BOEM Bureau of Ocean Energy Management

Pacific Region
Oregon Draft Wind Energy Areas

Pacific Fishery Management Council
Coastal Pelagic Species Advisory Subpanel

BOEM: Jennifer Miller
NCCOS: Jessica Carlton

August 30, 2023

Agenda

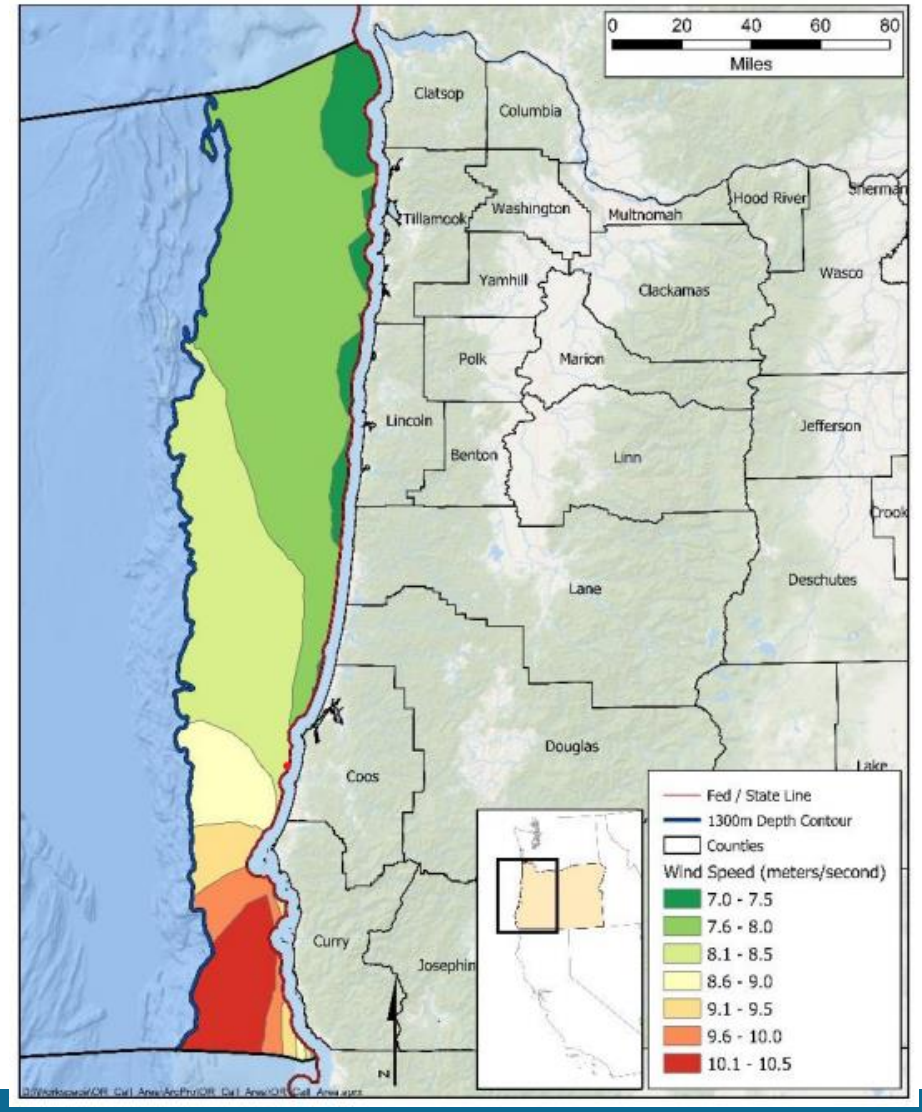
- Offshore wind planning in Oregon
- Development of Oregon Call Areas
- BOEM-NCCOS Spatial Modeling Process
- Potential Future Next Steps

Approach for Offshore Wind Energy Planning in Oregon

- Establish a data gathering and engagement plan in collaboration with Oregon DLCD and with Task Force input
- Create OROWindMap for data collection in publicly accessible website
- Conduct extensive outreach and engagement with stakeholders (120+ meetings since 2020)
- Published Call for Information and Nominations in the Federal Register in April, 2022: 278 comments, 4 nominations
- Coordination, outreach and engagement with Tribal Governments, State of Oregon, Federal agencies, State agencies
- Employing scientific studies and spatial analyses to support informed decision-making
- Publish Draft Wind Energy Areas for comments

Approach to Planning Process - Planning Area

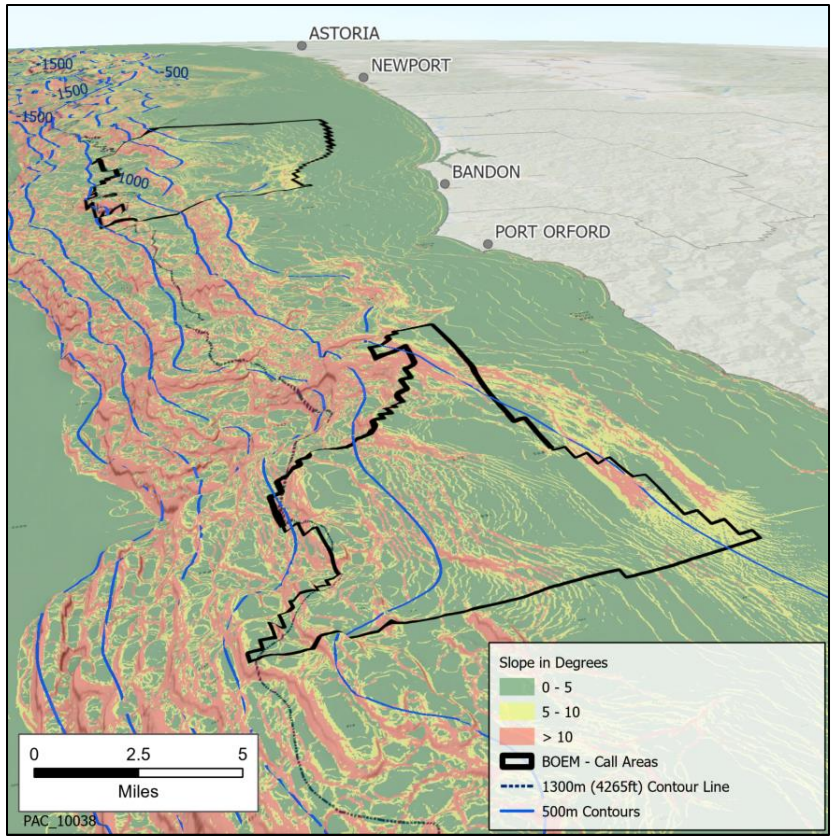
- **Planning Area - Entire Oregon OCS, where offshore wind is technically viable**
  - 3 nautical miles – 1,300 meters
  - Average wind speeds ≥ 7 meters/second (13.6 knots)
- **1,300 Meter Depth**
  - Technical and economically viable commercial development
  - World's deepest floating offshore wind facilities currently at 300 meters

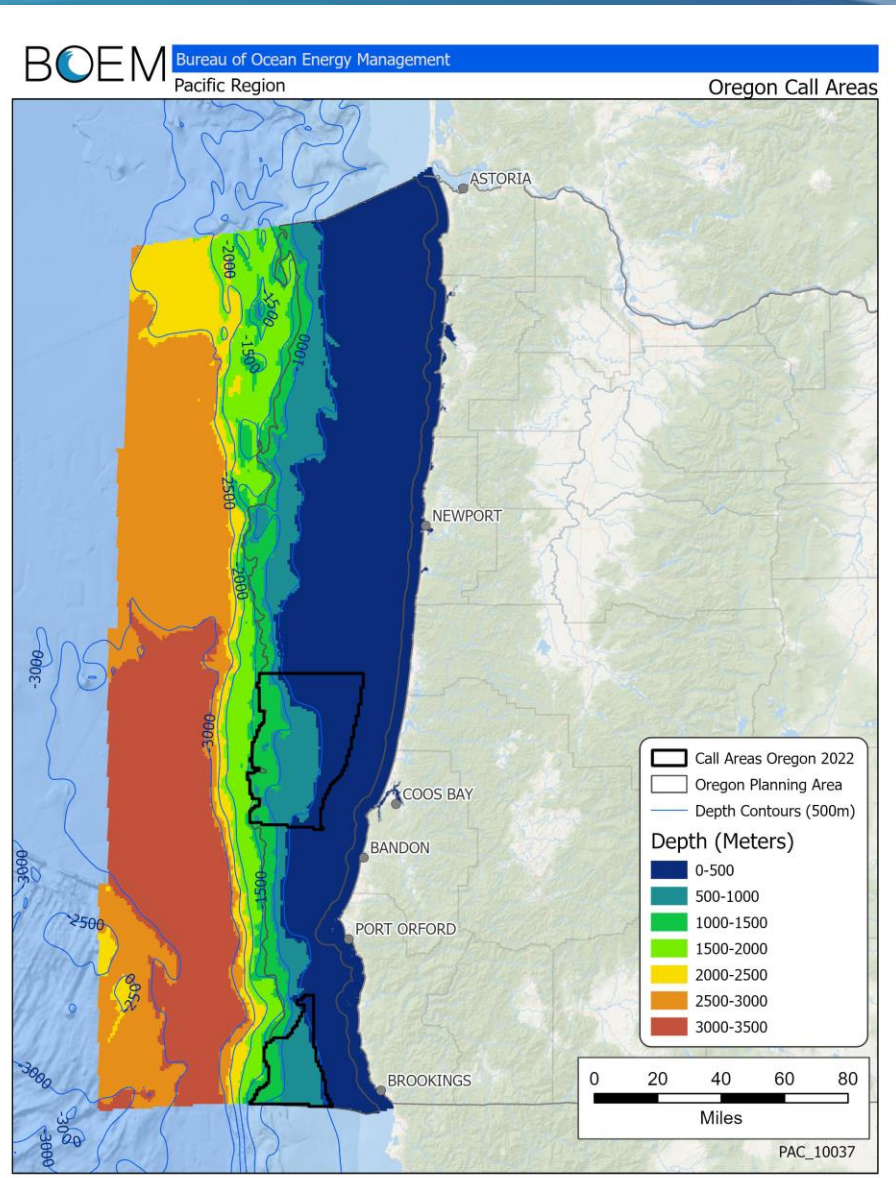


Why 1,300 Meters Offshore Oregon?

1,300 meter depth contour (4,300 ft)

- Very deep and steep beyond 1,300 m

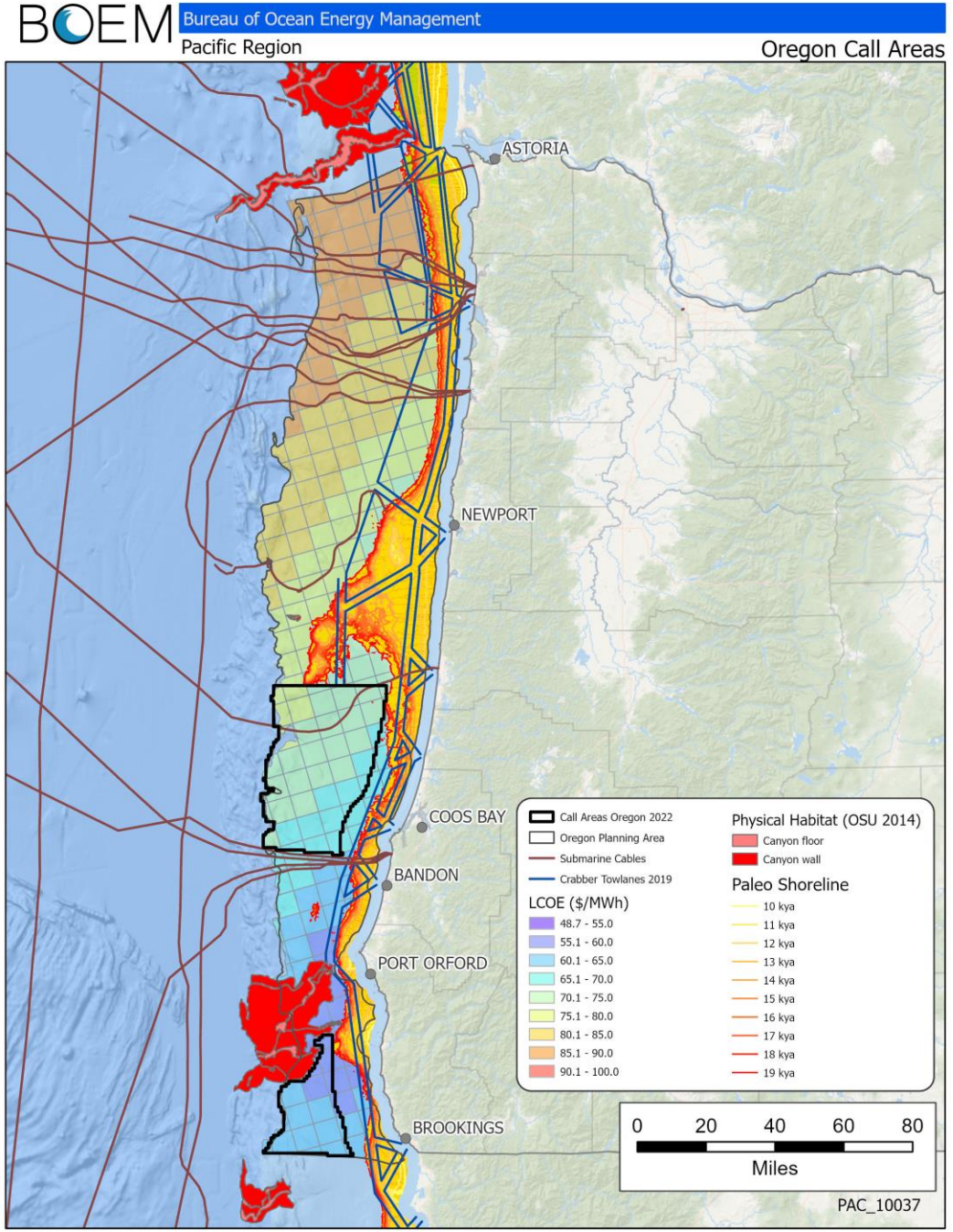




Note: underwater terrain is vertically exaggerated for illustrative purposes

Call Area Development

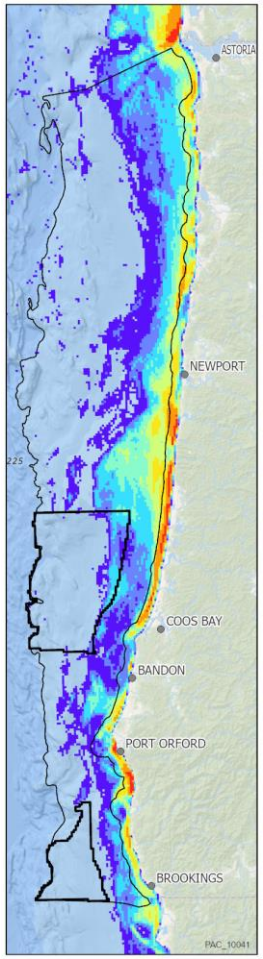
- 12 nautical miles (13.8 miles)
- 1,300 meter depth contour (4,300 ft)
- Wind Speed
- Levelized Cost of Energy (LCOE) ($/MWh)
- Paleo Shorelines
- Undersea Canyons
- Crabber Tug Tow Lanes
- Undersea Cables



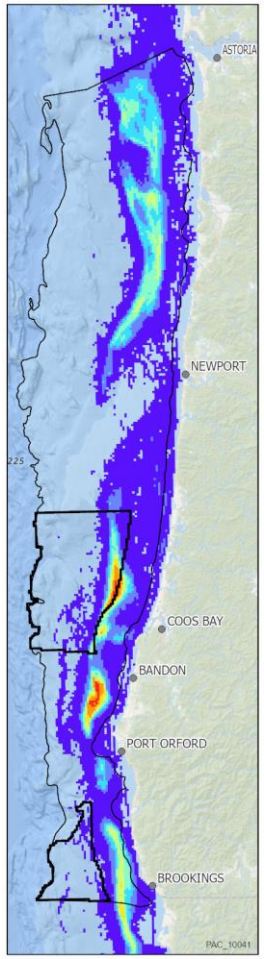
Commercial Fishing: Vessel Monitoring System (VMS)

(June 15-17, 2022, Newport, Coos Bay, Gold Beach meetings)

