, and tidal flats. Because ESI geography includes navigable rivers, bays, and estuaries, they are an important source of information for nearshore environments.

Gulf of Maine Coastal Ecosystem Survey
https://gomces.wordpress.com/about/

This collaborative project is led by the Maine Department of Inland Fisheries and Wildlife and seeks to better understand ecosystem dynamics in the Gulf of Maine. Integrated surveys of plankton communities, fish, birds, and marine mammals were conducted from July 2014 to February 2016. A final output of this project will be mapping biological hot spots in the coastal waters of the Gulf of Maine.

State-level information
Many New England state fish and wildlife agencies and marine fisheries agencies conduct regular surveys of biological resources in state waters and maintain databases of marine life observations.

NOAA Passive Acoustic Monitoring Program
http://www.nefsc.noaa.gov/psb/acoustics/

Passive Acoustic Monitoring provides information on marine life distribution during times and in places where human observations are limited (e.g., in the winter or at night), and it can serve to supplement or validate existing marine life products. See also the NOAA cetacean and sound mapping page at http://cetsound.noaa.gov/.

Biologically important areas for cetaceans
http://cetsound.noaa.gov/important

NOAA's effort to map biologically important areas (BIAs) for cetaceans (1) identifies areas where cetacean species or populations are known to concentrate for specific behaviors, or be range-limited, but for which there is not sufficient data for their importance to be reflected in the quantitative mapping effort, and (2) provides additional context within which to examine potential interactions between cetaceans and human activities. Four types of BIAs are identified: reproductive areas, feeding areas, migratory corridors, and small and resident populations.

Seal Surveys at the NOAA Northeast Fisheries Science Center Protected Species Branch
http://www.nefsc.noaa.gov/psb/seals/sealsurveys.htm

The NOAA Northeast Fisheries Science Center (NEFSC) conducts seal tagging, biological sampling, and aerial imagery surveys with numerous partners in the region (including the USFWS and the National Park Service).

Monitoring bat activity in the Northeast

- Stantec, in partnership with the Department of Energy (DOE) and the Northeastern Association of Coastal and Ocean Observing Systems (NERACOOS), has deployed bat sensors on NERACOOS buoys in the Gulf of Maine. The results of the 2011 deployment can be found in the BOEM Environmental Studies Program information System (ESPIS) report at http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5289.pdf. Another set of sensors has been deployed in the Gulf of Maine since April 2013. The goal of these efforts is to gain a better understanding of bat migration activity over ocean waters, to ultimately help determine and overcome potential risks associated with offshore wind turbines.
- BOEM is currently funding a tracking study of northern long-eared bats in the Northeast to investigate the risks of offshore wind energy development. See http://www.boem.gov/Tracking-Northern-Long-Eared-Bat-Offshore-Foraging-and-Migration-Activities/.
- Through the Northeast Regional Migration Monitoring Network, the Maine Coastal Islands National Wildlife Refuge (USFWS), the University of Maine, Acadia University and Acadia National Park collaborated, using radar, acoustic monitoring, banding stations, isotope analysis, nanotags, and receivers to document and understand bat use of Maine's coast. See http://rkozlo51-25.umesci.maine.edu/SBE/avian/MigrationMonitoring.html.

Saltmarsh Habitat and Avian Research Program
http://www.tidalmarshbirds.org/

The Saltmarsh Habitat and Avian Research Program (SHARP) is a group of academic, governmental, and non-profit collaborators gathering the information necessary to conserve tidal-marsh birds. The program collects data and information to monitor the health of North America's tidal-marsh bird communities and the marshes they inhabit in the face of sea level rise and upland development. The near-term goal of SHARP is to advise management actions across the Northeast US for the long-term conservation of tidal-marsh birds and the ecosystem that supports them.

Avian movement and migration studies
Telemetry and tracking data provide information on animal movement and migration, neither of which are well characterized by existing distribution and abundance products for avian species. For some species, breeding, wintering, staging, and molting areas occur in different places across North America, and understanding the links between these life history stages is important. The following efforts have the common goal of better understanding avian movement and migration at the continental scale for certain groups of species. Many have overlapping partners.

- Northeast Regional Migration Monitoring Network
  http://rkozlo51-25.umesci.maine.edu/SBE/avian/MigrationMonitoring.html
- USFWS Mid-winter Waterfowl Survey
  https://migbirdapps.fws.gov/mbdc/databases/mwi/mwidb.asp
- MOTUS Wildlife Tracking System
  http://sandbox.motus-wts.org/data/viewtracks.jsp
- Mid-Atlantic Diving Bird Study
  http://www.briloon.org/mabs/reports
- Atlantic and Great Lakes Sea Duck Migration Study
  http://seaduckjv.org/science-resources/atlantic-and-great-lakes-sea-duck-migration-study/
- Common Eider Wellfleet Bay Virus Tracking Study
  http://www.briloon.org/boston-harbor-common-eider-satellite-tracking-study
- Tracking Offshore Occurrence of Terns and Shorebirds in the Northwest Atlantic
  http://www.boem.gov/AT-13-01/
- University of Rhode Island avian tracking studies
  For example, see http://seagrant.gso.uri.edu/oceansamp/pdf/appendix/11a-PatonAvianRept.pdf

