AQUACULTURE

Aquaculture is an important maritime sector in New England with operations dotting the shoreline and providing locally grown seafood and jobs. Over a dozen finfish, shellfish, and algae species are, or have been, commercially grown in the region, including American oyster, Atlantic salmon, steelhead trout, Atlantic sea scallop, bay scallop, blue mussel, European oyster, green sea urchin, quahog, kelp, and soft-shell clam. Shellfish aquaculture is more widespread than finfish aquaculture in New England, with over 1,500 leases from Maine to Connecticut producing $45 million–$50 million per year of dockside value (point of first sale), with oysters representing the largest portion of that total.[1]

Shellfish aquaculture operations in New England include small, family-owned companies (often with roots in fishing families or from communities looking for economic diversification from wild harvest fisheries) as well as large corporations. Commercial finfish aquaculture in New England almost entirely consists of Atlantic salmon rearing in Maine, which had a market value of over $73 million in 2010.[2] At that time, the majority of this production came from one New Brunswick–based company, with a few other smaller, family-owned operations.

There is future growth potential for aquaculture in New England. National production of farm-raised seafood increased 8 percent per year from 2007 to 2012, with local shellfish production recently reaching all-time highs in several states.[3] Interest in the production of new species, such as certain seaweed varieties, and in establishing polyculture facilities that combine multiple species at one site is also increasing.

Combining finfish, shellfish, and kelp in a single site can help buffer the effects of changing market and environmental conditions and can mitigate waste and nitrogen inputs from finfish aquaculture. In addition, while shellfish aquaculture has traditionally been located in intertidal or nearshore waters, there has been recent interest in locating operations farther offshore (including in federal waters). There are many potential advantages to siting aquaculture offshore. Offshore areas often have better water quality and fewer existing activities that may conflict with the development of new facilities; therefore, offshore areas may be better suited for larger operations. However, there is currently no federal leasing authority and no designated lead agency for aquaculture in federal waters, and existing permitting processes are complex. Other challenges to offshore aquaculture include exposure to high-energy ocean conditions, biosecurity concerns, and increased distance to portside support and infrastructure.

In 2014 and early 2015, two longline blue mussel operations intended for commercial production were permitted in federal waters—one eight and a half miles off Cape Ann and the other in Nantucket Sound—representing the first two locations permitted for aquaculture in federal waters offshore New England. Permitting for these two facilities helped clarify the regulatory process and will inform the industry and regulators about siting aquaculture in federal waters. Through that process, regulators and the permit applicants identified potential conflicts with paralytic shellfish poisoning (PSP) closure areas, navigational safety, existing fisheries, essential fish habitat (EFH), and endangered species. They also identified permitting concerns related to potential impacts to National Marine Sanctuary resources and to federal consistency review with the Massachusetts Office of Coastal Zone Management. Each project sought and continues to seek a better understanding of the commercial potential of offshore areas by evaluating shellfish growth rates, environmental conditions, and different gear configurations.

REGULATION AND MANAGEMENT

Permitting aquaculture facilities is the responsibility of federal, state, and local authorities, depending on location and species. The permitting process is complicated by the necessity of obtaining separate permits for deploying structures on the site, for handling sublegal (undersized) animals, for discharging pollutants (if applicable), and for commercial harvesting. In state waters, states manage aquaculture according to individual state laws and regulations. Depending on the state, project proponents must acquire a lease, license, or permit for the site and for the propagation of the species being grown. Federal permits, through the USACE and EPA, are also typically required for projects in state waters.

In federal waters, the USACE is currently the lead permitting agency (through RHA for siting facilities) with other federal agencies coordinating to address protected species and habitat (NMFS), water quality (EPA primarily, which, depending on the nature of the proposed facility, also may be the lead agency for a separate permit for discharges), navigational safety (USCG), or other siting-related issues. A NOAA permit is also required for aquaculture of federally managed species in federal waters.

