WREN Hub – A Concept for Sharing Information on Wind and Wildlife Interaction Internationally

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Pacific Northwest National Laboratory

SEAI Seminar on Wind Energy Research
Dublin, Ireland
April 6th, 2016

WREN and WREN Hub Objectives

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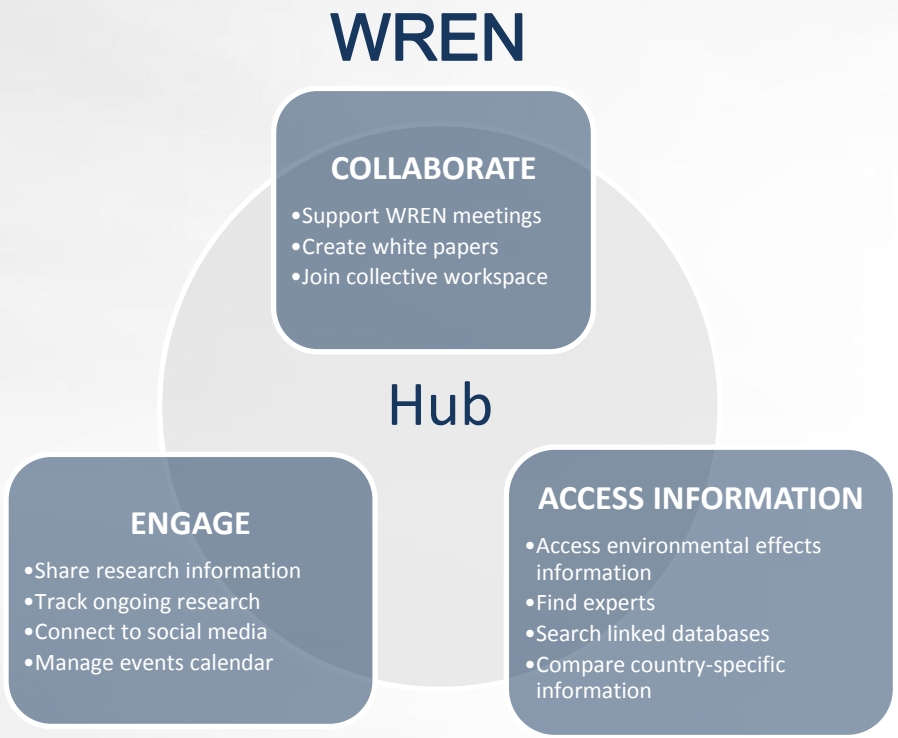
- WREN - To facilitate international collaboration for global understanding of environmental effects of offshore and land-based wind energy development.
- WREN Hub anchors the outreach and engagement aspects of WREN



WREN Hub

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Supporting the work of WREN nations to address the effects of wind energy development

WREN Hub is a concept in collaboration, supported by an IT platform. WREN Hub will:

- Act as a commons or gathering place for those interested in environmental effects of wind development;
- Serve as an online platform for information sharing;
- Provide tools for communication and collaboration among the Task 34 member nations;
- Deliver expert content through seminars and workshops; and
- Act as a managed clearinghouse, events calendar and bulletin board for key events and news items.

Tethys and WREN Hub

Pacific Northwest NATIONAL LABORATORY
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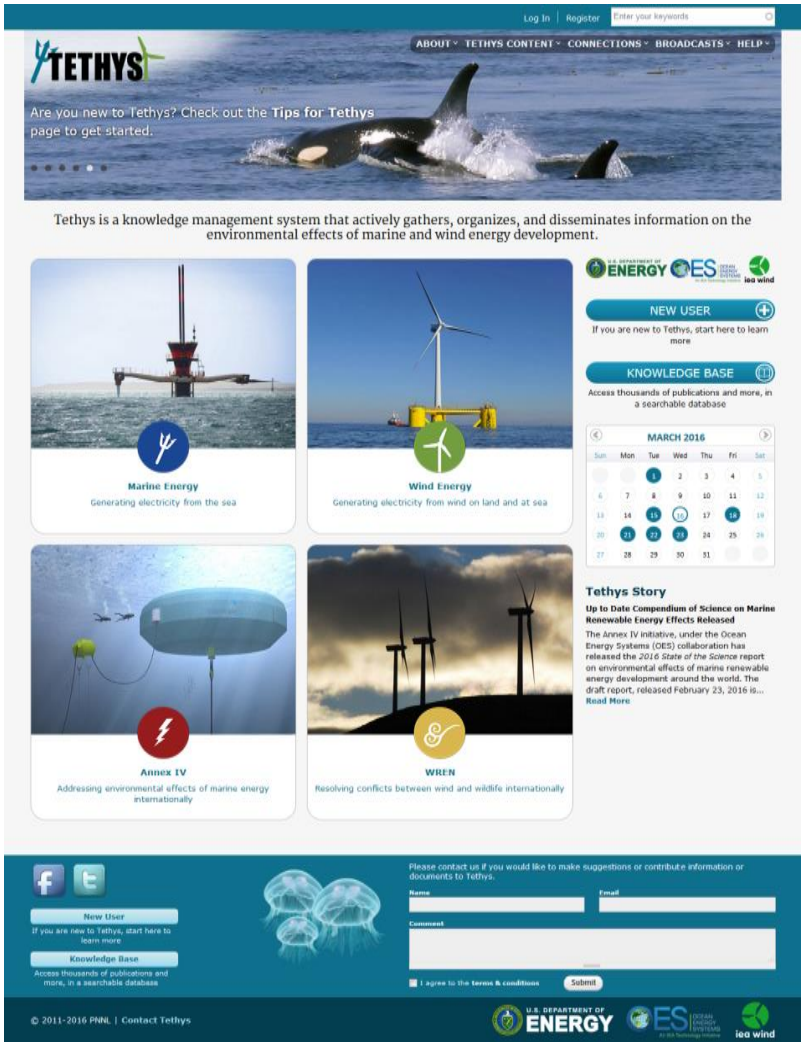
- WREN Hub is hosted on *Tethys*
- *Tethys* = publically accessible knowledge base about environmental effects of wind and marine renewable energy.
- Provides access to scientific papers, other information.
- Creates a commons for renewable energy community to facilitate collaboration and the exchange of information.
- Peer-reviewed once a year to ensure accuracy and usability of content.



