Identifying & Prioritizing Offshore Wind Knowledge Gaps for Oregon: Final Draft

OPAC Scientific & Technical Advisory Committee

January 29, 2026

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OPAC Charge

In support of OPAC, the Oregon's Offshore Wind Energy Roadmap process, and in the context of a proposed regional OSW research entity to inform adaptive management needs for research and monitoring:

- Develop an offshore wind energy "research prioritization framework" to prioritize key knowledge gaps for further research or monitoring
- Summarize regionally relevant research to identify current knowledge gaps
- Crosswalk STAC identified knowledge gaps with those identified by the OSW Roadmap work group(s), revise STAC summary
- Apply "research prioritization framework" to knowledge gaps summary to identify priority research and monitoring needs for Oregon

How we developed the report

Four STAC work groups + one ad hoc member

- Research prioritization framework
- Natural science
- Social science
- Engineering
- Background, empirical studies

Priority focus areas, 2-3 page briefs

- Topics not addressed in 7th Oregon Climate Assessment: Floating Offshore Wind Energy (FOSW) Infrastructure chapter
- Areas of expertise of members
- New reports and empirical data relevant to floating offshore wind

Report Overview

1. A **research prioritization framework** for evaluating and ranking research questions based on relevance, feasibility, and expected impact;
2. A synthesis of **key knowledge gaps and research needs** across natural sciences, social sciences, and engineering relevant to Oregon's deep-water floating offshore wind context.
3. A bibliography of **regionally relevant scientific and technical literature** on recent studies of floating offshore wind

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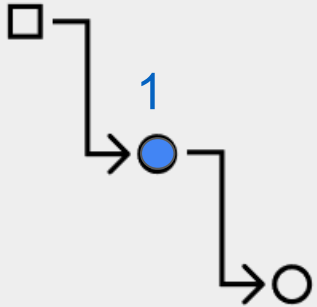
Proposed *Research Prioritization Framework*

- Goal: Given potential research projects that could fill identified knowledge gaps, prioritize based on:
    - Relevance to Oregon
    - Feasibility of success
    - Level of effort/funding required
    - Likely impact of information gained

Proposed *Research Prioritization Framework*



Two step process:

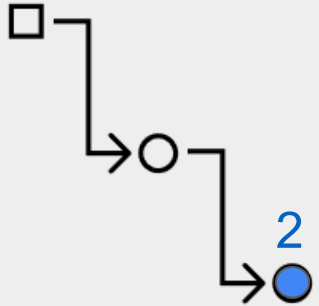
1. Score research on relevance & feasibility

   (0 = poor, 1 = partial, 2 = fully addresses)

Example scoring categories:

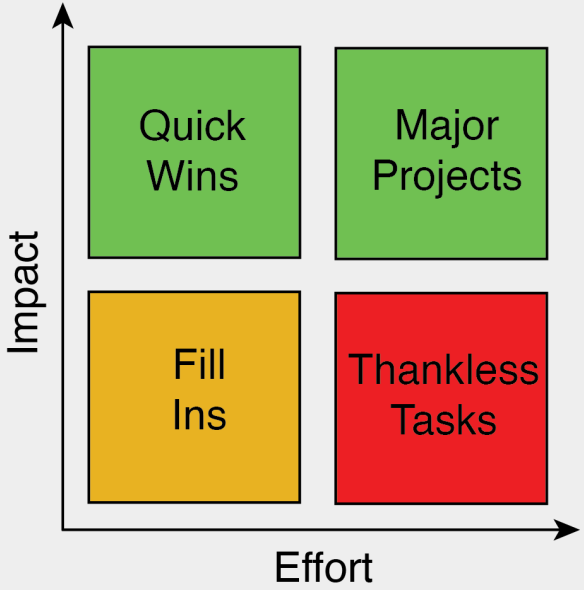
- Applicability to offshore wind projects
- Importance to decision making by the relevant agencies
- Feasibility to complete
- Addresses gaps in knowledge
- Addresses topics with a plausible hypothesis but limited evidence
- Likelihood of producing information that reduces uncertainty
- Addresses questions on a relevant time scale
- Addresses topics specific to Oregon
- Can be completed with existing data, or will collect all necessary data

Proposed *Research Prioritization Framework*



Two step process:

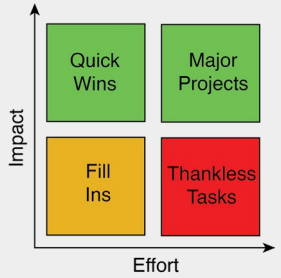
2. Evaluate priority using a matrix (based on expert opinion)



High Priority Proposals

- *In the green squares, AND*
- *Scoring above the median in step 1*

Two Worked Examples

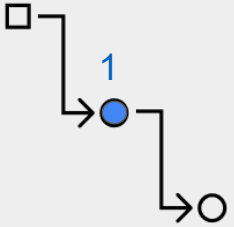


Two potential research questions:

- RQ1: Will floating offshore wind infrastructure cause a reduction or relocation of primary productivity because of interference with wind-driven upwelling circulation?

- RQ2: Will electromagnetic fields generated by offshore wind infrastructure or transmission cables affect navigation, orientation, or prey detection of marine species, particularly anadramous species in or near estuaries?

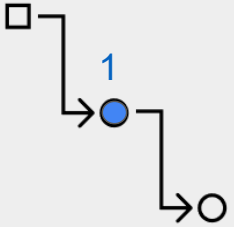
RQ1: Will floating offshore wind infrastructure cause a reduction or relocation of primary productivity because of interference with wind-driven upwelling circulation?



Score research on relevance & feasibility
(0 = poor, 1 = partial, 2 = fully addresses)

Scoring Question	Score	Comments
Applicability to offshore wind projects	2	
Importance to decision making by Oregon regulatory agency	1	Unclear how this information would influence state-level regulatory processes
Feasibility to complete	2	Could be simulated with existing biophysical models
Addresses gaps in knowledge	2	
Addresses topics with a plausible hypothesis but limited evidence	2	

RQ1: Will floating offshore wind infrastructure cause a reduction or relocation of primary productivity because of interference with wind-driven upwelling circulation?



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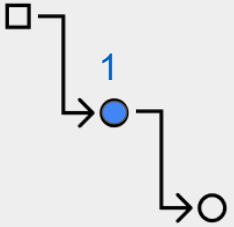
Scoring Question	Score	Comments
Likelihood of producing information that reduces uncertainty	2	
Addresses questions on a relevant time scale	2	
Addresses topics specific to Oregon	2	
Can be completed with existing data, or will collect all necessary data	2	
Total	**17**	

RQ2: Will electromagnetic fields generated by offshore wind infrastructure or transmission cables affect navigation, orientation, or prey detection of marine species, particularly anadramous species in or near estuaries?



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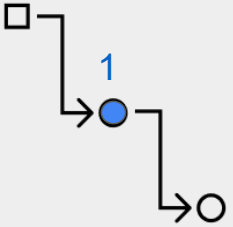
Scoring Question	Score	Comments
Applicability to offshore wind projects	2	
Importance to decision making by Oregon regulatory agency	1	Unclear how this information would influence state-level regulatory processes
Feasibility to complete	1	Would require experimental deployments in lab and field
Addresses gaps in knowledge	2	
Addresses topics with a plausible hypothesis but limited evidence	1	There is already a body of literature on EMF effects on fish, but it would be important to assess the specific proposed cable designs on species relevant to Oregon.

RQ2: Will electromagnetic fields generated by offshore wind infrastructure or transmission cables affect navigation, orientation, or prey detection of marine species, particularly anadromous species in or near estuaries?



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Scoring Question	Score	Comments
Likelihood of producing information that reduces uncertainty	1	It is uncertain whether lab or field investigations on EMF effects could scale up to the magnitude or spatial scale of proposed developments, or whether it is possible to assess effects on the full life cycle of species (e.g., anadramous salmonids).
Addresses questions on a relevant time scale	1	It may be impossible to fully assess RQ2 until full-scale infrastructure is in place.
Addresses topics specific to Oregon	2	Lab studies of EMF effects on behavior and orientation in Pacific salmon and Dungeness crab
Can be completed with existing data, or will collect all necessary data	2	Studies exist but are on Atlantic species
Total	**13**	

