

Appendix 2 - Compatibility Assessment/ Data Screening

This appendix provides the results of the compatibility assessments performed for each of the following uses: wind energy; tidal and wave energy; sand mining; pipelines; cables; and deep-water, non-tidal aquaculture. Separate compatibility assessments were conducted for these uses because they are potentially allowable pursuant to the Ocean Sanctuaries Act, and because individual uses can be differentiated on the basis of their conflicts with existing uses and natural resources.

As described in Chapter 3, the compatibility assessment was a key step in the development of the Massachusetts Ocean Management Plan because it was a main vehicle for developing a spatial representation of plan goals and strategies. The compatibility assessment itself was not the end of the development of the ocean management plan, since its results informed further discussion internally and with the Ocean Advisory Commission regarding the proper approach to development of management measures. Chapter 3 provides further discussion of the compatibility assessment.

The purpose of this appendix is to provide the detailed results of the compatibility assessment, and to indicate the sources of data used to portray those results. (See Appendix 4 for a complete listing/descriptions of data used in plan development.) This appendix is organized by use. For each use, a brief narrative is provided that generally describes the issues associated with each use that relate to potential conflicts with other uses of ocean resources or impacts to the resources themselves. Following this summary, siting criteria for each use are provided. These criteria indicate requirements for siting uses based on current technology, physical restrictions for such uses, and other considerations from the standpoint of the use itself. Following the siting criteria, issues related to exclusions and constraints are listed, along with associated data layers. Exclusions represent those existing uses and natural resources that proposed uses should avoid, and are represented spatially by available data as indicated. Constraints are those existing uses and natural resources that should be avoided by proposed uses and, if not possible to avoid, impacts minimized. For each use there may be certain uses or natural resources that may be compatible with the use in question; these “conditionally compatible” items are also provided.

Chapter 3 provides additional context for the compatibility assessment. Chapter 4 provides the proposed management measures.

Wind Energy Facilities - Commercial Scale (> 10 Turbines) and Community Scale

Overview: Point-location infrastructure with limited individual footprint; scale/scope of impacts derives from size of overall array (cumulative). Impacts from construction include temporary, localized degradation of water quality; temporary displacement of marine habitat and living resources; acoustic impacts to marine mammals; and temporary exclusion of existing uses from area of construction. Impacts of construction of interconnection cables are similar to cables generally. Permanent impacts include displacement of marine habitat and water occupied by monopiles or truss support structures and erosion control measures such as rip-rap if applicable. Impacts from siting and operation include potential displacement of mobile fishing gear and permanent impacts to marine mammal and avian habitat. Wind turbines alter the appearance of the area in which they are located. Rip-rap scour protection may provide enhanced recreational fishing opportunity.

Siting criteria: Water depth (20 meters monopile/60 meters jacket truss), wind speed, sub-bottom geology

Exclusion (avoid):

- One mile from approximate shoreline (applies to commercial-scale only)
 - Data: CZM baseline mapping
- Coast Guard-designated navigation areas (shipping channels and traffic lanes, precautionary areas, anchorage areas, pilot boarding areas)
 - Data: Navigation Work Group
- CWA 404 Special Aquatic Site
 - Data: Regulatory data layers
- Ferry routes
 - Data: Navigation Work Group
- High concentrations of avian resources: nesting, staging, and critical foraging areas for Roseate Tern; nesting, staging and core foraging areas for Long-tailed Duck, colonial coastal waterbirds, special concern tern species (Arctic, Least, Common)
 - Data: Habitat Work Group, NHESP
- High concentrations of whale populations: Right whale core habitat
 - Data: Habitat Work Group, NHESP
- Areas of significant commercial fishing effort and value: high fishing activity by effort and value [*Minimize conflict with commercial fishing by siting development areas outside areas of significant fishing effort and value*]
 - Data: Fisheries Work Group
- Direct transit navigation routes for shipping and fishing [*Minimize conflict with significant interconnections between homeports and grounds*]

- Data: AIS, VMS
- Regulated airspace
 - Data: FAA/MAC aviation buffers

Constraint (avoid or minimize):

- Areas of medium fishing activity by effort and value [*evaluate conflict with mobile gear in potential wind development areas*]
 - Data: Fisheries Work Group, qualitative maps from commercial fishermen
- High concentrations of avian resources: Leach's Storm Petrel
 - Data: Habitat Work Group; NHESP
- High concentrations of whale populations: fin and humpback whales
 - Data: Habitat Work Group, NHESP
- Direct-transit recreational navigation routes [*Consider impacts to significant interconnections between shore access points and destination areas.*]
 - Data: MMTA recreational fishing/boating survey, DMF recreational fishing survey
- Areas of concentrated recreational fishing activity [*Minimize conflict with recreational fishing by siting incompatible uses outside areas of concentrated recreational fishing activity*]
 - Data: MMTA recreational fishing/boating survey, DMF recreational fishing survey
- Concentrations of recreational uses [*Preserve/enhance public access by siting use areas to minimize impacts to concentrations of recreational uses*]
 - Data: MMTA recreational fishing/boating survey, DMF recreational fishing survey
- Known historic/archaeological resources
 - Data: AWOIS

