REVIEW OF THE MASSACHUSETTS OCEAN MANAGEMENT PLAN

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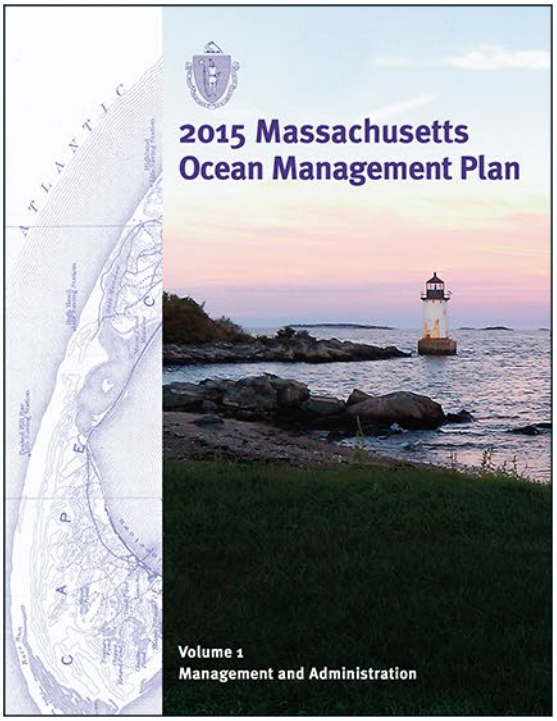

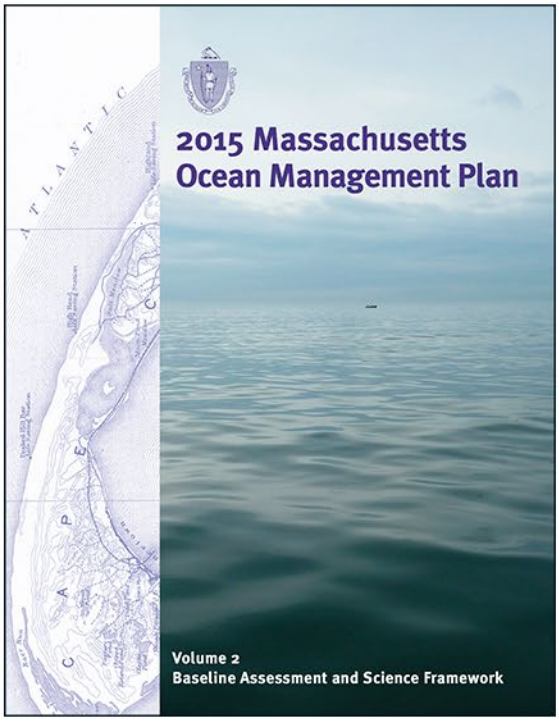

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Chapter 1 - Introduction

The Massachusetts Ocean Management Plan (ocean plan) promotes the sustainable use of state ocean waters and protects critical marine habitat and important water-dependent uses by establishing siting and management standards for new ocean-based projects. In response to the Oceans Act of 2008, the Executive Office of Energy and Environmental Affairs (EEA) published the first ocean plan in December 2009. The Oceans Act requires EEA to review the ocean plan at least once every five years. As with the review of the original plan, this process is led by EEA's Office of Coastal Zone Management (CZM).

This document fulfills the provision of the Oceans Act requiring review of the ocean plan at least once every five years. The review evaluates the plan as a whole, as well as its key components including the siting and management standards, delineation of critical coastal resources and maritime uses, Baseline Assessment, and Science Framework. Additionally, this document suggests a framework for policy updates and priority science objectives to support implementation of the ocean plan over the next five years. The review process began in the spring of 2019 and provides important insights into the content of the existing (2015) ocean plan and its performance and implementation over the last five years. This review document integrates input from agencies, advisory bodies, and the public and provides recommendations to the EEA Secretary on next steps for the ocean plan—including potential updates to the science and data underlying the management framework of the ocean plan, short- and long-term science priorities, and tracking of baseline conditions of the resources and habitats protected by the ocean plan. With the increase in the number of ocean-based projects proposed and reviewed subject to the ocean plan standards since 2015, this review provides meaningful insight into the application of the management framework.

The remainder of Chapter 1 presents a brief history of the ocean plan and its development, summarizes key plan components, and describes the purpose of the current plan review and gives a summary of the process.

Ocean Plan History

The release of the first ocean plan in 2009 was the culmination of an intensive planning process that included robust public participation and expert input from a range of stakeholders and practitioners. The Oceans Act of 2008 gave the EEA Secretary the formal oversight, coordination, and planning authority for the Commonwealth's ocean waters and ocean-based development. It also required EEA to develop an integrated ocean management plan that: defined the Commonwealth's goals, siting priorities, and standards for ensuring effective stewardship of ocean waters and resources held in trust for the benefit of the public; reflected the importance of the

waters of the Commonwealth to its citizens who derive livelihoods and recreational benefits from fishing; valued biodiversity and ecosystem health; identified and protected special, sensitive, or unique estuarine and marine life and habitats; and identified appropriate locations and performance standards for activities, uses, and facilities allowed under the Ocean Sanctuaries Act.

The Oceans Act of 2008 mandates review of the ocean plan, the Baseline Assessment, and the enforceable provisions of relevant statutes and regulations at least once every five years. The first review of the ocean plan (PDF, 3 MB) was conducted in 2013-2014. The review focused on the basic plan components, as well as the progress and performance of plan implementation. That review informed the development of the 2015 ocean plan, which was promulgated in January 2015 as the first formal ocean plan amendment (PDF, 73 MB).

This document serves as the review of the 2015 ocean plan and will inform the amendment process to develop the next iteration of the ocean plan.

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Key Plan Components

The ocean plan includes the following key elements: management framework, administration, Ocean Development Mitigation Fee, Baseline Assessment and data management, Science Framework and data priorities, and stakeholder engagement and public comment. These key plan components are described below.

Ocean Plan Management Framework

The ocean plan seeks to avoid and minimize impacts to critical environmental and human resources and maximize public benefits through siting and performance standards for new ocean-based projects in Massachusetts ocean waters. The ocean plan categorizes state waters into three designated use areas: prohibited, multi-use, and renewable energy areas. The Cape Cod Ocean Sanctuary is established as a “prohibited area” where a variety of uses, activities, and facilities (e.g., those associated with the generation of electricity) are prohibited. The remainder of the ocean planning area (PDF, 3 MB), including two areas designated for wind energy, is designated as multi-use. (See Figure 1 for the Massachusetts Ocean Management Planning Area.) Most water-dependent uses, activities, and facilities are permitted in multi-use areas, but ocean plan standards direct new development away from important areas of special, sensitive, or unique marine life and habitats (SSUs) and concentrated areas for water-dependent use. The ocean plan identifies and maps the protected areas to avoid (e.g., critical habitat for whales, sea birds, fish resources, and benthic habitat, as well as high value fishing and important navigation and recreation areas) and establishes performance standards to minimize impacts by ocean development.

