



## MARINE LIFE & HABITAT



**The diversity and richness of the marine life and habitats of the Northeast are a testament to one of the most productive marine ecosystems on the planet. The region's location, bridging the Acadian province in the north and the Virginian province to the south, fosters high productivity. Ocean currents carrying cold, nutrient-rich waters circulating counterclockwise through the Gulf of Maine, the influence of the Gulf Stream and riverine inputs throughout the region, and the presence of highly productive estuaries such as Long Island Sound and offshore habitats such as Georges Bank all contribute to this complex, dynamic, and intricately detailed ecological tapestry. It's because of these habitats and species that New England's history is so interwoven with the ocean.**

The Northeast is home to thousands of marine species, some of which are found nowhere else in the world. Hundreds of bird species find their feeding, breeding, or wintering grounds here after continental- or even hemispheric-scale migrations. Dozens of marine mammal species call the Northeast home for some or all of the year, including six species of whales listed under the federal Endangered Species Act. Hundreds of fish species are found from estuarine and salt marsh habitats to the deepest waters of the continental margin; many of these species are pursued by fishermen, and others are prey for other fish, marine mammals, and birds. All of these species are in some way supported by the countless phytoplankton, zooplankton, and benthic invertebrates that form the base of this ecosystem's food web.

We know much about these species, how they interact, and their habitats, but there is much more to learn. Recent years have demonstrated increasingly rapid changes in the distribution of many species and their habitats: warming waters drive some species northward and/or to deeper waters; increasing numbers of warm-water species change the composition of ecological communities in the region; alterations to the timing of the seasons shift migration patterns; increasing acidification affects shellfish; and other changes.

Therefore, a main focus during development of this Plan was to enhance marine life and habitat data. An unprecedented amount of peer-reviewed regional data are now available to characterize the distribution and abundance of marine life and habitats. From these basic building blocks, more complex measures of the ecosystem can be constructed: biodiversity,

species richness, assessments of ecosystem function, and more. As each building block is refined, the dependent measures get stronger and our understanding of the ecosystem improves.

For many coastal communities, the traditional dependence on the coastal and marine ecosystem and on the continued health of marine life and habitats continues to this day. The role that marine life and habitats play in our livelihoods is also reflected in the amount of management attention that species and habitats get: a large proportion of fish, bird, and mammal species—and their habitats—are monitored, managed, and protected through various federal and state programs and laws. Marine life and habitat data were developed for the Plan while considering the information needs of agencies as they implement these existing authorities.





## REGULATION AND MANAGEMENT

Numerous laws and federal, state, and tribal programs directly relate to the regulation, management, and conservation of marine life and habitat in New England. Federal actions, including regulatory activities (such as licensing, permitting, and leasing) and management activities (such as restoration projects, general management plans, and wildlife conservation plans) are subject to a variety of federal laws and regulations. These laws include NEPA and the individual laws requiring specific investigations into the potential effects of federal action, whether adverse or beneficial, to the ecosystem and individual species and habitats. Therefore, this section applies, but is not limited to, each of the previously identified **federal environmental and regulatory laws** and related processes, including:

- NEPA
- Leasing, licensing, and permitting laws (such as OCSLA, CWA, DWPA, RHA, MSA, and MPRSA)
- Natural resource consultations applicable to federal leasing, licenses, and permits (such as ESA, MSA, MMPA, MBTA, and the National Marine Sanctuaries Act [NMSA])

This Marine Life & Habitat section also generally applies to the **management activities** previously described in the introduction to Chapter 3 and specifically applies, but is not limited to, other federal programs and activities identified below because they are particularly relevant to this Plan, including:

- Federally designated and managed areas (such as Stellwagen Bank National Marine Sanctuary, National Park Service [NPS] units, and National Wildlife Refuges [NWR]).
- Federally designated NOAA National Estuarine Research Reserve System units and EPA National Estuary Programs, both of which are managed by state, regional, academic, or local entities.
- The US Fish and Wildlife Service (USFWS) Coastal Program, which works with partners to implement fish and wildlife habitat restoration and to build conservation capacity at the landscape scale.
- The USFWS National Coastal Wetlands Conservation Grant Program, which provides funding to states to support the long-term conservation of coastal wetland ecosystems.
- Conservation and science partnerships involving USFWS, including the Atlantic Coast Joint Venture (ACJV), the Sea Duck Joint Venture (SDJV), the North Atlantic Landscape Conservation Cooperative (NALCC), the Atlantic

Marine Bird Conservation Cooperative (AMBCC), and the Atlantic Flyway Shorebird Initiative (AFSI), which generally support conservation and decision-making by identifying conservation goals, discerning potential threats, and developing related science. An example is the New England/Mid-Atlantic Bird Conservation Region (BCR 30) Implementation Plan,<sup>1</sup> which identified high-priority bird species and habitats in the coastal area.

- The NOAA Community-Based Restoration Program, authorized by MSA, to implement and support the restoration of fishery and coastal habitats.
- The Northeast Region Marine Mammal and Sea Turtle Stranding and Disentanglement Network.
- Oil spill contingency plans, restoration plans, and natural resource damage assessments under the Oil Pollution Act.

## MAPS AND DATA

The *Framework for Ocean Planning in the Northeast United States* includes an action to produce regional spatial characterizations of marine life (marine mammals, sea turtles, birds, and fish) and habitat. The framework further states that the RPB will involve the public and science community in the development and review of these spatial characterizations and in complementary products demonstrating the

scientific certainty of the results. Additionally, the RPB expressed the desire for the Plan to include regional-scale data and information products that could inform decision-making and enhance agency coordination under existing laws, recognizing that there are other sources of data that will be applicable in certain circumstances. For example, site-specific information will be necessary to assess potential for construction and operations impacts for many development activities.

All of the marine life and habitat maps and data included in the Portal were informed by marine mammal, bird, and fish work groups (composed of over 80 regional scientists and managers),<sup>2</sup> the Ecosystem-Based Management Work Group,<sup>3</sup> the Habitat Classification and Ocean Mapping Subcommittee<sup>4</sup> of the Northeast Regional Ocean Council (NROC), similar proceedings in the Mid-Atlantic region, and public input. The result of this scientific and public review is an unprecedented amount of regional-scale marine life and habitat data for use in ocean planning, management, and conservation, along with accompanying documentation of the methods used, potential limitations of the data products, and links to additional information sources.





The majority of the **marine life data** (marine mammals, birds, and fish) were developed through a partnership with the Marine-life Data and Analysis Team (MDAT),<sup>5</sup> which collaborated with the RPB and expert work groups to produce **individual species maps** characterizing the distribution and abundance or biomass of 150 marine mammal, bird, and fish species, including measures of uncertainty to supplement each map. For this work, the RPB, with input from the expert work groups, identified a study area that extends from Hudson Canyon in the south into the Bay of Fundy in the north, with the intent of capturing the broader ecological context. The RPB and MDAT attempted to map as much of this study area as possible with consistent and repeatable methods. Therefore, the geographic extent of the maps depends on the availability of data and the specific methods chosen to model or map each taxa. To fill some of the geographic gaps, the Portal includes many additional marine life data products from other sources. For example, gaps in near-shore areas, such as in Long Island Sound, are (or are being) filled using state trawl data (for fish) and data from the Environmental

Sensitivity Index (ESI), the USFWS Mid-winter Waterfowl Survey, and other coastal sources (for birds). In addition, Chapter 5 further describes science and research needs to continue to fill gaps in information, geographically as well as for species that are not well-understood.