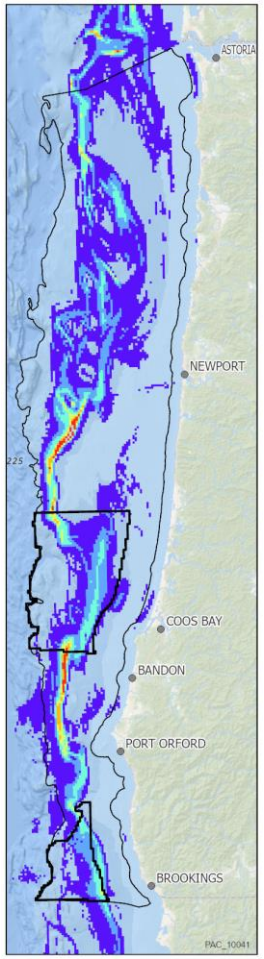
Dungeness Crab 2010-2021



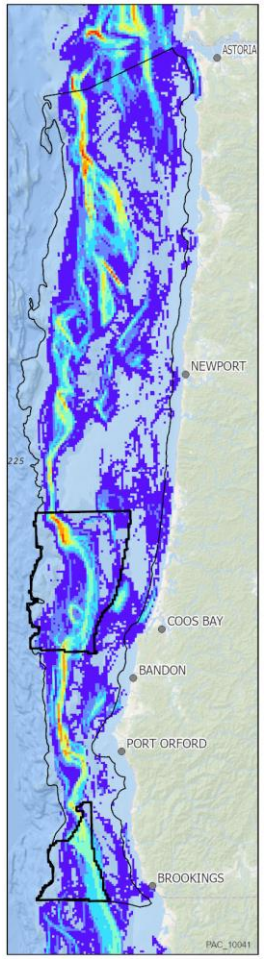
Pink Shrimp 2010-2021



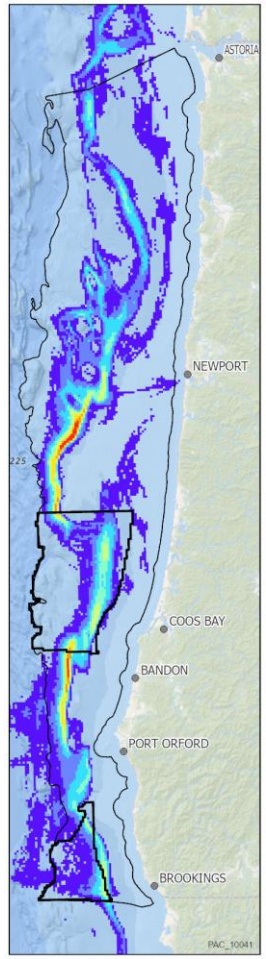
All Trawl 2010-2021



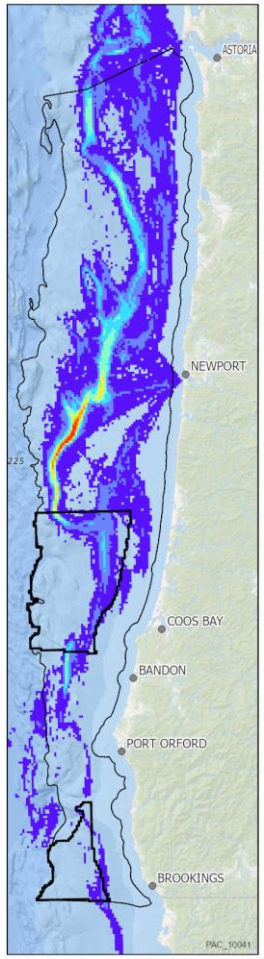
Bottom Trawl 2010-2021



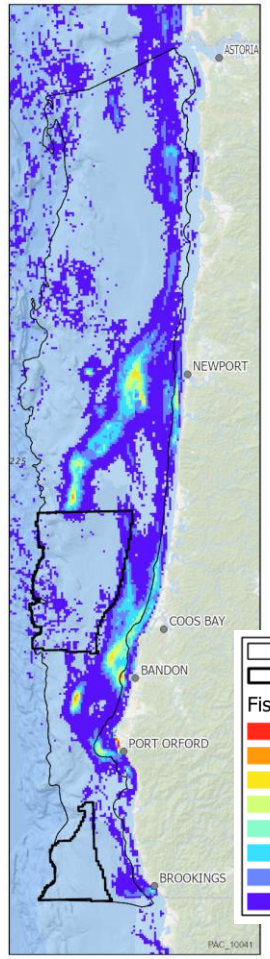
All Whiting 2010-2021



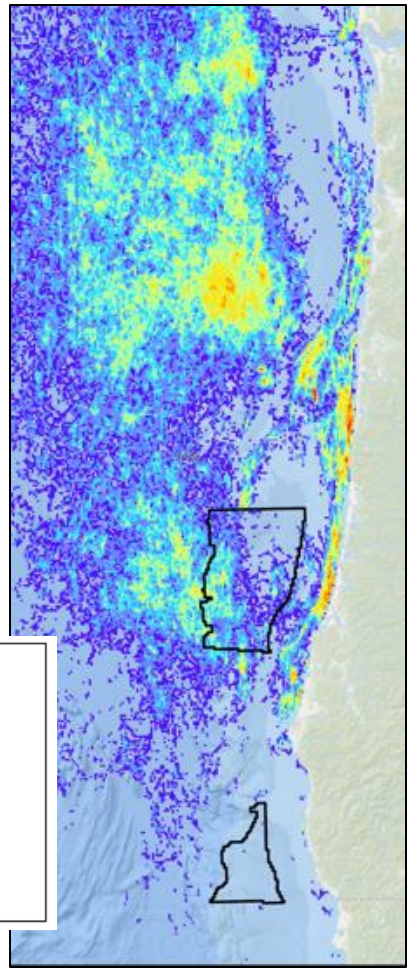
Shorebased Whiting 2010-2021



Salmon 2010-2021

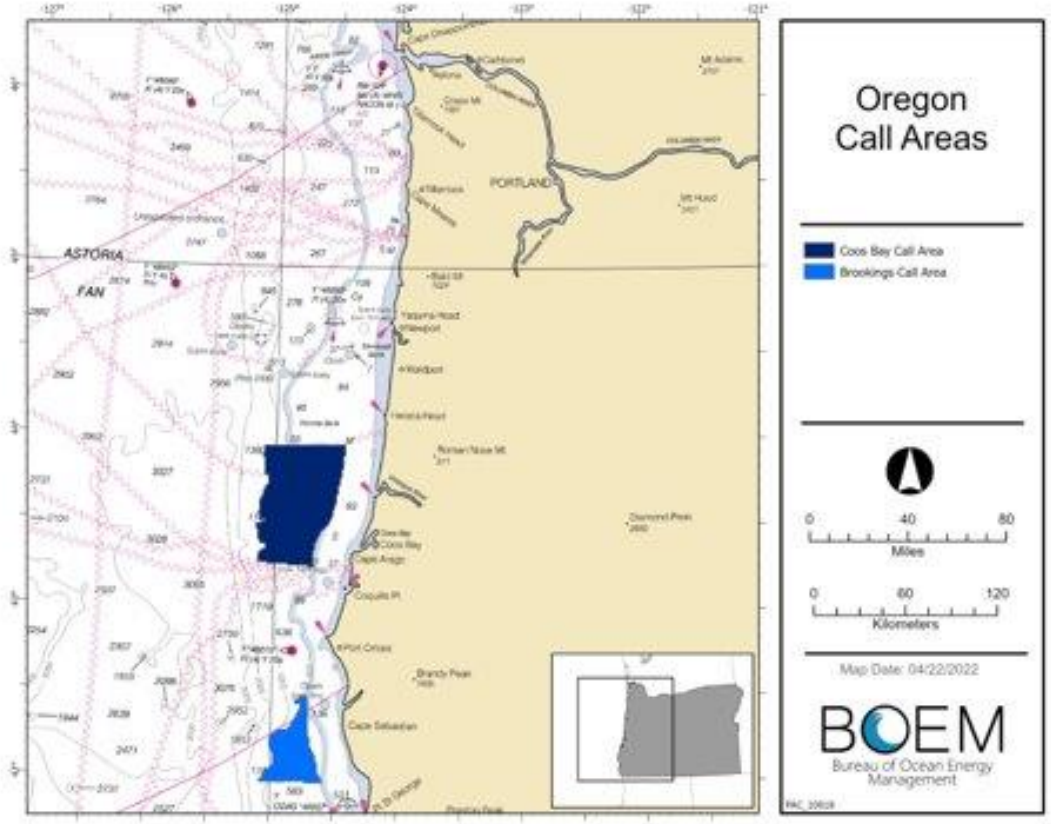


Highly Migratory Species 2010-2021



BOEM publishes 'Call for Information and Nominations'

- **February 25, 2022 – Task Force Meeting**
  - Proposed 3 Call Areas
- **April 29, 2022 – Task Force Meeting**
  - BOEM publishes 'Call for Information and Nominations' with 2 Call Areas in the Federal Register
- **60-day public comment period**
  - 278 unique comments received
  - 4 nominations of interest
- **Two Call Areas**
  - Coos Bay ~10.6 GW
  - Brookings ~3.5 GW
  - Supports Oregon state planning goal for up to 3 GW of floating offshore wind by 2030 (HB 3375)

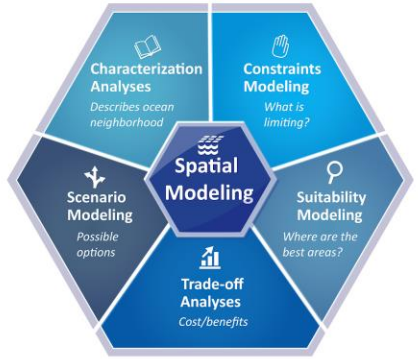


Data Gathering and Engagement Summary Report – Outreach Feedback Themes

- Interest in understanding:
  - **Visual impacts** from offshore wind farms
  - Impacts to **cultural resources** and Native American lifeways
  - Role and need for offshore wind energy as part of **Oregon's energy portfolio**, including **ratepayer costs**
  - **Economic** impacts and opportunities (e.g., jobs, tourism, port and shoreside infrastructure)
  - Socioeconomic impacts to **fishing activities;** long-term impact on the livelihood of fishers and other ocean users
  - Potential **environmental impacts**, including noise impacts and disruption of species behavior and migration patterns, on marine species, birds, and other wildlife
- Support for **continual and meaningful engagement** with potentially affected and interested users, especially ocean users, throughout all phases of offshore wind development

BOEM's Response to Comments and Feedback

- Added **Draft Wind Energy Area (WEA)** step to the process to improve transparency and allow for input from Tribal Nations, stakeholders, and the public
- Draft WEA development includes: input from government-to-government consultations; engagement with Federal, State, and local agencies; public comments received on Call Areas; BOEM-funded studies; and **NOAA NCCOS spatial suitability modeling**
- Increased **fishing outreach** discussions and opportunities for input
- **Provided information** on the Draft WEAs **to the Tribal Nations** for consideration and input **prior to** publication
- Created **full-time Tribal Liaison position** at BOEM Pacific Office
- Conducted **Visual Simulations study**



Spatial Modeling and Results

Spatial Suitability Modeling

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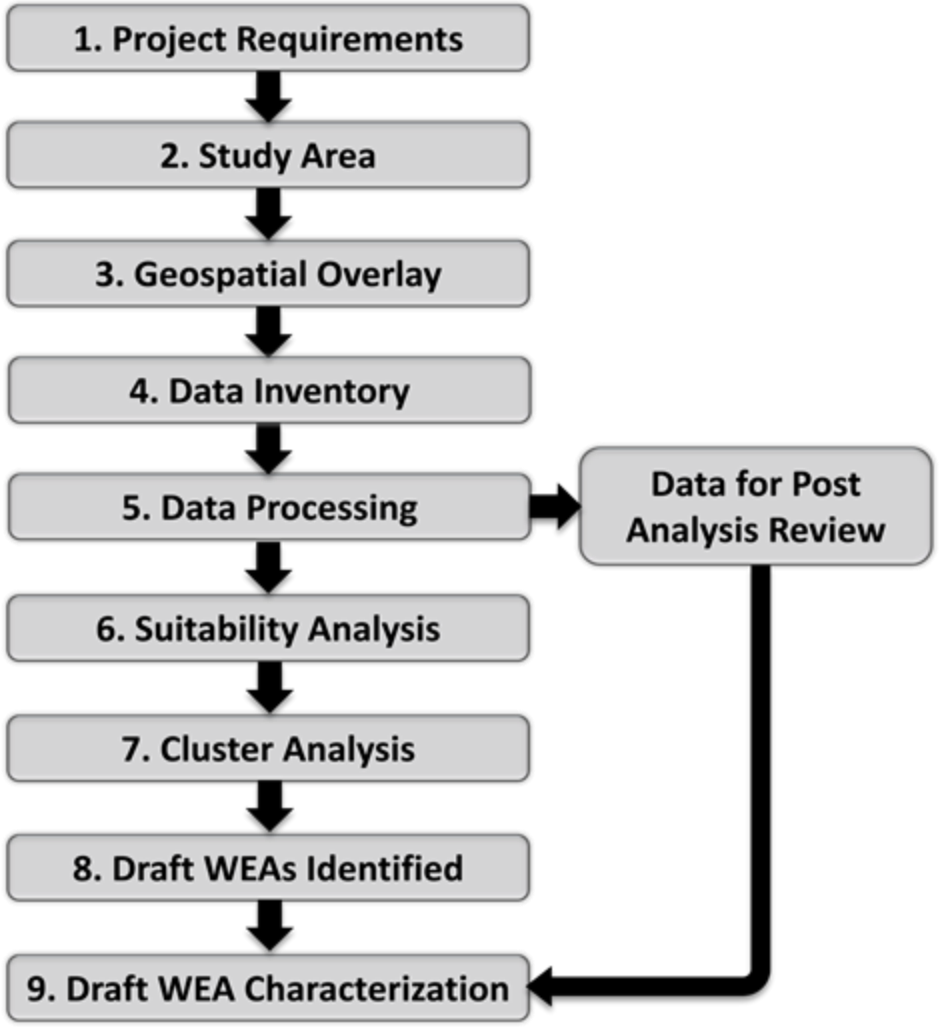
- A suitability model is a model that weights locations relative to each other based on given criteria.
- A common scale allows for meaningful values to be produced when the criteria are combined.
- Data must be transformed into a common scale so the criteria can be compared. We are using a 0 to 1 scale.
- Suitability modeling allows us to analyze the “whole ecosystem” and identify hotspots of conflict and opportunity.
- Provides defensible and transparent methods.
- Allows for scenario planning.

Spatial Planning Workflow



Modeling Methods

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Data

- OROWindMap — Supporting the Offshore Wind Planning Process in Oregon
- MarineCadastre.gov — An Ocean of Information — A joint BOEM and NOAA initiative providing authoritative data to meet the needs of the offshore energy and marine planning communities.
- NOAA FISHERIES
- United States Coast Guard
- Department of Defense
- National Weather Service
- Oregon Fish & Wildlife
- BOEM Bureau of Ocean Energy Management
- NCCOS

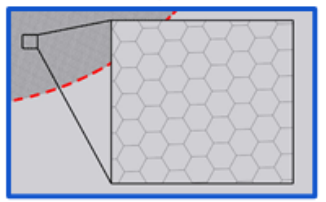
Submodels

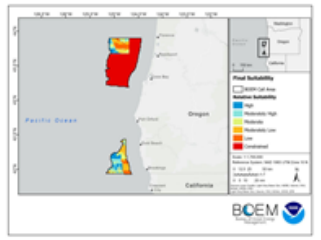
- Constraints
- Industry & Operations
- Fisheries
- Wind
- Natural Resources

Areas Eliminated

Geometric Mean Calculated

Final Suitability





Modeling Methods

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Categorical data

Data	Score
Hard Bottom Habitat	0.1
Marine Protected Areas & Preserves	0.4
Habitat Area of Particular Concern	0.1
Deep sea corals	0.2
Oil and Gas Pipelines	0.6
Shipwrecks	0.1
Shipping lanes	0

Example

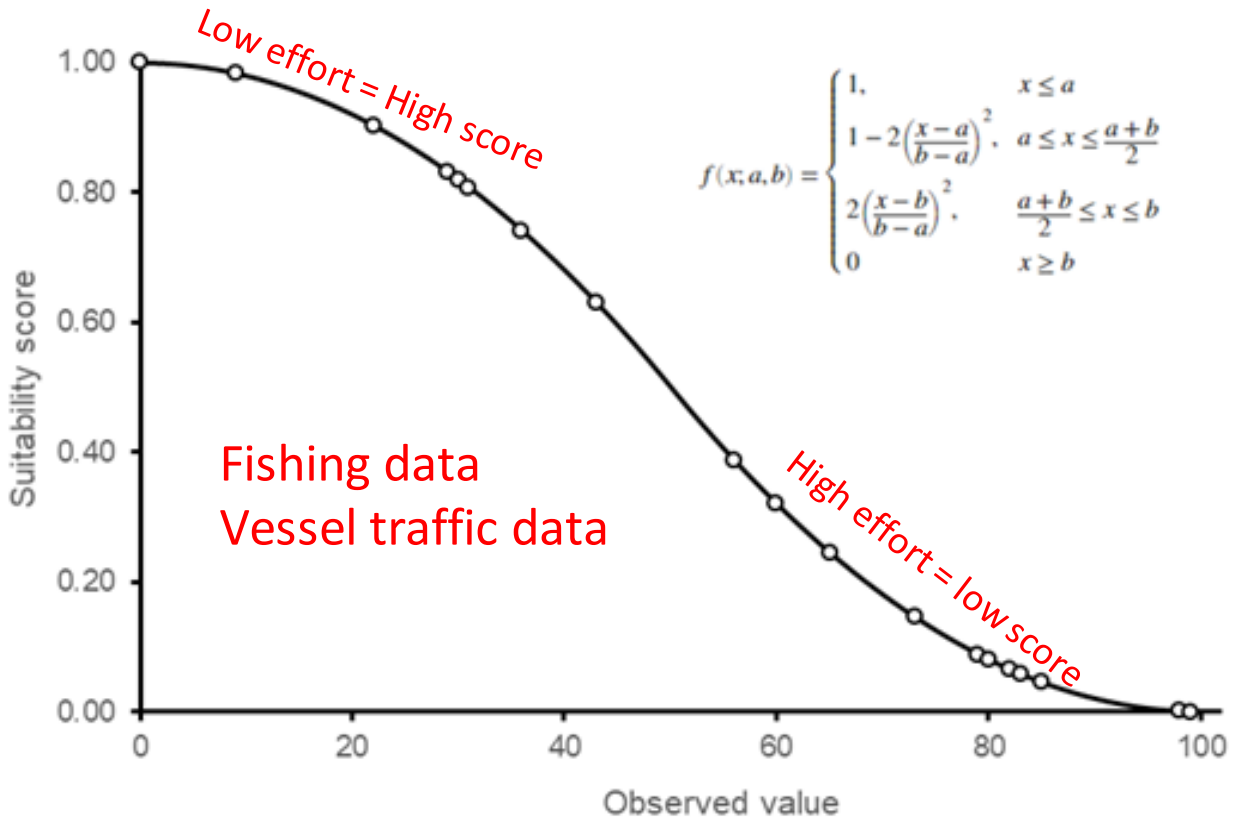
Data scoring

0 = not compatible

0.5 = moderately compatible

1 = most compatible

Continuous data



Combined Data Layers

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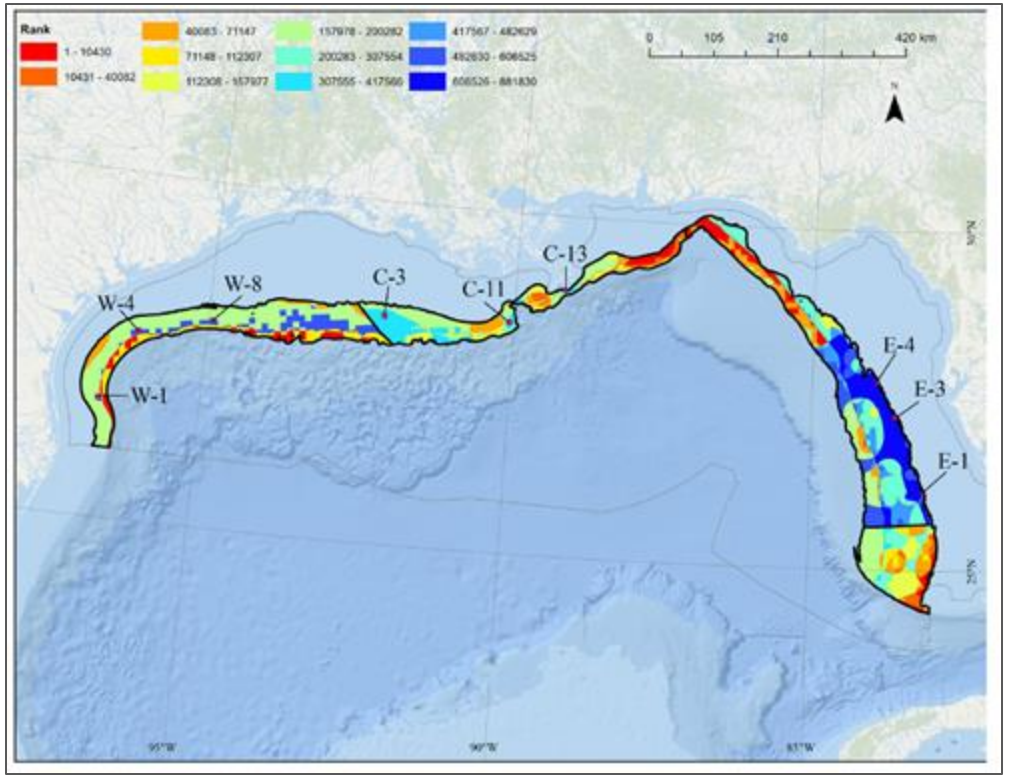
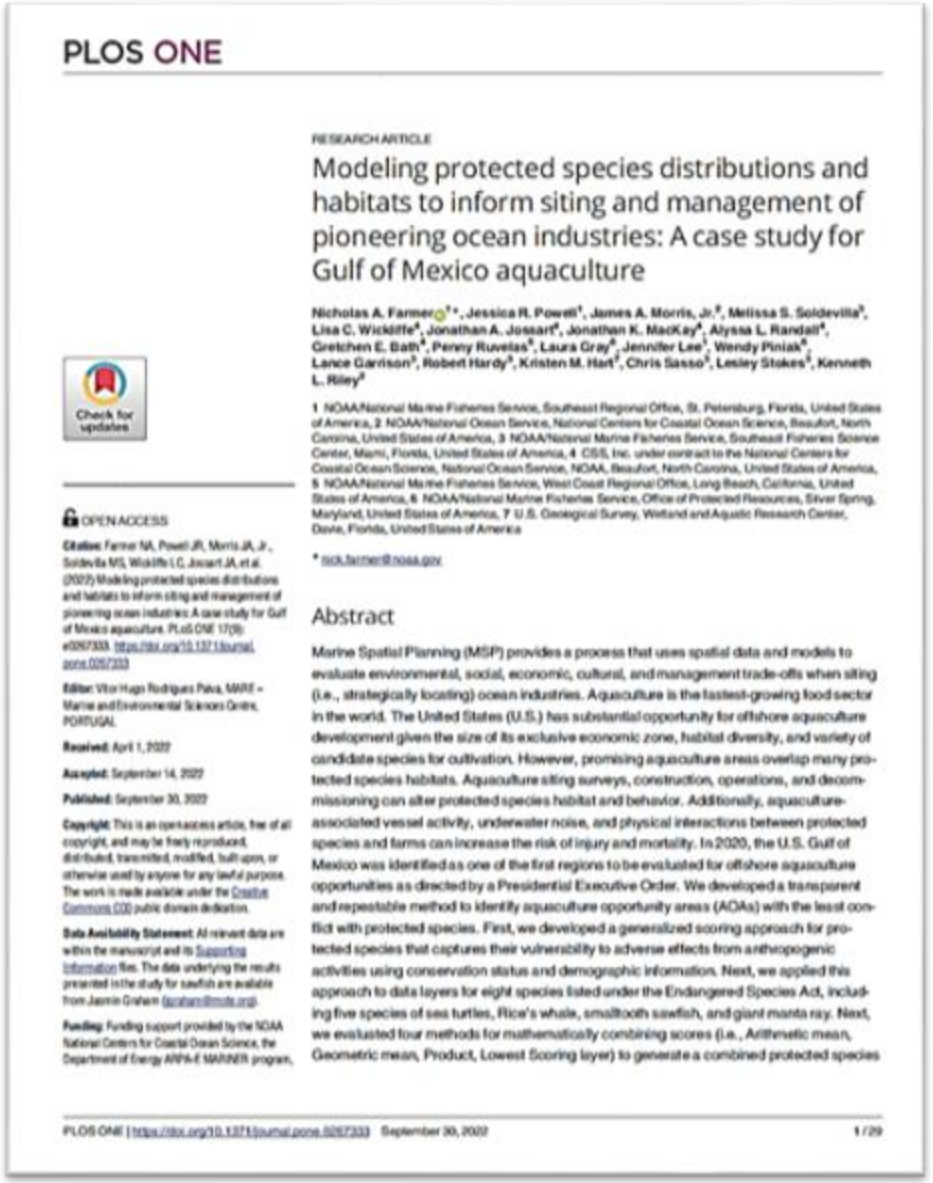
- Prioritizes conservation/deconfliction by topic
- Provides opportunity for everyone to get on the same page
- Provides new perspective on the topic at the regional ocean or call area scale
- Provides buy-in