Avian partnerships

- Atlantic Coast Joint Venture
  http://acjv.org/

  The Atlantic Coast Joint Venture (ACJV), established under the North American Waterfowl Management Plan, is a conservation partnership focused on the conservation of habitat for native (resident and migratory) birds in the Atlantic Flyway, from Maine south to Puerto Rico. The science provided by the ACJV and its partners includes the Atlantic Marine Assessment Program for Protected Species (described above). Additional research that is being conducted in collaboration with BOEM includes the winter movement patterns of satellite-marked sea ducks (black scoters, surf scoters, and white-winged scoters), red-throated loons, and gannets.
- Sea Duck Joint Venture
  http://seaduckjv.org/

  The Sea Duck Joint Venture (SDJV) is a conservation partnership established under the North American Waterfowl Management Plan that provides science-based information to support effective management decisions for North American sea ducks. The science provided by the SDJV and its partners includes the identification of coastal and marine areas that are of continental significance to North American sea ducks, survey information that can provide an additional measure of species composition and numerical estimates, and annual movement patterns of satellite-marked sea ducks.
- Atlantic Flyway Shorebird Initiative
  http://www.nfwf.org/amoy/Pages/home.aspx

  The Atlantic Flyway Shorebird Initiative (AFSI) is a partnership of government (led by the USFWS), conservation organizations, academics, and shorebird experts to safeguard the phenomena of migration that sustains shorebird populations throughout the hemisphere. The initiative has identified five strategies to address threats to shorebirds including protecting habitat, minimizing predation, reducing human disturbance, reducing hunting, and filling knowledge gaps. The AFSI business plan that describes these strategies can be found on the group's website.
- North Atlantic Landscape Conservation Cooperative
  http://northatlanticlcc.org/

  The North Atlantic Landscape Conservation Cooperative (NALCC) is a partnership in which the private, state, tribal, and federal conservation community works together to address widespread resource threats in aquatic, coastal, and terrestrial settings amplified by a changing climate, including enhancing coastal resilience to rising sea levels and coastal storms. The NALCC has sponsored two science projects in recent years: application of the Coastal and Marine Ecological Classification Standard (CMECS) to the Northeast, and modeling of the probability of occurrence of 24 species of marine birds in the northwestern Atlantic Ocean. Additionally, the NALCC is currently funding projects related to coastal habitats and species and their thresholds for tolerance to sea level rise and storms as stressors: assessing ecosystem services provided by barrier beaches, tidal marshes, and shellfish beds; and examining opportunities and tools to support tidal marsh restoration. Project reports are available on the NALCC website.
- Atlantic Marine Bird Conservation Cooperative
  http://www.fws.gov/northeast/migratorybirds/marinebirdconservation.html

  The Atlantic Marine Bird Conservation Cooperative (AMBCC) is a diverse partnership that identifies the most pressing conservation needs for marine birds in the Northwest Atlantic (Canada to the Caribbean), and develops actions to address them. The science provided by AMBCC partners includes the development of the Northwest Atlantic Seabird Catalog, the Business Plan for Addressing and Reducing Bycatch in Atlantic Fisheries, and a number of tracking, surveying, and distribution modeling research projects that will directly inform offshore energy development.

Shallow Water Benthic Habitats in the Gulf of Maine: A summary of habitat use by common fish and shellfish species in the Gulf of Maine
https://www.greateratlantic.fisheries.noaa.gov/policyseries/index.php/GARPS/article/view/11

This report provides habitat use scores for each benthic life stage of 16 common fish and shellfish species. The analysis highlights the importance of shallow water habitats (less than 10 meters) to juveniles and adults for spawning, feeding, and growth to maturity. Shallow water habitats were used by all young-of-the-year juveniles for all 16 species.

New England Aquarium sightings-per-unit-effort marine mammals maps
http://docs.dos.ny.gov/communitieswaterfronts/ocean_docs/NEA_URI_Report_Marine_Mammals_and_Sea_Turtles.pdf

New England Aquarium sightings-per-unit-effort (SPUE) maps provide a means to display marine mammal observations normalized by survey effort. Researchers at the New England Aquarium have contributed to SPUE mapping efforts for marine mammal species in the Gulf of Maine and offshore New York. These map products are important sources of marine mammal observations and could be used to compare and validate other marine mammal map products. The New England Aquarium also maintains the website for the North Atlantic Right Whale Consortium at http://www.narwc.org/index.php?mc=1&p=1. The New England Aquarium was part of offshore surveys for marine mammals and sea turtles south of Massachusetts. See http://files.masscec.com/research/OffshoreWindWildlifeFirstYear.pdf.

Northeast Fish and Shellfish Climate Vulnerability Assessment
http://www.st.nmfs.noaa.gov/ecosystems/climate/northeast-fish-and-shellfish-climate-vulnerability/index#

This work provides scores for the climate vulnerability of 82 species of fish and shellfish in the Northeast region. The species are scored in terms of sensitivity and exposure to climate change. In addition to overall positive, negative, or neutral effect, scores are provided for vulnerability to shifts in productivity, and propensity for a shifting distribution. Approximately half of the species assessed are estimated to have a high or very high vulnerability to climate change in the Northeast.