In response to agency, work group, and public feedback, the RPB further aggregated these individual species base products into maps for a range of species groups within each marine life category to provide additional information to support different regulatory, management, and conservation activities. Generally, marine life species have been aggregated into the following groups:

- Maps of species grouped by their **regulatory or conservation priority status** depict the distribution and densities or biomass of marine life species that have been formally protected or designated as a species of concern or are managed through a specific federal program or partnership.
- Maps of **ecologically and biologically grouped species** portray the distribution and abundance or biomass of species with similar characteristics or life history requirements, enabling an ecosystem perspective during decision-making.

- Maps of **species grouped by their sensitivity to specific stressors** enable a better understanding of specific interactions and potential compatibility considerations between marine life and human activities and the potential effects of ecosystem changes.

The **habitat data** were compiled by the Portal Working Group from authoritative regional sources with input and review by data managers and subject matter experts. Since these maps characterize habitat structure and a range of ecological processes, the Habitat theme on the Portal is subdivided into *physical habitat* and *biological habitat* to simplify data access and to group similar products.

- Maps of **physical habitat**, such as oceanographic properties and sediment types, depict the structure and dynamics of the ocean environment that shape marine life and human activity patterns.
- Maps of **biological habitat** display the distribution of valuable marine organisms that form habitats, such as eelgrass, shellfish beds, and benthic fauna, and they display important biological processes, such as primary and secondary productivity.

The marine life and habitat maps on the Portal provide managers, scientists, conservationists, members of ocean industry, and others with a library of information to use as necessary to inform many types of decision-making. They provide a regional and, in some cases, Atlantic coast-wide perspective, supporting management and decision-making at different scales when combined with subregional and site-specific information. The entire library of marine life and habitat data includes many maps, and it is unlikely that the full contents of the library will be relevant to every decision. It is intended that portions of the library will be used to address specific questions or to inform specific decisions in conjunction with site-specific data, scientific literature, public input, and many other sources of information.

**Regulatory or conservation priority species and habitat groups**

Agency and public feedback during the development of this Plan identified the need for spatial products depicting groups of marine life species and habitats that are identified or designated as a management or conservation priority through one of the federal environmental and regulatory laws or by one of the previously described nonregulatory management activities. Therefore, the RPB developed aggregate maps characterizing the abundance, diversity, richness, and core abundance/biomass areas<sup>6</sup> for groups of marine life species with this

type of special status (Table ML 3.1). The Portal also contains aggregate maps characterizing the extent of specific habitat areas identified in one of these laws or management programs (Table ML 3.2). These marine life and habitat products provide the opportunity to determine whether a potential action or conservation measure could affect concentrations of species or habitats that are regulated under existing law or managed through a particular program.

**Table ML 3.1 // Regulated and managed species groups available on the Portal**

PORTAL THEME	REGULATED AND MANAGED SPECIES GROUPS*	AUTHORITY
<b>Marine Mammals &amp; Sea Turtles</b>	All cetaceans Marine mammals species of concern and ESA-listed species	MMPA MMPA, ESA
<b>Birds</b>	All migratory birds Species of concern: State-listed Species of concern: ESA-listed Species of concern: BCR 30 priority Species of concern: AMBCC species of high conservation concern	MBTA ESA, MBTA ESA, MBTA ESA, MBTA ESA, MBTA
<b>Fish</b>	All fish Managed species: Northeast Multispecies Fishery Management Plan Managed species: Small Mesh Multispecies Fishery Management Plan Managed species: Monkfish Fishery Management Plan Managed species: Skates Fishery Management Plan	MSA MSA MSA MSA MSA
* Total abundance and richness		

**Note: The marine life species group products were reviewed by the EBM Work Group, the marine life work groups, and the public during the development of this Plan. The RPB decided to include products depicting abundance and richness in the Portal and, by reference, in this Plan. The RPB also decided that the diversity and core abundance/biomass area products need further consideration, especially given their potential importance for characterizing important ecological areas (IEAs). Therefore, those products will continue to be developed and evaluated within the context of the IEA Framework (see discussion beginning on page 51). A technical report documenting each of the species group products and methods is available at [www.neoceanplanning.org](http://www.neoceanplanning.org).**

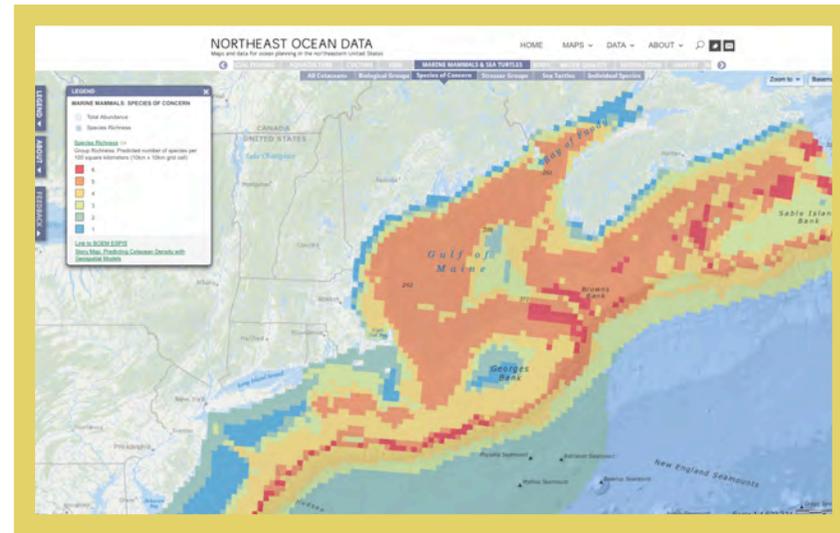


Table ML 3.2 // Regulated habitat areas available on the Portal\*

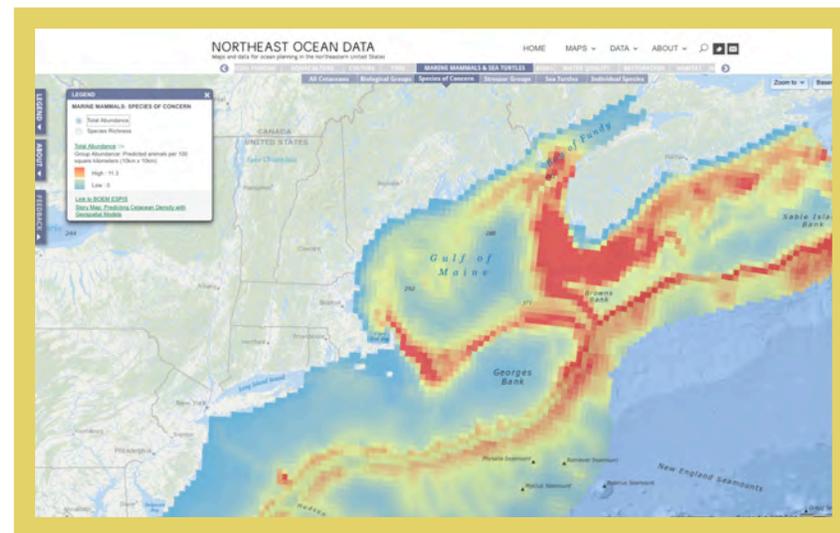
PORTAL THEME	REGULATED HABITAT AREAS (AREAL EXTENT)	AUTHORITY
<b>Marine Mammals &amp; Sea Turtles</b>	Critical habitat for ESA-listed species (where available)	ESA
<b>Fish</b>	Habitat areas of particular concern	MSA
<b>Fish</b>	Essential fish habitat	MSA
<b>Habitat (Biological)</b>	Eelgrass	CWA
<b>Habitat (Biological)</b>	Wetlands	CWA
<b>Habitat (Biological)</b>	Vegetated shallows	CWA
<b>Habitat (Biological)</b>	Mud flats	CWA
<b>Habitat (Biological)</b>	Corals	CWA

\* Note that the location of other, more broadly regulated habitat areas, such as the boundary for the Stellwagen Bank National Marine Sanctuary, are also available through the Portal.