PLOS ONE

RESEARCH ARTICLE

Modeling protected species distributions and habitats to inform siting and management of pioneering ocean industries: A case study for Gulf of Mexico aquaculture

Nicholas A. Farmer, Jessica R. Powell, James A. Morris, Jr., Melissa S. Soldevilla, Lisa C. Wickliffe, Jonathan A. Jossart, Jonathan K. MacKay, Alyssa L. Randall, Gretchen E. Bath, Penny Ruveias, Laura Gray, Jennifer Lee, Wendy Piniak, Lance Garrison, Robert Hardy, Kristen M. Hart, Chris Sasso, Lesley Stokes, Kenneth L. Riley

1 NOAA/National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, Florida, United States of America, 2 NOAA/National Ocean Service, National Centers for Coastal Ocean Science, Beaufort, North Carolina, United States of America, 3 NOAA/National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, Florida, United States of America, 4 CSS, Inc. under contract to the National Centers for Coastal Ocean Science, National Ocean Service, NOAA, Beaufort, North Carolina, United States of America, 5 NOAA/National Marine Fisheries Service, West Coast Regional Office, Long Beach, California, United States of America, 6 NOAA/National Marine Fisheries Service, Office of Protected Resources, Silver Spring, Maryland, United States of America, 7 U.S. Geological Survey, Wetland and Aquatic Research Center, Davie, Florida, United States of America

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OPEN ACCESS

Citation: Farmer NA, Powell JR, Morris JA, Jr., Soldevilla MS, Wickliffe LC, Jossart JA, et al. (2022) Modeling protected species distributions and habitats to inform siting and management of pioneering ocean industries: A case study for Gulf of Mexico aquaculture. PLoS ONE 17(9): e0267333. https://doi.org/10.1371/journal.pone.0267333

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Data Availability Statement: All relevant data are within the manuscript and its Supporting Information files. The data underlying the results presented in the study for sawfish are available from Jasmin Graham (jgraham@mote.org).

Funding: Funding support provided by the NOAA National Centers for Coastal Ocean Science, the Department of Energy ARPA-E MARINER program,

Abstract

Marine Spatial Planning (MSP) provides a process that uses spatial data and models to evaluate environmental, social, economic, cultural, and management trade-offs when siting (i.e., strategically locating) ocean industries. Aquaculture is the fastest-growing food sector in the world. The United States (U.S.) has substantial opportunity for offshore aquaculture development given the size of its exclusive economic zone, habitat diversity, and variety of candidate species for cultivation. However, promising aquaculture areas overlap many protected species habitats. Aquaculture siting surveys, construction, operations, and decommissioning can alter protected species habitat and behavior. Additionally, aquaculture-associated vessel activity, underwater noise, and physical interactions between protected species and farms can increase the risk of injury and mortality. In 2020, the U.S. Gulf of Mexico was identified as one of the first regions to be evaluated for offshore aquaculture opportunities as directed by a Presidential Executive Order. We developed a transparent and repeatable method to identify aquaculture opportunity areas (AOAs) with the least conflict with protected species. First, we developed a generalized scoring approach for protected species that captures their vulnerability to adverse effects from anthropogenic activities using conservation status and demographic information. Next, we applied this approach to data layers for eight species listed under the Endangered Species Act, including five species of sea turtles, Rice's whale, smalltooth sawfish, and giant manta ray. Next, we evaluated four methods for mathematically combining scores (i.e., Arithmetic mean, Geometric mean, Product, Lowest Scoring layer) to generate a combined protected species

Oregon Suitability Model Data Inputs

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Data Layer	Setback Distance	Score (0-1)
Constraints Submodel		
Department of Defense (DOD) – Exclusion Area	-	0
Pacific Coast Port Access Route Study (PACPARS)	-	0
Industry and Operations Submodel		
Submarine Cables	0 - 500 m	0.6
	501 - 1000 m	0.8
NMFS Scientific Surveys Combined Data Layer	-	NMFS Scoring
Natural Resources Submodel		
NMFS Protected Species Combined Data Layer	-	NMFS Scoring
NMFS Habitat Combined Data Layer	-	NMFS Scoring
Marine Bird Combined Data Layer	-	Z Membership Function 0.01 - 1.0
Fisheries Submodel		
NMFS & ODFW Fisheries Combined Data Layer	-	NMFS & ODFW Scoring
Wind Submodel		
Levelized Cost of Energy for 2027	-	Linear Function 0.8 - 1.0 (Lower cost is better)

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Constraints Submodel

Department of Defense Exclusion Area
PACPARS Proposed Fairway Zone

Constraints Submodel Data Inputs

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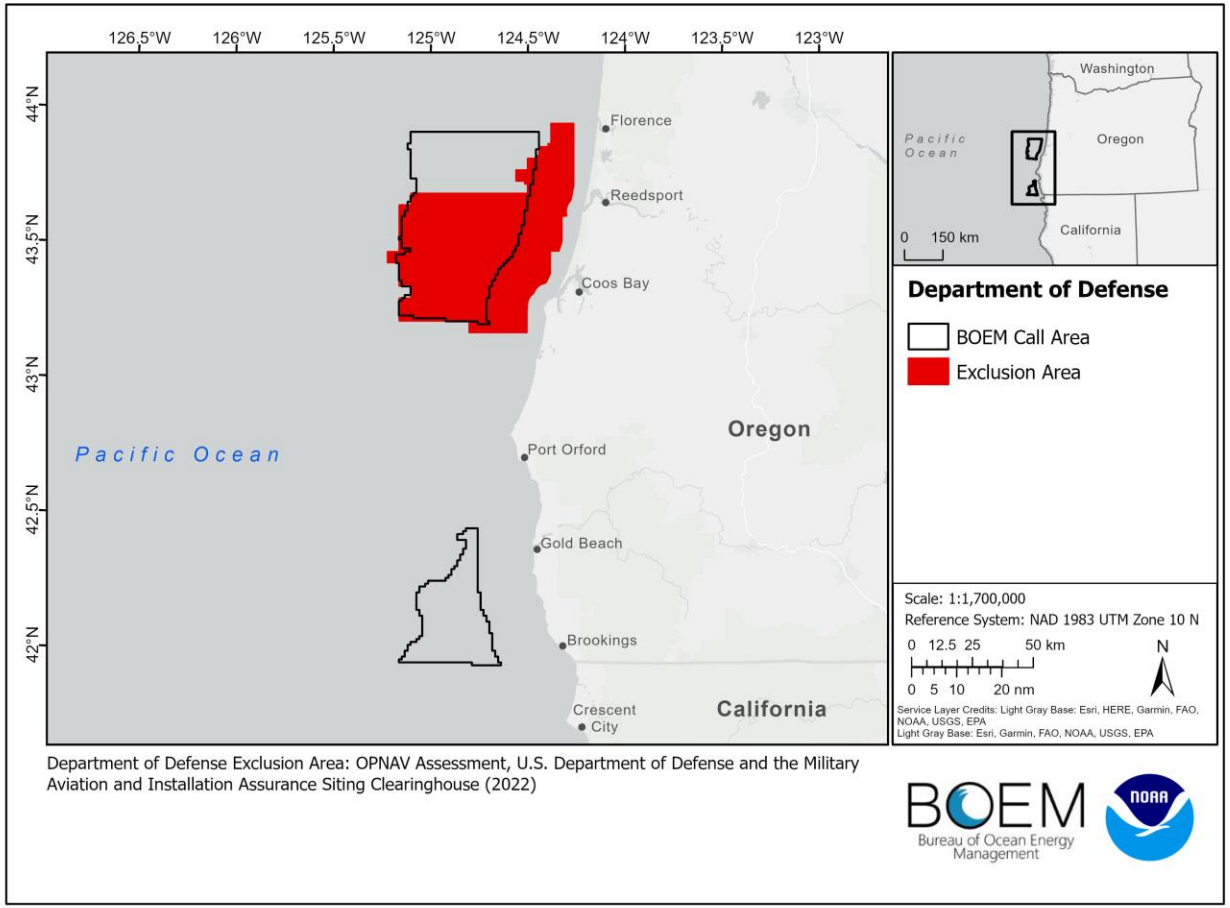
Department of Defense Exclusion Area
Score of 0



Department of Defense Exclusion Area: OPNAV Assessment, U.S. Department of Defense and the Military Aviation and Installation Assurance Siting Clearinghouse (2022)

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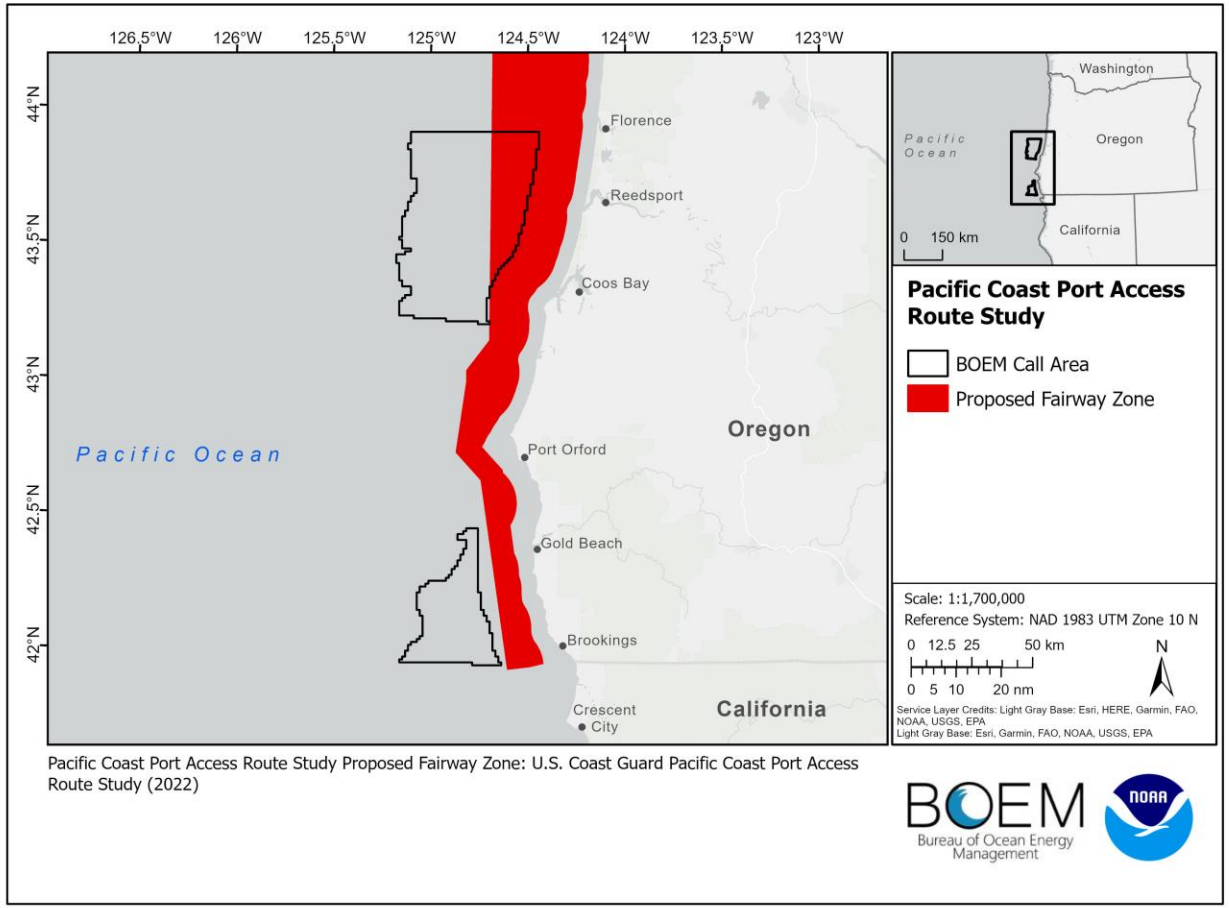
PACPARS – Proposed Fairway Zone
Score of 0



Pacific Coast Port Access Route Study Proposed Fairway Zone: U.S. Coast Guard Pacific Coast Port Access Route Study (2022)

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Constraints Submodel Results

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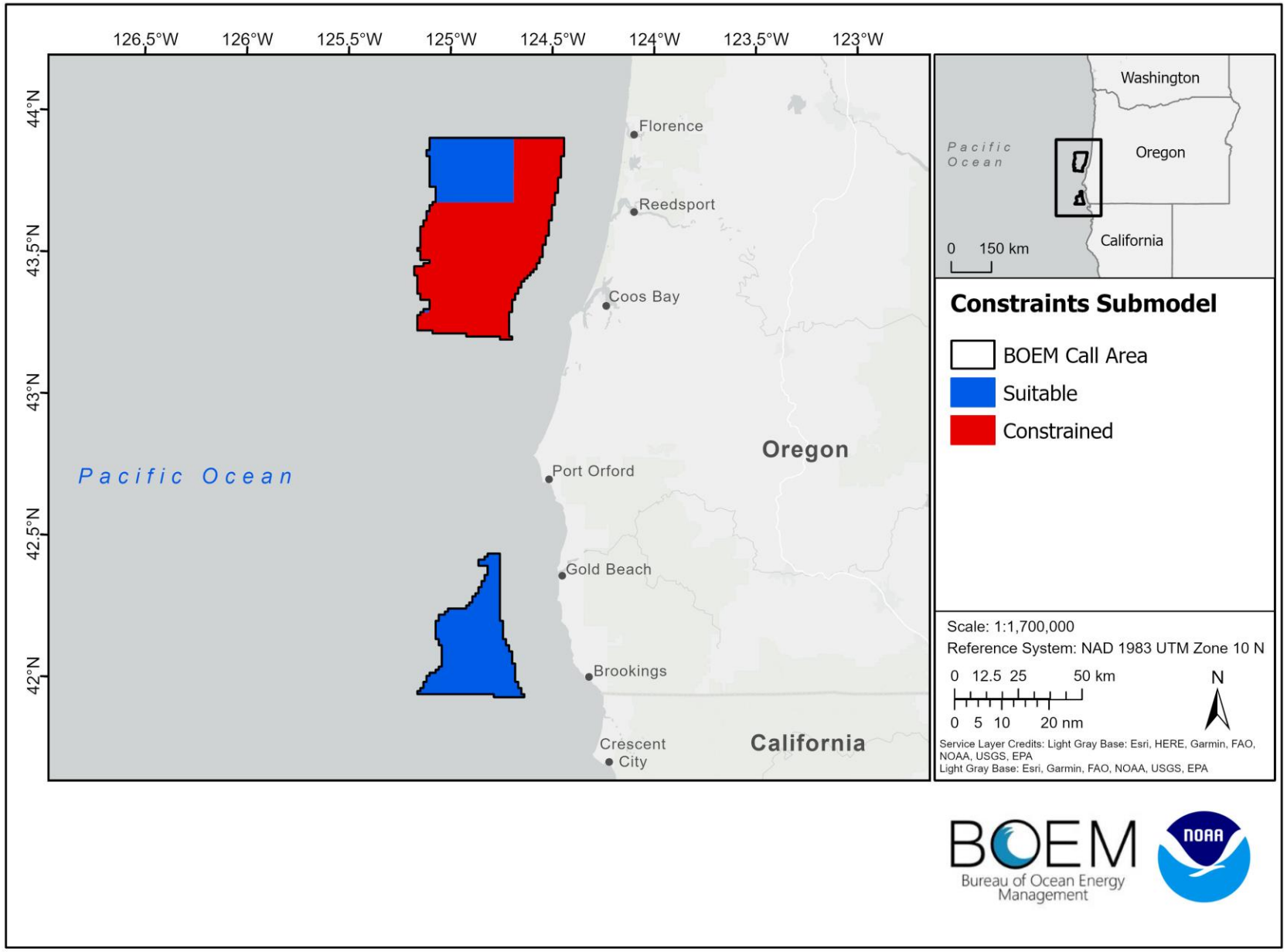
Constraint data layers	# acres constrained	# acres suitable
DOD	577,900	595,100
PACPARS	212,300	960,700
All Constraints	**675,550**	**497,450**

Constraints resulted in a **57.59%** reduction in Call Area.



