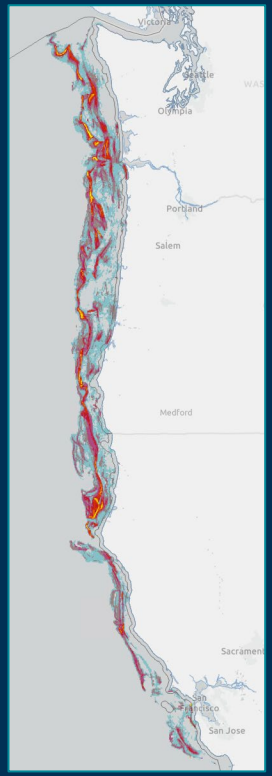
Development of Spatial Data to Support Ecosystem Management Initiatives and Economic Impact Analyses



Lisa Pfeiffer, NOAA Fisheries, Northwest Fisheries Science Center

Bob Ryznar, Pacific States Marine Fisheries Commission

Brett Holycross, Pacific States Marine Fisheries Commission

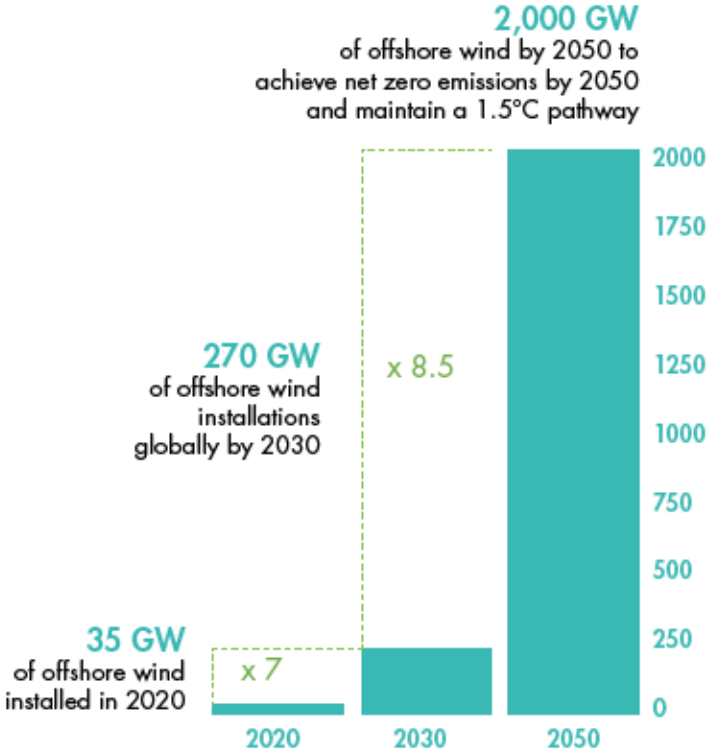
Prepared for World Fisheries Conference, 2024, Seattle