Conditionally compatible with:

- Fixed commercial gear
- Recreational boating and fishing
- Aquaculture
- Wave and tidal energy facilities
- Linear infrastructure
- Habitat and biota

Wave and Tidal Current Energy Facilities

Overview: Several technologies have reached varying states of development, and the environmental issues specific to individual technologies vary significantly. Tidal current facilities are near-shore technologies; wave energy technologies are under development for both near-shore and deep-water applications. Commercial-scale facilities do not appear likely in Massachusetts waters in the near-term (0-5 years); however, pilot tidal current sites have received preliminary permits from the Federal Energy Regulatory Commission for three locations within the planning area, and environmental surveys are being conducted to determine the feasibility of tidal current. At least one small, bottom-anchored, deep-water wave energy unit is currently installed for testing (North Shore). Deep-water, commercial-scale facilities will primarily impact commercial and recreational surface navigation and mobile fishing gear; potential significant environmental impacts are limited due to the scale of the projects; for commercial-scale facilities, impacts to fish, marine mammals, and other resources will be highly dependent on the specific technology and proposed location.

Siting criteria for wave facility:

- Highly variable

Tidal facility siting criteria:

- Peak tidal velocities of at least 3 knots, water depths of between 18-40 meters - Renewable Work Group recommends “Areas for further exploration of tidal power potential” – Naushon/Vineyard Sound, Muskeget Channel, Nantucket SE

Exclusionary (avoid):

- Coast Guard-designated navigation areas (shipping channels and traffic lanes, precautionary areas, anchorage areas, pilot boarding areas)
 - Data: Navigation Work Group
- Ferry routes
 - Data: Navigation Work Group
- Direct transit navigation routes for shipping and fishing [*Minimize conflict with significant interconnections between homeports and grounds*]
 - Data: AIS, VMS
- Direct-transit recreational navigation routes [*Preserve/enhance public access by siting use areas to minimize impacts to concentrations of recreational uses. Consider impacts to significant interconnections between shore access points and destination areas.*]
 - Data: To be acquired
- Areas of significant commercial fishing effort and value: high fishing activity by effort and value [*Minimize conflict with commercial fishing by siting development areas outside areas of significant fishing effort and value*]

- Data: Fisheries Work Group
- CWA 404 Special Aquatic Site
 - Data: Regulatory data layers
- Known historic/archaeological resources
 - Data: AWOIS
- Important fisheries resource areas (tidal only)
 - Data: Fisheries Work Group
- High concentrations of whale populations: Right whale core habitat
 - Data: Habitat Work Group, NHESP

Constraint (avoid or minimize):

- Areas of concentrated recreational fishing activity [*Minimize conflict with recreational fishing by siting incompatible uses outside areas of concentrated recreational fishing activity*]
 - Data: DMF recreational fishing survey
- High concentrations of whale populations: fin and humpback whales
 - Data: Habitat Work Group, NHESP

Conditionally compatible with:

- Fixed commercial gear
- Recreational boating and fishing
- Aquaculture
- Wind energy facilities
- Linear infrastructure
- Habitat and biota

Sand Mining for Beach Nourishment

Overview: Mechanical or hydraulic extraction of sand from the surface of the seabed. Significant impact to bottom habitat (removal) and benthic resources (mortality/displacement) over the extent of the project area. Impacts from construction include temporary, localized degradation of water quality; mortality and temporary displacement of habitat and living resources; temporary exclusion of existing uses from area of construction; temporary impact to bottom fishing from habitat degradation; and permanent alteration of bottom topography. Long-term impact to habitat function has not been documented in Massachusetts.

Siting criteria: Relative proximity to erosional/nourishment areas, marine sand resource of appropriate grain size

- Data: usSEABED, rugosity

Exclusionary (avoid):

- Coast Guard-designated navigation areas (shipping channels and traffic lanes, precautionary areas, anchorage areas, pilot boarding areas)
 - Data: Navigation Work Group
- Ferry routes
 - Data: Navigation Work Group
- Linear infrastructure
 - Data: Infrastructure Work Group
- High concentrations of whale populations: Right whale core habitat
 - Data: Habitat Work Group, NHESP
- CWA 404 Special Aquatic Site
 - Data: Regulatory data layers
- Areas of significant commercial fishing effort and value: high fishing activity by effort and value [*Minimize conflict with commercial fishing by siting development areas outside areas of significant fishing effort and value*]
 - Data: Fisheries Work Group
- Important fisheries resource areas
 - Data: Fisheries Work Group
- Hard/complex benthic habitat
 - Data: US Seabed, rugosity

Constraint (avoid or minimize):

- High concentrations of whale populations
 - Data: Habitat Work Group, NHESP
- Areas of medium fishing activity by effort and value [*evaluate conflict with mobile gear in potential wind development areas*]
 - Data: Fisheries Work Group, qualitative maps from commercial fishermen
- Areas of concentrated recreational fishing activity [*Minimize conflict with recreational fishing by siting incompatible uses outside areas of concentrated recreational fishing activity*]

