

This image illustrates one of the ways Altamont Pass has recorded less mortality. The red circle shows the proportionally undersized search areas used on the largest turbines. The blue circle shows the minimum proper search area for a 2.3 MW wind turbine; that area is seven times larger than what is currently being searched and extends into the kill zones of three much smaller 150 kW turbines.

## IMAGINE THE KILLING FIELDS IN A MAJOR MIGRATORY FLY ZONE, OVER LAKE ERIE

Experts now understand that developers under report and under estimate bird and bat deaths by some 95%. Some say 98%. It is not to their advantage to advertise the extent of the carnage.

<http://savetheeaglesinternational.org/new/us-windfarms-kill-10-20-times-more-than-previously-thought.html>

# SIGNS OF THINGS TO COME: and current SNAPSHOTS

## How much more can we take of this? Save Our Beautiful Lake



### OFFSHORE WIND FIASCO: RENEWABLES INDUSTRY FACES \$BILLIONS IN COMPENSATION FOR EARLY REPAIRS

Date: 23/02/18 | Jyllands-Posten

Ørsted is in danger of having to repair the blades of more than 600 offshore wind turbines.



Ørsted's wind farm at Anholt was completed in 2013. The turbines' blades are so worn down already that they have to be brought to land and repaired. Photo: A2Sea

### Ontario wind turbine factory closing, hundreds losing jobs

JENNIFER BIEMAN AND MEGAN STACEY, POSTMEDIA NETWORK

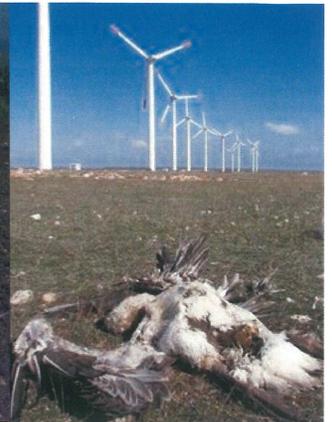
FIRST POSTED TUESDAY, JULY 18, 2017 12:38 PM EDT | UPDATED TUESDAY, JULY 18, 2017 02:14 PM EDT



Giant wind turbine blades sit outside the Siemens plant in Tillsonburg on Tuesday July 18, 2017. (Mike Hensen/Postmedia Network)

TILLSONBURG - The loss of 340 jobs at a factory that makes blades for wind turbines could be harbinger of troubles ahead in Ontario's green energy industry, a leading analyst says.

Siemens Canada announced Tuesday it's closing its Tillsonburg plant, one of four Ontario green-energy factories set up under a controversial, multi-billion-dollar deal with Korean industrial giant Samsung.



WTOL

## BIRDING GROUP OPPOSES ICEBREAKER

# Birding group opposes wind turbines along Lake Erie shoreline

Sunday, May 13th 2018

OAK HARBOR (WTOL) –

Opposition is growing to installing wind turbines along the Lake Erie shoreline as a source of generating renewable energy. It's coming from the Black Swamp Bird Observatory, sponsor of the just completed 'Biggest Week in American Birding' event.

Ninety-thousand birders from across the world came to our area to watch and photograph the annual bird migration. The warblers and other species stop here to rest and re-fuel on insects before heading out across Lake Erie into Canada. "This is an awesome spot for warblers and seeing different kinds of birds. It's like a treasure hunt," said Judy Lang of Columbus.

But the Observatory worries proposed commercial development of turbines popping up along the shoreline would be catastrophic for bird migration and bird tourism.

One project eight miles off the Cleveland shoreline with six turbines is under discussion.

"These little songbirds migrate at night and they can't see tall structures like this. When you've got a 400 foot pole with three massive blades sticking out it would be a gauntlet for these little migrating birds," said Kim Kaufman of the Observatory.

Ms. Kaufman supports renewable energy, but other kinds, like solar power.

She says there's scientific proof turbines kill birds and Ohio needs stronger laws to protect migrating birds.

"We are the bottleneck of so many migrating birds. If we get it wrong we could impact the global population of some species," said Kaufman. Bottom line in this emotional discussion by bird lovers.

And if they have their way, the Lake Erie shoreline will be for the birds not wind turbines.

*Copyright 2018 WTOL.*

See original article [here](#). Re posted with permission from News Room WTOL

September 19, 2018

Asim Z Haque, Chairman  
Public Utilities Commission of Ohio  
180 East Broad Street  
Columbus, OH 43215

Case Number: 16-1871-EL-BGN

We are submitting for your consideration the attached petitions from concerned residents of Ohio and Michigan urging you in your September 24 hearing to order appropriate delays of any approvals for the proposed “Icebreaker” demonstration project in Lake Erie.

As Ohio’s greatest natural resource, Lake Erie is a fragile body of water already facing a massive algae problem, a myriad of invasive species, and other threats to the ecosystem. The Lake Erie Energy Development Company (LEEDCo) has a stated goal of stimulating construction of hundreds more turbines in “wind farms” throughout Lake Erie and other Great Lakes after this first demonstration project. However, blighting our beautiful lakes with hundreds of industrial-size windmills is completely incompatible with the value, enjoyment and protection of these treasured waters that are held in the public trust by the states of Ohio and Michigan.

Much has already been written and published about this proposal. The damage to the environment, ranging from spreading carcinogens trapped in the lake bottom into the drinking water of millions to killing birds protected under the Migratory Bird Treaty, will be the unacceptable result.

Moreover, recognizing the increased costs of building and maintaining turbines in the waters of the Great Lakes make it abundantly clear the claimed economic benefits of such wind power simply cannot be substantiated. A study of such offshore installations in countries like Great Britain and Germany document their electric rates to be among the highest in the world.

Further, we foresee such turbine installations will become navigational hazards and will trigger large “security zones” around any wind farm, something LEEDCo has never addressed. Prohibiting thousands of recreational boating and fishing families access to large areas of water that is held in the public trust should be unacceptable to every member of the OPSB.

Therefore, we ask you to recognize the overwhelming negative consequences of “Icebreaker.” Further, that you uphold a duty to protect the health and aesthetics of Lake Erie and, thus, the quality of life for those who live, work and recreate on or near Ohio and Michigan’s most important natural resource. We urgently request this Board put the value of Lake Erie above any need to jeopardize our waters, and disapprove the “Icebreaker” project.

Sincerely,

---

John C. Lipaj  
Board Member  
Lake Erie Foundation  
Westlake, OH

---

Bryan Ralston  
President  
Lake Erie Marine Trades Association  
Westlake, OH

---

David Strang  
President  
[saveourbeautifullake.org](http://saveourbeautifullake.org)  
Rocky River, OH

---

Thomas C. Sullivan, Jr.  
Officer  
[nolakeeriewindfarm.org](http://nolakeeriewindfarm.org)  
Bay Village, OH

---

Jim Herold  
Trustee  
Edgewater Yacht Club  
Cleveland, OH

---

Nicki Polan  
Executive Director  
Michigan Boating Industries Association  
Livonia, MI

Attachments: Signed Petitions asking the Board to Reject the OPSB Staff Recommendation

<https://www.toledochamber.com/blog/economic-impact-why-birds-and-birding-matter>

For those who haven't given it much thought (or are still operating under the notion that all birdwatching is just for the Jane Hathaways of the world), it's time to consider the benefits of birds and birding. Birds enhance the quality of our lives in myriad ways, and birding tourism is providing our area with a much-needed economic "shot in the arm" in early spring. Here are just a few reasons to consider expanding your interest in and knowledge of birds and birding.