Maps of regulatory-based species groups provide the opportunity to determine whether a potential action or management measure could affect concentrations of species or habitats that are regulated under existing law or managed through a particular program. For example, these maps show the predicted annual abundance and richness of marine mammal species that are listed as endangered under ESA and therefore suggest the relative likelihood of interactions with these protected species.



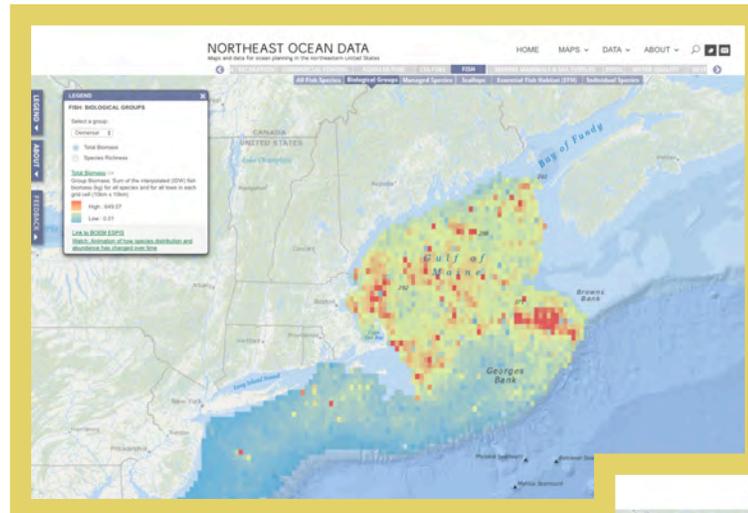
Richness



Abundance

**Ecologically and biologically based species groups**

Mapping of species in groups based on ecological and biological characteristics facilitates better understanding of species connectedness, ecosystem function, potential interactions and compatibility with human activities, cumulative impacts, and susceptibility to changing conditions. These products provide the underpinning for advancing an ecosystem-based approach to management by grouping species with similar life histories, trophic levels, spatial distributions, and habitat requirements (Table ML 3.3). Examining these products, along with other data, could help reveal the ecosystem processes that drive the observed patterns in marine life distribution and abundance. In addition, many environmental laws, particularly NEPA and permitting for Section 404 under the Clean Water Act, require consideration of the ecosystem context and the interconnectedness of species and habitats.



Biomass of demersal fish

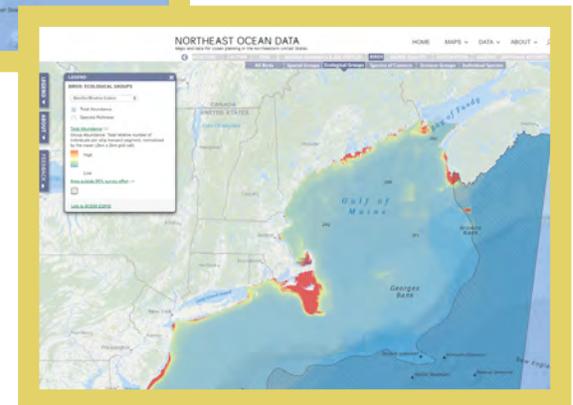
**Table ML 3.3 // Ecological and biological species groups available on the Portal**

PORTAL THEME	ECOLOGICAL & BIOLOGICAL SPECIES GROUPS*
<b>Marine Mammals &amp; Sea Turtles</b>	Baleen whales Small delphinoids Large delphinoids Sperm and beaked whales
<b>Birds</b>	Coastal waterfowl Divers and pursuit plungers Benthic/bivalve eaters Surface feeders Surface plungers Fish eaters Squid eaters Crustacean eaters Use the Northeast for breeding Use the Northeast for feeding Migrant Northeast resident
<b>Fish</b>	Diadromous Forage fish Demersal fish

\* Total abundance and richness

Maps of ecological and biological species groups can support an ecosystem-based approach to ocean management by showing species with similar life histories, trophic level, spatial distributions, and habitat requirements.

For example, these maps show the predicted abundance of benthic feeding bird species and the biomass of demersal fish species, which could be used to identify areas where disturbances or enhancements to benthic habitat will have the greatest effect on these components of the ecosystem.



Predicted abundance of benthic feeding birds



Table ML 3.4 // Stressor sensitivity-based groups available on the Portal

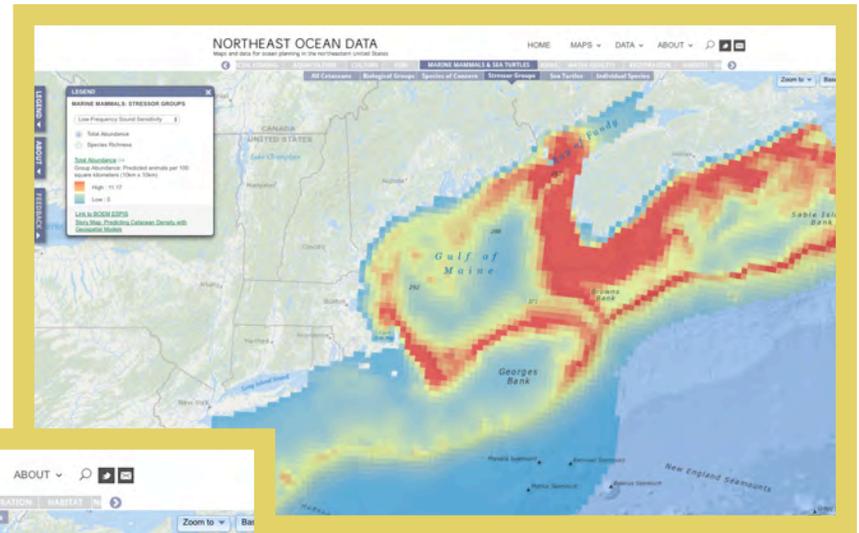
PORTAL THEME	STRESSOR SENSITIVITY-BASED SPECIES GROUPS*
<b>Marine Mammals &amp; Sea Turtles</b>	Cetaceans sensitive to low-frequency sound Cetaceans sensitive to mid-frequency sound Cetaceans sensitive to high-frequency sound
<b>Birds</b>	Birds with higher sensitivity to collision with offshore wind Birds with higher sensitivity to displacement due to offshore wind
* Total abundance and richness	