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Industry & Operations Submodel

Submarine Cables

NMFS Scientific Surveys Combined Data Layer

Industry & Operations Submodel Data Inputs

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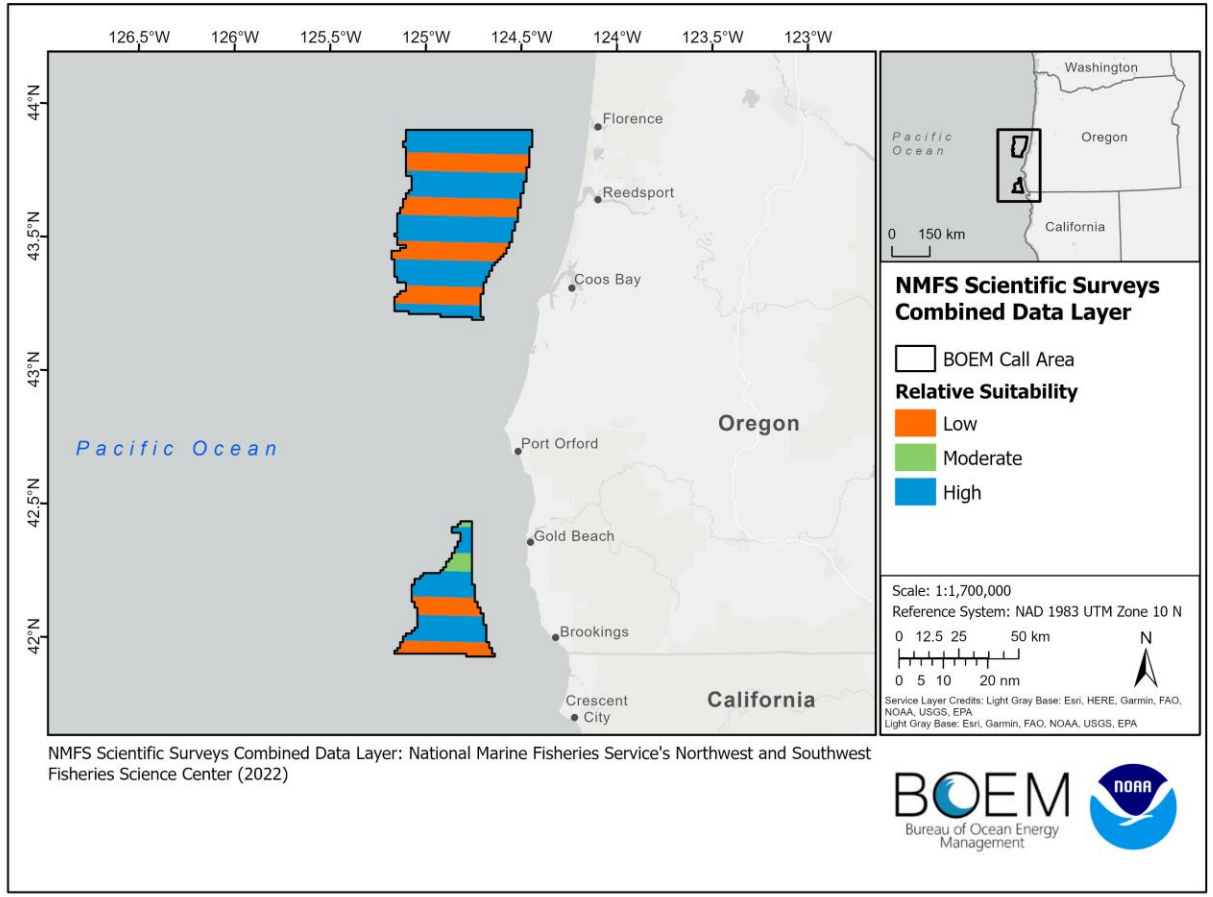
NMFS Scientific Surveys

Scoring provided by NMFS



NMFS Scientific Surveys Combined Data Layer: National Marine Fisheries Service's Northwest and Southwest Fisheries Science Center (2022)

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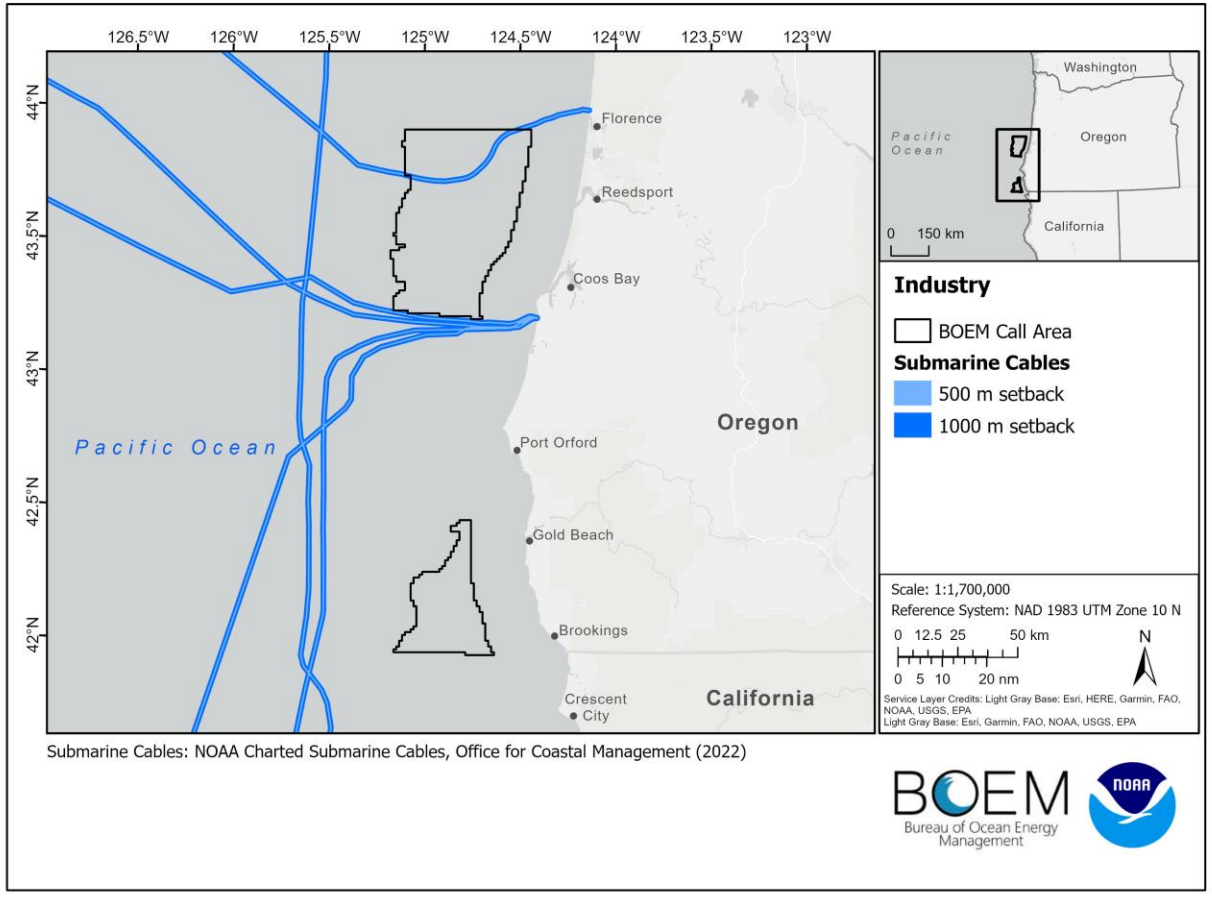
Submarine Cables

0-500 m = 0.6

501-1000 m = 0.8



Submarine Cables: NOAA Charted Submarine Cables, Office for Coastal Management (2022)

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Industry & Operations Submodel Results

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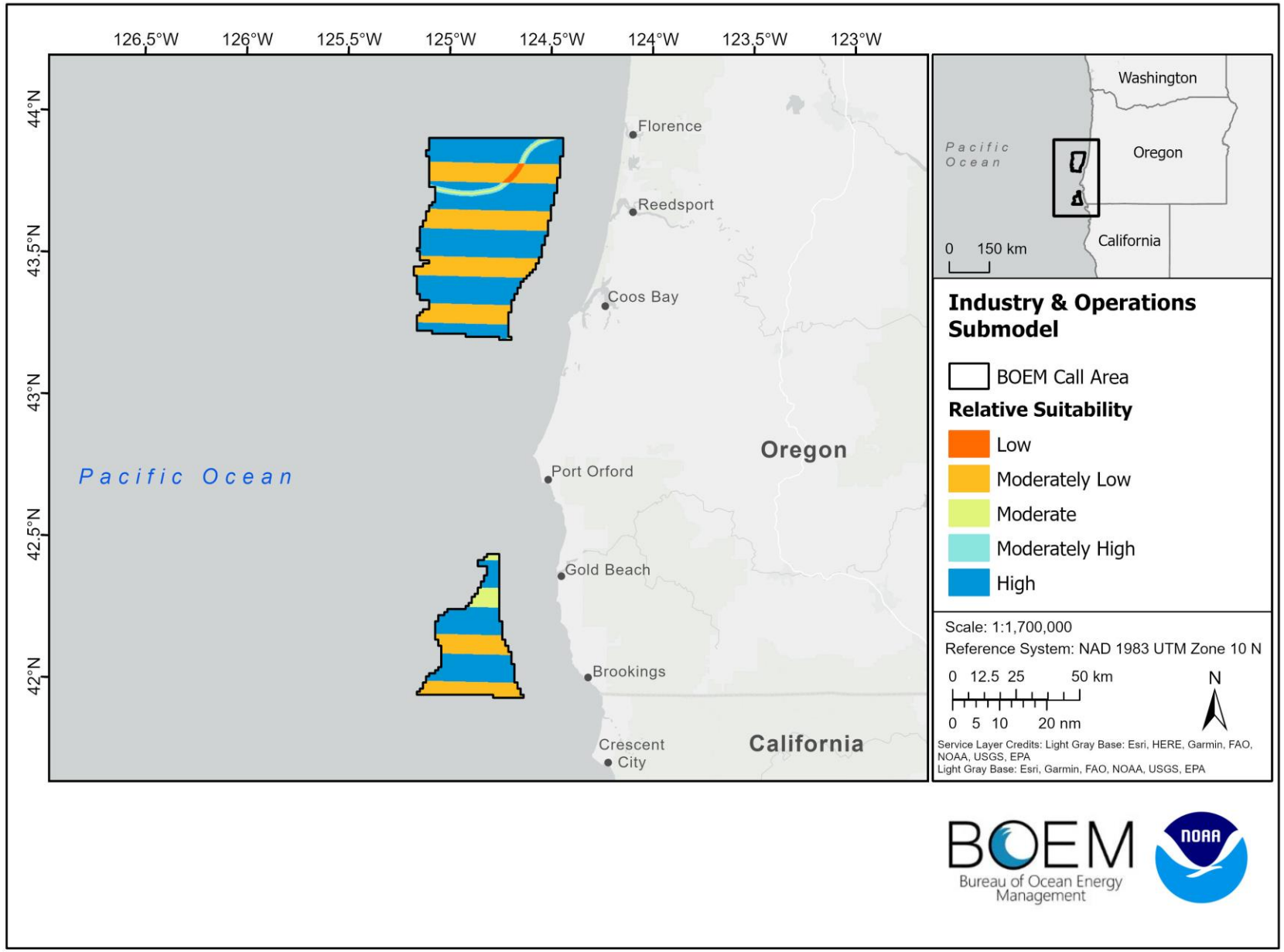

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Natural Resources Submodel

NMFS Protected Species Combined Data Layer
NMFS Habitat Combined Data Layer
Marine Birds Combined Data Layer

Natural Resources Submodel Data Inputs

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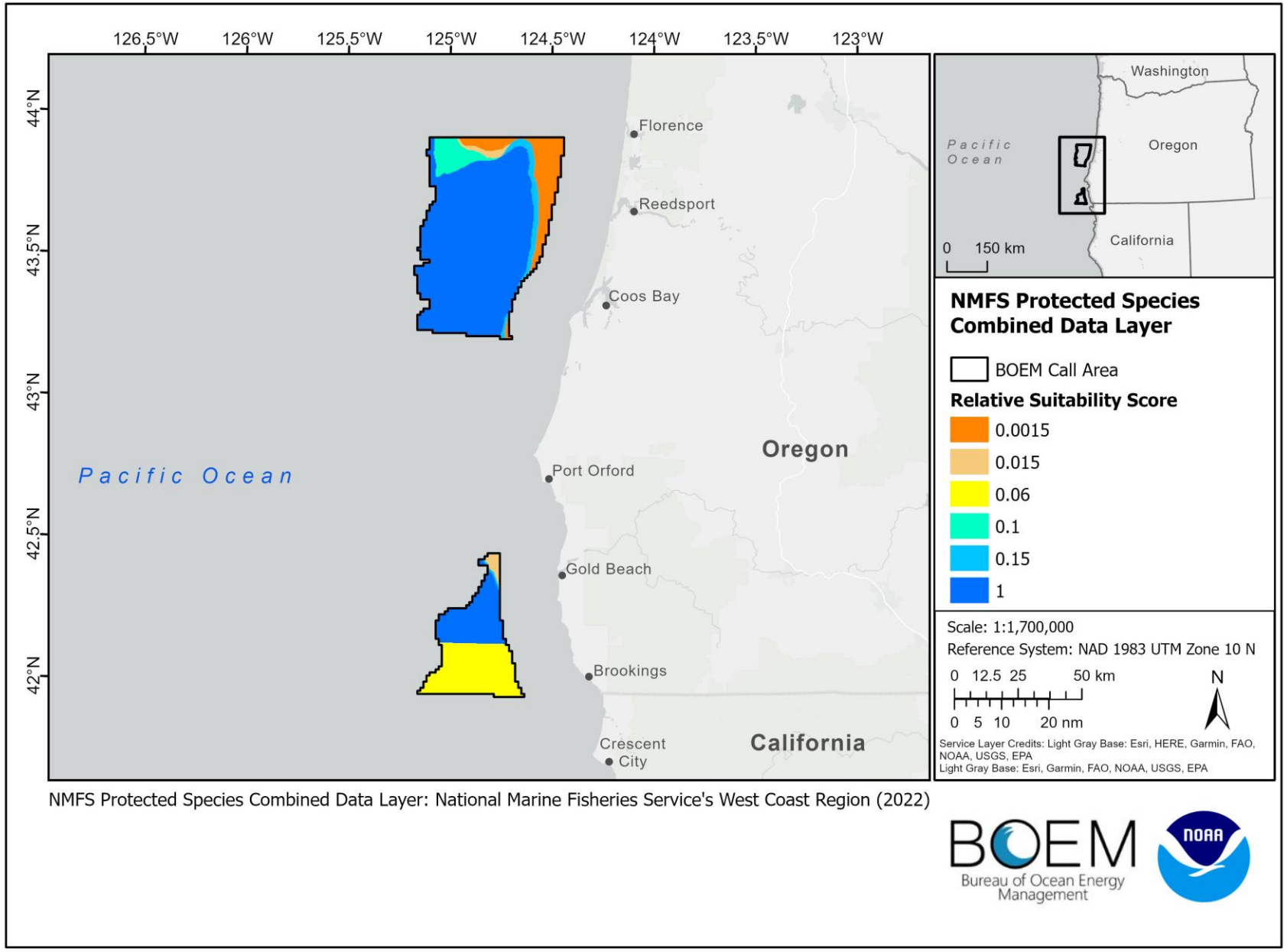
NMFS Protected Species
Scoring provided by NMFS

- Leatherback sea turtle
- Southern Resident killer whale
- Humpback whale Mexico DPS
- Humpback whale Central America DPS
- Blue whale



NMFS Protected Species Combined Data Layer: National Marine Fisheries Service's West Coast Region (2022)

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Natural Resources Submodel Data Inputs

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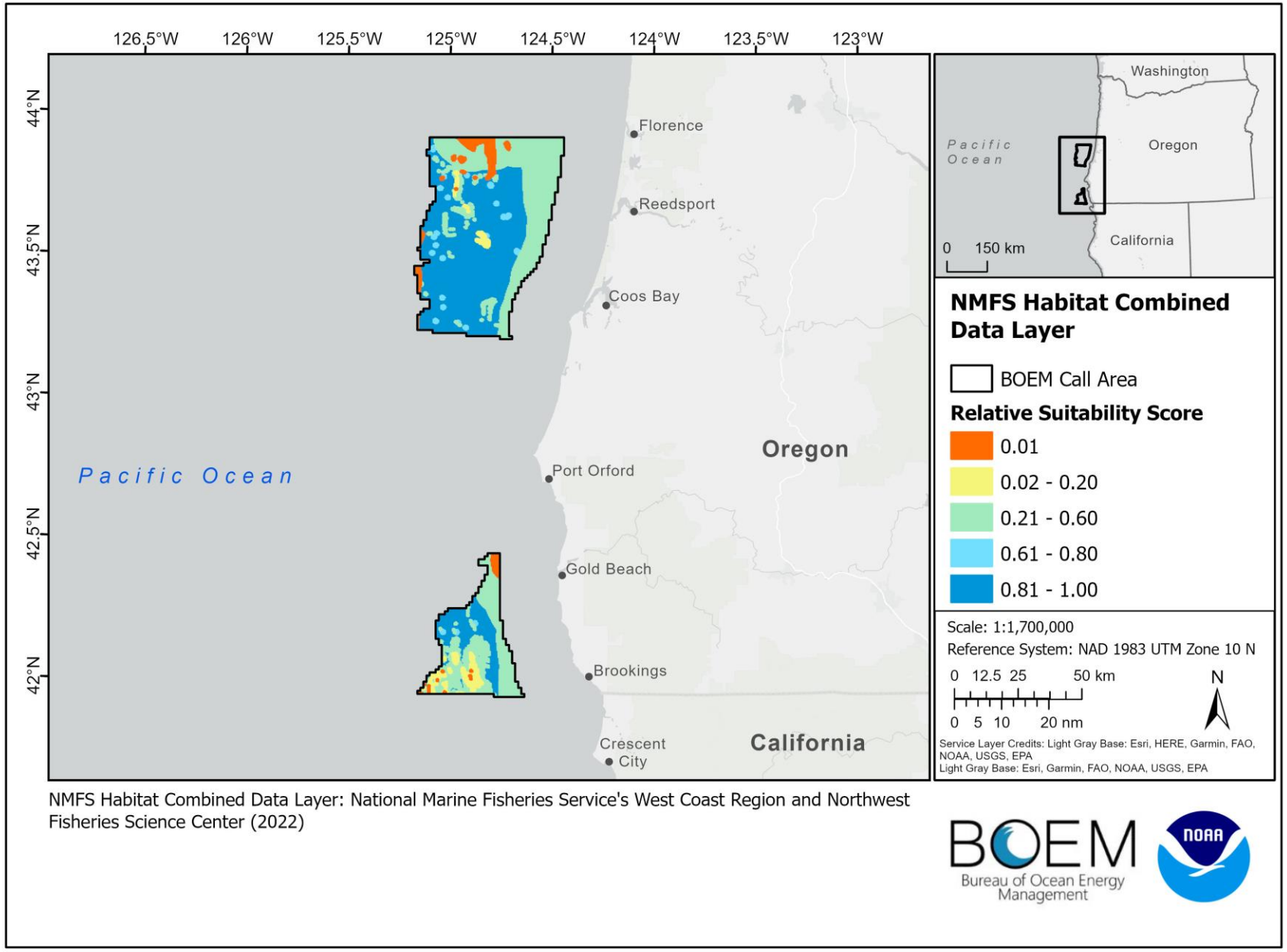
NMFS Habitat

Scoring provided by NMFS

- Essential Fish Habitat Conservation Areas
- Rocky Reef Groundfish HAPC
  - Mapped and Probable
- Deep-sea Coral Habitat Suitability
- Continental Shelf Break
- Methane Bubble Streams



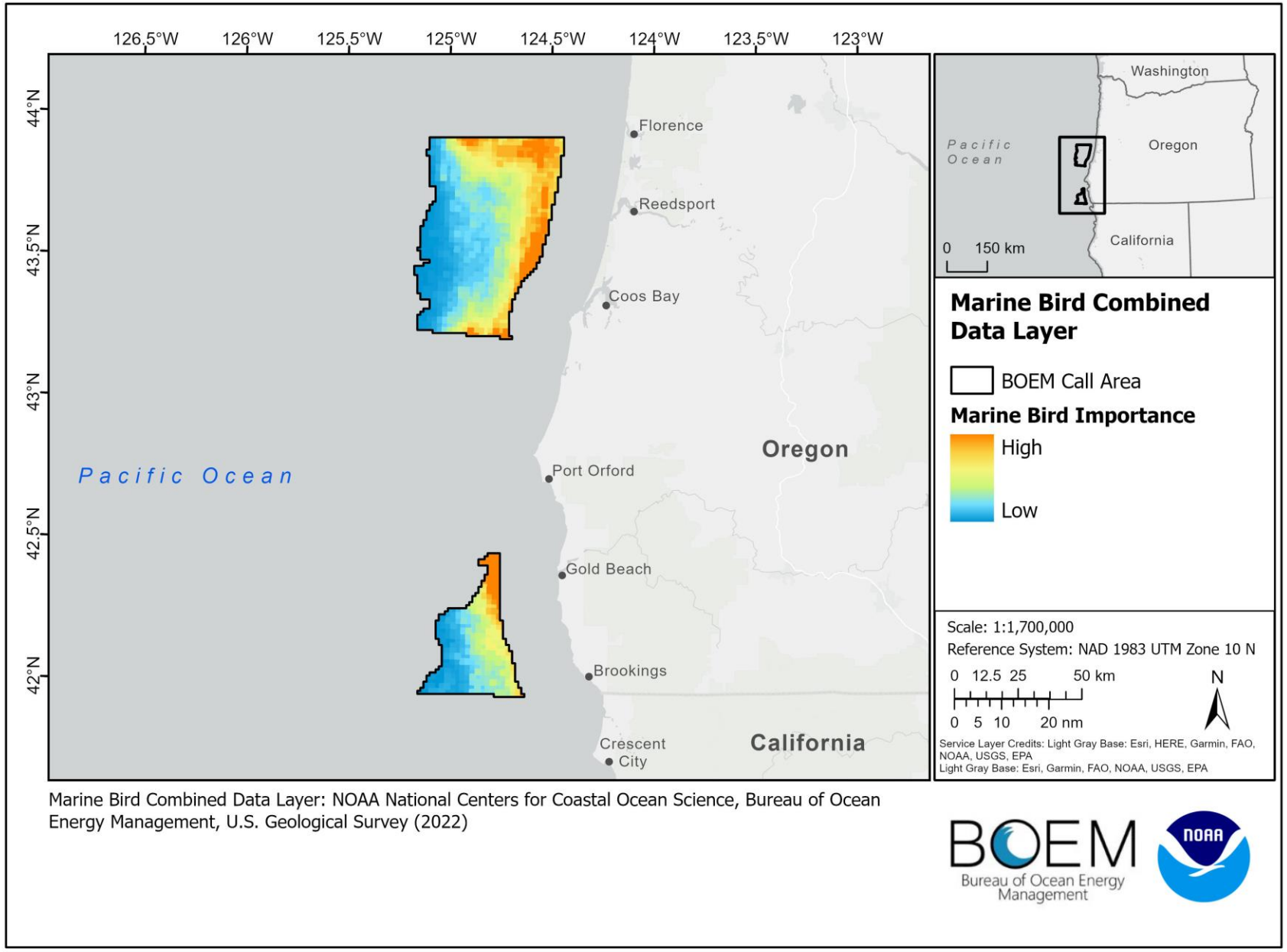
Natural Resources Submodel Data Inputs

NCCOS | NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

Marine Birds

Z-Membership Function

- 30 individual species and 12 taxonomic groups
- Utilized modeled relative density data
- Incorporated species vulnerability and sensitivity to offshore wind development



