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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

SEER Research Recommendations

The [U.S. Offshore Wind Synthesis of Environmental Effects Research \(SEER\)](#) effort recently compiled a database of research recommendations, from over 40 existing resources, that are relevant to the environmental effects of offshore wind energy development on the U.S. Pacific Coast. View the complete database, and a set of synthesized recommendations, on *Tethys* [here](#).

Marine Energy Video Series

[OES-Environmental](#) and Pacific Northwest National Laboratory recently published a series of animated videos on the effects of marine energy devices on ocean animals and habitats. Watch the series [here](#), and check out other [educational resources](#) on *Tethys* like our [coloring book](#).

ORISE Applications

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.

BOEM & NOAA Draft Strategy

The U.S. Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) recently [announced](#) the release of the [Draft North Atlantic Right Whale and Offshore Wind Strategy](#) that identifies the agencies' goals and objectives to better understand the effects of offshore wind development on the whales and their habitat. Public comments are due 4 December 2022.

BOEM Seeks Public Comment

BOEM is [seeking public comment](#) on two proposed guidelines that clarify the requirements that offshore wind lessees must include in Construction and Operation Plans before the agency will begin its formal environmental and technical reviews. Comments are due 12 December 2022.

Calls for Abstracts

The [Call for Abstracts](#) for the [International Ocean Data Conference - II \(IODC-II\)](#) is now open through 15 November 2022. IODC-II will take place on 20-21 March 2023 in Paris, France.

American Clean Power is now [accepting submissions](#) for panel and poster presentation opportunities at the [Siting and Environmental Compliance Conference 2023](#) through 2 December 2022. The conference will take place in Spring 2023.

The [Call for Abstracts](#) for [OCEANS 2023 Limerick Conference & Exhibition](#) is now open through 20 December 2022. The event will take place on 5-8 June 2023 in Limerick, Ireland.

The [Call for Abstracts](#) for the [15th European Wave and Tidal Energy Conference Series \(EWTEC 2023\)](#) is now open through 28 January 2023. Full papers will be due 27 May 2023. EWTEC will take place on 3-7 September 2023 in Bilbao, Spain.

Calls for Papers

The *Journal of Renewable and Sustainable Energy* is accepting submissions for the Special Issue, "[Preparatory Work for the American Wake Experiment \(AWAKEN\)](#)". Papers are due 1 December 2022.

The *Journal of Marine Science and Engineering* is accepting submissions for the Special Issue, "[Impacts of Offshore Wind Farms on Marine Ecosystems, Fisheries and Societies](#)". Papers are due 31 January 2023.

Wind is accepting submissions for the Special Issue, "[Floating Wind Energy Advances](#)". Papers are due 31 January 2023.

The International Council for the Exploration of the Sea (ICES) is accepting submissions for a Special Issue in the *ICES Journal of Marine Science*, "[Assessing the impact of expanding offshore wind energy](#)". Papers are due 3 April 2023.

Funding & Testing Opportunities

The U.S. DOE's WPTO has issued a notice of intent to release a \$35 million funding opportunity, "[Bipartisan Infrastructure Law \(BIL\), Section 41006\(a\)\(2\): U.S. Tidal Energy Advancement](#)", in early 2023 to develop a tidal or river current research, development, and demonstration site and to support in-water demonstration of at least one tidal energy system.

The U.S. DOE's Wind Energy Technologies Office has issued a notice of intent to release a \$28 million funding opportunity, "[Bipartisan Infrastructure Law FOA to Address Key Deployment Challenges for Offshore, Land-Based, and Distributed Wind](#)", in November 2022 to support social science research and community engagement for offshore wind development, as well as bat behavioral research, technology development, and field testing to advance deterrents.

The U.S. DOE'S WPTO has also 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 2 December 2022.

ProtoAtlantic is now accepting applications for the [ProtoAtlantic Customized Scale Start-Ups Support Program](#) at the Lir-National Ocean Test Facility in Ireland. The program will provide free facilities access to marine technology (wave, wind, tidal, floating solar, biotechnology, robotics) developers across the Atlantic Area. Applications are due 23 December 2022.

