



NORTHERN GANNET (SOURCE: ISTOCK)

## TASK 34 REPORT 2020

### Working together to resolve environmental effects of wind energy (WREN)

Environmental impacts associated with commercial land-based and offshore wind energy can delay construction or curtail operations.

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In response to these ongoing concerns, the International Energy Agency (IEA) Wind Technology Collaboration Programme (TCP) initiated Task 34 or Working Together to Resolve Environmental Effects

of Wind Energy (WREN) in October 2012. WREN serves as an international forum providing relevant, scientific data for government agencies, private industry, conservation organizations, and academia to inform siting and operational decisions. To help accomplish this, WREN conducts engagement and outreach activities to key stakeholder groups and develops state-of-the-science materials, including webinars,

short science summaries, and publications. Specifically, WREN's goals are to:

- 1) Identify key stressors (e.g., noise or collision) and receptors (e.g., marine mammals or birds), relevant methodologies, and technologies used in species impact assessment studies, and recommended practices,
- 2) Collect and analyse data on high-priority issues, and coordinate among international collaborators to disseminate information to critical stakeholders across sectors, and
- 3) Ensure the global community has access to the latest information on the technical readiness of existing monitoring and mitigation technologies.

WREN leverages resources and expertise from 13 member countries (Table 1) and their extended networks to identify priority issues and synthesize and disseminate information on the global state of the science.

### Progress and achievements

As part of WREN, Copping et al. (2020) published a peer-reviewed article entitled 'Enabling Renewable Energy While Protecting Wildlife: An Ecological Risk-Based Approach to Wind Energy Development Using Ecosystem-Based Management Values' in the journal *Sustainability* [1]. WREN also developed two fact sheets, one to summarize the risk-based management publication [2] and another to highlight the Tethys

website [3]. In addition, WREN hosted its 17th webinar highlighting lessons learned regarding the logistical, technical, and regulatory challenges encountered when conducting environmental research at land-based and offshore wind energy facilities [4].

WREN continued to manage the Tethys website (<https://tethys.pnnl.gov>), which provides key contacts, archives webinars, aggregates available literature, and displays a calendar of upcoming events. Highlights include:

- 937 new documents added to the knowledge base
- 216,895 page views for Tethys
- 1,680 page views for the WREN webpage.

Beginning 1 October 2020, WREN entered its third 4-year phase, which will extend through 30 September 2024. Four projects were initiated, including:

- 1) Reviewing the state of the science on raptors, including golden eagles and wind energy, which aims to assess the behavioral and physiological drivers of raptor interactions with wind turbines, and the technologies used for monitoring and mitigating mortality (Figure 1).
- 2) Drafting a research brief summarizing cumulative effects definitions, legislation, and applications.
- 3) Conducting a Horizon Scan of environmental priorities for land-based and offshore wind. This

TABLE 1. COUNTRIES PARTICIPATING IN TASK

Table 1. Task 34 Participants in 2020		
	Country/Sponsor	Institution(s)
1	Belgium	Royal Belgian Institute of Natural Sciences
2	Canada	Environment and Climate Change Canada
3	France	France Energies Marines
4	Ireland	EcoSource Consulting
5	Italy	Italian National Agency for New Technologies, Energy and Sustainable Economic Development
6	The Netherlands	Rijkswaterstaat
7	Norway	Norwegian Institute for Nature Research
8	Portugal	STRIX; Bioinsight
9	Spain	Spanish Council for Scientific Research
10	Sweden	Vindval; Swedish Energy Agency
11	Switzerland	Nateco AG
12	United Kingdom	Marine Scotland Science
13	United States	U.S. Department of Energy; Pacific Northwest National Laboratory; National Renewable Energy Laboratory



GOLDEN EAGLE (PHOTO CREDIT: LEE JAY FINGERISH)

project will aggregate the priority issues in the next 5-10 years through a systematic scan of the collective knowledge and experiences of the international community. The results will be published and used to help inform WREN activities in subsequent years.

