

Chapter 3 - Planning Process

The Massachusetts Ocean Management Plan was informed by extensive expert support and public input at all stages of plan development and is based on the best available scientific data and information. This chapter describes the process for developing the plan, beginning with the management framework options reviewed and followed by an overview of the framework selected. It then presents the goals, findings, and outcomes of the plan. Finally, the potential uses in the planning area, a compatibility assessment of the uses, and the management options selected are all presented.

Management Framework Options

As a first step in the development of the ocean management plan, the Executive Office of Energy and Environmental Affairs (EEA) reviewed planning efforts conducted elsewhere to identify potential frameworks for how to approach the management of ocean resources. The following four aspects of a management framework were considered.

Organizational/Institutional Structure

A networked approach and the development of a centralized, single authority were the two main options examined for an institutional structure for the Massachusetts Ocean Management Plan. With a centralized single authority, all or most aspects of planning and plan implementation are the responsibility of a single entity or agency. Networked approaches, which typically rely upon a central plan development entity with plan implementation carried out through associated regulatory agencies or programs, are generally more similar to the current Massachusetts setting. Specifically, as required by the Oceans Act, EEA has primary responsibility for development of the ocean management plan, with implementation conducted by existing agency regulatory programs.

Inter-Jurisdictional Coordination

Three approaches to coordinating across governmental levels were examined: using existing Massachusetts Office of Coastal Zone Management (CZM) program authorities; developing a Special Area Management Plan pursuant to the federal Coastal Zone Management Act (16 U.S.C. §1453); or developing a programmatic general permit. The use of existing coordination mechanisms through the networked Coastal Zone Management Program in Massachusetts would include the use federal consistency, wherein CZM works with federal agencies to ensure that federal decisions are consistent to the maximum extent practicable with state policy. CZM

also coordinates with other state agencies and at the local level through local administration of state regulatory programs (e.g., Conservation Commission implementation of the state Wetlands Protection Act). The second approach was to develop a Special Area Management Plan (SAMP), which is defined in the federal Coastal Zone Management Act as "...a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth ..." (16 U.S.C. §1453. Definitions (Section 304)). Such plans contain policy statements, standards regarding uses of the planning area (typically a specific, localized area), and implementation mechanisms. The third option was to develop a Programmatic General Permit (PGP), which is a type of general permit, issued by the U.S. Army Corps of Engineers and other agencies, that is intended to avoid unnecessary duplication of regulatory programs. In Massachusetts, the Corps has an existing PGP for activities pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbor Act of 1899.

Public/Stakeholder Involvement

Several options were considered for stakeholder involvement in plan implementation/revision, including continuing the Ocean Advisory Commission, establishing different stakeholder groups (either statewide or at a regional level), or relying on public participation opportunities in existing processes.

Management Approach

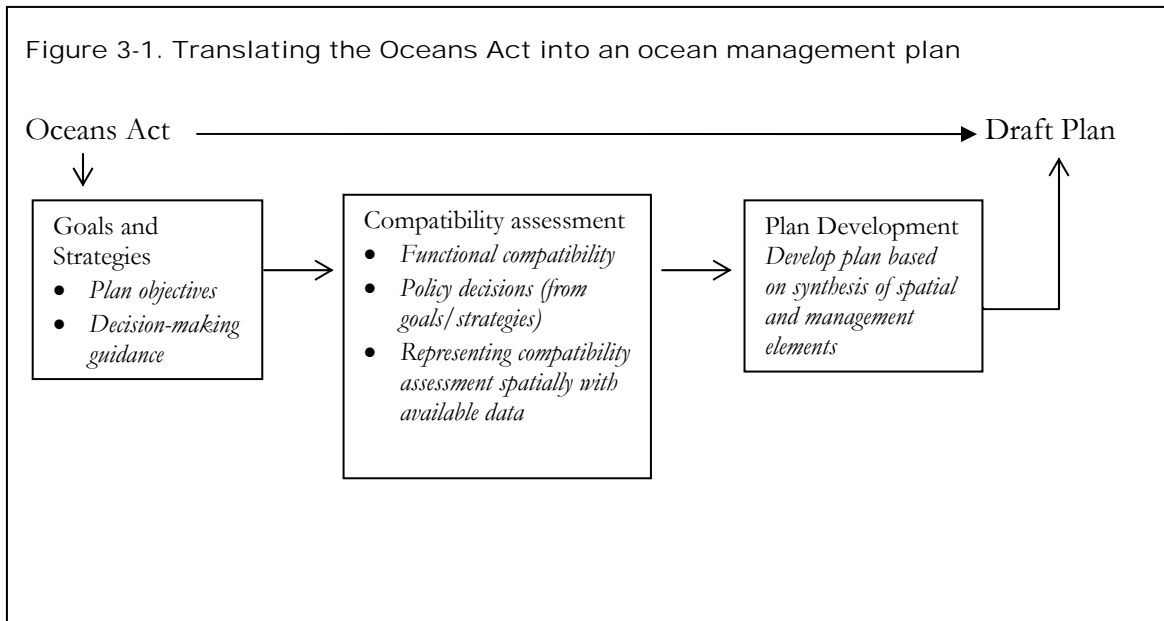
The management approaches considered for the Massachusetts Ocean Management Plan included: marine spatial planning (see Chapter 2 for an overview of this discipline) and the use of siting priorities/performance standards. Through marine spatial planning, areas can be designated to promote, conditionally approve, or prohibit specific uses; such areas can be designated regionally; and/or particular areas suitable for the uses allowed pursuant to the Ocean Sanctuaries Act can be identified. The siting priorities/performance standards option presents a less spatially explicit approach to development of the ocean management plan. Instead, siting priorities provide general statements of policy for certain uses. The performance standards are applied during the review of specific development projects.