The European Commission has launched two new [Calls for Proposals](#) under the European Maritime, Fisheries and Aquaculture Fund aimed at supporting careers and regional projects for a sustainable blue economy in EU sea basins. Proposals are due 31 January 2023.

Student & Employment Opportunities

Pacific Northwest National Laboratory is 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.

The National Offshore Wind Research and Development Consortium is hiring an [Offshore Innovation Hub Associate](#) to support the development and operation of the Equinor Offshore Wind Innovation Hub. Applications are due 18 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.

The Institute for Cyber-Physical Infrastructure and Energy at Lehigh University is inviting applications for a tenure-track [Assistant Professor in Coastal Infrastructure and Energy](#) to begin August 2023. Applications are due 31 December 2022.

Upcoming Events

Upcoming Webinar

ECONcrete is hosting a webinar, “[Environmental Considerations for Offshore Wind Development](#)”, at 1:00pm EST (6:00pm UTC) on 16 November 2022. During the webinar, speakers from the Northeast Fisheries Science Center, AKRF, and The Nature Conservancy will discuss insights gained from environmental planning documents, developing monitoring measures, and implementing best practices. Register [here](#).

Upcoming Conferences

[Offshore Energy Exhibition & Conference 2022](#) will take place 29-30 November 2022 in Amsterdam, The Netherlands. Register [here](#).

The [National Offshore Wind Research & Development Symposium](#) will take place 5-6 December 2022 in Boston, U.S. and online. Register [here](#).

The European Energy Research Alliance’s [DeepWind Conference 2023](#) will take place 18-20 January 2023 in Trondheim, Norway. Register [here](#).

New Documents on *Tethys*

Marine Energy

[Environmental impacts on marine energy systems: collision risks for marine animals and priority species for monitoring in Brazil](#) – Silva et al. 2022

The urgent need to reduce greenhouse gas emissions to slow global warming is the driving force behind the development of the renewable energy sector. To keep the global temperature rise below 1.5°C, renewable energy must grow 74% by 2050, which requires an eight-fold increase in the annual growth rate. Brazil has great potential for the development of technologies for the conversion of marine energy from waves and tides, which raises the debate on the possible environmental impacts of these projects. The review seeks to synthesize knowledge about potential collision risks for marine animals, such as mammals, fish and birds, in renewable marine energy (RME) devices, as well as to identify priority species for environmental monitoring along the Brazilian coast.

Mitigating Negative Impacts of Marine Renewable Energy on Biodiversity: The Role of International Environmental Law – Marauhn et al. 2022

While marine renewable energy will contribute to less greenhouse gas emissions, and thus enhance compliance with the Paris Agreement, there are concerns over potential impacts marine renewable energy installations may have on biodiversity. Such impacts include, among others, habitat loss, collision risks, noise and electromagnetic fields. This paper addresses these issues from the perspective of international environmental law, illustrating how potentially conflicting objectives (mitigating greenhouse gas emissions and preserving biodiversity) can be accommodated. This requires a discussion of broader concepts such as no harm and precautionary action as well as detailed rules extending from marine protected areas to the discussion of specific treaty issues, even public participation, including participation of indigenous peoples.

Field Observations of Scour Behavior around an Oscillating Water Column Wave Energy Converter – Lancaster et al. 2022

This study provides the first ever published measurements of scour and morphological change around an Oscillating Water Column (OWC) Wave Energy Converter (WEC) device at a real-world site, with the intention of informing future designs to reduce costs of the technology. A 200-kW prototype OWC WEC was deployed at King Island, Tasmania, Australia in January 2021, providing a unique opportunity to monitor the device using a combination of dive footage, multi-beam surveys and bedrock surveys. Settlement of the device was observed and monitored before ceasing once the foundation made contact with the underlying bedrock at the site. It is hypothesized that the settlement is caused by scour undermining the gravity structure's foundations.

