The California State University
COUNCIL ON OCEAN AFFAIRS, SCIENCE & TECHNOLOGY (COAST)

Sea Grant
CALIFORNIA

STATE SCIENCE INFORMATION NEEDS PROGRAM
Request for Proposals
Floating Offshore Wind Energy Development

KEY DATES & INFORMATION

Letter of Intent (LOI) deadline:	Tuesday, March 4, 2025, 5:00pm PST
Application deadline:	Tuesday, April 15, 2025, 5:00pm PST
Amount available:	$1,000,000
Award funding range:	Most awards will range from $200,000-$400,000; requests up to $500,000 with significant justification may be considered.
Funding sources:	CSU COAST and California Sea Grant
Who can apply	Lead PIs must be from the CSU; non-CSU co-PIs are permitted. See Grant Guidelines for additional details.
Start date:	February 1, 2026
Project duration:	24 months
Office Hours:	Two one-hour office hour sessions will be held Monday, February 17, 2025, 3-4pm PST and Tuesday, March 18, 2025, 11:00 am - 12:00 pm PST. Reminders will be sent through the COAST listserv and posted to COAST's SSINP webpage.

PROGRAM DESCRIPTION

The State Science Information Needs Program (SSINP) funds research to support the state of California's highest priority ocean and coastal scientific information needs. COAST works

iteratively with state agency representatives to identify these priorities and develop specific research objectives. Funded projects directly address one or more of these research objectives.

SSINP Grant Guidelines are available on COAST's website and articulate the basic purpose of the grant program, outline program restrictions such as eligibility requirements and award conditions, describe how funds will be administered, and describe the required components of an application. Please be sure to review the Grant Guidelines carefully in considering your application to this program. The Grant Guidelines are incorporated by reference into this present Request for Proposals (RFP).

California Sea Grant College Program (CASG) is a funding partner for this RFP. CASG is a federally funded, university-affiliated organization that supports applied ocean and coastal science for all of California through research grants, fellowships, extension programming, and communications and outreach. CASG's mission is to provide the information, tools, training, and relationships needed to help California conserve and sustainably prosper from our coastal and marine environment.

OFFSHORE WIND ENERGY BACKGROUND

Offshore wind (OSW) energy is a critical element in California's transition to renewable energy, spurred by the state's ambitious climate goals of achieving 100% clean energy by 2045 (CEC, 2023). With targets of 2 to 5 gigawatts (GW) of OSW energy by 2030 and 25GW by 2045, California's extensive coastline presents significant opportunities for harnessing OSW energy (CCA California, 2023; CEC, 2023).

Because of the deep waters off California's coast, floating wind turbines are required instead of traditional fixed-bottom turbines, allowing for deployment in deeper waters where there are more consistent and powerful wind resources (Cooperman et al., 2022). This deep-water environment necessitates the development of advanced anchoring systems and floating wind technologies. Shore-side infrastructure, such as expanded port facilities and stronger grid connections, will be needed to support OSW energy generation (CAISO, 2022).

The California Energy Commission (CEC) leads the development and establishment of energy generation targets for California and coordinates with state and federal agencies. The CEC's strategic plan outlines a roadmap emphasizing environmental sustainability, grid integration, and strong community engagement (CEC, 2024). Following are the key state and federal agencies that work with CEC:

- Bureau of Ocean Energy Management (BOEM) identifies suitable lease areas, conducts environmental reviews, and manages the leasing process to support renewable energy goals.

- California Coastal Commission (CCC) manages OSW energy projects within state waters and reviews federal projects through the Coastal Zone Management Act.
- California Department of Fish and Wildlife (CDFW) evaluates the environmental impacts of OSW energy projects on marine life, habitats, and endangered species, ensuring compliance with state laws and recommending mitigation measures. It also conducts research, monitors impacts, and collaborates with other agencies to protect California's natural resources.
- California Ocean Protection Council (OPC) coordinates OSW energy policy development, funds environmental research, and collaborates with state and federal agencies to ensure that OSW energy projects align with California's environmental goals.
- California Public Utilities Commission (CPUC) and the California Independent System Operator (CAISO) work on grid integration, ensuring that floating OSW energy projects can efficiently deliver power to the state's energy grid.
- California State Lands Commission (SLC) manages the leasing processes for project areas in state waters and collaborates with BOEM for federal waters leasing.
- National Oceanic and Atmospheric Administration (NOAA) supports OSW energy development off California's coast by collaborating with BOEM, providing critical data on marine ecosystems, oceanographic conditions, and wind resources while ensuring compliance with environmental laws.
- State Water Resources Control Board ensures OSW energy projects comply with water quality standards, issuing permits and overseeing environmental reviews to protect California's water resources. It collaborates with other agencies to mitigate impacts on marine and coastal ecosystems.