TETHYS

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- About Tethys
- About Annex IV
- About WREN
- Contribute to Tethys

Are you new to Tethys? Check out the **Tips for Tethys** page to get started.

Tethys is a knowledge management system that actively gathers, organizes, and disseminates information on the environmental effects of marine and wind energy development.

Marine Energy

Generating electricity from the sea

Wind Energy

Generating electricity from wind on land and at sea

U.S. DEPARTMENT OF ENERGY | OES OCEAN ENERGY SYSTEMS | iea wind

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20	21	22	23	24	25	26
27	28	29	30	31		

Tethys Story

About WREN

Get Started Here: Access the Knowledge Base

WREN (**W**orking Together to **R**esolve **En**vironmental Effects of Wind Energy) was established by the **IEA Wind** Committee in October 2012 to address environmental issues associated with commercial development of land based and offshore wind energy projects. As the operating agent for WREN, the US leads this effort with support from **Pacific Northwest National Laboratory (PNNL)**, the **National Renewable Energy Lab (NREL)**, and the **US Department of Energy's** Wind and Water Power Technologies Office (WWPTO).

The primary objective of WREN is to facilitate international collaboration and advance global understanding of potential environmental effects of wind energy. To support this effort, WREN Hub has been created to serve as a collaborative outreach and engagement space, and to disseminate knowledge and information, housed on Tethys. While most WREN information and content is publicly accessible, some space is reserved for WREN member nations for collaborative work, under password-protection.

To access member-only material, visit the WREN Members Page.

For WREN members, who log in with permission.

Members only page is similar but also includes additional features.

Countries Currently Involved in WREN (10)

- France
- Germany
- Ireland
- Netherlands
- Norway
- Spain
- Sweden
- Switzerland
- United Kingdom
- United States

List of WREN countries, can view all documents by country

WREN Webinars

WREN hosts quarterly webinars on the environmental concerns that are of importance to the land-based and offshore wind energy industries, as a means to effectively disseminate new information and research efforts to a large international audience of stakeholders. To join the webinar mailing list, send a blank email to **join-wind-webinars@lyris.pnnl.gov**.

Past wind webinars are hosted on Tethys, along with the associated video and presentations as available. **Visit the archive.**

WREN hosts quarterly webinars on wind energy and the environment, presented by international experts.

Attendance is open to all by sending a blank email to: join-wind-webinars@lyris.pnnl.gov

Videos and slides of past webinars are archived on *Tethys*.

Knowledge Base and Map Viewer

Tethys has collected over 1800 documents related to the environmental effects o
Tethys Knowledge Base and any documents related to a spatial location have a
the document available in the Knowledge Base).

Tethys Knowledge Base specific to wind energy (excludes MRE).

Currently over 2,100 documents (journal articles, reports, etc.)

Meetings

The following is a list of all WREN meetings - both past and upcoming:

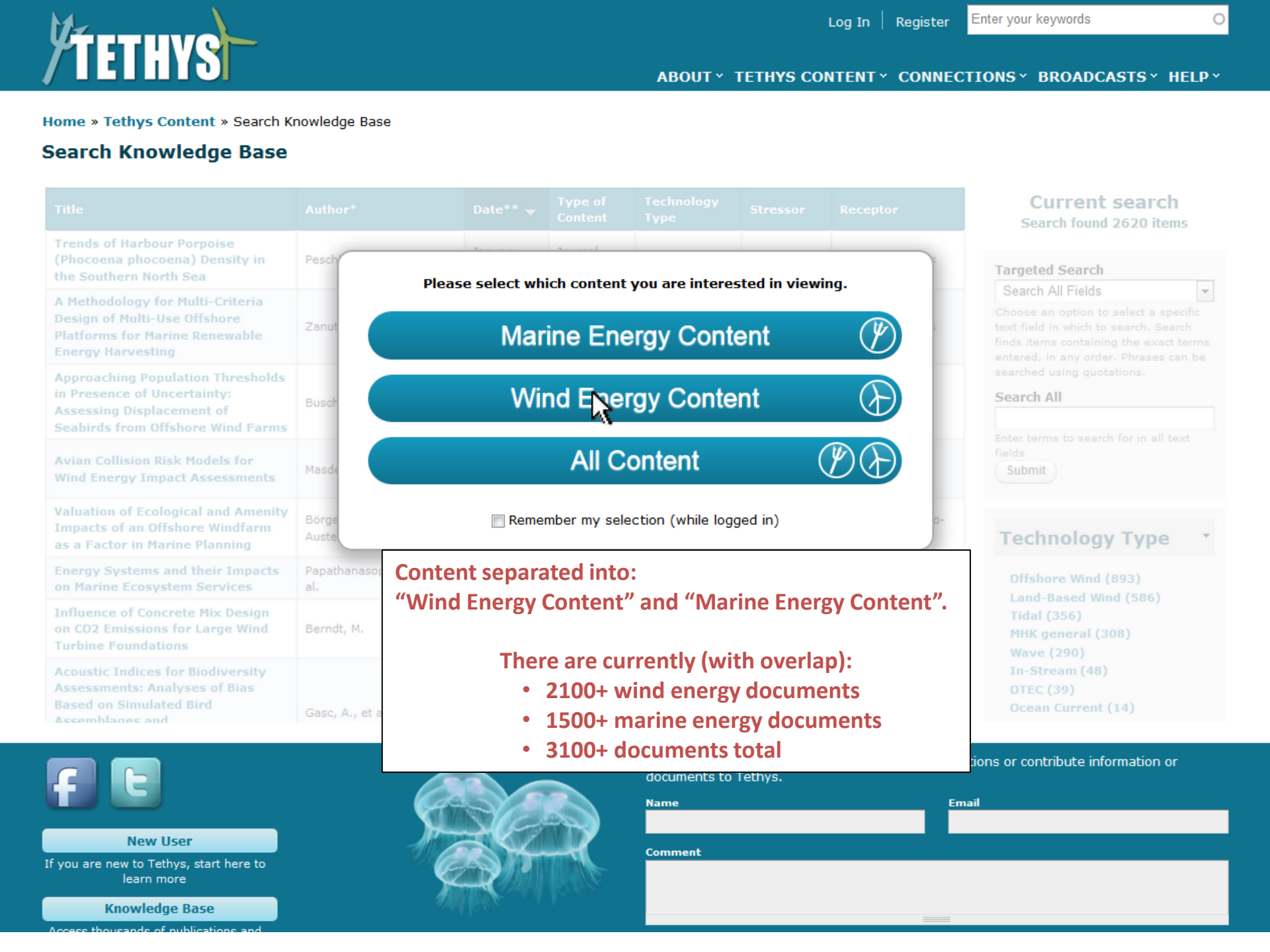
- **WREN 2013 Kick-Off Meeting - Trondheim:** December 3-5, 201
- **WREN 2014 Meeting - Newcastle:** May 15-16, 2014
- **WREN 2014 Meeting - Denver:** December 2, 2014
- **WREN 2015 Meeting - Berlin:** March 13, 2015
- **WREN 2015 Meeting - Bern:** October 21-22, 2015

Regulatory Framework

Information on the regulatory frameworks of member nations will soon be available here.

For more information, contact:

Andrea Copping
Karin Sinclair
Jocelyn Brown-Saracino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Search Knowledge Base
Title
Author*
Date**
Type of Content
Technology Type
Stressor
Receptor
Trends of Harbour Porpoise (Phocoena phocoena) Density in the Southern North Sea
A Methodology for Multi-Criteria Design of Multi-Use Offshore Platforms for Marine Renewable Energy Harvesting
Approaching Population Thresholds in Presence of Uncertainty: Assessing Displacement of Seabirds from Offshore Wind Farms
Avian Collision Risk Models for Wind Energy Impact Assessments
Valuation of Ecological and Amenity Impacts of an Offshore Windfarm as a Factor in Marine Planning
Energy Systems and their Impacts on Marine Ecosystem Services
Influence of Concrete Mix Design on CO2 Emissions for Large Wind Turbine Foundations
Acoustic Indices for Biodiversity Assessments: Analyses of Bias Based on Simulated Bird Assemblages and
Berndt, M.
Please select which content you are interested in viewing.
Marine Energy Content
Wind Energy Content
All Content
Remember my selection (while logged in)
Content separated into:
"Wind Energy Content" and "Marine Energy Content".
There are currently (with overlap):
2100+ wind energy documents
1500+ marine energy documents
3100+ documents total
Current search
Search found 2620 items
Targeted Search
Search All Fields
Choose an option to select a specific text field in which to search. Search finds items containing the exact terms entered, in any order. Phrases can be searched using quotations.
Search All
Enter terms to search for in all text fields
Submit
Technology Type
Offshore Wind (893)
Land-Based Wind (586)
Tidal (356)
MHK general (308)
Wave (290)
In-Stream (48)
OTEC (39)
Ocean Current (14)
documents to Tethys.
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Knowledge Base

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The Knowledge Base p ng **Annex IV** and **WREN** initiatives. Relevant documents and Annex selected on the right, or keywords entered in the Search Text box. Con scroll down.

As an alternative to the Knowledge Base, check out the **Map Viewer** to access geotagged content in a spatial view.