There is currently no federal leasing authority for aquaculture in federal waters such as exists in many states. The inability to obtain a lease is cited by many aquaculturists as a hindrance. The differences between a permit and a lease can sometimes be complicated, but generally, permits provide the terms for the conditional use of an area and leases provide the additional right to occupy a given area for a specific time period. This additional occupation right is sometimes necessary to obtain project financing. While a formal aquaculture leasing process does not currently exist in federal waters, the Energy Policy Act of 2005 allows for alternative uses of existing facilities on BOEM leases. This allowance provides for the potential colocation of aquaculture with offshore energy installations (which may raise complicating issues such as the potential attraction of marine birds to concentrated food resources).

The National Shellfish Sanitation Program (NSSP) is the federal-state cooperative program recognized by the US Food and Drug Administration (FDA) and the Interstate Shellfish Sanitation Conference (ISSC) for the sanitary control of shellfish produced and sold for human consumption. The public health provisions of the NSSP have significant effects on aquaculture producers through growing area closures, product handling requirements, and labeling.

At the national level, several recent initiatives are aimed at encouraging offshore aquaculture, particularly in federal waters, by clarifying the regulatory process and advancing research. The most relevant of these for ocean planning purposes are the following:

- In 2008, the US Government Accountability Office (GAO) issued an assessment of offshore aquaculture focused on establishing a regulatory framework and highlighting the need for such a framework to address four overall issues: program administration, permitting and site selection, environmental management, and research.[4]
- In 2014, the White House National Science and Technology Council's Interagency Working Group on Aquaculture issued a five-year strategic plan for federal research to encourage aquaculture in the United States. This plan includes nine critical strategic goals and identifies federal agency and interagency research, science, and technology priorities.[5]

- In 2016, NOAA's Office of Aquaculture[6] issued a strategic plan that intends to provide science, services, and policies in support of "significant expansion and sustainability of US marine aquaculture."[7] It includes objectives and strategies to achieve overall goals related to regulatory efficiency, tools for sustainable management, technology development and transfer, and an informed public. Included in these objectives and strategies are topics such as developing tools to inform aquaculture and siting and management decisions, and improving interagency coordination on permit applications.[8]
- A memorandum of understanding (MOU) has been developed for permitting offshore aquaculture activities in federal waters of the Gulf of Mexico. This MOU is intended to improve coordination between the seven federal agencies involved and to streamline the regulatory process. The agencies involved are the USACE, NMFS, USCG, EPA, USFWS, BOEM, and the Bureau of Safety and Environmental Enforcement (BSEE) within DOI. The MOU is expected to be signed by all participating agencies soon. Although this MOU is limited to aquaculture operations located in the Gulf of Mexico, it could serve as a model for other areas of the US coast, including New England.

Numerous regional efforts to support aquaculture have been useful for informing ocean planning:

- The Northeast Regional Aquaculture Center (NRAC) is one of five US regional centers established by Congress to "support aquaculture research, development, demonstration, and extension education to enhance viable and profitable US aquaculture production which will benefit consumers, producers, service industries, and the American economy."[9] NRAC's mission is to "focus … on science and education that will have a direct impact on attaining long-term public benefits through enhanced aquacultural development in the region."[10]
- In 2010, NRAC, in conjunction with NOAA, supported an effort by the East Coast Shellfish Growers Association to publish a best management practices manual.[11] The manual provides descriptions of various shellfish culture methods, lists state extension and advisory contacts, and includes "best management" guidance.
- The Northeast Aquaculture Conference and Exposition (http://www.northeastaquaculture.org) provides a forum for hundreds of growers, researchers and scientists, agency staff, and others to discuss the latest developments in technology and scientific research, announce new initiatives, and coordinate.

For certain tribes in New England, aquaculture (particularly shellfish) has important food provisioning and environmental value. Through the ocean planning process, RPB tribes also expressed interest in shellfish aquaculture sites and habitats (particularly for razor clams, soft-shell clams, quahogs, and mussels), recognizing that these areas are important to tribal sustenance and water quality restoration projects. Shellfish bed restoration opportunities have also been identified as being of interest to coastal tribes.

