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[Tethys](#) is an online knowledge hub that facilitates the exchange and dissemination of information on the environmental effects of wind and marine energy. The bi-weekly *Tethys Blast* highlights new publications in the [Tethys Knowledge Base](#); relevant announcements, opportunities, and upcoming events; and news articles of international interest. [ORJIP Ocean Energy](#) has partnered with [OES-Environmental](#) to provide additional content. Email tethys@pnnl.gov to contribute!

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Announcements

New Magazine Article

OES-Environmental and the Triton Initiative recently published, "[Clean Energy from the Ocean: Measuring the Environmental Footprint of Devices](#)", in the latest issue of *Sea Technology*.

ORISE Application Opens

The U.S. Department of Energy's (DOE) Water Power Technologies Office (WPTO) and Oak Ridge Institute for Science and Education (ORISE) recently opened applications for the next cohort of students for the [Marine Energy Graduate Student Research Program](#). The program is accepting applications from master's and doctoral students with a marine energy-focused research thesis and/or dissertation at a U.S. institution. Applications are due 2 December 2022.

INORE BECS

The International Network on Offshore Renewable Energy (INORE) has announced a [Call for Blue Energy Collaborative Scholarships \(BECS\) Proposals](#), targeted at INOREans from Latin America, Africa, and Asia. If you have a research project that can provide collaborative work with other INOREans, the grant can be used for travel expenses and accommodation at the institution where the work will take place or be presented. Applications are due 31 October 2022.

MORE-EST Platform

The Polytechnic University of Turin's Marine Offshore Renewable Energy Lab (MOREnergy) recently launched its new open access web platform, [MORE-EST](#), featuring wind and wave energy data for offshore renewable energy projects in Europe.

Calls for Abstracts

The [Call for Abstracts](#) for the [11th International Conference on Scour and Erosion \(ICSE11\)](#) has been extended through 20 October 2022. ICSE11 will take place on 17-21 September 2023 in Copenhagen, Denmark.

The Western Section of The Wildlife Society has opened the [Call for Abstracts](#) for its [70th Annual Meeting](#) through 28 October 2022. The event will take place on 7-10 February 2023 online and in Riverside, U.S.

The Business Network for Offshore Wind has opened the [Call for Workshops](#) for the [2023 International Offshore Wind Partnering Forum \(IPF\)](#) through 1 November 2022. IPF will take place on 28-30 March 2022 in Baltimore, U.S.

Funding & Testing Opportunities

The California Energy Commission (CEC) has released a solicitation entitled "[Advancing Environmental Monitoring Technologies for Floating Offshore Wind](#)", which aims to fund applied research and development projects. Applications are due 17 October 2022.

The French Office for Biodiversity is launching a [Call for Expressions of Interest](#) for projects aimed at testing innovative technologies for the assessment and monitoring of benthic marine habitats between 0 and 50 meters depth. Applications are due 31 October 2022.

The U.S. DOE'S WPTO has released a \$10.3 million funding opportunity, "[Marine Energy Systems Innovation at Sea](#)", to accelerate the development and testing of marine energy technologies with a focus on wave and ocean current. Concept papers are due 4 November 2022.

The U.S. Testing and Expertise for Marine Energy Research (TEAMER) program is now accepting [Request For Technical Support \(RFTS\) 8](#) applications through 4 November 2022. Developers can apply for support in numerical modeling and analysis, bench/lab or tank/flume testing, and open water activities. Visit the TEAMER site for the complete RFTS schedule.

Student & Employment Opportunities

Pacific Northwest National Laboratory's (PNNL) Coastal Sciences Division is recruiting a [Post Masters Research Associate - Marine Energy](#) who will work primarily on projects associated with coastal community energy transitions, as well as marine renewable energy for small scale applications, such as aquaculture and ocean observing. Applications are due 19 October 2022.

Oregon State University is seeking a [Safety and Compliance Officer](#) to join the PacWave team and ensure compliance with all safety and environmental regulations and requirements through the construction and operational phases of the project. Applications are due 31 October 2022.

PNNL's Coastal Sciences Division is also recruiting a [Post Doc Research Associate – Biological Modeler](#) to conduct research in two topic areas: 1) plankton transport modeling to investigate the effects of offshore renewables development and 2) larval transport modeling to assess the migration patterns of a marine invasive species. Applications are due 11 November 2022.

European Marine Energy Centre (EMEC) is seeking a [Project Development Coordinator](#) to identify, develop, and contract opportunities for the Islands Centre for Net Zero (ICNZ) to grow its research and development activities. Applications are due 23 November 2022.

Oregon State University is also seeking a [Marine Energy Testing Manager](#) to manage internal and external outreach and engagement with stakeholders including faculty, national and international testing facilities, and marine industries. Applications are due 30 November 2022.

