# Ocean Resources

This guidance is intended to clarify how the Ocean Resources Goal and Objectives of the Regional Policy Plan (RPP) are to be applied and interpreted in Cape Cod Commission Development of Regional Impact (DRI) project review. This technical bulletin presents specific methods by which a project can meet the goal and objectives.

***Ocean Resources Goal: To protect, preserve, or restore the quality and natural values and functions of ocean resources***

- ***Objective OR1*** *– Locate development away from sensitive resource areas and habitats*
- ***Objective OR2*** *– Preserve and protect ocean habitat and the species it supports*
- ***Objective OR3*** *– Protect significant human use areas and vistas*

The applicability and materiality of these goals and objectives to a project will be determined on a case-by-case basis considering a number of factors including the location, context (as defined by the Placetype of the project's location), scale, use, and other characteristics of a project.

## THE ROLE OF CAPE COD PLACETYPES

The RPP incorporates a framework for regional land use policies and regulations based on local form and context as identified through categories of Placetypes found and desired on Cape Cod.

The Placetypes are determined in two ways: some are depicted on a map contained within the RPP Data Viewer located at www.capecodcommission.org/RPPDataViewer adopted by the Commission as part of the Technical Guidance for review of DRIs, which may be amended from time to time as land use patterns and regional land use priorities change, and the remainder are determined using the character descriptions set forth in Section 8 of the RPP.

The project context, as defined by the Placetype of the project's location, provides the lens through which the Commission will review the project under the RPP.

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## INTRODUCTION

In 2008 the State enacted legislation (the "Oceans Act", St. 2008, c. 114) enabling limited types of development activity within the State's ocean waters, including renewable energy facilities, sand mining, and cable and pipeline installation. In response to the Oceans Act the Executive Office of Energy and Environmental Affairs (EEA) issued a Massachusetts Ocean Management Plan in 2009. The Oceans Act requires EEA to review the ocean plan at least once every five years.

In 2009 the Cape Cod Commission worked with Cape communities to develop the Cape Cod Ocean Management Plan (CCOMP), a plan that identified priorities for the protection of ocean based resources and uses. The RPP establishes those recommendations and priorities as goals and objectives. The guidance in this technical bulletin is intended to assist the proponent of offshore development projects in preparing an application for Development of Regional Impact (DRI) review.

The Cape Cod Commission Act requires DRI review for projects where an Environmental Impact Report is required under the Massachusetts Environmental Policy Act (MEPA). Where possible, the methods within this bulletin have been designed to be consistent with state regulations to streamline the permitting process. Although the majority of methods discussed in this Technical Guidance are intended to be flexible, certain methods will be required of all DRIs where a particular Ocean Resources objective is applicable.

## DEFINITIONS

Adverse Visual Impact: Where the degree of change in the scenic quality resulting from an activity is expected to unreasonably alter the public's enjoyment or appreciation of a scenic resource or otherwise unreasonably alter the character, setting or quality of a scenic resource.

Beach Nourishment: The placement of clean sediment, of a grain size compatible with existing beach nourishment, on a beach to increase its width and volume for purposes of storm damage prevention, flood control, habitat, or public recreation. The seaward edge of the nourished beach shall not be confined by any structure.

Improvement Dredging: Any dredging in an area which has not been previously dredged or which extends the original dredged width, depth, length, or otherwise alters the original boundaries of a previously dredged area for the purposes of improving navigation or flushing of an embayment or harbor.

Maintenance Dredging: Dredging in accordance with a license or permit in any previously authorized dredged area which does not extend the originally dredged depth, width, or length.

Sand Mining: Activities involving the removal of material from the ocean floor for the purposes of Beach Nourishment, but not including Maintenance Dredging activities that include a Beach Nourishment proposal.

# SUMMARY OF METHODS

## GOAL | OCEAN RESOURCES

To protect, preserve, or restore the quality and natural values and functions of ocean resources

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**Objective OR1** – Locate development away from sensitive resource areas and habitats

### METHODS

All DRIs must:

- Locate development away from designated rare species habitat
- Locate development away from designated prohibited areas for ocean species as identified in Cape Cod Ocean Management Plan
- Locate development away from designated exclusionary areas as identified in the Cape Cod Ocean Management Plan

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**Objective OR2** – Preserve and protect ocean habitat and the species it supports

### METHODS

All DRIs must:

- Protect whales and their habitats
- Protect rare species and their habitats
- Protect eelgrass from impacts unless there is no feasible alternative, there is a public purpose, and the impacts are minimized and appropriately mitigated
- Design the project, and time construction and operations to protect benthic habitats from direct and indirect impacts, including construction impacts
- Design the project, and time construction and operations to protect significant fish resources and habitats
- Design the project, and time construction and operations to protect sea turtles from impacts
- Design the project, and time construction and operations to protect coastal waterbirds and sea ducks, and their habitats

- Design the project, and time construction and operations to protect marine mammals and their habitats
- Manage construction-related noise
- Coordinate project siting with existing conduit routes in order to minimize damage to the environment
- Demonstrate public purpose
- Evaluate the cumulative impacts of the project together with existing development activities and design the project to avoid or minimize impacts to ocean habitats and human use areas

**Objective OR3** – Protect significant human use areas and scenic resources

### METHODS

All DRIs should:

- Provide buffers to navigation
- Protect aquaculture and commercial fishing from impacts
- Minimize impacts to ocean-based recreational activities
- Site project to protect sensitive archaeological sites
- Locate and design project to avoid adverse visual impacts to the Cape's cultural, historic, and scenic resources

# DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE OR1

***Objective OR1*** *– Locate development away from sensitive resource areas and habitats*

All DRIs must:

## Locate development away from rare species habitat

Applicants proposing development in the ocean should refer to mapped rare species habitat in project planning and siting. As a general practice, development should avoid mapped state or federal rare species habitat in order to protect these species from the adverse effects of development. Comments from the Massachusetts Natural Heritage and Endangered Species Program (NHESP) and/or National Marine Fisheries Service (NMFS) may be used to demonstrate that the project will not adversely impact rare species or their habitats (see also OR2 below, and WPH3).