Simple interface for sorting through thousands of documents.
Filter documents by typing in a keyword
Filter documents by technology type, receptor, stressor, etc.
Sort alphabetically by clicking on the column headers

Title	Author*	Date**	Type of Content	Technology Type	Stressor	Receptor
The Turbulent Wake of a Monopile Foundation	Rogan, C., et al.	August 2016	Journal Article	Offshore Wind	Energy Removal	N/A
Role of Benthic Habitat Distribution Data in Coastal Water Wind Turbine Site Selection	Sahla, M., Kalliola, R., Haldin, M.	May 2016	Journal Article	Offshore Wind	N/A	Benthic Invertebrates
Towards an Integrated Approach to Marine Benthic Monitoring	Fróján, C., Cooper, K., Bolam, S.	March 2016	Journal Article	N/A	N/A	Benthic Invertebrates
Environmental Interview: Wind Power, Birds and Bats	Green, M., Rydell, J.	March 2016	Video	Wind Energy general	N/A	Bats, Birds
Environmental Interview: Effects of Wind Power on Marine Life	Kautsky, L.	March 2016	Video	Offshore Wind	N/A	Fish, Marine Mammals
Environmental Interview: The Effects of Wind Power on Land-Dwelling Mammals	Helldin, J., Skarin, A.	March 2016	Video	Land-Based Wind	N/A	Terrestrial Mammals
Environmental Interview: The Effects of Wind Power on Human Interests	Henningsson, M.	March 2016	Video	Wind Energy general	N/A	Socio-economics
The Adhesion of Corrosion Protection Coating Systems for Offshore Wind Power Constructions after Three Years under Offshore Exposure	Momber, A., Plagemann, P., Stenzel, V.	March 2016	Journal Article	Offshore Wind	Chemicals	N/A
Modeling Magnetic Fields from a DC Power Cable Buried Beneath San Francisco Bay Based on Empirical Measurements	Kavet, R., Wyman, M., Klimley, A.	February 2016	Journal Article	N/A	EMF	N/A
Communication Masking in Marine Mammals: A Review and Research Strategy	Erbe, C., et al.	February 2016	Journal Article	N/A	Noise	Marine Mammals
What Drives Attitudes towards Marine		February	Journal	Marine Energy		Stakeholder

Clear All Filters

Current search

Search found 2169 items

Targeted Search

Search All Fields

Choose an option to select a specific text field in which to search. Search finds items containing the exact terms entered, in any order. Phrases can be searched using quotations.

Search All

Enter terms to search for in all text fields

Submit

Technology Type

- Offshore Wind (944)
- Land-Based Wind (879)
- Marine Energy general (138)
- Wave (27)
- Tidal (18)
- Riverine (8)
- OTEC (4)
- Wind Energy general (3)
- Ocean Current (1)

Receptor

Knowledge Base

You are currently viewing: Wind Energy Content Submit

The Knowledge Base provides access to information about the environmental effects of marine and wind energy, supporting **Annex IV** and **WREN** initiatives. Relevant documents and Annex IV metadata forms are compiled into a user-friendly table with **advanced filtering**. Filters may be selected on the right, or keywords entered in the Search Text box. Content may also be sorted alphabetically by clicking on column headers. More entries will load as you scroll down.

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The Adhesion of Corrosion Protection Coating Systems for Offshore Wind Power Constructions after Three Years under Offshore Exposure	Momber, A., Plagemann, P., Stenzel, V.	March 2016	Journal Article	Offshore Wind	Chemicals	N/A
What Drives Attitudes towards Marine Renewable Energy Development in Island Communities in the UK?	de Groot, J., Bailey, I.	February 2016	Journal Article	Marine Energy general, Offshore Wind	N/A	Stakeholder Engagement
From NIMBY to Acceptance: Toward a Novel Framework - VESPA - For Organizing and Interpreting Community Concerns	Petrova, M.	February 2016	Journal Article	Land-Based Wind, Offshore Wind	N/A	Socio-economics
Underwater Noise Modelling for Environmental Impact Assessment	Farcas, A., Thompson, P., Merchant, N.	February 2016	Journal Article	Marine Energy general, Offshore Wind	Noise	N/A
Public Opinion and the Environmental, Economic and Aesthetic Impacts of Offshore Wind	Bush, D., Hoagland, P.	February 2016	Journal Article	Offshore Wind	N/A	Socio-economics
Environmental and Social Footprint of Offshore Wind Energy: Comparison with Onshore	Kaldellis, J., et al.	February 2016	Journal Article	Land-Based Wind, Offshore	N/A	N/A

Clear All Filters

Current search

Search found 944 items

(-) Offshore Wind

Targeted Search

Search All Fields

Choose an option to select a specific text field in which to search. Search finds items containing the exact terms entered, in any order. Phrases can be searched using quotations.

Search All

whale

Enter terms to search for in all text fields

Submit

Technology Type

(-) Offshore Wind
Land-Based Wind (132)

Stressor

Static Device (263)
Noise (192)
Dynamic Device (151)
Energy Removal (70)

Knowledge Base

You are currently viewing: Wind Energy Content Submit

The Knowledge Base provides access to information about the environmental effects of marine and wind energy, supporting **Annex IV** and **WREN** initiatives. Relevant documents and Annex IV metadata forms are compiled into a user-friendly table with **advanced filtering**. Filters may be selected on the right, or keywords entered in the Search Text box. Content may also be sorted alphabetically by clicking on column headers. More entries will load as you scroll down.