Natural Resources Submodel Data Inputs

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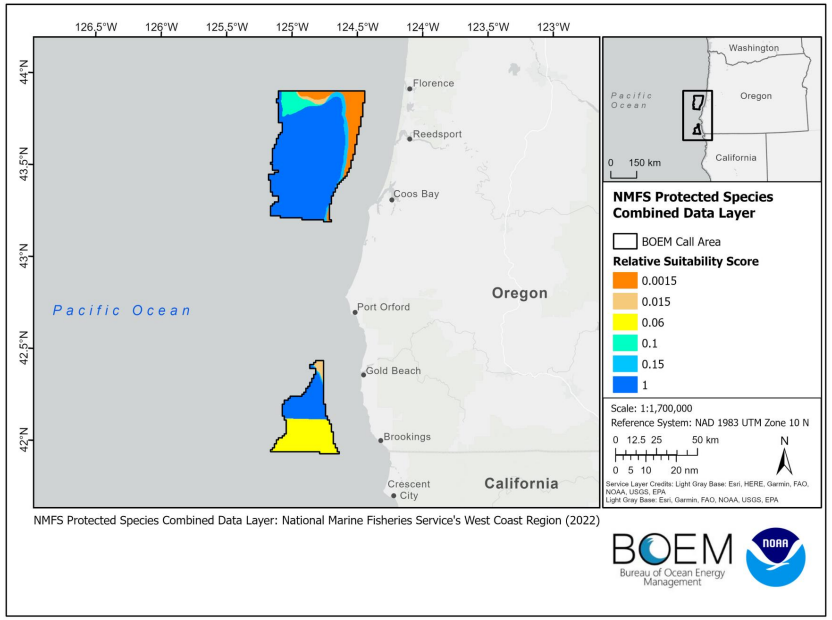
NMFS Protected Species
Scoring provided by NMFS



NMFS Protected Species Combined Data Layer: National Marine Fisheries Service's West Coast Region (2022)

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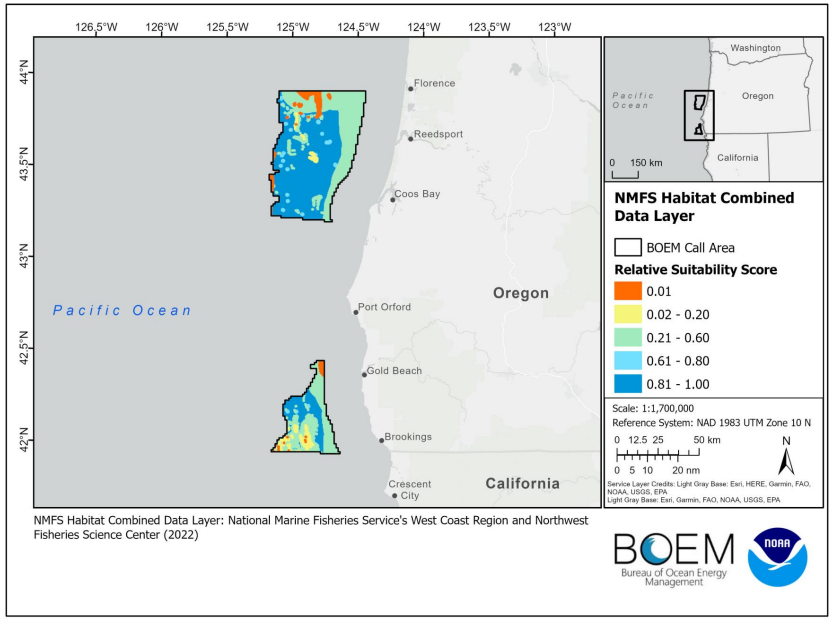
NMFS Habitat
Scoring provided by NMFS



NMFS Habitat Combined Data Layer: National Marine Fisheries Service's West Coast Region and Northwest Fisheries Science Center (2022)

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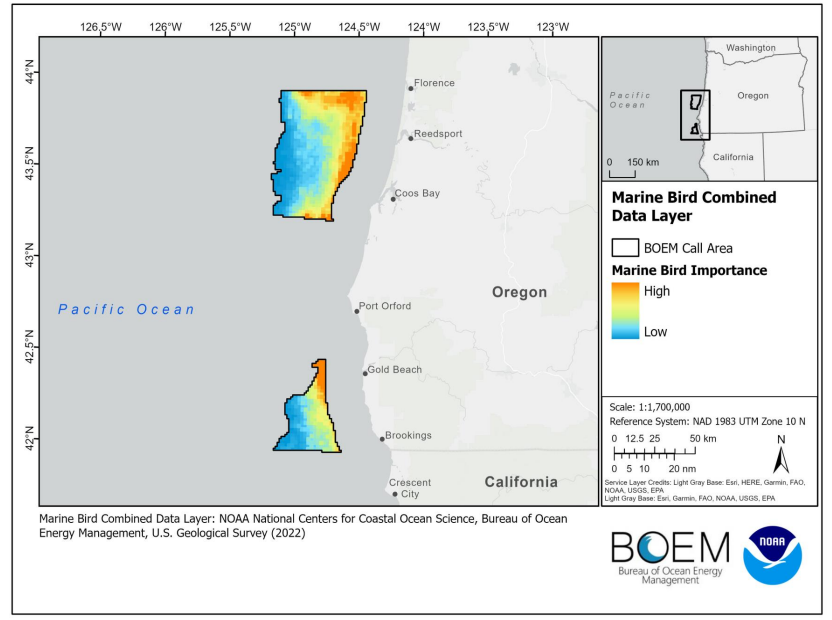
Marine Birds
Z-Membership Function



Marine Bird Combined Data Layer: NOAA National Centers for Coastal Ocean Science, Bureau of Ocean Energy Management, U.S. Geological Survey (2022)

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Natural Resources Submodel Results

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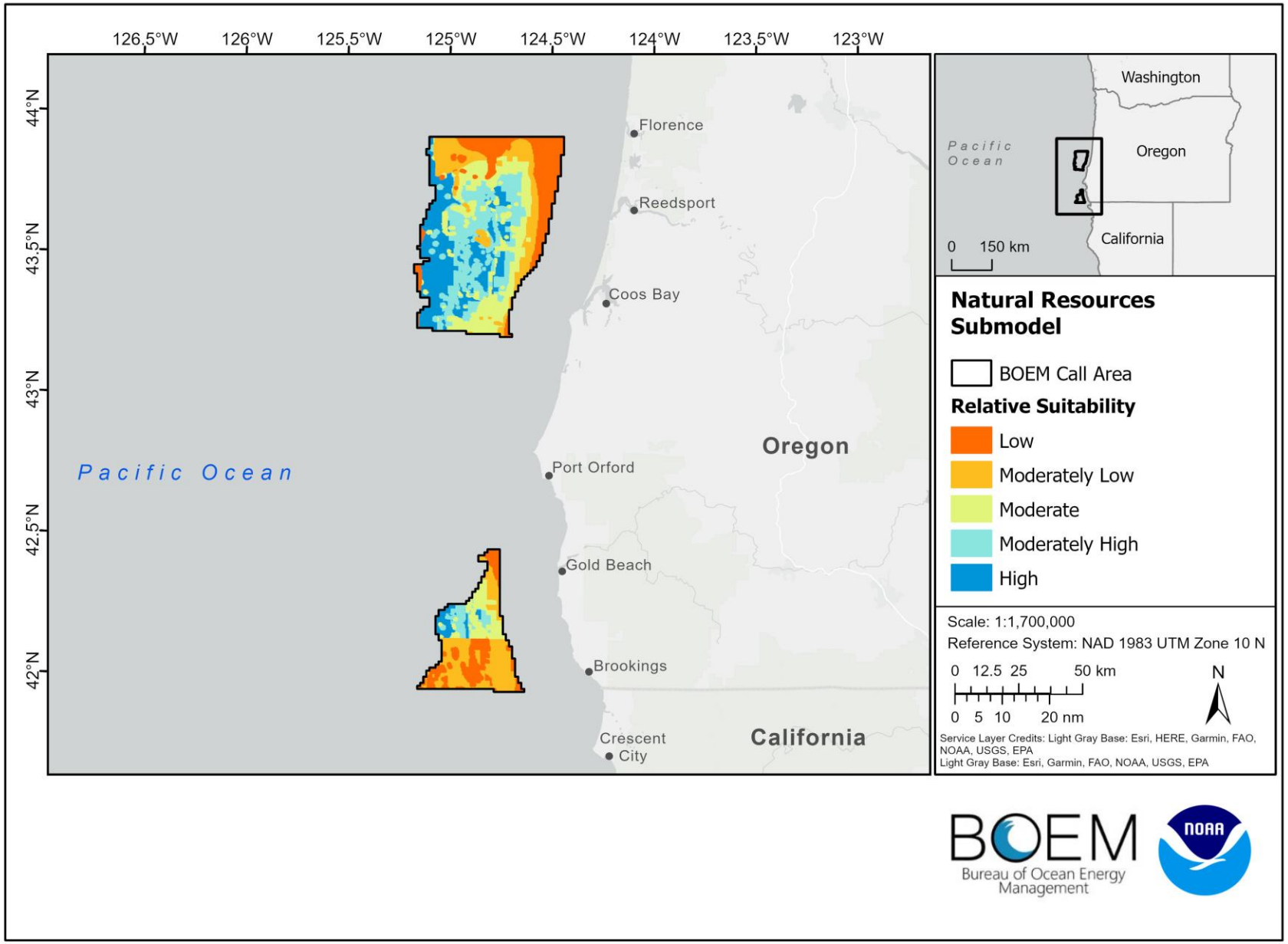

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Fisheries Submodel

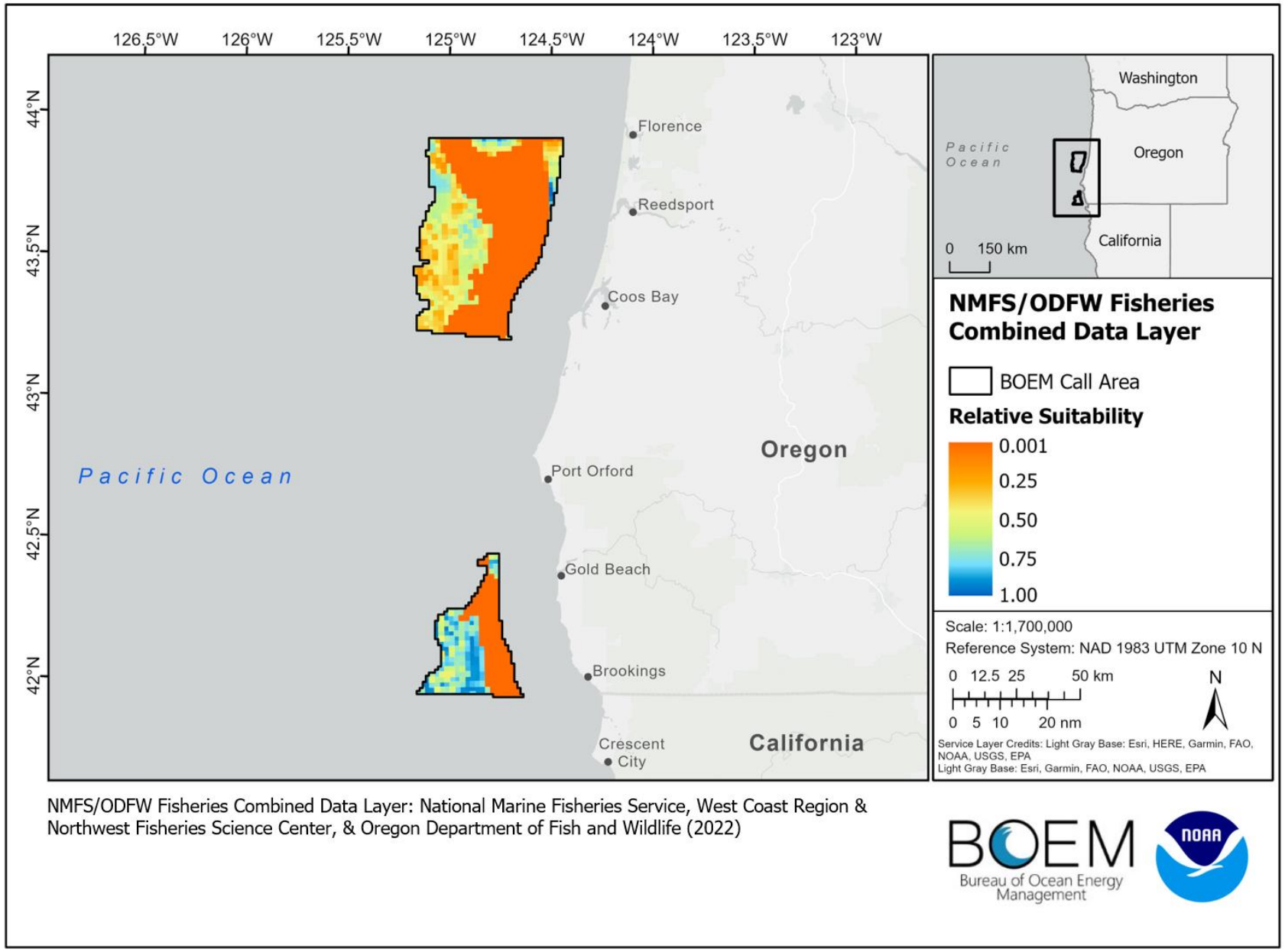
NMFS & ODFW Fisheries Combined Data Layer

Fisheries Submodel Data Inputs

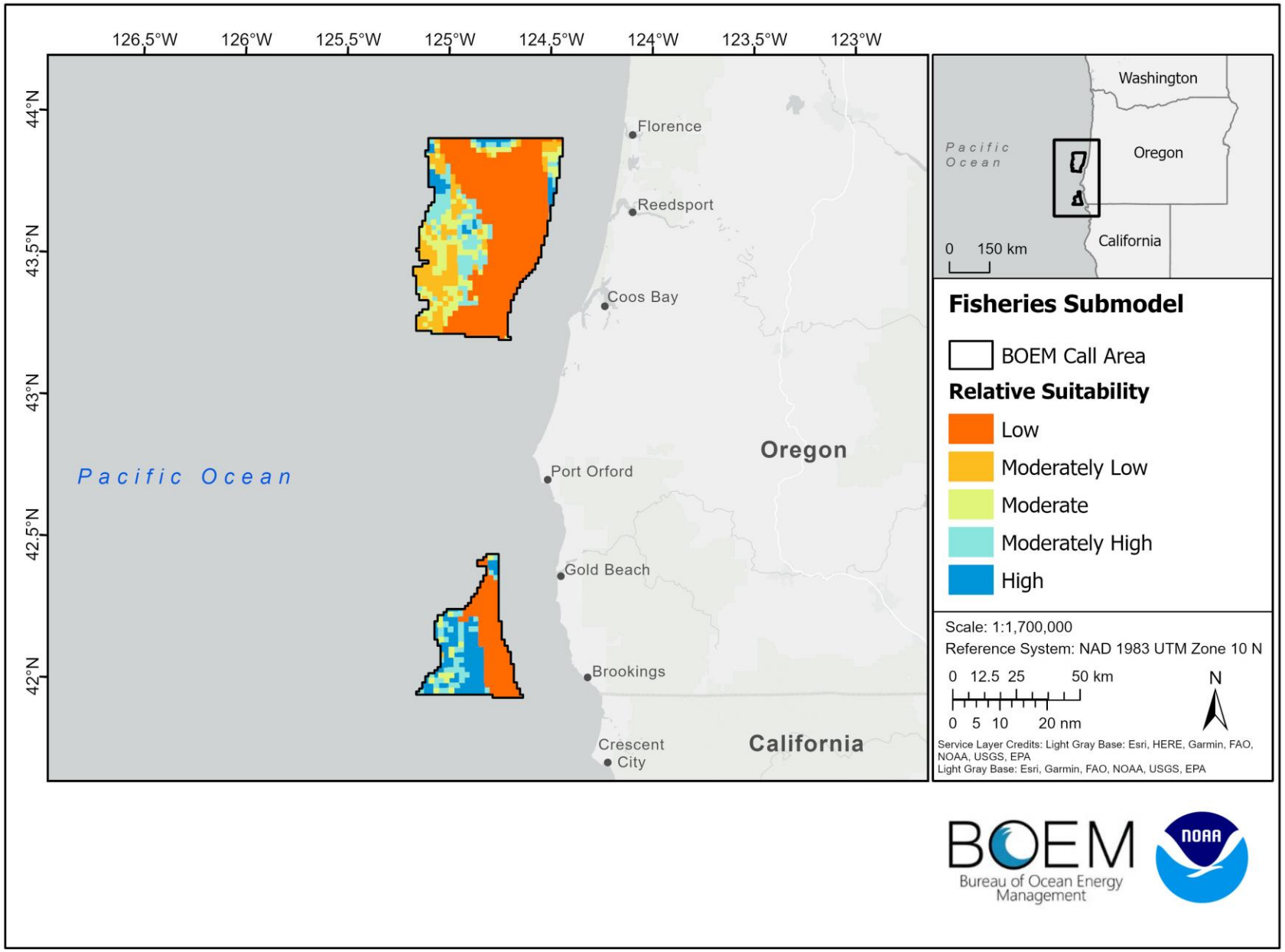
NMFS & ODFW Fisheries
Scoring provided by NMFS & ODFW

Fisheries included:

- At-sea Hake mid-water trawl
- Shoreside Hake mid-water trawl
- Groundfish bottom trawl
- Groundfish longline
- Groundfish pot gear
- Pink shrimp trawl
- Dungeness crab
- Albacore commercial troll/hook-and-line
- Albacore charter troll/hook-and-line



