OROWindMap Overview and Datasets Discussion

Andy Lanier, Oregon DLCD Marine Affairs Coordinator
Frank Pendleton, BOEM Pacific Office GIS Specialist

Offshore Wind Data Catalog Organizational Plan

Oregon Data Catalogs

Coastal and Marine Data

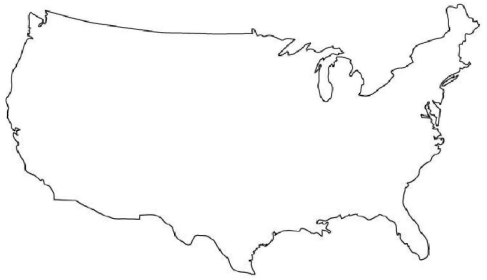
- Oregon Coastal Atlas
- Oregon Ocean Information

Oregon Statewide GIS Data Catalog

- Oregon Spatial Data Library
- Oregon Explorer (ORESA Project)

+

Federal Data Catalogs



- Marine Cadastre
- Ocean Reporting Tool
- Digital Coast
- NOAA Fisheries (FRAM)
- NREL Data Catalog
- Ocean Observing Initiative
- USGS
- …and many more

→

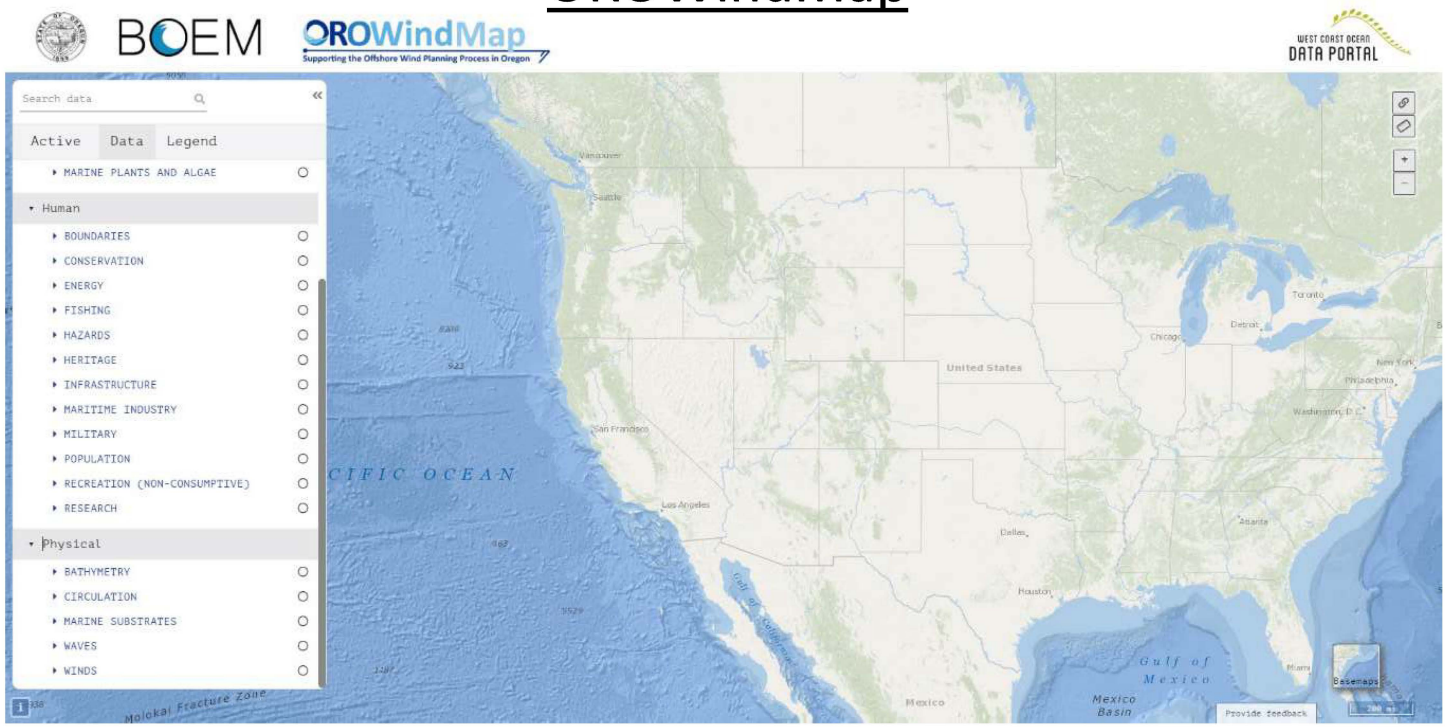
Curated Offshore Wind Catalog

WEST COAST OCEAN DATA PORTAL

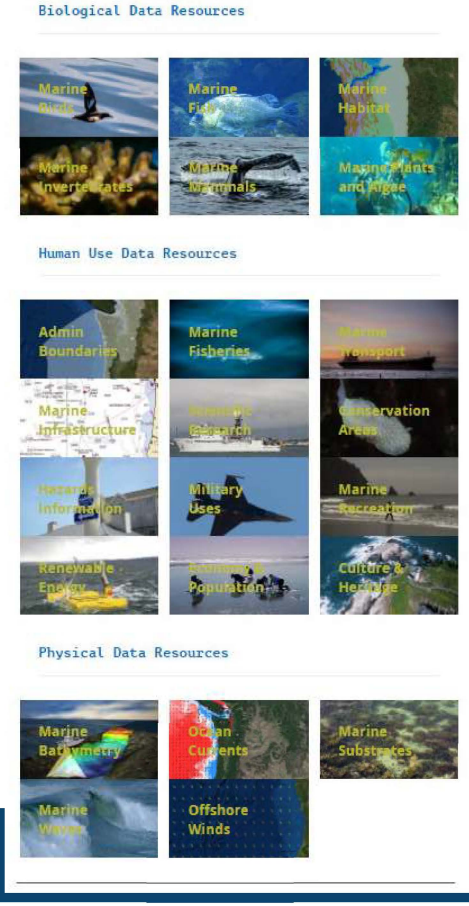
Offshore Wind Catalog (Combination of Records from Oregon and Federal Data Catalogs)

Offshore Wind Data Visualization Tool and Data Catalog

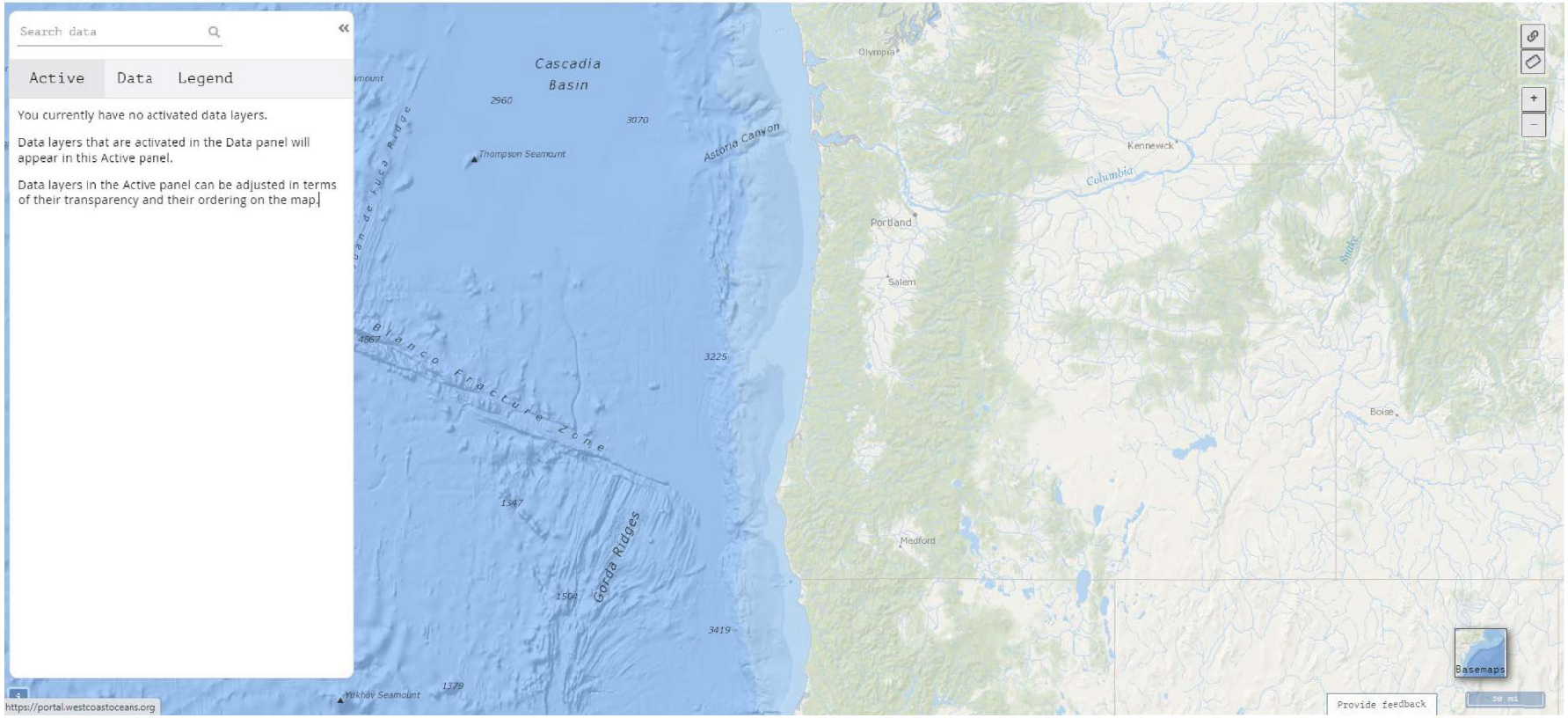
OROWindMap



Data Catalog



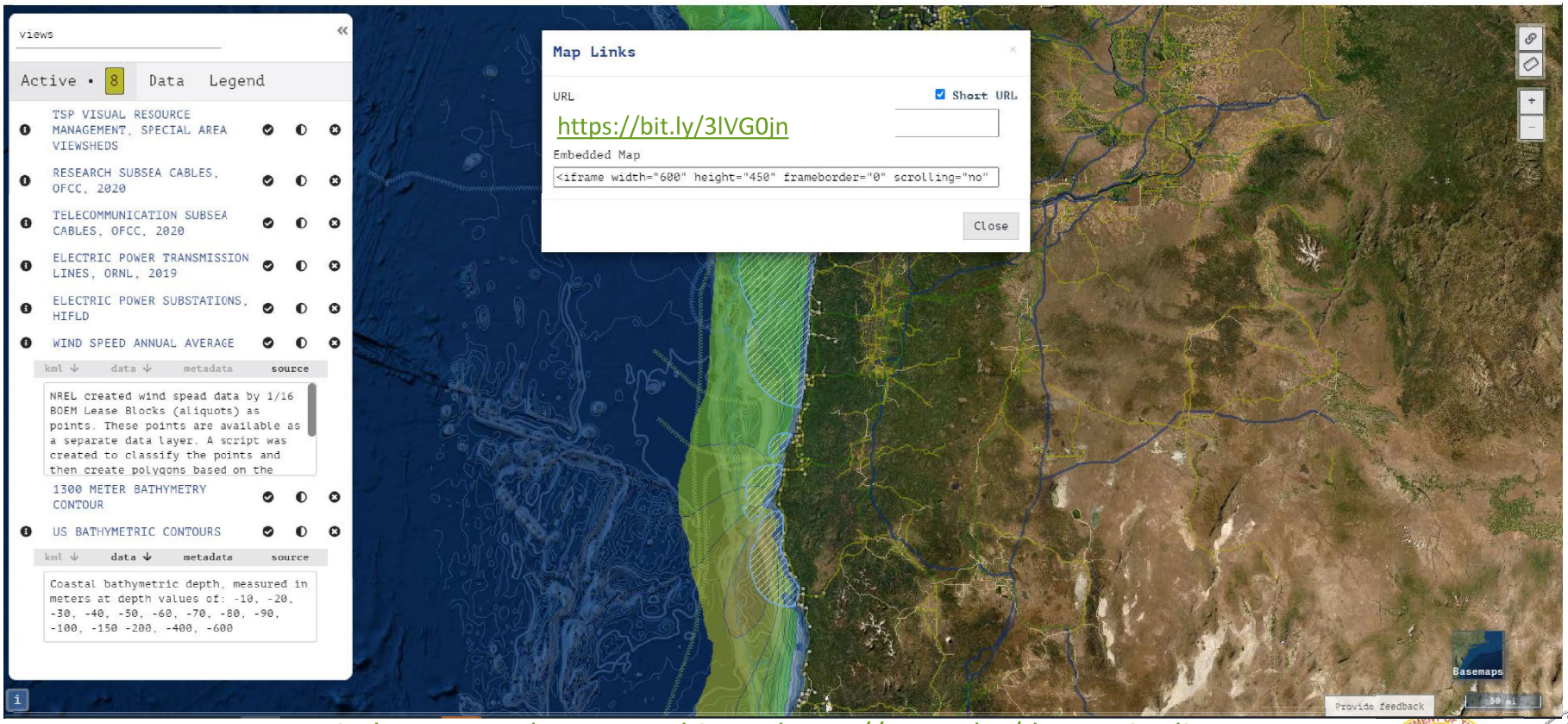
BOEM OROWindMap Supporting the Offshore Wind Planning Process in Oregon WEST COAST OCEAN DATA PORTAL