## **Birds Mean Business**

From the end of April to mid-May, more than 90,000 birders visit our area to take in this astounding migration spectacle.



Birders from around the world gather at the Magee Marsh boardwalk each spring. - Photo courtesy of Black Swamp Bird Observatory

### **Quality of Life**

Birds are colorful and active, and many sing beautiful songs. Once you delve into the world of birds, you'll also discover that their lifestyles are endlessly fascinating. Imagine a Ruby-throated Hummingbird (weighing just one-tenth of an ounce) crossing the Gulf of Mexico in fall migration, an 18 hour journey!



Ruby-Throated Hummingbird – Photo Courtesy of Kaufman Field Guides

And, although it's possible to do a lot of birding just by looking out the window, sooner or later birds will lure us outdoors. Studies have proven that when we're outdoors, moving around and breathing fresh air, we tend to take deeper breaths. With more oxygen transported to all the cells of our bodies, including our brains, we become more alert and our mood is likely to be elevated. Birding is a gateway to the natural world, and once you start looking for birds, you'll discover that northwest Ohio is blessed with some spectacular natural areas to explore.



Birders Enjoying Pearson Metropark – Photo by Charles Owens

### **A Feather in our Tourism Cap (Pun Intended)**

The sensational birding in this area is a highly marketable asset, and I like to say that all the birding stars align for us here in northwest Ohio. First, we have major

concentrations of birds. When migratory birds are moving north in spring, a large expanse of water poses a daunting barrier. **Before crossing Lake Erie, small songbirds need to rest and feed to build their energy reserves.** As a result, large concentrations of these small birds converge on the remaining patches of wooded habitat along our lake shore in spring.

We also have great access to some of the best birding spots on the continent for experiencing the migration parade. In addition to our outstanding Toledo Metroparks, the wooded beachfront at Magee Marsh Wildlife Area provides prime habitat for migratory birds, and the position of a mile-long boardwalk in the heart of wooded, lakefront habitat makes these large concentrations of birds accessible in spectacular fashion. And, since Magee Marsh is a state wildlife area, the access is free. And finally, spring migration happens before the leaf out, and before the emergence of mosquitoes, so it's truly birding at its best!

<https://www.ohiomagazine.com/travel/lake-erie-islands/article/8-great-ohio-birding-spots>



## 8 Great Ohio Birding Spots

*Whether you're a fledgling bird-watcher or have a veteran's eagle eye, these locations along the Lake Erie shore and its islands should be on your list.*

APRIL 2018

BY CAITLIN BEHRENS | PHOTO BY ISTOCK

Birders from near and far flock to northwest Ohio each year to witness the annual spring migration. The wetlands along the Lake Erie shore and its islands offer welcoming landing spots where migrating species can rest and eat before continuing on their journey. "Lake Erie has a rich supply of

aquatic insects that are coming up out of the lake starting with midges early in the season,” says Lisa Brohl, chairman of the Lake Erie Island Conservancy, a preservation group for the island’s busiest birding sites. With the Biggest Week in American Birding set for May 4 through 13, we asked Brohl as well as author and conservationist Kenn Kaufman to share some of northwest Ohio’s can’t-miss bird-watching spots.



## The Lake Erie Islands

### **Scheeff East Point Nature Preserve • South Bass Island**

Located at the easternmost point on South Bass Island, Scheeff East Point Nature Preserve is perfectly suited for birds needing to recuperate after a long flight. “A lot of times, those areas at the very edge are wooded and provide cover for migratory birds,” says Brohl. “Birds will sometimes build up there until they can start migrating and moving again.” The compact 9-acre park’s proximity to Lake Erie provides a full menu of insects and great Lake Erie views, with feathered visitors seen here including warblers, waterfowl and other shorebirds. *Visit website for directions. Put-in-Bay 43456, [lakeerieislandsconservancy.org](http://lakeerieislandsconservancy.org)*

### **North Pond State Nature Preserve • Kelleys Island**

Take a stroll through this pristine wetland thanks to a mile-long boardwalk that provides views of herons and hawks before opening up onto a stretch of beach that’s famous for its waterfowl sightings. “Even if it’s not a big day for migration of the land birds coming into the spots, you’ll see a lot of waterbirds along the edge. It always pays off,” says Kaufman. Connected to Lake Erie by a

channel, the 51-acre property is one of very few wetlands in the state not artificially maintained by dikes. Visit website for directions. Kelleys Island 43438, [naturepreserves.ohiodnr.gov/northpond](http://naturepreserves.ohiodnr.gov/northpond)

## **Ottawa County**

### **Black Swamp Bird Observatory • Oak Harbor**

Each May, thousands of spectators gather near the Black Swamp Bird Observatory and its surrounding marshland for the Biggest Week in American Birding. Songbirds, raptors, rails and shorebirds are easy to spot here. The "Window on Wildlife" within the observatory overlooks an array of bird feeders, some of which include birdbaths, waterfalls and other features. "If someone doesn't feel like going out and doing a lot of walking, they can just sit there and see a big variety of birds coming in," says Kaufman. 13551 W. St. Rte. 2, Oak Harbor 43449, 419/898-4070, [bsbo.org](http://bsbo.org)

### **Magee Marsh Wildlife Area • Oak Harbor**

This Oak Harbor wildlife park is deemed the warbler capital of the world. Thanks to its wetland habitat and abundance of low-hanging trees, the songbirds are brought down to eye level. "[At] other places, warblers tend to be tree toppers. There's an ailment called 'warbler neck' that you get from looking at the tops of trees trying to see warblers," says Kaufman. Bird lovers can venture through this 2,202-acre swamp forest along a 1.3-mile-long boardwalk, with multiple observation decks along the way. "Even when there are more than a thousand birders there, which happens in May, it's not necessarily that crowded," adds Kaufman. "... you can go there even when there are a thousand other people and find a spot where you're looking at birds no one else is looking at." 13229 W. St. Rte. 2, Oak Harbor 43449, 419/898-0960, [wildlife.ohiodnr.gov/mageemarsh](http://wildlife.ohiodnr.gov/mageemarsh)

### **Ottawa National Wildlife Refuge • Oak Harbor**

A mix of waterfowl and other migratory birds, as well as endangered and threatened species inhabit Ottawa National Wildlife Refuge's 6,500 acres. The area's mix of coastal wetlands, grassland and wooded habitat makes it the perfect stop for all types of birds during their journey. Throughout the spring and summer, this nature preserve opens up an additional 7 miles of trails, so visitors can observe specialty waterbirds, such as the snowy egret and American bittern, on either a guided or self-guided tour. "They've got a lot of different habitats they're preserving for waterfowl and shorebirds," says Brohl. 14000 W. St. Rte. 2, Oak Harbor 43449, 419/898-0014, [fws.gov/refuge/ottawa](http://fws.gov/refuge/ottawa)

### **East Harbor State Park • Lakeside-Marblehead**

East Harbor State Park has unlimited opportunities for year-round birding. Located on the Marblehead peninsula, this parkland is a mecca of wildlife habitat, with 7 miles of trails along the water's edge, as well as meadows, marshes, shrublands, channel dunes and more. "It gets as many migrants as some place like Magee Marsh or Sheldon Marsh. [But,] they're not quite as concentrated because the woods there are pretty large," says Kaufman. Its 1,831 acres are most known for attracting sandpipers, gulls, terns and other shorebirds and waterfowl. Fallout — when inclement weather results in a pileup of birds in one area — is common to the state park during the spring and fall seasons. 1169 N. Buck Rd., Lakeside-Marblehead 43440, 419/734-4244, [parks.ohiodnr.gov/eastharbor](http://parks.ohiodnr.gov/eastharbor)