MAPS AND DATA

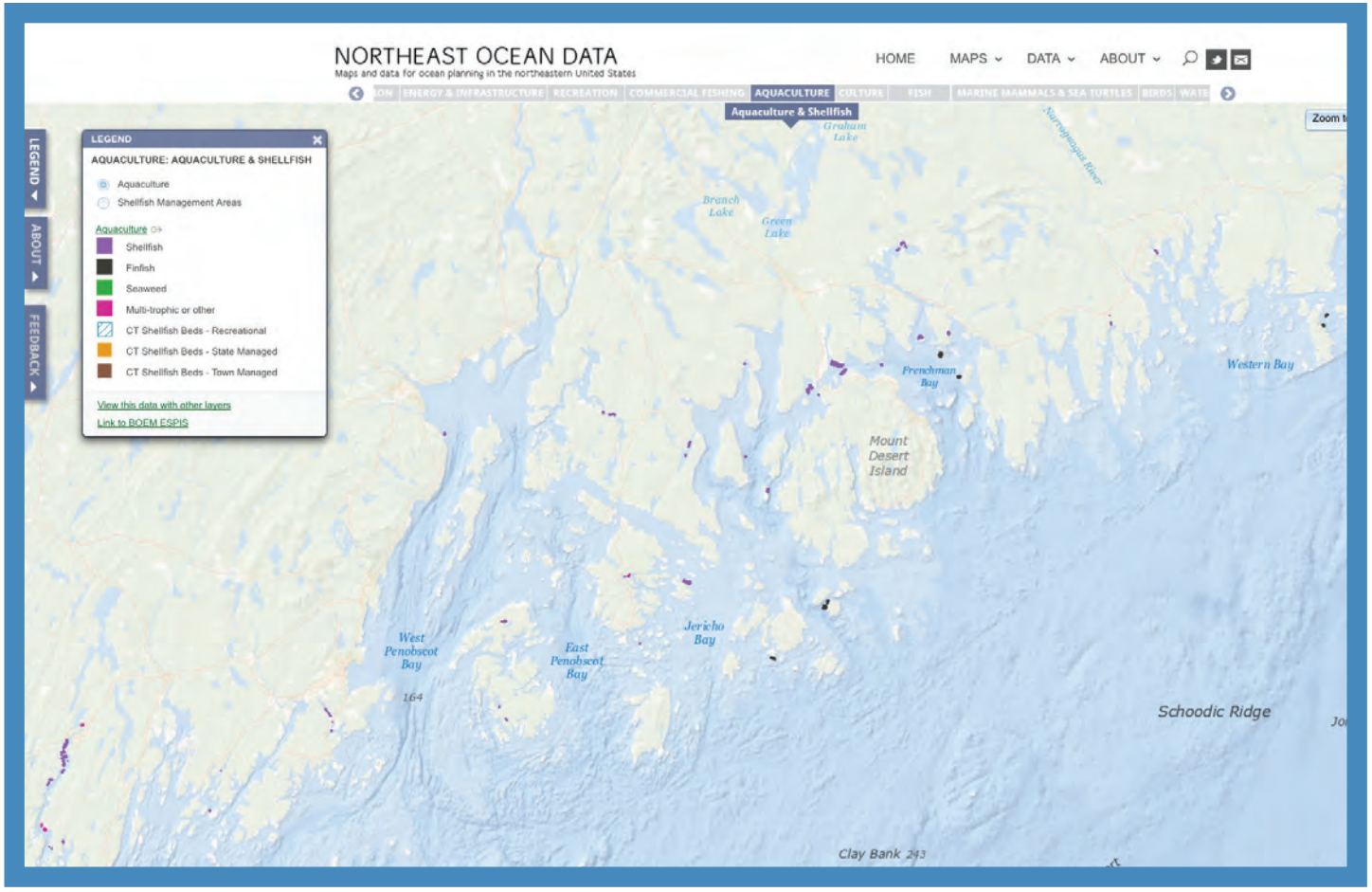
The Portal includes a series of maps characterizing the current footprint and relevant management areas for aquaculture in the region.