This analysis of options provided key insight in the beginning stages of the development of the ocean management plan and direction to the development of the plan's spatial components and management measures. First, the plan acknowledges the existing, networked approach to managing and regulating ocean uses and resources in Massachusetts and uses this networking approach as a coordinating mechanism (see Chapter 4 for additional details regarding the management approach). Second, the plan also is essentially a

SAMP, a designation which will be explored in additional detail with federal agencies. As will be discussed in Chapter 5, continued stakeholder involvement will be an important component of plan implementation. Finally, as discussed in greater detail in the remainder of this chapter and in Chapter 4, the ocean management plan included a hybrid approach to developing management measures, combining aspects of marine spatial planning but also developing performance standards.

Framework for the Ocean Management Plan

The basic purpose of the ocean management plan is to translate the policy direction and specific requirements of the Oceans Act into a management plan through a logical, sequential process of developing decision-making guidance for use in analyzing existing data (Figure 3-1). The plan was developed by a sequential process that entailed: 1) evaluating the Oceans Act and developing goals and strategies to identify key issues to be addressed based on values expressed therein; 2) assessing the compatibility and impacts of uses, activities, and facilities allowed under the Ocean Sanctuaries Act with marine resources and other uses; 3) applying the strategies as initial planning guidance to identify appropriate and inappropriate locations for specific uses, activities, and facilities; 4) correlating the planning guidance with spatial data and generating maps that illustrate impacts associated with uses of marine resources; 5) evaluating options for managing uses; and 6) developing an ocean management plan that best accomplishes the management plan goals described above.



The overall approach to developing the ocean management plan was therefore framed by the 15 core requirements (known as the Oceans 15) and other substantive and procedural elements of the Oceans Act, including the independent status of commercial and recreational fishing, the requirement that the plan be revised no less frequently than every five years, and the consultative roles of the Ocean Advisory Commission and Science Advisory Council. Important additional considerations included:

- Vested public interest in the development of the draft plan;
- The amount of data and information either immediately available or able to be acquired within the schedule for the draft plan;
- Principles and practices of marine spatial planning and ecosystem-based management;
- Existing law and policy; and
- The degree of change in current management practices necessary to address current challenges, justifiable by available information, and reasonable as a first response to the Ocean Act's comprehensive expression of the public trust doctrine.

To begin developing the ocean management plan and understanding the requirements of the Oceans Act, the 15 requirements of the Oceans Act were organized in generally common themes as illustrated in Table 3-1.

This organization by general theme was further refined by addressing the questions: What central principles does the Oceans Act establish? What are the most specific, important things that the Act requires the plan to do? How can the plan best accomplish those things in the context of the other important considerations described above? To respond to these questions, the following subjects were reviewed: the Oceans Act requirements, the current state of knowledge of the marine environment and its uses, consideration of the preferred management approach (discussed above), and public and stakeholder comment including input from the Ocean Advisory Commission.

This review led to the development of the following framework for the ocean management plan: specific **goals** describe what the ocean plan should achieve; **findings** summarize conditions, issues, and desired future conditions associated with the goals; **strategies** describe the information and process needed to achieve the goals; and **outcomes** define the final product that achieves the goal.

Table 3-1. Categorized Oceans Act requirements

Governance and Management
Set forth the Commonwealth’s goals, siting priorities and standards for ensuring effective stewardship of its ocean waters held in trust for the benefit of the public
Coordinate uses that include international, federal, state, and local jurisdictions
Adhere to sound management practices, taking into account the existing natural, social, cultural, historic, and economic characteristics of the planning areas
Adapt to evolving knowledge and understanding of the ocean environment
Facilitate public participation in decision-making
Preserve and protect the public trust
Natural Ecosystems
Value biodiversity and ecosystem health
Respect the interdependence of ecosystems
Address climate change and sea-level rise
Identify and protect special, sensitive, or unique estuarine and marine life and habitats
Human Uses
Identify appropriate locations and performance standards for activities, uses, and facilities allowed in Ocean Sanctuaries
Foster sustainable uses that capitalize on economic opportunity without significant detriment to the ecology or natural beauty of the ocean
Support the infrastructure necessary to sustain the economy and quality of life for the citizens of the Commonwealth
Reflect the importance of the waters of the Commonwealth to its citizens who derive livelihoods and recreational benefits from fishing
Preserve and enhance public access

The Oceans Act requirements, particularly the Oceans 15, include directives that are specific (“identify and protect special, sensitive and unique areas”) and more general (“respect the interdependence of ecosystems”). The ocean management plan must be responsive to these 15 requirements and, in doing so, must organize and focus these requirements in a manner that acknowledges their varying specificity. Thus, some of the Act’s 15 requirements are reflected in the goals, some as elements of strategies, and some as outcomes. Importantly, the goals, strategies, and outcomes also reflect the constraints imposed by the deadlines established by the Act. Within such constraints, the three broad goals, with four related and specific outcomes, are responsive to all 15 requirements and significantly advance the ocean management “state of the art.”