Offshore wind energy will change our seascape

NOAA FISHERIES

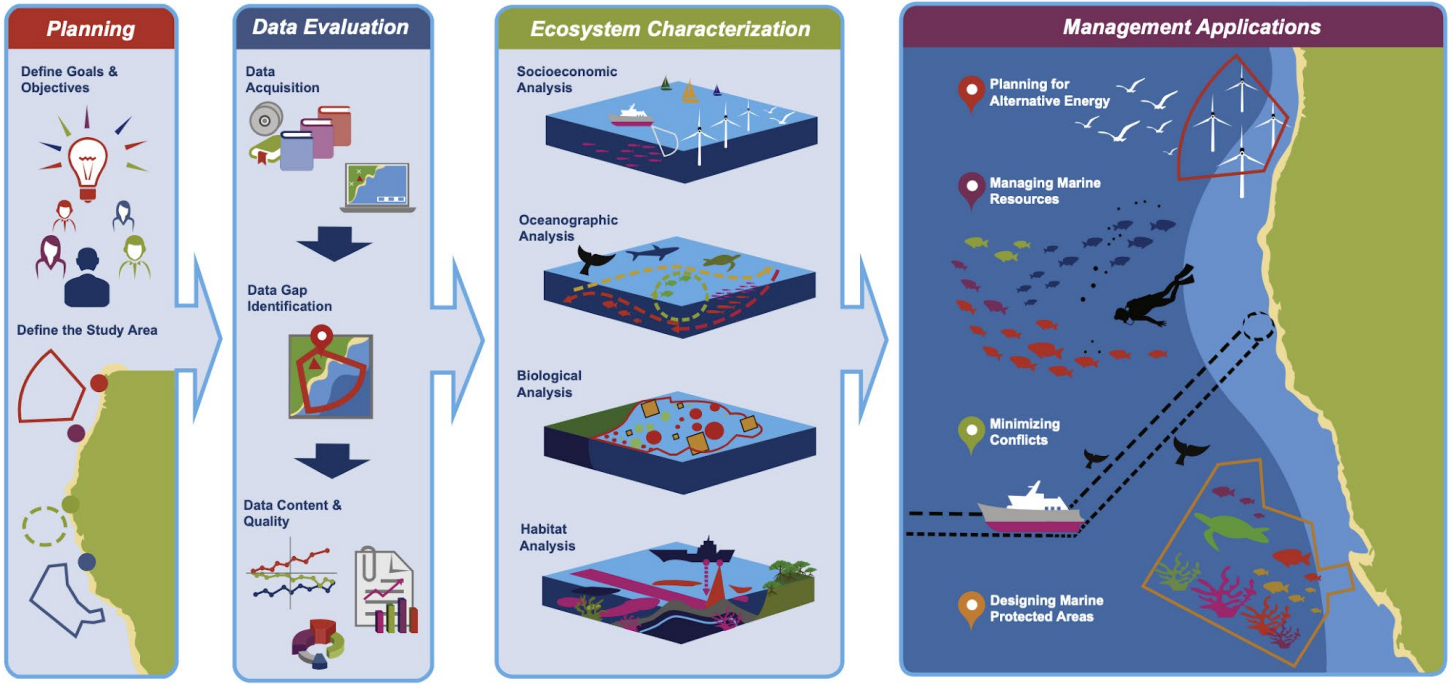
To maintain a 1.5 degree C climate change pathway:

Figure 20. Kincardine 47.5-MW floating offshore wind plant. *Photo courtesy of Principle Power, Inc.*



GWEC, 2021 https://gwec.net/global-offshore-wind-report-2021/

Marine Spatial Planning (MSP) brings together multiple users of the ocean - including energy, industry, government, conservation, and recreation - to make informed and coordinated decisions about marine resources.



A new era of ocean co-use

- How can we inform decisions about the use of marine space?
- How can we make best use of data we have collected for decades?
- How can we fulfill our mandates?

  "To support policies and actions to conserve, develop, and manage our fishery resources"

  "To ensure the productivity and sustainability of fisheries and fishing communities through science-based decision-making and compliance with regulations"

  "To recover and conserve protected resources"

Fisheries management data is designed *for fisheries management*

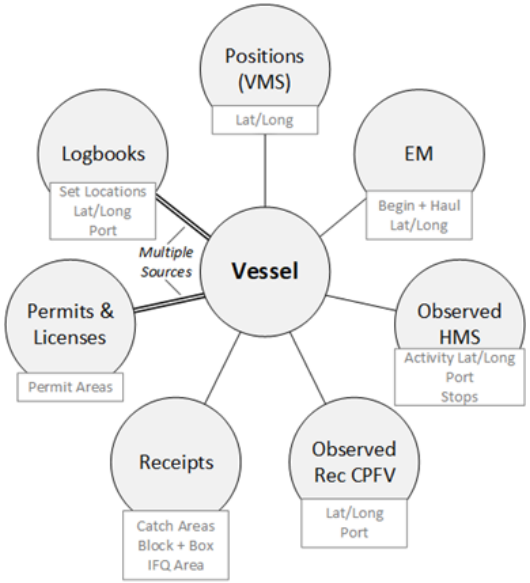
Data type	Data purpose
Fish tickets	Landings records
Logbooks	Trip and catch records
Observer records	Bycatch records
Electronic monitoring data (EM)	Bycatch records without human observer
Vessel Monitoring System (VMS)	Area and time-based enforcement
Cost-earnings surveys	Economic analysis