## **Erie County**

### **Old Woman Creek National Estuarine Research Reserve • Huron**

Old Woman Creek, one of the remaining natural estuaries in Ohio (a body of water where a river meets a lake or sea) offers a mix of freshwater marsh, beach, swamp and upland forests over nearly 500 acres. Being a transition zone gives this shoreline reserve an advantage in attracting birds well past the migratory season. "You have this river flowing and winding around through there, sort of twisting and turning before it empties out into the lake," says Kaufman. "It's interesting for nature in general ... This is now one of the better places in the whole country to see numbers of bald eagles." 2514 Cleveland Rd., East Huron 44839, [wildlife.ohiodnr.gov/oldwomancreek](http://wildlife.ohiodnr.gov/oldwomancreek)

### **Sheldon Marsh State Nature Preserve • Huron**

Although Sheldon Marsh State Nature Preserve has seen more than 300 visiting bird species, this 472-acre park still remains a relative secret. Its upland fields, hedgerows, cattail marsh and other habitats are a perfect place to spend a quiet spring day. From the observation platforms, visitors can look out over marshlands before making their way onto the boardwalk that connects to a barrier beach. "Along the waterfront is a good place for watching gulls and shorebirds," says Brohl. "As you walk through the woods at Sheldon, it's also good for warblers, thrushes and more." 2715 Cleveland Rd., Huron 44839, 614/265-6561, [naturepreserves.ohiodnr.gov/sheldonmarsh](http://naturepreserves.ohiodnr.gov/sheldonmarsh)

\*\*\*

## **The Big Time**

The Biggest Week in American Birding runs May 4 through 13 this year. The annual gathering of birders, who travel from far and near to witness the spring songbird migration, has lots of options for walks, talks and other ways to commune with our feathered friends. For more information on these events and more, visit [biggestweekinamericanbirding.com](http://biggestweekinamericanbirding.com).

### **Young Birder Walk: May 5 & 12**

#### **Family Bird Walk: May 13**

Bring your little ones and a pair of binoculars to join in the Magee Marsh Young Birder Walk or the Family Bird Walk at Pearson Metropark. *Magee Marsh, 13229 W. St. Rte. 2, Oak Harbor 43449; Pearson Metropark, 761 Lallendorf Rd., Oregon 43616*

### **Beginner's Bird Walk: May 5, 6 & 12**

Can't tell the difference between a warbler and a thrush? Not even sure what the two mean? Head to the Beginner's Bird Walk to learn the basics of birding, from identification tips to finding the right binoculars. *Pearson Metropark, 761 Lallendorf Rd., Oregon 43616*

### **23rd Annual Big Sit: May 12**

Birding expert Tom Bartlett sits on the west end of the boardwalk for 12 hours to raise funds for the Black Swamp Bird Observatory's education programs. He'll keep a tally of his sightings, so you can also discover what species are in the area. *Magee Marsh, 13229 W. St. Rte. 2, Oak Harbor 43449*

### **Birding Point Pelee National Park: May 10 & 17**

Ride the Jet Express ferry for a self-guided tour of Point Pelee National Park, a world-class birding

site that's recorded 80 percent of Ontario's native species. *Jet Express, 3 N. Monroe St., Port Clinton 43452*

**Birding by Canoe:** May 7, 9, 11 & 13

Paddle through Maumee's Green Creek to witness 2 miles of warbler-filled habitat, before traveling into Mud Creek Bay to spot the waterfowl within its marshland. *Maumee Bay Lodge, 1750 State Park Rd. #2, Oregon 43616*

<https://abcbirds.org/article/bird-conservation-groups-to-testify-against-icebreaker-wind-energy-project-in-lake-erie/>



## Bird Conservationists To Testify Against “Icebreaker” Wind Energy Project In Lake Erie

Contact: Black Swamp Bird Observatory: [Kimberly Kaufman](#),  
Executive Director, 419-898-4070



One of the highest concentrations of nesting Bald Eagles in the lower 48 states, along with many other bird species, could be at risk from Lake Erie's first proposed offshore wind energy project. Photo by rbrown10/Shutterstock

*(Cleveland, Ohio, July 18, 2018)* Bird conservation groups will be raising concerns about the impact on birds from Lake Erie's first proposed offshore wind project, "Icebreaker," tomorrow at a public hearing before the Cleveland City Council. Black Swamp Bird Observatory and American Bird Conservancy found numerous [problems with the project's environmental assessment](#) (EA); the inadequacy of the EA's science and process will be the basis for the joint testimony to be submitted by BSBO's Don Bauman and Mark Shieldcastle.

"We reject the EA's claim that this wind energy facility would have 'little to no impact'" on birds, said Kimberly Kaufman, Black Swamp Bird Observatory's Executive Director, citing the critical importance of Lake Erie to migratory birds such as the endangered [Kirtland's Warbler](#).

Five recent [advanced radar studies](#) conducted by the U.S. Fish and Wildlife Service (FWS) have recorded vast numbers of migratory birds and bats within 5 to 10 miles of the Great Lakes shorelines, including Lake Erie. Many were flying within the rotor-swept area of wind turbines.

"The six-turbine Icebreaker project poses a larger threat to wildlife than is now indicated in the documents," said

Kaufman. “But the planned expansion of offshore wind energy to over 1,000 turbines will have even more major impacts to birds that breed and migrate across Lake Erie, and that must be addressed.”

The organizations highlighted five major concerns about the EA in their comments, which were submitted to the U.S. Army Corps of Engineers and the Department of Energy:

1. The proposed Icebreaker project site is approximately 7 miles from the Lake Erie shoreline, near Cleveland, Ohio. This is a Globally Important Bird Area (IBA): The Ohio waters of the Central Basin of Lake Erie have been registered with BirdLife International and the National Audubon Society as globally significant habitat for birds.
2. The assessment cites outdated studies and ignores new data from birds fitted with radio transmitters, dismissing any threat to the endangered Kirtland's Warbler. These data show that the [species uses the airspace of central Lake Erie](#) almost exclusively for its fall migration. The site selected for the Icebreaker project turbines could put the entire global population of this rare species at risk just as it's been proposed for delisting from the Endangered Species Act.
3. To reach the “little to no impact” conclusion, the assessors relied on limited visual surveys conducted only during daytime and in good weather to conclude that