The strategies of the Massachusetts Ocean Management Plan describe the information and process needed in response to a particular goal to achieve a desired outcome. Certain strategies relate to how various non-spatial elements of the plan will be achieved, such as the implementation of an adaptive framework of the ocean management plan in the future.

Other strategies include “decision guidance,” which helps guide how planning decisions will be made regarding the spatial component of the plan (i.e., location of management areas). As with the goals, development of the strategies incorporated consideration of public comment, level of understanding of the marine environment, and a review of the Ocean Act requirements. Table 3-2 provides an example of how a particular strategy reflects a requirement of the Oceans Act. Strategies for each of the goals are presented in Appendix 1, and the goals, findings, and outcomes are described below.

Goals, Findings, and Outcomes

The four goals established in the ocean management plan are: 1) integrated ocean management; 2) good stewardship - protection of the marine ecosystem; 3) good stewardship - human use of the marine ecosystem, and 4) an adaptive foundation for ocean management in the future. These goals reflect the highest priority, basic elements needed to be responsive to the Act and provide the basis for ongoing work. For each of the goals, there is an accompanying outcome for the ocean management plan to achieve.

Findings provide summary characterizations of conditions, issues, and desired future conditions associated with each of the goals and also provide a general rationale for the selection of particular strategies. Findings are based on the understanding of the ocean ecosystem, human uses and natural resources in the marine environment, stakeholder comment, and the Ocean Act requirements and other existing laws, policies, and regulations regarding ocean resources and uses.

Table 3-2. Example of Oceans Act requirements reflected in a strategy.

Oceans Act requirement	Strategy	Rationale
Reflect the importance of the waters of the Commonwealth to its citizens who derive livelihoods and recreational benefits from fishing.	Minimize conflicts with commercial fishing by siting development areas outside areas of significant fishing effort and value; minimize conflict with recreational fishing by development outside areas of concentrated recreational fishing activity.	Avoiding areas important to existing uses will avoid impacts associated with new uses.

Each of the outcomes represents a concrete product. Three of the four outcomes reflect the three requirements for tangible products in the Oceans Act: develop an integrated management plan; identify and protect special, sensitive, or unique areas or marine and estuarine life and habitats; and identify appropriate areas for uses in Ocean Sanctuaries. The fourth outcome recognizes that much more data and information is needed to address all of the issues identified through the planning process.

Goal #1: Integrated Management

The first goal of the ocean management plan is:

The ocean management plan should facilitate careful and responsible management that balances and protects the interests of the marine ecosystem, including its natural, social, cultural, historic, and economic components.

The outcome for this goal is an integrated ocean management plan that:

- Is responsive to the Oceans Act.
- Is implemented in coordination across jurisdictional levels.
- Achieves balance through the designation of areas for uses and activities allowed pursuant to the Oceans Sanctuaries Act and in the planning area.

The findings for this goal are:

- Governmental decision-making regarding ocean resources and uses historically has occurred in a single-project or single-resource manner. This has led to important components of the ocean not being considered in certain decisions, resulting in undesirable impacts to oceans resources and uses. An integrated approach to planning and management would help remedy this.
- Recent national and Massachusetts reports on the state of ocean resources and uses have concluded that an integrated approach to ocean management is necessary to ensure continued health of ocean resources and balance of uses. An integrated approach to management is also a component of ecosystem-based management and marine spatial planning.
- The Commonwealth has several existing laws and regulations related to ocean resources and uses, including but not limited to the Massachusetts Environmental Protection Act, the Ocean Sanctuaries Act, Wetlands Protection Act, the Waterways Licensing Program (Chapter 91), Massachusetts Endangered Species Act, and the federal consistency function of the Office of Coastal Zone Management.
- Laws, plans, and regulations related to ocean resources and uses exist at the federal, state, regional, and local levels. Integration across these governmental levels is desirable from a governance standpoint.
- Public comment from stakeholders, the Ocean Advisory Commission, and the Science Advisory Council expressed a desire for an integrated approach

to ocean management across levels of government that considers simultaneously existing ocean resources and uses in developing the ocean management plan.

Implementing this goal will enable the ocean management plan to be responsive to the Oceans Act by:

- Setting forth the Commonwealth's goals, siting priorities, and standards for human uses allowed pursuant to the Ocean Sanctuaries Act and for the protection of special, sensitive, or unique areas of marine and estuarine life and habitat.
- Considering the existing natural, social, cultural, historic, and economic characteristics of the planning areas in development of the ocean management plan.
- Coordinating uses that include international, federal, state, and local jurisdictions.
- Encouraging public participation in decision-making, both through the development of the draft ocean management plan and by ensuring a process for public participation in the future.

Goal #2: Effective Stewardship - protection of the marine ecosystem

The second goal of the ocean management plan is:

The ocean management plan should facilitate careful and responsible management that recognizes and protects the interests of the marine ecosystem, including biodiversity, ecosystem health, and the interdependence of ecosystems.

The outcome for this goal is that special, sensitive, unique areas are identified and protected based on the first generation of an ecosystem-based management approach (see Chapter 4 for details).

The findings for this goal are:

- Massachusetts waters are highly productive, include areas that are important to the survival of marine organisms, and support populations of various species that rare and/or of global and regional significance.