Wind Energy

Unstated impacts of the green energy industry on the habitat of a coastal delphinid: Turbid-turbulent wakes induced by offshore wind turbine foundations – Huang 2022

Offshore wind farms (OWFs) are a green energy solution to reducing CO₂ emissions, but often encroach on major habitats of coastal delphinids. Clustered OWF construction in shallow waters may have cumulative negative impacts on coastal delphinids and marine ecosystems. Although the impacts of piling noise have been discussed extensively, the potential impacts of oceanographic alterations induced by wind turbine foundations are rarely discussed. Two OWFs were constructed near the core habitat of a critically endangered subspecies of humpback dolphin (*Sousa chinensis taiwanensis*) in the eastern Taiwan Strait. Turbid-turbulent wakes induced by wind turbine foundations were inspected using Landsat images. Sighting rates of the humpback dolphin that were obtained from boat-based line-transect surveys near the northern OWF (OWFn) since the late 2000s were examined.

Marine birds: vision-based wind turbine collision mitigation – Martin 2022

Throughout their evolution seabirds have not had to contend with obstacles which extend into their flight space above the water surface. However, the recent introduction and expansion of the Offshore Wind sector has significantly increased the potential for collisions with turbines. Bird collision risk with Offshore Wind Farm (OWF) turbines is now a major consenting consideration for OWF projects. Therefore, the possibility of reducing those risks through a simple vision-based mitigation is highly desirable. It has the potential to help both governments and developers accelerate the growth of OWF to achieve renewable energy targets. The report's Appendix presents a review of the vision of birds. This is used to determine key elements for the design of vision based mitigation measures aimed at reducing the collision of marine birds with Offshore Wind Farms.

Dominant Frequency Extraction for Operational Underwater Sound of Offshore Wind Turbines Using Adaptive Stochastic Resonance – Wang et al. 2022

Underwater sound generated by the rapidly increasing offshore wind farms worldwide greatly affects the underwater soundscape and may cause long-term cumulative effects on sound-sensitive marine organisms. However, its analysis and impact assessment are heavily interfered with by underwater ambient noise. In this study, an adaptive stochastic resonance method is proposed to extract the dominant frequency of wind turbine operational sound when heavy noise is present. In particular, a time–frequency–amplitude fusion index was proposed to guide the parameter tuning of an adaptive stochastic resonance system, and an equilibrium optimizer based on the physical dynamic source–sink principle was adopted to optimize the parameter-tuning process. The results from the simulation and field data showed that the dominant frequency of operational sound was extracted adaptively.

News & Press Releases

Marine Energy

EuropeWave reserves berths at BiMEP and EMEC test sites – EuropeWave

EuropeWave has reserved berths at the open-water test sites of the Biscay Marine Energy Platform (BiMEP) in the Basque Country, Spain, and the European Marine Energy Centre (EMEC) in Orkney, Scotland. The final phase (Phase 3) of the EuropeWave programme will see three prototype wave energy converter systems deployed in the Spring of 2025 for a 12-month demonstration and operational testing programme. Two systems will be deployed at the BiMEP test site, and one system deployed at EMEC's Billia Croo test site. The EuropeWave project is a partnership between Wave Energy Scotland (WES) and the Basque Energy Agency (EVE) to deliver a five-year collaborative R&D funding programme with match-funding through the European Commission's Horizon 2020 programme.

Resen Waves to supply wave energy tech for CCS project monitoring – Offshore Energy

Danish company Resen Waves has joined the Greensand carbon capture and storage (CCS) project to develop small-scale wave energy buoys that will be used for monitoring activities. Resen Waves has started collaborating with Greensand project to develop buoys that will, through wave power, generate electricity for monitoring the CO₂ storage and detecting any leaks. At the same time, they will function as a Wi-Fi hotspot, located several hundred kilometers out in the North Sea. The collaboration is expected to revolutionize the way energy is generated for monitoring offshore activities using small-scale wave energy buoys. The new green technology has major climate and safety benefits for Project Greensand and, once development is complete, the buoy will be the first of its kind worldwide, the project partners said.