**Stressor sensitivity-based species groups**

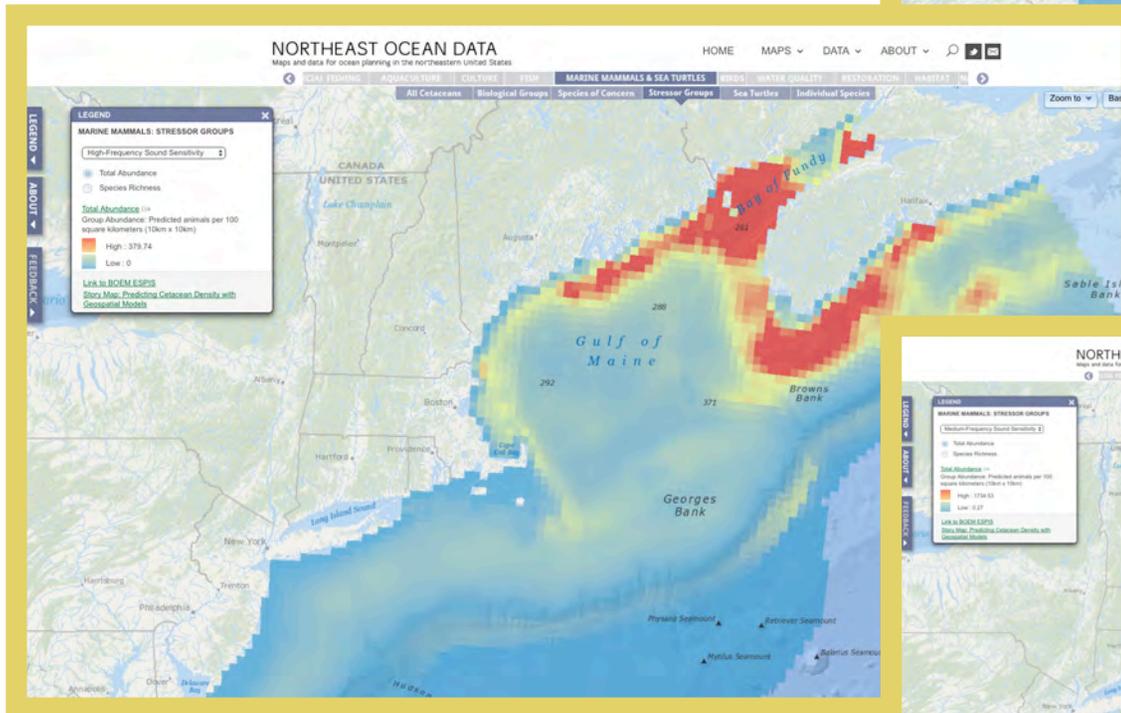
Stressor sensitivity-based maps provide the opportunity to understand where species could be directly affected by a particular human use or stressor when a specific interaction is suspected or known. These products can inform impact analyses and assessments of the potential compatibility considerations and conflicts associated with particular regulatory or management decisions. These groups were developed using existing science that attempted to quantify the relationships between species and stressors. As a result, the development of stressor sensitivity-based species groups is limited to those listed in Table ML 3.4. However, as the science progresses, this category of data provides one of the better opportunities to advance comprehensive ecosystem-based management. As described in Chapter 5, Science and Research Priorities, several sensitivity- and vulnerability-based species groups could be developed in the future to inform decision-making.

Maps of species grouped by their sensitivity to specific stressors provide the opportunity to understand whether and where groups of species could be directly affected by a particular human use or stressor when a specific interaction is suspected or known.

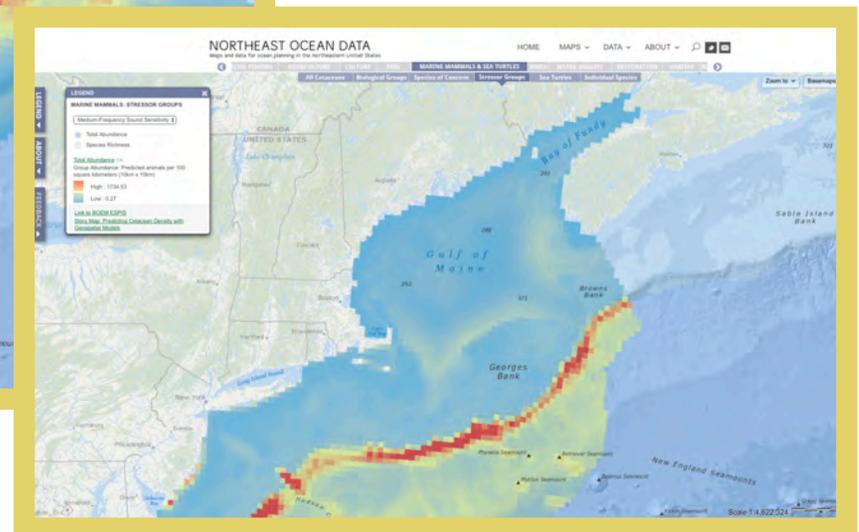
For example, these maps show the predicted abundance of cetaceans sensitive to low-, mid-, and high-frequency sound, and therefore can be useful when determining whether different activities producing different frequencies of sound, such as geological and geophysical surveying, pile driving, or shipping, could affect these species.



Cetaceans sensitive to low-frequency sound



Cetaceans sensitive to high-frequency sound



Cetaceans sensitive to mid-frequency sound



### Individual species maps

The Portal provides maps for 29 marine mammal species or species guilds, 40 bird species, and 82 fish species from the MDAT project. Associated with these maps are products depicting measures of scientific certainty (or uncertainty). In contrast to the previously described maps of species groups, individual species maps include a temporal component (i.e., decadal, annual, seasonal, and/or monthly distributions depending on the taxa and species), and, for fish, these maps include maps from different data sources. Table ML 3.5 provides an overview of the different map products for marine mammals, birds, and fish. Individual species map products were primarily developed by MDAT using modeling and mapping methods that are published and extensively peer reviewed, including reviews conducted by marine life work groups in 2014 and 2015.<sup>7</sup>

# 29//2//40//82

The Portal provides maps for 29 marine mammal, two sea turtle, 40 bird, and 82 fish species

These maps also provide the basis for and the inputs to the species group aggregations previously discussed.

In addition to products from the MDAT project, the Portal includes other sources of data and information for individual marine life species:

- The Fish theme includes maps of sea scallop biomass and average abundance from the NOAA Northeast Fisheries Science Center (NEFSC) scallop dredge survey and the University of Massachusetts School of Marine Science and Technology (SMAST) video survey, respectively. Additional sources, including the Virginia Institute of Marine Science dredge survey, the Maine Department of Marine Resources (DMR) sea scallop surveys, and others are being scoped for potential inclusion in the Portal.

- The Fish theme includes links to animations, developed by the NEFSC, that show annual changes in species distribution using the federal trawl survey. These animations include the NMFS spring bottom trawl survey, which is currently not included in the products on the Portal.
- The Marine Mammals and Sea Turtles theme includes maps of leatherback and loggerhead sea turtle sightings per unit effort from the Northwest Atlantic Marine Ecoregional Assessment (NAM ERA) conducted by The Nature Conservancy.
- The Portal includes bird nesting sites and bird habitat areas from the Environmental Sensitivity Index.