As an alternative to the Knowledge Base, check out the **Map Viewer** to access geotagged content in a spatial view.

Title	Author*	Date**	Type of Content	Technology Type	Stressor	Receptor
Dogger Bank Creyke Beck Environmental Statement - Chapter 14: Marine Mammals	Mackey, B., Keenan, G.	March 2014	Report	Offshore Wind	N/A	Marine Mammals
Understanding the Potential for Marine Megafauna Entanglement Risk from Marine Renewable Energy Developments	Benjamins, S.,					als
Marine Renewable Energy: A Global Review of the Extent of Marine Renewable Energy Developments, the Developing Technologies and Possible Conservation Implications for Cetaceans	James, V.	November 2013	Report	Marine Energy general, Offshore Wind	Chemicals, EMF, Noise, Static Device	Marine Mammals
Modelling of Noise Effects of Operational Offshore Wind Turbines Including Noise Transmission Through Various Foundation Types	Marmo, B., et al.	August 2013	Report	Offshore Wind	Noise	Fish, Marine Mammals
Design and Implementation of a Marine Animal Alert System to Support Marine Renewable Energy	Deng, Z., et al.	July 2013	Journal Article	Marine Energy general, Offshore Wind	N/A	Marine Mammals
Potential Impacts of Ocean Energy Development on Marine Mammals in Oregon	Davis, A.	December 2012	Report	Marine Energy general, Offshore Wind	N/A	Marine Mammals
Localization of Southern Resident Killer Whales Using Two Star Arrays to Support Marine Renewable Energy	Ren, H., et al.	October 2012	Conference Paper	Marine Energy general, Offshore Wind	N/A	Marine Mammals
Impacts of Wind Turbine Construction on Marine Mammals: What can be Done?	Bailey, H.	April 2012	Magazine Article	Offshore Wind	N/A	Marine Mammals
Assessment of the Marine Renewables Industry in Relation to Marine Mammals: Synthesis of Work Undertaken by the ICES Working Group on Marine Mammal Ecology (WGMME)	Tougaard, J., et al.	January 2012	Report	Marine Energy general, Offshore Wind	N/A	Marine Mammals

Access documents by clicking the title.

Clear All Filters

Current search

Search found 22 items

whale

(-) Offshore Wind

Targeted Search

Search All Fields

Choose an option to select a specific text field in which to search. Search finds items containing the exact terms entered, in any order. Phrases can be searched using quotations.

Search All

whale

Enter terms to search for in all text fields

Submit

Technology Type

(-) Offshore Wind

Receptor

Marine Mammals (20)
Fish (2)
Socio-economics (2)
Nearfield Habitat (1)

Search Map Viewer

Current search

Search found 705 items

Submit

Legend

Closely-packed items are clustered together. Clicking on the cluster allows you to navigate individual items. You may zoom in to make smaller clusters.

Technology Type

- Offshore Wind (187)
- Land-Based Wind (180)
- Tidal (162)
- Wave (126)
- MHK general (16)
- In-Stream (12)
- OTEC (10)
- Ocean Current (6)

Country

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Knowledge Base

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Please contact us if you would like to make suggestions or contribute information or documents to Tethys.

Name

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The Map Viewer provides a spatial view of information about the environmental effects of marine and wind energy, supporting Annex IV and WREN initiatives. Documents, project sites, and research studies associated with a geographic location are compiled into an interactive map with panning, zooming, and advanced filtering. Filters may be selected on the right, or keywords entered in the Search Text box. Clicking on a bubble will open a dialogue box with more information and a link to the document page.

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Search found 392 items

Targeted Search

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Legend

Documents (392)

Closely-packed items are clustered together. Clicking on the cluster allows you to navigate individual items. You may zoom in to make smaller clusters.

Technology Type

Offshore Wind (186)
Land-Based Wind (176)
Marine Energy - general (6)
Tidal (3)