Pacific Fishing Effort Mapping Project Goal:

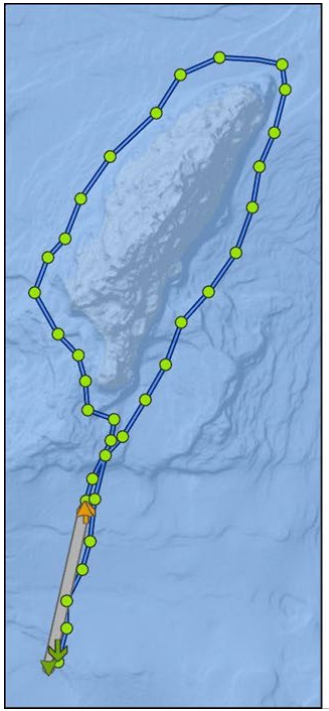
Development of an integrated, spatial data system to support ecosystem management initiatives, marine planning, and economic analyses of ocean activities.

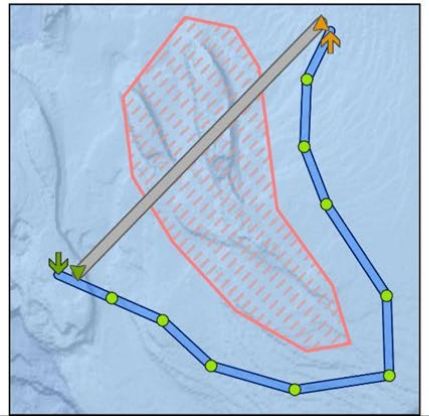
PacFEM Principles

- Integration of multiple fishery data systems
- Combines fishery-dependent data with best-available data on vessel locations
  - ‘Spatially-explicit’ (1-minute/1 nm scale)
- Multi-state integration
- Efficient data processing: repeatable + transparent
- Data summaries include landing port attributes (if available), allowing for enhanced analysis of fishing communities use of the ocean
- Extensive data summary attributes
- Data quality filtering