OROWindMap Introductory Webinar: https://youtu.be/d6xa3QjmdiM

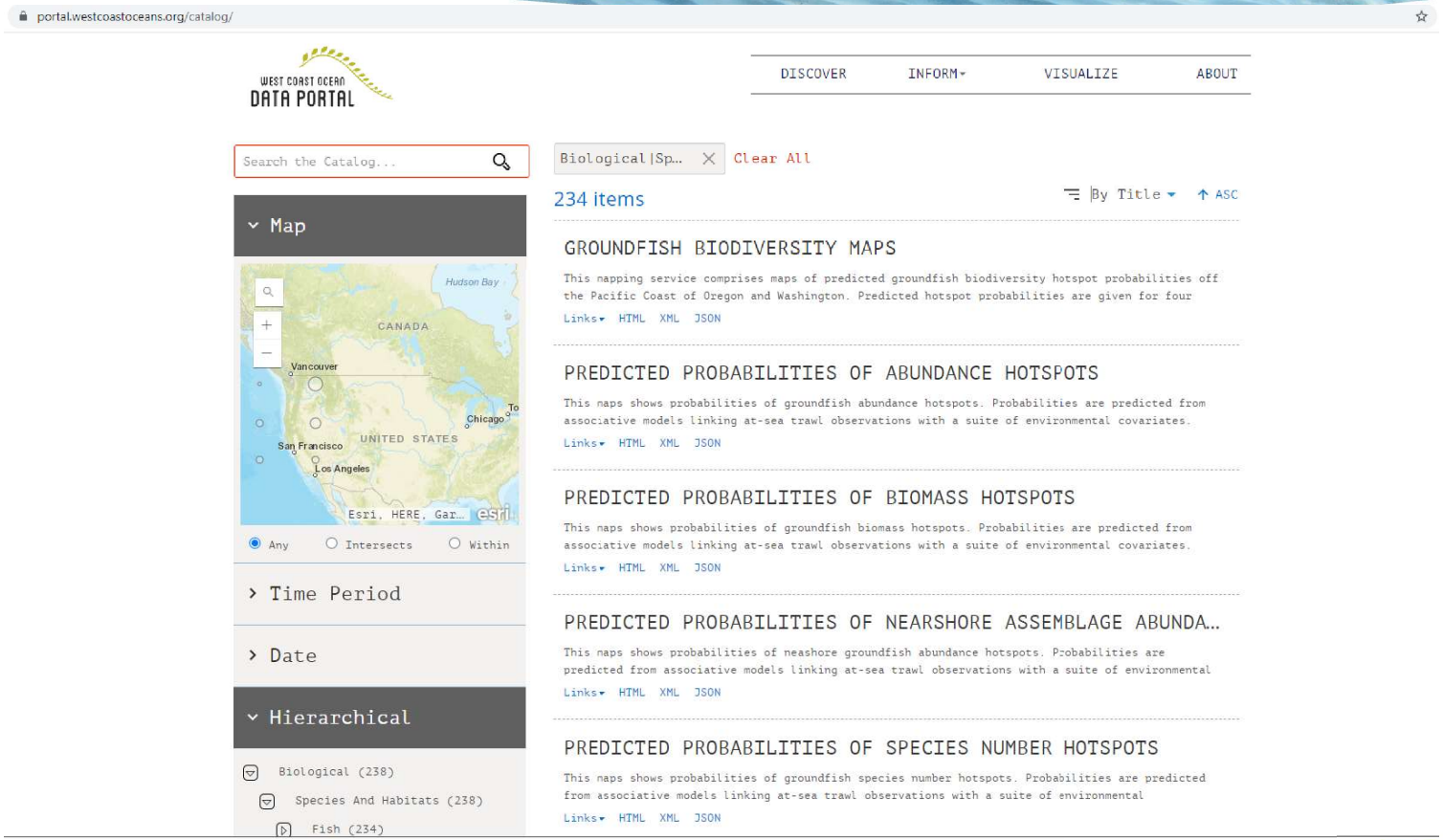
OROWindMap

Supporting the Offshore Wind Planning Process in Oregon

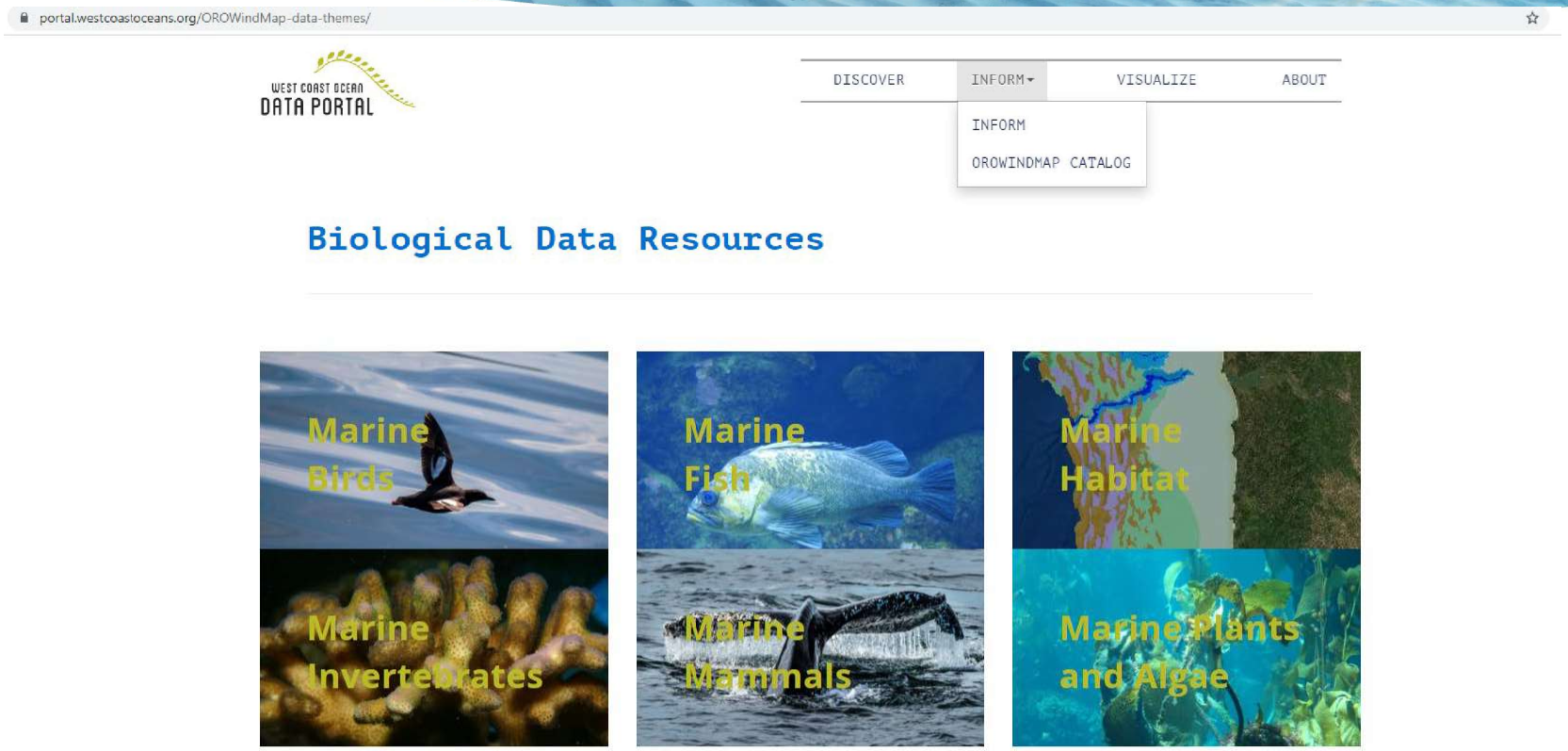


OROWindMap Introductory Webinar: https://youtu.be/d6xa3QjmdiM

Discover additional data resources via the Portal



OROWindMap Data Catalog



OROWindMap Data Catalog – Marine Birds

portal.westcoastoceans.org/OROWindMap-data-themes/marine-birds/

WEST COAST OCEAN DATA PORTAL

DISCOVER INFORM VISUALIZE ABOUT

Marine Birds

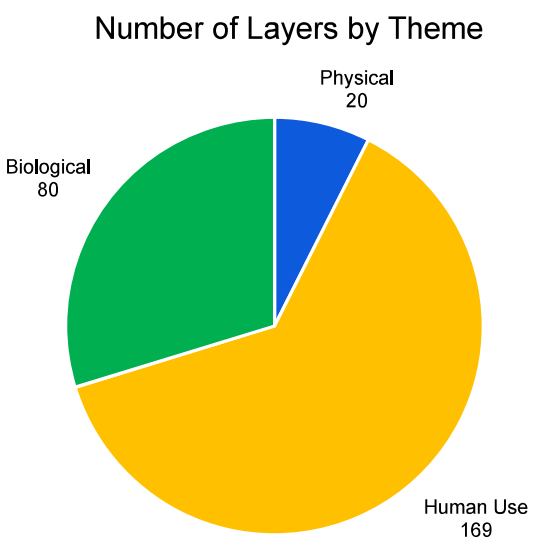
Marine Birds data theme includes information on avian fauna, including flying and nonflying forms.

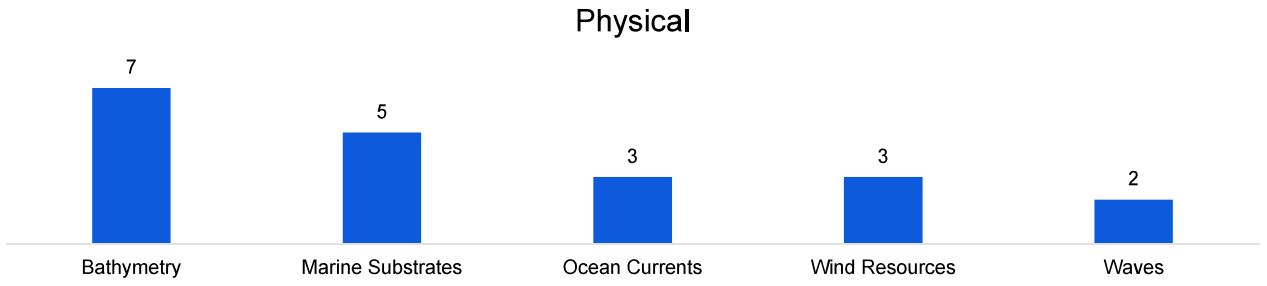
View all Marine Bird layers on OROWindMap

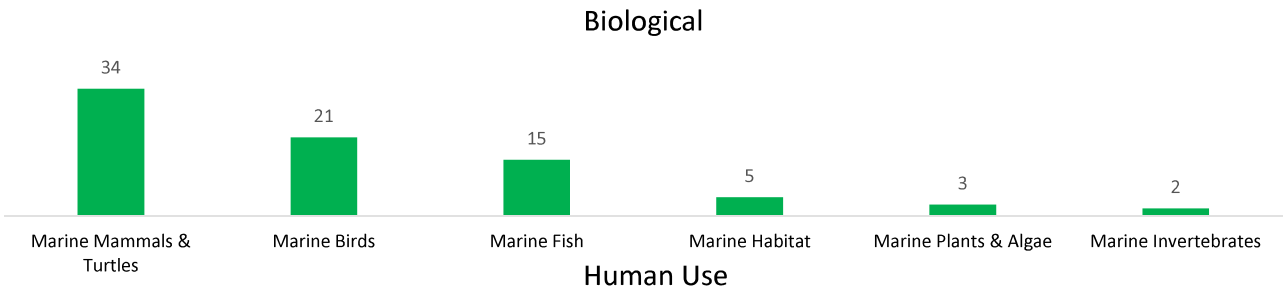
View Metadata

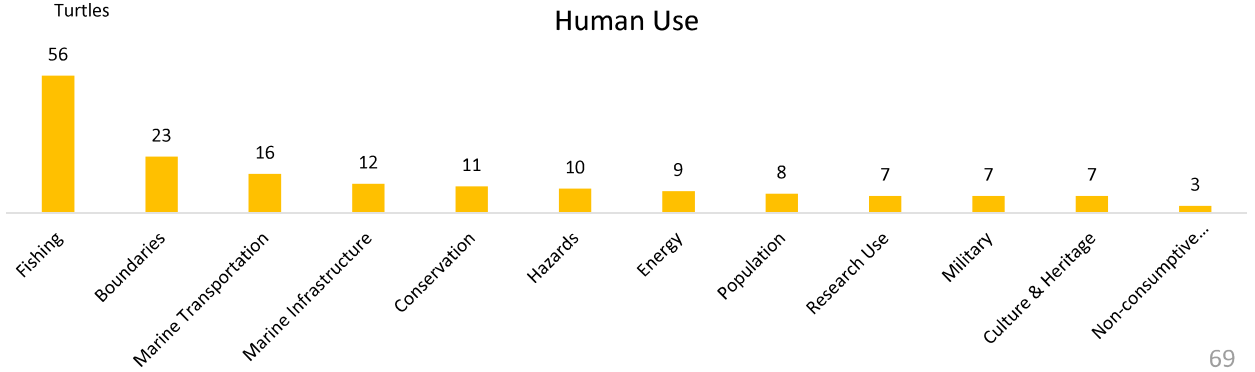
- Important Coastal Bird Areas, Audubon, 2013
  Catalog|OROWindMap
- PaCSEA All Surveys Avg 2011-2012
  Catalog|OROWindMap
  - PaCSEA Jan 2011
    Catalog|OROWindMap
  - PaCSEA June 2011
    Catalog|OROWindMap
  - PaCSEA Oct 2011
    Catalog|OROWindMap
  - PaCSEA Feb 2012
    Catalog|OROWindMap
  - PaCSEA July 2012
    Catalog|OROWindMap

Summary of Catalog Data Records by Theme









A Big Thank You to the Data Source Providers!

Active Tectonics and Seafloor Mapping Lab (ATSML), Oregon State University
- http://bhc.coas.oregonstate.edu/geoportal/catalog/main/home.page

Bureau of Land Management (BLM)
- https://www.blm.gov/

Bureau of Ocean Energy Management (BOEM)
- https://www.boem.gov/

Bureau of Safety and Environmental Enforcement (BSEE)
- https://www.bsee.gov/

Ecotrust
- https://ecotrust.org/

Environmental Protection Agency (EPA)
- https://www.epa.gov/

Federal Aviation Administration (FAA)
https://www.faa.gov/

Georgia Institute of Technology
https://www.gatech.edu/

Marine Cadastre (A joint initiative of NOAA & BOEM)
- https://marinecadastre.gov/

Marine Mammal Institute (MMI), Oregon State University
https://mmi.oregonstate.edu/

National Audubon Society
- https://www.audubon.org/

National Park Service (NPS)
- https://www.nps.gov/

National Oceanic and Atmospheric Administration (NOAA)
- https://www.noaa.gov/

Office for Coastal Management (OCM)
- https://coast.noaa.gov/

National Centers for Coastal Ocean Science (NCCOS)
- https://coastalscience.noaa.gov/

National Centers for Environmental Prediction (NCEP)
- https://www.weather.gov/ncep/

National Geophysical Data Center (NGDC)
- https://www.ngdc.noaa.gov/

Northwest Fisheries Science Center (NWFSC)
- https://www.fisheries.noaa.gov/about/northwest-fisheries-science-center

Southwest Fisheries Science Center (SWFSC)
- https://www.fisheries.noaa.gov/about/southwest-fisheries-science-center

Oak Ridge National Laboratory (ORNL)
- https://www.ornl.gov/

Ocean Reports (A joint tool of BOEM, NOAA NCCOS & NOAA OCM)
- https://coast.noaa.gov/digitalcoast/tools/ort.html

Oregon Coastal Atlas
- https://www.coastalatlas.net/

Oregon Department of Fish and Wildlife (ODFW)
- https://www.dfw.state.or.us/

Oregon Department of Land Conservation and Development (OR DLCD)
- https://www.oregon.gov/lcd

Oregon Department of Transportation (ODOT)
- https://www.oregon.gov/odot

Oregon Fishermen's Cable Committee (OFCC)
- http://www.ofcc.com/

Oregon Geospatial Enterprise Office (GEO)
- https://www.oregon.gov/GEO

Pacific Fishery Management Council (PFMC)
- https://www.pcouncil.org/

Pacific Marine and Estuarine Fish Habitat Partnership (PMEP)
- https://www.pacificfishhabitat.org/

Pacific States Marine Fisheries Commission (PSMFC)
- https://www.psmfc.org/

Point Blue Conservation Science
- https://www.pointblue.org/

Surfrider
- https://www.surfrider.org/

The Nature Conservancy (TNC)
- https://www.nature.org

United States Department of Homeland Security
- https://www.dhs.gov/

United States Geological Survey (USGS)
- https://www.usgs.gov/

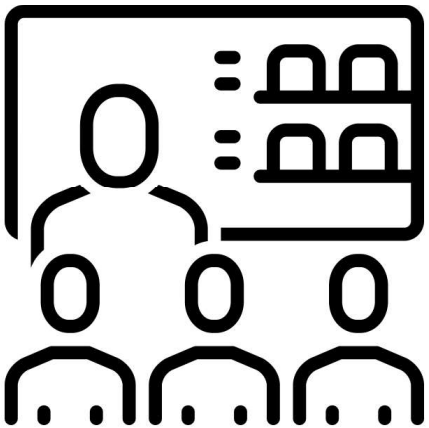
Virginia Tech
- https://vt.edu/

Washington State Department of Natural Resources (WA DNR)
- https://www.dnr.wa.gov/

West Coast Ocean Data Portal (WCODP)
- https://portal.westcoastoceans.org/

Public Data Review Workshops

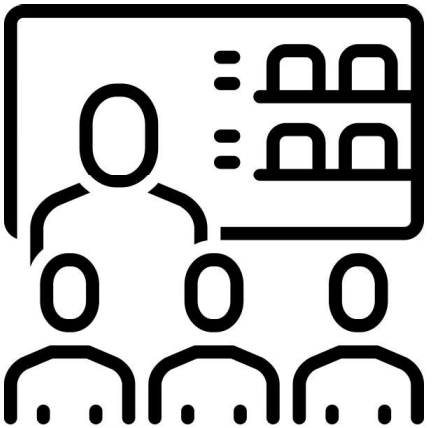
Data Review



129 Participants

Links to the Video Sessions:
Biological, Physical, Human

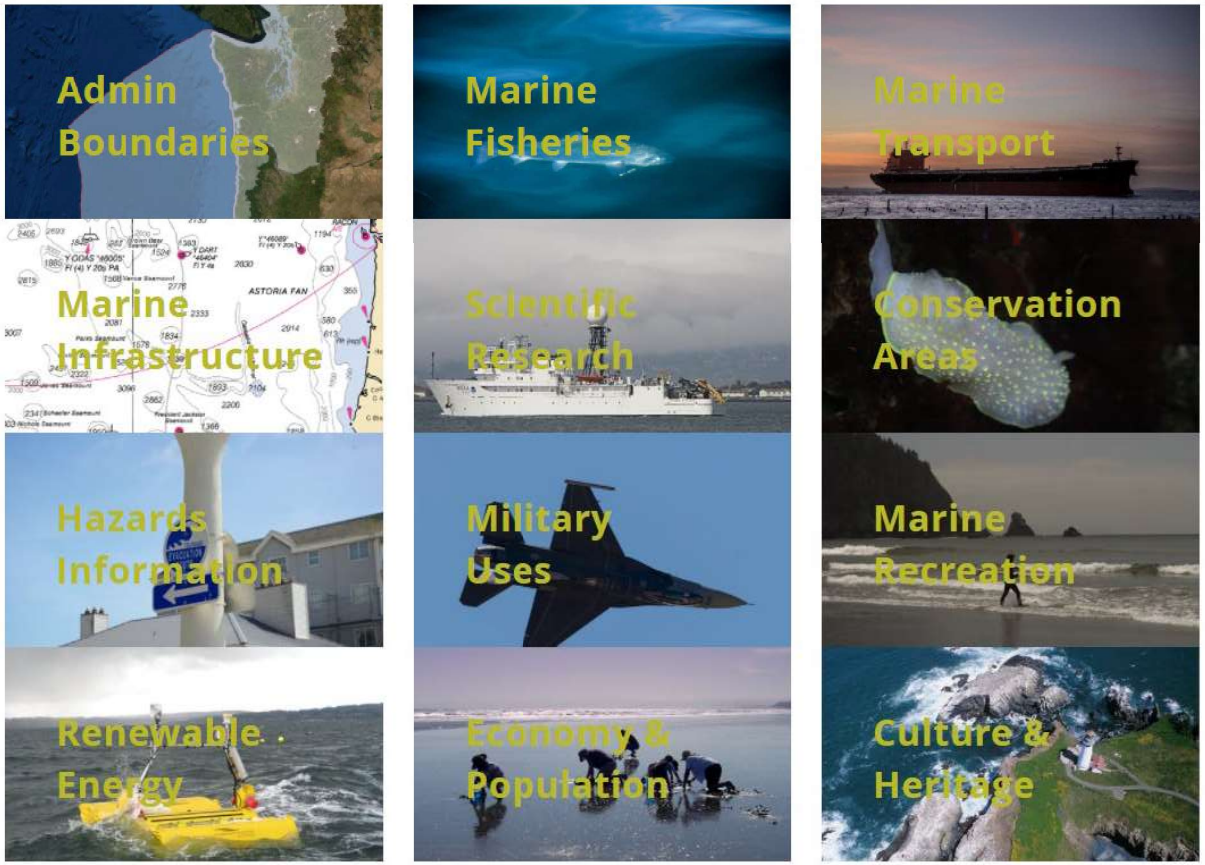
Fisheries Data Review



123 Participants

Link to the Video Sessions:
Pacific Groundfish, Crab, Shrimp, Pot or Trap
Salmon, HMS, CPS

Human Use Data



Marine Renewable Energy

Data in this theme include "Energy Resources" which refers to natural features that provide a capacity to do work through combustion, movement, radiation, or heat; these resources include oil, natural gas, coal, wind, sun, currents, tides, and natural heat gradients. Also included is information related to planning for offshore energy.