Table ML 3.5 // Individual species map products available on the Portal

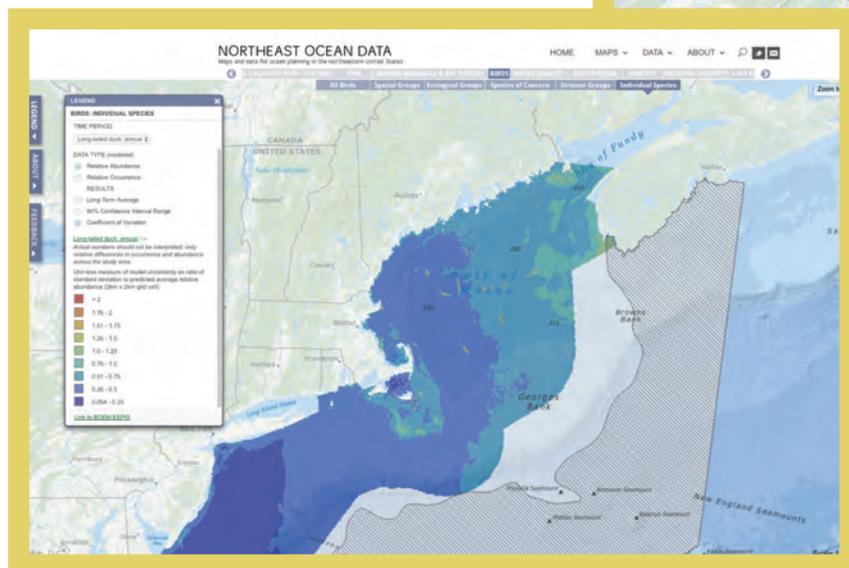
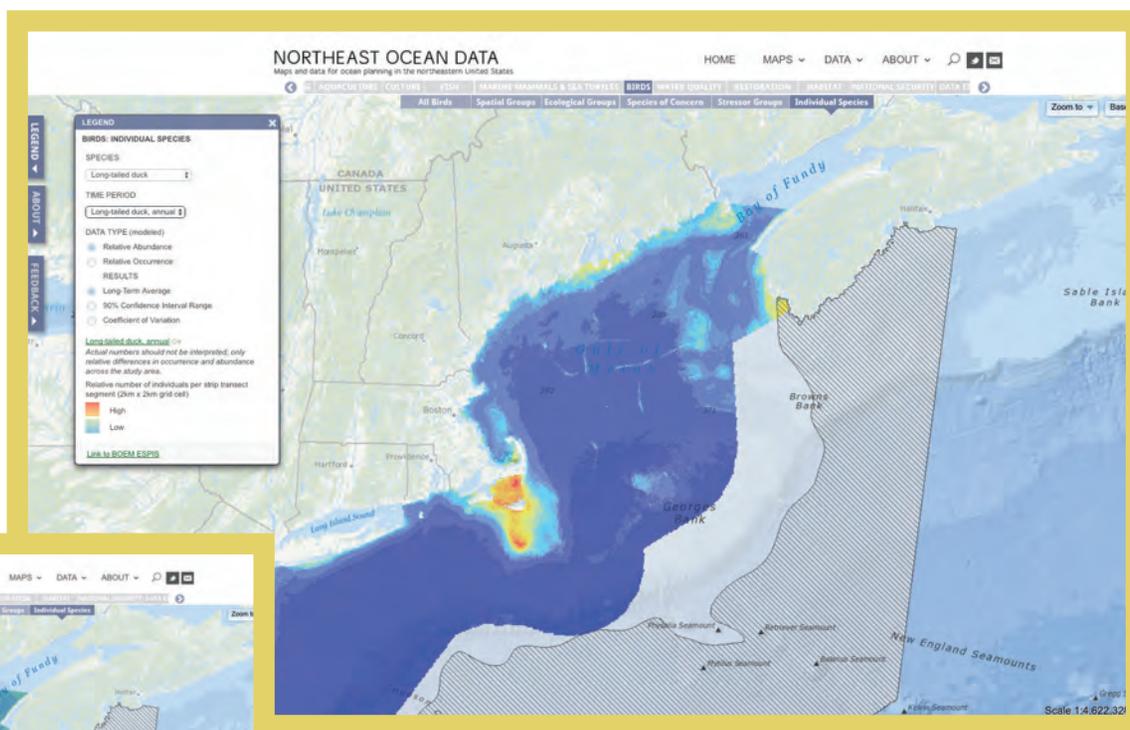
PORTAL THEME	INDIVIDUAL SPECIES MAP PRODUCTS	CERTAINTY PRODUCTS	SOURCE(S)
<b>Marine Mammals &amp; Sea Turtles</b>	Predicted monthly and/or annual density of marine mammal species and species guilds	95% confidence interval 5% confidence interval Standard error Coefficient of variation	Duke University Marine Geospatial Ecology Lab model <sup>8</sup>
<b>Birds</b>	Predicted seasonal and/or annual relative abundance and relative occurrence	90% confidence interval range Coefficient of variation	NOAA NCCOS model <sup>9</sup>
<b>Fish</b>	Natural log biomass for the 1970–2014 and 2005–2014 time periods (if available)	Variance of natural log biomass	Mapped by NEFSC from NEFSC, MDMF, NEAMAP, and Maine and New Hampshire trawls <sup>10</sup>

**NOTE:** MDMF = Massachusetts Division of Marine Fisheries; NCCOS = National Centers for Coastal Ocean Science; NEAMAP = Northeast Area Monitoring and Assessment Program; NEFSC = Northeast Fisheries Science Center; NOAA = National Oceanic and Atmospheric Administration.

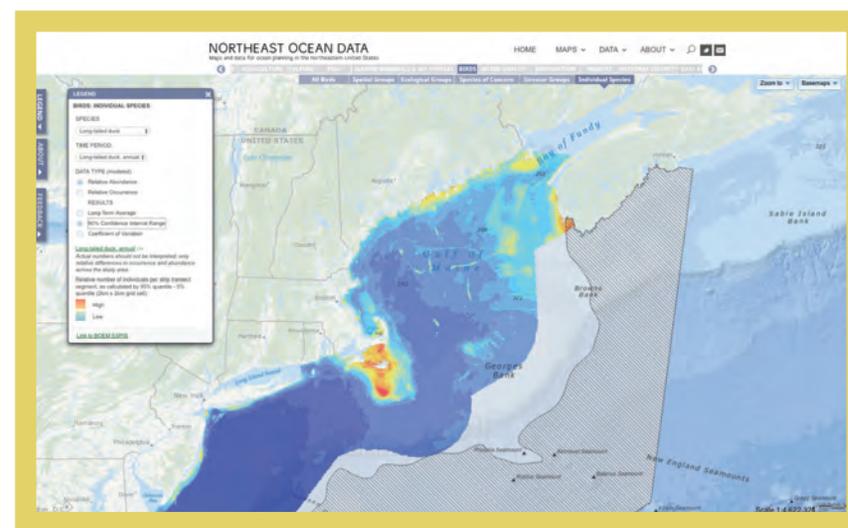
Long-tailed duck: Predicted annual relative abundance

Individual species maps allow for the user to explore the distribution and abundance of particular species and to consider the scientific certainty of the results.

For example, these maps show the predicted annual average relative abundance of long-tailed duck and provide confidence and variation measures as supplementary information.