Two OSW energy areas (WEAs) have been designated in California off the coast of Humboldt County and Morro Bay. The 2022 federal lease sale included five areas—two within the Humboldt WEA and three in the Morro Bay WEA—covering a total of 373,269 acres with a potential capacity of 4.6GW (Cooperman et al., 2022). Both WEAs are located about 20 miles offshore. Because of California's steep continental shelf, water depths in these WEAs vary significantly. In the Morro Bay WEA depths range from ~900m to more than 1,300m, and in the Humboldt WEA depths range from 500m to 1,100m (Cooperman et al., 2022).

The development of floating OSW energy infrastructure in California is undergoing thorough environmental assessment to evaluate its potential impacts on marine ecosystems. The turbines rest on large platforms anchored to the seafloor with mooring lines designed to withstand the waves, currents and winds of the Pacific Ocean (Cooperman et al., 2022). Each turbine can extend 850ft into the air, and the floating platforms can extend 300-600ft below the sea surface depending on the anchoring system (Cooperman et al., 2022). Catenary systems use long, heavy chains that curve and are weighted to secure the structures, while tension-leg platforms employ vertical tendons that stabilize the turbines through tension (Cooperman et al., 2022). Initial

projects are focused on maximizing energy output while minimizing ecological disruption (CEC, 2024).

Current Concerns Regarding Floating OSW Energy

There are concerns about the impacts of both fixed-bottom and floating wind turbines on bird and bat populations. Migratory seabirds, shorebirds, and waterfowl may be at risk of colliding with turbine blades, especially as they fly at altitudes that intersect with the rotor-swept area (Drewitt and Langston, 2006). While many birds may navigate around these structures successfully, certain species could face increased collision risks at specific times of the day or year (North Coast Offshore Wind, 2025). Research from Europe suggests that birds can adjust their flight paths in response to turbines, though similar studies specific to California are ongoing (Gill, unk.).

Bats are also impacted by OSW energy turbines, through potential collisions and barotrauma from sudden pressure changes near the spinning blades (Kunz, 2007; North Coast Offshore Wind, 2025). Migratory bat species traveling over water may be particularly affected (Cryan and Barclay, 2009; North Coast Offshore Wind, 2025). To mitigate these risks, researchers recommend raising the turbines' cut-in speed—the threshold at which they begin to rotate—to reduce operational time during peak bat activity, particularly at night (Martin et al., 2017). Such strategies aim to balance renewable energy generation with wildlife protection.

Floating OSW energy infrastructure also threatens marine mammals and sea turtles. The construction phase can generate significant underwater noise, especially from pile-driving and installation activities, which may disturb cetaceans that rely on echolocation and sensitive hearing for navigation and communication. This noise has the potential to cause temporary or permanent hearing loss in marine mammals and sea turtles if they are in proximity to the source (BOEM, 2022). To address these concerns, California's floating OSW energy projects are required to implement exclusion zones and conduct monitoring to limit exposure to harmful noise levels (BOEM, 2022).

Moreover, sea turtles and marine mammals may collide with vessels in or around the WEAs. Regulatory agencies mandate the use of trained observers during operational activities to monitor and minimize interactions with protected marine mammal and sea turtle species. Guidelines have also been established to limit vessel speeds in areas with high marine traffic, reducing the likelihood of strikes (CEC, 2023).

Floating OSW energy structures present additional risk of primary entanglement (e.g., direct entanglement in lines and/or cables associated with OSW energy infrastructure) or secondary entanglement (e.g., indirect or unintentional entanglement in debris or abandoned fishing gear that becomes entangled with OSW energy infrastructure, such as mooring lines, cables, or platforms) for marine mammals and sea turtles (BOEM, 2022). Ongoing inspections, debris monitoring, and removal initiatives are crucial to combat these risks. Together with guidelines

from regulatory agencies, these efforts aim to ensure developers actively manage and eliminate entangling debris, thereby protecting marine species.

The establishment of floating OSW energy farms in California may impact the distribution, abundance, and productivity of commercially and recreationally important fish species. These impacts arise from changes in habitat structure, oceanographic conditions, and potential disruptions to marine ecosystems. For instance, the presence of floating platforms, mooring lines, and cables may act as fish aggregating devices for certain species while potentially displacing others (Wilhelmsson et al., 2006). The electromagnetic fields (EMF) generated by underwater cables could also interfere with the migratory patterns of species like elasmobranchs, bony fish including Pacific salmon, and invertebrates (BOEM, 2023; Hermans et al., 2024). The fishing community has voiced concerns regarding these impacts, highlighting the need for comprehensive studies to fully understand the ecological and economic implications of OSW energy developments on local fisheries (CPUC, 2021).