Country

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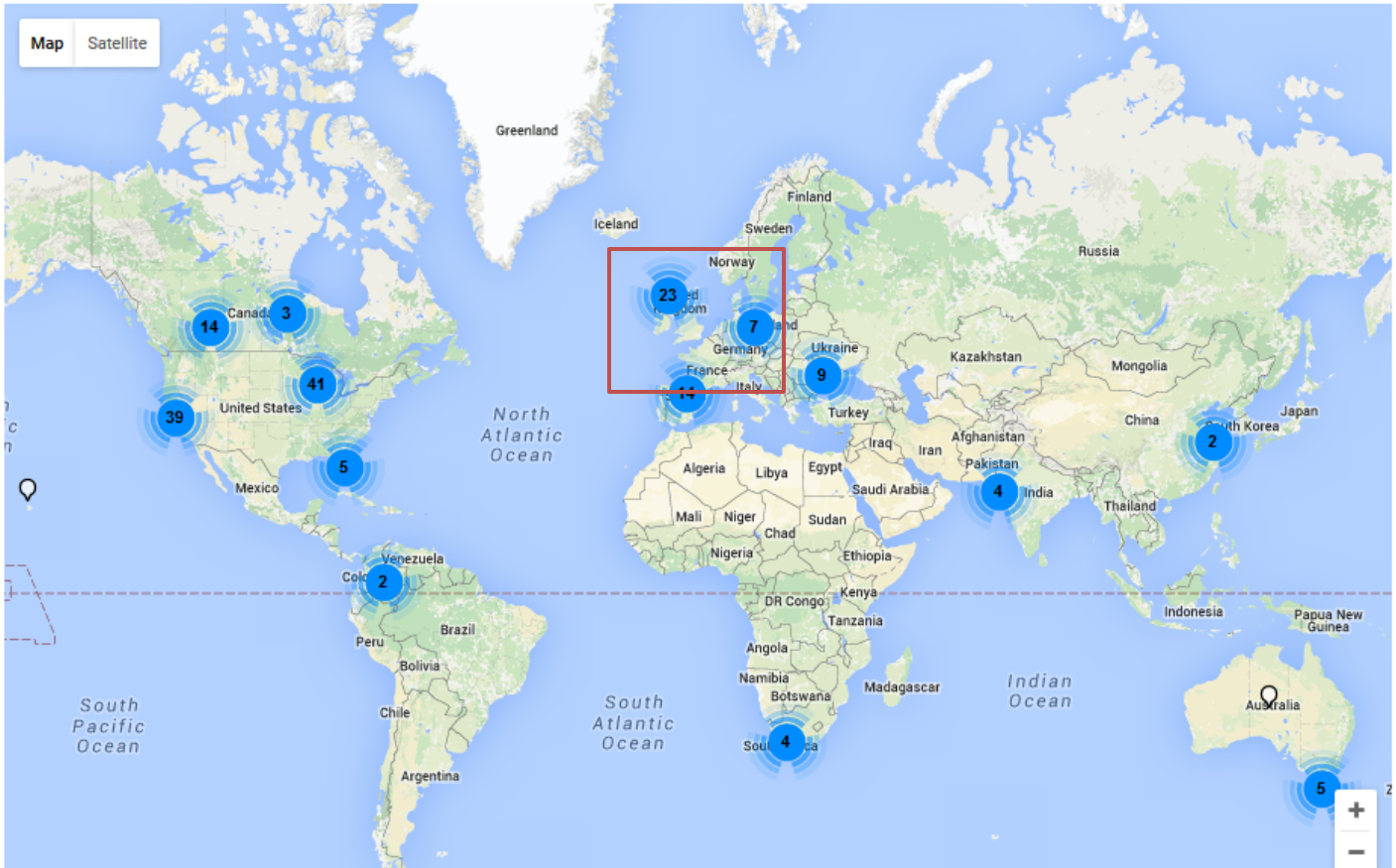

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Current search

Search found 176 items

(-) Land-Based Wind

Targeted Search

Search All Fields

Choose an option to select a specific text field in which to search. Search finds items containing the exact terms entered, in any order. Phrases can be searched using quotations.

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Enter terms to search for in all text fields

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Legend

Documents (176)

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Technology Type

(-) Land-Based Wind

Offshore Wind (9)

Country

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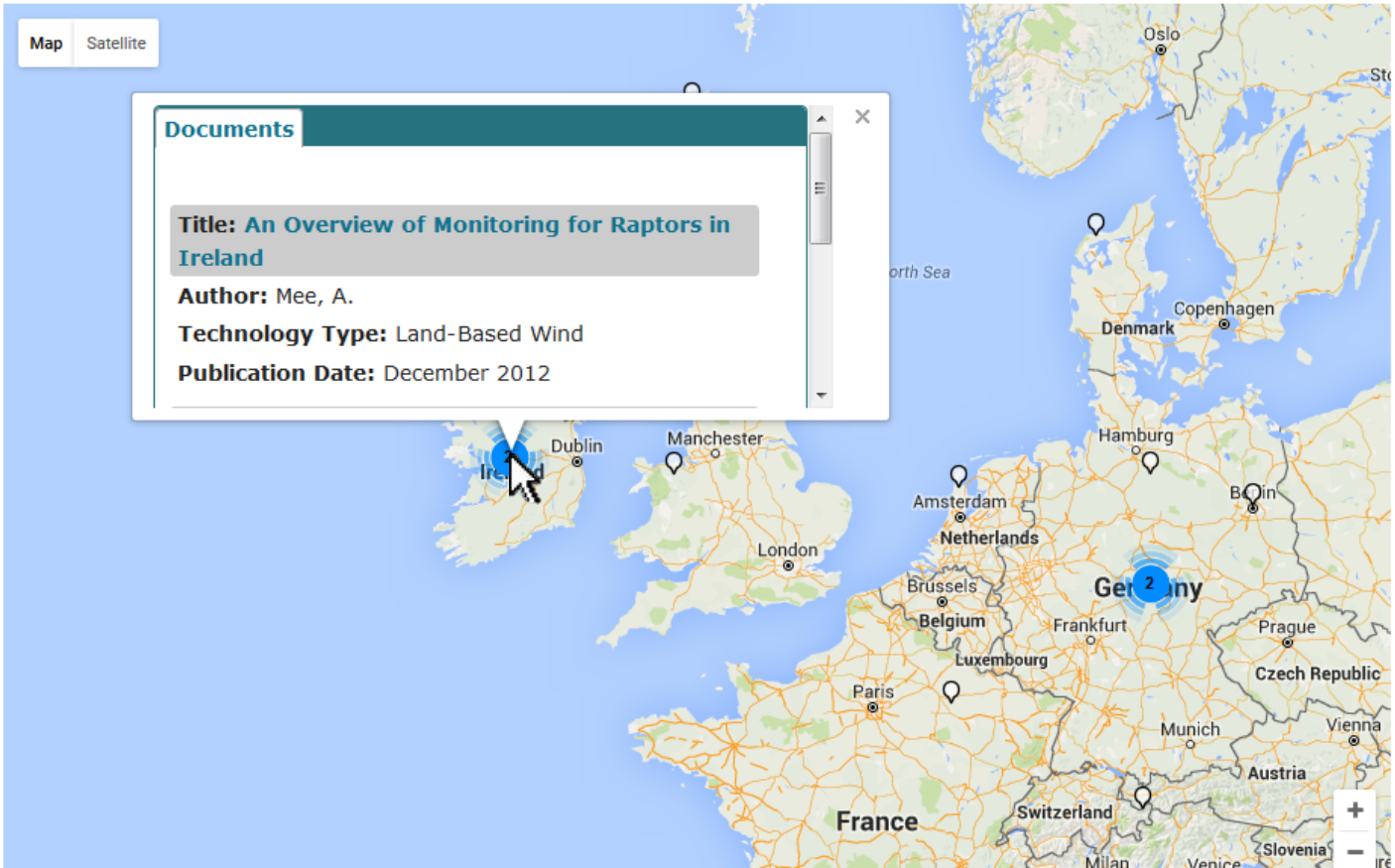