## Locate development away from mapped prohibited areas

Projects proposed in the ocean should utilize the Cape Cod Ocean Management Plan (CCOMP), as well as state data resources found in MORIS (Massachusetts Ocean Resources Information System) and the Massachusetts Ocean Management Plan (MOMP) (see Resources) to help select suitable locations for development. The CCOMP identified prohibited areas for certain development activities. Sand Mining projects are not allowed within the CCOMP Map of Sand and Gravel Mining Prohibited Areas, and cable and pipeline installations are not allowed within CCOMP Cable and Pipeline Prohibited Areas. Maps of these prohibited areas are available through the Regional Policy Plan Data Viewer and should be consulted when developing project proposals. (Applicants should be aware that state mapping and criteria established through the MOMP will also apply through the state permitting process.)

## Locate development away from mapped exclusionary areas

The CCOMP also established exclusionary areas where ocean-based development activities are strongly discouraged. Allowable development activities (i.e., those limited development activities allowed through the Oceans Act, including renewable energy installations, sand and gravel mining, and cable and pipeline installations) may be permitted within these exclusionary areas if the applicant can demonstrate there is no feasible alternative location, and all applicable methods for meeting the objectives OR1, OR2, and OR3 are met.

# DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE OR2

***Objective OR2*** *– Preserve and protect ocean habitat and the species it supports*

All DRIs must:

## Protect whales and their habitats

Sand Mining operations and cable/pipeline installations are not permitted from January to May in North Atlantic Right Whale Critical Habitat (comprising all of Cape Cod Bay due north and east of the Cape Cod Canal, as designated by National Marine Fisheries Service (NMFS)). At other times of year, Sand Mining operations and cable/pipeline installations anywhere in Barnstable County must immediately cease if North Atlantic Right Whale(s) are observed within two (2) miles of such activities. The sighting must be reported to NMFS immediately. Activities may not recommence until such time that NMFS or a NMFS-approved environmental monitor provides written notification of their determination that operations may resume.

Sand Mining operations and cable/pipeline installations are not permitted from January to May in the Exclusionary Areas that comprise expanded North Atlantic Right Whale habitat (see Cape Cod Ocean Management Plan Map of Exclusionary Areas). Sand Mining operations and cable/pipeline installations may be permitted in these Exclusionary Areas at other times of year provided the applicant can provide clear and convincing evidence that the activity will not cause direct or indirect impacts to North Atlantic Right Whales, or other whale species.

To reduce the potential for vessel harassments or collisions with listed whales and sea turtles, all vessel and aircraft captains and project managers associated with the development activity should be familiar with the NOAA Fisheries Northeast Regional Viewing Guidelines, as updated, and Bureau of Ocean Energy Management Vessel Strike Avoidance and Injured/Dead Protected Species Reporting guidelines.

The Commission will require the Applicant to verify it has incorporated these guidelines into the project manuals for operating and managing the development activity.

### Protect Rare Species and their Habitats

Where a project is located within mapped state or federal rare species habitat, the proponent must submit the development proposal to the Massachusetts Natural Heritage and Endangered Species Program (NHESP), and, in the case of marine mammals, to the National Marine Fisheries Service (NMFS) for review and comment. As a matter of practice, development that would adversely affect habitat of local populations of rare wildlife is not permitted. However, development in mapped rare species habitat may be allowed if the NHESP and/or NMFS provides written comment that the work will not adversely affect rare species (including through the development of a NHESP approved conservation and management permit, or that NHESP determines that the project will not result in a "take"). Comments from the NHESP and/or NMFS may be used to demonstrate that the project does not adversely impact rare species or their habitats (see also Wildlife and Plant Habitat Objective WPH3).

### Protect eelgrass from impacts unless there is no feasible alternative, there is a public purpose, and the impacts are minimized and appropriately mitigated

The general presumption is that work in the ocean must not have direct or indirect adverse effects on eelgrass beds, unless an applicant can demonstrate that there is no feasible alternative location or design for the project and the project is necessary to accomplish an overriding public purpose subject to a mitigation requirement. Sand Mining operations and cable/pipeline installation should avoid impacts to areas of historic eelgrass beds to the maximum extent feasible, regardless of whether eelgrass is found in the historic eelgrass bed at the time of application. If a project adversely affecting eelgrass is permitted, appropriate mitigation, including eelgrass restoration, is required. Mitigation includes replanting eelgrass following disturbance and/or planting eelgrass in a suitable off-site location. The Commission may require a planting and monitoring plan to ensure that restoration of the disturbed eelgrass bed is successful. In cases where a cable or pipeline route is permitted through an eelgrass bed, directional drilling must be used to avoid any direct impacts on eelgrass (see also WET1).