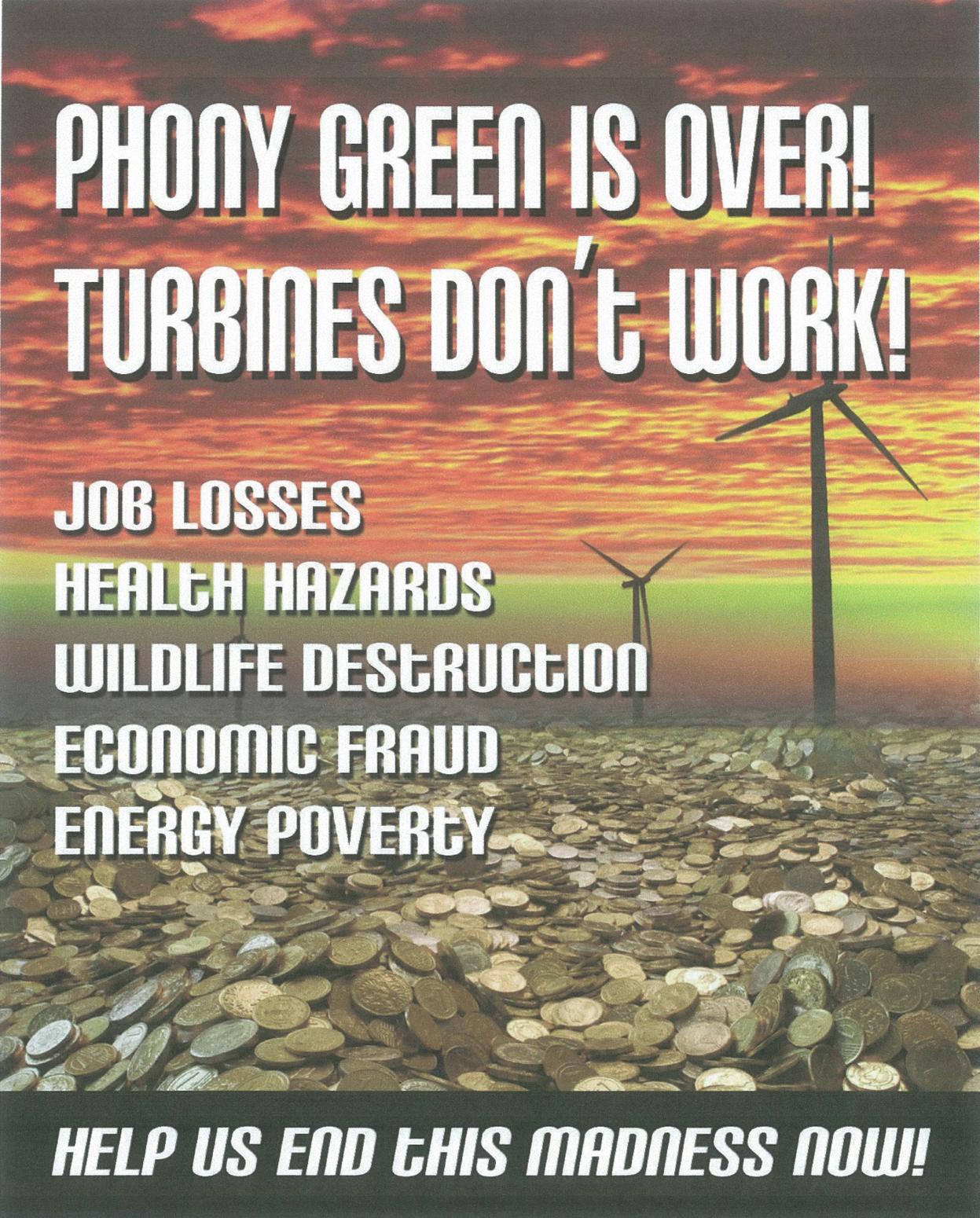
migrating birds fly at a height sufficient to avoid the turbines' blades. However, many songbirds migrate at night. The risk they face from turbines is likely greater during conditions of high winds, heavy rain, fog, or low cloud cover, which can affect flight altitude and bring them within the rotor-swept area of the turbines.

4. The assessment erroneously concludes that migratory birds avoid crossing Lake Erie and instead fly around it. Studies show with certainty that given good conditions, large numbers of migratory birds cross the lake, many of them making the long journey after stopping at the shoreline to rest and feed. Bird Studies Canada's tracking of radio-tagged individuals clearly shows birds and bats crossing Lake Erie.
5. The EA fails to acknowledge similar existing or planned projects throughout the Great Lakes that could increase the cumulative impacts on birds — an evaluation required by the National Environmental Policy Act. Moreover, project developer LEEDCo has publicly acknowledged their goal to install more than 1,000 turbines in Lake Erie. This will set an important precedent for further Great Lakes wind development. Ontario, for instance, has placed a moratorium on any open water wind facilities in Lake Erie until Icebreaker is decided.

###

[Black Swamp Bird Observatory](#) is a 501(c)(3) not-for-profit whose mission is to inspire the appreciation, enjoyment, and conservation of birds and their habitats through research, education, and outreach.

[American Bird Conservancy](#) is dedicated to conserving birds and their habitats throughout the Americas. With an emphasis on achieving results and working in partnership, we take on the greatest problems facing birds today, innovating and building on rapid advancements in science to halt extinctions, protect habitats, eliminate threats and build capacity for bird conservation.



**PHONY GREEN IS OVER!  
TURBINES DON'T WORK!**

**JOB LOSSES**

**HEALTH HAZARDS**

**WILDLIFE DESTRUCTION**

**ECONOMIC FRAUD**

**ENERGY POVERTY**

***HELP US END THIS MADNESS NOW!***

**A FEW MORE FACTS ON THE COSTS  
OF WIND AND THE ICEBREAKER**

*Marine Protected Areas and new areas for safety for seabirds, perspectives that relate to the OHIO and Lake Erie intense bird friendly habitat, especially Lake Erie.*

*The developer (Icebreaker and LEEDCo) has repeatedly at consultations expressed that birds and bats do not fly over the Lake. Imagine. This developer has zero knowledge of bird life, bats, and how they move, and where they feed and breed.*

*Clearly, the Great Lakes should be designated a Marine Protected Area.*

<https://www.ospar.org/news/views-sought-on-new-marine-protected-area-for-seabirds>

# VIEWS SOUGHT ON NEW MARINE PROTECTED AREA FOR SEABIRDS

OSPAR Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic) and OSPAR Commission



Official OSPAR logo

OSPAR is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Community, cooperate **to protect the marine environment of the North-East Atlantic**. It started in 1972 with the Oslo Convention against dumping. It was broadened to cover land-based sources and the offshore industry by the Paris Convention of 1974. These two conventions were unified, up-dated and extended by the 22th September **1992 Convention for the Protection of the marine Environment of the North-East Atlantic (the 'OSPAR**

**Convention').** The new annex on biodiversity and ecosystems was adopted in 1998 to cover non-polluting human activities that can adversely affect the sea.

18 July 2018

**A new Marine Protected Area (MPA) proposal for seabirds crossing the Atlantic is being developed by the OSPAR Commission for the protection of the marine environment of the North-East Atlantic**

The proposed MPA, around the size of France, is in part of the ocean known as an Area Beyond National Jurisdiction (ABNJ) for which no one nation has sole responsibility for management. OSPAR has the competency to designate MPAs in the ABNJ of its convention area and is now seeking views on the MPA proposal. This is the first time such a wide and inclusive process has taken place and demonstrates the importance of a regional approach to ocean governance.

The proposed area has been identified as an important foraging site for many species of seabirds through satellite tracking studies.

Susana Salvador, Executive Secretary of the OSPAR Commission said *"The Desertas Petrel is an example of how important the area of the proposed MPA is to seabirds, as the bird flies halfway across the Atlantic from the islands where it breeds to forage for food and then flies back again to continue breeding"*.

Some of the seabird species that forage within the proposed MPA are wide ranging and migrate across the entire Atlantic. OSPAR invites everyone with information about these seabird species to contribute to the development of the MPA proposal. OSPAR is also asking any competent authority with information on populations of seabirds or human activities that take place in the middle of the Atlantic to supply information to generate a better understanding of the proposed MPA site.