Current aquaculture footprint

The Aquaculture map shows sites that have been leased or permitted in the region. In addition, the map shows municipally managed, state-managed, and recreational shellfish beds in Connecticut. The map distinguishes between shellfish, finfish, seaweed, and multitrophic operations in each state's waters. These data are drawn from authoritative state sources and merged into a regional dataset with input and review from each of the data providers. The Portal map also includes the location of the two recently permitted blue mussel operations in federal waters. The location of these permitted sites was provided by USACE.

Management areas

The Shellfish Management Areas map includes shellfish growing and classification areas for New England states and New York. The classification scheme used in this regional dataset is adapted from the National Shellfish Sanitation Program's *Guide for the Control of Molluscan Shellfish.* These data are merged from the same authoritative state sources.



This map displays the areas currently used for shellfish, finfish, and seaweed aquaculture in the area between Penobscot Bay and Frenchman Bay, Maine.

OVERVIEW

ACTIONS

ACTIONS: MAINTAIN AND UPDATE DATA

A-1. Maintain aquaculture maps and data on the Portal: USACE and NOAA (for federal waters) and the states (for state waters) will review the maps of current aquaculture operations and shellfish management areas annually and provide updates to the Portal Working Group. Although most of the data comes from state fishery and aquaculture agencies, data on the location of permitted aquaculture operations (particularly in federal waters) can be corroborated with USACE. In addition, NOAA will provide maps of federally designated PSP closure areas (for example, PSP closures have been issued as part of managing the surf clam/ocean quahog commercial fishery).[12]

A-2. Identify additional information to support aquaculture siting: RPB agencies will consider incorporating additional data into the Portal, including recent permitting information from the Public Consultation Tracking System[13] managed by NMFS that provides information on its regulatory consultations, information about the potential effects of aquaculture on listed species and critical habitat from recent biological opinions developed under ESA,[14] and data resulting from new scientific studies.

ACTIONS: INFORM REGULATORY AND MANAGEMENT DECISIONS

A-3. Inform regulatory and environmental review of agency actions for their potential impacts to existing aquaculture: To the extent practicable, RPB agencies will use the data referenced in the Plan and the Portal when considering the potential effects of proposals for new offshore projects. The data will assist with the preliminary identification of potential conflicts with existing aquaculture operations and shellfish habitat areas, aid in the identification of potentially affected stakeholders, and identify when and where additional information (for example, regarding compatibility with existing aquaculture) may be required.

A-4. Inform permitting, leasing, and environmental review of proposed aquaculture operations: To the extent practicable, RPB agencies will use the Plan and the Portal to inform environmental review and permitting processes for newly proposed aquaculture operations. Data and information in the Plan will be used in the preparation of baseline information for environmental assessments. Additionally, maps of human uses—specifically, marine transportation, fishing, and recreation, which are the most likely existing activities to interact with new aquaculture operations—will

be used to help identify potentially affected stakeholders who should be engaged early in the project review process. Early engagement will assist with the identification of additional information needed for permit review, including details about any potential use conflicts.

Data related to marine life will also be used to help consider potential interactions with marine life species and habitat. Depending on the specific type of aquaculture, project proponents, agencies, and stakeholders can first consider those marine life species groups and habitats that are likely to have the greatest interaction.

For example, aquaculture may interact with birds that feed on the same fish and shellfish or forage in the same areas as the species that are being grown. Also, proposed offshore aquaculture operations with gear primarily located in the water column are relatively more likely to interact with pelagic species. An analysis of this type has actually already occurred using data from the Portal: project proponents for the longline mussel project in federal waters east of Cape Ann, Massachusetts, used marine mammal distribution and abundance and other information from the Portal in their biological assessment.