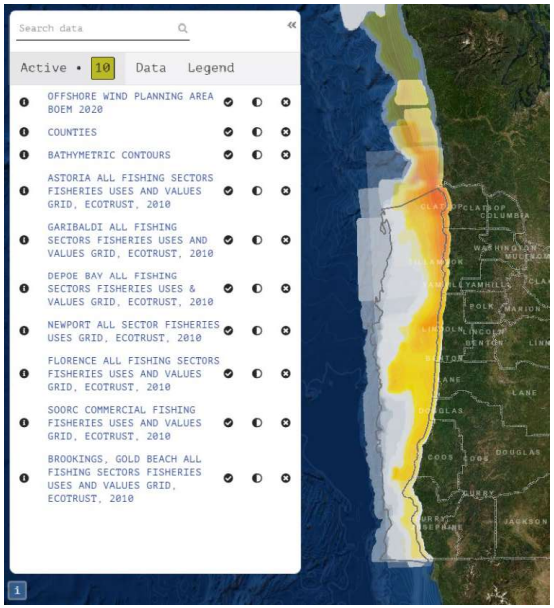
Data Layers in the Catalog

- BOEM Block Aliquots, BOEM, 2020
- BOEM Limit of OCSLA 8(g) zone, BOEM, 2020
- BOEM OCS Lease Blocks, BOEM, 2020
- DoD Offshore Wind Mission Compatibility Assessments, NOAA, 2021
- Offshore Wind Technology Depth Zones, NOAA, 2021
- Distance to Shore, BOEM, 2021
- Permitted Marine Hydrokinetic Projects, NOAA, 2018
- Oregon Offshore Wind Planning Area, BOEM, 2020
- Territorial Sea Plan Part V, DLCD, 2019

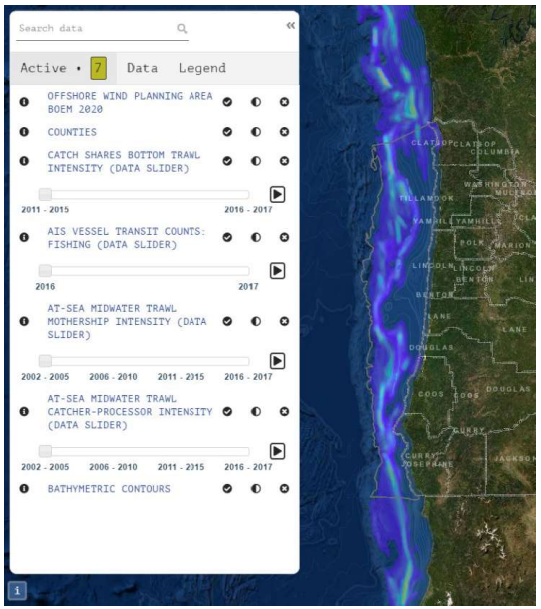
View in OROWindMap

Marine Fisheries Data Catalog

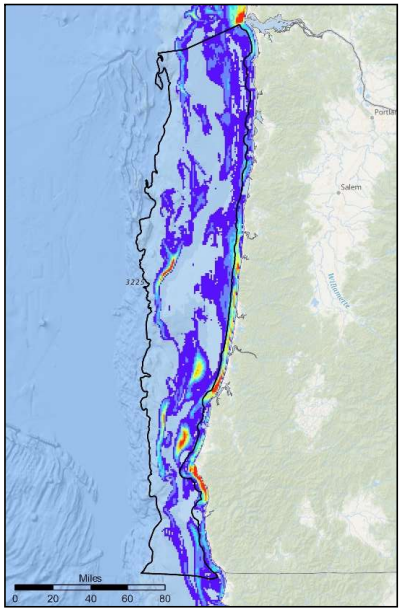
TSP Part Five



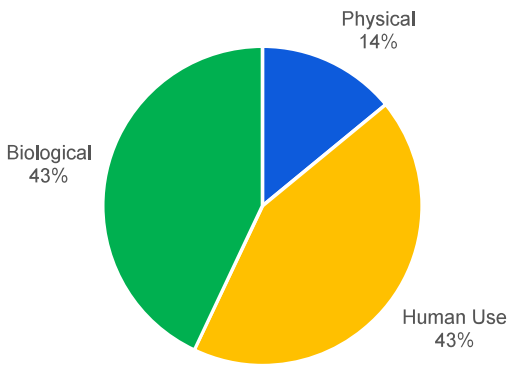
NOAA Fisheries (FRAM)

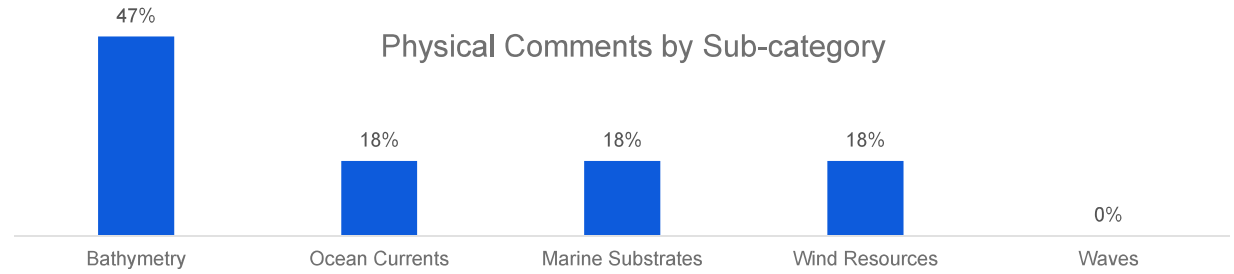


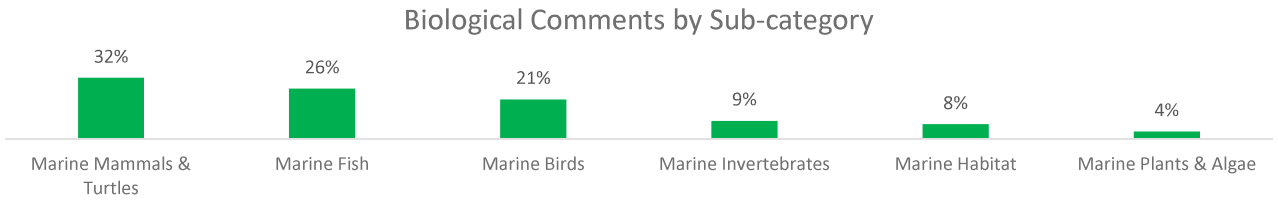
BOEM Vms Analysis (Draft Products)

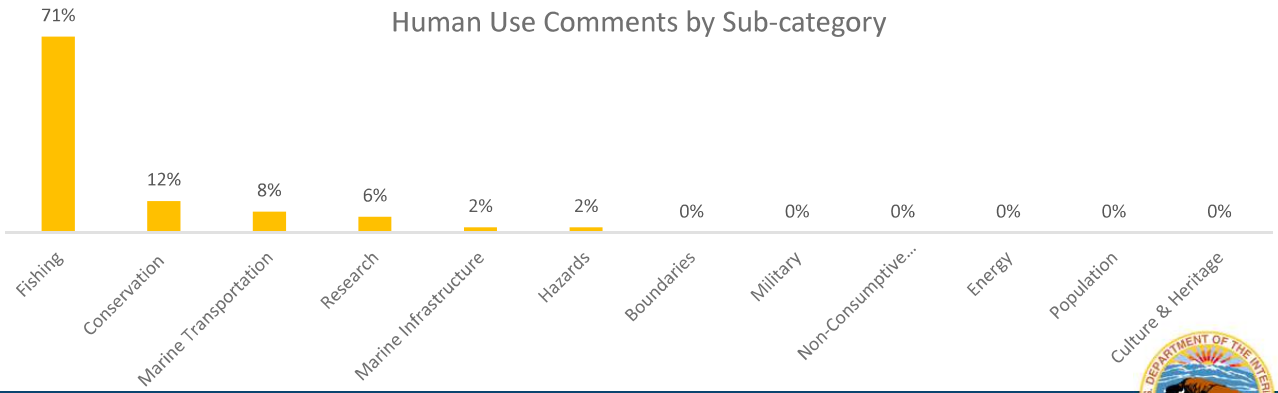


Public Data Review Comments by Theme

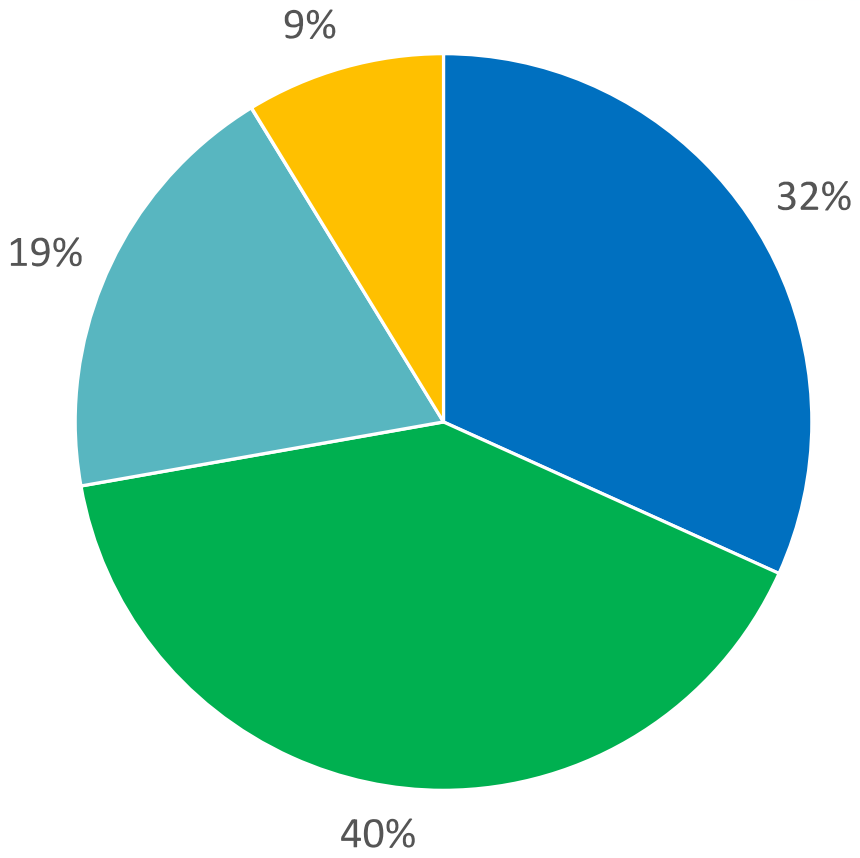








Public Data Review Comments by Type

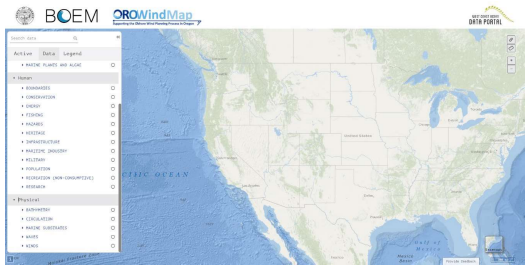


A total of 189 comments were received (includes written and verbal)

- Identified additional existing spatial data layers to include
- Identified desired changes to representation or metadata of spatial data layer in tool
- Identified data gap that would require creation of new spatial data layers
- Identified concern with limitations / accuracy of data layers

OROWindMap Data To-Go!~

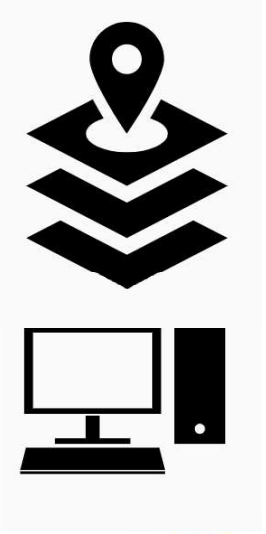
OROWindMap



Data Catalog

OROWindMap GIS Data Catalog Files

(Coming Soon!)



Got Data?

What?

Ocean Characteristics

Biological, Physical, Human Use

Where?

Oregon, West Coast

Geospatial

Ideal, but not required

Geospatial Service

Metadata

How was it made?

Where does it live?

www.boem.gov/OROWindMapInfo

BOEM Bureau of Ocean Energy Management

BOEM Bureau of Ocean Energy Management | WEST COAST OCEAN DATA PORTAL

Data Sharing for Oregon Offshore Wind Planning

The Bureau of Ocean Energy Management (BOEM) and the State of Oregon (the State), led by the Oregon Department of Land Conservation and Development (DLCD), are committed to offshore wind energy planning with a data gathering process to inform potential leasing decisions. In partnership with the BOEM Oregon Intergovernmental Renewable Energy Task Force (Task Force), BOEM and DLCD developed the *Data Gathering and Engagement Plan for Offshore Wind Energy in Oregon*, which outlines the activities BOEM and the State will conduct to gather information to inform the Task Force and offshore wind energy leasing decisions. The plan can be found at: www.boem.gov/Oregon.

The DLCD, in partnership with BOEM, is developing a data catalog and map viewer within the West Coast Ocean Data Portal to provide public access to the best available data throughout the planning process. The Oregon Offshore Wind Mapping Tool (OROWindMap), which can be found at https://offshorewind.westcoastoceans.org, has been developed to compile the collected data and information. This powerful planning tool accesses relevant datasets and provides visualization capabilities to inform the planning process for offshore wind energy leasing in federal waters offshore Oregon. The inclusion of new data sets will help inform the public, the State, and the Bureau of Ocean Energy Management during the planning process. Below are the criteria for inclusion of new data sets in OROWindMap.

- Data sets depict coastal and ocean characteristics (e.g., biological, physical) or human uses that are relevant to planning for offshore wind energy development in federal waters offshore Oregon.
- Data sets include the State (and its Territorial Sea) or federal waters offshore Oregon; however, data that encompasses the entire West Coast are ideal.
- Data sets are geospatial, ideally in a GIS format, but may be in a tabular format with coordinates.
- Data sets include standards-compliant metadata. The basic information required for metadata is outlined below, and more information can be found at http://wcodp.readthedocs.io/.

If there is an information product that is relevant to this process but is not geospatial or tabular, please contact the West Coast Ocean Data Portal (WCODP) Administrator at portal.westcoastoceans@sccwrp.org.

Metadata help document the details of data sets, including who created it, when it was created, and why it was created. All data in OROWindMap have, at a minimum, the following metadata associated with them:

- Title
- Abstract / Description
- Use Limitations / Constraints
- Bounding Box Coordinates in Latitude/Longitude (decimal degrees)
- Keywords
- Date Published
- Contacts
  - Originator
  - Publisher
  - Distributor
- URLs for data download, web services, kml, web application, documentation

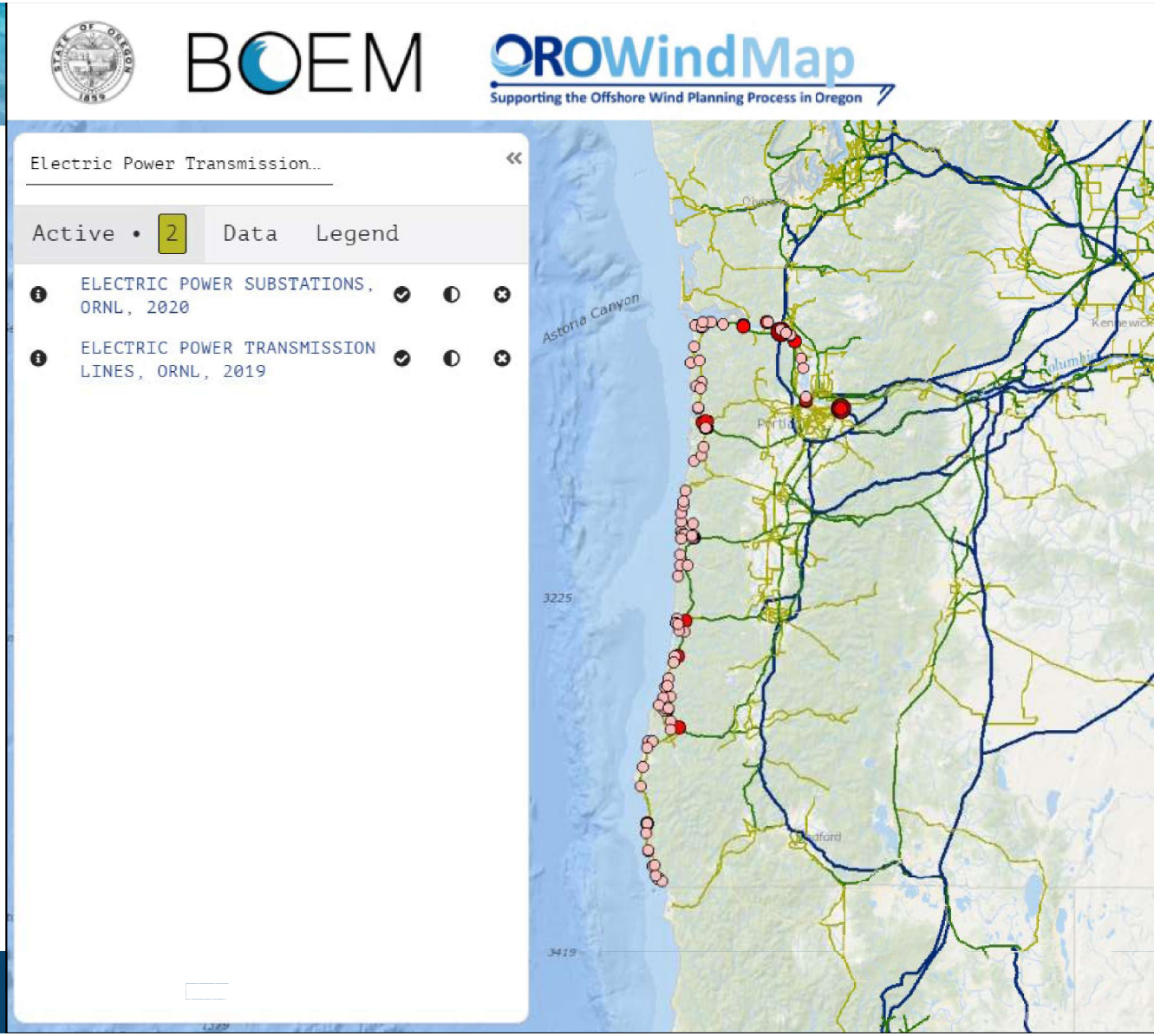
If the metadata meet the requirements of the Federal Geographic Data Committee (FGDC) endorsed standards (https://www.fgdc.gov/metadata/geospatial-metadata-standards), then it will meet the WCODP requirements.

