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[Tethys](#) is an online knowledge base that facilitates the exchange and dissemination of information on the environmental effects of wind and marine renewable energy (MRE). 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. If you have specific content you would like circulated to the greater wind and MRE communities, please send it to tethys@pnnl.gov for consideration.

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Announcements

Final 2020 State of the Science Report Available

Following a two-month public comment period on the draft report released in June, the final [OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World](#) is now available on *Tethys*. In addition to the full report, you can download each of the 14 chapters individually, as well as the short science summaries and supplementary material. An executive summary is also available and will be translated into additional languages in the coming months.

New WREN Factsheet Available

A new WREN (Working Together to Resolve Environmental Effects of Wind Energy) factsheet is now available on *Tethys*. Check out [A Risk-Based Approach for Addressing Wind and Wildlife Interactions using Ecosystem-Based Management Values](#) now!

PRIMRE Webinar Series

Pacific Northwest National Laboratory, National Renewable Energy Laboratory, and Sandia National Laboratories will be hosting a [two-part webinar series](#) to present new developments on the [Portal and Repository for Information on Marine Renewable Energy \(PRIMRE\)](#), a centralized access point that enhances the accessibility and discoverability of information relevant to MRE development and operations in the U.S. Register [here](#) for the first webinar, at 8:00am PDT (3:00pm UTC) on 7 October 2020, which will highlight new sites and tools that have been developed within PRIMRE: the [MRE Technology Database](#), [MRE Software](#), and [Telesto](#). Register [here](#) for the second webinar, at 8:00am PDT (3:00pm UTC) on 28 October 2020, which will highlight new features of existing [PRIMRE Knowledge Hubs: Signature Projects](#), the [Tethys Engineering Photo Library](#), and the PRIMRE aggregate search.

WPTO-MHK Graduate Student Research Program

The Oak Ridge Institute for Science and Education (ORISE) is now accepting applications for the [WPTO-MHK Graduate Student Research Program](#), which is designed to provide graduate thesis research opportunities in marine and hydrokinetics (MHK) at DOE laboratories and other DOE/WPTO-approved facilities. Applications are due by 5:00pm EST (10:00pm UTC) on 4 December 2020.

Call for Abstracts/Proposals

The American Wind Energy Association (AWEA) is now accepting proposals for podium and poster presentations at [CLEANPOWER 2021](#) in Indianapolis, Indiana (US) from 7-10 June 2021. The [Call for Proposals](#) closes 23 October 2020.

The University of Plymouth is now accepting abstract submissions for the [14th European Wave and Tidal Energy Conference \(EWTEC 2021\)](#) in Plymouth, UK from 5-9 September 2021. Relevant EWTEC 2021 themes include resource characterization, environmental impact and appraisal, and more. Abstract submission closes on 1 November 2020.

Funding/Testing Opportunities

The Supergen Offshore Renewable Energy (ORE) Hub is accepting applications for the [Early Career Researcher \(ECR\) Research Fund](#), designed to be a flexible research fund for ECRs to support small activities that either supports and develops your existing research activities, or develops your skills further. Research activities should be aligned with the objectives of the Supergen ORE Hub and should be directed at offshore wind, wave, or tidal energy research. Applications are due by 12:00pm BST (11:00am UTC) on 9 October 2020.

The [Marine Renewables Infrastructure Network \(MaRINET2\)](#) has opened its fifth and final call for fully funded access to a world-leading network of testing and research infrastructures in Europe. An open call for [virtual access](#) to data sets and a free-of-charge [training programme](#) are also available through the project. Applications are due 16 October 2020. A webinar recording to assist candidates with their application and share updates on the process is available [here](#).

Employment Opportunities

Bombora is seeking a [Graduate Engineering Intern](#) to support the development of the company's wave energy technology. Applications due by 4:00pm BST (3:00pm UTC) on 6 October 2020.

The Department of Energy and Process Engineering at the Norwegian Institute for Nature Research (NINA) has a vacancy for a [PhD Candidate](#) interested in modelling biodiversity impacts of future energy systems in Norway. Applications due by 28 October 2020.

Upcoming Events

Upcoming Workshops

The Triton Field Trials Team is hosting a virtual workshop on [Collaboration for Marine Renewable Energy Environmental Monitoring Guidelines](#) from 4:00-8:00pm UTC on 12 October 2020 as part of [Global OCEANS 2020: Singapore - U.S. Gulf Coast](#). The workshop strives to work with MRE stakeholders to gather information toward creating guidelines for MRE environmental monitoring. Register for the conference [here](#).