NOAA Deep-Sea Coral Database (sponges and corals)
https://deepseacoraldata.noaa.gov/

The database of deep-sea corals and sponges from the NOAA Deep Sea Coral Research and Technology Program is available online. This database includes historical and recent observations of corals and sponges from research surveys, dive transects, specimen collections, and the academic literature.

Geological and geophysical studies for offshore sand resource characterization
http://www.boem.gov/Marine-Minerals-Program-offshore-sand-resources/

Through the BOEM Atlantic Sand Assessment Project (ASAP) and cooperative agreements with Maine, New Hampshire, Massachusetts, and Rhode Island, there are several ongoing geological and geophysical studies to characterize offshore sand resources in the region. BOEM contracted the firm CB&I to conduct geophysical surveys three to eight nautical miles offshore, and several states are beginning to map sand within state waters.

CULTURAL RESOURCES

National Register of Historic Places
http://www.nps.gov/nr/

The National Park Service maintains the National Register of Historic Places, the official list of historic places worthy of preservation.

State Historic Preservation Offices
State Historic Preservation Offices (SHPO) provide updates to the lists of historic properties that have been nominated and/or deemed eligible for listing on the National Register.

MARINE TRANSPORTATION

Atlantic Coast Port-Access Route Studies
www.uscg.mil/lantarea/acpars/

In 2011, the US Coast Guard (USCG), in collaboration with NOAA and BOEM, initiated a Port-Access Route Study (PARS) for the Atlantic coast. Previous PARS studies were limited to a single port; however, understanding traffic along the entire coast was needed to facilitate unimpeded commercial traffic in the vicinity of wind energy areas (WEAs) in multiple regions. Common PARS outcomes are recommendations that routing measures be established to maintain navigational safety for all waterway users. Routing measures include the following designated areas: Area to Be Avoided, Deep Water Route, Inshore Traffic Zone, Shipping Safety Fairway, Precautionary Area, and Regulated Navigation Area. New or amended routing systems are approved through the International Maritime Organization (IMO),[1] of which the USCG is a participant. For example, the IMO Subcommittee on Safety of Navigation approved the narrowing of the north-south Boston Traffic Separation Scheme (TSS) to route vessels away from known right whale populations, thus reducing the risk of ship strikes.

The Atlantic Coast Port-Access Route Study (ACPARS) met a number of important goals, including enhancing Automatic Identification System (AIS) data collection and analysis, facilitating discussions concerning traffic patterns for several WEAs, and gathering significant stakeholder input regarding proposed WEAs. It was unable, however, to develop a modeling and analysis tool that would predict how vessel traffic patterns would be impacted by the presence of wind farms. Even without the ACPARS modeling tool, the USCG provides navigational safety evaluations to the lead permitting agency through well-established USCG policies leveraging United Kingdom Coast Guard guidance.

Interagency memoranda of understanding
The USCG has a multitude of references that waterway managers can utilize in order to characterize and maintain safe marine transportation. These include the Tactics, Techniques, and Procedures (TTP) Program, Navigation and Vessel Inspection Circulars (NVIC), and Instructions and Manuals.

The USCG uses memoranda of understanding (MOU) and memoranda of agreement (MOA) to document how to better understand and share mutual responsibilities with government agencies that relate to marine transportsation and ocean planning. The following are a few of the more recent and relevant of these memoranda:

- MOA – USACE/USCG dated June 2, 2000, and Appendix C: US Army Corps of Engineers Section 10 Permit Review Policy Guidance, dated January 25, 2002
- Cooperating Agency Agreement between the USCG and MMS for Programmatic EIS, July 7, 2006
- MOA-BSEE/USCG – Fixed Outer Continental Shelf (OCS) Facilities, dated September 10, 2014
- MOA-BOEMRE/USCG – Offshore Renewable Energy Installations on the Outer Continental Shelf, dated July 27, 2011
- MOU-BSEE/USCG – Building a Partnership to Improve Safety and Environmental Protection, dated November 27, 2012
- DOI/OSHA/USCG MOU re: Regulatory Oversight of Offshore Wind Farms in State Waters

The US Army Corps of Engineers (USACE) enters into MOUs/MOAs with other federal agencies regarding resource planning, investigations and management (National Marine Fisheries Service essential fish habitat programmatic assessments), and regulatory permit processing (for example, see USCG 2000 MOA, described above). The USACE enters into Project Partnership Agreements (PPAs) with state, county, and municipal bodies for nonfederal sponsorship, including cost sharing, for its Civil Works improvement activities.

The USACE also enters into MOAs with other federal, state, and local bodies under its authorities for international and interagency support, for study, design, and construction of marine infrastructure features managed by those agencies where a benefit to the public accrues from such cooperative action (for example, under the Economy Act). The USACE New England District has used these authorities to perform work funded by the states (mainly dredging), USCG (seawalls and Aids to Navigation [ATON] bases on breakwaters and jetties), National Archives (marina design), and the US Navy (pier engineering studies).