OSW energy farms will also disrupt access to fishing grounds and may have economic consequences for local fishing communities. OSW energy farms require large areas for turbine placement, anchoring systems, and maintenance activities. Such requirements often result in exclusion zones, restricting access to fishing grounds and forcing fishers to travel farther or adapt to less productive areas (Van Hoey et al., 2021). Many coastal communities and tribes have cultural and historical ties to specific fishing grounds, and disruptions to these areas could erode traditional practices and community identities (Romero-Lankao et al., 2023). Moreover, the displacement of key fish species or changes in population dynamics will adversely affect the livelihoods of both commercial and recreational fishers (Chaji and Werner, 2023). Navigational challenges further complicate the issue, as OSW energy infrastructure may hinder the movement of fishing vessels, especially in regions with strong currents or adverse weather conditions (BOEM, 2022). To address these concerns, efforts are being made to engage stakeholders, carefully site OSW energy farms, and develop strategies that balance renewable energy development with the needs of the fishing industry and coastal communities (CEC, 2024).

Furthermore, the introduction of floating OSW energy infrastructure may alter local ocean currents and sediment transport, potentially affecting the food web dynamics and habitat characteristics. The installation of OSW energy structures, such as turbines, foundations, and subsea cables, can alter natural sediment movement by blocking or redirecting currents that typically transport sediments along the seafloor (Henkel et al., 2014). This disruption can lead to the accumulation of sediment in some areas while causing erosion in others, potentially impacting benthic habitats (Henkel et al., 2014). Additionally, the foundations of OSW energy turbines can cause local erosion, particularly through scouring at the base, which may destabilize surrounding sediments and increase sediment resuspension (Henkel et al., 2014). Organisms living on the seafloor, such as benthic invertebrates, rely on stable sediment conditions, and alterations to their habitat may impact their productivity (Henkel et al., 2014). The construction

phase of OSW energy farms, involving activities like pile driving, trenching for cables, and dredging, can also increase water column turbidity, reducing available light penetration for seagrasses, kelp, and other photosynthetic organisms and negatively affecting filter-feeders and fish (Slavik et al., 2019).

Outreach and Engagement

Community and tribal engagement are central to the planning and permitting processes for floating OSW energy development in California. Early and continuous engagement with coastal communities and tribes is essential to addressing concerns related to visual impacts, potential disruptions to tourism, and effects on local economies. State agencies and wind energy developers are working closely with these communities and tribes through stakeholder meetings and public forums to address these concerns and ensure the benefits of floating OSW energy development are shared equitably (CEC, 2022; CPUC, 2021). Native American tribes in California have longstanding cultural and historical ties to coastal and marine areas. Floating OSW energy projects could potentially affect tribal fishing rights, archaeological sites, or cultural resources. Developers have stated they are collaborating with tribal representatives to ensure a comprehensive understanding of these impacts and to identify appropriate mitigation strategies (BOEM, 2024; SLC, 2023).

Looking ahead, California must finalize environmental permits, develop workforce training programs, and secure additional investment to meet its floating OSW energy targets. Expansion beyond the initial lease areas will require careful planning and collaboration with local communities, environmental justice organizations, and tribal representatives. Ensuring the benefits of floating OSW energy development are equitably distributed is essential to prevent disproportionate impacts on marginalized communities. The coming years will be critical for the successful launch of California's floating OSW energy industry, particularly as pilot projects commence and the state refines its regulatory and permitting processes.

RESEARCH OBJECTIVES

The research objectives outlined below are informed by discussions with state and federal management and regulatory agency representatives and align with the state's renewable energy and marine conservation goals. These objectives represent key priorities for advancing knowledge and understanding in the field of floating OSW energy development. Please note that the inclusion of these objectives in the RFP does not guarantee funding for projects addressing them.

OSW Energy RFP Research Objectives

1. **Impacts to Marine Mammals and Sea Turtles**
    1.1. Determine spatial and temporal patterns of presence and abundance of marine mammals and sea turtles within and around the Humboldt and Morro Bay WEAs.

1.2. Create a multi-modal Passive Acoustic Monitoring Plan to understand distribution of marine mammals and sea turtles within and around the WEAs.
1.3. Evaluate the susceptibility of marine mammals and sea turtles to impacts, such as primary and secondary entanglement and vessel strikes, from floating OSW energy installations.
1.4. Examine the potential displacement or attraction of marine mammals and sea turtles relative to OSW energy activities.
1.5. Assess the efficacy of tagging as a potential method for detecting and quantifying behavioral responses in marine mammals and sea turtles in response to floating OSW energy construction activities.