The Responsible Offshore Development Alliance, National Marine Fisheries Service, and the Bureau of Ocean Energy Management are convening a virtual workshop, [State of the Science: Fisheries and Offshore Wind Interactions](#), on 15, 16, and 30 October 2020. The workshop will engage key experts, including fishermen, fishing industry and agency representatives, wind energy developers, relevant fisheries managers, and expert scientists and academics to build and refine a regional fisheries and offshore science agenda, including through the Responsible Offshore Science Alliance. Register [here](#) by 12 October 2020.

New York State Energy Research and Development Authority (NYSERDA) is hosting the [State of the Science Workshop on Wildlife and Offshore Wind Energy 2020: Cumulative Impacts](#) online from 16-20 November 2020. Plenary presentations and Q&A panel discussions will occur throughout the week, with smaller taxon-specific working meetings in late 2020 and early 2021, and a final group webinar in the spring of 2021. Register for free [here](#) by 30 October 2020.

Upcoming Webinars

National Renewable Energy Laboratory and Defenders of Wildlife are hosting a nine-part webinar series, *Wildlife & Wind Energy Webinar Series: Considerations for monitoring and managing impacts*, through mid-November 2020. Register [here](#) for the sixth webinar, "Communicating Results: How to identify and produce robust monitoring reports", at 1:30pm EDT (5:30pm UTC) on 15 October 2020. Register [here](#) for the seventh webinar, "Impact Reduction Strategies for Eagles and Bats", at 1:30pm EDT (5:30pm UTC) on 22 October 2020. Sign up [here](#) to receive updates on and invitations for all remaining webinars in this series. All webinars will be recorded and available on *Tethys*.

The Schatz Energy Research Center at Humboldt State University is hosting a five-part webinar series through mid-October 2020 on [Exploring the Feasibility of Offshore Wind Energy for the](#)

[California North Coast](#). Register [here](#) for the fourth webinar, “Community Perspectives on Regional Impacts/Opportunities”, at 2:00pm PDT (9:00pm UTC) on 5 October 2020. Register [here](#) for the fifth and final webinar, “Reflections and Next Steps”, at 2:00pm PDT (9:00pm UTC) on 19 October 2020.

The Nova Scotia Offshore Energy Research Association (OERA) is hosting a webinar, “[Real-time detection of marine mammals in high flow environments](#)”, at 1:00pm ADT (4:00pm UTC) on 22 October 2020. Register [here](#).

Upcoming Conferences

[Global OCEANS 2020: Singapore - U.S. Gulf Coast](#) will feature a mix of live and on-demand events available to all registrants between 5-30 October 2020. Register [here](#).

The American Wind Energy Association’s (AWEA) [Offshore WINDPOWER 2020 Virtual Summit](#) will be held online from 13-14 October 2020. Register [here](#).

The [5th International Conference on Maritime Hydrogen and Marine Energy](#) will be held online from 14-15 October 2020. Register [here](#).

New Documents on *Tethys*

Marine Renewable Energy

[Behavioral responses of fish to a current-based hydrokinetic turbine under multiple operational conditions](#) – Grippo et al. 2020

There is significant international interest in developing current-based marine and hydrokinetic (MHK) technologies to capture the power of tidal energy. However, concerns have been raised regarding the ecological effects of these projects on fish, including the risk of blade collision and behavioral impacts such as the disruption of migratory behavior and food acquisition and displacement from preferred habitats. We conducted mobile hydroacoustic surveys to track fish as they approached a tidal turbine deployed in Cobscook Bay, Maine. There was a significant decline in fish numbers with decreasing distance to the turbine, beginning approximately 140 m from the turbine.

[Review Of Demographic Parameters And Sensitivity Analysis To Inform Inputs And Outputs Of Population Consequences Of Disturbance Assessments For Marine Mammals](#) – Sinclair et al. 2020

The interim Population Consequence of Disturbance (iPCoD) is a framework that allows individual-level effects from disturbance to be scaled to population-level impacts. This approach is parameterised by published figures for specific UK populations or derived from the literature for a given species. The original iPCoD model was developed in 2013, with subsequent reviews of the recommended demographic input parameters in 2014 and

2017. This current report by SMRU Consulting establishes the most up-to-date information on five key species of UK marine mammal (harbour porpoise, bottlenose dolphin, minke whale, harbour seal and grey seal) for use in the iPCoD model.

Testing 360 degree imaging technologies for improved animal detection around tidal energy installations – Pattison et al. 2020

This report provides an overview of an investigation in marine animal monitoring technology on floating tidal turbine platforms. Two different 360 degree cameras were compared to an acoustic camera to determine which system would be most suitable for marine animal monitoring around marine renewable energy devices. The 360 degree cameras were self-contained units that were mounted on Sustainable Marine Energy's PLAT-I. These deployments were conducted in Grand Passage, Nova Scotia, which is part of the Bay of Fundy. From the data collected, it is evident that marine life such as small fish and jellyfish are present around the platform but no larger marine fauna was observed during any of the data collection periods.