- Existing science, monitoring, and survey data indicate that many species of ecological and commercial importance, and the habitats that support such species, are found in Massachusetts waters.
- Under current management practices, potential impacts to natural resources are surveyed on a project- and resource-specific basis, often at level of effort sufficient only to take a “snapshot” of conditions existing at the time of survey, and regulatory decisions are made with an incomplete understanding of the larger temporal and spatial ecological context.
- The ability of resource managers to protect ecological functions and values is limited by an imperfect understanding of both the individual components of the ecosystem and their interrelationships, but tools such as the Ecological Valuation Index help to enhance that understanding.
- Ecosystem-based management requires simultaneous consideration of multiple components of the ocean ecosystem, both when developing a management and regulatory framework and when applying regulations to an individual project. Massachusetts has an existing legal framework with specific regulatory programs that address many aspects of the ocean ecosystem, but there is a need to improve coordination of regulatory programs to enhance protection of the ocean ecosystem. A science-based system of collectively identifying key resources for protection would allow agencies to target their limited resources most effectively when conducting their regulatory function.
- Natural resources in the ocean environment have varying vulnerabilities to specific human uses and activities, as indicated in the compatibility analysis results. Understanding the ramifications of climate change is a necessary first step to developing an appropriate management response.
- Public comment and discussion with the Ocean Advisory Commission and Ocean Science Advisory Council focused extensively on the ecological importance of Massachusetts waters, and the need to protect those areas and resources of particular importance.

Implementing this goal will enable the ocean management plan to be responsive to the Oceans Act by:

- Incorporating existing scientific data to identify and protect special, sensitive, or unique areas of marine and estuarine life and habitats.
- Valuing biodiversity and ecosystem health and respecting the interdependence of ecosystems in developing the management approach and specific management measures.

- Developing a compatibility assessment that considers the requirements of the Oceans Act and the intrinsic nature of various ocean resources
- Recognizing the current state of knowledge of the ocean ecosystem, including the limitations of existing information, in developing the plan's management measures.

Goal #3: Effective Stewardship - human use of the marine ecosystem

The third goal of the ocean management plan is:

The ocean management plan should facilitate careful and responsible management that supports the wise use of marine resources, including renewable energy, sustainable uses, and infrastructure necessary to sustain the economy and quality of life.

The outcome of this goal is the identification of use areas and the promulgation of enforceable management measures such that:

- Locations and performance measures for allowable uses and infrastructure are identified.
- Renewable energy development is of appropriate scale.
- Conflicts with/impacts to existing uses and resources are minimized.
- Measures for reconciling use conflicts with fisheries are developed.
- Permitting is streamlined.

The findings for this goal are:

- Massachusetts waters support an important component of the Commonwealth's economy, including traditional uses such as commercial fishing, recreational uses, commerce, and the movement of goods.
- Emerging technology, particularly related to renewable energy (primarily wind power, but also tidal and wave energy technologies) presents Massachusetts with an opportunity to develop sustainable industry that will enhance the Massachusetts economy.
- Climate change predictions are resulting in an increasingly urgent need to develop and implement new, cleaner ways of producing energy to reduce carbon emissions.
- The wind resource in the ocean planning area provides an important opportunity to help the Commonwealth meet its renewable energy goals, provided wind energy projects are appropriately located.

- Smaller-scale, community wind energy projects present different potential for conflict with existing uses and natural resources, compared to commercial-scale wind energy projects.
- Implications of climate change, such as sea level rise, will increase the pressure to extract marine sediments for beach nourishment purposes.
- Public comment, including discussion with the Ocean Advisory Commission and the Science Advisory Council, during the development of the ocean management plan cited the importance of addressing climate change issues, allowing for the continuation for traditional uses in Massachusetts, such as commercial fishing, and reducing the potential for conflict between uses.

Implementing this goal will enable the ocean management plan to be responsive to the Oceans Act by:

- Developing siting criteria and performance standards that minimize conflicts between traditional uses of ocean resources and new uses.
- Developing siting criteria and performance standards that minimize conflicts between allowable uses and natural resources.
- Developing siting standards for renewable energy projects, including standards for ensuring that such projects are appropriately scaled.
- Developing performance standards and siting criteria for other uses allowed pursuant to the Ocean Sanctuaries Act.
- Recognizing the current state of knowledge of the ocean ecosystem, including the limitations of existing information, in developing the plan's management measures.
- Preserving opportunities for public access to ocean resources.
- In development of use criteria and performance standards, recognizing and providing opportunities for sustainable uses of ocean resources.

Goal #4: Adaptive Framework

The fourth goal of the ocean management plan is:

The ocean management plan should incorporate new scientific knowledge as the basis for management that adapts over time to address changing social, technological, and environmental conditions.

The outcome of this goal is an adaptive framework for the ocean management plan that:

- Establishes the plan as a key driver of future, ocean-related scientific research.
- Provides a basis for sound ocean policy, management, and science in the future.
- Results in science and research in response to identified management and policy issues and continues to engage stakeholders in future plan iterations.
- Provides a foundation to communicate scientific information to the public.

