Identifying & Prioritizing Offshore Wind Knowledge Gaps for Oregon: Status Update

OPAC Scientific & Technical Advisory Committee

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Status Update

1. OPAC Charge
2. Research Prioritization Framework
3. Regional Knowledge & Gaps
    a. Natural Science
    b. Social Science

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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
- ***Deliver/present an initial short report to OPAC (summer)***

OPAC Charge (con’t)

- 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
- ***Deliver a final report to OPAC (fall/winter)***

Overview

Four work groups met over summer

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

Priority focus areas, 2-3 page briefs

- Topics not addressed in Seventh Oregon Climate Assessment: Floating Offshore Wind Energy (FOSW) Infrastructure chapter
- STAC members areas of expertise
- New empirical data on operating FOSW arrays

Ad hoc experts to fill (some) gaps in expertise

- Engineering R&D for FOSW
- Bats
- Benthic organisms

Compile questions raised, apply to research prioritization framework

- Various public input sources
- Technical experts

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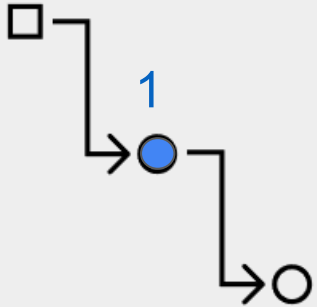
Proposed *Research Prioritization Framework*

- 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:

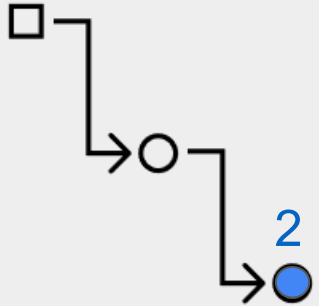


1. Score research on relevance & feasibility
   (0 = poor, 1 = partial, 2 = fully addresses)

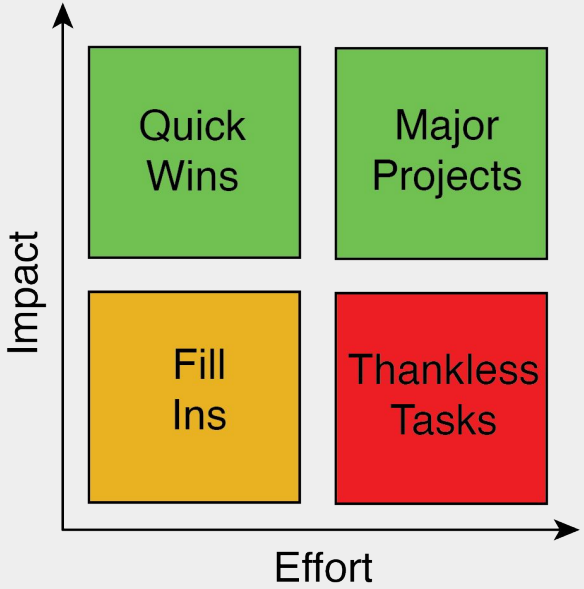
   Representative examples of scoring categories:
   - Importance to decision making by Oregon regulatory agencies
   - Addresses topics with a plausible hypothesis but limited evidence
   - Likelihood of producing information that reduces uncertainty
   - Addresses questions on a relevant time scale
   - Can be completed with existing data, or will collect all necessary data
   - Remains relevant if development is delayed for 5-10 years

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*

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*Expanding on topics not already reviewed in the "Seventh Oregon Climate Assessment: Floating Offshore Wind Energy Infrastructure" chapter.

Regional Knowledge & Gaps - *Winds, Upwelling, Circulation, Lower Trophic Level Response*

- **Existing modeling provides a good assessment framework.** Impacts of offshore wind structures on winds, upwelling, circulation, nutrients, phytoplankton, zooplankton.

- **Oregon specific assessment:** Unique bathymetric features and circulation patterns.
- **Observational methods for direct assessment and monitoring.** Methods and strategies are needed for direct observation of impacts within natural variability and long-term change.
- **Model resolution and parameterization assessment.** Are biologically significant smaller features such as fronts adequately represented? Are parameterizations of turbine impacts on wind/circulation adequate?

Regional Knowledge & Gaps - *Marine Mammals & Birds*

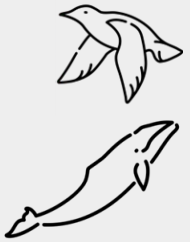
Cetaceans

- Marine Mammal Institute (OSU) - research projects in Oregon & Northern California; *Marine Offshore Species Assessments to Inform Clean Energy* (MOSAIC; also OPAL, HALO)
  - Robust information on “hot and cold spots,” abundance, seasonality April to October; winter information less robust
- Expected effects of FOSW development reviewed by NOAA
  - Short duration disruption of behavioral patterns or temporary reduction in hearing sensitivity
- Vessel strikes, in general, are a threat to large cetaceans

Sea Otters and Pinnipeds

- Most are nearshore species, good understanding of haul-outs on land; offshore distribution of more pelagic species less known
- Likely FOSW impacts minimal, unless new haul-out structures are created