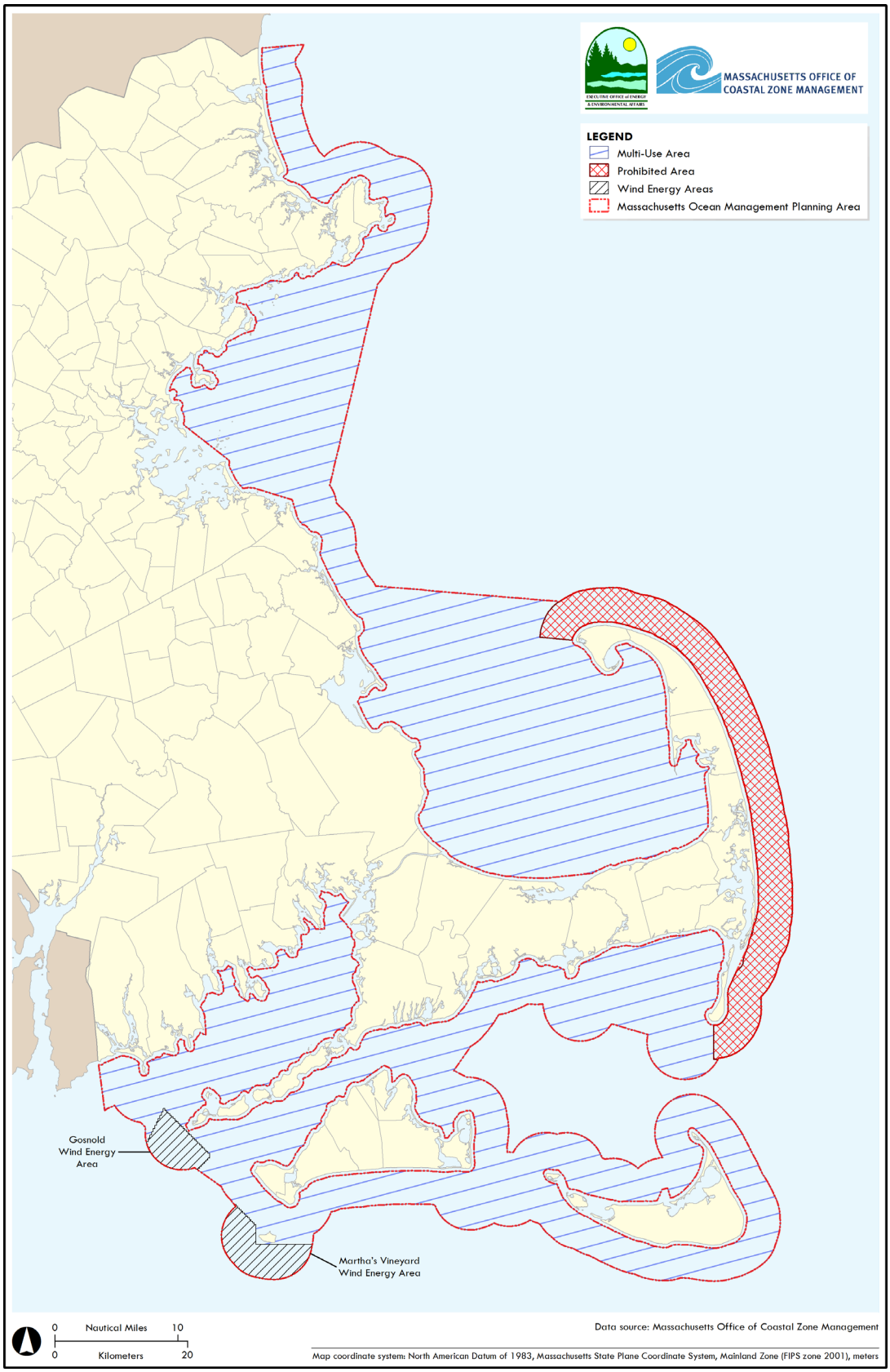

Figure 1 - Massachusetts Ocean Management Planning Area with Management Areas

The following major changes were made to the original ocean plan in the 2015 ocean plan:

- **Management Areas** - The 2009 ocean plan identified three management areas that were designated as "provisional sites" for the development of commercial-scale wind energy. While these provisional sites passed the initial screening process for the ocean plan, they were found to have technical limitations and potential cumulative impacts. Given the focus and progress on advancing offshore renewable wind energy in federal waters and considering the limitations related to developing wind facilities in state waters, the provisional commercial-scale wind energy areas were withdrawn in the 2015 ocean plan.
- **Protected Resources and Uses** - As part of the 2015 ocean plan, the boundaries of six of the 12 SSU maps were changed with the availability of new data. Two of these maps changed significantly enough to classify them as amendments. First, the North Atlantic Right Whale Core Habitat SSU increased significantly, expanding westward in Cape Cod Bay. Second, the Long-tailed Duck Core Habitat SSU was augmented in the Nantucket Sound and Islands area to include the habitat of several other species of sea ducks (White-winged Scoter, Black Scoter, Surf Scoter, and Common Eider) and was renamed the Sea Duck Core Habitat SSU. In addition, as recommended by the ocean planning technical work groups, the spatial extent of all five of the water-dependent use areas was changed.
- **Managed Uses** - The 2015 ocean plan advanced planning for potential areas of sand resources for nourishment of public beaches by: 1) identifying spatial data and information on ocean sediments, SSU resources, habitats and fisheries, navigation and transportation, infrastructure uses, and other information to be used in planning and siting; 2) conducting a preliminary compatibility and screening assessment that identified areas to avoid based on potential biological and physical environmental impacts, incompatibility and/or adverse interactions with existing uses and sites, and limitations and specifications of potential dredging operations; and 3) providing a framework for further refinements of the potential sand areas. The 2015 ocean plan also provided specific management standards for offshore sand extraction for nourishment of public beaches. In addition, information from a 2014 Massachusetts Clean Energy Center energy transmission study was integrated with spatial information on SSU resources, surficial sediment maps, navigation and other uses, and other areas to avoid (i.e., Nomans Danger Zone, existing cable areas, and the permitted Cape Wind offshore wind project area[1]) in a compatibility assessment and screening

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[1] Cape Wind relinquished its lease rights in 2017.

analysis in the 2015 ocean plan. Based on the outcomes of the analysis, four preliminary areas for offshore wind transmission cables were mapped and identified in the ocean plan as areas for further assessment.

Ocean Plan Administration

The ocean plan is implemented by an interagency team coordinating review within the existing Massachusetts regulatory structure. The team includes representatives from CZM, the Massachusetts Environmental Policy Act office (MEPA), Division of Marine Fisheries (DMF), and Department of Environmental Protection (MassDEP). Pre-application consultation with this team is strongly encouraged to determine the type and level of review required and to provide technical and other substantive feedback to project proponents. If MEPA review is required for a proposed project, an Environmental Notification Form (ENF) must be submitted that documents: 1) whether the project is subject to the ocean plan based on established criteria and 2) potential impacts to critical habitat or concentrations of water-dependent uses. The ENF is used to determine if an Environmental Impact Report (EIR) is necessary, and projects that require an EIR are subject to ocean plan siting standards. During EIR review, agencies assess project alternatives, mitigation measures (to avoid, minimize, or mitigate impacts), and public benefits of the project. Agencies must also ensure that all project certificates, licenses, permits, and approvals are consistent, to the maximum extent practicable, with ocean plan standards and conditions. CZM also coordinates with MassDEP on the terms and conditions in Chapter 91 licenses and Clean Water Act Section 401 Certifications for projects within the ocean planning area to ensure that they are consistent with the ocean plan. At the federal level, CZM works with the U.S. Army Corps of Engineers and the Bureau of Ocean Energy Management to ensure that federal permits and actions are consistent with the ocean plan and CZM's Program Policies.

Ocean Development Mitigation Fee

Projects proposed under the ocean plan are subject to an Ocean Development Mitigation Fee to compensate for unavoidable impacts to public interests and critical resources and to support the planning, management, restoration, or enhancement of marine habitat, resources, and uses pursuant to the Oceans Act. The mitigation fee structure is based on project scope, scale, and impacts to protected resources or uses. During MEPA review, project alternatives, impacts (short-term, long-term, and cumulative), mitigation measures, and public benefits are used to determine the fee rate. The Secretary Certificate determines the final ocean development mitigation fee as appropriate. Collected fees are deposited into the Ocean Resources and Waterways

Trust, which supports the restoration, enhancement, or management of marine habitat and resources.

The implementing regulations of the Oceans Act (301 CMR 28.00) call for the EEA Secretary to develop a fee schedule that reflects differences in terms of the scale and effects of ocean development projects. As part of the 2015 ocean plan amendment process, EEA consulted with an advisory group that included representatives from the regulated community, commercial fishing, environmental interests, and EEA agencies in the development of the proposed fee schedule. The 2015 ocean plan described a tiered fee schedule and the provisions for the administration of the fee (Table 1-1).

Table 1-1. Schedule shows three classes of fee structure reflecting a hierarchy of projects based on their scope, extent, duration, and severity of impact.

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Activity Class	Project Scope, Scale and Effects	Fee
Class I	• Project is limited in scale, size, footprint • Project footprint is generally less than 6 acres and project extent is generally confined to the seafloor (i.e., does not also include or has very minor footprint in the water column, sea surface, and space above) • Effects on habitats, natural resources, or water-dependent uses are generally negligible and limited in duration (i.e., primarily during construction/installation)	$10,000-$45,000
Class II	• Project is moderate in scale, size, footprint • Project footprint is generally 6-20 acres and project extent may include limited water column, sea surface, and space above • Effects on habitats, natural resources, or water-dependent uses are generally minor and may be more than temporary	$85,000-$300,000
Class III	• Project is large and/or complex in scale, size, footprint • Project footprint is greater than 20 acres and project extent may include moderate/major water column, sea surface, and space above • Effects on habitats, natural resources, or water-dependent uses are generally moderate and may be re-occurring or continuous in duration	$500,000-$5,000,000
Negligible: Effects are at the lowest level of detection, barely measurable, with no perceptible adverse consequences to the resources. Minor: Effects are measurable or perceptible but are slight. Impacts are to very few resources. Most impacts to affected resources are avoided or mitigated and affected resources will recover quickly. Moderate: Effects are measurable or perceptible. Impacts are to more than a few resources. Impacts to affected resources are unavoidable and affected resources will recover.		

Baseline Assessment and Data Management

The ocean plan depends on the best available data to identify critical habitats and important areas for water-dependent uses and to track the status and trends of the conditions and uses of ocean waters. In the development of the 2015 ocean plan, these data were compiled in the Baseline Assessment—a companion document of the ocean plan (Volume 2) that provides an extensive characterization of the current knowledge of

human uses, natural and cultural resources, physical environment, and economic value of Massachusetts ocean waters and adjacent federal waters. Ongoing data collection and updates will allow for future ocean plan documents to report on trends in the ocean planning area. Much of this information is compiled from reports developed by six technical work groups (Energy and Infrastructure, Fisheries, Habitat, Cultural Heritage and Recreational Uses, Sediment and Geology, and Transportation and Navigation). These work groups include nearly 100 science, technical, and subject-matter experts from state and federal agencies, academia, non-profit organizations, and the private sector. For the 2015 Baseline Assessment and final Work Group reports, see the 2015 Massachusetts Ocean Management Plan.