Upcoming Events

Upcoming Webinars

National Renewable Energy Laboratory is hosting a webinar on the [State of Knowledge on Bat Populations](#) from 9:00-10:30am PDT (4:00-5:30pm UTC) on 25 October 2022. The webinar will review current understanding of bat populations, provide an update on the potential listing of several species in the U.S., and discuss the various monitoring methodologies and genetic research used to estimate population size of trends of bats. Register [here](#).

As part of its *Learning from the Experts* series, the New York State Energy Research and Development Authority's Offshore Wind Team is hosting a webinar on Outer Continental Shelf Air Permitting for Offshore Wind on 26 October 2022 from 1:00-2:00pm EDT (5:00-6:00pm UTC). Register [here](#).

Upcoming Workshops

OES-Environmental is hosting a [Workshop on Environmental Monitoring around Deployed Marine Energy Devices](#) on 19 October 2022, as part of the International Conference on Ocean Energy in Donostia-San Sebastián. The workshop aims to identify the key components of effective and efficient programs for environmental monitoring around tidal and wave devices, and explore whether there are elements that could be standardized among projects worldwide. Email [Dorian Overhus](#) with any questions and to RSVP.

National Renewable Energy Laboratory and the Hydropower Foundation are hosting an [International Workshop on Marine Energy Workforce Development and Education Efforts](#) on 20 October 2022, as part of the International Conference on Ocean Energy in Donostia-San Sebastián. Email [Arielle Cardinal](#) with any questions and to RSVP.

Upcoming Conference

The Renewables Grid Initiative, WindEurope, and Offshore Coalition for Energy and Nature are jointly organizing a conference, [Speeding up Nature Positive Offshore Energy Infrastructure Deployment](#), on 19 October 2022 in Brussels, Belgium. View the agenda [here](#). Register for free.

New Documents on *Tethys*

Marine Energy

[To fly or not to fly? Comparing vantage point and uncrewed aerial vehicle surveys for assessments of seabird abundance and fine-scale distribution](#) – Costagliola-Ray et al. 2022

Marine renewable energy developments (e.g. offshore wind, wave, and tidal) are an increasing feature within the marine environment. It is therefore important to understand the potential impacts of such developments on seabirds that use these environments. Land-based vantage point (VP) surveys are widely used to collect data for environmental impact assessments (EIAs) within tidal stream energy sites. However, tidal stream environments are highly dynamic and present challenges when conducting VP surveys, for example there can be varying detectability of seabirds due to near-surface turbulence. In recent years, there has been increasing interest in the use of uncrewed aerial vehicles (UAVs) to quantify animal abundance and distribution. This study provides the first comparison of at-sea abundance and distribution of surface-foraging seabirds in flight within a tidal stream environment using concurrent VP surveys and UAV transects.

[Mapping potential environmental impacts of offshore renewable energy](#) – Galparsoro et al. 2022

The first section of the present report determines the potential interaction between different offshore renewable energy devices (i.e., wind turbines, wave energy converters, current turbines, photovoltaic and ocean thermal energy conversion systems) and ecosystem components, by identifying the pressures (stressors) and vulnerable group of species, habitats, or ecosystem elements (receptors), based on a literature review. The second section presents the methodology and results from a risk map, or cumulative impact index, analysis made primarily using GIS software and the open-source program EcoImpactMapper. The third section gives an overview of the most relevant policies, strategies, and directives for managing the environmental impacts of the development of offshore energy. The next section focusses on the synergies and trade-offs between these policies and strategies.

[Coupled BEM and two-phase mixture model for surrounding flow of horizontal axial turbine over sediment seabed](#) – Li & Chen 2022

Horizontal axial turbine (HAT) is widely used to extract kinetic energy from tidal current. The power absorption of HAT is largely decided by the surrounding flow. A two-phase,

sediment-laden mixture model is coupled with the blade element momentum method (BEM) for the impact of HAT on surrounding flow over sediment seabed. The mixture model incorporates theoretical relative velocity, turbulence enhancement from particle wake flow and turbulence damping from high concentration sediment. A blade-induced turbulence (BIT) term is introduced into the mixture model to represent the turbulence production at blade edge. The computed velocity and turbulence are improved by the BIT term in the wake region of HAT. Three turbine hub heights are adopted to investigate the impact of the turbine on sediment seabed and the surrounding flow.