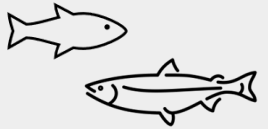
Regional Knowledge & Gaps - *Marine Mammals & Birds*



Marine Birds

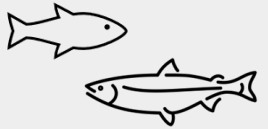
- Marine Mammal Institute (OSU) - research projects in Oregon & Northern California; *Marine Offshore Species Assessments to Inform Clean Energy* (MOSAIC), additional OSU researchers
  - Robust information on distribution and abundance for April - October; winter less robust (November - March)
- **Areas of where more information is needed:**
  - Collision vulnerability, lighting attraction - some recent suggest unlikely to be a major issue, mitigations available and in development
  - Foraging routes need to be identified for some species, if flight heights are within hight range of rotor span
  - Potential for structures to attract birds perching/resting/ roosting, also feeding if there is a “reef effect” that attracts fishes

Regional Knowledge & Gaps - *Fish Habitat*



- **Largely dependent on where FOSW is sited.**
- **Federal policy - Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPCs)** are designated for managed species.
- **FOSW structures will create habitat**, but of unknown quality and function. Research needed to assess effects on individuals, populations in neighboring habitats, and fisheries.
- **Fish habitat - ocean.** Updated maps of benthic and water column fish habitat needed to assess potential impacts, loss, and connectivity.
- **Fish habitat - estuary and onshore.** Identify impacts to salmon habitat from power infrastructure and delivery.

Regional Knowledge & Gaps - *Fishes*



Productivity

- **Studies show a range of impacts, from negative to positive** in the vicinity of the FOSW structures.
- **Fisheries impacts.** Models can predict changes in fishing mortality rates due to fisheries exclusion or attraction to the sites, and for which species
- **Scale of effect.** Do impacts at the site affect populations at a broader scale?

Physiology and Behavior

- **EMF sensitivity.** Elasmobranchs, sturgeon, salmon, crab have been tested. Recent studies suggest this is unlikely to be an issue due to rapid attenuation.
- **Anti-biofouling treatments.** Uptake and bioaccumulation of chemicals or impacts of mechanical treatments. Existing literature but important to know what treatments will be used.

Regional Knowledge & Gaps - *Altered Physical & Chemical Conditions*

- **Physical**: What types and quantities of plastic, metal, etc. may be generated by infrastructure installation and weathering?
- **Chemical**: What chemicals and quantities will be released during installation and weathering of infrastructure?
- **Sound**: What frequency, duration, types of sound will be generated? Installation of FOSW produces less sound than fixed. Effects of operational sounds on marine, avian species?
- **Light**: Lights for aviation (red) and marine navigation safety (yellow). Aircraft detection lighting systems can mitigate aviation lighting. What are the effects of introduced lights on marine/avian species?
- **Electromagnetic field (EMF)**: Many species respond to EMFs, but no evidence of harm from existing densities of high voltage subsea cables. At higher cable densities, migratory species of concern should be monitored
- **Scale of impact:** how are changes detected in and around the FOSW sites affecting the coast at a larger scale?

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Regional Knowledge & Gaps - *Oregon Coast Fishing Community*

- Systematic literature review of 1,268 documents found **insufficient evidence** to determine impacts of offshore wind on fisheries (Gill et al. 2025)
- Analysis of exposure risk, adaptive capacity, and sensitivity of three groundfish trawling fisheries identified **high relative risk in Coos Bay and Brookings** compared to other proposed West Coast offshore wind sites (Warlick et al. 2025)
- **Key research needs:**
  a. If the fisheries were negatively impacted, what social/cultural impact would it have on the fishing community? What alternative livelihoods are available, and what would transitioning look like?
  b. What would a meaningful engagement process and fair outcomes look like from the fishing community's perspective?
  c. Where is the fishing community obtaining its scientific evidence, and what are their trusted information pathways through which new evidence can be communicated to them?

Regional Knowledge & Gaps - *Tribal Consultation and Collaboration*

How Can State Agency Consultation related to Offshore Wind Projects be Improved?

- Governments should obtain free, prior, and informed consent from Tribes before enacting policies or actions that might affect their rights, lands, and resources.
- Tribal governments should determine the impact of any proposed action, not the agency. It is up to agencies to address these impacts.
- Tribes are more likely to oppose offshore wind if they cannot negotiate a co-management agreement.
- Meaningful consultation with Tribes acknowledges that Tribal Governments are sovereign governments, not stakeholders.

Regional Knowledge & Gaps - *Tribal Consultation and Collaboration (con't.)*

How Can State Agency Consultation related to Offshore Wind Projects be Improved?

- Agency consultation with Tribes should use consensus decision-making.
- Tribal governments and agencies need to identify and establish goals of consultation together.
- The overall process of information sharing, coordination, and engagement between Tribal Governments and agencies varies from Tribe to Tribe.
- Agencies need to maintain confidential data management agreements with Tribes as part of the consultation process.

Regional Knowledge & Gaps - *Economic Impacts on Commercial Fisheries*

How will offshore wind change the business of fishing?