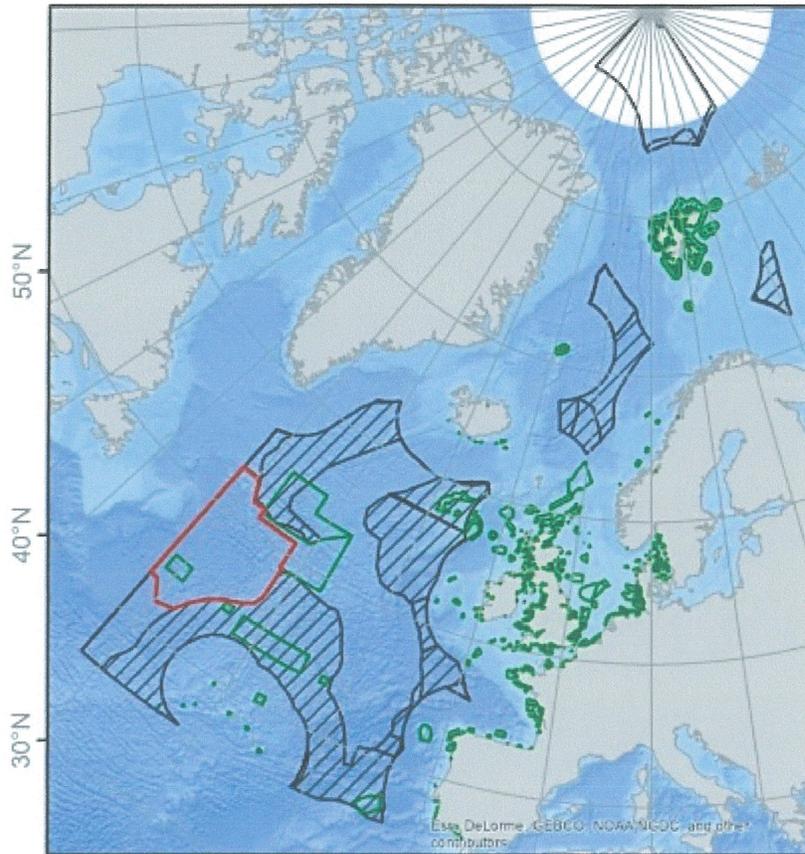
The MPA proposal, as well as information on how to contribute to this exceptional intergovernmental process, is available at [www.ospar.org/work-areas/bdc/marine-protected-areas/ospar-seeks-views-on-the-nomination-proforma-for-the-north-atlantic-current-and-evlanov-seamount-mpa](http://www.ospar.org/work-areas/bdc/marine-protected-areas/ospar-seeks-views-on-the-nomination-proforma-for-the-north-atlantic-current-and-evlanov-seamount-mpa)

OSPAR is currently in the process of developing this new MPA proposal which, if agreed, will form a substantial contribution to the OSPAR Network of MPAs which currently comprises 465 MPAs with a total surface area of 858,890 km<sup>2</sup> or 6.3 % of the OSPAR Maritime Area. The OSPAR Maritime Area in ABNJ currently holds 10 MPAs, covering 8.9 % of this area.

ENDS

## Note for editors

1. **The OSPAR Commission** was set up by the 1992 OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, which unified and updated the 1972 Oslo and 1974 Paris Conventions. It brings together the governments of Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom, together with the European Community.
2. More than 30 international non-governmental organisations are involved in OSPAR as official Observers. They represent a broad range of interests and expertise related to the marine environment and the uses of marine resources. Many contribute information, insights and standpoints. This is much appreciated feedback from civil society and the economy. The OSPAR Commission greatly values these partnerships that help inform its decisions and other results. (See list on OSPAR website at <http://www.ospar.org/organisation/observers>).
3. More information on OSPAR's network of MPAs can be found here <https://www.ospar.org/work-areas/bdc/marine-protected-areas> and our latest summary assessment here [https://www.ospar.org/site/assets/files/1378/assessment\\_sheet\\_mpa\\_status\\_2017.pdf](https://www.ospar.org/site/assets/files/1378/assessment_sheet_mpa_status_2017.pdf)
4. *Image*: Location of the [proposed] MPA within the OSPAR ABNJ and the existing network of OSPAR MPAs. [CAVEAT: the figure presents a draft of the final delineation and is subject to change



**Legend**

- Proposed MPA
- Existing MPAs
- Areas of extended shelf claim
- OSPAR ABNJ

0 380 760 1,520 km N

Coordinate System: Europe Lambert Conformal Conic  
 Projection: Lambert Conformal Conic; Datum: European 1950

# ENVIRONMENTAL CONSIDERATIONS RELEVANT TO THE DEVELOPMENT OF WIND POWER IN THE MEDITERRANEAN

## Review Marine Renewable Energy in the Mediterranean Sea: Status and Perspectives

... the overall regional effects of offshore wind are still unclear; partly because the industry has grown so fast, but also because oceans are — by nature — complex and dynamic ecosystems. <https://www.dw.com/en/how-do-offshore-wind-farms-affect-ocean-ecosystems/a-40969339>

Gill said it's too early to draw conclusions. Better monitoring is needed to determine whether ocean biomass (is being impacted) or if the ecosystems are just being shifted around by the turbine fields.

### **Cumulative effects**

The impacts of new offshore wind turbines should be considered together with effects from all other human activities, such as fishing, dredging, and oil and gas drilling, points out Bruna Campos, a marine and fisheries policy officer with BirdLife International, which has been watchdogging the wind industry for a while.

"You have to acknowledge that the moment you build wind farms, it can have major consequences for the survivability of species," she added. Birds in particular are affected by wind farms.

According to Campos, authorities are making progress on large-scale plans that consider wildlife impacts — but the pressure to fast-track offshore wind means that they sometimes fall short of their legal obligations. As a result, conservation advocates have [challenged a few wind energy projects in court](#).

Soukissian 1,\* ID , Dimitra Denaxa 1 , Flora Karathanasi 1,2, Aristides Prospathopoulos 1 , Konstantinos Sarantakos 1 , Athanasia Iona 1 , Konstantinos Georgantas 1 and Spyridon Mavrakos 2,3 1 Institute of Oceanography, Hellenic Center for Marine Research, 19013 Anavyssos, Greece; ddenaxa@hcmr.gr (D.D.); fkarathanasi@hcmr.gr (F.K.); aprosp@hcmr.gr (A.P.); ksarant@hcmr.gr (K.S.); sissy@hnodc.ncmr.gr (A.I.); kgeorgantas@hcmr.gr (K.G.) 2 Department of Naval Architecture and Marine Engineering, National Technical University of Athens, Zografos, 15780 Athens, Greece; mavrakos@naval.ntua.gr 3 Hellenic Center for Marine Research, 19013 Anavyssos, Greece \* Correspondence: tsouki@hcmr.gr; Tel.: +30-22910-76420 Received: 28 July 2017; Accepted: 20 September 2017; Published: 29 September 2017