### Design the project and time construction and operations to protect benthic habitats from direct and indirect impacts, including construction impacts

**ALL DRIS:**

Development activities must not have any direct impacts on areas of biologically productive benthic habitats (e.g., Hard/Complex Seafloor as defined in the CCOMP). The applicant must demonstrate through field surveys that the resources are not present, and/or will not be impacted adversely.

Applicants for projects located within 500 feet of eelgrass beds or other biologically productive benthic habitats (e.g., Hard/Complex Seafloor) must provide an analysis of anticipated sediment dispersion resulting from the development activities. The results of the sediment dispersion modeling will be used to ensure that the design and siting of development activities avoid indirect impacts (e.g., turbidity) to eelgrass and other biologically productive benthic habitats (e.g. Hard/Complex Seafloor). Best construction practices (e.g., directional drilling) should be used to the extent feasible to minimize impacts.

The applicant must consult with Massachusetts Division of Marine Fisheries (DMF) to determine whether restrictions should be placed on the timing or methods of construction for development activities to avoid temporary or permanent impacts to critical life history stages (e.g., spawning, and egg, embryo, and juvenile development) of marine species. Best management practices must be employed during development activities to minimize turbidity and sedimentation impacts to sensitive benthic habitats, including eelgrass and other biologically productive benthic habitats such as Hard/Complex Seafloor as identified in the Massachusetts Ocean Management Plan.

Applicants must provide a site monitoring plan for Commission review and approval. In order to evaluate project impacts, including any changes in the areal extent and health of sensitive marine resources, the plan should identify (a) sensitive marine resources in the vicinity of the construction site, (b) protocols to monitor turbidity, light penetration, dissolved oxygen and nutrient conditions in the proposed construction area, as well as within a buffer zone that extends to the furthest boundary of the potentially affected adjacent area (as determined by current/wave modeling), (c) monitoring schedules, and (d) contingency plans if turbidity conditions exceed identified thresholds.

**CABLE AND PIPELINE PROJECTS:**

Cable and pipeline installations must demonstrate that the project will not result in adverse impacts to benthic communities and their ecology, specifically, impacts to finfish, shellfish, and migratory species resulting from sedimentation, erosion, scour, or barriers to migration.

**SAND MINING PROJECTS:**

Sand Mining projects must be designed to minimize impacts to benthic resources and encourage recolonization. Projects must be designed to retain substrate in order to minimize impacts and promote recolonization of mined areas. Design practices that will facilitate recolonization include, but are not limited to, retaining refuge patches or strips through a sand mining site to promote recolonization of the postmining site to pre-mined benthic communities and related or dependent marine life.

Sand Mining operations must demonstrate that the project will not change ocean currents or wave conditions in a way that results in adverse effects on existing coastal landforms (e.g., coastal bank erosion), infrastructure, navigation, and public/private property, including saltwater intrusion on landward freshwater resources.

Applicants for Sand Mining operations must provide a post-construction monitoring plan for Commission review and approval. The post-project monitoring plan must include provisions for monitoring the physical, chemical and/or biological conditions at the borrow site for a minimum of three years following development closure to evaluate recovery of the site to productive benthic habitat conditions. Where the intent of a development is to establish a long-term borrow site, the elements of a post-development monitoring plan may be modified at the Commission's discretion.

## Design the project and time construction and operations to protect significant fish resources and habitats

Projects must protect important fish resources and habitat as classified by DMF. Sand Mining operations and cable/pipeline installation may be permitted in Exclusionary or Provisional (as designated on CCOMP map) areas, provided that the presumption of a site's importance to fish resources and habitat is overcome where the applicant can demonstrate to the satisfaction of the Commission through a site assessment that the resources do not exist, or the site is not significant to important fish resources and

habitat. In addition, projects should avoid construction in licensed commercial fishing or aquaculture installations (e.g., fish weirs, aquaculture pens, rafts, floats, etc.).

### Design the project and time construction and operations to protect sea turtles from impacts

Projects must protect sea turtles during construction or operations. The applicant must provide a species protection plan to the Commission for its review and approval that addresses and mitigates development activity that is proposed within sea turtle habitat or during times of year when turtles are present. The Commission may consult with the NMFS or DMF in review and approval of a species protection plan.

### Design the project and time construction and operations to protect coastal waterbirds and sea ducks, and their habitats

Projects must be designed to protect coastal waterbirds from the adverse impacts of Sand Mining or cable and pipeline installation and operations where these activities would adversely impact the core habitats of Long-tailed Duck, Roseate Tern, Special Concern Tern species (Arctic, Least, and Common Terns), and important nesting habitats of colonial waterbirds and Leach's Storm Petrel (core habitat delineations as identified by the Massachusetts Ocean Management Plan). Development may be permitted where the proponent can demonstrate that the development will not adversely affect the habitat of these species. A species protection plan may be required as a condition of approval when development is permitted in these habitat areas.

Sand Mining operations should avoid directly or indirectly impacting important feeding, resting, staging, or overwintering habitat for sea ducks in waters less than 65 ft (20 meters) deep. Determination of whether an area supports sea duck habitat will be based on factors including but not limited to pre-construction site surveys, areas known to support large congregations of sea ducks, and/or seafloor mapping that confirms the presence of important benthic feeding habitat (MOMP mapping may be used to help make the determination of important sea duck habitat).

### Design the project and time construction and operations to protect marine mammals and their habitats

In addition to requirements to protect marine mammals which are protected under state and federal law, projects should be designed and construction and operations timed to protect all marine mammals from adverse impacts of development and construction. The Commission may consult with NMFS or DMF to determine whether

projects are anticipated to have adverse impacts on marine mammals. A species protection plan may be required as a condition of approval.