Fisheries Submodel Results



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Wind Submodel

Levelized Cost of Energy

Wind Submodel Data Inputs

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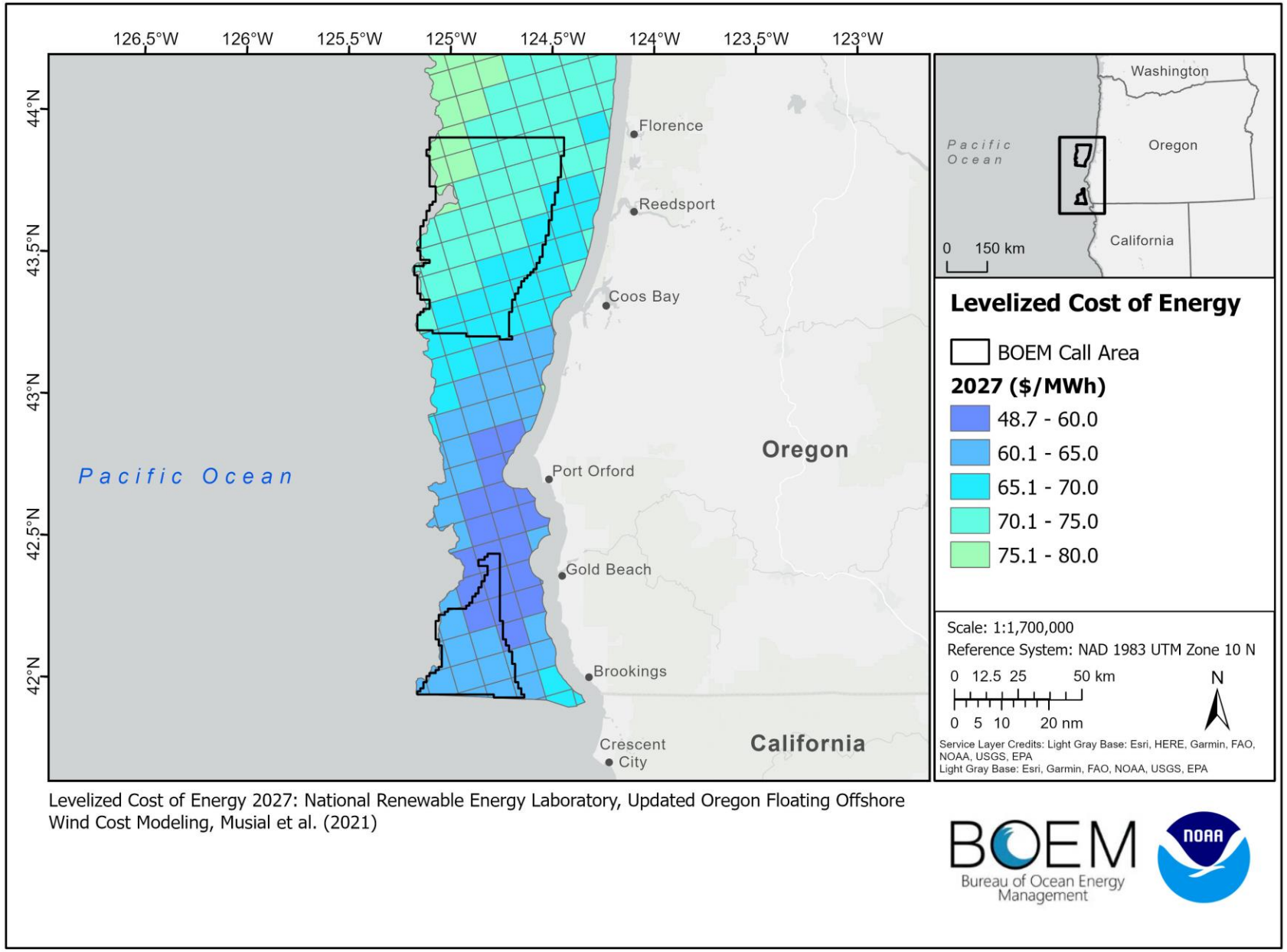
Levelized Cost of Energy for 2027

Linear function: 0.8-1.0

Lower cost is better



Levelized Cost of Energy 2027: National Renewable Energy Laboratory, Updated Oregon Floating Offshore Wind Cost Modeling, Musial et al. (2021)

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Wind Submodel Results

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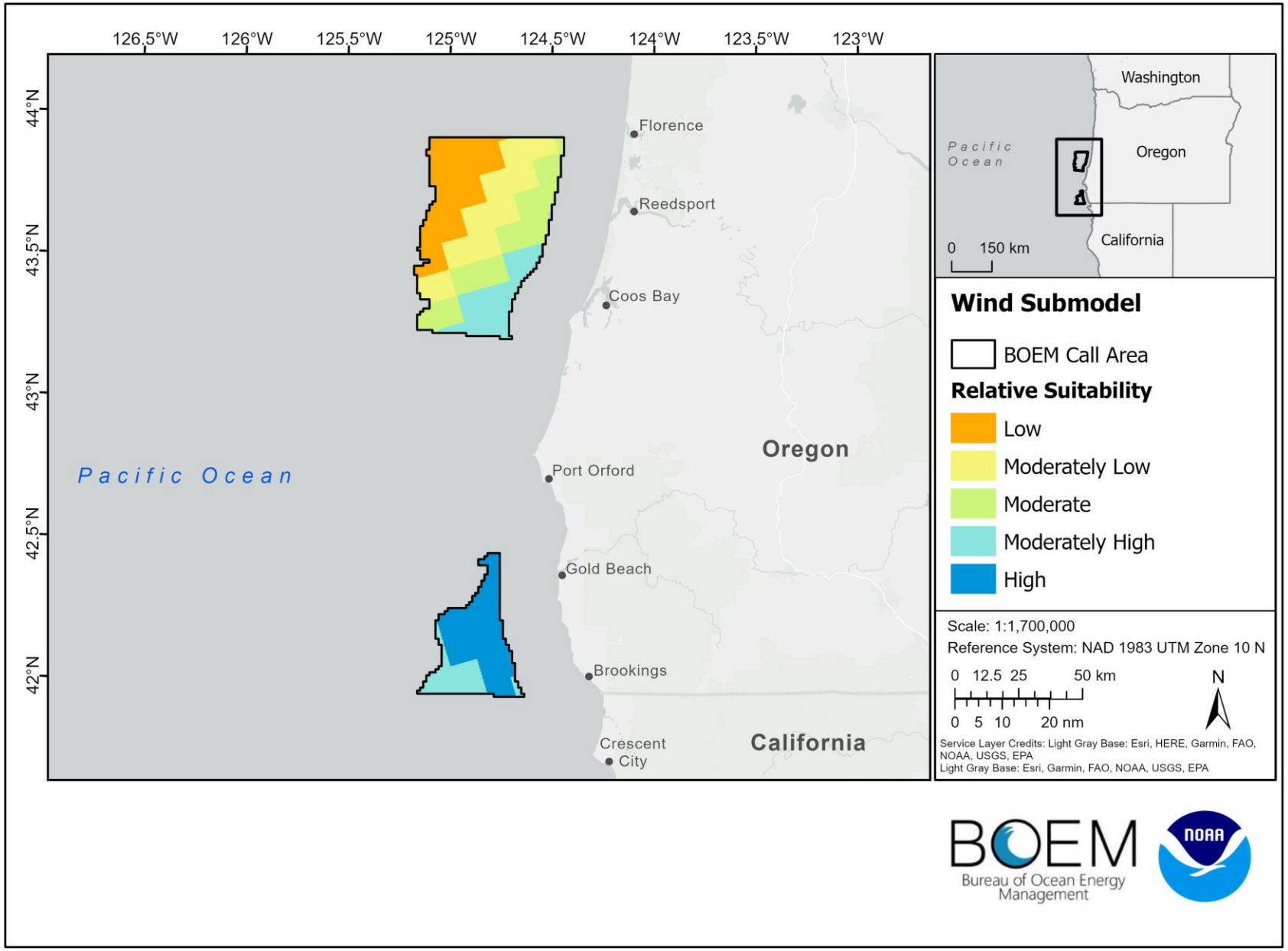

All Submodels

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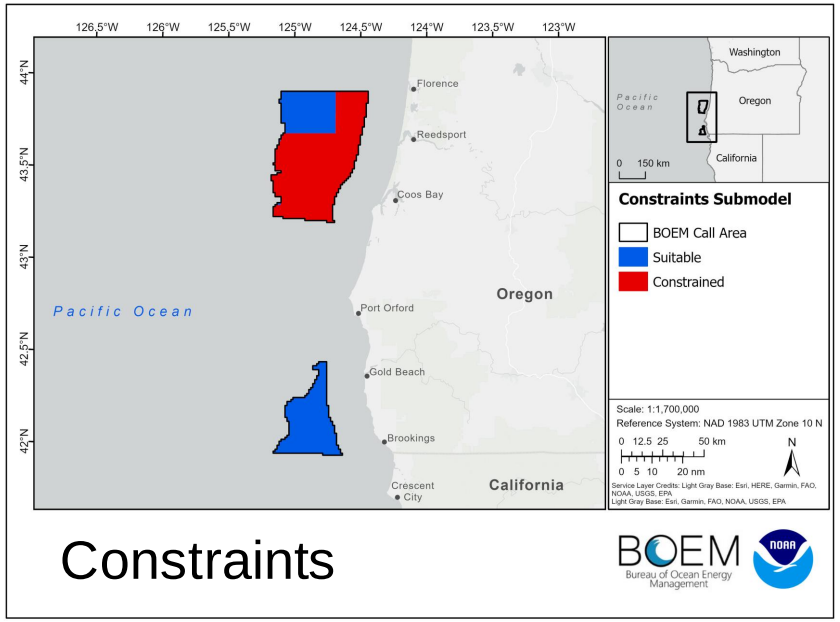
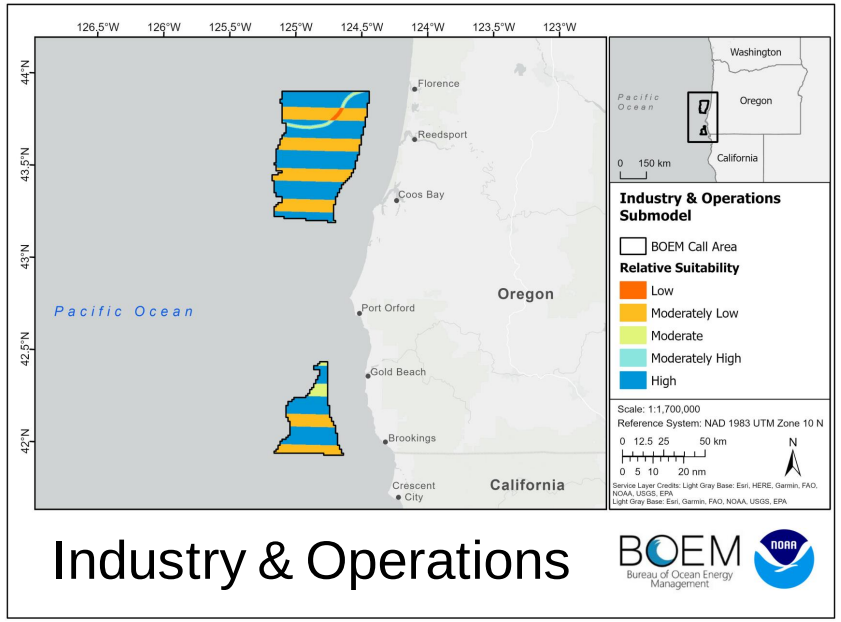
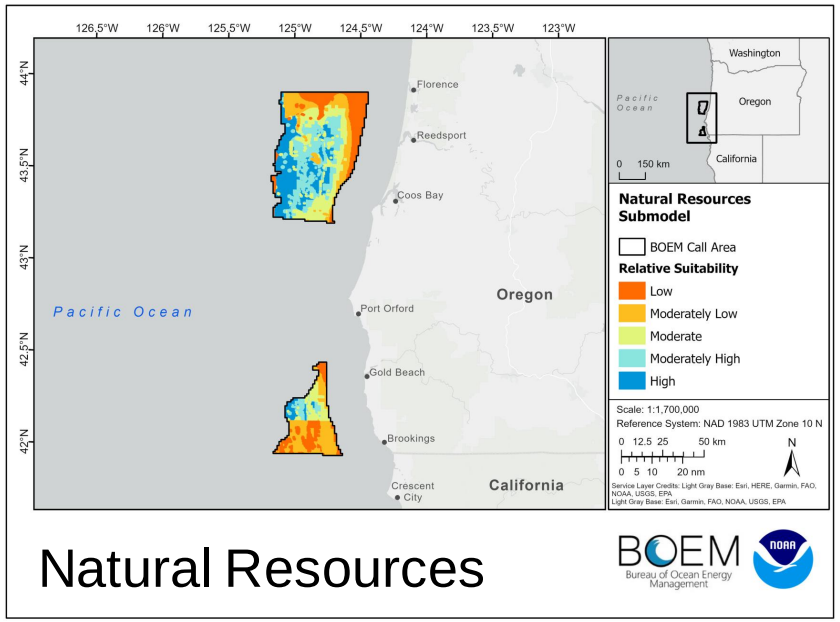
Constraint data layers	# acres constrained	# acres suitable
DoD	577,900	595,100
PACPARS	212,300	960,700
All Constraints	**675,550**	**497,450**



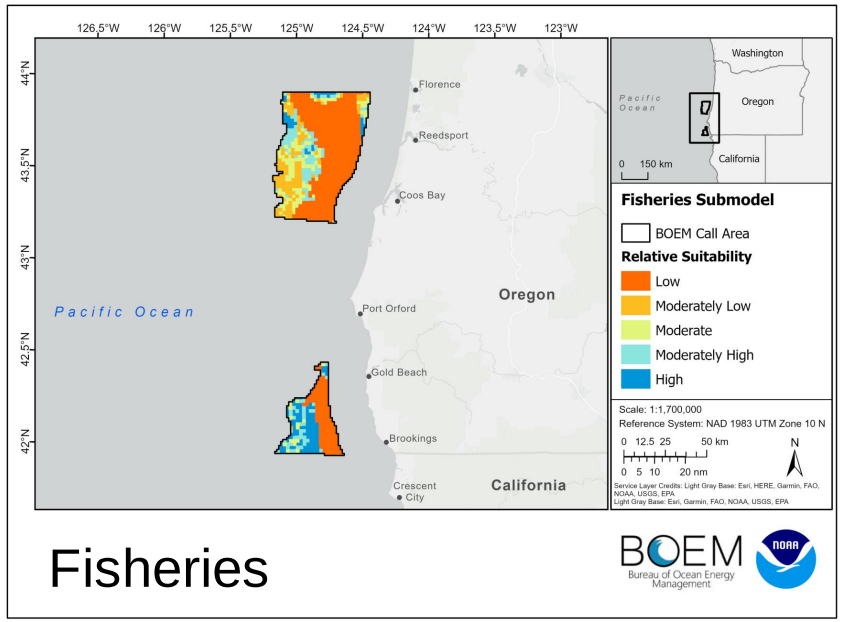
Constraints



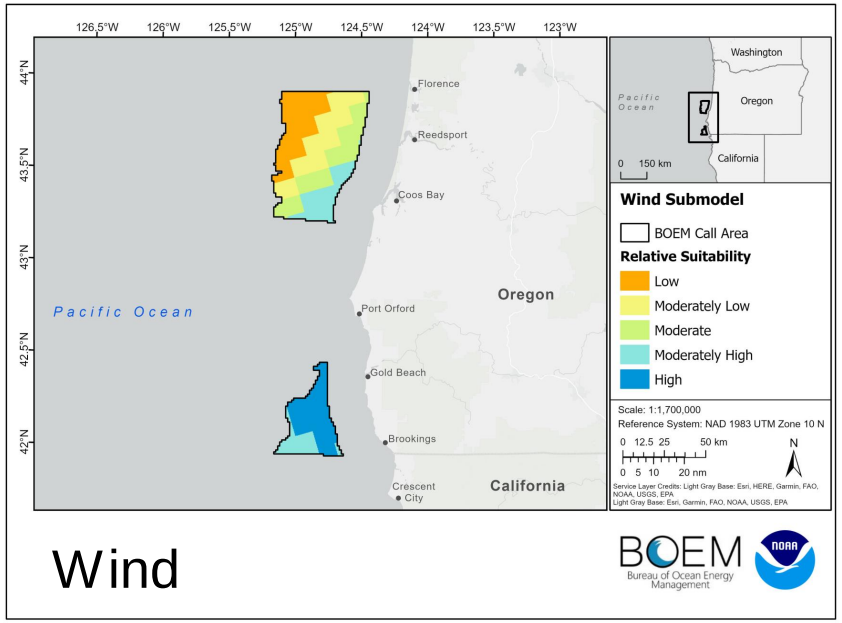
Industry & Operations



Natural Resources



Fisheries



Wind

Final Suitability Results

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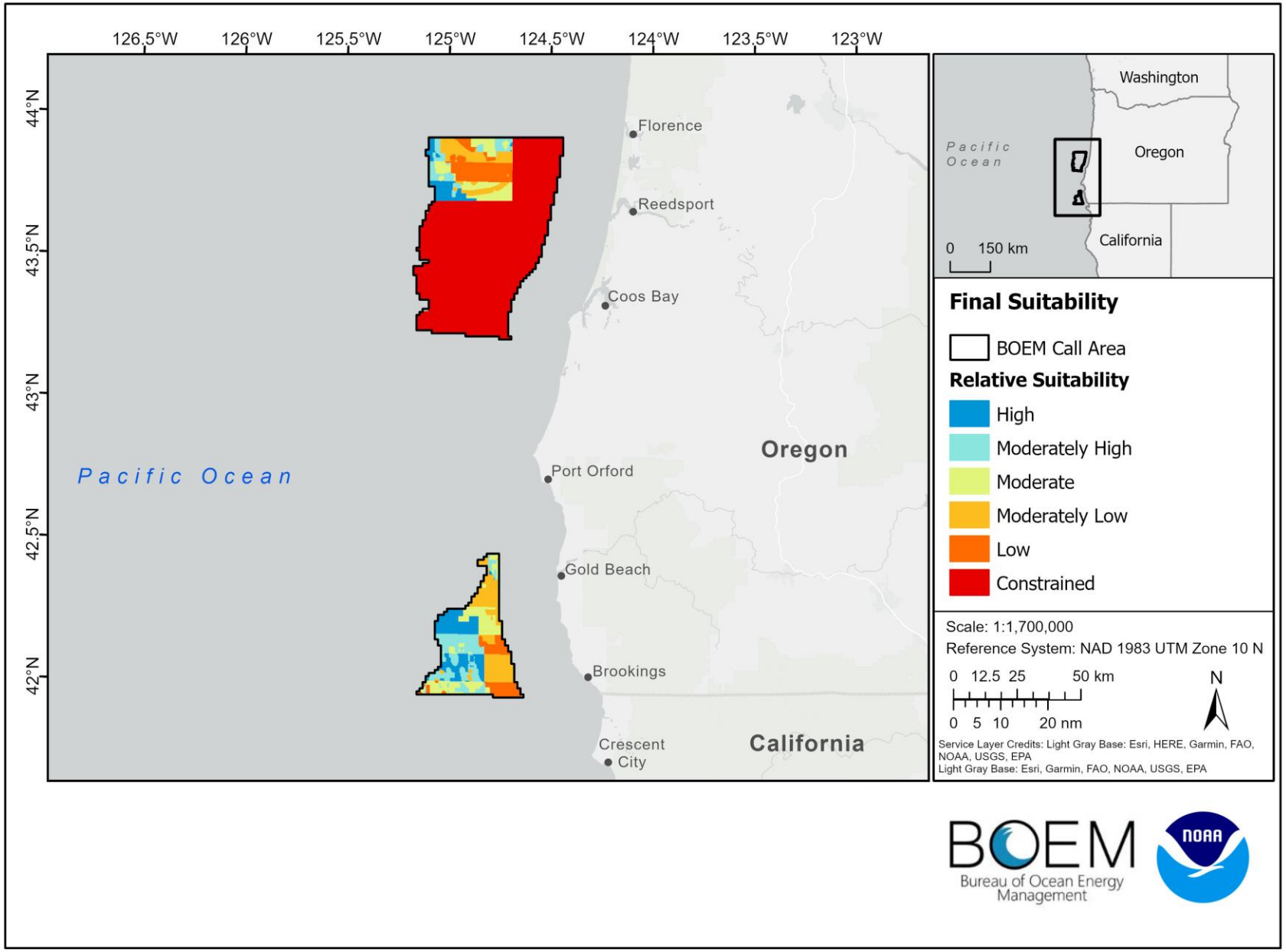