Science Framework and Data Priorities

The Science Framework identifies priority science and data needs to support ocean management and the continued evolution of the ocean plan. The original ocean plan established priorities that led to important advancements in seafloor and habitat science and characterization, major additions of data on human-use patterns (such as recreational boating activity), and key updates to the state's online data and mapping system (the Massachusetts Ocean Resource Information System, or MORIS).

The 2015 ocean plan prioritized the following eight near-term science and data actions: further characterization of marine sand deposits and development of regional sediment budgets; characterization of potential wind energy transmission corridors; advancement of marine habitat mapping; monitoring of climate change across Massachusetts ocean waters; identification of ecologically important areas; improvement of data and maps for specific resources (important fish resources, sea turtles, marine birds, recreational and commercial fishing, submerged wrecks, and ancient Native American land use); and refinement and implementation of the Monitoring and Evaluation Framework to improve ocean plan review and updating.

Long-term priorities were identified to: characterize the economics of Massachusetts-specific fisheries; assess potential and emerging climate change impacts on ocean and coastal environments; develop a database and identify spatial patterns of important recreational uses (such as diving, ocean-based wildlife viewing, surfing, and non-motorized boating); evaluate underwater noise and its potential effects on marine animals; and continue to advance integrated geospatial data management. Significant progress on these needs has been made, the details of which are described in Chapter 2. For links to the Science Framework, see Volume 2 of the 2015 Massachusetts Ocean Management Plan.

Stakeholder Engagement and Public Comment

Continued evolution of the ocean plan requires robust input and guidance from experts, stakeholders, and the public. The 17-member Ocean Advisory Commission (OAC), which includes legislators, agency representatives, and stakeholder representatives, advises the EEA Secretary on ocean plan review, implementation, and related ocean management issues and holds public meetings to promote stakeholder input. The Ocean Science Advisory Council (SAC), made up of nine experts in marine science, policy, and data management, supports the EEA Secretary with the science and technical aspects of the ocean plan, including the Baseline Assessment and identifying trends in ocean resources or uses. Technical work groups provide input from nearly 100 additional experts. Throughout the development of the 2009 plan and the 2015 amendment, extensive public input was solicited through workshops, hearings, stakeholder meetings, and direct solicitation of public comment. EEA continues to encourage robust public participation process with the review of the 2015 ocean plan.

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Current Plan Review Process

The ocean plan regulations allow for periodic "updates" or "amendments" to the ocean plan. Ocean plan updates are minor revisions necessary for the effective and efficient administration of the ocean plan and include clarifications of the management framework or administration, updated geospatial data related to SSUs or water-dependent uses, and minor shifts in management area boundaries. Updates must be posted in the *Environmental Monitor* for a 30-day comment period. Ocean plan amendments are more significant changes and include the creation of new management areas or significant boundary changes; the creation of new, or substantial revision to, existing management standards; and the identification of new, or the removal of existing, SSUs or water-dependent uses. Amendments require scoping coordination between the EEA Secretary, OAC, and SAC; a 60-day comment period; public hearings held in each of the five CZM planning areas; filing of the amended plan with the Massachusetts House of Representatives and Senate clerks; and any necessary revisions to 301 CMR 28.00 along with the required comment period.

Whether the ocean plan warrants an update or amendment is informed by the ocean plan review process. To date, the review of the 2015 Ocean Management Plan has included: a survey of ocean-based projects required to meet ocean plan standards or otherwise applicable to the ocean planning area, review by the six technical work groups of the geospatial extent of the sensitive coastal resources and maritime uses protected through the ocean plan, evaluation of science priorities and data actions as presented in the previous Science Framework, assessment of the Baseline Assessment, public input through a survey and technical/stakeholder meetings, and development of this draft ocean plan review document.

This draft review document summarizes the information collected to date during the review of the 2015 ocean plan and makes recommendations on how to best proceed with the next iteration of the ocean plan and its implementation. After completion and public review of this document, CZM, on behalf of the EEA Secretary, will implement these final recommendations, with support from the OAC, SAC, and the technical work groups.

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Chapter 2 - Factors Considered in Review of the 2015 Ocean Plan

The Massachusetts Ocean Management Plan is intended to be an evolving document that is periodically revisited and revised to adapt to better information and science, evolving policy goals, and enhanced experience in applying the management and administrative framework. This chapter provides an overview of the major factors that informed the review of the 2015 ocean plan, organized into the following sections: regulatory and policy updates, projects in and affecting the ocean planning area, Baseline Assessment, Ocean Resources and Waterways Trust, science priorities, technical work groups, ocean plan survey, and input from Ocean Science Advisory Council (SAC) and Ocean Advisory Commission (OAC).

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Regulatory and Policy Updates

Since 2015, updates have been made to the Massachusetts Ocean Management Plan regulations and Ocean Sanctuaries Act Regulations, as described below.

Massachusetts Ocean Management Plan Regulations

First promulgated in 2013, the Ocean Plan Regulations (301 CMR 28.00) (PDF, 108 KB) were updated in 2017 to include management standards for sand and gravel extraction (Section 28.04(5)) and management standards for Cable Activities (Section 28.04(6)). These changes addressed new activities introduced in the 2015 ocean plan in response to a perceived need for public beach nourishment to mitigate the impacts of increased storms, and in anticipation of offshore wind energy development that would require the laying of submarine transmission cables from offshore wind projects in federal waters through the ocean planning area to the Massachusetts coast.

Massachusetts Ocean Sanctuaries Act Regulations

The Massachusetts Ocean Sanctuaries Act (OSA) and its implementing regulations (301 CMR 27.00) (PDF, 117 KB), define the prohibited and allowed uses in the five ocean sanctuaries and require state agencies to protect the sanctuaries from exploitation, development, or activities that would significantly alter or otherwise endanger their ecology or appearance. In 2014, the Massachusetts legislature passed An Act Improving Drinking Water and Wastewater Infrastructure, which added new municipal wastewater discharges to the list of allowed uses in the Commonwealth's five ocean sanctuaries. In 2017, the OSA regulations were updated to establish the information necessary to demonstrate that a new municipal wastewater discharge will not significantly alter the ecology or appearance of an ocean sanctuary. The OSA regulations now reflect the

various surveys (water quality, fisheries, benthic sediment and infauna, eelgrass), evaluations (hydrodynamic and hydrologic modeling, commercial and recreational fisheries), and long-term monitoring necessary for a successful determination of no significant alteration.

Projects in and Affecting the Planning Area

The nearshore boundary of the Massachusetts ocean planning area is approximately 0.3 nautical miles (NM) from mean high water and extends to the state-federal boundary, approximately three nautical miles from shore. The multi-use management area allows for many important water-dependent uses including aquaculture, dredging, energy and telecommunications cables, renewable energy structures, pipelines, sand extraction for beach nourishment, and ocean outfalls. All these uses are "allowed uses" within the five Massachusetts ocean sanctuaries (301 CMR 27.06(2)). Below is a summary of activities in the ocean planning area since 2015, organized by allowed uses.

Aquaculture

The aquaculture industry is expanding in Massachusetts and across the United States. Oyster culture in particular has increased substantially, up 50% by weight from 2014-2018 in Massachusetts. However, the number of acres of shellfish growing areas (i.e., approved, conditionally approved, restricted, or conditionally restricted areas) has remained static over the same time period at 1.7 million acres (Hickey et al., 2015[2]). The increase in aquaculture has led to three distinct initiatives that seek to bring attention to and address issues associated with the advancement and improvement of the aquaculture industry in Massachusetts.

In response to a perceived space conflict among aquaculturists, wild harvesters, and water quality restoration projects (e.g., bivalve culture to remove estuary nitrogen), the Cape Cod Commercial Fishermen's Alliance, the Massachusetts Aquaculture Association, The Nature Conservancy, and the University of Massachusetts Boston created the Massachusetts Shellfish Initiative (MSI) in early 2019. The goal of the MSI is to "maximize the economic, environmental, and social benefits of Massachusetts' nearshore shellfish resources." The Massachusetts Office of Coastal Zone Management (CZM), Division of Marine Fisheries (DMF), Massachusetts Department of Agriculture (DAR), Massachusetts Department of Environmental Protection (MassDEP), and Massachusetts Environmental Policy Act (MEPA) Program all have seats on the MSI Task Force/steering committee. Additionally, CZM and DMF have seats on the MSI

[2] https://www.mass.gov/files/2017-07/shellfish-planting-guidelines_0.pdf (PDF, 417 KB)

Assessment and MSI Scoping Committees. An Assessment Report of the status of the shellfish industry across municipalities was developed in early 2020, and the Scoping Committee has taken public comment on what the scope of the MSI should include. Next, the Assessment and Scoping Committees will submit recommendations to the Task Force for consideration. Most shellfishing activities take place landward of the ocean planning area. However, in anticipation of emerging interest in deep-water aquaculture within the ocean planning area as the industry matures, siting and management provisions may be considered for the ocean plan.