The findings for this goal are:

- Extensive scientific study has been conducted on Massachusetts waters, life, and habitats, and there is a recognized need for additional study to enhance our understanding of the ocean ecosystem.
- Increasing understanding of the ocean ecosystem—and applying such understanding to management—requires a multi-disciplinary approach to scientific advancement and management through study of the ocean’s physical, biological, chemical, and ecological processes and systems. Equally important from a management perspective is the need to be able to quantitatively address the socio-economic impact and importance of human uses of ocean resources.
- The first version of the plan cannot address all the issues identified during plan development; much more data and information are needed. An important piece of the first plan is the outline for ongoing work and identification of priority data needs.
- Discussion with the Ocean Science Advisory Council and the Ocean Advisory Commission, as well as public comment, indicated the importance of ensuring that the ocean management plan was developed incorporating the best available science, data, and information.

Implementation of this goal will enable the ocean management plan to be responsive to the Oceans Act by:

- Incorporating a science framework that identifies and prioritizes science and research needs in the future.
- Presenting a framework for ocean management that is science-based and adaptable in the future as new science is developed.

- Describing the process through which scientific advances will be utilized to improve management of ocean resources and uses.

These goals and their associated strategies and findings provide the foundation for the Massachusetts Ocean Management Plan. The next step in developing the plan, as illustrated in Figure 3-1, was to apply the decision-making guidance supplied by the goals and strategies. This step occurred through the development of compatibility assessment and application of this assessment using existing data, as discussed in the next section.

Compatibility Assessment

Uses, activities, and facilities allowed by the Ocean Sanctuaries Act, as described below, were analyzed to determine the degree to which they are incompatible with marine resources and other uses, activities, and facilities based on: 1) functional incompatibility (e.g., two uses that cannot physically occupy the same location); 2) the significance of potential impacts to natural resources that have special status under existing law and policy (e.g., a use that could have significant impacts to a Special Aquatic Site protected by the Clean Water Act); and 3) the significance of potential impact to values expressed in the Oceans Act (e.g., areas of high fishing effort and value). Appendix 2 provides detailed results of the compatibility assessments conducted for pertinent uses. While the compatibility assessments included resources of special status under existing law, they did not include “special, sensitive, or unique marine and estuarine life and habitat” *as represented by a defined class*, pursuant to the Act. The study and definition of these resources occurred in a parallel planning process; these resources are discussed in Chapter 4.

The compatibility assessments were organized to characterize the activity, use, or facility. This was done by first developing an understanding of specific siting or operational requirements, analyzing the nature and duration of likely impacts to resources or uses, and then identifying two levels of planning criteria: 1) resources or uses subject to likely or significant incompatibility or impact; and 2) resources or uses subject to potential incompatibility or impact. An example assessment (a portion of the sand extraction assessment) illustrating its rationale is described in Table 3-3.

Once these planning criteria were defined, they were then correlated with data layers to represent the location and extent of human uses and natural resources. Table 3-4 provides an example of the results of this step, continuing the example provided in Table 3-3.

Table 3-3. Compatibility assessment for extraction of sand and gravel for beach nourishment (simplified for illustrative purposes)

Siting requirements	Typical Impacts	Planning criteria: significant incompatibility	Planning criteria: potential incompatibility or impact
Seafloor areas with sand or gravel with grain-size compatible with beach to be nourished	Disruption and displacement of benthic life and permanent physical alteration of benthic habitat; displacement of existing water-dependent uses during extraction operations	Eelgrass	Areas of concentrated recreational fishing activity

Table 3-4. Example of specific data layers associated with identified planning criteria

Planning criteria	Data layer
Significant incompatibility: Eelgrass	Clean Water Act Section 404 Special Aquatic Site from regulatory data layers
Potential incompatibility: recreational fishing surveys	Division of Marine Fisheries and Mass. Marine Trades Assoc. recreational fishing surveys

The compatibility assessment provided specific guidance that was subject to best professional judgment based on consideration of such factors data availability, data quality, or the need for additional data analysis (e.g., Division of Marine Fisheries spatial data related to areas of high, medium, and low fishing activity by effort and value should be refined by organizing the data by gear type, as mobile and fixed gear are incompatible with different kinds of uses).

Combining the compatibility assessments with representative data layers provided the spatial planning tools to illustrate and analyze the human and natural elements of Massachusetts waters.

Uses and special status resources were then mapped by category of potential incompatibility or impact. These initial maps served two purposes: first, they provided the basis for screening and identification of areas suitable areas for large-scale wind energy development; and second, they provided the basis for considering management and regulatory options to be implemented by the ocean management plan.

Uses in the Ocean Planning Area

General uses in the ocean planning area are governed by the Ocean Sanctuaries Act, as modified by the Oceans Act. Pursuant to the Oceans Act, commercial and recreational fishing are allowable uses, subject to continued oversight provided by the Division of Marine Fisheries (and National Marine Fisheries Service at the federal level, as applicable), and are not the subject of the Massachusetts Ocean Management Plan. The following discussion focused on those uses that would potentially be governed by the plan.

The Ocean Sanctuaries Act, as modified by the Oceans Act, governs uses, activities, and facilities in the majority of the ocean planning area, as described in Table 3-5. Only waters seaward of the Greater Boston coastline are not in an ocean sanctuary. (See Figure 2-1 and note that because the Oceans Act directs the ocean management plan to “identify appropriate locations and performance standards for activities, uses and facilities allowed under [the Ocean Sanctuaries Act]” within the planning area, which does include the waters seaward of Greater Boston, those waters are now subject to management under the plan for uses allowed under the Oceans Sanctuaries Act.)