- 4) Developing a monitoring and mitigation technology database. The database will include the technology readiness level and relevant literature for each technology.

In January 2020, Italy became the 13th member nation of WREN.

### Highlight

The Copping et al. (2020) publication on risk-based management examines the potential negative effects of wind energy development and operations on birds, bats, marine mammals, other organisms, and their habitats or migratory pathways to determine which factors pose the greatest risk [1]. The risk-based approach that most closely aligns with wind energy

development is ecosystem-based management because it incorporates both human activities and ecological processes. Ecosystem-based management embraces holistic methods to include human needs and effects in an integrated view for managing resources sustainably.

Ecosystem-based management approaches are relatively new and are in the early stages of implementation internationally. The following are recommended practices when implementing ecosystem-based management at a project site:

- 1) Incorporate spatial and temporal complexity of populations and habitats.
- 2) Use standardized methods to collect data to answer questions of scientific importance.
- 3) Allow monitoring results to guide appropriate mitigation measures throughout the phases of development.

- 4) Apply adaptive management principles to reassess the appropriate level of monitoring and mitigation needed.
- 5) Engage stakeholders to incorporate experience and community involvement.
- 6) Focus on ecological, social, and economic aspects to increase the potential for positive outcomes and acceptance.

### Outcomes and significance

International collaboration is essential to understand how the global deployment of wind energy impacts species and habitats that cross jurisdictional boundaries. WREN's approach is to leverage research and incorporate perspectives to enhance our global knowledge base. The outreach and engagement activities are designed to:

- 1) Ensure research and recommended practices are broadly disseminated to accelerate wind energy deployment while protecting species,
- 2) Expand international engagement among WREN and non-WREN members, and
- 3) Create and maintain a global technology database as a reference of available monitoring and mitigating strategies.

This knowledge transfer among WREN member and nonmember nations may assist in advancing wind energy development by decreasing the levelized cost of energy and impacts to the environment.

### Next steps

In 2021, WREN will host webinars and expert forums as well as draft short science summaries related to

raptor interactions with wind turbines. WREN will also complete the horizon scan to systematically identify emerging and priority environmental issues for land-based and offshore wind energy development and publish the results. In addition, WREN will finalize the monitoring and mitigation technology database, which will be accessed through Tethys.

### References

- [1] Copping, A. E., A. M. Gorton, R. May, F. Bennet, E. DeGeorge, M. R. Goncalves, and B. Rumes. 2020. Enabling renewable energy while protecting wildlife: an ecological risk-based approach to wind energy development using ecosystem-based management values. <https://tethys.pnnl.gov/sites/default/files/publications/Copping-et-al-2020-Risk-Based-Approach.pdf>.
- [2] Copping, A. E., A. M. Gorton, R. May, F. Bennet, E. DeGeorge, M. R. Goncalves, and B. Rumes. 2020. Factsheet: a risk-based approach for addressing wind and wildlife interactions using ecosystem-based management values. <https://tethys.pnnl.gov/sites/default/files/summaries/Risk-Based-Management-Factsheet.pdf>.
- [3] Pacific Northwest National Laboratory. 2020. Tethys Wind. [https://tethys.pnnl.gov/sites/default/files/summaries/Tethys%20Wind%20One-Page\\_2020.pdf](https://tethys.pnnl.gov/sites/default/files/summaries/Tethys%20Wind%20One-Page_2020.pdf).
- [4] Thompson, P., and S. Webster. 2020. Experiences from conducting environmental research and land-based and offshore wind energy facilities.' TETHYS Webinar #17 in WREN Environmental Webinar Series. July 7, 2020. <https://tethys.pnnl.gov/events/experiences-conducting-environmental-research-land-based-offshore-wind-energy-facilities>.

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<https://tethys.pnnl.gov/about-wren> 