Long-tailed duck: Coefficient of variation

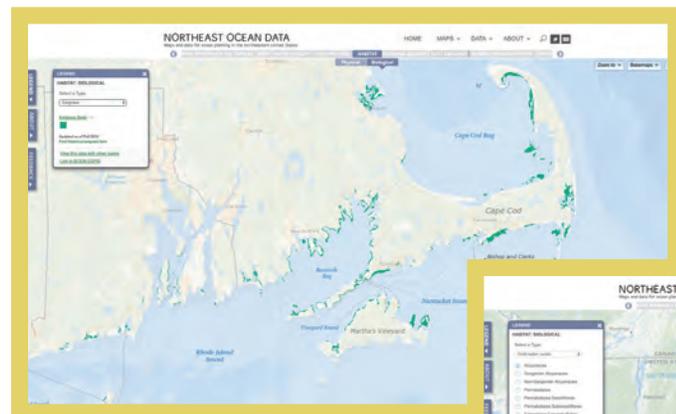


Long-tailed duck: 90 percent confidence interval range

### Physical and biological habitat

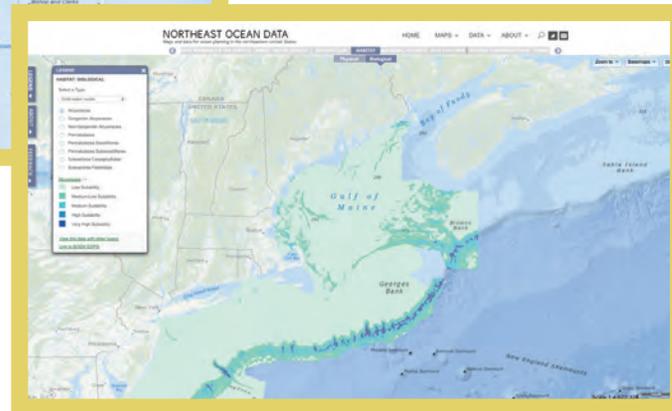
The Portal includes maps of data describing certain physical and biological habitats (Table ML 3.6). Several physical and biological habitat layers are represented by annual or seasonal averages using long-term datasets. This approach provides users with a broad picture. Recognizing that the temporal variability in some of these parameters may be important or influential for some data applications, it is intended that these data are used in conjunction with

additional sources of information. For example, the benthic fauna layers in the Biological Habitat subtheme includes links to animations, developed by the University of Massachusetts SMAST, that show annual changes in fauna distribution. The need to develop physical and biological habitat map products at fine temporal scales is described in Chapter 5, Science and Research Priorities.



Eelgrass

Physical and biological habitat maps such as these maps of eelgrass and cold-water corals demonstrate ecological connections that can be considered when taking an ecosystem-based approach to management. They can also support the identification of specific habitat areas protected under existing law.

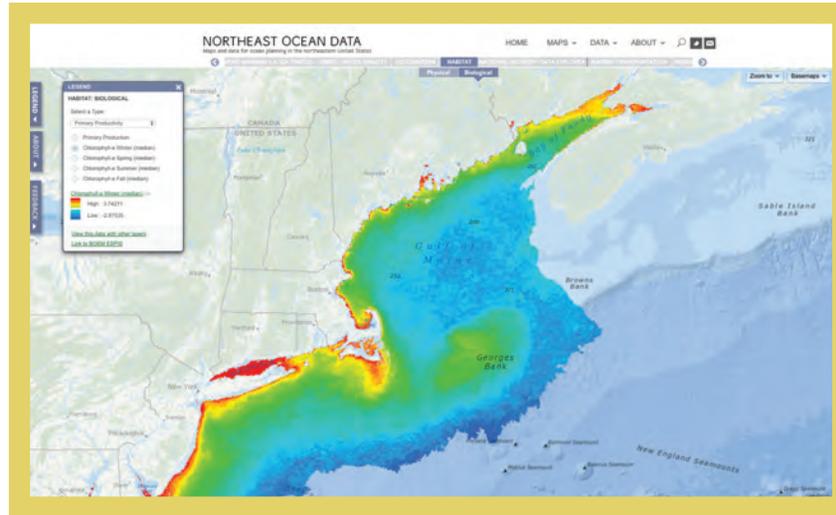


Corals

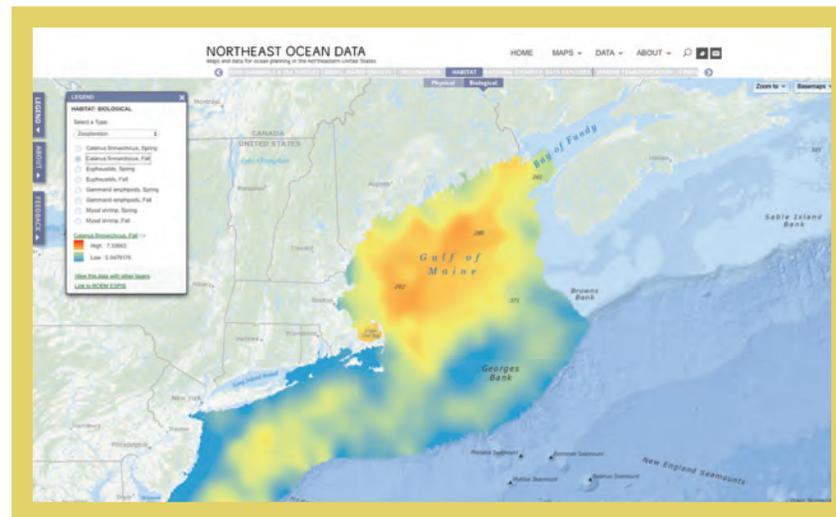
Table ML 3.6 // Physical and biological habitat map products available on the Portal

PORTAL THEME	MAP PRODUCTS
<b>Habitat</b> (Physical)	<ul style="list-style-type: none"> <li>Sediment grain size</li> <li>Sediment grain size data quality</li> <li>Seabed forms</li> <li>Sediment stability</li> <li>Surface currents (annual average 1978–2013)</li> <li>Bottom currents (annual average 1978–2013)</li> <li>Surface temperature (annual average 1978–2013)</li> <li>Bottom temperature (annual average 1978–2013)</li> <li>Stratification (annual average 1978–2013)</li> </ul>
<b>Habitat</b> (Biological)	<ul style="list-style-type: none"> <li>Annual mean primary production (1998–2007)</li> <li>Median winter, spring, summer, fall chlorophyll-a concentration (2003–2015)</li> <li>Average spring and fall zooplankton abundance (Calanus, Euphausiids, Gammarid amphipods, Mysid shrimp) (2005–2014)</li> <li>Eelgrass</li> <li>Wetlands</li> <li>Shellfish habitat (oyster, mussel, scallop, clam)</li> <li>Predicted habitat suitability for cold-water corals</li> <li>Average abundance of benthic fauna (hermit crab, moon snail, sea star) in SMAST video surveys (2003–2012)</li> <li>Average percentage of sample locations with benthic fauna (bryozoans, sand dollars, sponges) in SMAST video surveys (2003–2012)</li> </ul>

Physical and biological habitat maps depict ecological processes such as primary productivity (chlorophyll-a concentrations) and secondary productivity (zooplankton abundance).



Primary productivity



Zooplankton

### Important ecological areas

In addition to the regional spatial characterizations of marine life and habitat described in this section, the *Framework for Ocean Planning in the Northeast United States* includes an action and a specific task to assess regional efforts to identify areas of ecological importance and to convene the RPB, scientists, and stakeholders to consider options for how to proceed with characterizing and using important ecological areas (IEAs) in ocean planning. The RPB framed its approach to identifying IEAs in several important ways.

First, the RPB sought input from scientists and the public (including forming the Ecosystem-Based Management [EBM] Work Group) to inform key aspects of the methodology, including defining “importance” and determining how to use existing and emerging data products. These discussions were informed by an understanding of the available data that would underpin a characterization of IEAs, including products that were recently developed by MDAT. Important topics identified in these discussions included the potential for better understanding ecological processes, functions, and interrelationships by advancing the concept of IEAs; the importance of understanding the degree of scientific certainty for data products used in these analyses and of ensuring all methods are peer-reviewed or



use published methods; and the need for consideration of temporal trends and potential future shifts in habitats and species distribution.