High Priority Proposals

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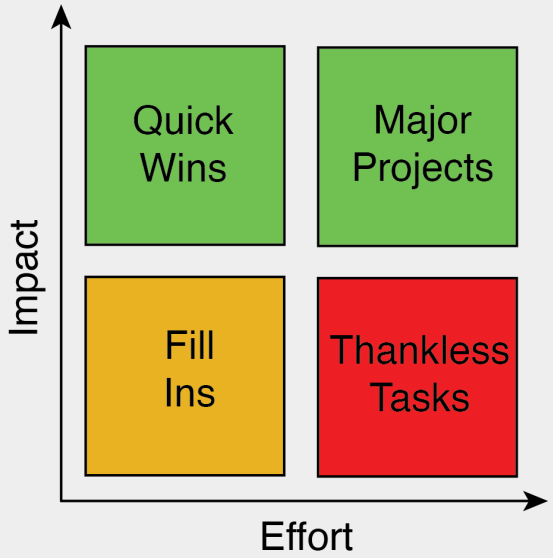

- RQ1: Will floating offshore wind infrastructure cause a reduction or relocation of primary productivity because of interference with wind-driven upwelling circulation? **QUICK WIN**

- RQ2: Will electromagnetic fields generated by offshore wind infrastructure or transmission cables affect navigation, orientation, or prey detection of marine species, particularly anadramous species in or near estuaries? **MAJOR PROJECT**

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Identified Research Needs - *Selected Examples*

Natural Sciences

- Establish fine scale coastal modeling tailored to Oregon's unique wind regime and topography
- Develop robust methods to detect cumulative and far-field impacts beyond the immediate turbine zone in the presence of natural variability and climate change.
- Monitoring to determine how local effects of floating offshore wind infrastructure manifest at larger spatial or population scales, and their cumulative impacts on focal species.
- Field studies examining species assemblages at floating structures, moorings, and anchors.
- Effects of planned mitigation strategies (chemical and mechanical) for reducing biofouling on infrastructure.
- Regional-scale monitoring of microplastics, metals, and coatings.

Identified Research Needs - *Selected Examples*

Natural Sciences - Birds, fish, and mammals

- Habitat maps, including foraging areas and migration routes, need to be refined to model potential impacts, particularly for listed and sensitive species
- Identification of fishes and fish communities that are attracted to or repelled by floating structures, cables and anchoring devices
- Response studies at different spatial scales for local species of concern (significant overlap in species composition with Northern California), scale up to evaluate effects coastwide
- Year-round monitoring programs for species distribution and collision risk

Identified Research Needs - *Selected Examples*

Social Sciences

- Codeveloped research with Tribes on justice frameworks and culturally grounded governance models.
- Analysis of community perceptions of fairness in offshore wind outcomes and engagement processes.
- Predict the potential regional economic impact of marine terminal construction.
- Predict the economic impact of floating offshore wind construction and operation on commercial fisheries at the port level using existing fisheries data sets.
- Analysis of offshore wind value to Oregon’s grid under multiple decarbonization scenarios.

Identified Research Needs - *Selected Examples*

Engineering

- Development, and comparative analysis, of novel platform designs suitable for Oregon's offshore conditions and port infrastructure.
- Modeling, laboratory testing, and field trials of innovative mooring configurations.
- Comparative techno-economic assessments of anchor technologies.
- Research, development, and testing of dynamic cables for depths relevant to Oregon.
- Evaluation of offshore wind contributions to grid reliability and resilience; in combination with emerging high-impact events.
- Port-driven engineering studies of required upgrades (cranes, quay walls, channel dimensions) for specific ports with specific opportunities.
- Pilot demonstrations of autonomous monitoring and measurement systems in Oregon waters.

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Recent, regionally relevant reports and peer-reviewed literature focused on floating offshore wind (~ 60)

- Studies, observations from existing offshore wind energy projects
- Recent reviews and modeling studies
- Resources to support development of research and monitoring plans
- Topically organized
  - Biodiversity
  - Fish, birds, mammals
  - Planning and Monitoring Strategies
  - Ecological impacts
- Report sections also include references

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Follow Up Recommendations

1. Follow up on the compilation and crosswalk of research questions generated from the various offshore wind working groups
2. Form a joint working group with a subset of members from the STAC, Roadmap Roundtable, and OPAC Working Group for this effort
3. Ask the STAC to apply the research prioritization framework to the list of questions


Thank You!
Questions?