Table 3-5. Uses, Activities, and Facilities Allowed or Conditionally Allowed in Ocean Sanctuaries*

Electric generating facilities for emergency and temporary use
Renewable energy facilities of appropriate scale
Activities and facilities associated with the generation, transmission, and distribution of electric power
Laying of cables
Operation and maintenance of existing municipal, commercial or industrial facilities and discharges
Municipal wastewater treatment discharges and facilities
Channel and shore protection projects
Sand and gravel extraction for shore protection or beach restoration
Navigation aids
Harvesting and propagation of fish and shellfish
Educational and scientific activities
Projects authorized under Chapter 91 and deemed to be of Public Necessity and Convenience**
Improvements not specifically prohibited by the Oceans Sanctuaries Act

*No uses, activities or facilities other than harvesting fish and shellfish are allowed in the Cape Cod Ocean Sanctuary.

**Recent pipelines for natural gas have been permitted under this provision.

Management Options - Uses

The maps resulting from the compatibility assessment analyses conducted for each category of use, activity, and facility allowed under the Ocean Sanctuaries Act formed the basis for consideration of planning and management options that were reviewed and discussed with the Ocean Advisory Commission. Three general management options were considered:

1. Regulate as now, using ocean data for alternatives analysis and performance standards in permit conditions;
2. Designate specific areas for individual use based on data and compatibility assessment criteria; or
3. Apply a hybrid approach to: 1) designate areas for uses with potentially significant impacts for which EEA has good data; and 2) identify exclusionary areas, defined by resources and uses subject to likely or significant incompatibility or impact, applicable to spatially indeterminate uses or uses for which EEA has limited data.

The management options were evaluated based on their ability to:

- Advance the interests of the Oceans Act;
- Protect the marine environment;
- Avoid and minimize conflict with existing water-dependent uses;
- Provide flexibility for new uses and future changes to management based on an increasing understanding of the marine environment, new technologies, and evolving social values;
- Apply management and regulatory limits that can be substantiated by current data;
- Use and streamline existing law and regulation to allow regulatory decisions appropriate to the scale of potential impact;
- Employ new data and information within an adaptive framework

Each of the management options for uses is discussed below.

Manage and Regulate as Now

This option would represent the status quo, as informed by a significant amount of data new to regulators and the regulated community. Under this option, the Oceans Act would be implemented as guidance for individual agency regulatory actions and would inform actions such as alternatives analyses and the development of performance standards in permit conditions. This approach would advance the effectiveness of the current management and regulatory process by providing both better information and ocean use policy guidance as the basis for good decision-making. This approach would also provide flexibility for future advances and

changes to ocean management that will occur based on new data, technological change, and changing social values, and would minimize the impacts to developing a management approach that is sensitive to constraints imposed by data quality. It would not represent, and would not achieve the organizational benefits of, an integrated plan as directed by the Oceans Act.

Designate Specific Areas for Uses

This option would represent a highly organized approach to managing the location of uses, activities, and facilities, which would be allowed only in designated areas identified by applying the compatibility assessment and associated data as screening criteria. This approach has the potential to significantly increase the protectiveness of the underlying Ocean Sanctuaries Act, in that (assuming the designated areas are limited in scale) no uses, activities, or facilities could be located outside the designated area, the effect would be to prohibit all development. This approach would also facilitate more efficient and coordinated review and permitting by all levels of government by locating uses, activities and facilities in areas that, by definition, have avoided, minimized, and mitigated impacts through the siting process. This would provide a significant benefit to the interests addressed by the Oceans Act, including sustainable uses, renewable energy, and necessary infrastructure. However, this approach is challenging to substantiate with currently available ocean planning data and would provide only limited flexibility to respond to future change based on new data, technological change, and changing social values.

Hybrid of Areas and Performance Standards

This option would blend the benefits and minimize the detriments of the previous approaches. This option would designate areas for uses with potentially significant impacts for which we have good data, and would identify exclusionary areas, defined by resources and uses subject to likely or significant incompatibility or impact, applicable to spatially indeterminate uses or uses for which we have poorer data. The benefits of this approach are that it would allow for the appropriate level of management supported by currently available data, balance protection and use, and preserve, depending on its configuration, significant flexibility for new data, technological change, and changing social values.

All of the management options for uses incorporated spatial data representing the compatibility assessments, from which were derived “exclusionary data” for individual uses, activities, and facilities allowed under the Ocean Sanctuaries Act. Exclusionary data portrayed both functional incompatibilities (where a particular use could not functionally co-exist with an existing use) and incompatibility considerations based upon the Oceans Act

and goals and strategies of the Massachusetts Ocean Management Plan. Under this approach, if a use was not assigned to or prohibited from a specific management area, it could be located anywhere within the planning area where it would not have an impact to significant resources and uses—these significant resources and uses comprised the exclusionary areas.