Wind Energy

Existing Conditions and Potential Environmental Effects – H.T. Harvey & Associates

In support for the North Coast Offshore Wind Feasibility Project, funded by the California Ocean Protection Council, this document provides an inventory of existing conditions and evaluates the potential effects of the project scenarios developed by Humboldt State University and Mott MacDonald. The Project assesses two offshore wind farm locations with multiple build-out scenarios that differ in project size and the associated number of 12 MW turbines. All of the project scenarios (proposed action) would entail construction, operations and maintenance, and decommissioning that would result in effects on the marine and terrestrial environments.

Use of Upland and Riparian Areas by Wintering Bald Eagles and Implications for Wind Energy – Schmuecker et al. 2020

Weather can shape movements of animals and alter their exposure to anthropogenic threats. Bald eagles (*Haliaeetus leucocephalus*) are increasingly at risk from collision with turbines used in onshore wind energy generation. Our objective was to determine the factors that cause wintering bald eagles to occupy riparian areas and riskier, upland areas. We tracked 20 bald eagles using telemetry in the Upper Midwest during winter 2014–2015 and 2015–2016 and evaluated habitat use by eagles in response to variation in weather and time of year. Our results suggest that eagles are most likely to be exposed to wind energy developments located in upland areas during low pressure systems, after long periods of cold weather, and several months before the onset of spring migration.

Underwater Noise Simulation of Impact Pile Driving for Offshore Wind Farm in Taiwan – Fang et al. 2020

The radiated acoustic waves from impact pile driving produce high noise level into the water which may cause damage to marine mammals living close to the offshore construction location. In this paper, a linear, axisymmetric finite element model is applied to predict pile driving noise in the water. Measurement from bottom-mounted hydrophone deployed at a site 230 m from the source is used to validate model results. Comparisons between model results and measurement, such as structure modal analysis, sound exposure level at different pile penetration and unweighted one-third octave band level, are presented and show useful predictions of noise level from the model.

News & Press Releases

Marine Renewable Energy

[Eco Wave Power Announces Performance Improvements and Significant Cost Reductions from Gibraltar Wave Energy Project](#) – Eco Wave Power

As a result of an upgrade of the automation and control system, as well as experience gained in operations and maintenance, Eco Wave Power has managed to significantly increase uptime for the Gibraltar power plant. In 2018–2019, power production performance of the array reached 70% of the forecasted output for the site, as compared to 31% in 2017–2018. Furthermore, direct maintenance and repair costs decreased from 18% of project cost in 2017, to 9% in 2018 and 4% in 2019. The next step for the company is to finalize the construction of the EWP-EDF One project in Israel and validate technology performance in a second grid-connected site, with different wave conditions.

[TEAMER Network Director Announces RFTS 1 Recipients](#) – TEAMER

This month, the U.S. Testing Expertise and Access to Marine Energy Research (TEAMER) Network Director made 16 selections for its first Request for Technical Support (RFTS). Open to applicants seeking technology support with modeling and analysis; laboratory and bench tests; and tank, flume, tunnel, and basin tests, TEAMER network director, the Pacific Ocean Energy Trust (POET), announced the selections, including CalWave Power Technologies, Orbital Marine Power, and the University of Hawaii. TEAMER is designed to provide marine energy technology developers and researchers with access to U.S.-based test facilities and technical expertise. RFTS 2 is scheduled to begin accepting applications later this fall.

[French turbine builder makes comeback with Togo delivery](#) – Offshore Energy

Following the acquisition by the Acti Group, the French start-up Guinard Energies Nouvelles has delivered a tidal turbine in Togo. The tidal turbine Poseide 66 on the Mono River is a key part of the autonomous electricity network deployed in this remote area of the power grid with the German company Reusch Energietechnik. At the beginning of 2020, Reusch Energietechnik, contacted Guinard Energies Nouvelles to take part of a

renewable and decentralised electricity production project in Togo. The production unit composes a floating Poseide 66 hydrokinetic turbine positioned on the river by a swerve arm, a hybrid converter, a 7 kWp photovoltaic set and a 30 kWh battery bank.