Cluster Analysis Results

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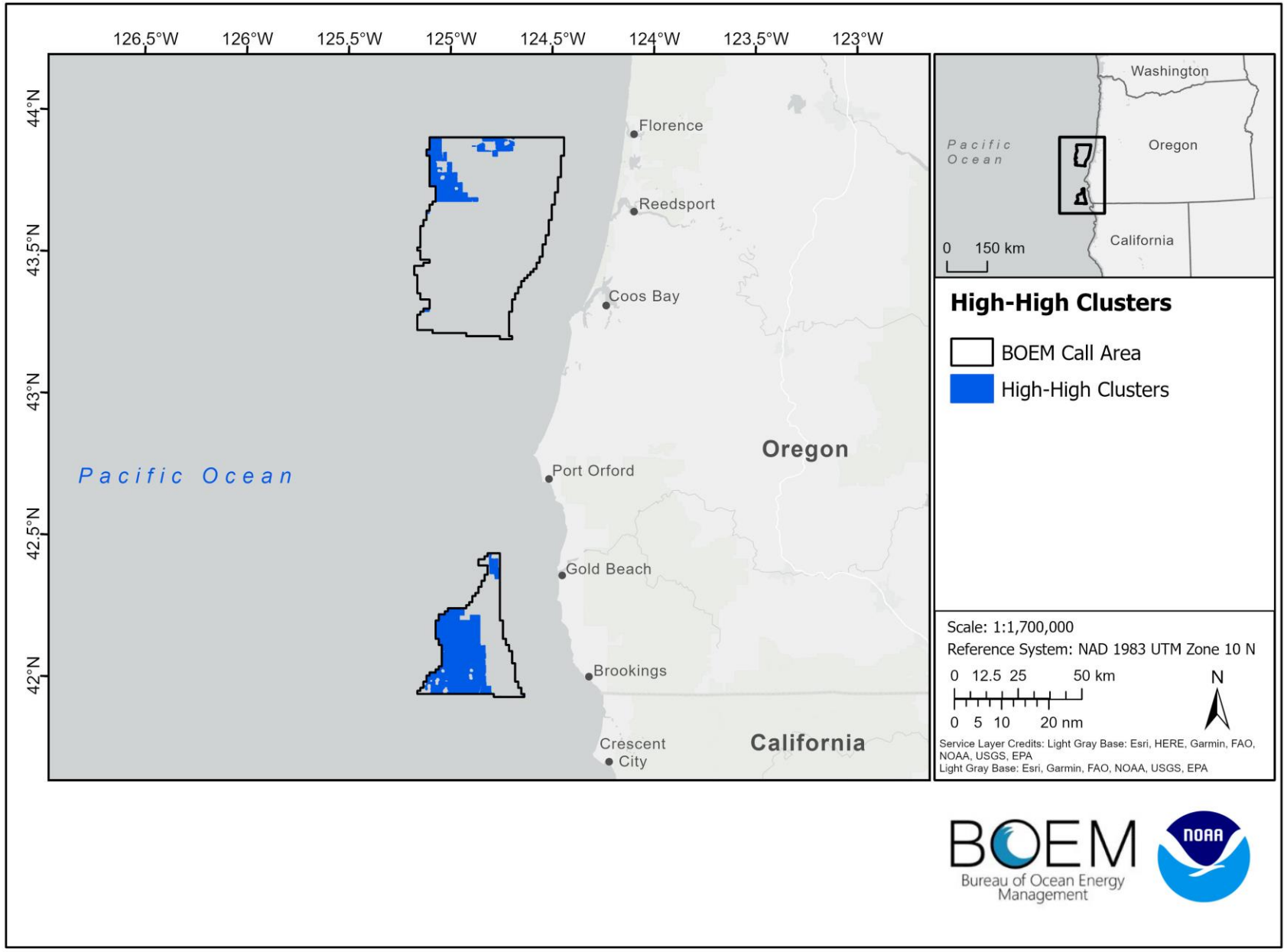
Rules for identifying WEAs

- BOEM aliquots that intersect with a high cluster grid cell are selected
- Groups of aliquots less than 55,000 acres are removed
- Additional aliquots were included if they were fully encircled by the selected aliquots



Oregon Draft Wind Energy Areas

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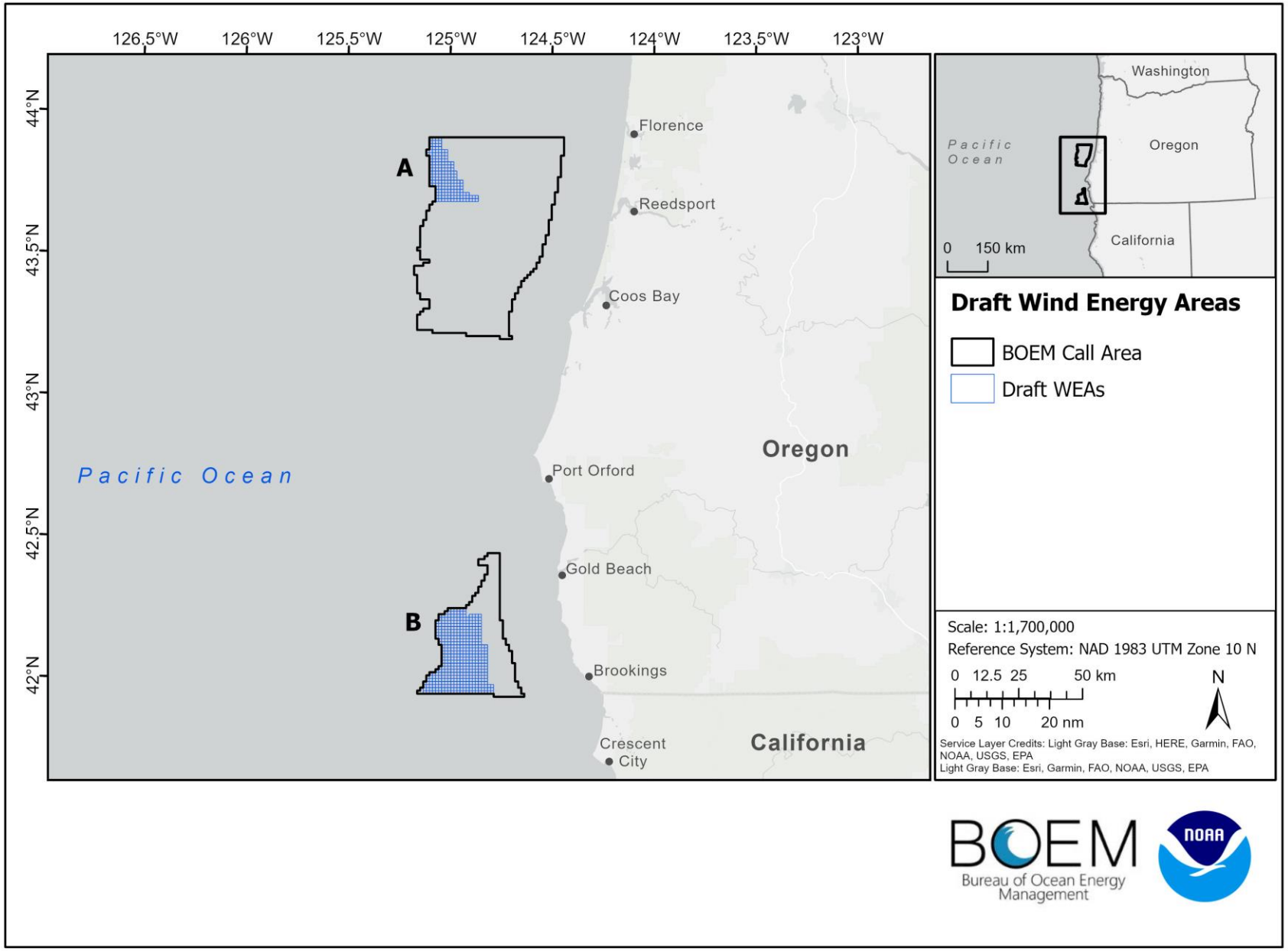

Draft Wind Energy Areas and NMFS Scientific Surveys

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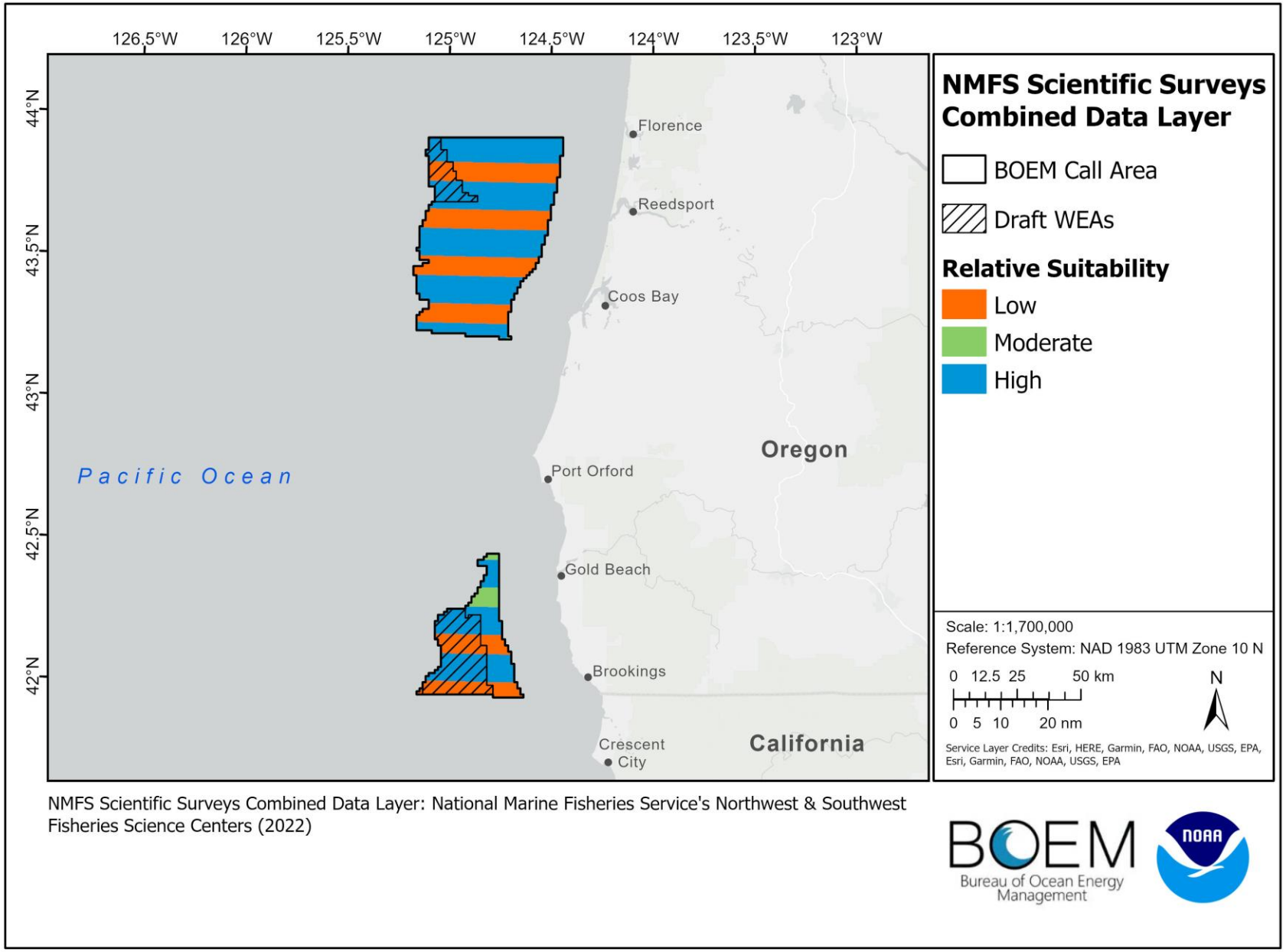
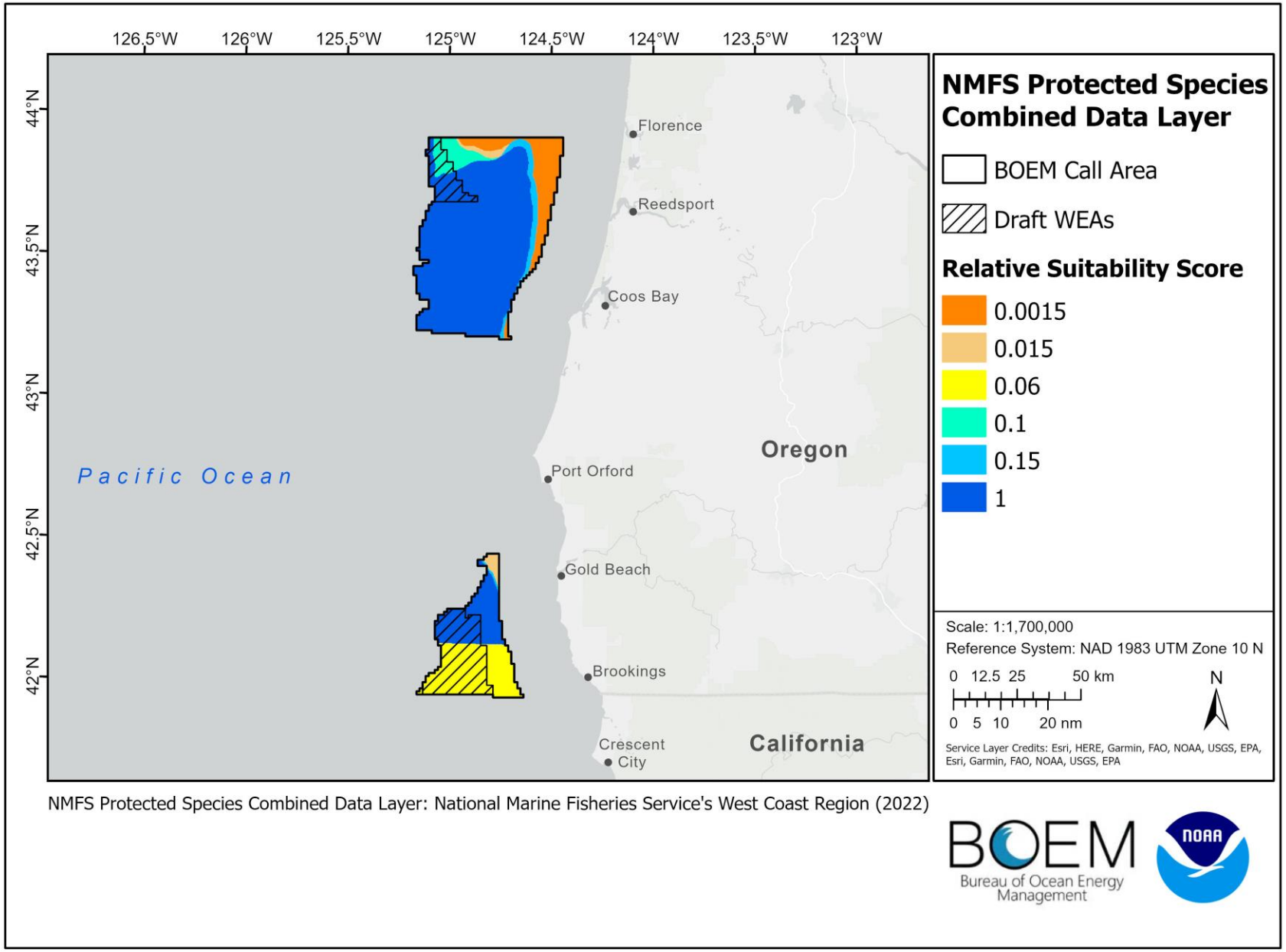


Draft Wind Energy Areas and NMFS Protected Species



Draft Wind Energy Areas and NMFS Habitat

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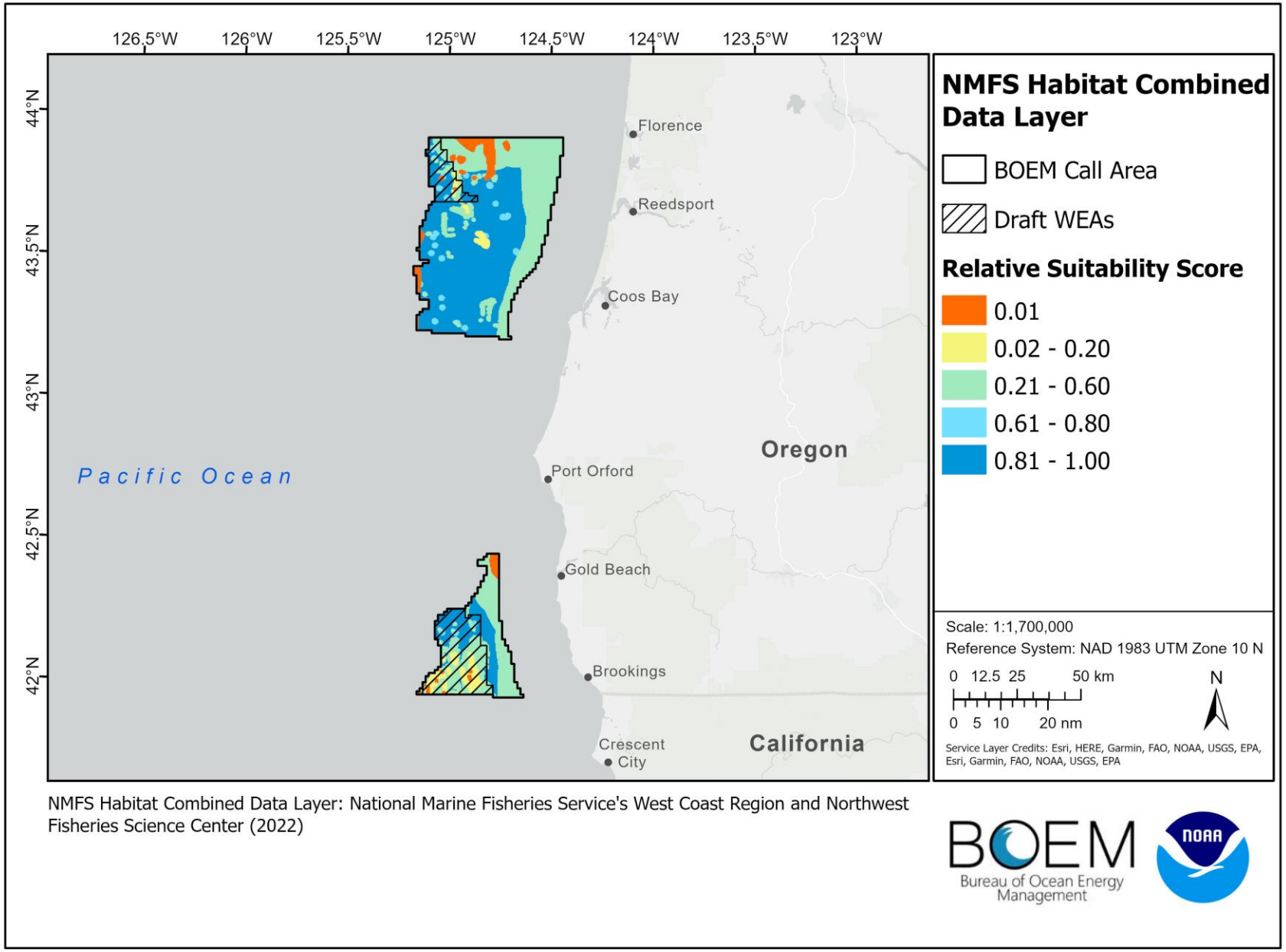

NMFS Habitat Combined Data Layer: National Marine Fisheries Service's West Coast Region and Northwest Fisheries Science Center (2022)