### Manage construction-related noise

Applicants must provide a Construction Noise Mitigation Plan to the Commission for review and approval. The plan must address issues to avoid or minimize construction noise impacts on marine mammals and sea turtles, including but not limited to an assessment of the construction noise impacts on marine life, a monitoring plan for tracking marine mammals and sea turtles entering the construction zone, and a mitigation plan, including time-of-year (TOY) restrictions on construction, to avoid or minimize construction noise impacts on marine mammals and sea turtles.

### Coordinate project siting with existing conduit routes in order to minimize damage to the environment

Applicants should locate conduit installations with existing cable or pipeline routes to the maximum extent feasible in order to minimize impact to the environment.

### Demonstrate public purpose

Ocean resources are public resources. Applicants for ocean-based projects must demonstrate that the development furthers a substantial public purpose with respect to these coastal or ocean resources, including but not limited to, protection against storm damage, protection against sea level rise, flood control, protection of recreational beaches, restoration or improvement of habitat, utility-related reliability or necessary capacity or technology improvements, or water quality improvement. The areal extent of these anticipated effects should be quantified, where possible, and the time period over which the public purpose is expected to persist.

Consistent with this purpose and the priorities established through the CCOMP, sediments derived from an offshore borrow site must be utilized within Barnstable County.

## Evaluate the cumulative impacts of the project together with existing development activities and design the project to avoid or minimize impacts to ocean habitats and human use areas

As part of an application for offshore development, the applicant must provide for consideration an assessment of cumulative impacts of any existing or permitted offshore renewable energy facilities, sand mining operations, and cables and pipelines within Barnstable County. The intent of this standard is for the Commission to determine whether the incremental addition of impacts from the project, when added to the impacts from existing and permitted development, will cumulatively adversely affect resources protected under the Act. Applicants should identify on a map all of the existing or permitted offshore renewable energy facilities, ongoing or prior sand mining operations, or cable or pipeline installations within Barnstable County. The Commission will determine whether the incremental addition of the proposed project will unduly degrade ocean habitats or resources, or will conflict with human use activities to such an extent that those resources or activities are threatened.

The cumulative impact assessment should:

a. Define the boundary of the area that will be affected by the project (project impact zone).
b. List the resources that could be affected by the project. Establish baseline conditions for resources: are resources presently degraded, and to what extent?
c. Determine the geographic areas occupied by those resources outside of the project impact zone – (for example, if the project impacts whale habitat, the extent of critical whale habitat within the region).
d. Establish the timeframe of potential impacts.
e. Identify existing and proposed activities which may impact significant resources protected by the Act and the RPP. Significant resources for the purposes of this analysis should include any wildlife or supporting habitat resource, but may also include cultural, archaeological or historic resources.
f. Characterize the significant resources in terms of their response to the proposed change and their capacity to withstand the potential stress, i.e., will the activity fragment habitat or create barriers to normal life cycle activities for wildlife resources?
g. Identify and describe cause and effect relationships between stresses and resources and/or ecosystems. Describe magnitude of effect, e.g., degradation of water quality, removal of benthic habitat, etc. and the temporal and spatial parameters of the impact
h. Identify modifications to reduce potential impacts.

# DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE OR3

***Objective OR3*** *– Protect significant human use areas and vistas*

## Provide buffers to navigation

Development activities should provide buffers to established ferry routes, navigational channels and commercial shipping lanes with adequate width to prevent accidents or irreconcilable conflict between different uses. Cable and pipeline installations may be sited coincident with established navigational routes provided an applicant can provide evidence that the proposed installation will not adversely impact established navigational uses.

## Protect aquaculture and commercial fishing

Applicants should avoid siting projects in areas of active or significant fishing use. The applicant and the Commission should refer to mapped data available through the MOMP (mapped data is available in MORIS, see Resources) and the CCOMP regarding areas used for recreational and commercial fishing and/or aquaculture.

## Minimize impacts to ocean-based recreational activities

Projects should be sited and construction windows should be timed to minimize impacts to areas of high-use ocean-based recreation. The applicant should provide a current survey of activities in the project vicinity and should reference human use activity areas mapped in the MOMP as provided in MORIS (see Resources).

## Site project to protect sensitive archaeological sites

Applicants should configure projects to avoid known archaeological sites or sites with high archaeological sensitivity as identified by the Massachusetts Board of Underwater Archaeological Resources, the Massachusetts Historical Commission and/or the Mashpee Wampanoag Tribe.

## Locate and design project to avoid adverse visual impacts to the Cape's cultural, historic, and Scenic Resources

Development activities should be sited and designed to avoid adverse visual impacts to the Cape's cultural/historic and scenic resources, including structures listed or eligible for listing on the National or State Register of Historic Places and Historic or Cultural Landscapes. Sand mining operations less than 12 months in duration are presumed to

have no adverse visual impact. Any development that is planned or designed to exceed 12 months in duration must provide an assessment to demonstrate that the project will not have adverse impacts on cultural/historic or scenic resources (see also Community Design Technical Bulletin Objective CD3).

# GENERAL APPLICATION REQUIREMENTS

This Technical Bulletin identifies required reports and analyses to characterize the existing environment, analyze the potential impacts, describe the anticipated public purposes and cumulative impacts, and address the protection of sensitive resources.

The requested information must be submitted in a narrative report, on plans of an appropriate scale. Plan preparation, data collection and analysis, and natural resource evaluations must be conducted by individuals qualified through academic credentials and experience. The Commission or its designee may waive application requirements where the required study or plan is deemed unnecessary to the review process or duplicative of requirements under state and/or federal authority.

