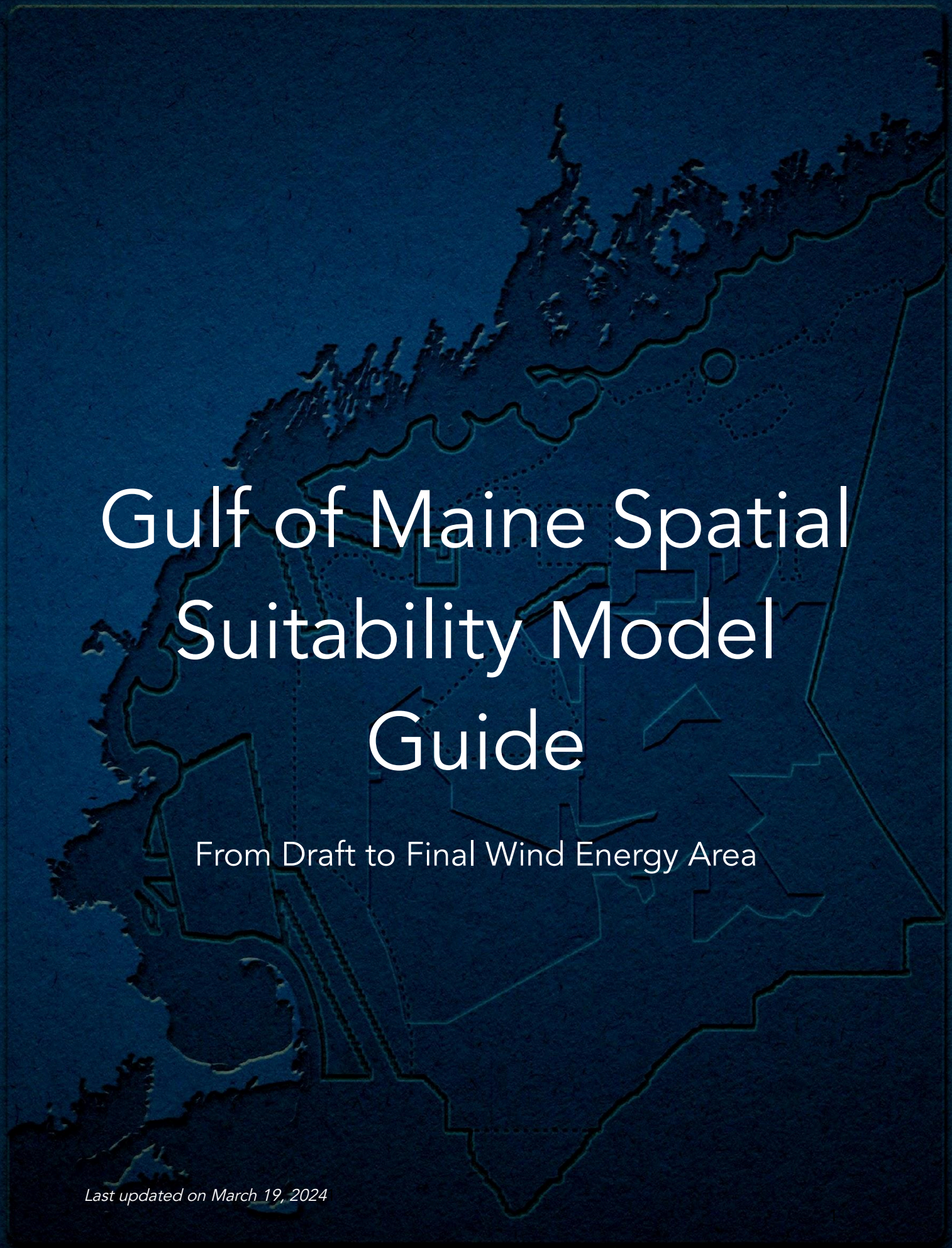

Gulf of Maine Spatial Suitability Model Guide

From Draft to Final Wind Energy Area

Last updated on March 19, 2024

What is the Final Wind Energy Area Suitability Model?