Datasets

Frank Pendleton, GIS Analyst
BOEM Pacific Office

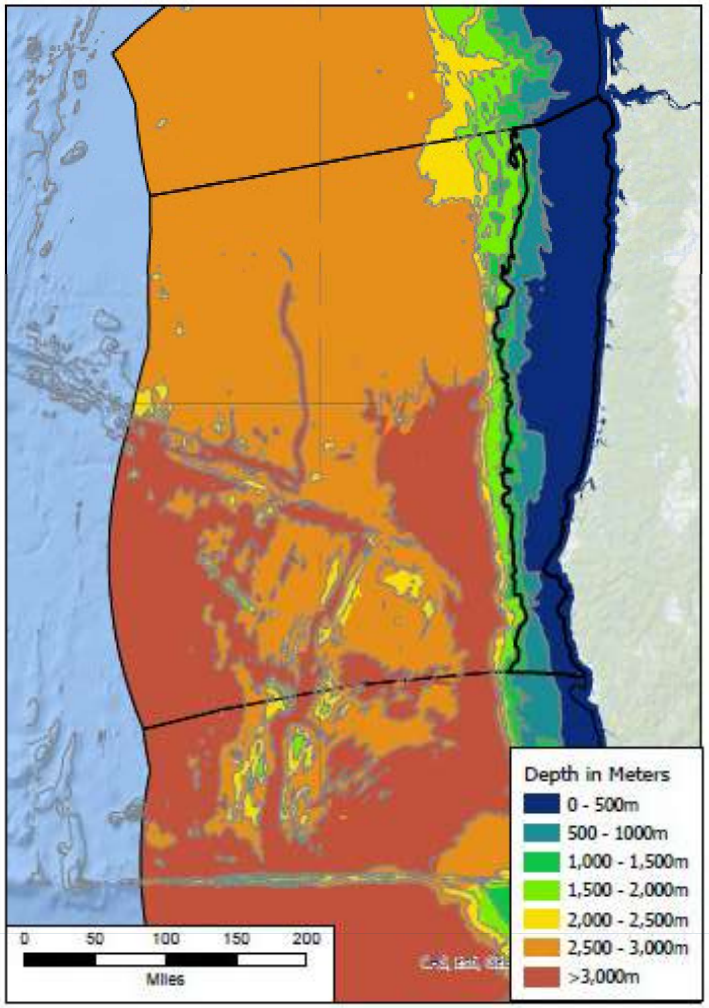
Grid Connection

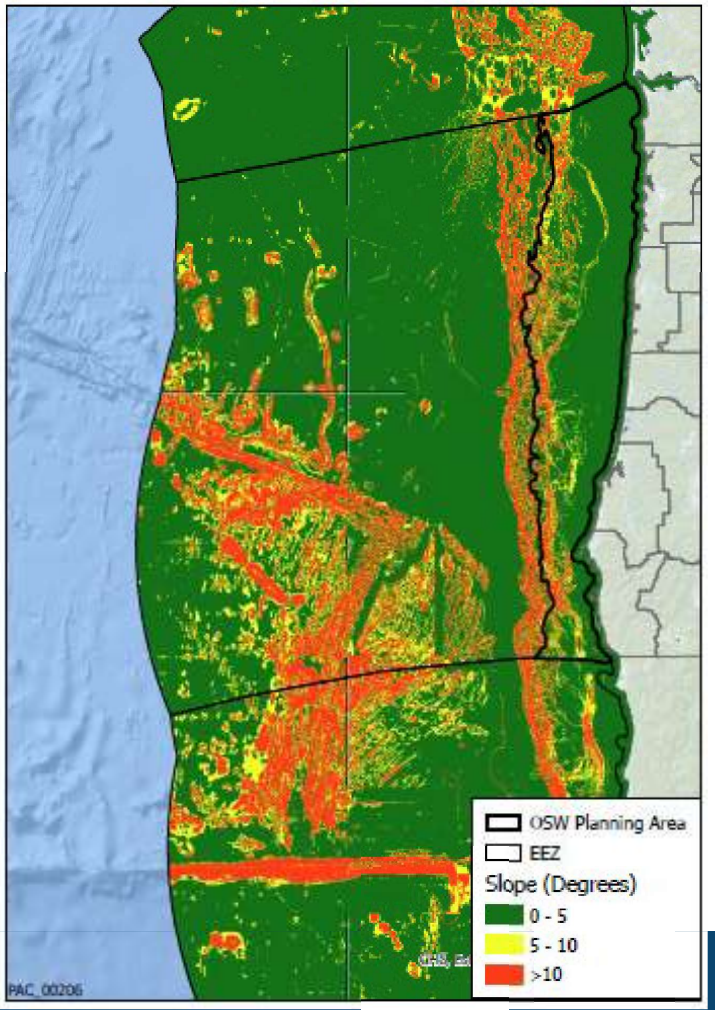
- **Electric substations and transmission lines**
- **Homeland Infrastructure Foundation Level Data (HIFLD)**
  - Department of Defense
  - Department of Homeland Security
  - National Geospatial Intelligence Agency
  - Department of the Interior



Water Depth and Slope

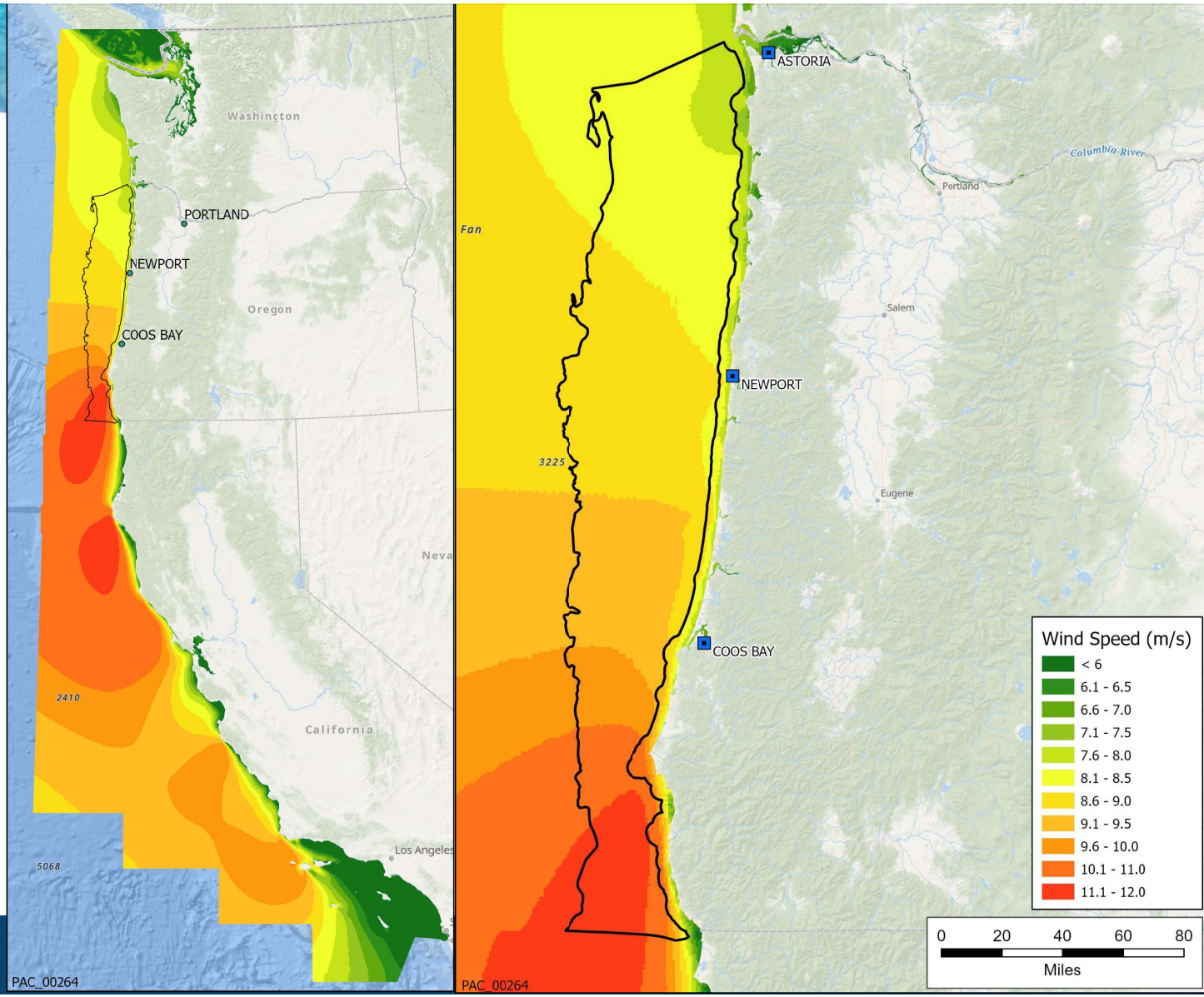
- Bathymetry data from NOAA
- Slope derived from bathymetry





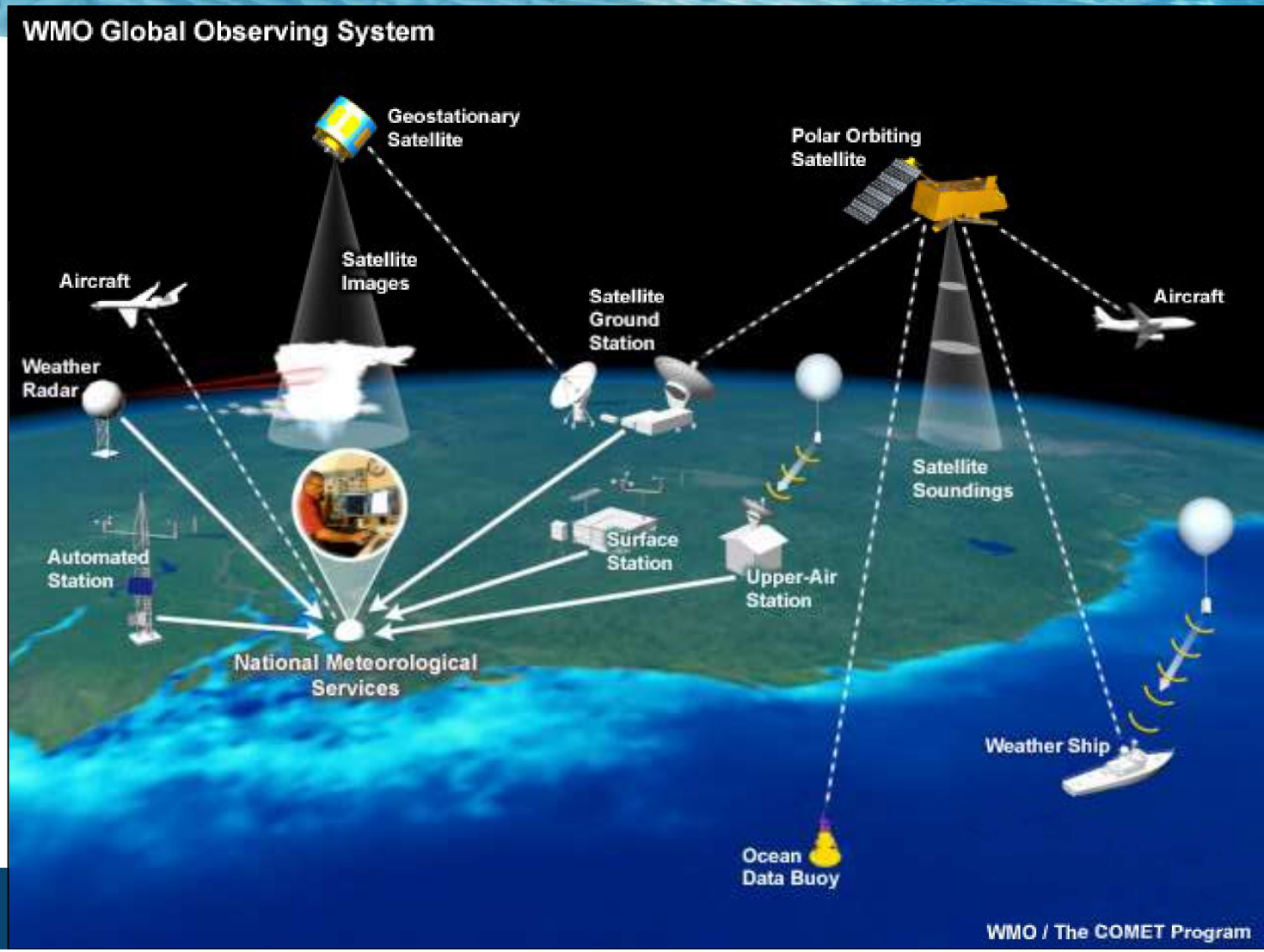
Wind Speed Data

- **National Renewable Energy Laboratory (NREL)**
- **2020 Dataset**



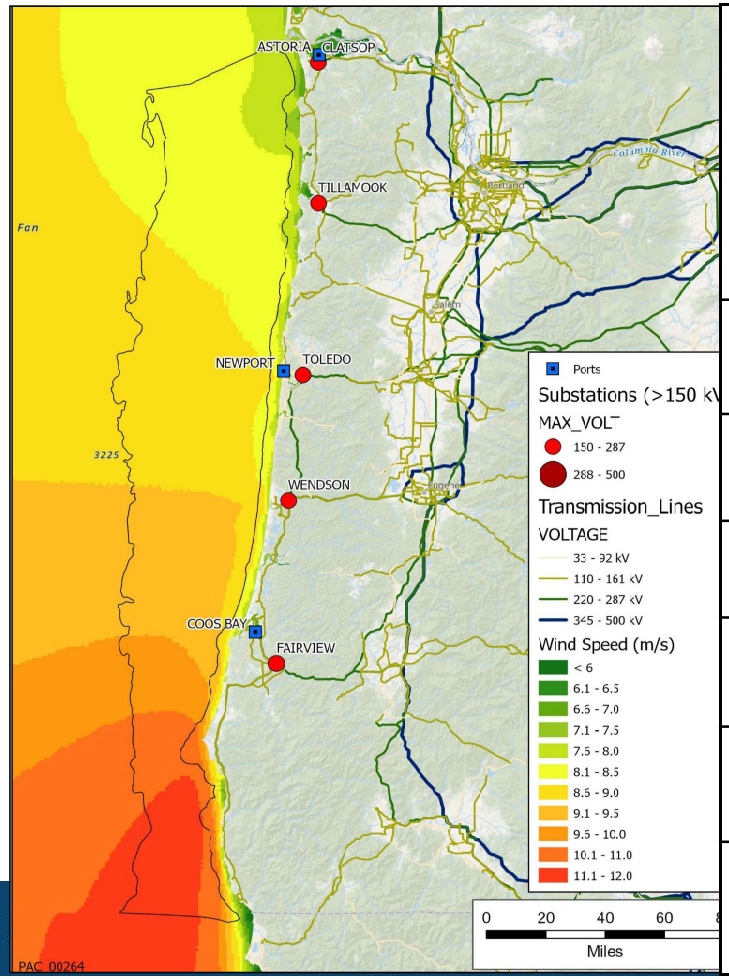
Wind Speed Data

- Many data sources
- Modeled to provide consistent dataset for USA



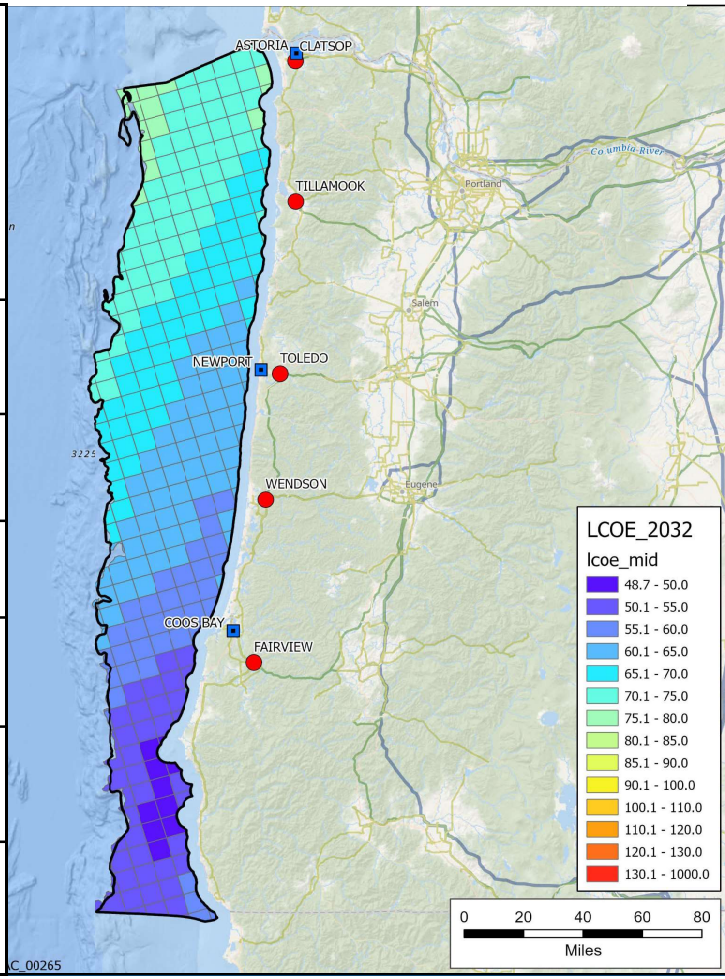
NREL Studies

Wind, Transmission, Ports



Offshore Wind Point of Interconnection	Max Capacity (MW)
Clatsop	361
Tillamook	553
Toledo	156
Wendson	613
Fairview	941
Total	**2,625**

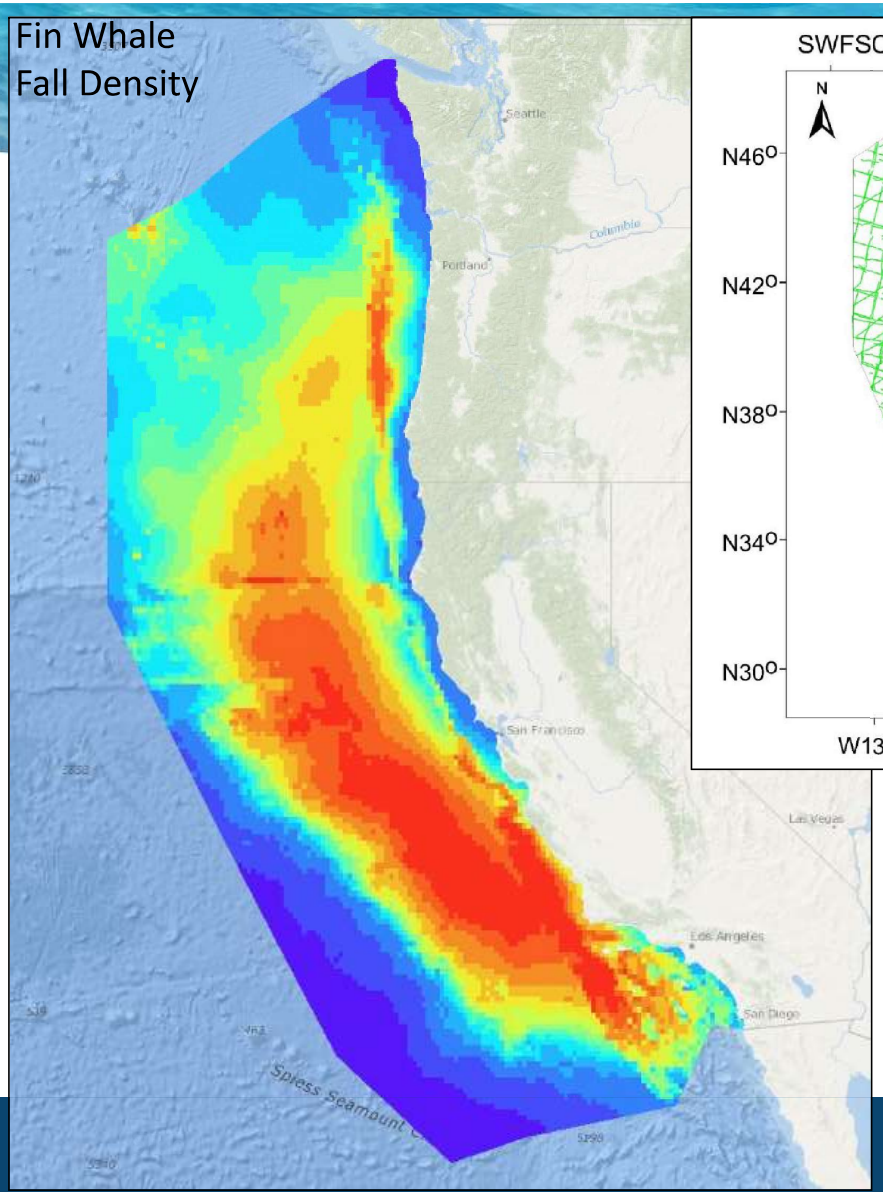
Levelized Cost of Energy

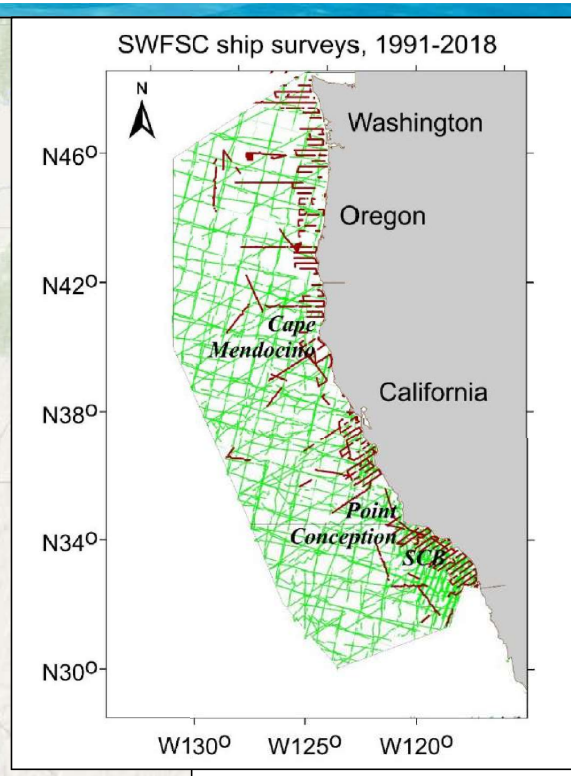


BOEM

Biological Data

- **Whales and Dolphins**
  - NOAA NMFS
  - Jul – Dec
  - 1991 – 2018
- **Variables for Predictive Models**
  - Time of year
  - Latitude
  - Depth / Slope / Dist to Shore
  - Chlorophyll / Temperature
  - Etc, etc, etc