The USACE also enters into MOAs with project sponsors for nonfederally funded study, design, and construction of local service facilities and betterments associated with USACE Civil Works project activities (for example, local berth dredging undertaken concurrent with federal channel dredging), use of nonfederally provided confined placement facilities for dredged material, and nonfederally funded beneficial use of dredged material for beach nourishment and other coastal resiliency projects.

Relevant References

- New England Regional Dredging Team
  http://nerdt.org/
- Port Security Grants
  http://www.fema.gov/port-security-grant-program
- TIGER Grants to fund capital investments in surface transportation infrastructure
  https://www.transportation.gov/tiger
- NOAA PORTS Program
  http://www.nws.noaa.gov/om/marine/ports.htm
- USACE Waterborne Commerce of the United States
  http://www.navigationdatacenter.us/wcsc/wcsc.htm

COMMERCIAL & RECREATIONAL FISHING

Data from the multipurpose Marine Cadastre
www.marinecadastre.gov

The Marine Cadastre includes a Vessel Trip Report–derived data layer that displays fishing revenue information across the Atlantic Seaboard, including New England state and federal waters, from 2007 to 2012. Other data including historical (1970s) fishing data are also available through the Marine Cadastre.

Mid-Atlantic Ocean Data Portal
http://midatlanticocean.org/data-portal/

The Mid-Atlantic Ocean Data Portal provides several Vessel Trip Report–derived data products that extend into the Northeast. These include products related to all fisheries reported in the Vessel Trip Report system as well as products organized by gear type.

The New England Fishery Management Council, the Atlantic States Marine Fisheries Commission, and state marine fisheries agencies
The New England Fishery Management Council (NEFMC), the Atlantic States Marine Fisheries Commission (ASMFC), and state marine fisheries agencies are primary data sources for many important commercial and recreational fisheries and are key sources for information that may have a significant impact during review of proposed development. Additionally, the Massachusetts Ocean Management Plan and Rhode Island Ocean Special Area Management Plan (SAMP) include maps and other information related to commercial fishing.

Marine Recreational Information Program
http://www.st.nmfs.noaa.gov/recreational-fisheries/index

The NMFS Marine Recreational Information Program (which operates in partnerships with several New England states) is a survey-based assessment of recreational fishing nationwide that produces summary statistics related to catch and effort. Both the Massachusetts Ocean Management Plan (http://www.mass.gov/eea/waste-mgnt-recycling/coasts-and-oceans/mass-ocean-plan/) and the Rhode Island Ocean SAMP (http://seagrant.gso.uri.edu/oceansamp/documents.html) provide information within their respective planning areas depicting the spatial footprint of components of recreational fishing.

Atlantic Coastal Cooperative Statistics Program's Data Warehouse
The Atlantic Coastal Cooperative Statistics Program's Data Warehouse (http://www.accsp.org/data-warehouse) is a repository of commercial fisheries catch, effort, and landings data, and recreational catch data for the Atlantic coast. The commercial data are supplied by partner state and federal agencies, and the recreational data are from NOAA's Marine Recreational Information Program.

RECREATION

There are numerous other information sources available to help capture the extent of recreational activity by providing a particular perspective or additional information for a portion of the region:

National Recreational Boating Survey
http://www.uscgboating.org/statistics/national-recreational-boating-safety-survey.php

The USCG conducts a National Recreational Boating Survey and maintains a database of past and current marine event permits, among many other sources of information on waterways use and safety.

NPS, SBNMS, USFWS, and NOAA can provide more information on visitation and actual activities within and near national parks, wildlife refuges, and the Stellwagen Bank National Marine Sanctuary.

Each New England state has a marine or coastal unit of its Environmental Police that participates in ocean safety and enforcement exercises. These units and their personnel often have data and extensive personal knowledge of offshore recreational activities.

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[1] Note that other provisions of the Clean Water Act are relevant to coastal and ocean management activities informed by this Plan.

[2] Maritime and Coastguard Agency, MGN 371 Offshore Renewable Energy Installations (OREIs): Guidance on UK Navigational Practice, Safety and Emergency Response Issues (Maritime and Coastguard Agency, 2008), https://www.gov.uk/government/publications/mgn-371-offshore-renewable-energy-installations-oreis.

[3] United States Coast Guard, "Internet-Releasable TTP Publications," uscg.mil, http://www.uscg.mil/forcecom/ttp/.

[4] United States Coast Guard, "Navigation and Vessel Inspection Circulars," uscg.mil, http://www.uscg.mil/hq/cg5/nvic/.

[5] United States Coast Guard, "Directives and Publications Division," uscg.mil, www.uscg.mil/directives/.

[6] Unites States Coast Guard, "Commandant Instruction 5216.18: Memoranda of Understanding/Agreement," uscg.mil, http://www.uscg.mil/directives/ci/5000-5999/CI_5216_18.pdf.