The National Oceanographic and Atmospheric Administration's (NOAA) National Centers for Coastal and Ocean Science (NCCOS) and the Bureau of Ocean Energy Management (BOEM) have partnered to understand ocean ecosystems and the interactions of human uses and natural resources through the use of a spatial suitability model. The model calculates important uses of the ocean to identify areas of lower conflict for future offshore wind development that have resulted in the Final Wind Energy Area.

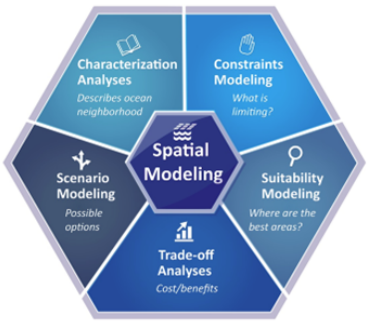

Figure 1. Spatial modeling overview. Source: NCCOS.

Why use spatial suitability modeling in the Gulf of Maine?

The Gulf of Maine is one of the most productive ecosystems in the world. The ecosystem drives the region's economy, culture, and heritage. As the floating offshore wind industry arrives in the Gulf of Maine, it is important to minimize any negative impacts on valuable resources and current marine uses. The spatial suitability model uses data to analyze the whole ocean system in an effort to identify hotspots for conflicting uses and potential opportunity.

How did BOEM use the spatial suitability model in the Gulf of Maine?

BOEM worked with NCCOS to create a spatial suitability model to inform the area identification process by incorporating the best-available data to reflect the multiple ocean uses and sectors. The model was developed by expert marine spatial scientists, marine ecologists, project coordinators, policy analysts, and subject matter experts at both BOEM and NCCOS, and informed by extensive outreach efforts to identify the areas of highest conflict that should be avoided for offshore wind development. BOEM first used the suitability model to inform the Draft Wind Energy Area (WEA) based on a boundary of the Call Area. After an extensive period of public engagement and receiving feedback on the Draft WEA, NCCOS and BOEM updated the model to inform the Final WEA.

The Final WEA analysis is a further refinement of the Draft WEA and is an additional effort to find the most suitable area in the siting process. Data layers included in Draft WEA model but not in the Final WEA model were still highly influential, as they informed the boundaries of the Draft WEA, which became the basis for siting the Final WEA.

The first model used 98 data layers to identify the most suitable area to inform the Draft WEA. This led to the exclusion of many areas of highest concern and greatest conflict, like Lobster Management Area 1 and fisheries habitat management areas. For a deeper dive into the suitability model used to inform the Draft WEA please read the Draft WEA Suitability Model Guide. Since many conflicts were removed from further consideration using the first model, an updated model was used to determine the Final WEA. The second model used the Draft WEA as a boundary and reduced the amount of data layers to eight key inputs. Reducing the data layers and using a smaller geographic area allowed the model to focus on identifying suitable areas based on constraining areas of spatial conflict that reflected the most concern from stakeholders: commercial groundfishing, North Atlantic right whales, and those resources and activities with high resolution data.