## I. List of Required Permits and Authorizations

Applicants proposing work in offshore ocean waters must provide a list of all permits and authorizations (not limited to the following) required by local, state, and federal regulatory agencies for the proposed activity in a format similar to the following example:

| AGENCY | PERMIT/APPROVAL | INTENT/FOCUS |
|---|---|---|
| US Environmental Protection Agency | See 401 Water Quality Certification, below | |
| US Army Corps of Engineers | Programmatic General Permit (PGP), Category 2 pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Included in this review is coordination with Federal agencies (National Marine Fisheries Service, US Fish and Wildlife, EPA), Massachusetts CZM, Massachusetts Historical Commission, and the Tribal Historic Preservation Office | To protect navigable waters of the U.S. from being obstructed or altered without government review |
| US Coast Guard | Notification for Notice to Mariners and information to be shared with the National Ocean Survey for updates to nautical charts. | |

| AGENCY | PERMIT/APPROVAL | INTENT/FOCUS |
|---|---|---|
| Federal Energy Regulatory Commission | | |
| National Oceanic and Atmospheric Administration | Federal Consistency Review | |
| National Marine Fisheries Service | "Take" authorization under Marine Mammal Protection Act<br>Biological Opinion under Endangered Species Act | To protect marine mammals from harassment, capture, killing |
| US Fish and Wildlife Service | | |
| Massachusetts Coastal Zone Management | Federal Consistency Certification | To ensure coordination among state agencies of the protection of resources within the coastal zone |
| Mass. Department of Environmental Protection | Water Quality Certification pursuant to Section 401 of the Clean Water Act<br>Chapter 91 Waterways License | To protect public health from discharges of dredged materials into waters of the commonwealth<br>To protect public rights to fish, fowl, and navigate |
| Mass. Environmental Policy Act | Environmental Review | To ensure adequate analysis of project impacts has been collected for permitting by state regulatory agencies |
| Mass. Historical Commission<br>Mass. Board of Underwater Archaeological Resources<br>Tribal Historic Preservation Office | Determination of No Adverse Effect | |
| Local Conservation Commissions | Order of Conditions | To protect wetland resources |
| Local Planning Board, Board of Appeals, Building Inspector | Special Permit, Building Permit | Interests are individualized by town |
| Others? DPW | Road opening permit | |

## II. Characterization of Existing Environment

An application for DRI review must include a narrative description and map of environmental resources and human use areas potentially affected by the project. Site characterization should encompass sufficient data for establishing natural variability and a baseline from which to assess whether or not a resource is being affected by project activities. Site characterization should:

a. Define the project site
   The application should include engineered plans at an appropriate scale showing all areas that may be physically affected by the proposed action. In the case of sand mining or cable/pipeline installation, the project site plans should include the area that incorporates the estimated full extent of disturbance, and for a wind turbine facility should include an area within an envelope that encloses all footings/foundations out to at least 200 meters[1].

b. Describe the existing physical environment including:
   i. Meteorology (seasonal patterns of temperature, wind direction and speeds, frequency and magnitude of storm events, precipitation, air quality)
   ii. Geology (bathymetry, seafloor and subsurface sediment types, geologic features and hazards)
   iii. Physical oceanography (temperature, salinity, density, tides and wave energy)
   iv. Chemical oceanography (nutrients, dissolved organic matter, chemical pollutants)

c. Describe the biological environment within the project site including:
   i. Pelagic, demersal and benthic organisms
   ii. Avifauna including ducks, seabirds and migrants
   iii. Endangered and threatened species
   iv. Fishery resources and habitat (including spawning, feeding and nursery habitat)

d. Characterize the socioeconomic marine environment, in both narrative form and on a plan, including:
   i. Employment, existing offshore and coastal infrastructure, commercial and recreational fisheries, including typical seasons, location and type

[1] (McCann, 2012)

ii. Cultural resources including subsistence resources and harvest practices
iii. Archaeological resources
iv. Vessel traffic, including recreational boating and commercial shipping, military activities
v. Other space/use conflicts

e. Context Map identifying resource areas and important seascape/landscape features within and surrounding the project location(s).

## III. Analyses of Site Assessment, Construction, and Operational Impacts

DRI applications must include a narrative analysis of the anticipated impacts from a project during different phases of project implementation. The discussion should reflect completion of analyses designed to assess impacts to different types of resources, as indicated below. Supporting evidence should be provided, as appropriate, including:

a. Physical resources

i. Anticipated changes in bathymetry, seafloor topography, sediment grain size characteristics, impacts of sediment suspension and turbidity on physical and biological resources through modeling. Evaluate impacts to a distance of at least 200 meters from project boundaries.
ii. Analysis of wave and tidal currents patterns and impacts in dredging footprint, affected nearshore/shorelines, etc.
iii. For Sand Mining operations only:
    1) Analyses of the movement and quantity of sediment at both the extraction and nourishment sites,
    2) An analysis of the potential effects of the borrow pit on wave heights and the direction of wave propagation,
    3) An analysis of the potential impact of the proposed project on regional sediment transport,
    4) An analysis of the potential impacts to the form of ridge and shoal features, including alterations to the biological communities,
    5) Analysis of alternative sediment removal design scenarios, e.g., removal in strips or patches, with the goal of encouraging recolonization of benthic resources,
    6) Identification and mapping of sensitive natural and cultural resources potentially affected by the project (dredging and placement sites), including benthic habitats, shellfish beds, eelgrass beds, fish spawning and nursery areas and archaeological sites,