Wind Energy

[Pile driving repeatedly impacts the giant scallop \(*Placopecten magellanicus*\) – Jézéquel et al. 2022](#)

Large-scale offshore wind farms are a critical component of the worldwide climate strategy. However, their developments have been opposed by the fishing industry because of concerns regarding the impacts of pile driving vibrations during constructions on commercially important marine invertebrates, including bivalves. Using field-based daily exposure, we showed that pile driving induced repeated valve closures in different scallop life stages, with particularly stronger effects for juveniles. Scallops showed no acclimatization to repetitive pile driving across and within days, yet quickly returned to their initial behavioral baselines after vibration-cessation. While vibration sensitivity was consistent, daily pile driving did not disrupt scallop circadian rhythm, but suggests serious impacts at night when valve openings are greater.

[Prairie grouse and wind energy: The state of the science and implications for risk assessment – Lloyd et al. 2022](#)

How to shape the anticipated build-out of industrial-scale renewable energy in a way that minimizes risk to wildlife remains contentious. The challenge of balancing wildlife conservation and decarbonization of the electricity sector is well illustrated in the grasslands and shrub-steppe of North America. Here, several endemic species of grouse are the focus of intensive, long-term conservation action by a host of governmental and nongovernmental entities, many of whom are now asking whether anticipated increases in the number of wind-energy facilities will exacerbate declines or prevent recovery of these species. To address this question, we synthesized the potential consequences of wind-energy development on prairie grouse. Published literature on behavior or demography of prairie grouse at wind-energy facilities is sparse, with studies having been conducted at only 5 different facilities in the United States.

[How can the impacts of an operating wind farm on marine mammals be assessed? \(Available in English and French\) – Couturier et al. 2022](#)

COME3T, a committee of experts for environmental issues related to offshore renewable energies, brings together neutral, independent experts to provide scientific knowledge and recommendations in response to environmental issues associated with offshore renewable

energy. In France, marine mammals are heritage species which face major conservation challenges and are liable to be impacted by the installation and operation of offshore wind farms. For this COME3T Bulletin (n°04) from France Energies Marines, the experts focused on the methods and monitoring implemented in order to assess the impacts of an operating offshore wind farm on marine mammals. The operational phase of an offshore wind farm can last up to 25 years and represents the majority of its life cycle. It is also the phase for which the impacts on marine mammals are least well known.

News & Press Releases

Marine Energy

[With Marine Power, It's Not the Size of Your Turbine, It's the Motion of the Ocean](#) – Esquire

A big chunk of our clean-energy pie will be wind and solar. Somewhat smaller slices will be geothermal and nuclear and hydropower. But the last part, maybe the last 10 percent or so, might come down to more niche technologies like hydrogen fuel cells and marine power. The latter represents the cutting edge of clean energy research and development, and it's primarily happening at the Department of Energy (DOE), where the Water Power Technologies Office (WPTO) is seeking to develop, test, and tinker with different devices until they're commercially viable, at which point private firms will take it away. In general, these devices fit into a few main categories: wave, tidal, river current, and gradients. Jennifer Garson, director of WPTO, and Tim Ramsey, the Marine Energy Program Manager, explained all of this—and how marine energy could play a role in responding to natural disasters.

[Exowave starts testing wave energy prototype offshore Belgium](#) – Offshore Energy

Danish clean energy start-up Exowave has deployed the scale model of its wave energy technology at the Blue Accelerator test platform, located just off the Port of Ostend in Belgium. Exowave's scale model, weighing 19 tons with the height of 7.2 meters, has been deployed on the seabed at the end of September for a test campaign in real, offshore environment. The wave energy technology has been connected to the Blue Accelerator with a data cable to collect information on the conversion of wave energy in different wave heights and current strength. After the test period, the wave energy converter will be disconnected and retrieved to the port.

[CorPower Ocean and Maersk Supply Services install subsea cable for HiWave-5 Project](#) – CorPower Ocean

CorPower Ocean and Maersk Supply Services have successfully installed a 6.2km subsea export cable off the coast of northern Portugal to energise the flagship HiWave-5 Project. The 100-tonne cable was installed using the Maersk Achiever vessel and will provide power and data connection from an on-land substation in Aguçadoura to the wave energy

demonstration site 5.5km offshore. Now connected to the national grid of Portugal, the site will initially accommodate the recently unveiled CorPower C4 Wave Energy Converter (WEC) which later form part of a larger four-system array, and one of the world's first grid-connected wave farms.

Minesto's tidal array buildout progressing on schedule – Minesto

Minesto, leading marine energy developer, recently announced that the site development of the world's first tidal energy kite array in Hestfjord, Faroe Islands, is efficiently progressing according to plan. The total planned capacity of the array is about 30 MW, including twenty-four kite systems at 1.2 MW each. The annual yield of the site is estimated to be 84 GWh, which is equivalent of 20% of the total Faroese energy consumption in 2021. The assessment work undertaken covers all aspects of the site development, including environmental assessment, and the infield cable routing and grid connection works. The focus ahead is to finalise the installation configuration of the first four kites forming the first 5 MW phase, as well as securing onshore service assets.