A related initiative is the creation of the Massachusetts Aquaculture Permitting Program (MAPP). MAPP outlines the permitting and review process for several common aquaculture activities and related gear types and evaluates the potential for environmental impacts and user group conflicts associated with those common aquaculture activities. It also identifies practical alternatives and siting and performance criteria that applicants can implement to ensure aquaculture activities are consistent with local, state, and federal requirements and that projects avoid or minimize damage to the environment and conflicts with other user groups. While MAPP relies on existing regulatory authorities, one of its goals is to streamline permitting for aquaculture projects to ensure that: 1) projects are submitted to regulatory authorities in proper order, and 2) they meet siting and performance standards established in state regulations and summarized in MAPP.

Coincident with the MSI and MAPP processes, MEPA has been developing a Special Review Procedure (SRP) for marine aquaculture. The focus of the MEPA SRP is on bivalve aquaculture and, similar to the MAPP, seeks to streamline the MEPA review process for oyster and clam aquaculture while ensuring that these projects meet pre-defined siting and performance standards that avoid, minimize, and mitigation impacts to coastal resources and uses. MEPA continues to work with DMF and CZM to develop this SRP.

Dredging

Dredging is necessary throughout the Massachusetts coastal zone to remove shoaling that impedes navigation to and from harbors and marinas to support water-dependent businesses and operations. Most of the dredging that occurred since 2015 has taken place in waters shoreward of the ocean planning area, which begins 0.3 NM from shore. The Boston Harbor Federal Navigation Improvement Project was the only dredging project that extended into the ocean planning area, with two aspects of this large project located in the ocean planning area: the Broad Sound North Entrance Channel, which was deepened to -50 feet mean lower low water (MLLW), and the lower Main

Ship Channel through President Roads, which was deepened to -48 feet MLLW. All dredge spoils were deposited at the Massachusetts Bay disposal site in federal waters. In 2019, a permit to allow dredging up to 85,000 cubic yards of seafloor in the ocean planning area to allow for adequate burial of the Vineyard Wind 1 offshore export cable through Muskeget Channel and Nantucket Sound was issued by MassDEP. This work is expected to commence in 2021.

Cables

The 2015 ocean plan identified several preliminary areas for siting offshore wind transmission cables in state waters. The purpose of mapping these areas was to identify routes from the offshore wind energy lease areas to potential land-based transmission connections that had the least number of conflicts with protected areas and existing water-dependent uses. Although to date offshore wind developers have not used these exact routes, the maps in the 2015 ocean plan are highly informative and the proposed offshore export cable routes for the Vineyard Wind 1 project approximate the potential wind transmission corridor through Muskeget Channel.

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State agencies permitted two offshore export cables from the proposed 800-megawatt (MW) Vineyard Wind 1 project. The two 20-mile cables will be buried five to eight feet below the seafloor from Muskeget Channel to Barnstable. Agencies also reviewed the Environmental Notification Form for the Vineyard Wind 2 project, which will also include two cables running through Muskeget Channel to Barnstable. Additionally, state agencies have been reviewing three offshore export cable routes proposed by Ørsted to connect future wind farms to energy markets in New York, Connecticut, or Somerset, Massachusetts, all of which are outside of the ocean planning area.

Since 2015, agencies also reviewed four other transmission cables, one for telecommunications, one to energize an offshore research station, and two to deliver energy from outside of Massachusetts to coastal markets. The Amitie communications cable would run from England and France and make landfall in Lynn, Massachusetts. Twenty-nine miles of the 1.5-inch cable are proposed to be buried four to six feet below the seafloor from the state/federal boundary off Gloucester to Lynn. The Amitie project is undergoing MEPA review.

The Martha's Vineyard Coastal Observatory (MVCO) is a cabled observatory that has been serving the scientific community since 2001. The cable, replaced under a Chapter 91 amendment, was roughly one mile long and 0.75 inches in diameter. The new cable was deployed in 2018.

The SeaLink high voltage direct current (HVDC) eight-inch cable was proposed to connect the Seabrook substation in Seabrook, New Hampshire, to the Mystic substation in Everett, Massachusetts, and deliver 520 MW. Total submarine cable length to Boston, Massachusetts, was proposed to be about 55 miles. To minimize the environmental footprint and susceptibility to storm damage, the proponents proposed to completely bury the cable with a target burial depth of four to six feet beneath the seabed and deeper in channels. SeaLink was not selected by Independent Service Operator New England as an option to bring power to Massachusetts so the project did not submit an application to MEPA.

The Atlantic Link project proposed the installation of two new 337-mile long, subsea, 320 kV, high voltage direct current (HVDC) transmission lines between Coleson Cove, New Brunswick, and Plymouth, Massachusetts. The five-inch diameter cables would have a delivered capacity of 1,000 MW and would be bundled together along with one fiber optic cable. Approximately 19 miles of the cable would traverse Massachusetts waters. The proposed cables would be buried to a depth of three to six feet using a jet hydroplow. If seabed conditions were found to require placement on the surface of the seabed or at a shallower than designed depth, coverage using rock or concrete mattresses was proposed to armor the cables. At landfall, the project included the installation of an approximately 4,500-foot span starting at the 30-foot depth contour off Plymouth, where the cable would be laid using horizontal directional drilling (HDD) under the seabed, beach, and coastal bank, emerging in the upland within the Town of Plymouth. The landside facilities included the construction of a 2,375-foot underground HVDC cable, an HVDC converter station, a substation, and a transmission line tap to existing power lines. This project went through MEPA and a Secretary's certificate was issued on November 9, 2017, but the project did not proceed to permitting.

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The Maine Green Line proposal was an Anbaric transmission solution proposed by the Green Line Devco, LLC as a project of the Green Line Infrastructure Alliance. The Maine Green Line would transmit up to 1,200 MW of power from Maine to eastern Massachusetts. Its goals were to encourage the development of renewable resources in northern New England by providing the necessary infrastructure to bring "green" power to more densely populated areas to the south, including the Boston area, while at the same time increasing the supply of reliable energy into the largest demand center in New England. The Maine Green Line would enable New England to meet its Regional Greenhouse Gas Initiative goals by bypassing congestion that exists on the existing overhead transmission lines between northern and southern New England. CZM held initial meetings with the project proponent but the project did not proceed to permitting.

Renewable Energy

No renewable energy structures (e.g., wave, tidal, or wind) were proposed in the ocean planning area over the last five years. However, as described above, state agencies reviewed the environmental impacts of laying the offshore export cable (OEC) for the Vineyard Wind 1 project through Muskeget Channel to Barnstable and began the review of the Vineyard Wind 2 OEC. Additionally, CZM also worked with Bay State Wind on developing environmental assessments for a proposed offshore export cable up Mount Hope Bay to Somerset, Massachusetts, which, while in state waters, is outside the ocean planning area. State agencies have begun early discussions with Mayflower Wind, whose 804 MW project 20 miles south of Nantucket was selected by the Commonwealth to provide renewable energy and whose cable will cross Muskeget Channel on its way to the southern Cape Cod shoreline.

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Two areas for community-scale wind projects—one located off Gosnold Island and one located off Martha's Vineyard—were included in the first ocean plan and carried forth in the 2105 ocean plan. These areas, located in state waters, were designated in the first ocean plan as opportunities for communities to consider developing local nearshore renewable energy through offshore wind. However, due to the costs and impacts of realizing these projects, as well as the focus on offshore wind resources in federal waters by energy companies, the potential to develop nearshore offshore wind has not progressed.

The Muskeget Channel Tidal Energy Project, which was first proposed in 2010 and would have consisted of 13 horizontal hydrokinetic turbine generation units with a total installed capacity of 5 MW, was withdrawn from consideration in September 2016. A tidal energy test structure was permitted for the Cape Cod Canal in 2016 and installed on U.S. Army Corps of Engineers property in late 2017. In November 2020, at this location the Aegis tidal test turbine—a 10-foot diameter, 2 kilowatt, twin turbine system—was tested alongside a Bioenno energy storage module to demonstrate energy generation and storage capability. In addition, University of Massachusetts Dartmouth researchers used acoustic sensors to determine how fish interacted with the turbines.

Pipelines

No new energy pipelines were proposed in the last five years. The existing Northeast Gateway offshore natural gas port and pipeline located 13 miles outside Boston in Massachusetts Bay was active in both the 2014-15 and 2015-16 winter heating seasons, bringing in a total of three cargoes over that period. Although the site was planned for decommissioning, in 2018 the owners of the port asked federal permitting agencies to approve an expansion to full operation (24 hours per day, 7 days per week) for up to

two vessels. The owners of the Neptune offshore natural gas port and pipeline located 13 miles south/southeast of Gloucester, Massachusetts, applied for a five-year suspension of port operations in 2013 and again in 2018. In June 2020, CZM and MassDEP met with Neptune's owners, Engie, to discuss either selling or decommissioning the port. This conversation with state and federal agencies is ongoing.

Offshore Sand Extraction

The 2015 ocean plan identified nine potential offshore sand resource areas for further investigation, and further characterization of these areas to understand additional parameters of these sites was one of the science priorities in the 2015 ocean plan. To address this need, CZM used the Ocean Resources and Waterways Trust Fund to contract with the consultant firm APTIM Environmental & Infrastructure, Inc. (APTIM) to assess the sediment grain size, depth, and extent of five of the nine offshore sand resource areas. The results estimate that there may be more than 400 million cubic yards of sand resources within state waters at these five locations.