2. Impacts on Fish Species and Fisheries

2.1. Assess the impact of low-energy, high-resolution geophysical surveys associated with floating OSW energy development on distribution and abundance of commercially and recreationally important fish and invertebrates.
2.2. Evaluate the fisheries socioeconomic impacts of floating OSW energy development and associated port development for small-scale, subsistence, and recreational fisheries, especially in rural and low-income coastal communities.
2.3. Evaluate the potential of floating OSW energy platforms, including mooring lines and inter-array cables, to function as fish aggregating devices, haul-out structures for pinnipeds, and habitat for invertebrate colonization.

3. Impacts to Benthic Environment

3.1. Determine spatial and temporal patterns of benthic macrofaunal communities (e.g., species abundance, richness, diversity, assemblage structure, and relationship dynamics between macrofaunal communities and their associated environments) and identify sensitive habitats (e.g., corals, chemosynthetic systems) within and around the Humboldt and Morro Bay WEAs.
3.2. Determine buffer size to adequately protect sensitive habitats from floating OSW energy development impacts.

4. Impacts to Birds and Bats

4.1. Determine spatial and temporal patterns of presence and abundance of birds and bats that move through the Humboldt and Morro Bay WEAs.
4.2. Determine year-round movement patterns of birds and bats, using tags such as Motus or GPS as applicable, within and outside of the Humboldt and Morro Bay WEAs.
4.3. Evaluate the susceptibility of birds and bats to impacts, such as collision with turbine blades and other structures, from floating OSW energy installations.

4.4. Examine the potential displacement or attraction of birds and bats relative to floating OSW energy activities.

4.5. Assess the efficacy of Motus or GPS tags as a potential method for detecting behavioral changes in birds and bats in response to floating OSW energy construction activities.

5. Other Floating OSW Research Questions

5.1. Innovative proposals addressing state needs for scientific information on floating OSW energy outside of the priority research objectives listed above will also be accepted. A successful proposal must concretely demonstrate the relevance of the research project to state needs, including identification of specific state agencies that will benefit in the form of a detailed letter of support from said agency.

For further information, contact:

Michelle Robbins, MSc
Science Policy Specialist, CSU COAST
Phone: (925) 303-6100
Email: mrobbins@csumb.edu

RESOURCES

BOEM. “A Framework for Studying the Effects of Offshore Wind Development on Marine Mammals and Turtles.” U.S. Department of the Interior, 2022, www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Renewable-Energy/A-Framework-for-Studying-the-Effects.pdf.

BOEM. “Electromagnetic Fields (EMF) and Offshore Renewable Energy: Information Sheet.” U.S. Department of the Interior, 2023, www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/EMF%20Info%20Sheet%20revNov%202023.pdf.

BOEM. “Tribal Consultation Guidance.” *Bureau of Ocean Energy Management*. 2024, https://www.boem.gov/sites/default/files/documents/about-boem/Tribal-Consultation-Guidance_0.pdf.

CA Sea Grant. “Federal and State Agencies Involved in Offshore Floating Wind: Agencies Involved: Bird Displacement, California Current Upwelling, California Offshore Wind Leases, Community Benefit Agreements, Cost of Offshore Wind.” CA Sea Grant, January 10, 2025. https://caseagrant.ucsd.edu/california-offshore-winds/federal-and-state-agencies-involved-offshore-floating-wind

CCA California. "CEC Adopts Offshore Wind Energy Strategic Plan to Support California’s 100% Clean Electricity Future." *California Coast Anglers*, 2023, https://ccacalifornia.org/cec-adopts-offshore-wind-energy-strategic-plan-to-support-californias-100-clean-electricity-future/.

CEC. “California Offshore Wind Fact Sheet.” California Energy Commission, 2023, https://www.energy.ca.gov/sites/default/files/2023-11/California_Offshore_Wind_Fact_Sheet_ada.pdf.

CEC. “Assembly Bill 525 Offshore Wind Energy Strategic Plan.” California Energy Commission, 2024, https://www.energy.ca.gov/news/2024-07/cec-adopts-offshore-wind-energy-strategic-plan-support-californias-100-clean#:~:text=The%20plan%20outlines%20analysis%20and,to%20power%2025%20million%20homes.

CAISO. "Grid Integration and Offshore Wind: Technical Considerations." 2022, www.caiso.com/Documents/GridIntegration-OSW.pdf.