*energies-10-01512-v2 (2)*

*(MRE is Marine Renewable Energy) FROM 2017*

OWF is offshore wind farm

## PLEASE NOTE: THESE OMISSIONS ARE ALSO CLEARLY EVIDENT IN THE ICEBREAKER APPLICATION

- LACK OF MAPPED BIRD MIGRATION
- NEED FOR MORE DETAILED INFORMATION ON ENVIRONMENTALLY SENSITIVE MARINE DEPTHS
- IDENTIFICATION OF IMPORTANT HABITATS AND DEEP WATER CORAL FORMATIONS
- MAPPING NEED FOR DISTRIBUTION OF IMPORTANT SPECIES
- NEED FOR MONITORING CAMPAIGNS BEFORE, DURING AND AFTER CONSTRUCTION

*The installation of the main components of a structure might allow the prediction of the impacts as if the whole structure was deployed. In this way, the study of the potential environmental effects in the far- and near-field environment and the optimization and adjustment of the MRE installation will be considerably facilitated.*

*EIA studies should be followed by consultation of the general public, local authorities, organizations concerned and any*

*stakeholder involved in the MRE project in order to be realistic and of actual value*

- NEED FOR SIMULATIONS

*EXCERPTS FROM THE ARTICLE FOLLOW*

### 5.3. Environmental Recommendations

Some recommendations relevant with OWF development in the MS have been provided by the COCONET project [149]; see also [107]. It was acknowledged that more detailed information on the environmentally sensitive marine areas at depths 0–200 m is required. The more accurate identification of important habitats, coralligenous, and deep-water white coral formations, is necessary for the efficient planning in the MS. The current lack of mapped bird migration routes is an additional information gap for the offshore wind sector. Taking into consideration the COCONET findings, some general recommendations as regards the interactions of MRE development and environmental issues are summarized below. In the areas scheduled for MRE development, there is need to screen and map the existing habitats and the distributions of important species, as well as the surrounding water volumes and the sea bottom areas so as to avoid impacts on biodiversity. In this respect, monitoring campaigns are necessary before and during construction, operation and decommissioning of MRE installations in order to enrich knowledge as regards long-term environmental effects and the acting of the installations as stepping stones across MPAs. The monitoring programs shall be standardized in order to assess marine biota shifts, create baseline inventories and identify thresholds so as to understand and predict future changes in marine biodiversity due to the MRE installations. An efficient

means to fulfil this task is Energies 2017, 10, 1512 39 of 56 by **utilizing pilot sites** before MRE development in order to study and assess actual environmental impacts in the surrounding environment. The installation of the main components of a structure might allow the prediction of the impacts as if the whole structure was deployed. In this way, the study of the potential environmental effects in the far- and near-field environment and the optimization and adjustment of the MRE installation will be considerably facilitated. EIA studies should be followed by consultation of the general public, local authorities, organizations concerned and any stakeholder involved in the MRE project in order to be realistic and of actual value. A necessary, yet overlooked, part of the EIA studies is the simulation of the potential impacts of MRE installations on the local geophysical/oceanographic characteristics (wave propagation, circulation, sediment equilibrium, coastal morphodynamics, etc.).

Finally, there is need to review and share the knowledge from the implementation of important EU directives (Marine Strategy Framework Directive, EIA, and the Habitats and Birds Directive) for enabling more consistent approaches across Mediterranean EU Member States, especially in cross-border cooperation issues. This is necessary since the directives as regards licensing and consenting processes for MRE development are often integrated in a non-homogeneous way into the national legislations.

#### 5.4. Socio-Economic Recommendations

Taking advantage of the existing experience from northern European countries and France, regarding OWF development in the Mediterranean, there is need to promote floating structures as a rational solution for the offshore wind exploitation in the area. This shift may also contribute to the mitigation of potential environmental effects. Another urgent necessity is to

increase the likelihood of social acceptance for MRE development in an area.

This can be achieved in several ways, such as:

- Combining other beneficial economic activities with the operation of MRE plants (e.g., the underwater structures of WT's or other MRE devices can be used to farm filtering bivalves or provide space for commercial fish, mimicking artificial reefs) in order to minimize fears and prejudices. These activities might become part of the compensations offered to the local communities.
- Raising environmental awareness of the local communities through informational campaigns and by making explicit the pros and cons of each MRE plant; the advantages for the local communities must be realistically stated, along with proposed compensation measures.
- Providing proper and accurate information of stakeholders about the economic implications of MRE installations on tourism.
- **Performing detailed socio-economic valuation surveys during the design phase of MRE projects, with consultation processes for any relevant application, focusing on stakeholders.**

Finally, the lack of MSP is expected to raise conflict of interests among different user groups. Creating the conditions to rationally exploit the benefits of MRE development in the MS and mitigating the expected social conflicts is highly dependent and interrelated with the development of MSP and ICZM at the regional/local level. These issues, combined with EIA studies of actual and realistic value, and rational regulation of the uses of the same ocean space constitute key drivers towards MRE sustainability in the Mediterranean basin. The management of marine, maritime, and coastal space must be accomplished in an integrative fashion in order to acquire a complete picture of all existing, scheduled, and foreseen human activities, and associated threats to environmental integrity and, most of all, to maximize its value.

<http://blogs.discovermagazine.com/crux/2017/08/16/piping-plover-pennsylvania/#.W7pTLmhKg2w>

## On the Shores of Lake Erie, Endangered Birds Catch a Lucky Break

By Hannah Gavin | August 16, 2017 2:11 pm

54



Endangered piping plovers are a precocial species, which means they mobile after emerging their egg. *(Credit: Shutterstock)*

Protecting species in peril doesn't happen overnight. Rather, it's all about stringing together small wins that, in the long-term, make all the difference. A little luck can also go far.

When waves surged on the Pennsylvania coast of Lake Erie early this summer, it could easily have been the end for a nest of piping plover eggs caught in the water's path. Fortunately, a dynamic team of biologists, zookeepers and volunteers swooped into action, rescuing the eggs and rearing them at a quiet facility at the tip of the Michigan mitten.

Recently, young birds from those very eggs were released, in the hopes that they will join the 75 nesting pairs of birds sustaining this **endangered population**.