Ocean Outfalls

As stated above, changes to the Ocean Sanctuary Regulations in 2017 allowed for the permitting of ocean outfalls to discharge treated municipal wastewater to ocean sanctuaries. The Town of Wareham, with assistance from the Buzzards Bay Coalition (BBC), has been collecting data to support the relocation of the Wareham water pollution control facility's outfall from the Agawam River to the Cape Cod Canal at the site of the Massachusetts Maritime Academy outfall. Modeling of an outfall discharging a minimum of 3 million gallons per day (MGD) and up to 10 MGD of effluent (treated to 3 mg/l total nitrogen (TN)) demonstrated the concentration of TN in the receiving waters would increase by <1% and 2%, respectively. The proposed Wareham facility would likely have the capacity to treat wastewater from the western part of Bourne, a part of the Town of Plymouth, and potentially the Town of Marion, in addition to the Town of Wareham. The communities and BBC have partnered to model the outfall relocation to understand potential impacts to downstream estuarine resources. In addition, BBC has collected two years of baseline water quality and benthic monitoring (required by OSA regulations) and continues to gather data to inform future water quality and habitat assessments.

Five upper Cape Cod communities (Bourne, Sandwich, Falmouth, Mashpee, and Barnstable) have been discussing the potential use of the Joint Base Cape Cod (JBCC) wastewater treatment facility as a regional wastewater treatment and disposal opportunity. In addition to upgrades to JBCC, other alternatives for treated wastewater disposal include an ocean outfall, potentially in the Cape Cod Canal. A report prepared by consultant Wright Pierce estimated that in the mid-term (10-year) timeframe, up to

2.2 MGD of wastewater disposal capacity might be needed, and in the long-term (20-year) timeframe, up to 4.5 MGD disposal capacity might be needed for these five communities.

Baseline Assessment

The Baseline Assessment is a characterization of the current knowledge of human uses, natural and cultural resources, the physical environment, and economic value in Massachusetts ocean waters and adjacent federal waters. The information in the Baseline Assessment is primarily derived from reports developed by the six technical work groups (Energy and Infrastructure, Fisheries, Habitat, Recreational and Cultural Services, Sediment and Geology, and Transportation and Navigation) representing nearly 100 science, technical, and subject-matter experts from state and federal agencies, academia, non-profits, and the private sector.

The Baseline Assessment in the 2015 ocean plan reported on the conditions, status, and trends in Massachusetts coastal waters at that time. The status of specific categories of resources, physical ocean parameters, climate change indicators, maritime uses, bird species, and other marine species, as well as changes or trends since 2009, were noted. As with the 2009 Baseline Assessment, the 2015 Baseline Assessment served as a valuable resource for understanding specific biological, physical, cultural, or economic parameters and trends within the ocean planning area. There were no notable changes in the use or application of the Baseline Assessment since 2015. However, within the last five years, continuous monitoring programs for physical ocean parameters have become more common, providing publicly accessible data in real-time over the internet. Data and trends for a selection of the parameters in the Baseline Assessment are accessible through online platforms managed by others including the Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS) and Massachusetts Water Resources Authority (MWRA). Data and information such as these will support the evaluation and update of the Baseline Assessment for the next iteration of the ocean plan.

Ocean Resources and Waterways Trust

The Massachusetts ocean plan regulations require that any activity under the jurisdiction of the ocean plan and requiring state permits “shall be subject to an ocean development mitigation fee” (301 CMR 28.06). Funds deposited into this trust are to compensate the Commonwealth for unavoidable impacts of ocean development activities on the broad public interests and rights in the lands, waters, and resources of the ocean planning area and to support the planning, management, restoration, or enhancement of marine habitat, resources, and uses pursuant to the Massachusetts Oceans Act.

Between 2014 and 2019, one project was required to make a deposit to the Ocean Resources and Waterways Trust. This project was the dredging and laying of the Vineyard Wind 1 offshore export cable. The February 1, 2019, MEPA certificate required Vineyard Wind, LLC to deposit $240,000 into the trust when permitting was completed and before construction to mitigate for construction impacts. Any additional and unanticipated impacts from the Vineyard Wind 1 export cable project will be assessed $10,000 per acre for cable protection beyond the permitted nine acres and $500 for every 1,000 cubic yards of dredging required beyond the permitted 75,000 cubic yards. Conclusion of the federal permitting for the Vineyard Wind 1 project is anticipated in December 2020.

One expenditure from the trust has occurred since 2015. In 2017, CZM used $217,311 from the Ocean Resources and Waterways Trust to contract with APTIM to assess the sediment grain size, areal extent, and depth of five offshore sand resource areas. Results of this study are discussed below and in the Sediment and Geology technical work group report. A full accounting of deposits to and expenditures from the trust can be found on the Ocean Resources and Waterways Trust Deposits and Expenditures web page.

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Science Priorities

The first ocean plan included a Science Framework, which presented a blueprint for identifying and addressing science and research needs to effectively manage the Commonwealth's ocean resources. The purpose of the original Science Framework was to "identify and prioritize the scientific research and data acquisition necessary to advance ecosystem-based management in Massachusetts waters, and identify necessary steps and responsibilities for these tasks, based upon the Oceans Act and the ocean plan." The Science Framework includes priority science actions as well as longer-term priorities for the five-year window that coincides with the anticipated plan review timeline.

Building on the progress of the first ocean plan, the 2015 ocean plan identified 11 science and data priorities to continue to advance ocean management goals. Significant progress has been made on the priorities since 2015, resulting in new information that directly and indirectly supports implementation of the management framework of the ocean plan. Addressing these priorities is integrally linked to available resources. Consequently, the ocean plan's Science Framework serves as a recommendation for prioritization rather than a commitment to implementation. CZM collaborates with multiple institutions and organizations to address these shared goals. Below is a brief description of the progress made since 2015 on the identified science priorities.

1) ***Further characterize marine sand deposits and support development of regional sand budgets***

CZM used deposits to the Ocean Resources and Waterways Trust Fund to address this science priority. In 2017, CZM contracted with APTIM and CR Environmental, Inc., to

conduct a preliminary characterization of offshore sand resources in five study areas located offshore of the Massachusetts coastline. The project consisted of an historic data review; collection of vibracores (sediment sampling method for retrieving underwater cores), surface grab samples, and towed video footage; and sediment analysis. The five Study Areas included offshore areas adjacent to the Merrimack River, Nantasket Beach, Duxbury Bay, Sandwich, and Cuttyhunk. The study concluded that there are likely more than 400 million cubic yards of sand potentially available within state waters at these five locations. The preliminary volumes of potential sand resources are based on widely spaced reconnaissance-level geotechnical data and varying levels of geophysical data coverage. Design-level geotechnical and geophysical data collection would be required to accurately and fully characterize these sand deposits. Additional information is required to understand the presence of environmental and cultural resources, including fisheries and habitat, and to determine compatibility and dredgeability of the potential sand resource. In a related effort, CZM is working with U.S. Geological Survey (USGS) to apply a coupled ocean-wave sediment transport model along Cape Cod Bay from Plymouth to Dennis to evaluate how storm events affect sediment flux to/from shore and shoreline change.

2) Characterize potential wind energy transmission corridors

CZM used an optimization and screening analysis to identify several preliminary areas for siting offshore wind transmission cables in state waters in the 2015 ocean plan (Volume 1, Chapter 2, Appendix 5). This effort used information characterizing the geology, benthic fauna, and fisheries resources in these areas to assist in advancing offshore transmission planning.

The purpose of mapping these areas was to identify routes from the offshore wind energy lease areas to potential land-based transmission connections that had the least number of conflicts with protected areas and existing water-dependent uses. Although to date offshore wind developers have not used these exact routes, the maps in the 2015 ocean plan are highly informative, and the Vineyard Wind 1's proposed offshore export cable routes approximate the potential wind transmission corridor through Muskeget Channel. Since 2015, CZM has worked with offshore wind developers as they consider potential cable corridors from the Southern New England wind energy areas to the onshore transmission grid. These discussions will inform the planning and permitting of future offshore transmission corridors. Additionally, data collected by offshore wind developers and provided to CZM will further enhance the already extensive catalogue of the Commonwealth's seafloor habitats.

3) Advance marine habitat mapping

For more than 15 years, CZM has worked with DMF, USGS, and the National Oceanic and Atmospheric Administration (NOAA) to map the seafloor of Massachusetts, and this work

has continued since 2015. In 2018, CZM and USGS signed a cooperative agreement to produce a high-resolution geophysical map of southern Cape Cod Bay. By 2022, USGS will have conducted a geophysical survey (swath bathymetry, backscatter, and seismic reflection profile data); collected sediment samples, underwater videos, and seafloor photos to groundtruth the acoustic information; and published interpretive maps for this area of the Commonwealth's seafloor.

CZM is in the process of building a spatial bibliography tool that depicts the geographic extent for publicly available seafloor mapping data in and adjacent to Massachusetts waters. The tool provides full citation information for a variety of data types, including sediment samples, photos, videos, bathymetry, side scan sonar, and subbottom profiling, and allows users to find and download data relevant to a specific area of interest. CZM has also been working with NOAA and the coastal programs in New Hampshire and Maine on two mapping-related projects. The first project is to develop a comprehensive bathymetry map from Nantucket Shoals to the Canadian border out to 24 NM. The second project, with funding from NOAA, will map the unique geoforms, or habitats, of the seafloor according to the Coastal and Marine Ecological Standard (CMECS) classification system. Future related efforts will add biotic data and habitat descriptions to the geoforms mapping project.