Additional planning analysis and discussion with the Ocean Advisory Commission determined that, as screening criteria for specific management areas, such an approach is appropriate—but as the basis for management within all of the planning area it would be unnecessarily inflexible in its treatment of human activity. In addition, the exclusionary areas approach was developed on the assumption that special, sensitive, or unique areas of marine and estuarine life and habitat would be designated, based on the output of the Ecological Valuation Index, as discrete areas representing complexes of resources and habitats. Based on the analysis described below, management of individual special, sensitive, or unique species and habitats was determined in consultation with the Science Advisory Council to be the most justifiable approach, given the level of existing data and the current analytic capacity of the ecological valuation process.

As a result of the above considerations, the management option based on a hybrid of designated areas and performance standards was further refined for the ocean management plan. This refinement occurred by developing three management areas.

- A first category of management was developed that designates specific areas where uses, activities, and facilities are prohibited by the Ocean Sanctuaries Act, in acknowledgement of existing law.
- A second category of management area was developed that designates specific areas for commercial wind energy facilities, in recognition of the need to provide opportunity for renewable energy generation at a meaningful scale, but to do so with careful regard for potential environmental impacts.
- A third category of management area designates the majority of the planning area as a multi-use area. Within this area, the uses, activities, and facilities allowed by the Ocean Sanctuaries Act are managed based on siting and performance standards. These standards were in part based on the compatibility assessment, and specific uses were categorized according to their recognition by the Oceans Act. Potential special, sensitive, or unique marine or estuarine resources (described below) were analyzed to determine their vulnerability or incompatibility with specified categories of uses, activities, and facilities allowed under the Ocean Sanctuaries Act.

Based on these analyses, use-specific maps identifying incompatible uses and special, sensitive, and unique resources were developed. To accompany these maps, siting standards and performance standards were assigned to specific uses. In addition to the identification of

special, sensitive, or unique areas (described below), incompatibilities with specific uses were identified for certain categories of uses potentially allowed under the Ocean Sanctuaries Act: commercial fishing, recreational fishing, and areas of direct navigation routes for commerce and commercial fishing (see Chapter 4). The Oceans Act requires consideration of conflicts with such uses, in part because these existing uses contribute to the coastal and ocean economy and could potentially be negatively impacted by new uses in the ocean. These uses, and rationale for their identification, are illustrated in Table 3-6, and the management approach to these uses is described in Chapter 4.

Table 3-6. Uses identified as sources of incompatibility for potential projects.

Use	Rationale
Areas of high commercial fishing activity based on effort and value	Oceans Act requires plan to reflect the importance of the waters of the Commonwealth to its citizens who derive livelihoods and recreational benefits from fishing; Fisheries workgroup identified areas of high commercial fishing activity based on effort and value.
Areas of commerce and commercial fishing traffic	Oceans Act requires plan to preserve and enhance public access and the public trust, including public right to navigation; AIS and VMS data indicate highly used navigation routes for commercial vessels over 299 tons and commercial fishing vessels fishing in federal waters, respectively.
Areas of concentrated recreational fishing	Oceans Act requires plan to reflect the importance of the waters of the Commonwealth to its citizens who derive livelihoods and recreational benefits from fishing. The DMF conducted a coastwide survey to identify areas of concentrated recreational fishing.
Areas of concentrated recreational boating activity	Oceans Act requires plan to preserve and enhance public access and the public trust, including public right to navigation; the Massachusetts Marine Trades Association identified areas of concentrated boating activity through a survey of certain of their members.

Management Options - Special, Sensitive, or Unique Marine and Estuarine Life and Habitat

As the management options for uses were being developed, in a parallel process, options for identifying and protecting special, sensitive, or unique marine and estuarine life and habitats was conducted (as required by the Oceans Act). This exercise looked at two management options:

- Protect specific values and functions by limiting impacts from specific uses (targeted additional protection); OR

- Protect a complex of values that are represented by the limited data available (comprehensive protection).

These management options were evaluated based on their ability to:

- Advance the interests of the Oceans Act;
- Protect the marine environment;
- Provide flexibility for new uses and future changes to management based on an increasing understanding of the marine environment, new technologies, and evolving social values;
- Apply management and regulatory limits that can be substantiated by current data;
- Use and streamline existing law and regulation to allow regulatory decisions appropriate to the scale of potential impact;
- Employ new data and information within an adaptive framework

Each of these management options are discussed below.

Targeted Additional Protection

This option would develop specific protective measures (e.g., performance standards) that are directly related to specific values and functions and would consider impacts of specific uses. This option would in part be reflective of the level of confidence in the data that was available. The benefits of this approach are that specific measures would be developed that would be commensurate with the availability of existing data.

Comprehensive Protection

This option would identify an area or areas in the ocean management plan where available data would indicate a complex of values significant enough to warrant comprehensive protection. This would result in identification of areas wherein uses would be prohibited. Identification of such areas would be limited by the available data.

Ecological Valuation Index

Members of the Habitat and Fisheries Work Groups convened to develop an approach to address the requirements of the Oceans Act to identify and protect special, sensitive, or unique areas by developing the concept, methodology, and data for an ecological valuation index (EVI). The EVI is an attempt to systematically evaluate the ecology of Massachusetts waters using available data. The EVI was

conceived and developed to be responsive to the directives of the Oceans Act, to incorporate existing ecological knowledge and data (qualitative and quantitative, as available and appropriate), and to be scientifically defensible and rigorous in approach. Not all data compiled by the Habitat and Fisheries Work Groups were used in the EVI development. Some data sets were spatially and/or temporarily incomplete and had limitations that precluded their use in this process.