## A Piping Plover Nest in Distress

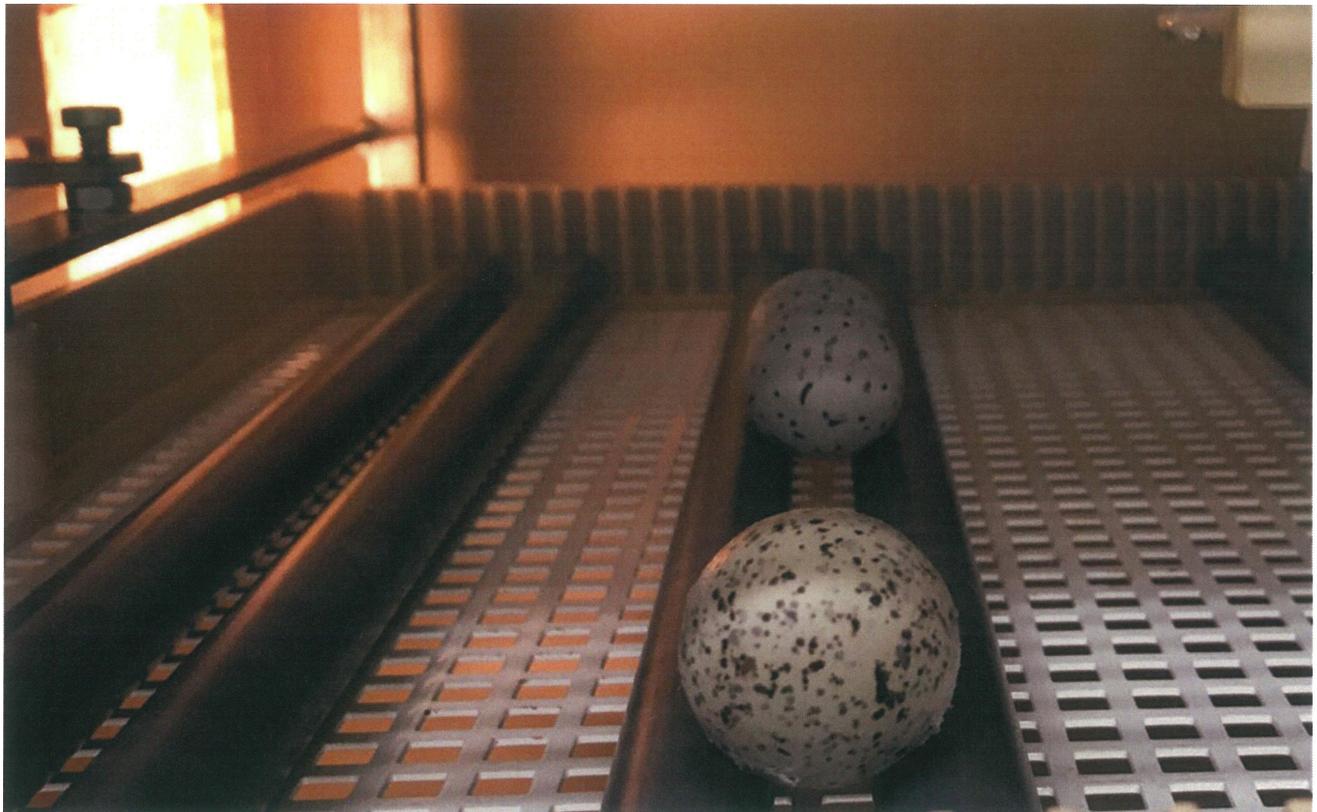
The day was sunny, but all was not well on the Pennsylvania coast of Lake Erie.

As a pair of piping plover parents anxiously hopped about, waves swept over a shoreline nest and carried four eggs from their sandy home. Washed into shallow waters ten feet afield, the would-be shorebirds seemed to have met their demise.

Unbeknownst to them, regional wildlife diversity biologist Tim Hoppe was at the same moment searching cabinets for Tupperware and cotton balls – the construction materials for an impromptu egg container. In fact, an entire team of adoptive plover parents was mobilizing in what Pennsylvania Game Commission wildlife biologist Cathy Haffner describes as “basically a flurry of texting!”

Earlier the same morning, shared electronic communications had been celebratory: the first piping plovers to nest on Erie’s Pennsylvania shores in **60 years** had just successfully hatched their chicks. Come afternoon, however, things turned more somber. A bird monitor noticed water and wind threatening the state’s second, un-hatched nest.

It was Sunday, and business offices were closed, but the monitor got in touch with Catherine, who contacted Tim. He arrived at the beach just in time to pluck the washed-out eggs from the water. A trip to a local tractor supply, 10 minutes before closing, yielded an incubator that would keep the eggs warm for the night.



Plover eggs stay warm and safe in an incubator until hatching. (Courtesy: Bonnie Van Dam, Detroit Zoological Society)

## Safe Haven

The rescue was novel in Pennsylvania, but similar scenarios have played out for years in the Midwest. In fact, Catherine did her graduate research with University of Minnesota ornithologist Francesca Cuthbert, who first incorporated captive rearing programs into the **Great Lakes Piping Plover Conservation** efforts. When they first began rescuing abandoned and washed-out eggs, Dr. Cuthbert and her team borrowed time in a 20-by-20-foot room.

The efforts have expanded, and today the Detroit Zoological Society's Associate Curator of Birds, Bonnie Van Dam, oversees the captive-rearing arm of the conservation efforts. Her team of zookeepers is based at the University of Michigan Biological station each summer. They knew just what to do when this summer's Pennsylvania eggs arrived in Michigan after a long road trip.

They watched, turned, and weighed the eggs daily. They supervised hatching, which takes up to four days for a given egg. Then they monitored the new chicks, taking weights and delivering worms and observing behaviors.

"We (zookeepers) are basically professional animal stalkers!" laughs Bonnie.

Actually, she notes, piping plover chicks are generally quite independent. Altricial birds, such as robins and condors, are born naked and helpless. Piping plovers, in contrast, are a precocial species, meaning they are relatively mature and mobile after emerging their egg. Just 4 to 6 hours after hatching, each bird resembled a feathered cotton ball on unsteady toothpick legs, scooting toward worms and crickets. With siblings and mirrors for company, and feather dusters for warmth, the chicks were safe.

## Back to Nature

Fast forward 20 days, and the plovers had progressed from sand-filled bathtubs, via a kiddie pool, to a lakeside enclosure. They were nearing graduation. Zookeeper Matt Porter predicted the birds were on schedule to be released in just a few days provided there weren't any setbacks.



Members of the Great Lakes Piping Plover Conservation Team trek down sand dunes to a lakeside release site. (Credit: Hannah Gavin)

They certainly looked ready to go as they ran from waves, squatted among plants, and flew in the longest stretches a 5-meter enclosure would allow. Still, how would they fare, far from their protectively netted home?

**Research** shows that captive-reared plovers are responsive to potential predators, so the same inborn knowledge that leads them to eat and fly will help defend them upon release. Unfortunately, captive reared plovers produce **fewer successful offspring** than their wild-reared counterparts. Still, a 2008 study reported that the captive-reared Great Lakes plovers constituted **up to 3 percent** of the birds in the total population. Plus, more chicks have been successfully reared each summer of the ensuing decade.

### Letting Go

Come release day, all chicks get a final weigh-in. Then they are loaded into a plastic pet crate, and zookeepers part with the birds they've come to know and love.

Plover banding duo Stephanie Schubel and Sarah Saunders secure the crate in the rear seat of a car, and head for the big lakes. Plover peeps sound out in waves, as if the birds keep re-remembering their excitement about impending freedom.



Freedom! A newly released piping plover explores the beach. (Credit: Hannah Gavin)

On the beach, the crate is opened and the plovers depart with little sentiment. Watching them soar, it's hard to remember the peril they endured early on. Without help, the Pennsylvania eggs would never have hatched. Even with help, their road wasn't smooth. Of the nest's four eggs, one was cracked during the washout. Another was whole, but never hatched; the tumble rendered the embryo unviable. Circumstances certainly weren't ideal even for the two remaining eggs.

But, Bonnie points out, dealing under non-ideal circumstances is central to the Great Lakes Piping Plover Recovery efforts. As the newly released plover chicks swoop along the beach to independence, they are a living testament to the team's success in doing just that.

CATEGORIZED UNDER: **LIVING WORLD, TOP POSTS**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4172316/>

NOTHING REALLY HAS PROVEN SAFETY TO FOOD WEBS, POLLUTION, EVEN IMPACTS ON MARINE SPECIES AND BIRDS.

**Key instructions:**

Define populations over studies of many years. Sound and collision studies are inadequate to protect species, habitats, and endangered species. HAS ICEBREAKER DONE ANY OF THE STUDIES INDICATED AS NECESSARY IN THE ARTICLE REFERENCED? Where are the baseline studies, and identified populations?