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Current search

Search found 176 items

(-) Land-Based Wind

Targeted Search

Search All Fields

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Legend

Documents (176)

Closely-packed items are clustered together. Clicking on the cluster allows you to navigate individual items. You may zoom in to make smaller clusters.

Technology Type

(-) Land-Based Wind

Offshore Wind (9)

Country

An Overview of Monitoring for Raptors in Ireland

☆☆☆☆☆
No votes yet

Abstract:
Ireland holds a low diversity of breeding raptors as a result of its location on the western edge of Europe but also due to historical persecution leading to the loss of at least seven species. Recolonisation by Buzzards Buteo buteo and the recent reintroduction of three species, Golden Eagle [illegible] Kite Milvus milvus, has helped redress such losses. M[illegible] NGOs and two university research groups. Decadal a[illegible] of Ireland and Northern Ireland for Peregrine Falcon Falco peregrinus and Hen Harriers Circus cyaneus, respectively. Long term monitoring projects have been established for some key species such as Barn Owl Tyto alba. However, some species receive little monitoring effort (e.g. Sparrowhawk [illegible]us). A dedicated Raptor Monitoring Scheme to determine long-term population tr[illegible]acking and remains an urgent priority. Development of an Action Plan for raptors an[illegible]er help identify priorities and raise awareness of the need of monitoring for rapt[illegible]

Find other documents from these Authors, organizations, technologies, etc.

Access to a PDF (as copyright allows)

Journal Article

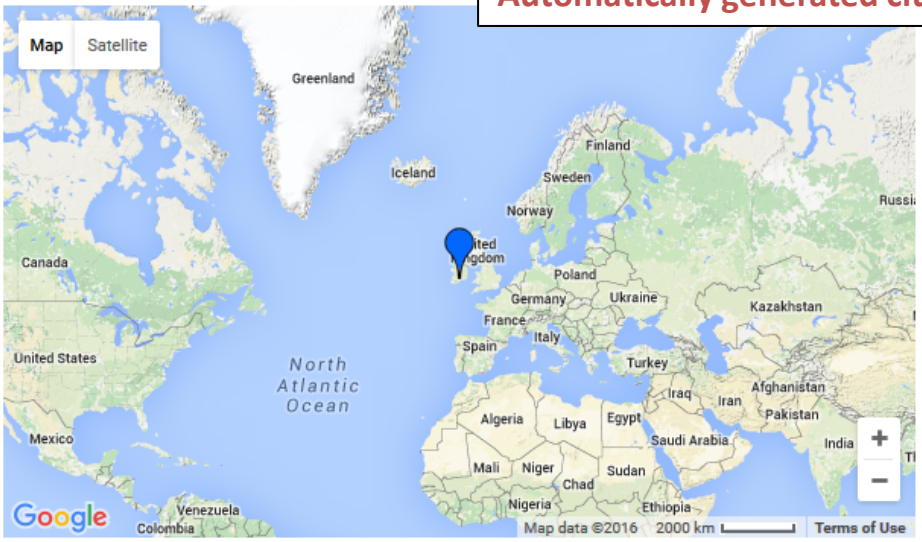
Title:	An Overview of Monitoring for Raptors in Ireland
Authors:	Mee, A.
Publication Date:	December 01, 2012
Journal:	Acrocephalus
Volume:	33
Pages:	239-245
Affiliation:	Irish Raptor Study Group
Website:	External Link
Stressor:	Dynamic Device, Static Device
Receptor:	Birds
Technology Type:	Land-Based Wind

google scholar | bibtex | xml

Automatically generated citation.

Citation

Mee, A. (2012). An Overview of Monitoring for Raptors in Ireland. *Acrocephalus*, 33, 239-245.



Land-Based Wind

Harnessing wind energy in land environn

Each page lists all documents tagged with that term.