APPENDIX 3: DRAFT IMPORTANT ECOLOGICAL AREA FRAMEWORK

Identifying Important Ecological Areas in Northeast Ocean Planning

The Framework for Ocean Planning in the Northeast United States (adopted by the NE RPB in January 2014) includes an action and a specific task to assess regional efforts to identify areas of ecological importance and to convene the Northeast Regional Planning Body (RPB), scientists, and stakeholders to consider options for how to proceed with characterizing and using important ecological areas (IEAs) in ocean planning. It also suggests that defining IEAs is the first step to identifying those areas. In June 2014, the RPB issued a "Draft Summary of Marine Life Data Sources and Approaches to Define Ecologically Important Areas and Measure Ocean Health"[1] and convened a public workshop to consider next steps related to defining and using IEAs. Informed by that workshop, the RPB decided to take a stepwise approach by first developing regional marine life and habitat data.

Since June 2014, the RPB, through the efforts of the Northeast Ocean Data Portal Working Group[2] and the Marine-life Data and Analysis Team,[3] has developed numerous data layers that map various habitats and the distribution and abundance of 150 species of marine mammals, birds, and fish. In April 2015, the RPB convened an ecosystem-based management workshop, resulting in the formation of an Ecosystem-Based Management Work Group (EBM Work Group). The role of the EBM Work Group is to support and inform a range of activities designed to incorporate additional EBM considerations into the 2016 Northeast Ocean Plan, including approaches to define and characterize IEAs. At its September 30, 2015, meeting, the EBM Work Group reviewed regional marine life and habitat data that have been developed to date and recommended that the RPB define IEAs as various ecological components and ecosystem functions, using existing definitions from National Ocean Policy documents as a starting point.

In the Final Recommendations of the National Ocean Policy Task Force, important ecological areas are described as including "areas of high productivity and biological diversity; areas and key species that are critical to ecosystem function and resiliency; areas of spawning, breeding, and feeding; areas of rare or functionally vulnerable marine resources; and migratory corridors." This description provides a basis for defining IEAs for ocean planning in the Northeast.

Several other definitions and criteria for important biological or ecological areas provide additional context, mostly demonstrating consistent definitions and similar approaches nationally and internationally.[4]

Using the National Ocean Policy (NOP) definition as the basis, the RPB developed a series of IEA components, noted their consistency with the NOP and other approaches to defining IEAs, defined each IEA component according to ecological features and the existing natural resources datasets that could be used to characterize and map those features, and included long-term data needs for each component. An initial draft IEA document was then released for review and public comment in November 2015. EBM Work Group review was generally positive, especially regarding the definition and identification of the components of IEAs. Other feedback focused on the details of which ecological datasets could be used to characterize the IEA components. This feedback was incorporated into a revised document that included a summary of the IEA Framework development process to date and suggested definitions for IEA components, tables outlining categories of existing marine life and habitat data that could apply to IEAs, and tables of potential long-term data, science, and research needs.

This revised framework document was reviewed and discussed by the EBM Work Group at its second meeting on January 6, 2016. The EBM Work Group provided additional positive feedback on the framework, and made specific recommendations for further improving the definitions of IEA Components and the use of data to support IEA components. These recommendations included:

- The NE RPB should conduct scientific review of draft marine life and habitat data that will be referenced in the Plan and that are applicable to IEA components (as described in the Plan, this review is currently ongoing).
- Applicable data for areas of high productivity, areas of high biodiversity, and areas of rare marine resources could be illustrated for review.

The EBM Work Group also recommended that the development of data applicable to IEA components be an iterative, adaptive process. Allowing for some iteration in data development ensures that thresholds of "importance" are thoroughly reviewed. An adaptive process ensures that data applicable to IEAs continue to stay relevant and representative of changing conditions, a dynamic marine environment, and shifting human uses. The EBM Work Group reviewed current data gaps and anticipated data needs, which are described in Chapter 5.

The following framework for defining and identifying IEAs incorporates feedback on the November 2015 and January 2016 drafts from the NE RPB, the EBM Work Group and public comment. The framework includes:

- An overarching definition of important ecological areas for Northeast Ocean Planning
- The identification of five IEA components and a simple definition to describe and bound each IEA component
- A table suggesting categories of existing marine life and habitat data described in Chapter 3 that could be used to characterize and map IEA components, recognizing that an individual ecological resource and corresponding dataset may be applicable to many IEA components
- A table suggesting longer-term data, science, and research needs, which are also included as science and research priorities in Chapter 5
- Actions associated with the continued development of the IEA Framework and data applicable to IEA components, which are also described in Chapter 5

IEA definition

Important Ecological Areas (IEAs) for Northeast ocean planning are habitat areas and the species, guilds, or communities critical to ecosystem function, resilience, and recovery. IEAs include areas/species/functional guilds/communities that perform important ecological functions (e.g., nutrient cycling, provision of structure) that are further defined by five components.

Five Components of Important Ecological Areas

The following definitions are intended to describe and bound the types of datasets that could be applicable to each component:

1. **Areas of high productivity** – includes measured concentrations of high primary and secondary productivity, known proxies for high primary and secondary productivity, and metrics such as food availability
2. **Areas of high biodiversity** – includes metrics of biodiversity and habitat areas that are likely to support high biodiversity
3. **Areas of high species abundance including areas of spawning, breeding, feeding, and migratory routes** – support ecological functions important for marine life survival; these areas may include persistent or transient core abundance areas for which the underlying life history mechanism is currently unknown or suspected

4. **Areas of vulnerable marine resources** – support ecological functions important for marine life survival and are particularly vulnerable to natural and human disturbances
5. **Areas of rare marine resources** – includes distribution and core abundance areas of state and federal ESA-listed species, listed species of concern and candidate species, other demonstrably rare species, and spatially rare habitats

Use of existing marine life and habitat data to describe IEAs

As a consequence of working toward the RPB's action to produce regional spatial characterizations of marine life and habitat distribution and abundance, the majority of the datasets currently available for use in the IEA Framework are products describing habitat and species distribution and abundance. While habitat and species distribution and abundance are important structural ecological features, the IEA Framework identifies additional ecological features that may be independent of abundance (e.g., representations of function, connectivity, dynamics) and suggests datasets to address these.