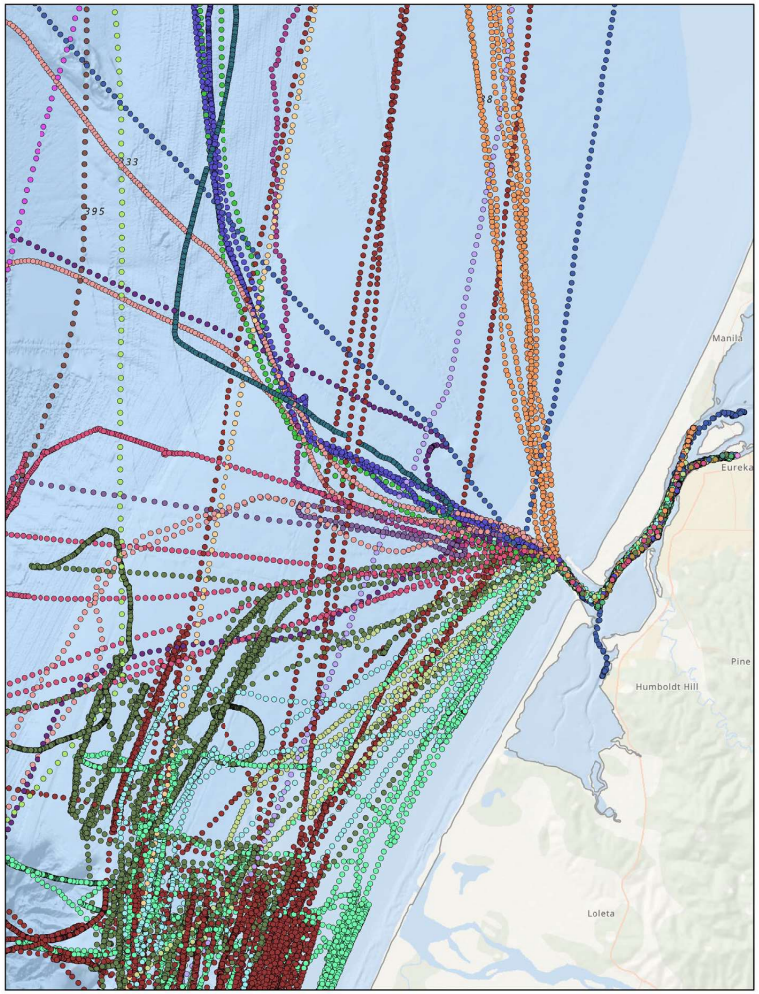
Becker, et al. 2020. Habitat-based density estimates for cetaceans in the California Current Ecosystem based on 1991-2018 survey data,
U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-638
https://www.fisheries.noaa.gov/about/southwest-fisheries-science-center.

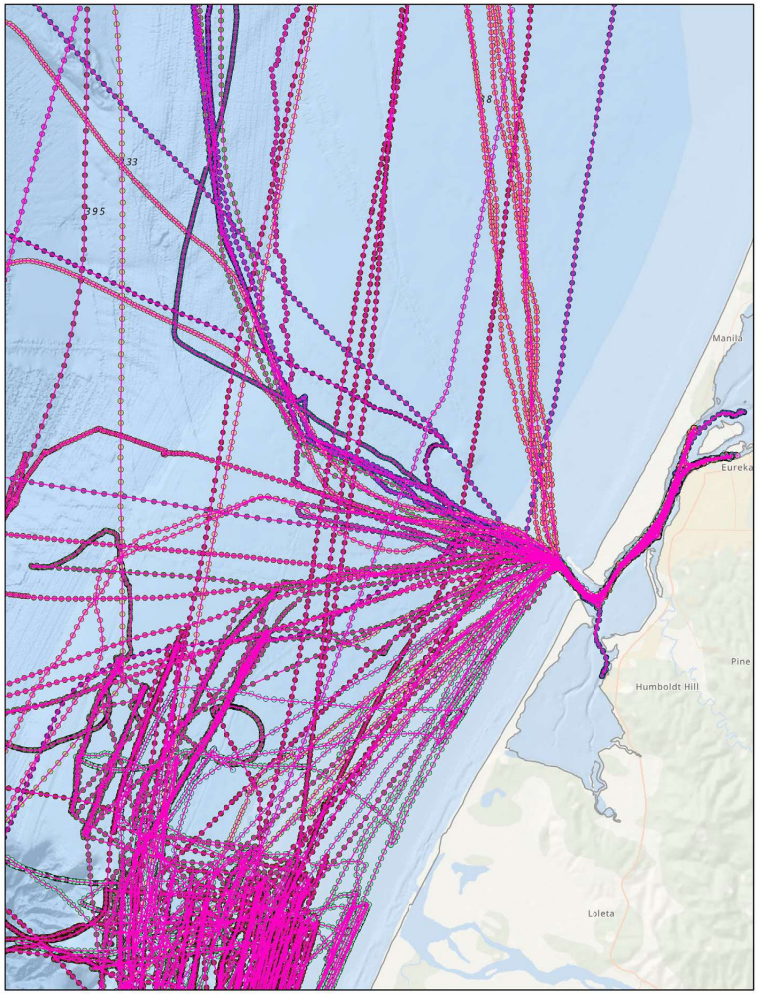
Vessel Traffic / Fishing

	Automatic Identification System (AIS)	Vessel Monitoring System (VMS)
Source	U.S. Coast Guard	National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement
Purpose	Collision avoidance	Fisheries management
Required Vessels	>300 gross tonnage (~65 feet)	Federally managed fishery
Confidential?	N/A Data available at https://marinecadastre.gov/ais/	Non-Disclosure Agreement At least 3 vessels in any block
Years	2009-2020 (2017 shown)	2010-2018
Analysis	All speeds	Fishing speed only/all speeds

Point Data to Density Grids

- **AIS Vessel Traffic**
- **Same process for VMS**





Point Data to Density Grids

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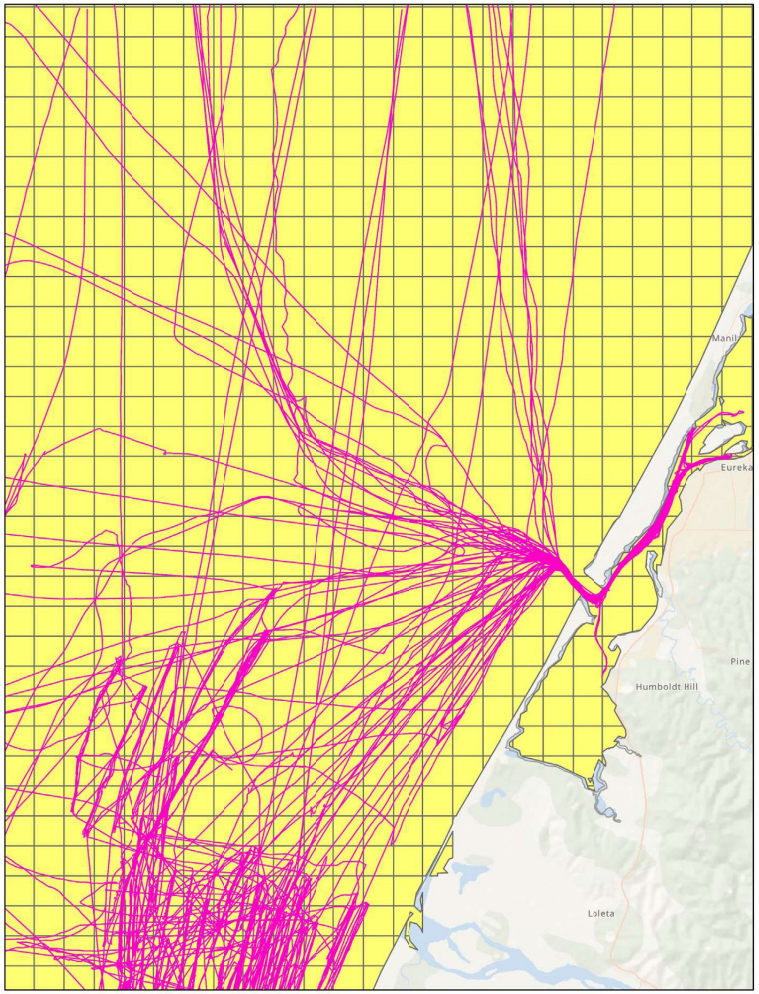
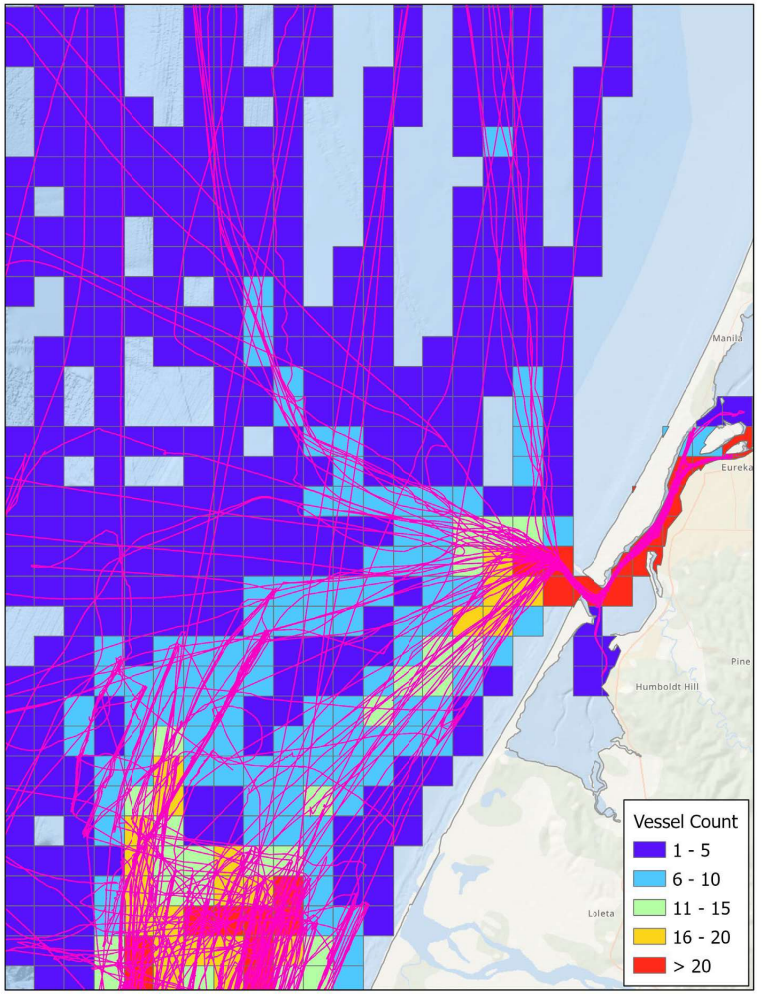
- **Same process for VMS**





BOEM Bureau of Ocean Energy Management

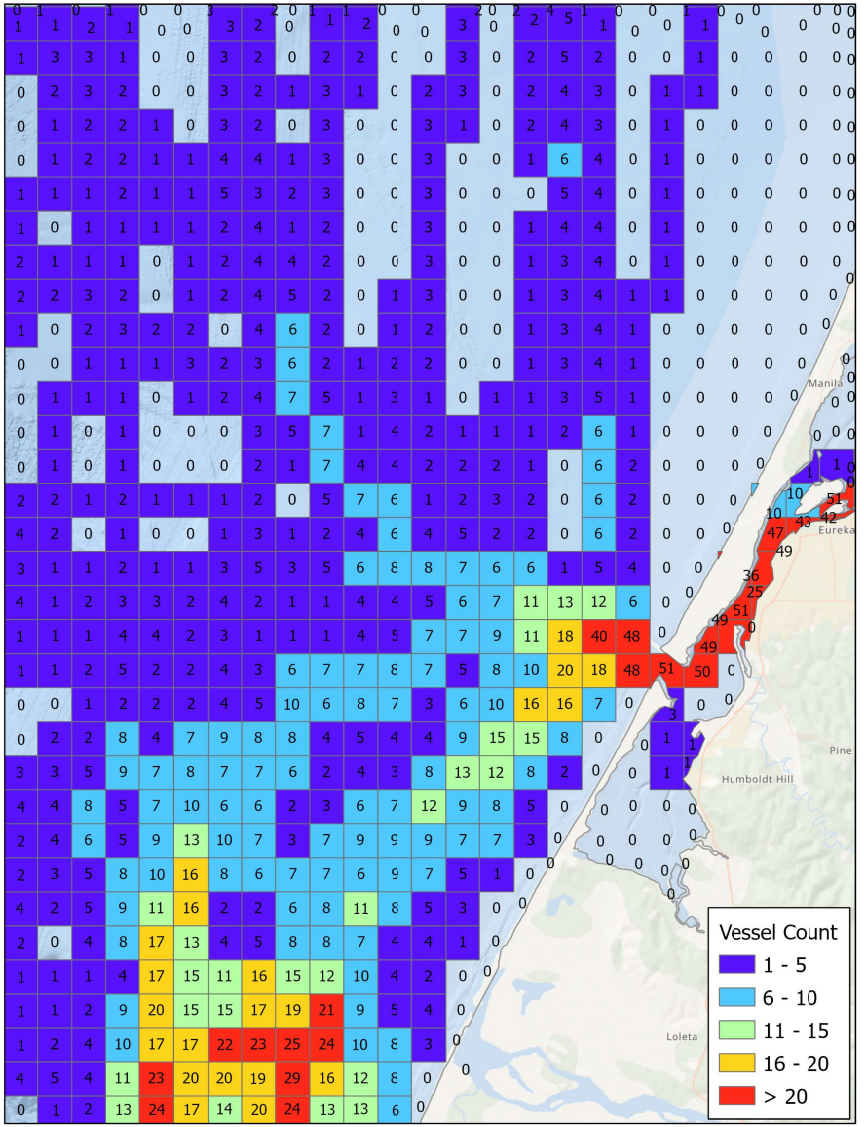
Point Data to Density Grids

What's in the boxes

- # Vessels (AIS)
- # Fishing Events for VMS fisheries

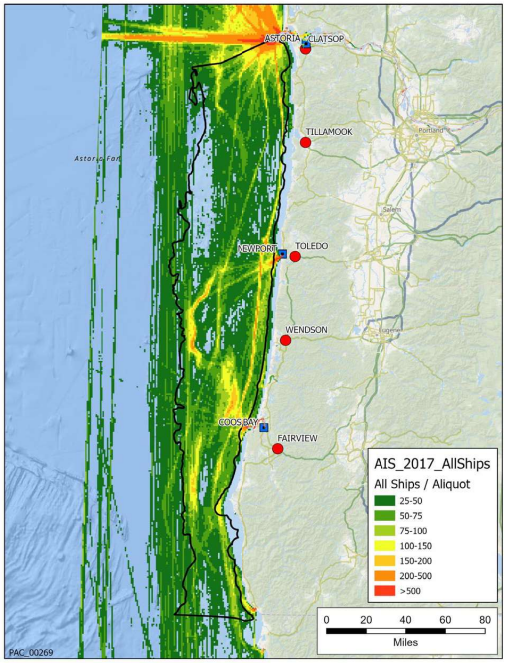
But it could be

- # Fishing Events for non-VMS fisheries
- Km fished / Square km
- Ex-Vessel Value