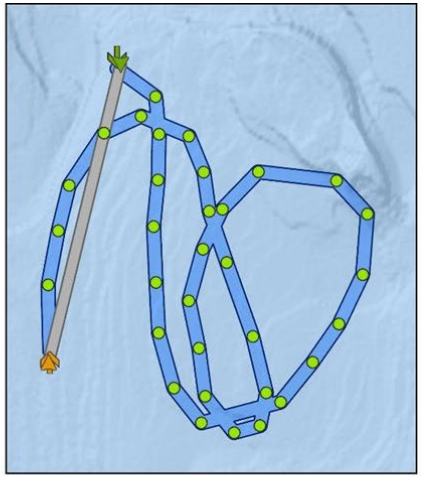
Combining data

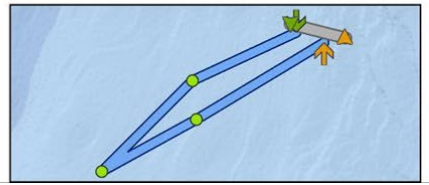


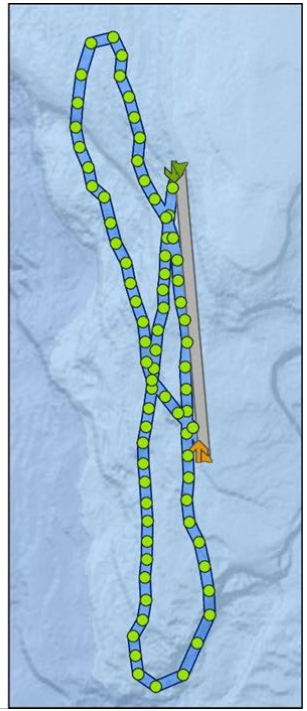


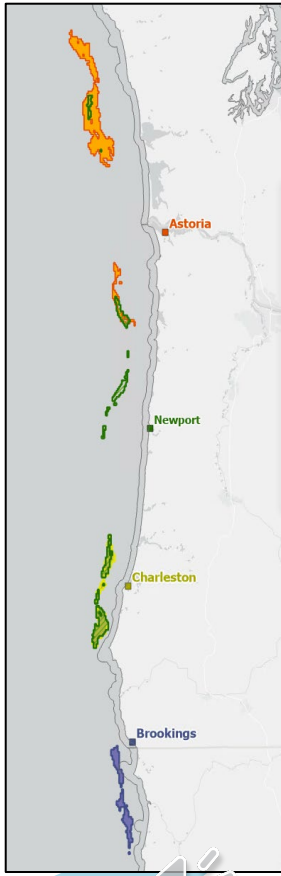
Logbook (LB) or Observer (OBS) Inputs
- LB/OBS Haul
- LB/OBS Set
- LB/OBS Set-Haul Track (200-m buffer)

"Fused" fishing track locations
- VMS
- Set: VMS location + LB/OBS time
- Haul: VMS location + LB/OBS time
- Buffered Fishing Track (VMS + LB/OBS)
- Closed Fishery Area