The following tables provide a listing of existing spatial marine life (Table 1a) and physical and biological habitat data (Table 1b) and suggest where each dataset could fit within the IEA component framework. The tables incorporate feedback from the EBM Work Group, much of which could be grouped into the following general themes:

- Each ecological resource and corresponding dataset could fit into more than one IEA component
- Some ecological features could be determined to be inherently important over their full extent
- Some datasets characterizing an ecological feature may require determination and scientific review of a certain population threshold, areal extent, or time of year in order to be used to identify IEAs (see table below for examples)

Table 1a // Applicability of existing marine life spatial data to IEA components.[5]

	Areas of high productivity	Areas of high biodiversity	Areas of high species abundance*	Areas of vulnerable marine resources	Areas of rare marine resources	Threshold needed?
	1	2	3	4	5	
Diversity of marine mammals, birds and fish (Shannon diversity index or Simpson diversity index for each group from MDAT)		●				
Multi-taxa species richness (richness for about 150 species of mammals, birds, and fish from MDAT; does not rely on abundance)		●				
Marine mammal abundance core area, bird abundance core area, and fish biomass core area (based on annual averages from MDAT; this could be for species groups, whole taxa, and/or multiple taxonomic groups)[6]			●	●		Core as defined by MDAT?
Core areas for ESA-listed species (from MDAT)				●	●	
Core areas for species groups that are sensitive to particular disturbances or impacts (e.g., marine mammal species groups sensitive to high-, mid- and low-frequency sound, or bird species groups sensitive to collision or displacement from offshore wind energy projects)[7] (from MDAT)				●		

* Including areas of spawning, breeding, feeding, and migratory routes

Table 1b // Applicability of existing physical and biological habitat spatial data to IEA components

	Areas of high productivity	Areas of high biodiversity	Areas of high species abundance*	Areas of vulnerable marine resources	Areas of rare marine resources	Threshold needed?**
	1	2	3	4	5	
Rate of photosynthesis	●					
Chlorophyll-*a* concentration	●					Highest 10% over 50% of time?
Eelgrass meadows	●		●	●		Presence
Cold-water coral habitat		●		●	●	
Wetlands	●		●	●		
Shellfish beds				●		
Frontal boundaries	●	●				>50% of year?
Upwelling zones	●	●				
Canyons	●	●				
Seamounts	●	●				
Areas of complex seafloor	●	●				
Essential fish habitat (EFH)				●		
Designated ESA critical habitat				●	●	
Habitat Areas of Particular Concern (e.g., Atlantic cod, Atlantic salmon, Tilefish)				●	●	

* Including areas of spawning, breeding, feeding, and migratory routes
**Some example thresholds provided as context

Long Term Science and Data Needs to Advance the Identification of IEAs

The following tables provide a listing of potential marine life science and data needs (Table 2a) and physical and biological habitat science and data needs (Table 2b) that would advance the identification of IEAs and suggests where each identified need could fit within the IEA Framework. The tables incorporate feedback provided throughout the course of the Northeast ocean planning process, including suggestions provided during the October 2015 Stakeholder Forum, EBM Work Group meetings, and comments on draft IEA documents. These science and data needs are also described in Chapter 5.

[1] Northeast Regional Planning Body, Draft Summary of marine life data sources and approaches to define ecologically important areas and measure ocean health (Northeast Regional Planning Body 2014). http://neoceanplanning.org/wp-content/uploads/2014/08/Marine-Life-Assessment-Inventory_Draft.pdf

[2] Northeast Regional Planning Body, "Northeast Ocean Data Portal." http://www.northeastoceadata.org.

[3] Northeast Regional Planning Body, "Marine Life/Habitat and Ocean Planning." neoceanplanning.org. http://neoceanplanning.org/projects/marine-life.

[4] The following efforts to define IEAs were considered:

- National Marine Sanctuary nomination criteria for national significance, 15 CFR §922.10.
- Essential Fish Habitat as defined by the Magnuson-Stevens Act, 16 U.S.C. §§ 1801-1884.
- Canada Department of Fisheries and Oceans, *Identification of Ecologically and Biologically Significant Areas* (Canada Department of Fisheries and Oceans 2004), http://www.dfo-mpo.gc.ca/csas/Csas/status/2004/ESR2004_006_E.pdf.
- Derous S., et al., A concept for biological valuation in the marine environment, (Oceanologia vol. 49, pp. 99-128, 2007), http://www.iopan.gda.pl/oceanologia/491derou.pdf
- Convention on Biological Diversity, "Ecologically or biologically significant marine areas." https://www.cbd.int/ebsa/about.
- Jim Ayers, Ashley Blacow, Ben Enticknap, Chris Krenz, Susan Murray, Santi Roberts, Geoff Shester, Jeffrey Short , and Jon Warrenchuk, *Important Ecological Areas in the ocean: A comprehensive ecosystem protection approach to the spatial management of marine resources* (Oceana 2010), http://oceana.org/sites/default/files/reports/oceana_iea_discussion_paper.pdf.