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4) Monitor climate change across Massachusetts ocean waters

Since 2015, CZM has continued to be actively involved in regional efforts to monitor and report on long-term temperature changes and secondary physical effects, such as changes in ocean pH, salinity, and sea level. Additionally, CZM tracks changes in distribution and abundance of sensitive coastal resources through updates to the mapping of sensitive coastal habitats that may be influenced by the physical changes to ocean waters relating to climate change. CZM is a board member of NERACOOS, co-Chaired the Northeast Regional Ocean Council (NROC), and contributed to the Integrated Sentinel Monitoring Network for Ecosystem Change and the Gulf of Maine Council's Ecosystem Indicator Partnership. CZM is also actively involved in efforts to address coastal and ocean acidification. CZM contributes to the Northeast Ocean Acidification Network (NECAN) and is a member of the legislatively convened Massachusetts Ocean Acidification Commission. Policy recommendations from the Ocean Acidification Commission will likely provide resources to support additional monitoring of coastal waters.

5) Identify ecologically important areas

Identifying ecologically important areas is a key component of ecosystem-based management and a primary goal of ocean planning. Since 2015, CZM and its partners have been collecting new information to update the 12 important areas of special, sensitive, or unique marine life and habitats (SSUs) that are the foundation of the ocean plan. CZM

continues to partner with MassDEP and DMF to understand changes in the extent of eelgrass. Partnerships with the New England Aquarium and the Massachusetts Clean Energy Center (MassCEC) support annual surveys for cetaceans such as the federally endangered North Atlantic Right Whale, humpback whale, and fin whale. In addition, CZM served as an advisor to an NROC-funded project to model and produce probability maps for hundreds of species that inhabit the northwestern Atlantic Ocean. These data layers are served through the Northeast Ocean Data Portal and can be viewed for individual species, by classes of species, by total abundance or biomass, and by species richness.

6) Develop data tools and products to improve interpretation and refinement of the Important Fish Resources SSU maps

The existing Important Fish Resource Areas SSU map is generated from the biomass or counts of 20 species and two life stages (juvenile Atlantic cod and black sea bass young-of-year) collected in the DMF spring and fall assessment surveys between 1978 and 2018. The goal of the map is to produce a statewide distribution identifying areas of relatively high biomass that are consistent over time for commercially and recreationally important species. However, one of the limitations of this map is that it may be depicting species biomass from previous decades that is no longer representative. To address this issue, DMF assessed the implications of using a truncated time series that only includes data from the previous 10 years. Additionally, CZM began working with DMF to use an analysis tool that can depict upward or downward trends in biomass or counts in specific regions where repeated trawls have been made. DMF has also been working toward developing maps of classes of key species and life stages based on their vulnerability to specific types of ocean development activities (e.g., sand extraction, cable and pipeline installation).

7) Advance work on an effort-corrected sea turtle database and improve resolution of marine bird spatial data

Filling the data gap for sea turtle and marine birds continues to be a priority for CZM, but one that has proven difficult to fill as comprehensive data from directed surveys is limited. As stated above, the Northeast Ocean Data Portal contains probability maps for hundreds of species in the Northeast, including sea turtles and marine birds. While these data are useful for some planning exercises, they cannot be classified in the manner used by CZM to identify SSU areas for ocean planning. CZM has reached out to the MassCEC, NOAA, U.S. Fish and Wildlife Service, New England Aquarium, and Mass Audubon Wellfleet Bay Wildlife Sanctuary for data on sea turtle observations. The data were mapped, but because they are off-survey and opportunistic, sea turtle specialists determined that they should not be used to develop spatial maps for ocean planning purposes. CZM also acquired tracks of tagged sea turtles, but the majority of those data place turtles well outside of the ocean planning area.

8) Develop higher resolution maps and characterization of recreational and commercial fishing

The Northeast Ocean Data Portal used Vessel Monitoring System (VMS) data to characterize multispecies (groundfish) commercial fishing hotspots based on vessel speed in state and federal waters from 2006 through 2016. Although the portal includes data extending to the outer continental shelf, the resulting maps show vessel activity at less than four knots (a speed threshold determined with industry input to highlight fishing areas) in parts of the ocean planning area. In the case of recreational fishing, data in the 2015 ocean plan were based on a survey of 25 recreational fishermen within areas that were considered hotspots for this recreational fishing activity. Recognizing the limitations of these data, DMF explored the possibility of integrating questions on spatial data of recreational fishing in the NOAA recreational fishing survey. However, this effort was placed on hold until an alternative method was developed by DMF. DRAFT

9) Revise and update the state inventory of submerged wrecks

The Board of Underwater Archeological Resources (BUAR) maintains files documenting shipwrecks, aircraft, and other possible sunken historic properties. This inventory includes more than 3,600 possible shipwreck sites in ocean waters off Massachusetts and serves as the resource for these important cultural resources. Up until recently, these files were only available in paper format. Since the 2015 ocean plan, BUAR has been collaborating with the Geography Department at Salem State University to convert these site files into a searchable geo-referenced access database. When complete, the state inventory of submerged wrecks database will provide an inventory of reliable site locations with associated attribute information that will inform project review, permitting, and protection of these sensitive and unique resources.

10) Develop a paleo-landscape and predictive model of ancient Native American land use

The development of a paleolandscape model and subsequent archaeological sensitivity maps of the seabed is an initial step for determining the potential presence and preservation of ancient Native American archaeological sites on these now submerged lands. While early paleolandscape and predictive models relied heavily on applying sea level rise data to bottom contours to estimate where and when areas of the seafloor had been exposed land available for human occupation with potential for containing archaeological sites, these models failed to account for the effects that coastal processes, sea level rise, and local erosion/accretion have on determining where and what parts of the paleolandscape are preserved. The collection and analysis of sub-bottom profiling data and geo-technical sediment cores is required to assess the paleolandscape and the potential for archaeological site presence and preservation. Recent research by the Bureau of Ocean Energy Management (BOEM) and the University of Rhode Island (URI) has led to the

refinement of archaeological survey standards, elements of which were incorporated into BUAR's current survey guidelines. Development of a paleolandscape model and a predictive model of archaeological sensitivity remain a research priority.

11) Refine and implement the monitoring and evaluation framework to improve the review and updating of the ocean plan

The Oceans Act requires the plan to be based on an adaptive management approach. To address this aspect, CZM worked with SeaPlan to develop an approach to gather data on indicators that will provide information on progress toward plan goals through a survey. The first survey, targeted to members of the OAC and the SAC, was developed in 2014 to gather information as part of the review of the 2009 ocean plan. In keeping with the framework used for the 2015 ocean plan, and as part of the current review of that plan, CZM developed and released a survey in early 2019 to ask for public feedback on the ocean plan and planning process. CZM received 86 (approximately 10%) responses suggesting areas of interest for the ocean plan. Respondents also provided several suggestions for new maps and science, increased coordination and collaboration, and enhanced management. (See page 28 for more information on the survey.)

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Technical Work Groups

As part of the ocean plan process, the six technical work groups consisting of technical and scientific experts met to discuss and review the 2015 ocean plan. These work groups include Habitat, Sediment and Geology (formerly Regional Sediment Resource Management), Fisheries, Transportation and Navigation, Cultural Heritage and Recreational Resources (formerly Recreational and Cultural Services), and Energy and Infrastructure. They were tasked with reviewing the management framework, mapped resources, and science and data priorities associated with their work group's expertise. Specifically, the scope of the work group reviews was to: 1) identify changes since 2015 to the special, sensitive, or unique areas or/or water-dependent uses mapped in the ocean plan; 2) identify trends in resources or uses addressed by the ocean plan or that may be addressed in the future; 3) propose new science or data sources that would inform the ocean plan; and 4) review the science and data priorities in the 2015 ocean plan and make recommendations for updated science and data priorities. Recommendations of the technical work group are based on new or additional data, revisions to method of analyses, revision of mapping approach, or a combination of these.

The technical work groups have developed draft reports of their findings. This section presents a synopsis of the work groups' review and includes their recommendations for updates to the science and data underlying the mapped resources in the ocean plan—both SSUs and concentrations of water-dependent uses—as well as potential short- and long-term science and

data priorities to be advanced in the next iteration of the ocean plan through the Science Framework. Work group reports also contain information that will be helpful in evaluating and updating the Baseline Assessment.

Habitat

The Habitat Work Group, comprised of scientists from the National Marine Fisheries Service (NMFS), NOAA, Mass Audubon, U.S. Environmental Protection Agency, MassDEP, DMF, Center of Coastal Studies, and New England Aquarium, identified new and updated spatial data available for marine mammals, birds, turtles, and benthic habitats and reviewed nine of the SSU maps from the 2015 ocean pan. Based on the review of this new data and analysis, the work group identified potential changes to six of the nine SSU maps (see Table 2-1). Sea Duck Core Habitat, Leach's Storm-Petrel Important Nesting Habitat, and Colonial Waterbirds Important Nesting Habitat were not recommended for updates at this time based on lack of new data. The work group recommended that the marine mammal maps should be updated with more current data extending through 2018 from the North Atlantic Right Whale Consortium.