Second, the RPB was mindful of the executive order's requirement to work within the existing statutory and regulatory framework, particularly when considering how identification of areas of ecological importance could be applied in agency decision-making (agencies must use all Plan-related maps and information within the existing regulatory context). As described later in this section, the RPB recognizes that significant progress was made in establishing a conceptual framework for using existing data to identify IEAs and that there is considerable additional work to be done before an approach can be implemented.

Lastly, the RPB acknowledges that it must obtain and consider public input on the potential use of products characterizing IEAs and that there are other related government processes (such as the NEFMC habitat amendment, the identification of essential fish habitat under MSA, and the designation of critical habitat under ESA, to name a few) that must be recognized when developing and implementing potential uses of IEA products. The RPB initiated the characterization of IEAs with the premise that data developed to improve our understanding of the interrelationships between ecosystem components and processes could potentially

be used, like any other dataset referenced in this Plan, as one overlay to guide and inform decision-making. More work needs to be done, in a public forum, to consider this and other potential uses for IEA products.

An overview of the RPB's proceedings related to IEAs follows.

**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"<sup>11</sup> and convened a public workshop to consider next steps related to defining IEAs. Informed by that workshop, the RPB decided to first focus on developing peer-reviewed regional marine life and habitat data products, to conduct additional research, and to seek input on approaches for using marine life and habitat data in a broader, multifactor framework.

**In April 2015**, the RPB convened an ecosystem-based management workshop to further consider potential approaches for developing IEAs and other subjects related to ecosystem-based management. At its June 2015 meeting, the RPB formed the EBM Work Group. The RPB's charge to the EBM Work Group was to inform the RPB on a range of activities for the 2016 Northeast Ocean Plan, including reviewing approaches to defining and characterizing IEAs. During fall 2015, the EBM Work Group provided feedback on many of the draft marine life and

habitat data products described in this chapter. It also recommended that the RPB define IEAs as various ecosystem components and ecosystem functions, using existing definitions from the National Ocean Policy as a reference point.

**In November 2015**, the RPB released an initial framework for characterizing IEAs (the IEA Framework) for public comment. The IEA Framework defined IEAs in terms of several components representing ecosystem structure and function. The RPB also identified existing marine life and habitat data that could be used to characterize and map each IEA component and identified long-term science and data that would support a more complete characterization of each component over time. EBM Work Group and public review generally expressed agreement with the definition and identification of the IEA components. Other feedback focused on the identification of specific ecological datasets that could be used to characterize each IEA component.

In response to these comments, the RPB revised the IEA Framework, and on **January 6, 2016**, the EBM Work Group met to review the revised IEA Framework, resulting in the following recommendations to the RPB:

- Ensure all marine life and habitat data referenced in this Plan are reviewed by regional scientists before being used in the IEA Framework.



- Illustrate one or two IEA components for which existing marine life and habitat data are sufficient to advance the development and application of the IEA Framework.

The IEA Framework was released with the draft Plan on **May 25, 2016**. Subsequently, on **July 27, 2016**, the RPB convened a full-day EBM Work Group meeting to obtain input on progress illustrating the first two components of the IEA Framework using existing data. During the meeting, RPB members, EBM Work Group members, and the public reiterated the need for peer review, for use of published methods, and for a method to determine the scientific certainty of results, where possible. Participants also recommended that the RPB clarify the potential uses of IEA products in order to better inform their development. Lastly, the meeting resulted in detailed feedback on many specific scientific and technical issues, including the continued

development and management application of species diversity and core area abundance products within the context of characterizing IEAs.

**The IEA Framework is incorporated into this Plan as a working draft** (see Appendix 3). It will be modified, as appropriate, as the RPB continues to consider the characterization of IEAs and the potential use of IEA products. It defines IEAs for Northeast ocean planning as “habitat areas and species, guilds, or communities critical to ecosystem function, resilience and recovery.” These areas are further defined and identified by the following five components:

- 1. Areas of high productivity**—These areas have high primary and secondary productivity, include known proxies for high primary and secondary productivity, and have high metrics of food availability.
- 2. Areas of high biodiversity**—These areas are characterized by metrics of high 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**—These areas 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**—

These areas support ecological functions important for marine life survival and are particularly vulnerable to natural and human disturbances.

- 5. Areas of rare marine resources**—These areas include core abundance areas of state and federal ESA-listed species, species of concern and candidate species, other demonstrably rare species, and spatially rare habitats.

The draft IEA Framework also includes information describing the potential use of existing marine life and habitat data to map each IEA component, and, recognizing the limits of existing data, it makes note of the long-term science and data needs to advance the characterization of IEAs. These and other related science and research needs are also described in Chapter 5. Finally, Action ML-4 (see page 56) describes the next steps the RPB will take to advance the IEA Framework.



OVERVIEW

## ACTIONS

- ML-1 Update marine life data through 2017
- ML-2 Update habitat data through 2017
- ML-3 Identify opportunities to update marine life and habitat data every five years
- ML-4 Continue the development of the Important Ecological Area Framework and further determine potential uses of IEA data products
- ML-5 Use marine life and habitat data as key inputs to monitor ecosystem health
- ML-6 Use marine life and habitat data to inform applicable review processes under federal environmental and regulatory laws
- ML-7 Use marine life and habitat data to inform responsibilities within managed areas
- ML-8 Use marine life and habitat data to inform other management activities



### **ACTIONS: MAINTAIN AND UPDATE DATA**

**ML-1. Update marine life data:** Through 2017, the RPB will make the following updates to the marine life data through continued collaboration with the Portal Working Group and MDAT:

- Incorporate recent survey data from the Atlantic Marine Assessment Program for Protected Species (AMAPPS), the Massachusetts Clean Energy Center survey, and other sources into the marine mammal models and provide updated maps.
- Develop updated sea turtle maps using recent survey data.
- Incorporate fish trawl data for Long Island Sound from the Connecticut Department of Energy and Environmental Protection and for Rhode Island waters from the Rhode Island Department of Environmental Management's Narragansett Bay and Rhode Island Sound fixed-site surveys.
- Develop additional ecological groupings for whales and fish, including foraging guild groupings for whales and dietary guild groupings for fish.
- Further develop maps of scallop abundance and biomass, potentially including the Virginia Institute of Marine Science dredge survey and the Maine DMR sea scallop surveys.

- Determine the feasibility of incorporating other marine life products that would fill priority data gaps within the 2017 time frame. One factor in determining feasibility will be the ability to leverage agencies' (or partners') work, since associated costs could be significant. Marine life data sources to be reviewed include:

- > USFWS Mid-winter Waterfowl Survey
- > Other information sources in coastal and estuarine areas, such as the Environmental Sensitivity Index (ESI) and the Saltmarsh Habitat and Avian Research Program (SHARP)
- > Telemetry and acoustic data for fish, birds, and marine mammals
- > Available data sources of bat distribution and abundance

**ML-2. Update habitat data:** Through 2017, the Portal Working Group will develop the following habitat datasets with RPB input and review:

- Map products characterizing persistent phytoplankton bloom events
- Updated submerged aquatic vegetation maps
- Updated benthic habitat maps
- Habitat vulnerability data developed under NEFMC's Omnibus Habitat Amendment 2

**ML-3. Identify opportunities to update marine life and habitat data every five years:** RPB agencies, particularly NOAA, BOEM, and USFWS, will identify opportunities to update the existing marine mammal, sea turtle, bird, fish, and habitat data on the Portal over the long term. This includes reviewing existing agency efforts for potential additions into the Portal, including the various programs and information sources identified in Appendix 2 and data resulting from any of the science and research priorities described in Chapter 5. All of these data should be updated within a five-year cycle using methodologies and outputs similar to the initial products, while allowing for incremental updates, improved methods, and practical budget considerations.