[5] Note that there are no marine life datasets listed that correspond to high productivity. Recognizing that "snapshots" of abundance do not necessarily equal high productivity, can a metric for high productivity be derived from marine life data? See table 2a.

[6] This product could address persistence of abundance for marine mammal and bird species and persistence of biomass for fish species on an annual basis; i.e., provide a very broad characterization of marine life aggregations averaged over a year. There is potential to look at shorter time scales and certain times of year for certain species/groups – this is captured in Table 2a.

[7] Species sensitivity/vulnerability groups will be derived from published studies such as: Bureau of Ocean Energy Management, *The relative vulnerability of migratory bird species to offshore wind energy projects on the Atlantic Outer Continental Shelf* (Bureau of Ocean Energy Management 2013), www.data.boem.gov/PI/PDFImages/ESPIS/5/5319.pdf.

Table 2a // Long-term marine life science and spatial data needs relevant to IEA components (described in Chapter 5)

	Areas of high productivity	Areas of high biodiversity	Areas of high species abundance*	Areas of vulnerable marine resources	Areas of rare marine resources	Threshold needed?
	1	2	3	4	5	
Multi-taxa metric of high marine life productivity	●					
Multi-taxa index of high biodiversity		●				
Identification and distribution of key-stone species, foundational species, and ecosystem engineers				●		
Distribution and abundance of benthic fauna, including crustaceans				●		
MDAT core areas for species with low fecundity, slow growth, longevity				●		
MDAT core areas for species groups sensitive to impacts including warming waters and acidification				●		
MDAT core areas for mammals, birds, fish (monthly or seasonal averages)			●	●		
Seal haul outs			●			
Identification and distribution of ecologically rare species					●	To distinguish rare endemics from nonendemics

* Including areas of spawning, breeding, feeding, and migratory routes

Table 2b // Long-term physical and biological habitat science and spatial data needs relevant to IEA components (described in Chapter 5)

	Areas of high productivity	Areas of high biodiversity	Areas of high species abundance*	Areas of vulnerable marine resources	Areas of rare marine resources	Threshold needed?
	1	2	3	4	5	
Distribution/abundance of kelp forests	●	●		●		
Multi-taxa index of high productivity	●					
Identification and distribution of offshore habitats defined by pelagic hydrodynamic processes			●			
Distribution of bivalve-dominated communities				●		
Rolling closures and spawning area closures for managed species			●			
Identification and distribution of ecologically rare habitats					●	

* Including areas of spawning, breeding, feeding, and migratory routes

APPENDIX 4: REFERENCE DOCUMENTS INCORPORATED INTO THE PLAN

The process of developing the Plan led to the creation of the following documents, which are incorporated into this Plan:

1. Northeast Regional Planning Body Charter, http://neoceanplanning.org/wp-content/uploads/2014/07/Charter-with-Signatories.pdf
2. *Framework for Ocean Planning in the Northeast United States*, http://neoceanplanning.org/wp-content/uploads/2014/02/NE-Regional-Ocean-Planning-Framework-February-2014.pdf
3. Baseline Assessment, http://www.neoceanplanning.org
4. Marine-life Data ands Analysis Team (MDAT) *Technical Report on the Methods and Development of Marine-life Data to Support Regional Ocean Planning and Management*, http://neoceanplanning.org/projects/marine-life/

As part of Plan development, the RPB produced many background reports, white papers, summaries of engagement with specific stakeholder groups, and other meeting materials. These are available on the Northeast ocean planning website, www.neoceanplanning.org.

Acronyms and Abbreviations

Agencies, Bureaus, Centers, Commissions, Committees, Councils, Departments, Offices, Organizations, Services

ACHP	Advisory Council on Historic Preservation
ASMFC	Atlantic States Marine Fisheries Commission
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
DHA	Department of Homeland Security
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
GAO	Government Accountability Office
GARFO	Greater Atlantic Fisheries Office (NOAA)
IMO	International Maritime Organization
MARAD	Maritime Administration (DOT)
MDMF	Massachusetts Division of Marine Fisheries
MMP	Marine Minerals Program (BOEM)
NAE	New England District (USACE)
NAVCEN	Navigation Center (USCG)
NCCOS	National Centers for Coastal Ocean Science (NOAA)
NEAMAP	North East Area Monitoring and Assessment Program
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center (NOAA)
NMFS	National Marine Fisheries Service (NOAA)
NOAA	National Oceanic and Atmospheric Administration
NOC	National Ocean Council
NOC ESG	National Ocean Council Executive Steering Group
NOPP	National Oceanographic Partnership Program
NPS	National Park Service
NRAC	Northeast Regional Aquaculture Center
NRCS	National Resources Conservation Service (USDA)
NREL	National Renewable Energy Laboratory (DOE)
NROC	Northeast Regional Ocean Council
NSCPO	Naval Seafloor Cable Protection Office
NUWCDIVNPT	Naval Undersea Warfare Center Division Newport
OLE	Office of Law Enforcement (NMFS)
RTOC	Regional Tribal Operations Committee
SOST	Subcommittee on Ocean Science and Technology
USACE	US Army Corps of Engineers
USAF	US Air Force
USCG	US Coast Guard
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

