2.0 Regional Analysis Criteria

One of the first tasks in evaluating the potential development of offshore renewable deepwater wind energy is to establish criteria that would aid in the evaluation and selection of feasible locations for project development. As part of this feasibility study, a regional analysis and evaluation of the potential for developing up to a 30 MW floating offshore wind project in the Gulf of Maine (GoM) was conducted using a set of six (6) screening criteria based on the Maine PUC RFP requirements and general permitting requirements for offshore wind projects. The selected screening criteria included met-ocean data (e.g., wind, waves, and currents), bathymetric data, environmental resource impacts, distance to mainland, distance to grid interconnection and constructability/supply chain. A description of each criterion follows and the key criteria are depicted in Figure 2-1.

2.1 MET-OCEAN CONDITIONS

Met-ocean conditions include information regarding wind, currents and waves. Areas of interest for project development must have a mean annual wind speed of over 8 meters per second (m/s) to ensure commercial viability for offshore wind project development (see Figure 2-1). Wave and current information must be available for areas of interest to provide necessary data for design of floating offshore platforms and other structures. Data required for review of areas of interest include extreme wave measurements, wind and wave measurements, average wind speed data, and oceanic currents at varying depths. For a detailed description of these data and other met-ocean information used in this study (see Section 3.1).

Observations in the GoM consist of the Northeastern Regional Association of Coastal Observing Systems (NERACOOS) buoys, Gulf of Maine Ocean Observing System (GoMOOS) buoys, UMaine, Bowdoin, and University of New England (UNE) buoys, NOAA buoys and NOAA CMAN (land) stations, and Environment Canada buoys. Active NERACOOS and GoMOOS buoys are A01 (Massachusetts Bay), B01 (Western Maine Shelf), E01 (Central Maine Shelf), I01 (Eastern Maine Shelf), M01 (Jordan Basin), and N01 (Northeast Channel). Stations E02 and F01 are the UMaine DeepCwind and UMaine Penobscot Bay moorings. Bowdoin and UNE's moorings are respectively D02 (Lower Harpswell Sound) and C03 (East Saco Bay). NOAA buoys are given designated numbers as follows: 44005 (Gulf of Maine), 44007 (Portland), 44008 (Nantucket), 44011 (Georges Bank), 44013 (Boston), 44017 (Montauk Pt), 44018 (Cape Cod), 44020 (Nantucket Sound), and

44027 (Jonesport). NOAA CMAN (land) stations are given designated lettered names as follows: BUZM3 (Buzzards Bay), IOSN3 (Isle of Shoals), MDRM1 (Mt Desert Rock), MISM1 (Matinicus Rock), and PSBM1 (Eastport). Similar to the NOAA buoys, the Environment Canada buoys are given designated numbers and are as follows: 44258 (Halifax Harbor) and 44150 (LaHave Bank).

2.2 BATHYMETRY

As required by the RFP, offshore pilot project areas must have a minimum water depth of 300 ft (91 m). See Section 3.7 for a description of bathymetric data and resources used in this study. Bathymetric data for the GoM is depicted in Figure 2-1.

2.3 ENVIRONMENTAL RESOURCE IMPACTS

Selection of areas of interest for project development must include choosing sites that will avoid or minimize impacts on the environment, natural resources and human use activities. The process of assessing impacts must cover the offshore wind project area, the construction and assembly area, and the onshore aspects of the project. The following list includes relevant topics for area of interest impact assessment (see Section 5.0 for the impact assessment component of this study).

- Marine and onshore protected areas: federal or state designated areas
- Fisheries: Including lobster industry, commercial fishing, recreational fishing and other fisheries
- Benthic communities (corals): Including threatened and endangered species and fishery resources
- Demersal species: Including threatened and endangered species and fishery resources
- Pelagic species: Including threatened and endangered species and fishery resources
- Marine mammals: Including migratory species and threatened and endangered species
- Sea turtles: Including migratory species and threatened and endangered species
- Birds/bats: Including threatened and endangered species, migration routes, nesting and other important areas
- Visual impact: Including important tourism/recreational areas and neighboring communities
- Sound concerns: For people on the water or on nearby land masses
- Oceanographic effects: Including ecosystem-level impacts
- Communication: Including radars, microwave towers, etc.

- Ship traffic: Including commercial shipping lanes, short-distance freight and ferry routes
- Military activity/restricted areas: Including active military zones, unexploded ordnance areas, etc.
- Aviation: Including coastal airports
- Onshore land use conflicts: Including wetland and vernal pools fill impacts, as well as local zoning and land use permitting
- Cultural heritage/archaeology: Including shipwrecks, lighthouses, etc.

2.4 DISTANCE TO COASTLINE

As required by the Maine PUC RFP, proposed pilot projects must be a minimum of ten (10) nmi from any land area of the State of Maine, other than coastal wetlands or uninhabited islands. For the purposes of this report, this distance is measured from the mean lower low water (MLLW) datum. A ten (10) nmi offset from the coastline is depicted in Figure 2-1.

2.5 DISTANCE TO GRID INTERCONNECTION

Minimizing the distance to the electric grid interconnection, while still complying with requirements for distance to coastline, is particularly important to managing overall development costs. Greater distances translate into longer cable runs along the ocean floor and increased permitting and construction costs. Construction costs increase significantly the greater the distance from the grid interconnection due to increased diameter and lengths of cables and greater transit distances.