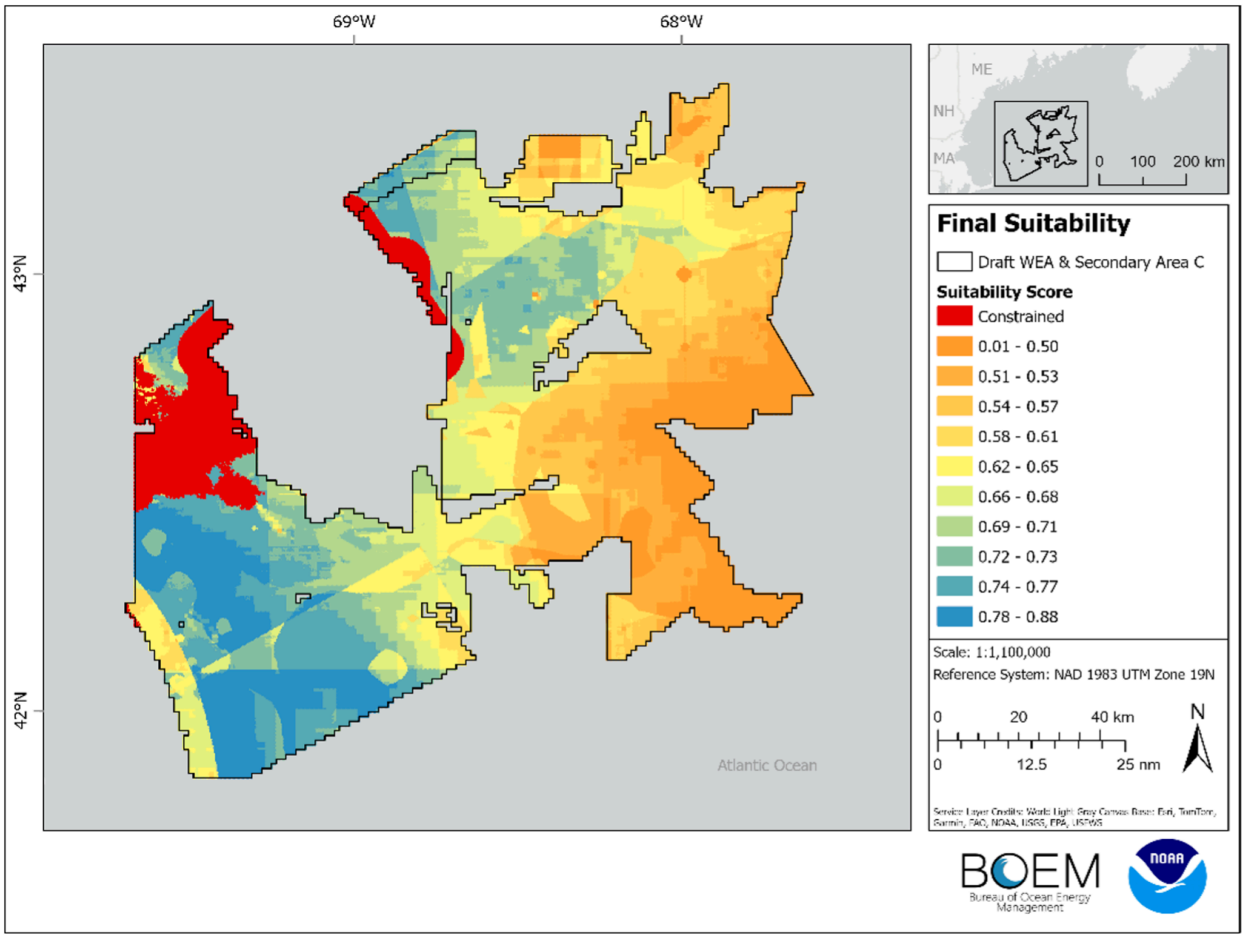

Figure 2 . Final suitability modeling results within the boundary of the Draft Wind Energy Area. Red color indicates a constrained (or removed) area. Orange/yellow color indicates areas of lowest suitability (highest conflict) for offshore wind energy development. Green/blue color indicates areas of highest suitability for offshore wind energy development. Source: BOEM.

What goes into the Suitability Model?

The NCCOS Suitability Model is complex. To understand its function, it is important to understand what goes into the model and what the model is asked to do. Data is acquired from many sources including - but not limited to - NOAA Fisheries, Northeast Ocean Data Portal, US Coast Guard, NCCOS, BOEM, state agencies, and the National Weather Service. Eight data layers were selected and then

characterized into categories (submodels) that get calculated for suitability individually, and then cumulatively, to identify the most suitable areas for offshore wind development.