Descriptions available for: stressors, receptors, interactions, and technology.

Over 1200 organizations with description, link, and logo.

Land-based wind refers to a vast array of technologies used to convert wind into electricity. The most common technology is a three-bladed horizontal axis turbine, but vertical axis turbines are advantageous in some situations. The type, size, and location for each turbine depend on wind availability, wind directionality, access to the grid, accessibility, and potential environmental impacts. Most projects are required to conduct an environmental assessment - EA (or Environmental Impact Statement - EIS) to address environmental concerns that are specific to the specific location. Of greatest importance to land-based wind are collision risk with birds and bats. However, there are additional concerns being studied such as noise impacts, visual impacts, atmospheric changes, and habitat alterations.

Title	Author	Research Start Date	Type of Content	Technology Type	Stressor	Receptor
Environmental Interview: The Effects of Wind Power on Land-Dwelling Mammals	Helldin, J., Skarin, A.	March 2016	Video	Land-Based Wind		Terrestrial Mammals
Environmental and Social Footprint of Offshore Wind Energy: Comparison with Onshore Counterpart	Kaldellis, J., et al.	February 2016	Journal Article	Land-Based Wind, Offshore Wind		
From NIMBY to Acceptance: Toward a Novel Framework - VESPA - For Organizing and Interpreting Community Concerns	Petrova, M.	February 2016	Journal Article	Land-Based Wind, Offshore Wind		Socio-economics
Avian Collision Risk Models for Wind Energy Impact Assessments	Masden, E., Cook, A.	January 2016	Journal Article	Land-Based Wind, Offshore Wind	Dynamic Device	Birds
Study on Australian Energy Policy, Socio-Economic, and Environment Issues	Azad, A., et al.	December 2015	Journal Article	Land-Based Wind, Marine Energy general, Offshore		Socio-economics

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Tethys is a knowledge management system that actively gathers, organizes, and disseminates information on the environmental effects of marine and wind energy development.

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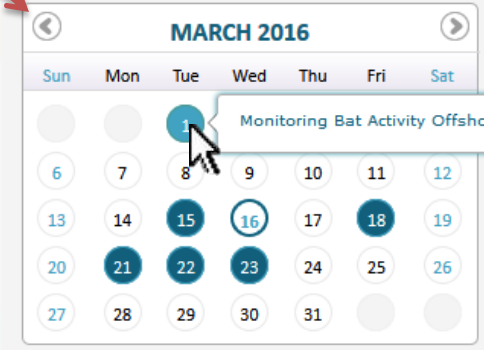

Tethys Story

Monitoring Bat Activity Offsh

Information for joining the webinar can be found on this page before the event.

Webinar #6 in WREN Environmental Webinar Series
March 1, 2016

Summary

Please join our webinar scheduled for Tuesday, March 1, 2016 from 4 to 5:30 pm UTC (8:00 am PT/11:00 am ET) developed as part of International Energy Agency's Wind Task 34 (also known as WREN – Working Together to Resolve Environmental Effects of Wind Energy). This webinar series supports WREN's goal to facilitate international collaboration that advances global understanding of environmental effects of offshore and land-based wind energy development. (WREN Introductory Slides)

Event

Title:	Monitoring Bat Activity Offshore
Host:	WREN
Location:	Online
Date:	March 1, 2016 16:00-17:30 UTC+00:00
Technology Type:	Offshore Wind

Bats at Sea: Results of Long-Term Acoustic Monitoring at Islands, Coastal Sites, and Offshore Structures

Trevor Peterson is a senior wildlife biologist at Stantec Consulting Services Inc., where he has worked since 2003, and is responsible for developing ecological survey protocols and conducting a variety of wildlife research, primarily related to assessments of bird and bat impacts at wind projects. He has played a leadership role in developing methods for ecological risk assessments for proposed wind projects as well as post-construction mortality surveys at operational wind farms. Mr. Peterson serves as a technical lead within Stantec for acoustic bat survey and data analysis methods. Trevor is also enrolled in the Ecology and Environmental Sciences program at the University of Maine, where he is pursuing a PhD based on use of acoustics to document offshore bat activity patterns and manage potential turbine-related impacts to bats associated with wind energy.

Bat Migration across the Southern North Sea and Possible Implications for Offshore Wind Farms

Sander Lagerveld is a researcher at IMARES with a background in ecology and mechanical engineering. His prime focus is the migration ecology of bats, as well as innovative monitoring techniques. **Maarten Platteeuw** is a senior advisor with a background in animal ecology for the Dutch Ministry of Infrastructure and Environment on aquatic and marine ecology and nature legislation, with special focus on birds and mammals. He is involved in Natura 2000 management plans and other aspects of applying European and national nature conservation legislation in the management of large water systems. Together Sander and Marrten will present on migratory bat activity at several points offshore on the Dutch continental shelf.

A video recording of the webinar has been posted below:

Access presentations

After the webinar, the video of the webinar can be found here.

WREN Hub Moving Forward

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- WREN Hub will be primary dissemination platform for white papers.
- Still completing collection of land-based wind papers and reports.
- Curated collection of papers and other media is continually updated.
- New topics for webinars and other online meetings (expert forums) continually of interest.
- Looking for peer reviewers for this year…

Thank you!

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