Chaji, Marina, and Werner, Samantha. “Economic Impacts of Offshore Wind Farms on Fishing Industries: Perspectives, Methods, and Knowledge Gaps.” *Marine and Coastal Fisheries*, vol. 15, issue 3, 2023, https://doi.org/10.1002/mcf2.10237.

Cooperman, Aubryn, et al. “Assessment of Offshore Wind Energy Leasing Areas for Humboldt and Morro Bay Wind Energy Areas, California.” National Renewable Energy Laboratory, 2022, https://www.boem.gov/BOEM-2022-025.

CPUC. "Offshore Wind Energy in California: Opportunities and Challenges." California Public Utilities Commission, 2021, www.cpuc.ca.gov/OSW.

Cryan, Paul M., and Robert M. Barclay. "Causes of Bat Fatalities at Wind Turbines: Hypotheses and Predictions." *Journal of Mammalogy*, vol. 90, no. 6, 2009, pp. 1330–1340. https://doi.org/10.1644/09-MAMM-S-076R1.1.

Downey Brand LLP. “Developing Offshore Wind in California: Environmental Permitting and Interconnection Considerations.” Downey Brand LLP, 2022, https://www.downeybrand.com/publications/developing-offshore-wind-in-california-environmental-permitting-and-interconnection-considerations/?utm_source=chatgpt.com

Drewitt, Allan L., and Rowena H. W. Langston. "Assessing the Impacts of Wind Farms on Birds." *Ibis*, vol. 148, no. s1, 2006, pp. 29–42. https://doi.org/10.1111/j.1474-919X.2006.00516.x.

Gill, Andrew B. "Offshore Wind Energy and Marine Ecosystems: Insights from European Studies." *University of Rhode Island Sea Grant*, unk., https://seagrant.gso.uri.edu/oceansamp/pdf/presentation/present_gill_europe.pdf.

Henkel, Sarah, et al. “Marine Renewable Energy and Environmental Interactions: Baseline Assessments of Seabirds, Marine Mammals, Sea Turtles and Benthic Communities on the Oregon Shelf.” *Marine Renewable Energy Technology and Environmental Interactions*. 2014, pp. 93-110. https://link.springer.com/chapter/10.1007/978-94-017-8002-5_8

Hermans, Annemiek, et al. “Do electromagnetic fields from subsea power cables effect benthic elasmobranch behavior? A risk-based approach for the Dutch Continental Shelf.” *Environmental Pollution*, vol. 346, no. 1, 2024, https://doi.org/10.1016/j.envpol.2024.123570.

Kunz, Thomas H., et al. "Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses." *Frontiers in Ecology and the Environment*, vol. 5, no. 6, 2007, pp. 315–324. https://doi.org/10.1890/1540-9295(2007)5[315:EIOWED]2.0.CO;2.

Martin, Colleen M., et al. “Reducing bat fatalities at wind facilities while improving the economic efficiency of operational mitigation. *Journal of Mammalogy*. vol. 98, no.2, 2017, pp. 378-385. https://doi.org/10.1093/jmammal/gyx005.

North Coast Offshore Wind. "FAQ: Offshore Wind Impacts to Birds and Bats." *North Coast Offshore Wind*, January 10, 2025. https://www.northcoastoffshorewind.org/faq-offshore-wind-impacts-to-birds-and-bats.

Romero-Lankao, Paty, et al. “Community Engagement and Equity in Renewable Energy Projects: A Literature Review.” National Renewable Energy Laboratory, 2023, www.nrel.gov/docs/fy23osti/87113.pdf

Slavik, Kaela, et al. “The large-scale impact of offshore wind farm structures on pelagic primary productivity in the southern North Sea.” *North Sea Open Science Conference*. vol. 845, 2019, pg. 35-53. https://link.springer.com/article/10.1007/s10750-018-3653-5

SLC. “Offshore Wind Development in California.” California State Lands Commission, 2023. https://www.slc.ca.gov/renewable-energy/offshore-wind-energy-development/.

Van Hoey, G., Bastardie, F., Birchenough, S., De Backer, A. et al. “Overview of the effects of offshore wind farms on fisheries and aquaculture er – Final report.” European Commission: European Climate, Infrastructure and Environment Executive Agency, 2021, https://data.europa.eu/doi/10.2826/63640.

Wilhelmsson, D., Malm, T., & Öhman, M. C. “The influence of offshore wind power on demersal fish.” *ICES Journal of Marine Science*. vol. 63, no. 5, 2006, pg. 775–784. https://academic.oup.com/icesjms/article/63/5/775/661096.