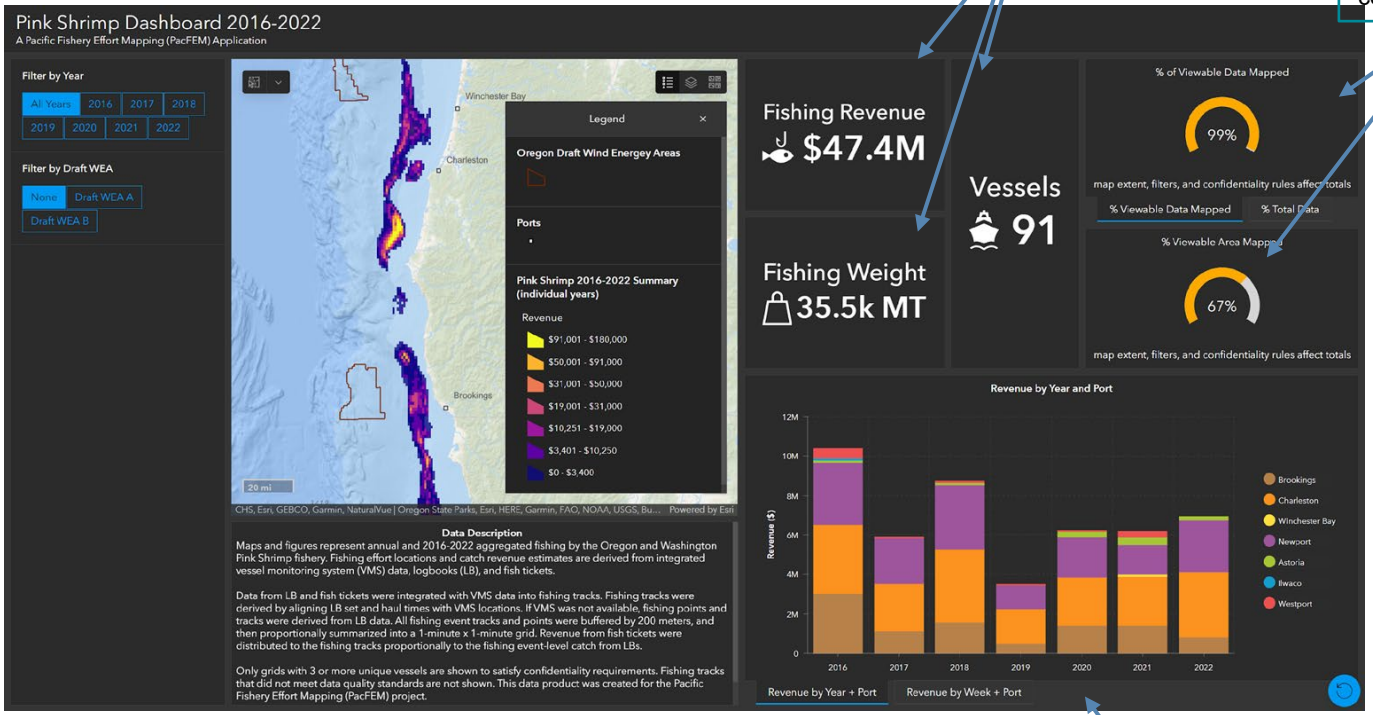




Dashboard example

Dashboard 'widgets' change with interactions (filters/map extent/AOI)

Track % of data and grids removed due to confidentiality.



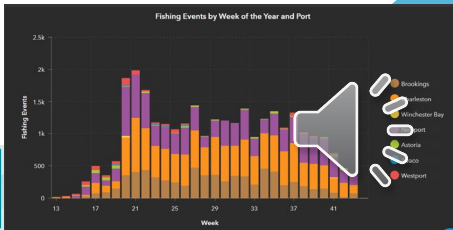
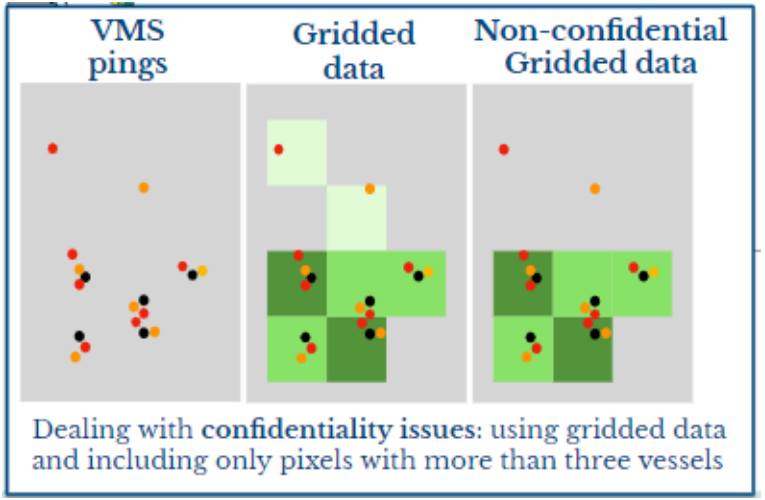
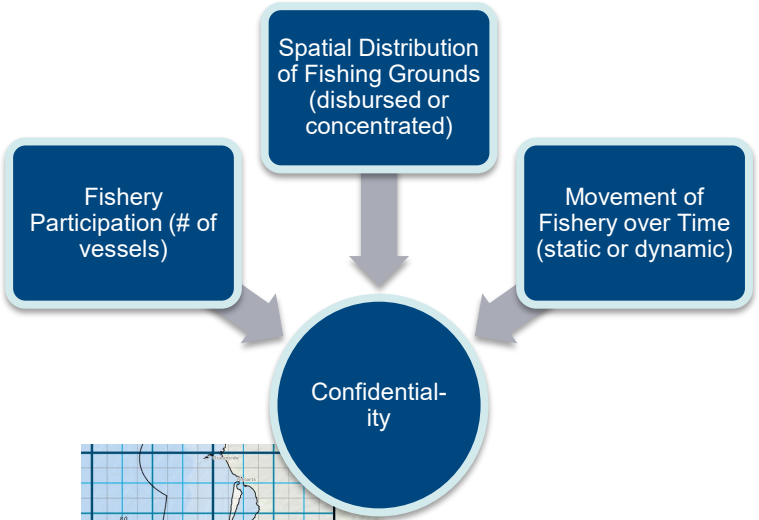