Table 2-1 - Proposed SSU Map Updates from the Habitat Work Group

SSU Resource	Recommended for update?
North Atlantic Right Whale Core Habitat	Yes
Humpback Whale Core Habitat	Yes
Fin Whale Core Habitat	Yes
Roseate Tern Core Habitat	Yes
Special Concern (Arctic, Least, and Common) Tern Core Habitat	Yes
Sea Duck Core Habitat	No
Leach's Storm-Petrel Important Nesting Habitat	No
Colonial Waterbirds Important Nesting Habitat	No
Eelgrass	Yes

Additionally, the Habitat Work Group evaluated the science and data priorities identified in the 2015 ocean plan and suggested updates that should be considered for inclusion in the Science Framework of the next iteration of the plan. The recommendations for the science and data priorities include investigating the feasibility of collecting plankton data to support the development of a predictive model for North Atlantic right whales; continuing surveys to map vulnerable seafloor organisms including

kelp, soft corals, worm reefs, and emergent sponges; and developing and using bathymetric data to inform knowledge of seafloor habitat in Massachusetts waters.

Sediment and Geology

The Sediment and Geology Work Group includes scientists from federal and state agencies as well as academia. The work group reviewed the Hard/Complex Seafloor SSU and its component datasets, as well as data to inform the mapping of potential sites for sand extraction for beach nourishment. Based on the review of recent data and scientific information, including updated data and information from USGS, the work group recommended an update to the Hard/Complex Seafloor SSU (see Table 2-2). The work group also made recommendations to update the surficial geology map and artificial reef information in the plan, as well as refine the data in the map of proposed sand extraction sites for beach nourishment.

Table 2-2 - Proposed SSU Map Updates from the Sediment and Geology Work Group

SSU Resource	Recommended for Update?
Hard/Complex Seafloor	Yes

The following science priorities were also identified for future work to continue generating new data to inform these maps in the next iteration of the plan: gathering information on biogenic reefs (e.g., mussels, oysters, *Crepidula* spp., worms) for potential inclusion in the siting and performance standards of the ocean plan; continuing the collection and interpretation of bathymetry data, backscatter data, and sub-bottom profiling to enhance the Hard/Complex Seafloor SSU; further investigating the development of a regional sediment transport dataset by mapping littoral cells in the ocean planning area; and further advancing the understanding of offshore sand resources relating to biotic and abiotic parameters.

Fisheries

The Fisheries Work Group is made up of fisheries scientists from various federal and state agencies as well as academia. The work group reviewed the Important Fish Resources SSU, as well as industry related water-dependent uses including commercial fishing effort and value and recreational fishing. The work group recommended updates to the Important Fish Resources SSU based on updated DMF survey data, and updates to the High Commercial Fishing Effort and Value water-dependent use map. No updates to the Concentrated Recreational Fishing water-dependent use map were recommended. (See Tables 2-3 and 2-4.) The work group also made recommendations to revisit mapping methodologies for the spatial distribution of specific species for

improved application of siting and management standards. The work group consulted closely with the Recreational Fishing Advisory Committee on the mapping of recreational fishing hotspots and recommended development of an approach to improve collection of spatial data to identify these areas in the future.

Table 2-3 - Proposed SSU Map Updates from the Fisheries Work Group

SSU Resource	Recommended for Update?
Important Fish Resources	Yes

Table 2-4 Proposed Water-Dependent Use Map Updates from the Fisheries Work Group

Water-Dependent Uses	Recommended for Update?
High Commercial Fishing Effort and Value	Yes
Concentrated Recreational Fishing	No

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Recommendations for updates to the Science Framework included the deployment of a survey of recreational fishermen to develop a new recreational fishing water-dependent use map; investigation of an approach to address fish species vulnerabilities to specific allowable uses including sand extraction, pipelines, and cables; investigation of methods to depict vulnerable species that cannot be spatially mapped (surf clams, ocean quahogs, sand lance) with existing data; and reassessment of the commercial fishing effort and value layer.

Transportation and Navigation

The Transportation and Navigation Work Group is comprised of federal, state, and industry representatives. The work group reviewed the water-dependent use data sets included in the ocean plan related to the industry, and reviewed all five areas of concentrated water-dependent use maps: High Commercial Fishing Effort and Value, Concentrated Recreational Fishing, Concentrated Commerce Traffic, Concentrated Commercial Fishing Traffic, and Concentrated Recreational Boating. The work group recommended updates to two of five areas of concentrated water-dependent use maps based on updated data: Concentrated Commerce Traffic and Concentrated Commercial Fishing Traffic. (See Table 2-5 for the recommendations.)

Table 2-5 - Proposed Water-Dependent Use Map Updates from the Transportation and Navigation Work Group

Water-Dependent Uses	Recommended for Update?
High Commercial Fishing Effort and Value	Reviewed by Fisheries work group
Concentrated Recreational Fishing	Reviewed by Fisheries work group
Concentrated Commerce Traffic	Yes
Concentrated Commercial Fishing Traffic	Yes
Concentrated Recreational Boating	No

The Transportation and Navigation Work Group also reviewed the resources contained in the Baseline Assessment. Recommendations for the next iteration of the ocean plan include updating the transportation and navigation uses with new data including anchorage areas and berths, precautionary areas, separation zones, traffic lanes, ferry routes, and pilot boarding areas. The work group recommended recategorizing Automatic Identification System (AIS) data by vessel classification with separate maps for the different classes: commerce vessel density, cargo vessel density, fishing vessel density (new), tug and tow vessel density, passenger vessel density, tanker vessel density, and passenger pleasure vessel density (new). The work group also made preliminary recommendations for the Science Framework in the next iteration of the ocean plan, including investigating more robust methodologies for understanding, tracking, and predicting trends in vessel traffic over time.

Cultural Heritage and Recreational Uses

The Cultural Heritage and Recreational Uses Work Group includes representatives from the scientific, tribal, archaeology, and recreational industry communities. The work group reviewed the shipwreck dataset that is currently included in the Hard/Complex Seafloor SSU, as well as the data and maps related to specific recreational activities including boating. Included in the scope for the Cultural Heritage and Recreational Uses Work Group review were data from the 2015 ocean plan relative to recreational uses and cultural resources that are not mapped as SSUs or water-dependent uses, but which are an important part of the Commonwealth's coastal and ocean areas, such as cultural landscapes, recreational shipwreck sites, coastal access points, beaches, scenic landscapes, and historic places within the coastal zone.

Based on the review of recent data and scientific information, the Cultural Heritage and Recreational Uses Work Group do not recommend changes to the extent or

methodology for mapping shipwrecks within the Hard/Complex Seafloor SSU or changes to the Concentrated Recreational Boating water-dependent use map at this time (which concurs with the recommendation of the Transportation and Navigation Work Group; see Table 2-5). The Cultural Heritage and Recreational Uses Work Group suggested updates to other mapped areas included in the Baseline Assessment, such as marinas, beaches, whale watching hotspots, recreational diving, and land use/land cover with updated information. The work group highlighted the need to investigate methodologies using coastal erosion data and cultural sensitivity mapping that would inform the understanding of submerged paleocultural landscapes and culturally sensitive areas along the coast. Additional science and data priorities from the work group included efforts to update recreational boating information and mooring fields data, coordination with Massachusetts tribes to understand traditional tribal rights of way, coordination with the Northeast Ocean Data Portal to map whale watching activity, and surveys of the recreational diving community to better understand diving hotspots.

Energy and Infrastructure

The scope of the Energy and Infrastructure Work Group did not include sensitive resources or uses that are protected in the framework of the ocean plan, and therefore the work group does not suggest changes to the extent of mapped SSUs or concentrations of water-dependent uses. However, the group recommends that the next iteration of the ocean plan discusses trends in the energy industry, specifically as they relate to ocean activities such as offshore wind and the required onshore cable connections. These trends should inform the evaluation of the management framework of the ocean plan. Further, since development of tidal energy and nearshore community offshore wind are not an immediate priority at this time, this should be reflected in the management framework of the plan. Recommendations for updates to the Science Framework include the need to continue to characterize and refine habitat and resource data within and adjacent to the ocean planning area to support potential siting of offshore energy projects and associated infrastructure, including potential investigations within the Gulf of Maine.

Ocean Plan Survey

In early 2019, CZM sent a 16-question survey to the OAC, SAC, and interested public to gather feedback on the 2015 ocean plan and its implementation to inform the next plan update. Of the almost 900 people who received the survey, 86 responded (about 10%). Survey respondents included those with varying degrees of familiarity with the ocean plan but 79% were either very familiar or somewhat familiar with the ocean plan.