7) Identification of potential impacts to shore erosion or shoaling, navigation channels or marinas, landward freshwater resources,
8) Estimates of sand infill rates in borrow pit,
9) Utilization of sediment dispersion models to characterize sediment re-suspension and dispersion during mining operations. The result of this modeling should be used to design mining operations, including "at sea" processing, to limit impacts of suspended sediment and turbidity on fishery resources and minimize the area affected.

iv. For Cable or Pipeline installations only:

1) Site reconnaissance plan of proposed cable/pipeline route extending 100 meters on each side of the installation route to include bathymetry, substrate characteristics (grain size, sediment thickness), fisheries/benthic habitat classification, sensitive marine resources, potential/documented archaeological sites, high resolution scanning of seafloor using sidescan sonar, multi-beam bathymetry to acquire continuous data. Post-installation surveys should also be conducted,
2) Description of cable/pipeline installation methodology,
3) Pre- and Post-construction impacts to benthic wildlife, including habitat structure and function, specific focus on migratory and/or mobile species (e.g. horseshoe crabs) that may be affected by cable/pipeline.

b. Biological and ecological resources

i. Analysis of impacts to marine organisms, including fish, crustaceans, mollusks and benthic infaunal communities (consult with DMF)
ii. Analysis of impacts to habitat for marine organisms, including fish, crustaceans, mollusks, etc. (consult with DMF)
iii. Analysis of impacts to other biologically productive habitats (hard bottom, eelgrass, etc.)
iv. Analysis of impacts to rare species (listed by the Mass. Div. of Fisheries and Wildlife, as published in the Code of Massachusetts Regulations) or their habitat,
v. Analysis of impacts to marine mammals and sea turtles, ducks, pelagic and sea birds
vi. For Wind Turbines only: Analysis of impacts to both resident and transient/migratory birds and bats and potential impacts to migration corridors.

c. Recreational and commercial fisheries, including aquaculture

i. Analysis of displacement, competition for space and impacts from vessel traffic volume and transit routes
ii. Analysis of impacts of activity on inshore and offshore bottom and off-bottom aquaculture operations

d. Cultural resources and public viewsheds (historic districts, native American sites, parks, public beaches, coastal vistas)
    i. Identify historic and cultural resources and public viewsheds within the project vicinity and within the project's viewshed (contact MHC, Tribal Preservation Officer, and town staff; review town Local Comprehensive and Open Space plans)
e. Archeological resources (shipwrecks, other)
    i. Identify onshore and underwater archaeological resources within the vicinity of the project area (contact MHC and MBUAR)

## IV. Resource Protection Plans, required as may be determined necessary

Where the Commission finds that a proposed activity is consistent with the goals and objectives, conditional approval of the project will likely require the approval of resource protection plans. The applicant must prepare narrative and spatial plans to address mitigation and monitoring consistent with the following requirements.

a. Rare Species Protection Plan required where development is allowed in rare species habitat (e.g., terns, colonial water birds) but is demonstrated not to adversely affect such habitat. The applicant should consult with the National Marine Fisheries Service (NMFS), the Natural Heritage and Endangered Species Program (NHESP) and the Division of Marine Fisheries (DMF) in the preparation of this plan. Plans should include:
    i. Assessment of habitat characteristics, rare species population status (locally and within the region),
    ii. Maps showing location of rare species habitat within and adjacent to project site, as well as transportation routes to and from project site, and other potential conflicts,
    iii. Mitigation measures to avoid or minimize impacts to rare species and their habitat (i.e., time- of -year (TOY) restrictions; exclusion zones; training of vessel operators and key project personnel),
    iv. Contingency plan if project impacts rare species,
    v. Post-construction monitoring and reporting protocols

b. Marine Mammal and Sea Turtle Protection Plan, required when development is proposed within habitat for whales, sea turtles, and other listed species, or during times of year when these species are present. The applicant should consult with DMF, NMFS and NHESP in the preparation of this plan. Plans should include:

   i. Sampling and reporting protocols and information sources to determine presence/absence, seasonal variability and habitat utilization of marine mammals and sea turtles,
   ii. Mitigation measures to avoid or minimize impacts to species (e.g., exclusion zones, TOY restrictions; training of vessel crew and other key project personnel; use of marine mammal observers),
   iii. Methods for monitoring exclusion zone, monitoring schedule and contingency for poor viewing conditions,
   iv. Contingency plan if whales, sea turtles or other listed species enter the exclusion zone, including waiting times, reporting protocol, etc.,
   v. Best management practices to avoid, minimize or mitigate impacts to marine wildlife; (e.g., compliance with NOAA noise limits for marine mammals and turtles, use of noise control devices, etc.),
   vi. Post-construction monitoring and reporting protocols

c. Fishery Resource and Habitat Protection Plan, required to determine the presence/absence of the resource, and if resource is present, to address potential impacts from the development. The applicant should consult with DMF on the significance of the habitat, development of the plan, and sampling protocols. Plan should include:

   i. Sampling protocol and information sources to identify and quantify spawning/feeding/nursery habitat for fish (including anadromous and catadromous species), shellfish and crustaceans,
   ii. Assessment methodology to determine species/habitat composition and distribution, habitat quality and key focus species/habitat types in and adjacent to the development activities,
   iii. Mitigation measures to avoid, minimize or mitigate impacts,
   iv. Post-construction monitoring and reporting protocols

d. Sea Duck Habitat Surveys for projects within 20m water depth or less[2] to determine whether site provides breeding, resting, staging, migration, overwintering habitat for sea ducks. A plan should include:

[2] The USFWS sea duck survey found that 75% of sea ducks observed were in less than 20 meters of water, within 4 nautical miles of shore and over bottom slopes of less than 1%.

i. Sampling protocol and information sources to identify presence, habitat utilization of area in and adjacent to proposed development activities,
ii. Mitigation measures to avoid, minimize or mitigate impacts to sea ducks and their habitats

e. Protection Plan for Eelgrass and other biologically productive benthic habitats. Plan should demonstrate presence/absence and quality of eelgrass, or other productive benthic habitats such as hard/complex bottom. If resources are present, explain how they will be protected during development activities. Plan should include:

i. Sampling protocol and information sources to determine presence/absence of the resource, including historic presence/absence of eelgrass, as well as habitat quality (sediment type, wind and wave energy, plant density and height, percent cover and eelgrass depth limit)
ii. Sediment dispersion modeling and pre-construction analysis if project is within 150 m. of eelgrass or other productive benthic habitat to ensure that design and siting of project avoids indirect impacts (e.g., turbidity) to eelgrass and other biologically productive benthic habitats
iii. Best management practices employed during development activities to avoid, minimize or mitigate for turbidity and sedimentation impacts to eelgrass habitat (e.g., TOY restrictions, installation methods, buffer zones)
iv. Short- and long-term monitoring plan for turbidity, suspended particulates, light penetration, dissolved oxygen and nutrient conditions near eelgrass before, during and after development activities, as recommended by DMF
v. Reporting protocol for monitoring and research activities
vi. Contingency plan if turbidity exceeds identified thresholds during development activities

f. Noise Mitigation and Monitoring Plan for Marine Wildlife
All project proposals should include a noise mitigation plan that includes:

i. An assessment of construction noise (dredging, boat traffic, tower installation, hydroplow, etc.) on marine wildlife, and a determination of the zone of influence by species
ii. A plan to monitor sound levels in the water column during construction operations
iii. A monitoring plan for tracking marine wildlife entering the construction zone (e.g., acoustic buoy array; trained observers onsite)
iv. A monitoring and contingency plan to avoid or minimize construction noise on marine wildlife, e.g. TOY restrictions, soft start, suspension of operations when endangered species are within zone of influence
v. Post-construction monitoring and reporting protocol

g. Marine Archaeological Reconnaissance Survey and Protection Plan. All project proposals should include a survey of underwater archeological resources and protection plan, to be developed in consultation with MBUAR.

h. For Wind Energy Facilities only: The individual phases of wind energy facility development are characterized by different noise sources during the different phases. The noise mitigation plan for wind energy facilities should address the following development-specific activities:

   i. Initial surveys will increase small boat traffic in an area, adding to background noise

   ii. Construction of the facilities includes larger and more sustained ship traffic, turbine installation, dredging and other activities

   iii. Turbine operation introduces sound and vibration over prolonged periods while the facility is in use

   iv. Decommissioning of the facilities increases background noise from large vessel traffic, and noise sources from any removal of equipment

   v. A monitoring program should be in operation during pre- and post-construction as well as during decommissioning activities

i. Avian and Bat Monitoring and Mitigation Plan, for Wind Energy Facilities only, to demonstrate that a WEF can be operated to ensure bird and bat safety during significant migratory events. Plan should include:

   i. Type, duration and frequency of pre-construction and post-construction monitoring

      1) Monitoring systems to gauge the presence/absence of birds and bats (e.g., acoustic bat detector surveys, avian acoustic monitoring, video monitoring, thermal animal detection systems (TADS) or other)

      2) Number of detectors, location, monitoring schedule, frequency/duration of observations, TADS design

      3) Telemetry tracking

      4) Avian surveys monitoring protocol: # of transects, survey timing (breeding, staging and migration seasons), etc.

   ii. Type of deterrents used to minimize avian presence in WEF area (e.g., anti-perching devices)

   iii. Reporting protocol

1) Frequency of reporting (near-term, long-term), summary of previous results relative to monitoring objectives, effectiveness of monitoring techniques
2) Reporting protocol to document collisions, mortality of listed and non-listed bird, bat species

j. Habitat Recovery Monitoring Plan, for Sand Mining only:
A monitoring plan should be initiated prior to mining and nourishment activities, continue through the project, and continue afterwards for a period to be determined in consultation with DMF. The key objective of monitoring is to determine whether environmental conditions at both the mining and nourishment sites have recovered.

The monitoring plan should include sampling design and protocols for:

i. Biological resources, including the benthic community and fishery resources
ii. Wave monitoring and modeling
iii. Bathymetric and sediment surveys
iv. Shoreline monitoring and modeling
v. Reporting protocol for monitoring activities

Recovery is defined as return to within the 95% confidence interval for mean values of the pre-dredging condition.