What is a submodel?

The model uses several data layers that make up submodels based on major ocean sector categories. Each submodel data layer is assigned a unique suitability score for grid cells within a study area. In the Gulf of Maine the following two constraints and four submodels were used:

Constraints

A constraint is an area of complete avoidance due to limitation that restricts the suitability of an area for wind energy development. Constraints indicated in the Final WEA model:

1. Top 10% of of revenue for the multispecies groundfish fishery using vessel trip report (VTR) data
2. 5 mile buffer around Cashes Ledge Groundfish Closure and Habitat Management Area

Fisheries

This submodel is used to describe fishing activity and includes spatial data on effort, revenue, fishing vessel traffic, and fishing importance. Fisheries data layers used in the Final WEA model:

1. Fishing Footprint Raster Data (revenue) 2008 - 2021
2. VMS Data 2009 - 2021 (speed filtered to <4 knots)

Natural and Cultural Resources

This submodel represents spatial data on protected species, habitat, right whales, sea birds, protection areas, viewshed, and bathymetry to best represent the significance of natural and cultural resources to signal potential conflict. Natural and cultural resource data layers used in the Final WEA model:

3. Combined habitat layer with known coral and hard bottom habitat areas, conservation buffers from important benthic features, biogenic habitats, and areas shallower than 220 m for coral habitat protection
4. North Atlantic right whale Density (MDAT version 12.0)
5. Combined avian later with Integrated Seabird Risk and Vulnerability Assessment, tracking data for diving birds, and 24 nm from shore and islands

Industry and Operations

This submodel represents spatial data on vessel traffic and scientific surveys. Industry and Operations data layers used in the Final WEA model:

6. NMFS's Fisheries-Independent Surveys (13 total surveys)
7. AIS Vessel Traffic All Vessels 2015-2022 (fishing vessels removed)

Wind

This submodel represents spatial data on the levelized cost of energy which takes into account wind speed, points of interconnection and distance to ports to assess where cost can be lower. Wind data layers used in the Final WEA model:

8. Levelized Cost of Energy 2023

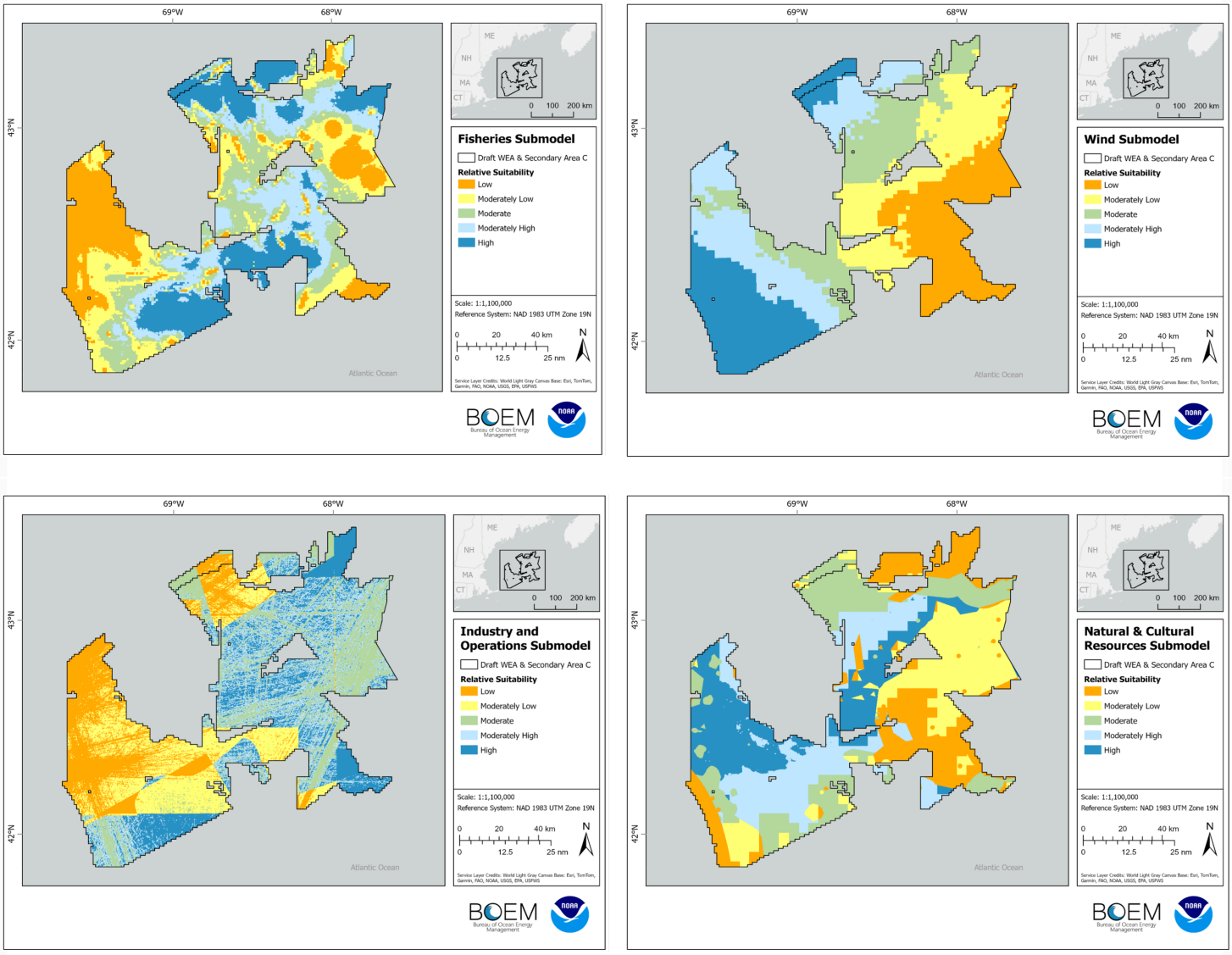

Figure 3 . Final suitability modeling results within the boundary of the Draft Wind Energy Area for each submodel (fisheries, wind, industry and operations, and natural and cultural resources. Orange/yellow color indicates areas of lowest suitability (highest conflict) for offshore wind development. Green/blue color indicates areas of highest suitability for offshore wind energy development. Source: BOEM.

How is the Suitability Model run?

The suitability model was run through a structured process that involved data collection and analysis, identifying criteria and assigning weights, and establishing methods to produce the map that reflected overall suitability for the Final Wind Energy Areas. BOEM used the Draft WEA and Secondary Area C as the boundary of the updated model. In response to engagement and comments, they removed the area that produced the top 10% of revenue for multispecies groundfish using vessel trip report data and any area within 5 miles of the Cashes Ledge Groundfish Closure and Habitat Management Area.

Eight data layers were assigned scores of relative compatibility (0 representing no suitability for offshore wind, and 1 being highly suitable for offshore wind). Data layers were then assigned to a submodel and each submodel (Figure 3) was weighted 25% of the model after constrained areas were removed to get to the final suitability model (Figure 2). For detail on the weights used for each data layer please refer to the NCCOS Final WEA model report.

From Model to Area Identification

BOEM opted to select the grid cells containing the top sixty percent of suitability scores. These areas are mostly represented by orange colors in the final model (Figure 2). BOEM requested to remove any non-contiguous area under 40,000 acres as areas smaller than this are not considered practical for commercial development. Upon further analysis, one triangular region in the center portion of the Final WEA was included because it was previously avoided in the Draft WEA based on the number of developer nominations in response to the Call and the area did not have any more or less ocean resource use conflicts than adjacent areas. This resulted in one contiguous WEA was identified at 2,001,902 acres.