AWS Waveswing trials exceed expectations – AWS Ocean Energy

AWS Ocean Energy confirmed highly encouraging results from the current phase of sea trials of its wave energy device at the European Marine Energy Centre (EMEC) in Orkney. In a key highlight of the scientific testing programme to date at EMEC's Scapa Flow test site, the Waveswing wave energy converter captured average power over 10kW and peaks of 80kW, during a period of moderate wave conditions. These figures exceeded the developer's own predictions by 20%. Other key findings underline the survivability potential of the subsea Waveswing which continued to deliver power in poor weather conditions. AWS demonstrates this in the following simple but highly effective video clip, shot during Force 10 gales, showing a steel nut suspended on a string inside the device.

Curious About a Career in Water Power? – U.S. DOE WPTO

Whatever your background, there are opportunities for *you* in science, technology, engineering, and mathematics (STEM) fields. This National STEM Day, the U.S. DOE WPTO is featuring resources, tools, and opportunities that can help you pursue a clean energy career in water power. In WPTO's [marine energy](#) STEM portal, students, educators, and the public can learn about water power technologies, check out careers and training programs, and find resources to use in the classroom or for self-directed learning. Visit the portal to peruse workforce data, animations, games, and lesson plans. You can also Explore what a water-powered world could look like with the National Renewable Energy Laboratory's [Renewable Energy Discovery \(REDi\) Island](#).

Wind Energy

BOEM Designates Two Wind Energy Areas in Gulf of Mexico – BOEM

As part of the Biden-Harris administration's goal of deploying 30 gigawatts of offshore wind energy capacity by 2030, the Bureau of Ocean Energy Management (BOEM) today announced it has finalized two Wind Energy Areas (WEAs) in the Gulf of Mexico, with the potential to produce enough clean wind energy to power nearly 3 million homes. The

first WEA is located approximately 24 nautical miles (nm) off the coast of Galveston, TX. The area totals 508,265 acres and has the potential to power 2.1 million homes. The second WEA is located approximately 56 nm off the coast of Lake Charles, LA. The area totals 174,275 acres and has the potential to power over 740,000 homes. The next steps in BOEM's renewable energy competitive leasing process include issuing a Proposed Sale Notice with a 60-day public comment period later this year or early next year.

Three ScotWind Clearing project agreements confirmed – Crown Estate Scotland

Crown Estate Scotland recently confirmed that all three successful ScotWind Clearing applicants now have seabed option agreements in place meaning that their projects can move into the development stage. Full seabed leases are granted at a later stage once applicants have the necessary consents from regulators, such as Marine Scotland, and have secured grid connections and financing. The addition of three more ScotWind projects takes to 20 the total number of ScotWind projects which now have option agreements confirmed. Together these total up to 27.6GW of clean energy. A total of £56m in option fees will be paid by the three successful applicants taking the total figure for ScotWind option fees for the 20 projects to £755m.

X1 Wind successfully installs floating wind platform in Spain – X1 Wind

X1 Wind's floating platform has been successfully installed at the PLOCAN test site in the Canary Islands. As summer trade-winds abated, a suitable weather window allowed X1 Wind and partners from the EU-backed PivotBuoy Project to complete the installation process, connecting the fully-functional floating wind prototype to the mooring system and dynamic cable pre-installed last June. The X30 platform has been developed with several key design features to streamline the installation process, including a light-weight and stable floater which can be easily wet towed by local vessels. The PivotBuoy Project focuses on demonstrating an innovative mooring system configuration that combines the advantages of a SPM (single point mooring) with a small TLP (Tension-Leg Platform) mooring system, allowing the ability to reach deeper waters and minimizing the footprint and impact on the seabed.

Joint Venture investing in green energy future for South Taranaki with 900MW offshore wind project – BlueFloat Energy

The consortium formed by BlueFloat Energy, Energy Estate and Elemental Group in 2021 is excited to announce their plans to build an offshore wind farm 22 kilometres off the coast of South Taranaki. The proposed project is the first of four offshore wind projects planned by the consortium in Aotearoa with the potential to add up to 5GW of new clean energy generation. The South Taranaki project is designed to be a ~900 MW offshore wind development using fixed bottom technology located to the west of Beach Energy's Kupe platform in the South Taranaki Bight. The proposed site was identified as offering huge potential in the Offshore Wind Discussion Paper published by Venture Taranaki in April 2020, due to the site's unique characteristics and favourable environmental conditions.