Although most respondents indicated that there were no sensitive areas lacking adequate consideration within the ocean plan framework, a few suggestions were provided. The top three ocean uses not currently addressed by the ocean plan noted by respondents were offshore aquaculture, oil and gas exploration, and artificial reefs. The three areas within the scope and geographic boundary of the ocean planning area that respondents thought needed additional protection were white shark habitat, cultural sites, and aquaculture/shellfish areas. Water-dependent uses not currently covered under the ocean plan noted by respondents were offshore aquaculture and commercial and recreational intertidal shellfishing sites. New geospatial data that respondents thought should be generated and used in ocean planning were the locations of aquaculture leases, fisheries management areas, lobster and crab fleet fishing, sand deposition, and cultural sites. There was also interest in completing seafloor mapping across all of Massachusetts coastal waters. Areas of research that respondents thought should be science priorities included: shellfish propagation/restoration, monitoring for contaminants of emerging concern, ocean acidification, medicinal uses of ocean products, and the impacts of sand extraction.

The results of the ocean plan survey were used to inform the review by the technical work groups of specific topic areas relevant to the plan.

Input from the Ocean Planning Advisory Groups

The Ocean Science Advisory Council (SAC) and Ocean Advisory Commission (OAC) provide expert opinion and advice throughout the ocean plan development and review process. The SAC, consisting of nine experts in marine science, policy, and data management, supported the review of the ocean plan by providing scientific and technical expertise, specifically focusing on the draft recommendations from the technical work groups, Baseline Assessment, and identifying trends in ocean resources or uses. Technical work group findings and proposed recommendations were presented to the SAC during two intensive meetings, and SAC members provided expert feedback and added valuable insight to the draft recommendations from the groups. The SAC also helped refine the data and methods used to develop the proposed mapping of critical resources and concentrations of water dependent uses that may affect management decisions.

The 17 members of the OAC represent stakeholders as well as coastal communities in Massachusetts. The draft review document was presented to a joint meeting of the OAC and SAC in September 2020. At this meeting, the OAC and SAC provided feedback, advice, and direction on the results of the review process as well as the proposed recommendations for the implementation of the ocean plan over the next five years.

Chapter 3 - Recommendations and Next Steps

This chapter makes recommendations for implementation of the Massachusetts Ocean Management Plan in the next five years. These recommendations draw from information and evaluations provided by the technical work groups, insight from the Ocean Advisory Commission (OAC) and Ocean Science Advisory Council (SAC), and public input received during the public meeting and public comment period. These recommendations are broken into five distinct topic areas but as a whole form the basis of a scope for the implementation of the ocean plan in the next five years. They include opportunities to gather and incorporate more current and refined data, review components of the management framework, improve plan administration, continue engagement with key stakeholders, and continue to coordinate with regional ocean planning efforts in neighboring states to leverage resources that will further the important work of ocean planning. This chapter also presents the overall recommendation of this review document to proceed with an ocean plan amendment to best update the 2015 ocean plan and presents the process for completing that process.

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Data and Science

The ocean plan is based on the principles of adaptive management informed by the best available information. A top priority for the ocean plan has always been to identify and address gaps in data and science, and the next iteration of the ocean plan will continue to highlight the development of current and relevant data and science as a top priority. Accurate and scientifically robust data are critical for applying the management framework of the ocean plan to protect critical marine resources and uses.

Significant progress was made in the last five years toward characterizing the Commonwealth's marine environment. The technical work groups examined these data to provide recommendations regarding how best to incorporate the data into the ocean plan framework, specifically considering the mapping of resources and uses protected through the ocean plan. Based on this review, six of the twelve special, sensitive, or unique marine life and habitats (SSU) resource maps and three of the five maps depicting concentrated water-dependent uses are recommended for revision in the next iteration of the ocean plan. These maps include the SSU's for North Atlantic Right Whale Core Habitat, Humpback Whale Core Habitat, Fin Whale Core Habitat, Roseate Tern Core Habitat, Special Concern (Artic, Least, Common) Tern Core Habitat, Hard/Complex Seafloor, Eelgrass, and Important Fish Resources, as well as the water-dependent use maps for High Commercial Fishing Effort and Value, Concentrated Commerce Traffic, and Concentrated Commercial Fishing Traffic.

An additional data and science recommendation applies to the Baseline Assessment. With the next iteration of the ocean plan, the scope of the Baseline Assessment will be evaluated to ensure that information collected and reported is integral to ocean planning efforts. Although the scope of the Baseline Assessment may be reassessed, the purpose of the Baseline Assessment will remain the same—to continue to track trends in specific resources, habitats, and uses as they apply to the framework of the ocean plan and serve as a resource for stakeholders.

Management Framework

The management framework of the ocean plan includes both the delineation of the three management areas within the ocean planning area as well as siting and performance standards for allowed activities. Management areas include Prohibited, Multi-Use and Wind Energy areas. Allowed activities include renewable energy (wind, wave, and tidal), sand for beach nourishment and shore protection, and cables and pipelines. Because activities have different potential impacts on SSU resources and concentrations of water-dependent uses, the siting standards vary for each activity. With the continued implementation of the ocean plan and the permitting and review of additional projects within the ocean planning area since 2015, more is known about the sensitivity of resources and uses to ocean development activities as well as potential impacts of proposed activities. The next iteration of the ocean plan will evaluate the delineation of the existing management areas and the siting and performance standards to ensure they continue to reflect current understanding of conflicts between sensitive resources and uses and the allowed ocean development activities. The next iteration of the plan will continue to evaluate the development of siting and performance standards for aquaculture and offshore sand extraction for beach nourishment.

Plan Administration

The administration of the ocean plan relies heavily on interagency coordination to apply the ocean plan framework to proposed projects as well as to ensure the enforceable aspects of the plan are codified and updated in relevant regulation and policy. As discussed earlier in this document and as reflected in stakeholder input, interagency coordination continues to be critical to the effective implementation of the ocean plan framework in the review of proposed projects. Also, in the last five years, changes to the Massachusetts Ocean Management Plan regulations and Ocean Sanctuaries Act regulations, as well as the development of an Ocean Development Mitigation Fee schedule, ensured trends in ocean development were reflected in the administrative aspects of the ocean plan.

Recommendations for the next steps in plan administration are based on stakeholder and public input received through the ocean plan review process. The technical work groups recommended updates to the management framework, where new science and data may inform the performance standards of the ocean plan relating to specific ocean uses such as aquaculture and offshore sand extraction for beach nourishment. Incorporation of either of these ocean activities into the management framework would require significant interagency collaboration, policy development, review, and approval. Additionally, as with the previous ocean plan review, there continues to be interest in assessing the boundaries of the ocean planning area in relation to more nearshore areas. Changes to the ocean planning area boundary could not occur through the ocean planning update and review process but would require legislative action.

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Coordination with Regional and Adjacent State Ocean Planning Efforts

Coordination between the Commonwealth's ocean planning activities and those of the region continues to be critical. And as discussed, data development and advances in science and research will continue to be a priority in the next iteration of the ocean plan. The facilitation of data development that is relevant across state boundaries serves as an opportunity to share resources and expertise and strengthen partnerships. Since the previous ocean plan review, the Northeast Regional Ocean Plan was released in December 2016. This regional ocean plan provides a multi-state vision for managing shared ocean resources from Maine to New Jersey. Where the regional and state plans share goals and objectives, coordination to implement shared visions through the development of science and data, the sharing of data through the Northeast Ocean Data Portal and MORIS, collaborating on information exchange, and stakeholder education will be a continued priority.

Stakeholder Engagement

Starting with the first ocean plan in 2009, and continuing through the implementation of the 2015 ocean plan, stakeholder involvement has been a critical component of the ocean plan development and implementation, including public meetings, public comment periods, an online survey, OAC and SAC meetings, and technical work group meetings. A continued commitment to this level of engagement is a fundamental priority for the next steps in ocean plan implementation. As the ocean plan progresses, there will be significant opportunities for public engagement including ocean plan website updates, the CZM e-newsletter (CZ-Mail), public comments, public meetings, and social media.

Next Steps

A central component and necessary outcome of the ocean plan review process is a recommendation on whether to proceed with an ocean plan update or an ocean plan amendment. As previously noted, ocean plan updates are considered minor revisions relating to underlying geospatial data, clarifications to the management framework, or minor shifts in management area boundaries. Ocean plan amendments allow for more significant changes that may include the creation or removal of management areas; the creation, removal, or major shift in the spatial extent of SSUs or water-dependent uses; or the development of new management standards. The recommendation of the ocean plan review process as reflected in this document is to proceed with an amendment to the 2015 Ocean Plan. An amendment will ensure the ocean plan continues to be an effective and robust management tool for the Commonwealth's coastal waters in the next five years. This over-arching recommendation is based on the recommendations of the OAC and SAC and the technical work groups to incorporate new data into many of the mapped SSU's and concentrations of water-dependent uses, to reevaluate the management framework, and to reassess the scope of the Baseline Assessment.

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Upon completion of the review of the 2015 ocean plan, CZM—with support from the OAC, SAC, and technical work groups—will undertake the development of a draft Ocean Management Plan amendment. The development of this draft amendment will consider the recommendations from this document and comments received through public review. CZM will host public meetings to provide information, answer questions, and solicit feedback on the draft amendment. If possible, these meetings will be held in person in each of the five CZM regions. Informational meetings with other interested groups and stakeholders will also be offered. Public input received from public hearings, written comments, and public meetings will be compiled and responsive edits to a new draft ocean plan will be vetted with the OAC and SAC as well as state agencies. The last step in the ocean plan review and update/amendment process will be the promulgation of the next iteration of the ocean plan.