2.6 CONSTRUCTABILITY AND SUPPLY CHAIN

Construction and assembly of offshore wind project components (e.g. floating foundations and turbines) requires access to suitable construction facilities and equipment/material/trade supply chains in order for construction to be physically and economically feasible. These nearshore assembly areas need to be closely located to onshore facilities and must have ready access to navigable waters of sufficient depth connecting them to offshore wind project areas. Equipment and resources needed to meet constructability requirements are listed as follows:

- Contractors: Capable and experienced in offshore work, deepwater mooring installation, and subsea cables
- Trades people: Experienced welders, steel fabricators, pipe installers, etc.
- Machinists: Machining companies with wind turbine and energy component experience.
- Mooring systems: Mooring designers and manufacturers

- Cranes: Ranging from under 100 ton to 500 ton with offshore capabilities, onshore cranes available as well at shore facilities
- Barges: Capable of handling crane equipment and other construction activity, short lead time on rental vessels
- Support vessels: Tug boats capable of supporting barge vessels, crew vessels
- Shore support facilities: Dock yards, piers, launching capabilities, etc.
- Staging area: Available land for staging
- Harbor capacity and draft: Must be adequate to accommodate construction equipment, barges and support vessels
- Field office space: Temporary construction field office facilities with communications and office equipment
- Interior work/storage space: Available structures for interior construction work and storage
- Assembly area: Adequate marine assembly area
- Access to rail, highways and roads: Onshore facilities must be accessible by overland means of transport
- Proximity to local storage for components: There must be adequate facilities onshore to store component materials and parts. The local storage must have accessible dock facilities and allow for delivery of components to the assembly area in a timely fashion.

Development and construction of offshore wind projects requires a supply chain that is able to provide, at a minimum, the following in a timely fashion:

- Steel fabrications: Specifically for energy and/or maritime structural applications
- Composites: Access to manufacturing facilities with composite capabilities
- General: Construction materials, supplies and equipment for a complete and successful project.

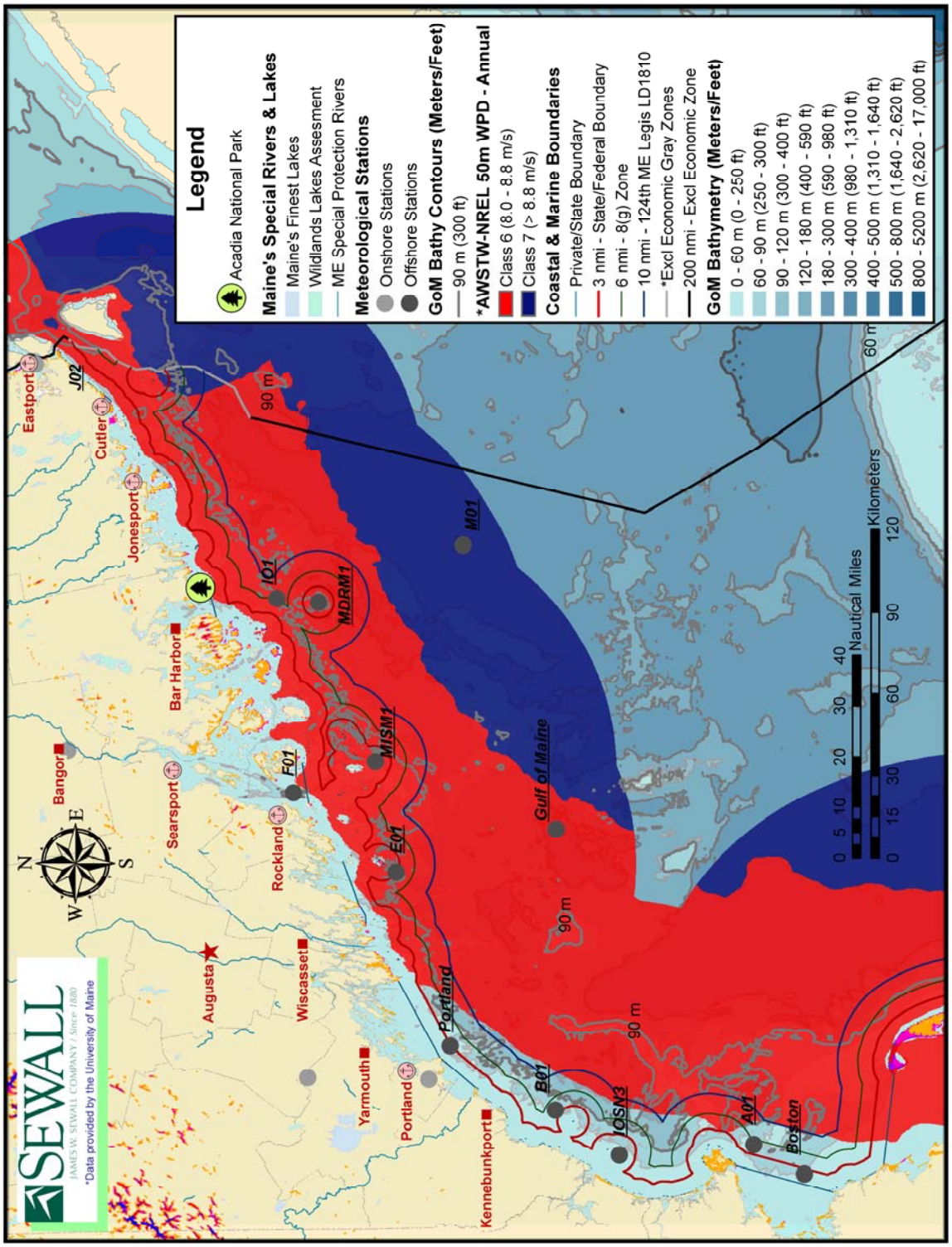

Figure 2-1: Screening criteria for offshore pilot project areas