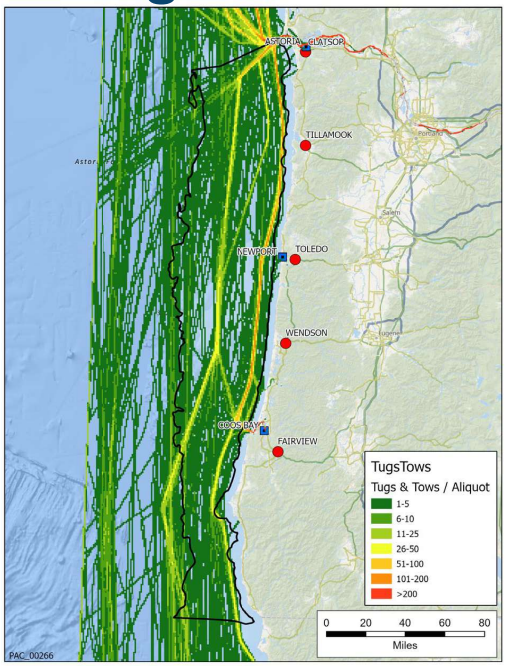


Existing Uses – Vessel Traffic

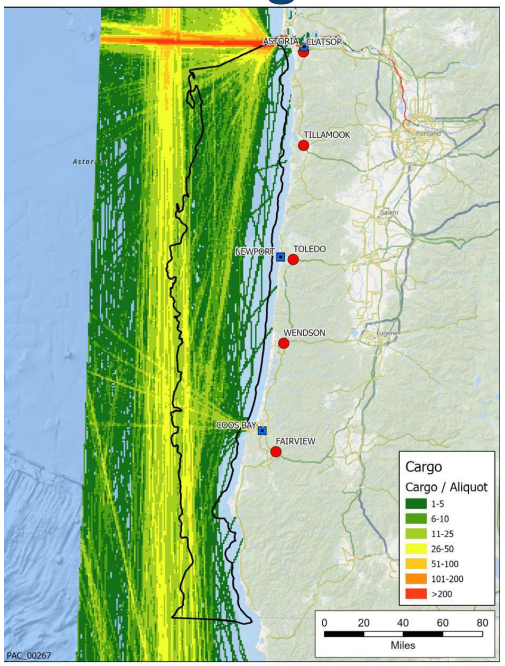
All Ships



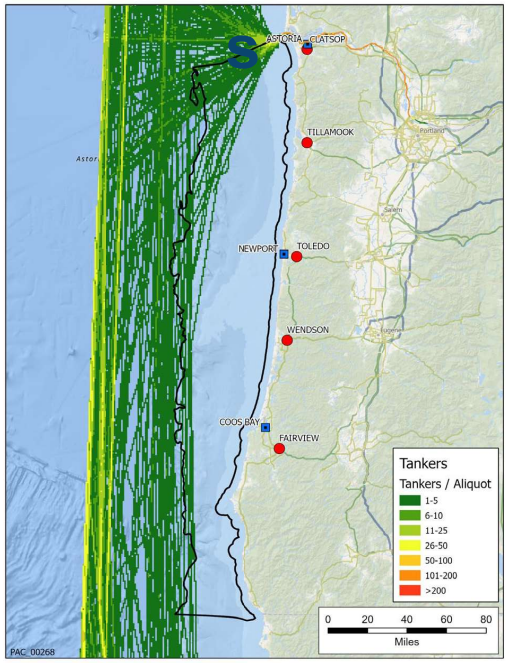
Tugs & Tows



Cargo

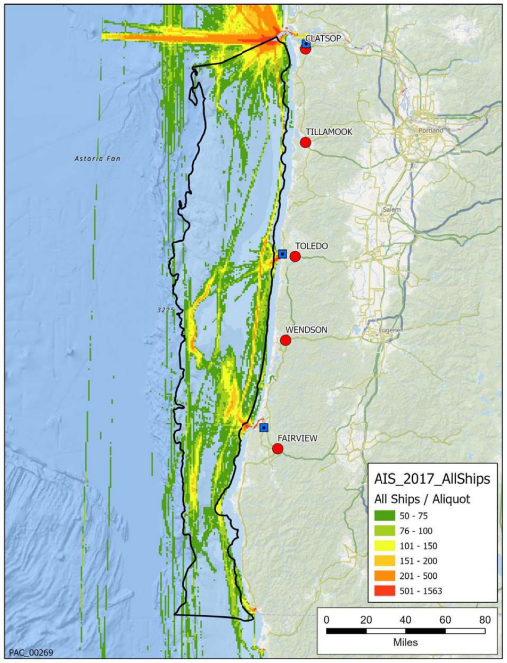


Tanker

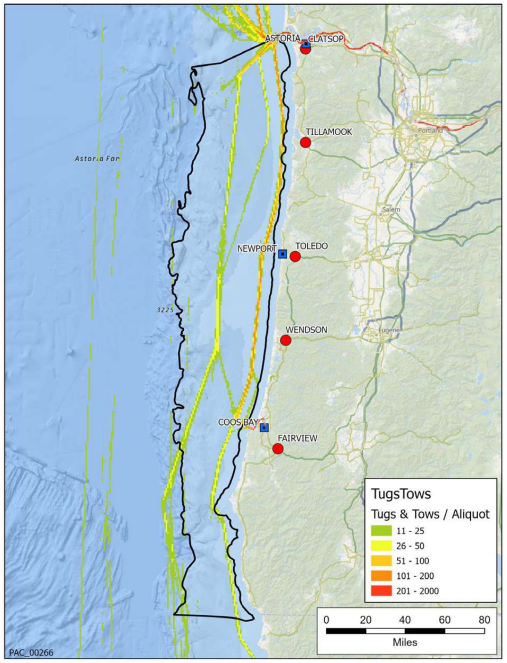


Existing Uses – Vessel Traffic (Busy Areas)

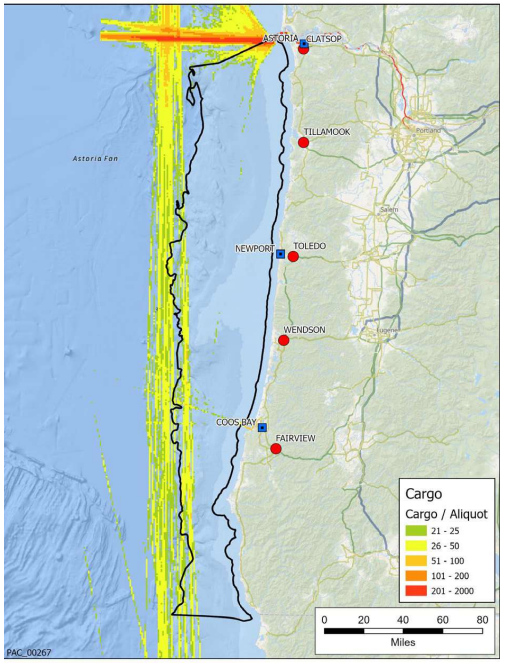
All Ships >50



Tugs & Tows >10



Cargo >20



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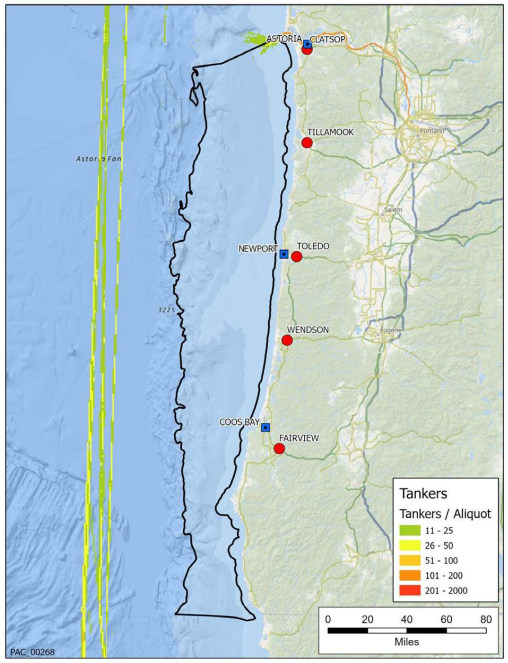


Vessel Monitoring System (VMS)

Collaboration between

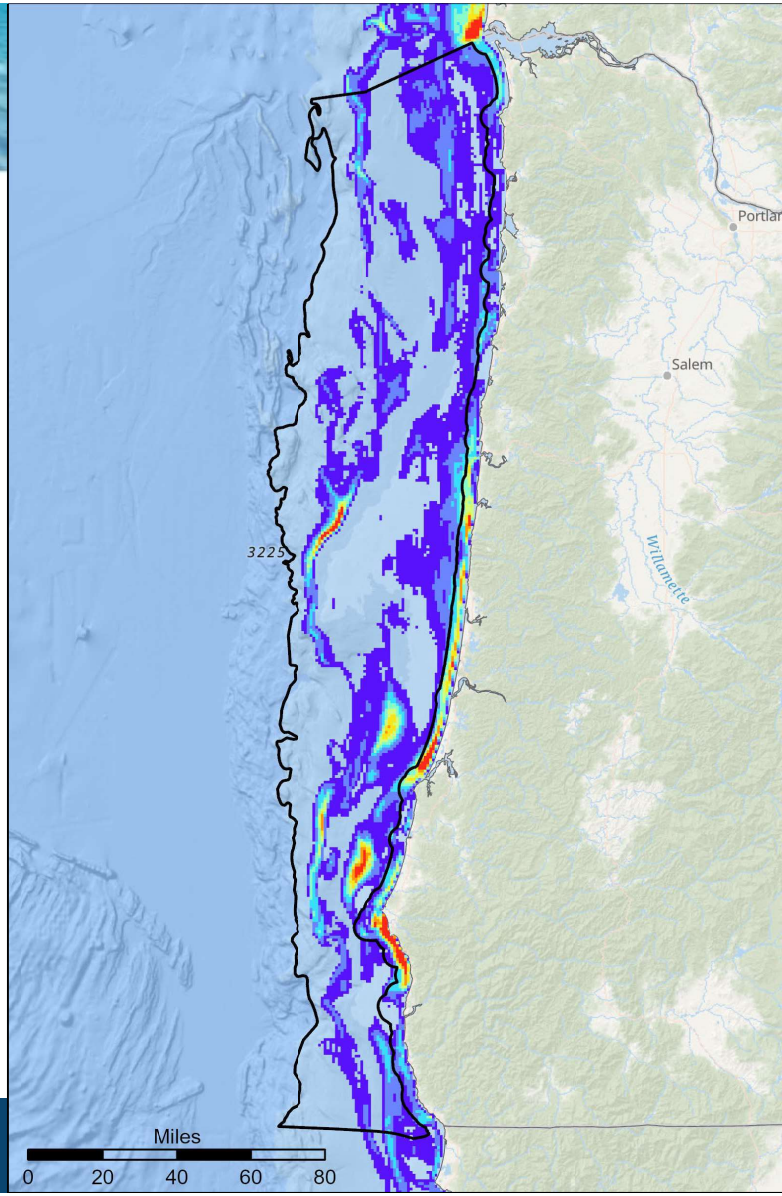
- California Polytechnic State University
- BOEM

NOAA Office of Law Enforcement Data

- Non-Disclosure Agreement
- Rule of 3

Our Dataset = 2010 – 2017

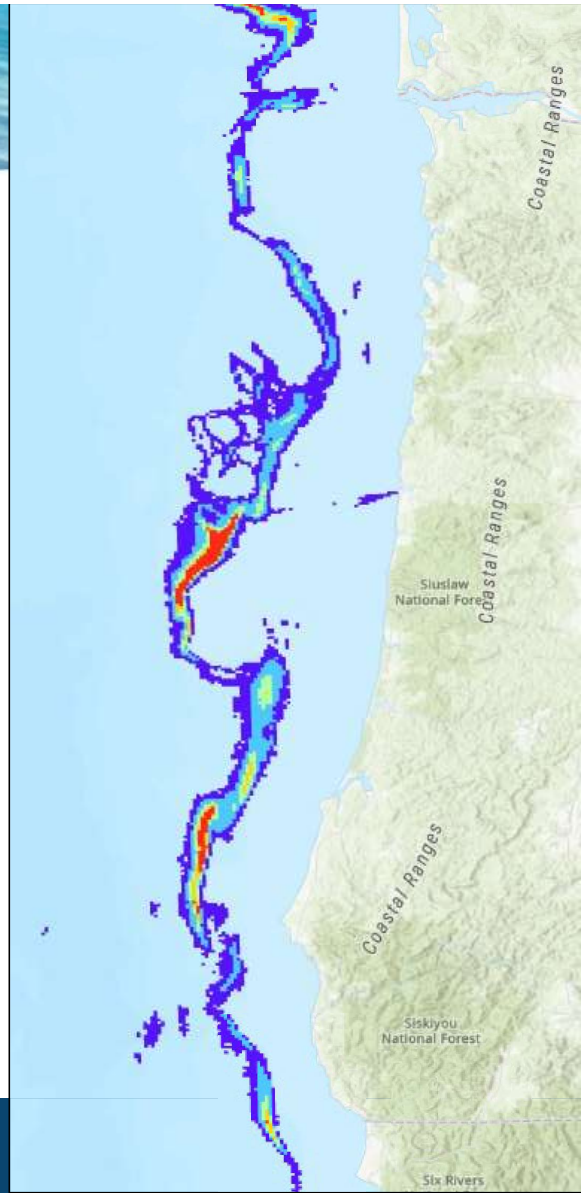
Dynamic dataset



Fisheries Outreach & Datasets

Outreach and discussions with:

- California Dept of Fish and Wildlife
- Oregon Dept of Fish and Wildlife
- NOAA Aquaculture Team
- NOAA NMFS Offshore Wind Team
- NOAA Office of Law Enforcement
- Pacific Fishery Management Council (PFMC)
- Pacific States Marine Fisheries Commission (PSMFC)
- Fishery Commissions / Organizations
- Oregon Fisheries Data Review



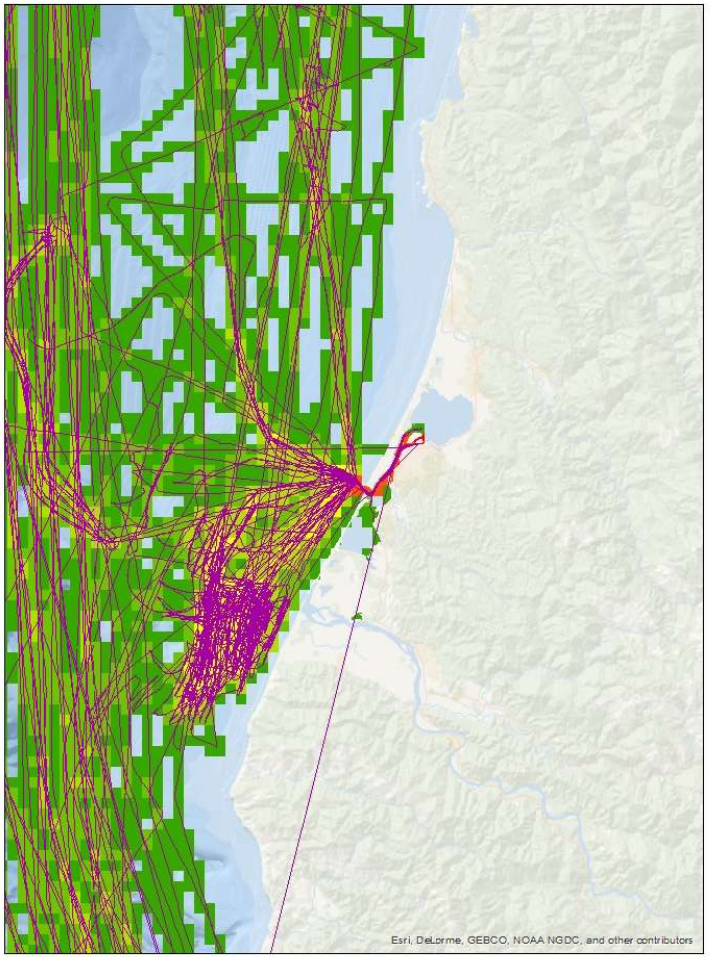
VMS Processing

Fishing Trip

- Begins when a vessel leaves port
- Ends when it enters port

Fishing Event

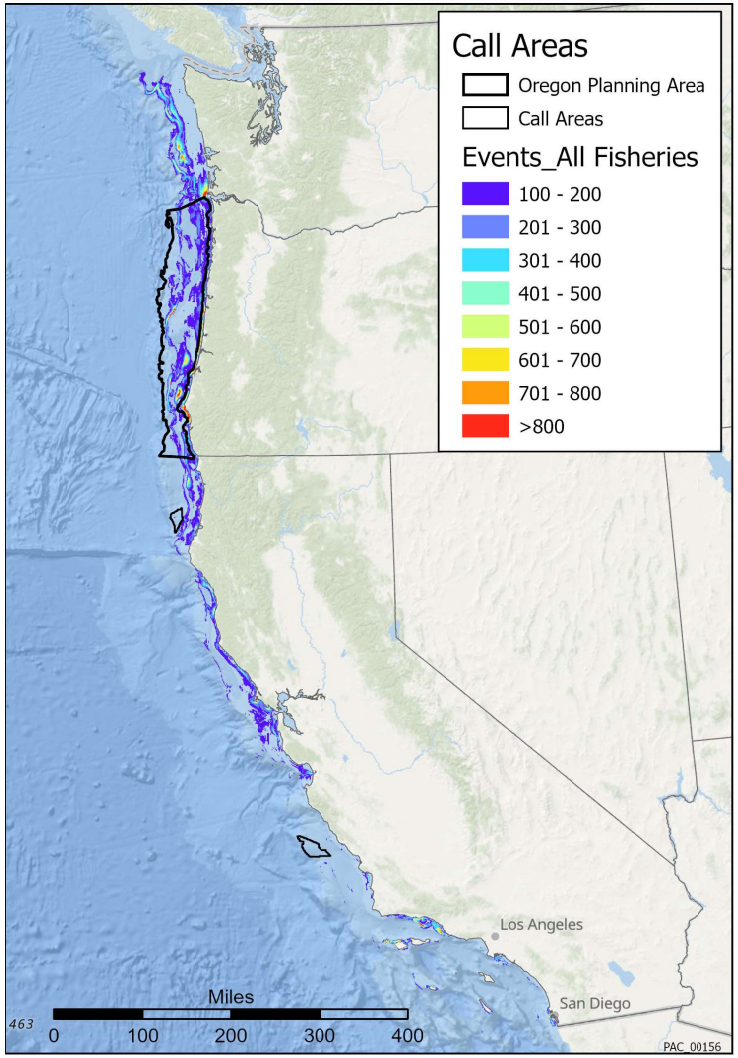
- Begins when a vessel slows below cutoff speed
- Ends when it speed up above cutoff speed
- Speed varies by Fishery (~5 kts)