**ML-4. Continue the development of the Important Ecological Area Framework and further determine potential uses of IEA data products:**

**2016–2017**

- Convene an IEA work group, which includes individuals with a range of expertise, to further explore and obtain public input on potential uses of IEA products for RPB consideration. Also, consider membership and terms of reference for the Ecosystem-Based Management Work Group (EBM Work Group).
- Continue the RPB’s review of the IEA Framework to determine its appropriateness for informing potential uses identified by the IEA work group. Continue to revise and illustrate each IEA component using existing data and published and peer-reviewed methods. Provide opportunities for EBM Work Group members and the public to review and inform the development of each IEA component, including two to three EBM Work Group meetings and opportunities between meetings.
- Continue developing and reviewing marine life diversity and core abundance area data products as important inputs into the IEA Framework. Consider data development, thresholds, and interpretation for these and other data within the context of the potential

uses of IEA data products. Incorporate these and other new and updated marine life and habitat products from Actions ML-1 and ML-2 into each IEA component, as appropriate.

**2018**

- Determine next steps, including consideration of whether the Plan and Portal should be updated given progress in characterizing IEAs and in determining the potential use of IEA products.

**ML-5. Use marine life and habitat data as key inputs to monitor ecosystem health:**

The RPB will use the marine life and habitat data presented in this Plan as key inputs along with other available information when developing indicators of ecosystem health and monitoring changing conditions (see Chapter 4). The comprehensive nature of the products in the Plan (i.e., the maps of hundreds of species of fish, marine mammals, birds, and turtles, their groupings, and the repeatable methods used in developing the products) should contribute to efforts to track changes over time for most of the species of management interest. In addition, certain marine life products were developed specifically to facilitate the examination of change over time (e.g., fish biomass 1970–2014 and 2005–2014).

## **ACTIONS: INFORM REGULATORY AND MANAGEMENT DECISIONS**

**ML-6. To the extent practicable, RPB agencies will use marine life and habitat data to inform applicable review processes under federal environmental and regulatory laws:** The Portal provides new tools and a library of over 3,000 stakeholder- and expert-reviewed marine life and habitat maps to inform and enhance agency regulatory, conservation, and management decisions.

**Species groups** maps are useful as an early indicator of whether and which marine life populations could be affected by a proposed action and therefore might require additional information to determine potential compatibilities or impacts associated with the action. They can also be used to help determine areas where marine life conservation, management, and restoration activities might have the most benefit. Species richness products, in particular, could be used to evaluate the potential number of different species in an area in an average year. Once a species is identified as potentially present, total abundance maps provide additional information about the relative amount of marine life use of a particular area. By identifying species groups potentially affected by a proposed action, along with the relevant agencies and particular regulatory processes that pertain to the action, it may be possible to anticipate information needs for similar future actions.

**Individual species** maps provide additional information on those species that are likely to have an interaction with a particular activity or management measure, including their presence over time and the certainty associated with the findings.

**Habitat** maps indicate the underlying physical and biological characteristics of the area, including the ecosystem dynamics, which support marine life populations and influence marine life patterns. Habitat maps also provide a snapshot of areas that are specifically protected under existing management authorities.

Regional marine life and habitat data provide initial indications of species and habitats that can be expected in a geographic area. The data will enable more-consistent regional characterizations of natural resource conditions and will support the preliminary identification of potential resource impacts. The data will potentially be useful for initial project site characterization, for scoping of alternatives for NEPA and other reviews, and for work with project proponents to avoid or minimize impacts associated with different phases of offshore projects (for example, as discussed further in the Energy & Infrastructure section). As described previously, collection of additional information is likely to be necessary to understand the potential for site-specific construction and operations impacts, as well as to develop pre- and postconstruction monitoring requirements.

Early coordination with federal and state resource agencies can help determine what additional site-specific information may be useful (as described more in Chapter 4).

In addition to the general use of data described above, RPB agencies have identified the following activities specific to each set of applicable federal laws:

- **NEPA:** RPB agencies will use the Portal to the extent practicable to help identify alternatives, describe the affected environment, and assess cumulative effects under NEPA.
- **Federal leasing, licensing, and permitting (OCSLA, CWA, DWPA, RHA, and MPRSA):** RPB agencies responsible for leasing, licensing, and permitting processes will use the Portal to the extent practicable as an information source to identify potential resource impacts, to help communicate potential issues with a proposed project, and to provide information for use in determining appropriate avoidance and mitigation measures.
- **MSA:** The National Marine Fisheries Service (NMFS) will encourage RPB agencies and project applicants to consider marine habitat information contained in the Plan during the essential fish habitat (EFH) consultation process. To the extent practicable, RPB agencies will use the Portal to identify the presence of already designated habitat areas of particular concern (HAPC) and EFH in a proposed project

area and assist with determining whether an agency action may adversely affect EFH. If necessary, the Portal can be used to assist in the development of an EFH assessment describing the action, the EFH present within the proposed project area, and the effects the project would likely have on EFH. The EFH assessment should consider the physical and biological data layers identified in the Portal.

- **ESA:** To the extent practicable, NMFS and USFWS will use individual species products as one information source when determining if a species should be listed (or delisted) as threatened or endangered. NMFS and USFWS will also, to the extent practicable, use individual species products as one information source to assist in the monitoring and recovery of ESA-listed species. Lastly, NMFS and USFWS will, to the extent practicable, use the Portal when upgrading or developing new guidance regarding consultations under ESA Section 7.
- **MMPA:** To the extent practicable, NMFS will use Plan data to inform Take Reduction Teams, help in the evaluation of take reduction plans, and conduct cumulative impacts assessments.

- **MBTA:** To the extent practicable, USFWS will use the Portal and the Plan, along with other information, to help facilitate successful enforcement of MBTA and increase coordination among federal agencies in support of Executive Order 13186 by integrating bird conservation principles, measures, and practices into agency activities that avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources.

**ML-7. Use marine life and habitat data to inform responsibilities within managed areas:**

To the extent practicable, RPB agencies will use the Portal, along with many other sources of information, to enhance resource protection, management planning, and decision-making in state and federally designated managed areas. Applications could include:

- Applications of data to inform development and revisions to management or conservation plans.
- Characterization of existing conditions, interactions, potential compatibility considerations, and conflicts between marine resources and human activities.
- Interagency consultations regarding potential effects of federal activities on managed area resources.
- Informing development or implementation of research and monitoring programs.

**ML-8. Use marine life and habitat data to inform other management activities:**

This Plan references a diverse subset of other management programs, including restoration, conservation science partnerships, oil spill response, research, conservation, and other activities. A common aspect of these programs is that they rely on up-to-date scientific information to support decisions. RPB agencies responsible for the management programs listed in this Plan will use the Portal to inform their specific activities. Some examples include:

- NMFS will encourage the use of the Portal by the NOAA Community-Based Restoration Program, including in the preparation of proposals for federal funding opportunities.
- In the event of a pollutant spill, the Oil Pollution Act (OPA) trustee council and other appropriate agencies will, to the extent practicable, provide information on protected and endangered species and EFH to the US Coast Guard (USCG) to be considered in response activities. The OPA trustee council and others will be able to use the Portal to inform the Natural Resources Damage Assessment and coordinate restoration actions.
- USFWS will use the Portal to the extent practicable to help inform science and conservation partnership priorities.