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NOAA

Draft Wind Energy Areas and Marine Birds

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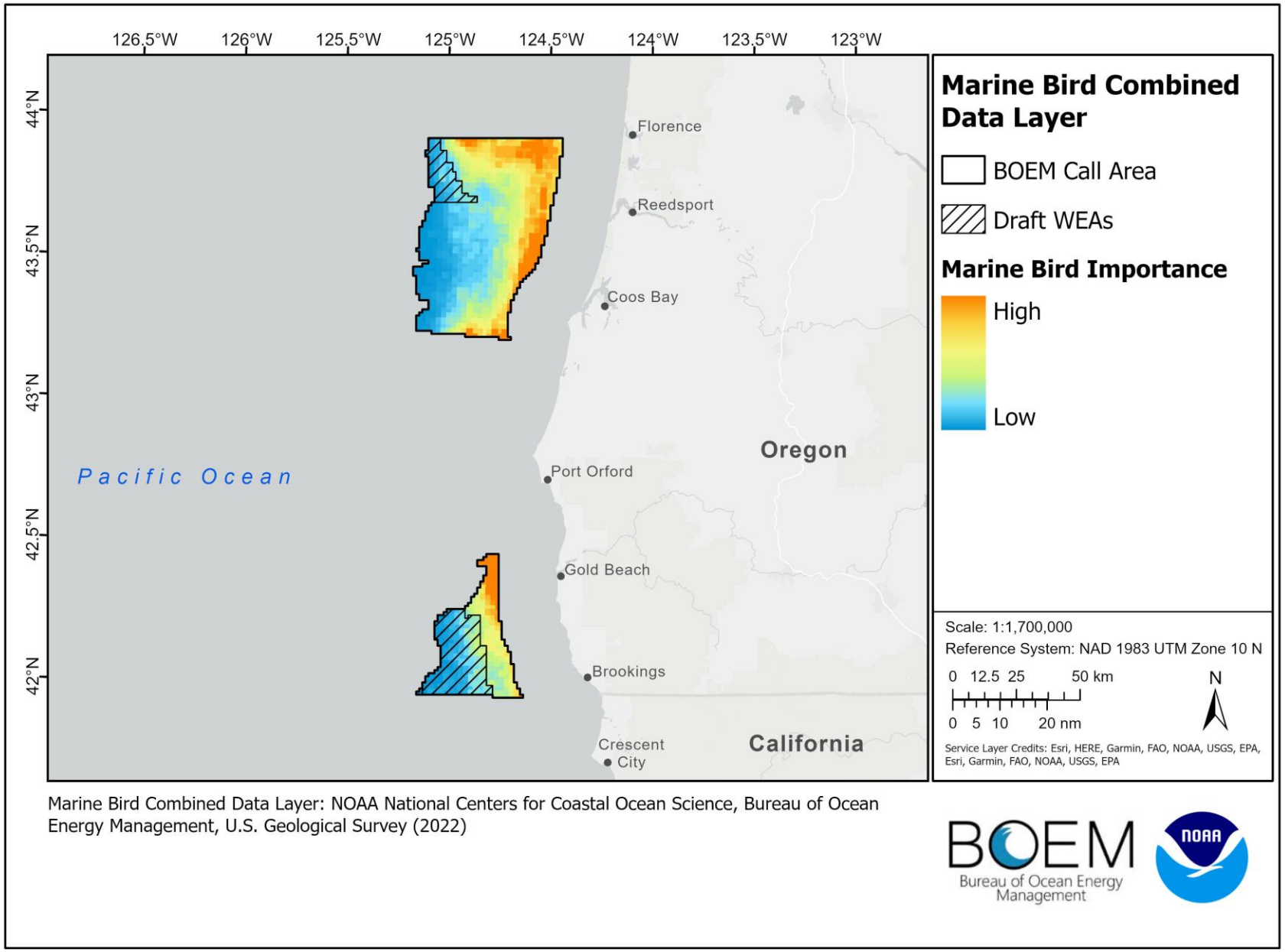
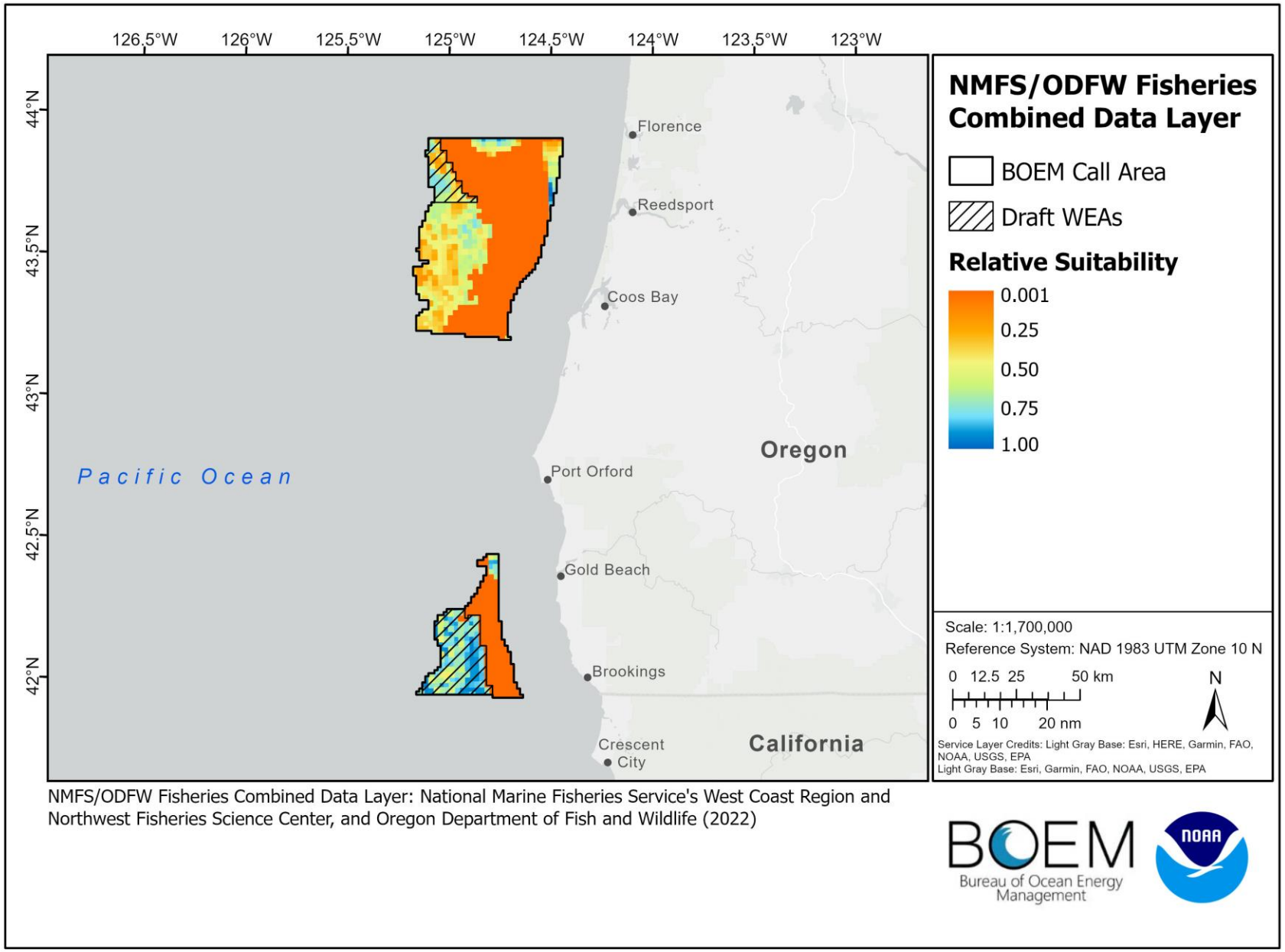


Draft Wind Energy Areas and NMFS & ODFW Fisheries



Draft Wind Energy Areas and VMS Fisheries

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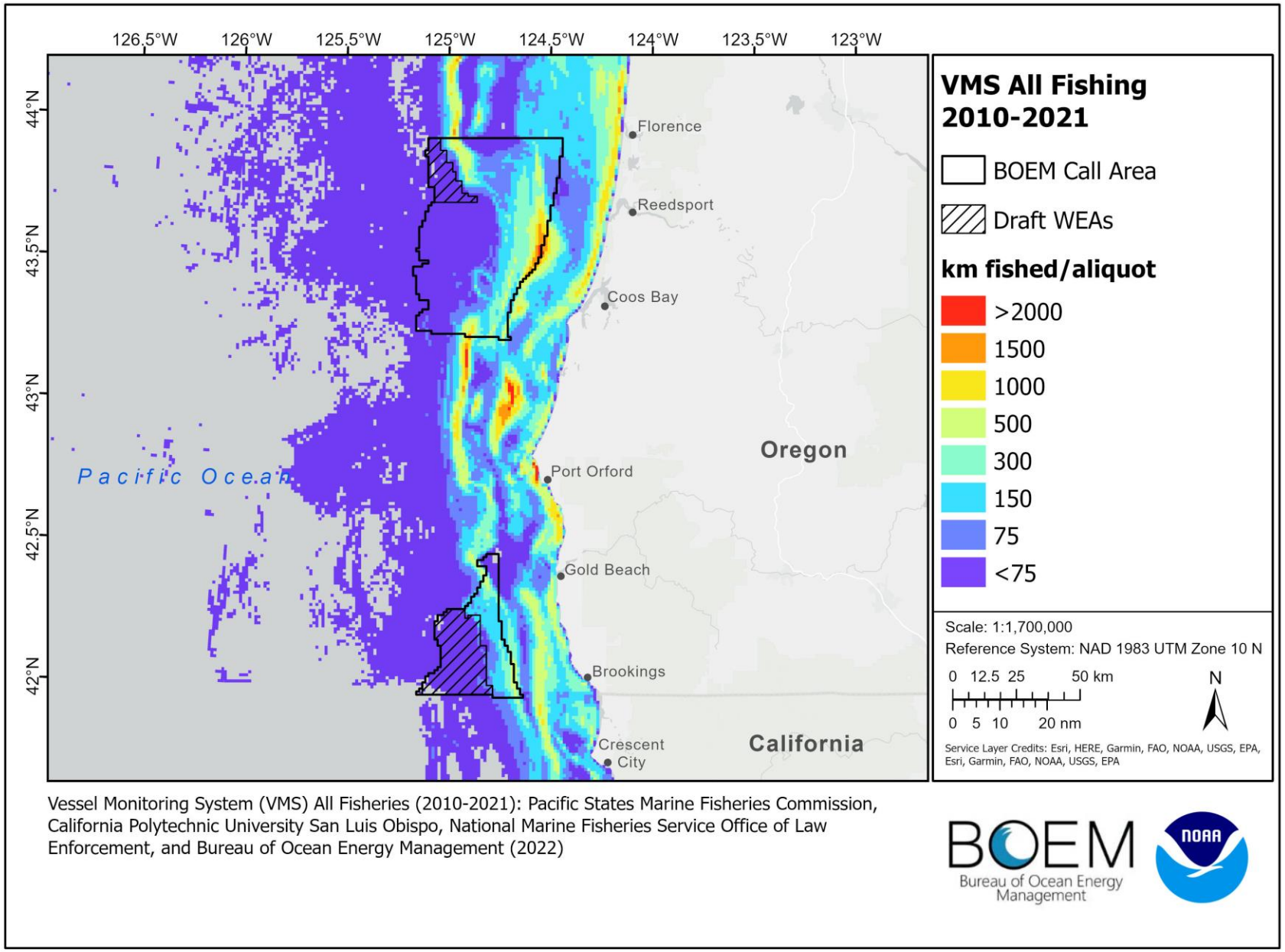


Vessel Monitoring System (VMS) All Fisheries (2010-2021): Pacific States Marine Fisheries Commission, California Polytechnic University San Luis Obispo, National Marine Fisheries Service Office of Law Enforcement, and Bureau of Ocean Energy Management (2022)

BOEM Bureau of Ocean Energy Management

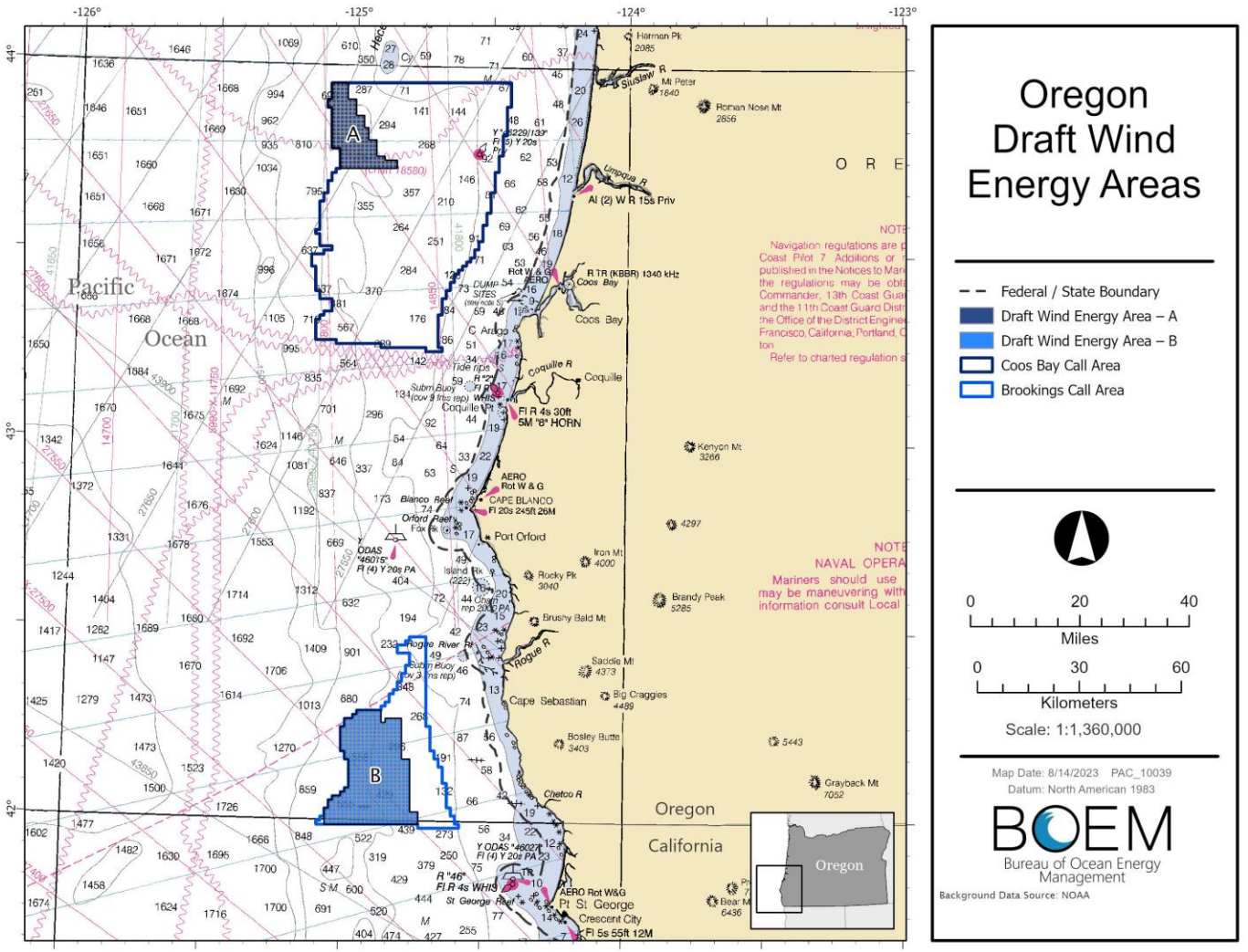
NOAA

Next Steps in BOEM's Renewable Energy Authorization Process

Oregon Draft Wind Energy Areas

- Draft WEA – A (Coos Bay Call Area)
  - 61,204 acres
  - ~740 MW
  - 32 miles nearest to shore
  - 40 miles to Port of Coos Bay

- Draft WEA – B (Brookings Call Area)
  - 158,364 acres
  - ~1,920 MW
  - 18 miles to shore
  - 23 miles to Port of Brookings



Next Steps in the BOEM Wind Energy Authorization Process

Draft Wind Energy Areas Published on BOEM website for Public Comment

- On Aug 15, 2023, BOEM published a Request for Comments on BOEM website
- Comment period is open for 60-day public comment period
- Comments through Regulations.gov, docket number BOEM-2023-0033
- Supporting Documents available on BOEM website: Completed visual simulations, NCCOS Modeling Report, maps and shapefiles of the Draft WEAs

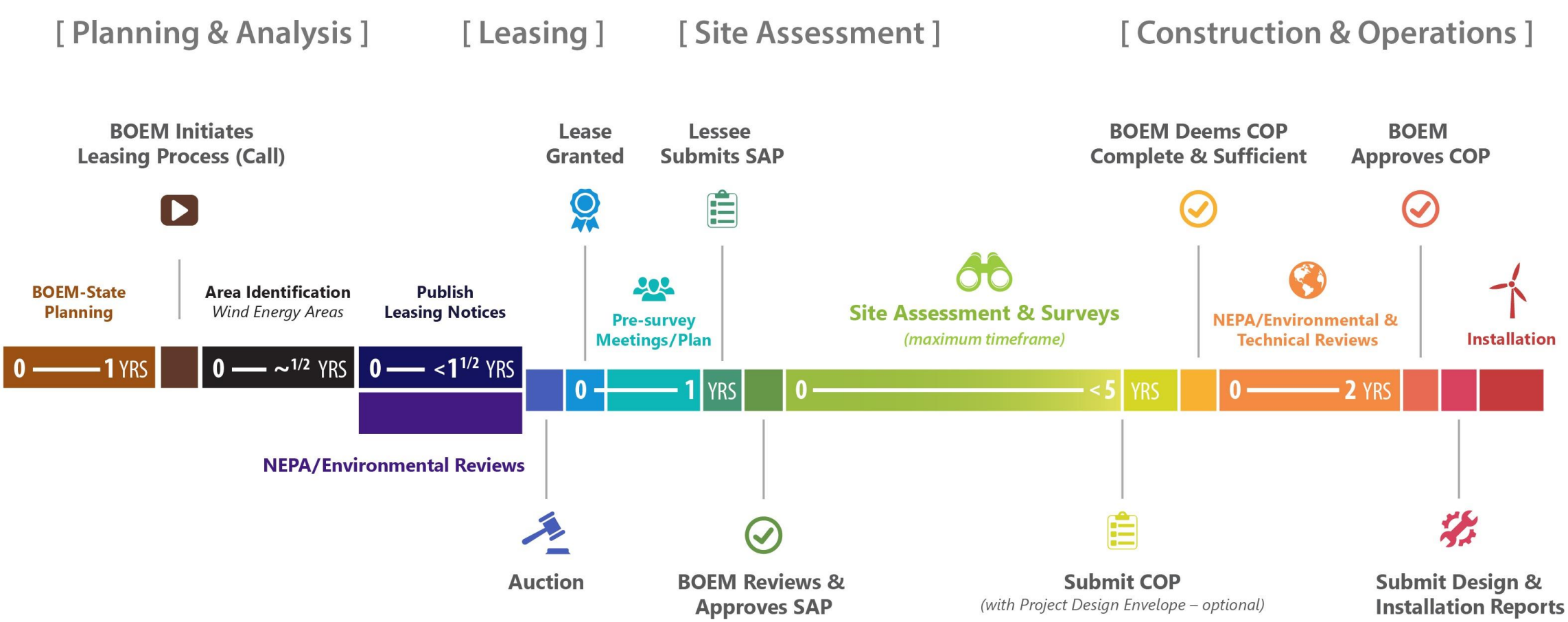
Recent Stakeholder Engagement

- Aug 30, 2023: PFMC Coastal Pelagic Species Advisory Subpanel meeting
- Sept 1, 2023: PFMC Marine Planning Committee meeting

Upcoming Engagement Opportunities

- Sept 11, 2023: Pacific Fishery Management Council Meeting, General Session
- Sept 18, 2023: BOEM Oregon Intergovernmental Renewable Energy Task Force Meeting
- TBD: Fishing Industry Informational Webinar
- TBD: (3) Public Meetings – Coastal Oregon
- Continued Consultation with Tribes

Next Steps After Close of Draft Wind Energy Areas Comment Period



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