- Commercial fisheries in Oregon will have varying degrees of overlap with future floating offshore wind (FOSW) energy development projects.
- Current research does a good job of predicting overlap, identifying some fisheries that would have the greatest degree of overlap (Feist et al. 2025).
- So far there has been less research on the possible effects of FOSW on:
  - Profitability of individual fisheries
  - Landings by port
  - Entry/exit decisions by fishing businesses
- Data exists to make informed predictions for different FOSW scenarios.

Regional Knowledge & Gaps - *Wind Energy Economic Competitiveness*

Will offshore wind in Oregon be attractive to investors?

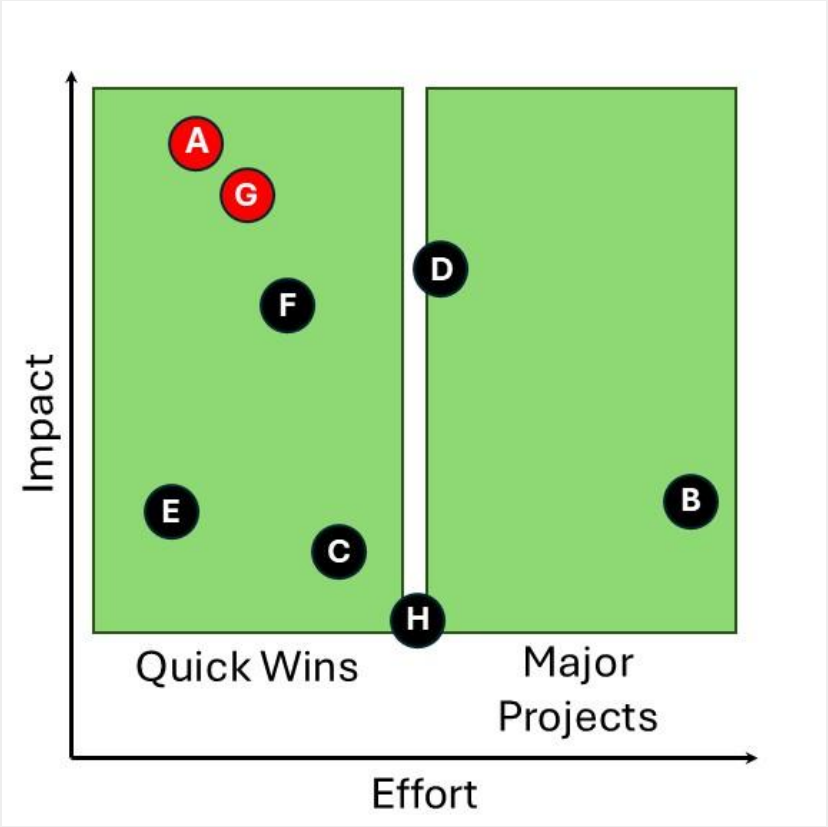
- Costs and returns to renewable energy technologies vary by type and location.
- Costs of renewables have been declining at a fast pace since 2010.
- Levelized costs of energy from offshore wind have declined 62% from 2010 to 2024.
- Globally, offshore wind remains more than double the cost of onshore wind
- For the US, offshore wind costs are triple the cost of onshore wind.
- Will subsidies or state mandates be necessary for offshore wind?

(International Renewable Energy Agency, 2025)

Applying the Prioritization Framework to Social Science Gaps

- Fewer distinct research gaps identified so far, and none are in the bottom two categories of likely impact.

- Consensus that all social science knowledge gaps identified would be useful and realistic to investigate.



Topic	Short Title	Question	Effort Score (lower = more effort)	Impact Score
A	**Tribal consultation**	How can state agency consultation and communication practices and protocols with Tribal governments be improved?	4.17	13.75
B	**Tribal-led relational sovereignty**	How could a Tribal-led relational sovereignty for offshore wind be developed in Oregon?	1.33	11.34
C	**Energy justice**	How could principles of energy justice be incorporated into offshore wind decision-making processes?	3.5	9.84
D	**Social/cultural impact on fishing communities**	If the fisheries were negatively impacted, what social/cultural impact would it have on the fishing community? What alternative livelihoods are available, and what would transitioning look like?	2.92	12.83
E	**Economic impact on commercial fisheries**	What are the likely economic impacts of FOW construction and operation on commercial fisheries?	4.33	10.75
F	**Fair engagement with fishing communities**	What would a meaningful engagement process and fair outcomes look like from the fishing community's perspective?	3.67	12.68
G	**Where do people get information about FOW?**	Where is the fishing community obtaining its scientific evidence, and what are their trusted information pathways through which new evidence can be communicated to them?	4	13.42
H	**Will FOW attract investors?**	Will offshore wind in Oregon be attractive to investors?	3.17	9

Next Steps

- Update, revise, regional knowledge and gaps briefs
- Crosswalk STAC identified knowledge gaps with those identified by the OSW Roadmap work group, other sources
- Refine and apply “research prioritization framework”to highlight key research and monitoring needs for Oregon
- Deliver final report to OPAC in January 2026


Thank You!
Questions?