

# Gulf of Maine Offshore Wind Energy Development Initiative



**Topic:** Updated Content of the Gulf of Maine Offshore Wind Energy Geographic Information System (OWEGIS) – DRAFT\*

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The Offshore Wind Energy Geographic Information System (OWEGIS) was created with the intent to collect, analyze, and graphically display information to assist in planning, permitting, and development of offshore wind energy in the Gulf of Maine. This document provides a brief description of the data been collected and integrated into the Gulf of Maine OWEGIS to date. Additionally, it identifies data in various stages of acquisition and integration, as well as supplemental information necessary to improve OWEGIS. **\*N.B. This information reflects current state of knowledge and should not be considered the final authority on continuously evolving data, data sources, or on-going scientific studies.**

## A. Current Content

(Items in gray indicate data sources that can only be viewed due to proprietary reasons and/or limited data sharing agreements.)

### 1 Gulf of Maine Wind Resource

- Analysis/interpretation of comprehensive wind data collected from the Gulf of Maine buoy network by Dr. Susan A. Elston, including wind speeds and classes for elevations of 50 m and 100 m above mean sea level.
  - January 2009 analysis includes 11 data stations within 3 nautical miles and 13 stations within 6 nautical miles of the coast, with a total of 40 data stations within U.S. and International Atlantic Ocean waters.
  - An additional 16 verifiable sites will be included for subsequent analyses of the wind resource.
- U.S. DOE National Renewable Energy Laboratory (NREL)/AWS Truewind Gulf of Maine wind resource at 50 & 100m.
- Scatterometer winds providing spatial fields of wind vectors over the entire Gulf of Maine (under consideration with Andy Thomas)

### 2 Boundaries/Municipalities/Population

- 2000 Maine State Census Data
- Maine towns
- Tax parcels (i.e., LURC vs. non-LURC divisions)
- State easements and right of way access (roads, transmission lines, pipelines, rail)
- State, New England States, and International boundaries
- Coastal state and federal marine boundaries  
(*private, state, federal “8(g)” revenue-sharing, territorial sea, contiguous zone, economic exclusive zone*)
- Outer Continental Shelf (OCS) Lease Blocks (data acquired, to be incorporated)

### **3 Transportation**

- Coastal airports (*within 10 nautical miles of the coast showing a 5 nautical mile radius buffer zone around them*)
- Ferry routes
- Coastal Navigation Charts (Resolution: 1:24,000 for Greater Portland; 1:80,000 – 1:120,000 elsewhere in the Gulf of Maine Region)
- Rail lines

### **4 Infrastructure**

- Electrical (*power plants, substations, 115 kV and 345 kV transmission lines*)
- Pipeline and cable infrastructure (data requested from management body)

### **5 Cultural/Historical Features**

- Native lands
- Sunken vessels, sea archeology sites
- Maine special protection rivers, Maine's Finest Lakes, Wildlands Lakes
- Maine portion of the Appalachian Trail
- Maine Wind Jammer Association estimated use range
- Fishing charter vessel and operations locations
- LANDSAT satellite imagery for the Gulf of Maine from USGS Global Viewer (to be incorporated)

### **6 Coastal Wildlife**

- Anadromous fish year-class counts of salmon per location
- Aquatic habitats (eelgrass, freshwater wetlands)
- Bats – some digitally available migration route and tracking survey routes
- Breeding bird – locations/routes where surveys were conducted
- Essential avian habitats (bald eagle nests; coastal seabird nesting; piping plover, least tern, roseate tern areas; inland waterfowl and wading bird areas)
- Migratory marine mammals – sightings of threatened, endangered, and depleted species (dolphins: bottlenose, spinner; turtles: green, leatherback, loggerhead; whales: fin back, humpback, minke, sei, northern right)
- Marine sanctuaries
- National Marine Fisheries Service Trawl Data
- Northeast Resources
  - Essential fish habitat – as per the Code of Federal Regulations (50CFR 648.81)
  - New England Multispecies closures (year-round and seasonal closures for scallops and other species)
  - Gulf of Maine Dynamic Area Management Zones (DAMS) for Right Whales (yearly, seasonal, and real time closures)

- Regulated mesh area (regulated fishing zones)

## **7 Coastal/Land Economic Regions**

- Lobster and fish trap area
- Coastal shellfish collection regions
- Worm crop harvest regions
- Biomass (total for the State of Maine)