Acts, Laws

AIRFA	American Indian Religious Freedom Act
ARRA	American Recovery and Reinvestment Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DWPA	Deepwater Port Act
ESA	Endangered Species Act
FWCA	Fish and Wildlife Coordination Act
FWPCA	Federal Water Pollution Control Act
ICOOS	Integrated Coastal and Ocean Observation System Act
MARPOL	International Convention for the Prevention of Pollution from Ships
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMSA	National Marine Sanctuaries Act
OCSLA	Outer Continental Shelf Lands Act
OPA	Oil Pollution Act
PWSA	Ports and Waterways Safety Act
RHA	Rivers and Harbors Act
WRDA	Water Resources Development Act

Other Acronyms and Abbreviations

ACFHP	Atlantic Coast Fish Habitat Partnership
ACJV	Atlantic Coast Joint Venture
ACPARS	Atlantic Coast Port Access Route Study
AFSI	Atlantic Flyway Shorebird Initiative
AFTT	Atlantic Fleet Training and Testing
AIS	Automatic Identification System
AMAPPS	Atlantic Marine Assessment Program for Protected Species
AMBCC	Atlantic Marine Bird Conservation Cooperative
ASAP	Atlantic Sand Assessment Project
ATON	Aids to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BIA	biologically important area
BCR 30	New England/Mid Atlantic Coast Bird Conservation Region

BO	biological opinion
CAP	Continuing Authorities Program
CFR	Code of Federal Regulations
CMECS	Coastal and Marine Ecological Classification Standard
COTP	Captain of the Port
DWP	deepwater port
EEZ	exclusive economic zone
EFH	essential fish habitat
ESI	Environmental Sensitivity Index
ESPIS	Environmental Studies Program Information System (BOEM)
FMP	fishery management plan
FNP	federal navigation project
GDP	gross domestic product
GIS	geographic information systems
GLD	geographic location description
HAPC	habitat area of particular concern
HSC	harbor safety committee
IEA	important ecological area
IOOS	Integrated Ocean Observing System
ISMN	Integrated Sentinel Monitoring Network
ISSC	Interstate Shellfish Sanitation Conference
JB MDL	Joint Base McGuire-Dix-Lakehurst
LIDAR	light detection and ranging
LNG	liquefied natural gas
LOA	letter of authorization
MDAT	Marine-life Data and Analysis Team
META	Maritime Environmental and Technical Assistance
MOA	memorandum of agreement
MOU	memorandum of understanding
NALCC	North Atlantic Land Conservation Cooperative
NAM ERA	Northwest Atlantic Marine Ecoregional Assessment
NEAMAP	Northeast Area Monitoring and Assessment Program
NEP	National Estuary Program
NERACOOS	Northeastern Regional Association of Coastal and Ocean Observing Systems
NERRS	National Estuarine Research Reserve System
NFHAP	National Fish Habitat Action Plan
NGDA	National Geospatial Data Asset
NNA	negotiated noncompetitive agreement
NPDES	National Pollutant Discharge Elimination System
NS	Naval Station
NSB	Naval Submarine Base
NSSP	National Shellfish Sanitation Program
NWR	National Wildlife Refuge
O&M	operations and maintenance
OBIS-SEAMAP	Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations
OCS	outer continental shelf
OHI	Ocean Health Index
OOS	ocean observing systems
OOSSG	Ocean Observing System Security Group
OPAREA	operating area
PARS	Port Access Route Study
PGIS	participatory geographic information system
PNSY	Portsmouth Naval Shipyard
PSP	paralytic shellfish poisoning
RCT	regional coordination team
RPB	Regional Planning Body
ROD	Record of Decision
SAMP	Special Area Management Plan
SDJV	Sea Duck Joint Venture
SHARP	Saltmash Habitat and Avian Research Program
SHPO	State Historic Preservation Officer
SINKEX	sink at-sea live-fire training exercise
SMAST	School of Marine Science and Technology, University of Massachusetts
SPUE	sightings-per-unit-effort
SOST	Subcommittee on Ocean Science and Technology
TEU	twenty-foot equivalent unit
THPO	Tribal Historic Preservation Officer
TNC	The Nature Conservancy
TSS	Traffic Separation Scheme
VACAPES	Virginia Capes
VIMS	Virginia Institute of Marine Science
VMS	Vessel Monitoring System
VTS	Vessel Traffic System
WAMS	Waterways Analysis and Management System
WEA	wind energy area

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"We are tied to the ocean.
And when we go back to the sea, whether it is to sail or to watch it,
we are going back from whence we came."

PRESIDENT JOHN F. KENNEDY

NORTHEAST **OCEAN PLAN**