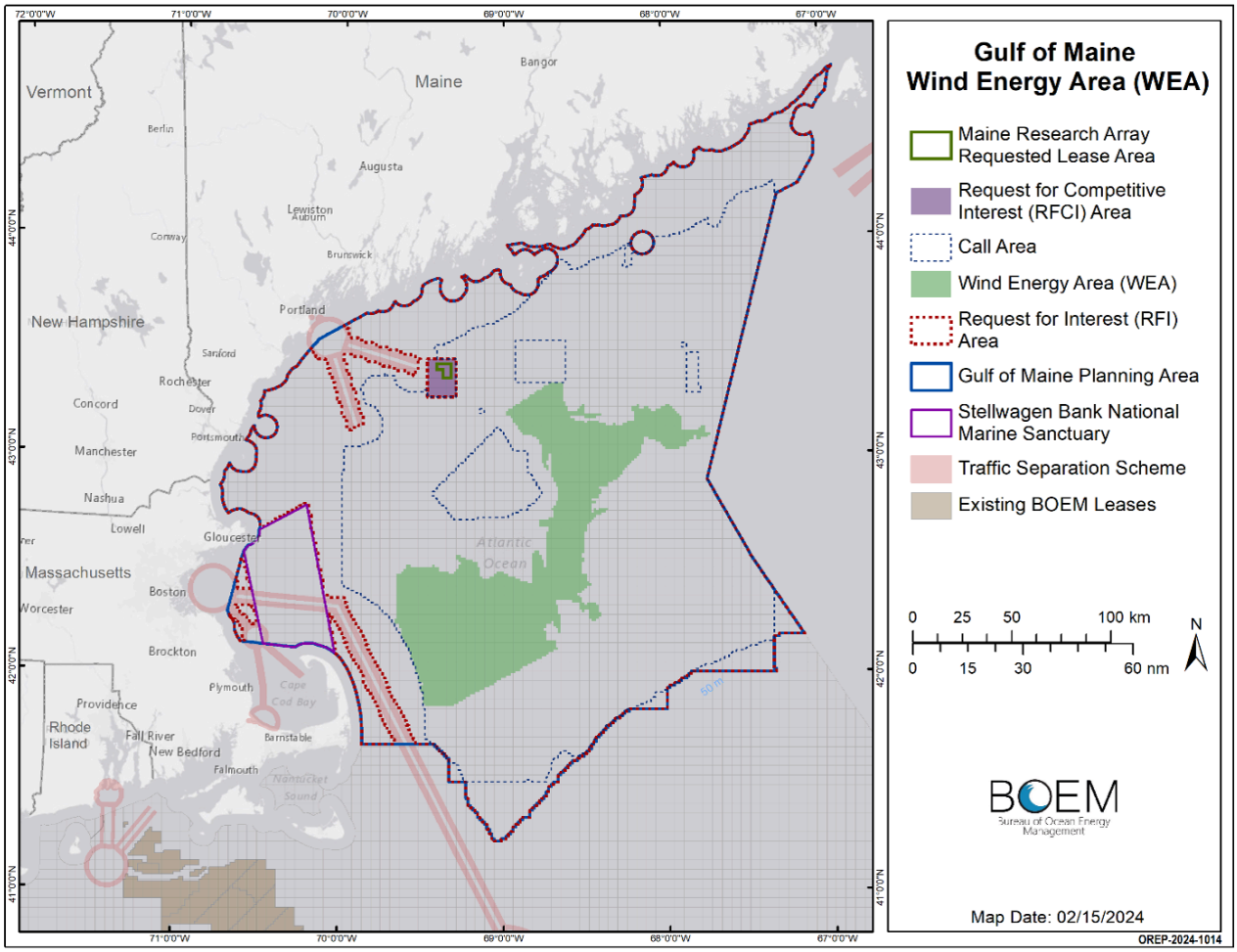

Figure 4. Final Wind Energy Area in green totaling 2,001,902 acres. Source: BOEM.