Chart Elements: changes over time (annual or seasonal), by landing port

Representation and confidentiality





Fine-scale mapping = confidentiality filtering can obscure significant activity

- Options to increase timeframe or grid size to allow increased representation
- Applications track amount of filtering

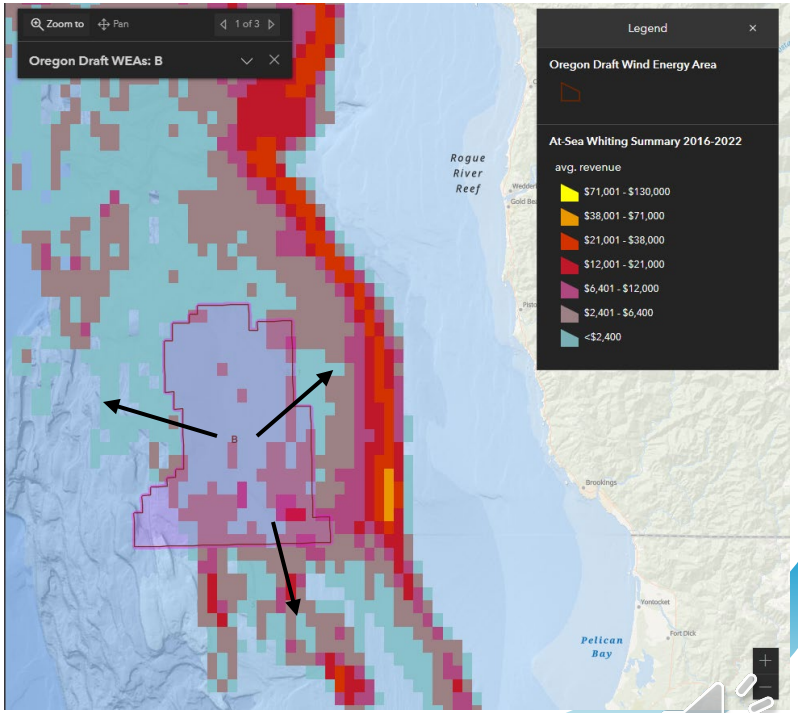
4-Level Grid System

Wind energy-related uses

- Wind energy area siting discussions and decisions
- Understanding potential fisheries exposure
- Analyses under NEPA
- Siting of cable routes and landfall
- Socioeconomic impact discussions
- Support commercial, recreational, and tribal fisheries and fishing communities

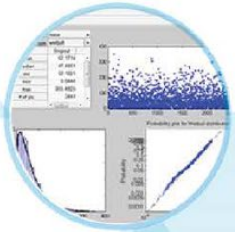
Redistribution of fishing effort

- Empirical models of spatial closures
- Fisher's make decisions about where to fish – "fishing site" – based the attributes of the site – making tradeoffs such that their utility is maximized
- Fitted model can predict effort redistribution, welfare changes, marginal substitution rates, under policy or attribute-related scenarios



FishSET – Spatial Modeling Toolbox

What tools are in the FishSET toolbox?



Model Tools

Model Design and Selection Tool
Enables modeling of different combinations of variables and models

Modeling Tool
Runs standard, cutting-edge, and user-designed models

Model Comparison and Reporting Tool
Provides an extensive comparison of model performance and summarizes data, models, and results

Data Tools

Data Management and Integration Tool
Facilitates the development and integration of datasets for spatial modeling

Monte Carlo Tool
Simulates real fisheries data while preserving confidentiality, allowing better model testing and comparison.

Data Analysis and Mapping Tool
Enables graphical and geographic data viewing and prepares data for spatial modeling

Policy Tool

Policy Simulation Tool
Predicts location choices and estimates policy impacts

NOAA FISHERIES

Project team and funders

Research and development team:
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Aaron Mamula (NOAA SWFSC)

Partners:
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Oregon Department of Fish and Wildlife
Washington Department of Fish and Wildlife
California Department of Fish and Wildlife
NOAA NMFS West Coast Regional Office

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