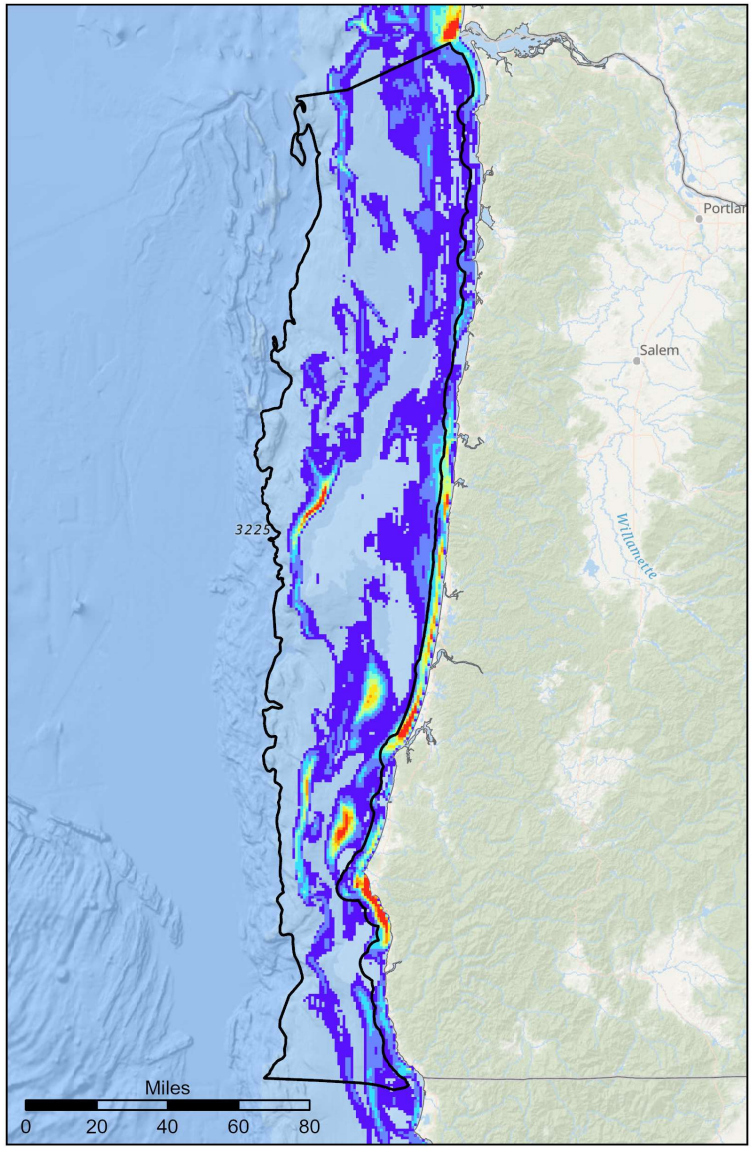


VMS Draft

VMS All Fisheries

VMS All Fisheries (>100 events / aliquot)
2010-2018

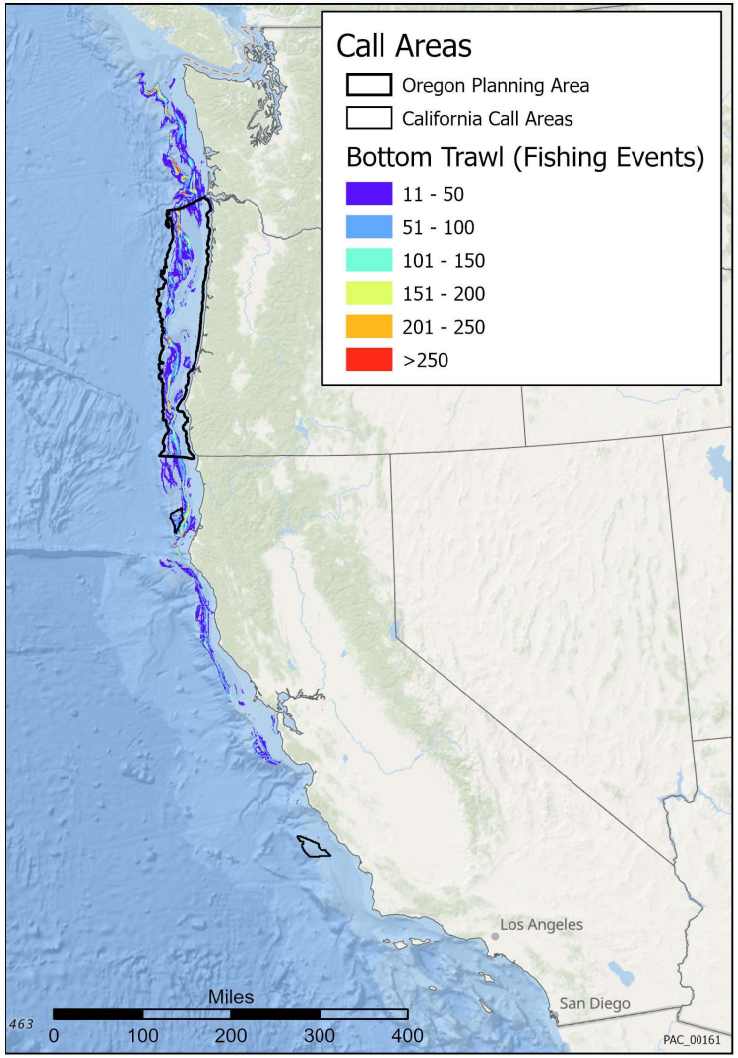


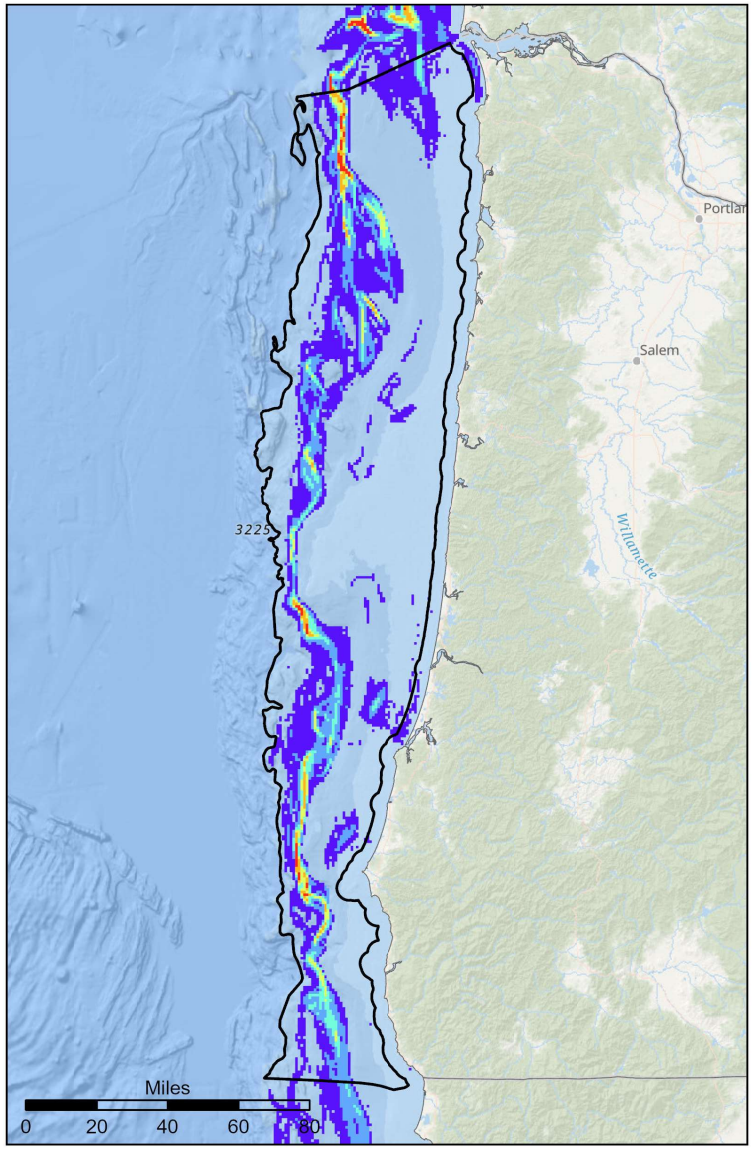


VMS Draft

Bottom Trawl 2010-2017

Bottom Trawl 230-231

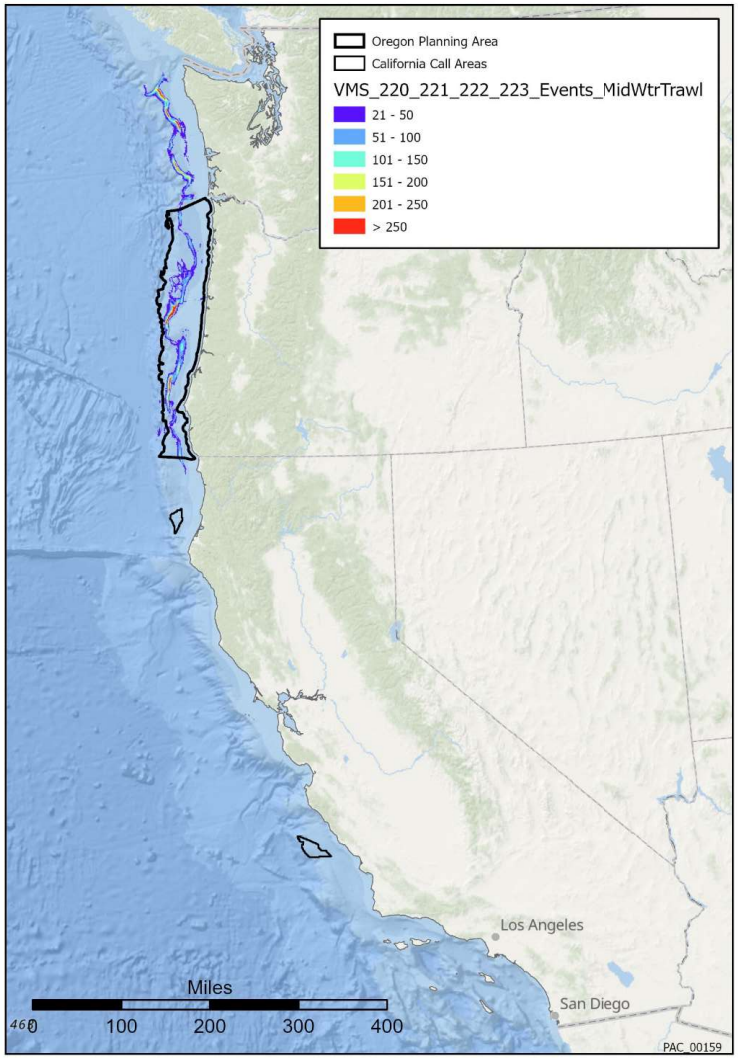


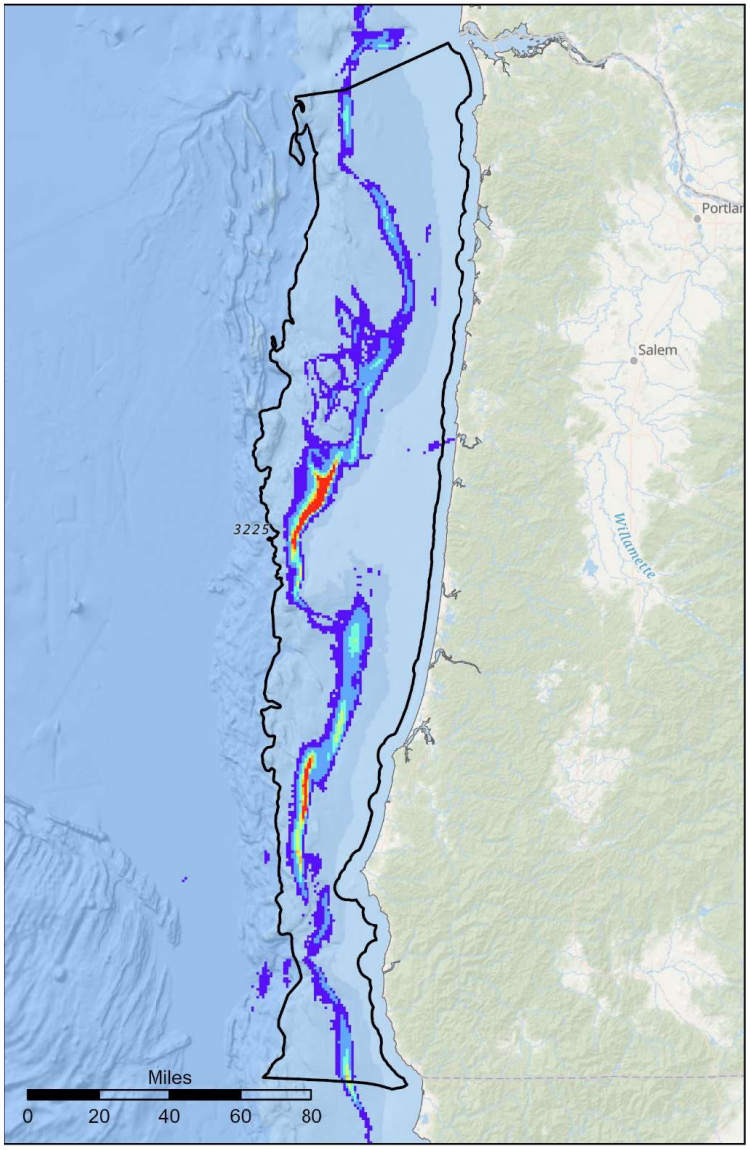


VMS Draft

Midwater Trawl
2010-2017

Midwater Trawl 220-223
2010-2017

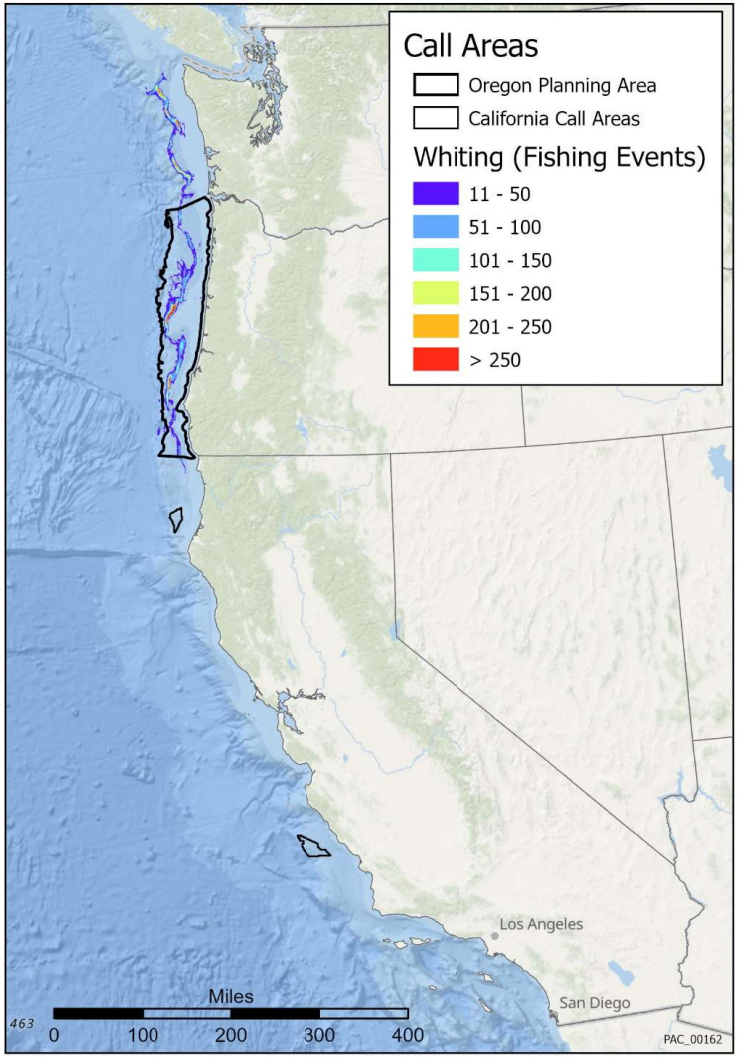


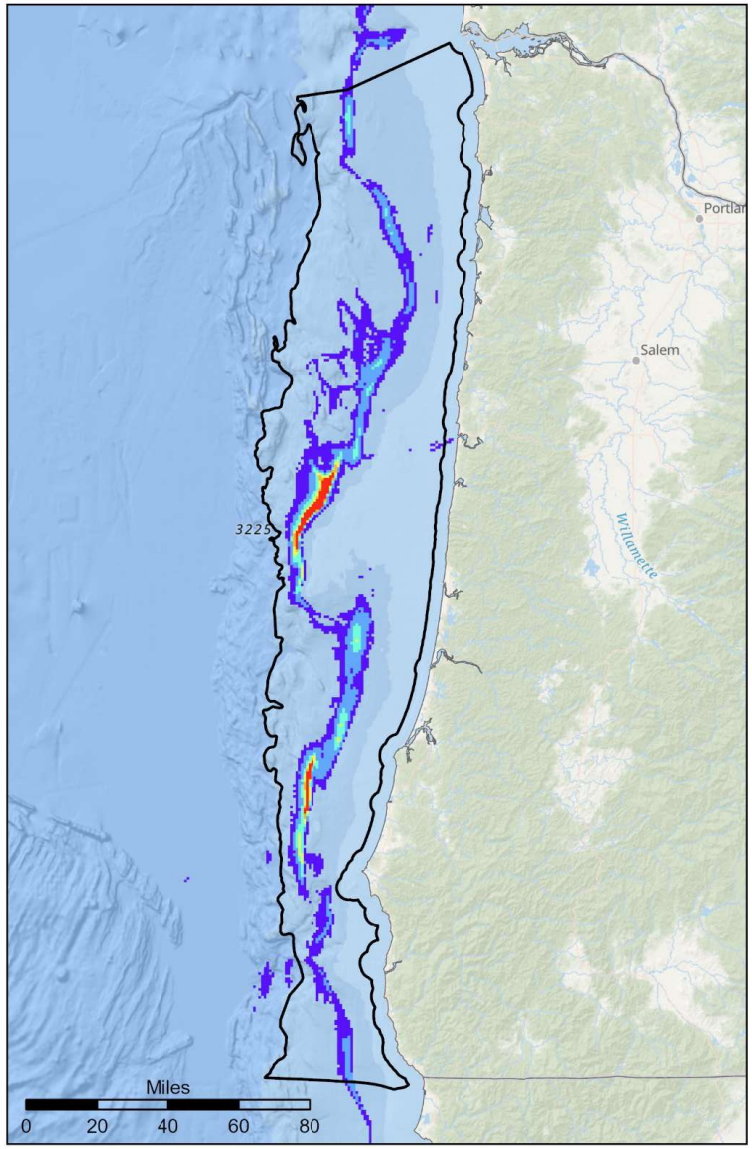


VMS Draft

Whiting Trawl
2010-2017

Whiting 221-223

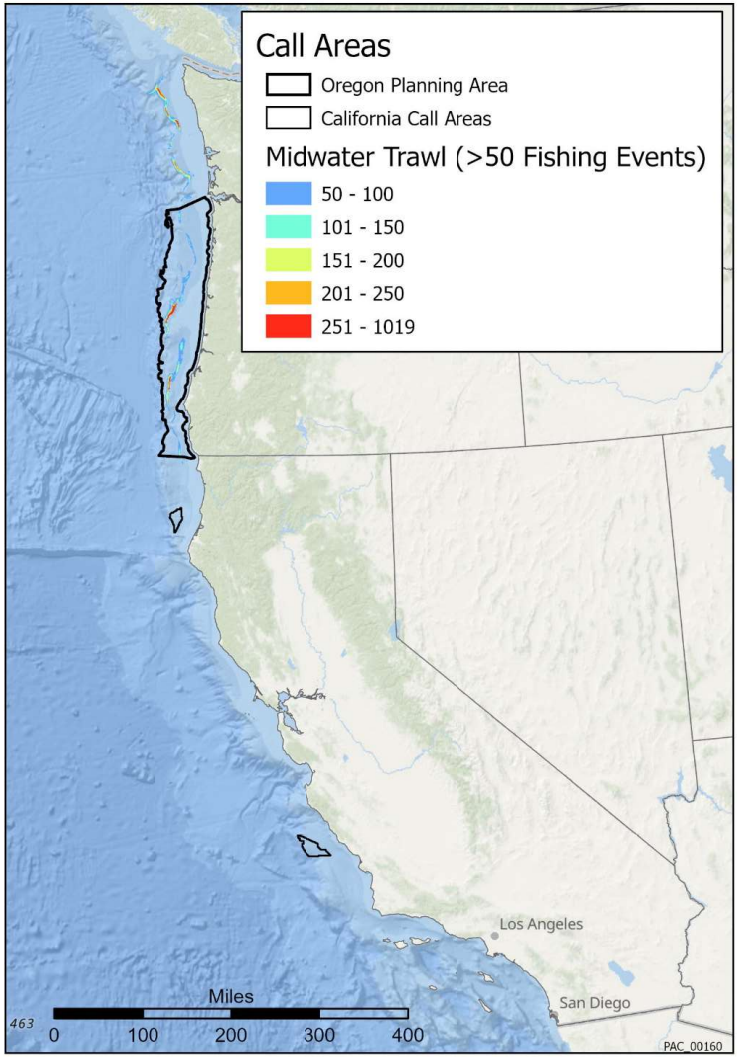


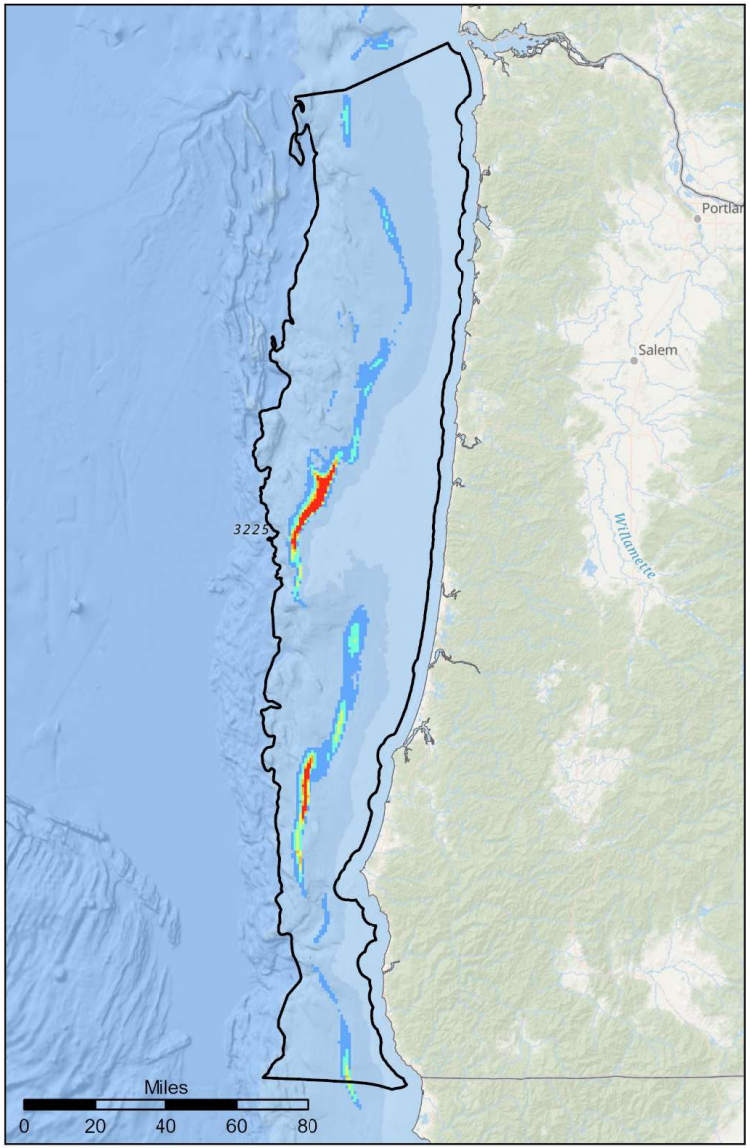


VMS Draft

Whiting Trawl
2010-2017

Midwater Trawl 221-223

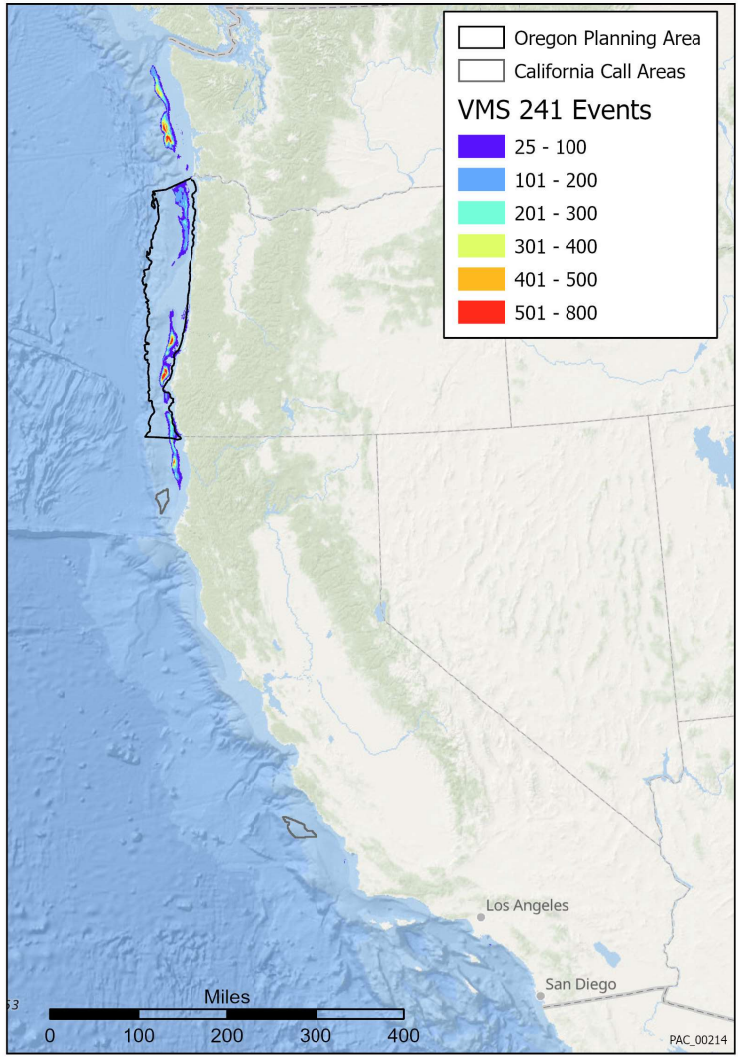