The document *Development of an Ecological Valuation Index in Massachusetts*, provided in Volume 2 of the Massachusetts Ocean Management Plan, gives a detailed overview of the EVI, including its conceptual basis, methodology, and data incorporated. As a brief overview, the EVI begins with a compilation and analysis of existing spatial data regarding species occurring in the ocean planning area. Data for four marine mammal species, five bird species, five crustacean species, eight mollusk species, and 22 fish species were incorporated into the EVI. Individual datasets were then rated according to a standard set of ecological criteria (major contribution to survival/health of population, spatial rarity, and global and regional importance).

In mapping the results of the EVI, the planning area was gridded into 250-meter cells (called quartiles). Figures 3-2a, b, and c illustrate three options for portraying the output of the EVI using this grid. Figure 3-2a¹ illustrates the values for each cell based on the sum of the rankings of the datasets present in each cell; rankings were then broken into quartile intervals. Because there were many more species of fish represented in the EVI, datalayers also were binned by guild (i.e., all fish datalayers were combined to a single “fish” layer; all marine mammal datalayers were combined to a single “marine mammal” layer, etc.). Figure 3-2b illustrates the results so organized, broken into quartile intervals. Figure 3-2c contains the results of this organization broken into intervals of ten.

The intent of the EVI was to develop a scientifically defensible approach for differentiating areas in terms of their ecological value. Such a differentiation would support efforts to identify locations appropriate for particular uses and to designate “special, sensitive, or unique” areas of life and habitat, pursuant to the Oceans Act. Because it was a multi-species approach by design, it was also a step toward incorporating an ecosystem-based perspective into the ocean management plan.

Limitations of the EVI included data availability (data for certain species or guilds are not available) and the spatial resolution of certain data leading to limitations on the conclusions that could be drawn. Additionally, our understanding of ocean habitats

¹ For production purposes, all color figures are placed at the end of the Draft Massachusetts Ocean Management Plan.

and species habitat requirements is continually evolving, as are the related data available to managers.

The development of the EVI provided important information for use in the ocean management plan. The process of developing the EVI also provided important insight into the development of the Science Framework, as outlined in Chapter 5.

Additionally, through the compatibility analysis process and identification of exclusionary criteria (described above), individual species were assessed for their vulnerability to particular uses allowed by the Ocean Sanctuaries Act. Special, sensitive, or unique marine and estuarine resources, indicated in Table 3-7, represent a category of resources determined to be vulnerable or incompatible with specified categories of uses, activities, and facilities allowed by the Ocean Sanctuaries Act (see Chapter 4 for additional details).

Management Approach Summary

For purposes of the Massachusetts Ocean Management Plan, uses were categorized according to their recognition in the Oceans Act and Ocean Sanctuaries Act. Three categories of management areas were developed for these uses: specific areas for commercial wind energy facilities; prohibited areas; and multi-use areas. Through consideration of individual species' vulnerability to impacts resulting from specific uses, special, sensitive, or unique areas of marine and estuarine life and habitats were identified, specific to each use. Siting and performance standards were assigned to specific uses, activities, or facilities and resources, and management maps developed for specific uses, activities, or facilities allowed by the Ocean Sanctuaries Act. Chapter 4 describes these areas and associated siting and performance standards in additional detail.

Table 3-7. Special, sensitive, or unique marine and estuarine life and habitats

Special, sensitive, or unique life or habitat		Rationale
Marine Mammals	North Atlantic Right Whale critical habitat area	North Atlantic Right Whales are state and federally listed endangered species; a significant percentage of the global population relies on areas in planning area as obligate habitat.
	Humpback and Fin Whale important habitat areas	Humpback and Fin Whale are state and federally listed endangered species with important habitat in planning area.
Avifauna	Roseate Tern critical habitat areas	Roseate Terns are state and federally listed endangered species; significant percent of global population relies on parts of planning area as obligate habitat.
	Special concern (Arctic, Least, and Common) tern critical habitat areas	Arctic, Least, and Common Terns are state-listed special concern species and rely on parts of planning area as important habitat.
	Long-tailed Duck important habitat area	Regionally significant populations of Long-Tailed Ducks rely on parts of the planning area as important habitat.
	Leach’s Storm Petrel important nesting habitat areas	Leach’s Storm Petrels are state-listed endangered species; they are pelagic birds with a wide range but only two documented nesting habitat locations in planning area.
	Colonial water birds important nesting habitat areas	A few high concentrations (colonies) of estuarine and marine avifauna in parts of the planning area are important nesting area habitat.
Fish	Important fish resource areas	Areas in the planning area identified as high importance to 22 species considered to be important components of commercial or recreational fisheries.
Abiotic or Biogenic	Areas of hard/complex bottom	Areas with complex benthic habitat structure have greater available surface area for colonization by epiphytic plants and invertebrates and provide significant spawning, foraging, and refuge habitat for fish.
	Eelgrass habitat areas (component of CWA 404 Special Aquatic Site)	Sensitive and highly productive biogenic plant habitat that supports significant spawning, foraging and refuge habitat.
	Intertidal flat habitat areas (component of CWA 404 Special Aquatic Site)	Shallow areas of bays and harbors located between the spring high and low tides; nutrient-rich sediments host large numbers of invertebrates that provide forage habitat for fish, mollusks, crustaceans, and shorebirds.