## REFERENCES AND RESOURCES

Cape Cod Ocean Management Plan (http://capecodcommission.org/CCOMP)

Massachusetts Ocean Management Plan (https://www.mass.gov/service-details/massachusetts-ocean-management-plan)

The Massachusetts Ocean Resource Information System (MORIS) has GIS data on a number of resources and uses of Massachusetts waters, including fishing grounds, special sensitive and unique resources, cultural resources, ferry routes and vessel traffic (http://www.mass.gov/czm/mapping/)

Designing site assessment and monitoring programs: J. McCann (2012). *Developing Environmental Protocols and Modeling Tools to Support Ocean Renewable Energy and Stewardship.* U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Herndon, VA., OCS Study BOEM 2012-082, 626 pp. (https://repository.library.noaa.gov/view/noaa/43408 )

Applicants should review the BOEM Guidelines for Providing Geological and Geophysical Hazards, and Archaeological Information Pursuant to 30 CFR Part 285 (http://www.boem.gov/Renewable-Energy-Program/Regulatory-Information/Index.aspx) in the preparation of the application.

Applicants should consult with the Massachusetts Board of Underwater Archeological Resources (MBUAR) (http://www.mass.gov/czm/buar/) to determine whether marine archaeological surveys should be conducted, and if so, the appropriate survey protocol to follow.

Dibajnia, M. and R. B. Nairn. Investigation of Dredging Guidelines to Maintain and Protect the Geomorphic Integrity of Offshore Ridge and Shoal Regimes, U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, Herndon, VA., OCS Study MMS 2011-025. 150 pp. + appendices at: http://www.boem.gov/Non-Energy-Minerals/Marine-Mineral-Studies.aspx

CSA International, Inc., Applied Coastal Research and Engineering, Inc., Barry A. Vittor & Associates, Inc., C.F. Bean, L.L.C., and Florida Institute of Technology. 2009. Analysis of

Potential Biological and Physical Impacts of Dredging on Offshore Ridge and Shoal Features. Prepared by CSA International, Inc. in cooperation with Applied Coastal Research and Engineering, Inc., Barry A. Vittor & Associates, Inc., C.F. Bean, L.L.C., and the Florida Institute of Technology for the U.S. Department of the Interior, Minerals Management Service, Leasing Division, Marine Minerals Branch, Herndon, VA. OCS Study MMS 2010-010. 160 pp. + apps at: http://www.boem.gov/Non-Energy-Minerals/Marine-Mineral-Studies.aspx

Applicants should review the Massachusetts Department of Environmental Protection Guide to Best Management Practices for Beach Nourishment Projects with Technical Attachments, for information on recommended site surveys and general monitoring guidelines (https://www.mass.gov/doc/beach-nourishment-massdeps-guide-to-best-management-practices-for-projects-in-ma/download)

Applicants should consult with the Natural Heritage and Endangered Species Program, the Massachusetts Division of Marine Fisheries and with the National Marine Fisheries Service prior to design development. Proponents should ensure that projects are 1) not located in areas known to support endangered marine life, and 2) where project siting unavoidably conflicts with state or federally listed endangered species habitat, the project should be designed to minimize impacts to these species.

Applicants are encouraged to review the Mass. Division of Marine Fisheries eelgrass monitoring page https://www.mass.gov/info-details/dmfs-eelgrass-restoration-and-monitoring or the 2010 publication, Technical Guidelines for the Delineation, Restoration and Monitoring of Eelgrass (*Zostera marina*) in Massachusetts Coastal Waters (https://www.mass.gov/doc/eelgrass-survey-guidelines-2010-tr-43/download) in developing a plan for delineating and monitoring eelgrass habitat.

For information on Essential Fish Habitat (EFH), designated under the federal fishery management plan development process, applicants should consult with the New England Fishery Management Council (http://www.nefmc.org/) and the National Marine Fisheries Service (http://www.habitat.noaa.gov/protection/efh/index.html)

Information regarding NMFS biological opinions for endangered marine mammals and sea turtles can be found at: https://www.fisheries.noaa.gov/national/endangered-species-conservation/biological-opinions-noaa-fisheries-office-protected

Applicants are encouraged to view the Department of the Interior's Bureau of Ocean Energy Management (BOEM) guidelines for providing environmental information for offshore renewable energy projects (https://www.boem.gov/renewable-energy/regulatory-framework-and-guidelines), particularly those associated with benthic habitat surveys and avian resource surveys.

Applicants can obtain information on sea ducks in this region in the 2012 USFWS Atlantic Coast Wintering Sea Duck Survey athttps://seaduckjv.org/atlantic-coast-wintering-sea-duck-survey/ .

Applicants are encouraged to review OCS Report MMS 2001-089: Development and Design of Biological and Physical Monitoring Protocols to Evaluate the Long-Term Impacts of Offshore Dredging Operations on the Marine Environment https://www.boem.gov/sites/default/files/mm-research/2022-03/2001-089.pdf

## ADDITIONAL MAPPING RESOURCES

The MarineCadastre.gov is an integrated marine information system that provides ocean data, offshore planning tools, and technical support to the offshore renewable energy community. It has three primary focus areas: Web map viewers and ocean planning tools; spatial data registry; and technical support and regional capacity building: www.marinecadastre.gov

The National Oceanic and Atmospheric Administration (NOAA) Coastal and Marine Spatial Planning (CMSP) Data Registry is a collection of web-accessible NOAA geospatial data deemed essential for local, regional, or national-level CMSP processes: https://coastalscience.noaa.gov/

The OBIS–USA (Ocean Biogeographic Information System) is a program of the United States Geological Survey (USGS) Core Science Analytics and Synthesis (CSAS). It is the U.S. national node of the Ocean Biogeographic Information System (OBIS). Meant to serve research and natural resource management needs, OBIS-USA brings together marine biological occurrence data in a standard format, with metadata, web-based discovery and download, and web service access for users and applications.

The Northeast Regional Ocean Council (NROC) Northeast Ocean Data: http://northeastoceandata.org/