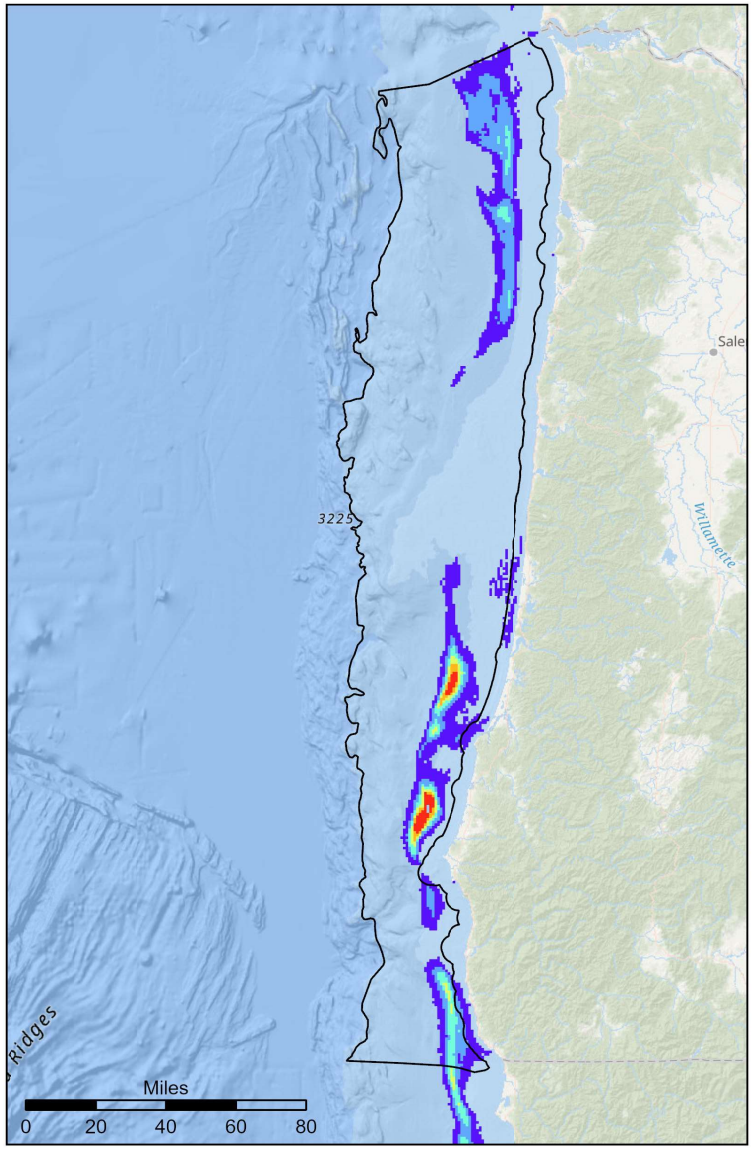


VMS Draft

Pink Shrimp
2010-2017

241_Non-Groundfish Trawl Gear
for Pink Shrimp

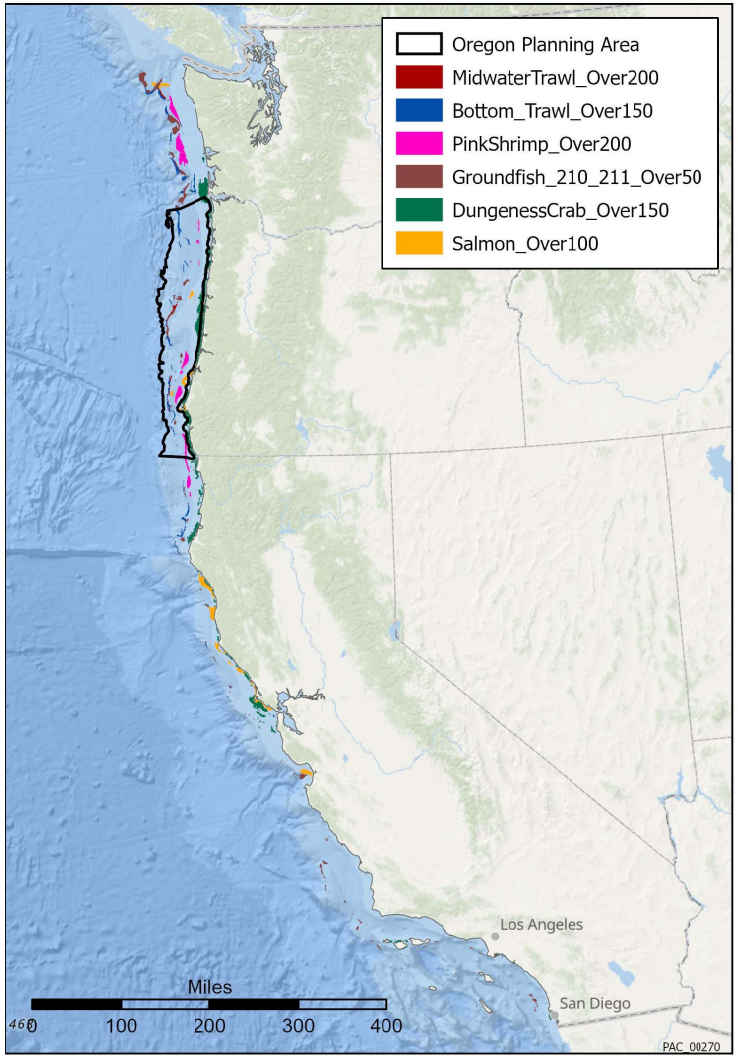


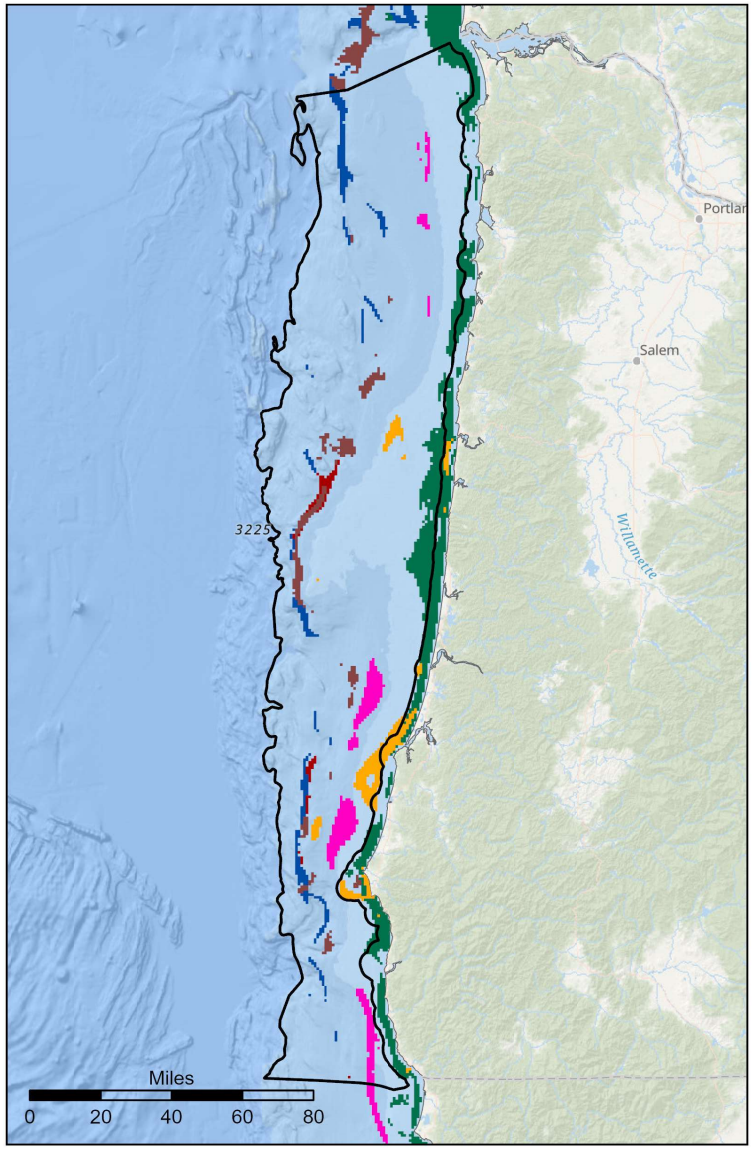


VMS Draft

Highest Use by Fishing Type

Highest Fishing Effort by Fishing Type





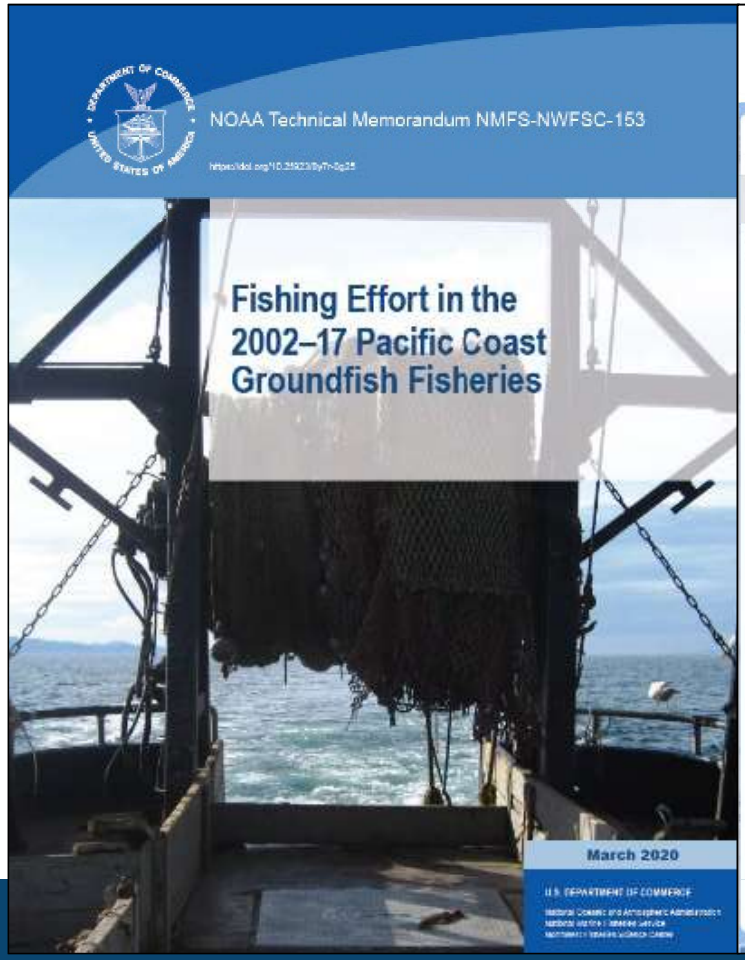
Fishing Effort in the 2002-2017 Pacific Coast Groundfish Fisheries

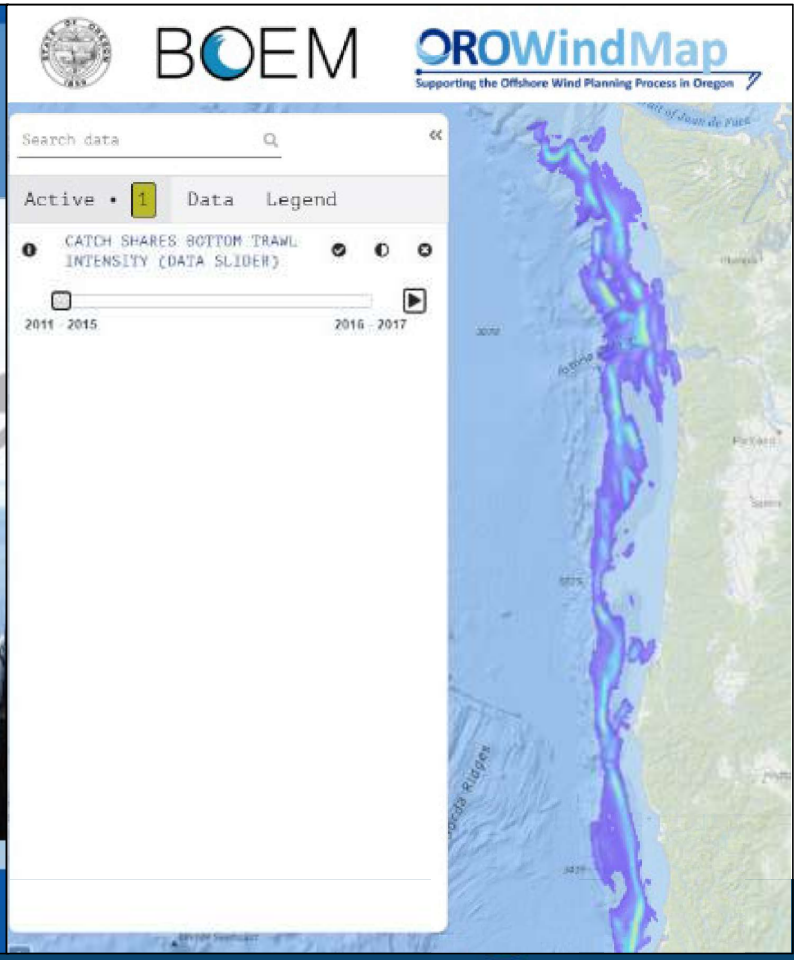
NMFS NWFSC

- March 2020

Input Data

- Observer Data
- State Logbooks
- Fish Tickets
- Electronic Monitoring





https://repository.library.noaa.gov/view/noaa/23712

VMS Draft

NOAA Observer / VMS Comparison

BOEM Bureau of Ocean Energy Management
Pacific Region

FRAM Observer & Logbook / VMS Comparison
Midwater Trawl for Whiting Mothership