Conditionally compatible with:

- Mobile and fixed commercial fishing gear
- Direct transit navigation fishing and recreational routes
- Recreational boating and fishing
- Concentrations of recreational uses
- Wave and tidal energy

Pipelines

Overview: Linear infrastructure installed on or beneath seabed; three recent projects in Massachusetts to transport natural gas. Impacts from construction include temporary, localized degradation of water quality; temporary displacement of habitat and living resources, including demersal fish; temporary exclusion of existing uses from area of construction; and temporary impact to bottom fishing from habitat degradation. Time to complete habitat recovery exceeds five years for one project (Hubline), and has not been determined for two others (Northeast Gateway and Neptune [recent/current construction]). Quality of geotechnical data and construction methods are very important to minimize impacts to habitat, resources, and commercial fishing. Pipelines have less flexibility in route than cables, involve more surface equipment and construction time than cables, and have a larger area and duration of impact.

Siting criteria: soft sediment

- Data: usSEABED, rugosity

Exclusionary (avoid):

- Dredged material disposal sites
 - Data: Infrastructure Work Group
- CWA 404 Special Aquatic Site
 - Data: Regulatory data layers
- Hard/complex bottom areas
 - Data: usSEABED, rugosity
- High concentrations of whale populations: Right whale core habitat
 - Data: Habitat Work Group, NHESP
- Important fisheries resource areas
 - Data: Fisheries Work Group

Constraint (avoid or minimize):

- High concentrations of whale populations
 - Data: Habitat Work Group, NHESP
- Coast Guard-designated anchorage areas
 - Data: Navigation Work Group
- High concentrations of whale populations
 - Data: Habitat Work Group, NHESP
- Known historic / archaeological resources
 - Data: AWOIS

Conditionally compatible with:

- All other uses and resources, subject to alternatives analysis to “avoid, minimize, and mitigate” impacts to resources and uses, and regulatory performance standards

Cables for Electricity and Telecommunications

Linear infrastructure with several installations in Massachusetts waters. Impacts from construction include temporary, localized degradation of water quality; temporary displacement of habitat and living resources; temporary exclusion of existing uses from area of construction; and temporary impact to bottom fishing. Quality of geotechnical data important to minimize impacts. Scale of impact significantly less than pipelines. Permanent impacts not expected. Minerals Management Service evaluating electro-magnetic field issues associated with electricity transmission.

Siting criteria: soft sediment

- Data: usSEABED, rugosity

Exclusionary (avoid):

- Dredged material disposal sites
 - Data: Infrastructure Work Group
- CWA 404 Special Aquatic Site
 - Data: Regulatory data layers
- Hard/complex bottom areas
 - Data: usSEABED, rugosity
- High concentrations of whale populations: Right whale core habitat
 - Data: Habitat Work Group, NHESP

Constraint (avoid or minimize):

- Coast Guard-designated anchorage areas
 - Data: Navigation Work Group
- Known historic/archaeological resources
 - Data: AWOIS
- High concentrations of whale populations
 - Data: Habitat Work Group, NHESP

Conditionally compatible with:

- All other uses and resources, subject to alternatives analysis to “avoid, minimize, and mitigate” impacts to resources and uses, and regulatory performance standards

Deep-Water (Non-Intertidal) Aquaculture

Overview: Primary technologies are submersible, bottom-anchored cages for finfish and submersible, bottom-anchored long-line systems for shellfish. Depending on type of technology, varying impacts to commercial and recreational surface navigation and commercial and recreational fishing. Primary potential environmental impact is water quality degradation (increased nutrient loads) and the potential of escaped animals to affect health or genetics of wild stocks.

Siting criteria: Division of Marine Fisheries regulates aquaculture; DMF regulations require site review to avoid and minimize impacts to existing marine resources and uses.

Exclusionary (avoid):

- Coast Guard-designated navigation areas (shipping channels and traffic lanes, precautionary areas, anchorage areas, pilot boarding areas)
 - Data: Navigation Work Group
- Ferry routes
 - Data: Navigation Work Group
- Direct transit navigation routes for shipping and fishing [*Minimize conflict with significant interconnections between homeports and grounds*]
 - Data: AIS, VMS
- Areas of significant commercial fishing effort and value: high fishing activity by effort and value [*Minimize conflict with commercial fishing by siting development areas outside areas of significant fishing effort and value*]
- High concentrations of whale populations: Right whale core habitat
 - Data: Habitat Work Group, NHESP
- CWA 404 Special Aquatic Site
 - Data: Regulatory data layers

Constraint (avoid or minimize):

- Areas of concentrated recreational fishing activity [*Minimize conflict with recreational fishing by siting incompatible uses outside areas of concentrated recreational fishing activity*]

Conditionally compatible with:

- Fixed commercial gear
- Recreational boating and fishing
- Wind, wave, and tidal energy facilities
- Linear infrastructure
- Habitat and biota