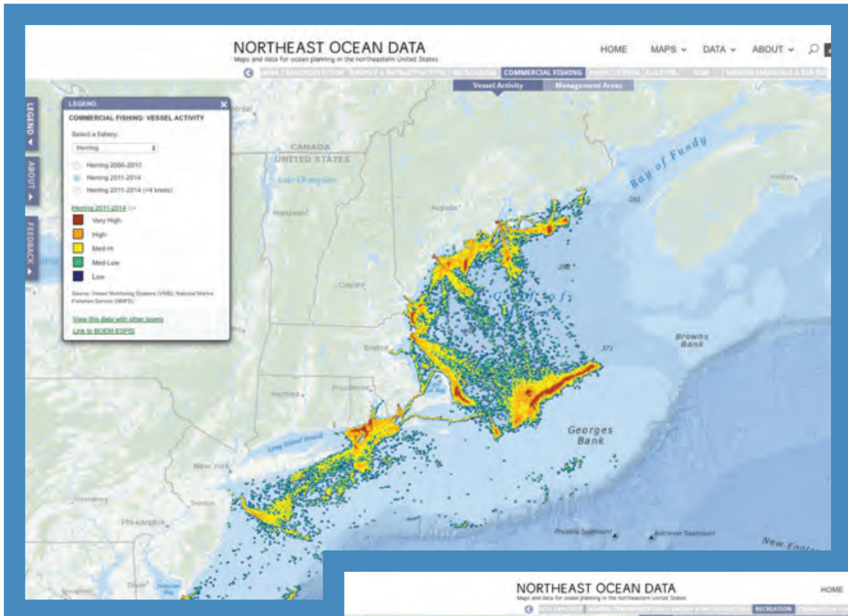
A-5. Ensure the Plan and the Portal are used by agencies and project proponents: RPB agencies will incorporate, where practical and appropriate, the use of the Plan and the Portal into existing internal agency guidance for implementing NEPA. Relevant federal agencies, including USACE, NOAA, and BOEM, and the Northeast states will also identify the Plan and the Portal in guidelines to developers, where practical, or refer aquaculture applicants to the Portal and the Plan as sources of information for siting decisions (particularly for potential operations in federal waters). States will use the Portal as one source of information in the review of offshore aquaculture proposals for federal consistency.

ACTIONS: ENHANCE AGENCY COORDINATION

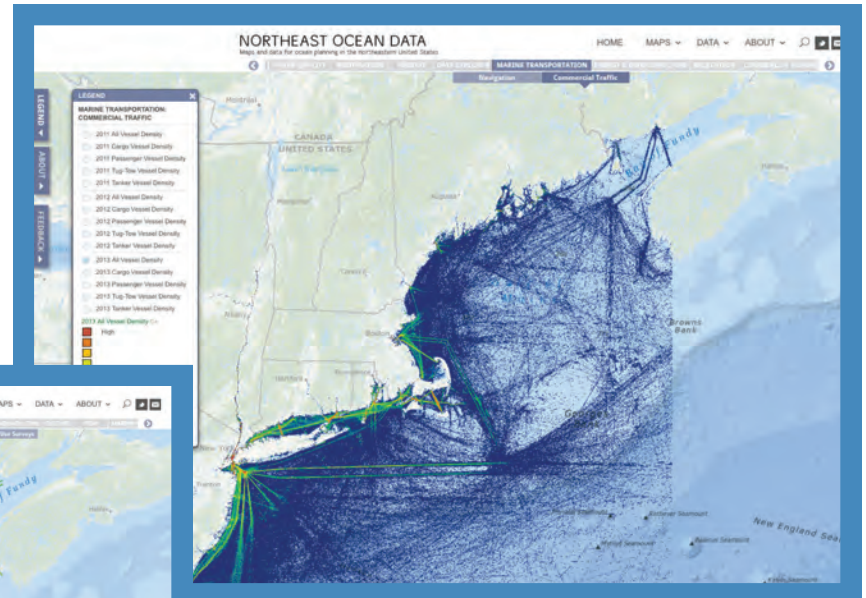
A-6. Continue interagency work group to inform regulatory and siting issues: In recent years, federal agencies in the Northeast US have coordinated to consider ways to address permitting and other issues related to offshore aquaculture in federal waters. In particular, an interagency work group composed of staff from USACE, NOAA, EPA, and BOEM has met throughout the planning process to identify issues and inform the development of the Plan. These agencies will continue to meet (and include USFWS and states as appropriate) to advance the following activities:

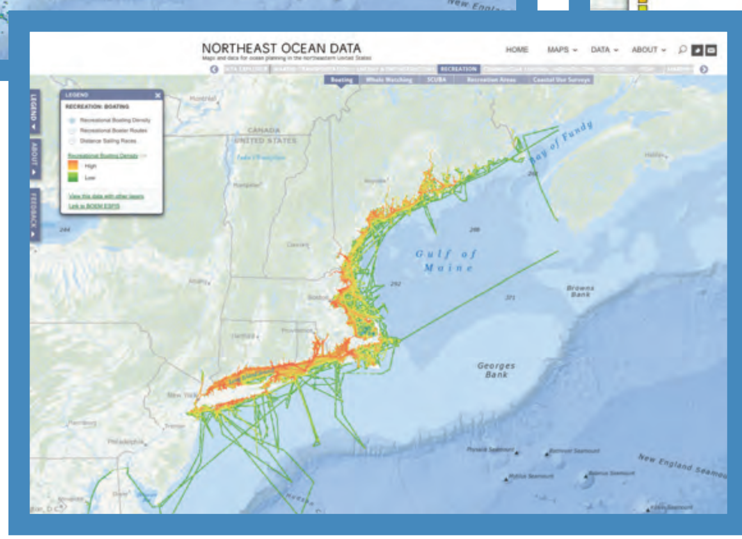
- Using data from the Portal and other sources, map areas of federal waters where potential aquaculture impacts (to specific priority species) and conflicts or synergies (with existing human activities) are more likely to occur and should be considered when siting an aquaculture facility. For example, bird data for species that could be drawn to aquaculture facilities (e.g., species such as gannets, scoters, and eiders that feed on blue mussels) could be examined to determine potential for depredation. Many considerations would have to be taken into account for this type of analysis, such as the specific type of aquaculture and whether the potential application of

Herring fishing vessel density (representative of potential interaction with fishing activity)



Commercial shipping vessel density





Recreational boating density

Fishing, recreation, and marine transportation are the three ocean uses most likely to interact with new aquaculture operations.

the mapping effort would be useful, given dynamic ecological conditions and technological advancements.

- Develop information using Portal data and other sources to assist with the siting of aquaculture facilities, given the physical, biological, and chemical requirements of certain species and the logistical and operational limitations of different gear types. This information could include water quality, currents, bathymetry, or other physical and biological oceanographic characteristics used to help determine the feasibility and practicality of potential sites.
- Share information and best practices related to gear types and culturing methods for different species, including potential impacts on marine species and water quality. This activity includes sharing information about entanglement hazards for marine mammals and sea turtles, potential interactions with migratory birds, the strength and tension of different types of lines in the water, and water quality considerations including monitoring.
- Review the MOU developed in the Gulf of Mexico and determine whether an MOU for aquaculture in New England federal waters would improve regulatory coordination.
- Ensure that aquaculture proponents and stakeholders who have expressed an interest are able to participate in each of these activities; their knowledge will be critical to the success of these efforts. The interagency work group will engage the aquaculture community and others as these activities progress. Increasing public involvement and awareness through coordinated outreach efforts by the permitting and resource agencies will help to reduce user conflicts and can be beneficial in reaching resolution early in the permit review process.

A-7. Coordinate with national and regional initiatives to support and promote marine aquaculture: RPB agencies, particularly NOAA, will continue to coordinate initiatives to support and promote marine aquaculture, including the following specific activities:

- RPB agencies will continue to coordinate on the implementation of the five-year strategic plan for research issued by the White House National Science and Technology Council's Interagency Working Group on Aquaculture.
- RPB agencies will have opportunities to coordinate through the RPB in the implementation of the NOAA Office of Aquaculture strategic plan.
- NOAA/GARFO will facilitate and promote communications internally, and will collaborate with other federal and state agencies and with the marine aquaculture industry to identify information needs essential for streamlining NOAA's consultation activities as part of the permitting process.
- NOAA will also facilitate collaboration between GARFO, USFWS, NEFSC, and state agencies, and with the regional aquaculture industry, to identify and evaluate research and information needs to promote marine aquaculture development in the greater Atlantic region.
- NOAA will seek to advance public understanding with respect to benefits, potential impacts, and management of marine aquaculture through its outreach activities and associated funding opportunities in the greater Atlantic region.