## **8 Coastal Restrictions & Marine Hazards**

- Military zones
- Dragging prohibited zones
- Obstructions (physical hazards, buoys, etc.)
- Dumping and spoil grounds, explosives dumping grounds, areas of unexploded ordinance(s).
- Shipping lanes (harbor approach, traffic separation)
- Right whale restrictions (critical habitat, foaling grounds, recommended avoidance routes)
- Historical Atlantic hurricanes
- Maine Oil Spill Maps – indicating oil-sensitive areas with varying seasonal issues (partially incorporated)

## **9 Physical Characteristics**

- Maine 20 m topography
- Gulf of Maine bathymetry (ocean depths)
- Inter-continental shelf bathymetric survey tracks and bathymetry from Maine Geological Survey
- Geologic depth profiles of marine soils, bedrock, and gas deposits at discrete locations from Maine Geological Society survey tracks: locations shown in *OWEGIS*, with actual profiles available from UMaine Marine Geologists Joseph Kelley and Daniel Belknap.
- Inter-continental shelf (ICS) surficial soils and methane gas locations from the Maine Geological Survey (data in acquisition)
- Surficial soils (low resolution data)

## **B. Areas of *OWEGIS* Needing Further Development**

- Supplemental migration routes and tracking survey data (digital GIS or tabulated) for the following:
  - Protected mammals (right whales, etc.); Ground fish and fisheries resource zone information
  - Updates to salmon essential habitat; Birds; Bats (tracking methods: radar, satellite, or radio-tagged)
- Onshore historical or archeological sites (for permitting), recreational trails, additional recreational resources
- Additional Native population information regarding cultural/historical resources and wind power development
- Coastal island registry with latitude and longitude associated with island number
- Seaweed and Kelp Harvesting Areas
- National Park Service Data

- Comprehensive Maine State permitting agencies and requirements for offshore energy development
- All relevant public and marine policy, management, and planning information
- Additional power infrastructure information
- Med-flight information and coastal hospitals with helicopter landing facilities
- Potential New Sources of Information
  - Northwest Atlantic Marine Alliance
  - Island Institute
  - Maine Island Trails Association
  - University of Southern Maine Census on Marine Life
  - Penobscot East Resource Center
  - Cobscook Bay Resource Center

**C. Bibliography of digital information collected and integrated into *OWEGIS***

- Automated Wreck and Obstruction Information System (AWOIS) (from NOAA)
- Bangor Hydro (BHE)
- Maine Department of Environmental Protection (ME-DEP)
- Environment Canada (envCanada)
- Federal Emergency Management Agency (FEMA)
- Federal Geographic Data Committee (FGDC)
- Maine Department of Marine Resources (DMR)
- Maine Office of GIS (MEgis)
- Maine Geological Survey
- Maine Land Use Regulation Commission (LURC)
- Massachusetts Office of GIS (MAgis)
- National Atlas
- National Data Buoy Center (NDBC)
- National Geophysical Data Center (NGDC)
- National Oceanographic and Atmospheric Administration (NOAA)
- National Renewable Energy Laboratory (NREL)/AWS Truewind
- National Weather Service (NWS)
- National Marine Fisheries Service (NMFS)
- Northeast Multi-Species Information Sheet: Closed Area Regulations (<http://www.nero.noaa.gov/whaletrp>)
- Northeast Protected Resources (Division of NOAA)
- Office of Coast Survey (OCS) (Division of NOAA)
- Coastal Service Center (CSC) (Division of NOAA)

- Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP)  
A clearinghouse of proprietary “spatially, temporally interactive online archives for marine mammals, sea turtles and seabirds” comprised of data collected from worldwide resources and hosted by Duke University (<http://seamap.env.duke.edu/>)
- Patuxent Wildlife Research Center (<http://www.mbr-pwrc.usgs.gov/bbs/>)
- Maine State Planning Office (ME-SPO)
- The Nature Conservancy (TNC)
- United States Code of Federal Regulations (CFR)
- United States Geological Survey (USGS)
- United States Minerals Management Service (MMS)
- University of Maine Department of Marine Sciences
  - Physical Oceanography Group (PhOG) - Gulf of Maine Oceanographic Observation System (GoMOOS) Buoy Program
  - Marine Geology Work Group - Joseph Kelley and Daniel Belknap