Ocean Power Technologies Awarded Contract with Department of Homeland Security Science and Technology Directorate on Maritime Domain Awareness – Sensors (MDA-S) Initiative – Ocean Power Technologies

Ocean Power Technologies, Inc. (OPT), a leader in innovative and cost-effective low-carbon marine data, power, and consulting service solutions, has been selected for a \$529,025 procurement by Amentum Services. OPT was awarded the procurement to assist Amentum in providing the U.S. Department of Defense (DoD) Information Analysis Center (IAC) with land, air, space, and port & coastal surveillance services in support of the U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T). OPT will provide the required hardware, hardware deployment support, software, software deployment support, integration services, surveillance and telemetry data, and associated training in support of a PB3 PowerBuoy® equipped with OPT's proprietary Maritime Domain Awareness solution.

Wind Energy

BOEM Completes Environmental Review of Offshore Wind Leasing in Central California – Bureau of Ocean Energy Management (BOEM)

BOEM recently announced it has completed its environmental review of potential impacts from offshore wind energy leasing activities in the Morro Bay Wind Energy Area (WEA), located 20 miles offshore central California. The Environmental Assessment (EA) reflects close coordination and engagement with the State of California, the Department of Defense, Tribes, ocean users, including the fishing community, and coastal communities. The final EA assesses potential impacts from the issuance of leases within nearly 240,898 acres (376 square miles) of the Morro Bay WEA off the coast of San Luis Obispo County, California. Based on the analysis in the EA, BOEM has issued a finding of no significant impacts (FONSI) to environmental resources.

EMEC Concludes Concept Design on 100 MW Floating Wind Test Site – EMEC

EMEC, based in Orkney, Scotland, has concluded concept design for a new 100 MW floating offshore wind test and demonstration site. As the world's leading, and only accredited, ocean energy test facility, EMEC is aiming to secure a lease for a site ~20 km west of Orkney, further out to sea from its existing wave energy test facility at Billia Croo. EMEC's proposed test site will comprise six berths for floating offshore wind turbines of up to 20 MW rated capacity. With water depths of 80-95 meters, large waves and a mean windspeed of 10.7 m/s, the site will offer floating wind developers representative metocean conditions to those in ScotWind, Celtic Seas and future leasing rounds. Four of the six berths will be grid-connected, while the final two berths will be reserved for alternative applications such as hydrogen generation.

MPS and WavEC to Deliver Pre-Commercial Floating Offshore Wind Project in Portugal – Marine Power Systems (MPS)

MPS have joined forces with WavEC to deploy their unique modular floating offshore wind platform technology in the north region of Portugal. This follows the recent news that Marine Power Systems is to demonstrate a commercial scale array at EMEC in Orkney, Scotland. WavEC will support MPS throughout the licensing and consenting process, as well as the environmental impact assessment and performance monitoring in Portugal, for which WavEC bring extensive expertise and experience. With the signature of a Memorandum of Understanding, Marine Power Systems and WavEC intend to lay the foundations for a long-term relationship that identifies opportunities for the implementation of Marine Power System's technology in Portuguese waters, including at the future Technological Free Zone at Viana do Castelo, and other potential sites.

U.S. Fish and Wildlife Service Proposes Improvements To Incidental Take Permit Process for Bald and Golden Eagles – U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service is proposing improvements for how it processes permits for the incidental take of bald and golden eagles. The bald eagle's recovery is one of the United States' most important wildlife conservation success stories, yet the future of golden eagle populations remains uncertain. Under federal law, the Service must ensure that regulations for eagle permits are consistent with the goal of maintaining stable or increasing eagle populations. The Service is proposing to create general permits for four activities under current regulations: wind-energy generation projects, power line infrastructure, disturbance of breeding bald eagles, and bald eagle nest take. Each general permit outlines eligibility criteria and mitigation requirements to avoid, minimize and compensate for impacts to eagles.

SSE, Equinor plan 1.3 GW Dogger Bank D offshore wind project – Offshore Energy

SSE Renewables and Equinor are looking into building what would be the fourth part of Dogger Bank Wind Farm, the world's largest offshore wind farm, whose three phases (A, B and C) are currently under construction. Surveys are now underway at an offshore site

where the partners want to develop Dogger Bank D, which would bring Dogger Bank Wind Farm's total capacity to nearly 5 GW if built. The surveys that are currently being performed at the Dogger Bank D site started in mid-August and are expected to run until the end of November, during which time geophysical data will be gathered for the offshore wind farm's array area. Dogger Bank Wind Farm is a result of several projects that were initially developed back in the early to mid-2010s by the Forewind consortium that comprised SSE, Equinor, Statkraft, and RWE.