The Wave to Energy and Water project consortium signs an agreement to test a wave energy prototype on the PLOCAN test site – Plataforma Oceánica de Canarias (PLOCAN)

With the support of the European Union's Fast Track to Innovation (FTI) programme, the Wave to Energy and Water (W2EW) project consortium—Vryhof Anchors, Fiellberg, Energia Mediterranea and Wavepiston—has signed an agreement with PLOCAN to test a combined solution for power generation and water desalination: a full-scale wave energy system with a capacity of 150 kW and the ability to produce 28,000 m³ of desalinated water per year. The project plans to bring together the required multidisciplinary technologies to demonstrate the benefits of a combined wave energy system for power generation and water desalination, and aims to develop the first commercial applications on islands and remote coastal communities.

Carnegie Mooring Tensioner for Wave Energy Converters Collaborative Project Announced – Blue Economy Cooperative Research Centre

The Mooring Tensioner for Wave Energy Converters (MoTWEC) collaborative project between Carnegie Clean Energy, Advanced Composite Structures Australia, University of Queensland, and ClimateKIC will support the use of rotary power take-off systems and associated cost reductions for wave energy converters. This project will develop, proof test, and demonstrate a novel energy storage element, the Mooring Tensioner, enabling the use of rotary electrical generators for wave energy converters. The project team members have already completed initial work to develop the concept and explore the benefits and opportunities of developing a Mooring Tensioner from advanced composite materials.

Wind Energy

Maersk Supply Service and Ørsted to test offshore charging buoy to reduce vessel emissions – Ørsted

Maersk Supply Service A/S, a part of A.P. Moller-Maersk, and Ørsted have joined forces to test a proto-type buoy that will act as both a safe mooring point and a charging station for vessels, potentially displacing a significant amount of marine fuel with green electricity. The solution, developed by Maersk Supply Service, will be tested on one of Ørsted's offshore wind farms in 2021. Ørsted intends to make any intellectual property generated in designing the integration of the buoy into the offshore wind asset publicly available to maximise the uptake potential of this carbon reduction innovation across the offshore wind sector.

GE Renewable Energy launches the uprated Haliade-X 13 MW wind turbine for the UK's Dogger Bank Wind Farm – GE Renewable Energy

GE Renewable Energy recently announced that it has finalized supply contracts with Dogger Bank Wind Farm (a 50:50 joint venture between SSE Renewables and Equinor) for the first two phases of what will become the world's largest offshore wind farm. These first two phases (Dogger Bank A & B) will each feature 95 Haliade-X 13 MW wind turbines. The agreements will include a total of 190 units of the 13 MW Haliade-X wind turbine, and a five-year Service & Warranty agreement to provide operational support for the wind turbines. The Haliade-X 13 MW is an enhanced version of the successful 12 MW unit which has been operating in Rotterdam since November 2019 and which recently secured its provisional type certificate from DNV-GL.

Dominion unleashes Coastal Virginia – reNEWS

Dominion Energy has commenced commercial operations at its 12MW Coastal Virginia offshore wind farm in the US. Orsted oversaw the installation of the project's offshore components, including turbines and foundations, on behalf of the US developer, while Dominion Energy oversaw all onshore aspects, such as the interconnection. Coastal Virginia uses two 6MW Siemens Gamesa turbines, which were installed in the summer. Coastal Virginia is the first offshore wind farm to be approved by the Bureau of Ocean Energy Management and installed in federal waters, and is the second in the US, after the 30MW Block Island, now owned by Orsted, taking US operational offshore wind capacity to 42MW.

IRT Jules Verne launches 'ZEBRA project' to develop 100% recyclable composite wind turbine blades with industrial partners – IRT Jules Verne

Wind energy, both onshore and offshore, plays a critical role in the world's transition to carbon-free energy sources. With a product lifespan of 30 years and a wind turbine recyclability rate of 85% to 90%, the wind power industry is now looking to close the remaining gap by designing and manufacturing the first 100% recyclable wind turbine blade. The ZEBRA (Zero waste Blade ReseArch) project, driven by IRT Jules Verne, brings together industrial companies and technical centers to demonstrate on a full scale the technical, economic and environmental relevance of thermoplastic wind turbine blades, with an eco-design approach to facilitate recycling. The project has been launched for a period of 42 months with a budget of 18.5M€

Construction starts on the world's largest floating offshore wind farm – Equinor

Norwegian Prime Minister Erna Solberg and Kværner apprentice Arne Linga recently started construction of Hywind Tampen, a floating offshore wind farm, at Kværner Stord. Kværner's assignment will include building 11 floating concrete hulls for the turbines on Hywind Tampen. The Hywind Tampen project will be the first floating offshore wind project to supply renewable power for oil and gas installations. The wind farm will have a total capacity of 88 MW, and is expected to cover about 35 percent of the annual power needs on the five platforms Snorre A and B and Gullfaks A, B and C. When the Hywind

Tampen project is operational in 2022, Equinor will be operating one-third of the global floating offshore wind capacity.