Our notes: There are only 34 breeding pairs of the Piping Plover in the Great Lakes Region.

*List revised August 8, 2017*

Species	Status	Counties	Habitat
<b>Mammals</b>			
<a href="#">Indiana bat</a> ( <i>Myotis sodalis</i> )	Endangered	All counties in Ohio	Hibernacula = Caves and mines; Maternity and foraging habitat = small stream corridors with well developed riparian woods; upland forests
<a href="#">Northern long-eared bat</a> <i>Myotis septentrionalis</i>	Threatened	Statewide	Hibernates in caves and mines - swarming in surrounding wooded areas in

			autumn. During late spring and summer roosts and forages in upland forests.
--	--	--	---

## Birds

<a href="#">Kirtland's warbler</a> ( <i>Dendroica kirtlandii</i> )	Endangered	Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky	Kirtland's warblers are known to migrate along the Lake Erie shoreline through Ohio in late April-May and late August-early October.
<a href="#">Piping plover</a> ( <i>Charadrius melodus</i> )	Endangered	Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky	Beaches along shorelines of the Great Lakes
<a href="#">Piping plover</a> ( <i>Charadrius melodus</i> )	Critical Habitat Designated	<a href="#">Erie, Lake</a>	
<a href="#">Red Knot (Rufa)</a> <i>Calidris canutus rufa</i>	Threatened	Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, and Sandusky	Present in Ohio during spring and fall migration

## Reptiles

<a href="#">Lake Erie water snake</a> ( <i>Nerodia sipedon insularum</i> )	Delisted August 2011	Erie, Ottawa	Shorelines of islands in western Lake Erie
<a href="#">Copperbelly water snake</a> ( <i>Nerodia erythrogaster neglecta</i> )	Threatened	Defiance, Hardin, Williams	Wooded and permanently wet areas such as oxbows, sloughs, brushy ditches and floodplain woods
<a href="#">Eastern massasauga</a> ( <i>Sistrurus</i> )	Threatened	Ashtabula, Butler, Champaign, Clark, Clinton, Columbiana,	

<i>catenatus</i> )		Crawford, Erie, Fairfield, Fayette, Greene, Hardin, Holmes, Huron, Lake, Licking, Logan, Lucas, Mahoning, Marion, Montgomery, Ottawa, Perry, Portage, Preble, Richland, Sandusky, Stark, Summit, Trumbull, Warren, Wayne, Wyandot	
--------------------	--	---	--

### Fish

<a href="#">Scioto madtom</a> ( <i>Noturus trautmani</i> )	Endangered	Franklin, Madison, Pickaway, Union	Stream riffles of moderate flow over sandy gravel bottom
---	------------	------------------------------------	--

### Mussels

<a href="#">Clubshell</a> ( <i>Pleurobema clava</i> )	Endangered	Ashtabula, Coshocton, Defiance, Franklin, Greene, Hancock, Hardin, Madison, Pickaway, Pike, Ross, Scioto, Trumbull, Union, Williams	Found in coarse sand and gravel areas of runs and riffles within streams and small rivers
--	------------	---	---

<a href="#">Fanshell</a> ( <i>Cyprogenia stegaria</i> ) (= <i>C. irrorata</i> )	Endangered	Adams, Athens, Brown, Clermont, Coshocton, Gallia, Hamilton, Lawrence, Meigs, Morgan, Muskingum, Scioto, Washington	Found in areas of packed sand and gravel at locations in a good current
---	------------	---	---

<a href="#">Northern riffleshell</a> ( <i>Epioblasma torulosa rangiana</i> )	Endangered	Defiance, Franklin, Madison, Pickaway, Pike, Ross, Scioto, Union, Williams	Large streams and small rivers in firm sand of riffle areas; also occurs in Lake Erie
---	------------	--	---

<a href="#">Pink mucket pearlymussel</a> ( <i>Lampsilis abrupta</i> )	Endangered	Adams, Athens, Brown, Clermont, Gallia, Hamilton, Lawrence, Meigs, Morgan, Scioto, Washington	The lower Ohio River and its larger tributaries
--	------------	---	---

<a href="#">Purple cat's paw pearlymussel</a>	Endangered	Coshocton	Gravel riffles of medium to large
---	------------	-----------	-----------------------------------

<i>(Epioblasma obliquata obliquata)</i>			rivers
<a href="#">Rabbitsfoot</a> <i>Quadrula cylindrica cylindrica</i>	Threatened	Coshocton, Delaware, Franklin, Madison, Muskingum, Pickaway, Union, and Williams	Fish Creek, Ohio River, Muskingum River, Walhonding River, Big Darby Creek, Little Darby Creek
<a href="#">Rabbitsfoot</a> <i>Quadrula cylindrica cylindrica</i>	Critical Habitat	Coshocton, Madison, Union, and Williams <a href="#">Maps of critical habitat in Ohio</a>	Fish Creek, Little Darby Creek, and Walhonding River
<a href="#">Rayed bean</a> <i>(Villosa fabalis)</i>	Endangered	<sup>1</sup> Adams, Brown, Butler, Clark, Clermont, Coshocton, Darke, Defiance, Delaware, Franklin, Fulton, Greene, Hamilton, Hancock, Hardin, Logan, Lucas, Madison, Marion, Miami, Montgomery, Pickaway, Pike, Ross, Scioto, Shelby, Union, Warren, Williams Wyandot	Smaller, headwater creeks, but they are sometimes found in large rivers, and Lake Erie
<a href="#">Sheepnose</a> <i>(Plethobasus cyphus)</i>	Endangered	Adams, Athens, Brown, Clermont, Coshocton, Gallia, Hamilton, Lawrence, Meigs, Morgan, Muskingum, Scioto, Washington	Shallow areas in larger rivers and streams
<a href="#">Snuffbox</a> <i>(Epioblasma triquetra)</i>	Endangered	Adams, Ashtabula, Athens, Brown, Clermont, Coshocton, Delaware, Franklin, Gallia, Greene, Hamilton, Lake, Lawrence, Madison, Meigs, Miami, Montgomery, Morgan, Muskingum, Pickaway, Ross, Scioto, Union,	Small to medium-sized creeks in areas with a swift current and some larger rivers, and Lake Erie

		Washington	
<a href="#">White cat's paw pearly mussel</a> ( <i>Epioblasma obliquata perobliqua</i> )	Endangered	Defiance, Williams	Firm sand or gravel riffles in small streams and medium to large rivers
<b>Insects</b>			
<a href="#">American burying beetle</a> ( <i>Nicrophorus americanus</i> )	Endangered	Athens, Hocking, Morgan, Perry, Vinton	
<a href="#">Mitchell's satyr</a> ( <i>Neonympha mitchellii mitchellii</i> )	Endangered	Portage	Fens; wetlands characterized by calcareous soils which are fed by carbonate-rich water from seeps and springs
<a href="#">Karner blue butterfly</a> ( <i>Lycaeides melissa samuelis</i> )	Endangered	Luc	

## FROM THE ARTICLE

The major environmental concerns related to offshore wind developments are increased noise levels, risk of collisions, changes to benthic and pelagic habitats, alterations to food webs, and pollution from increased vessel traffic or release of contaminants from seabed sediments. There are several reviews of the potential impacts of offshore wind energy on marine species e.g. [5-7]. As well as potential adverse impacts, there are possible environmental benefits. For example, wind turbine foundations may act as artificial reefs, providing a surface to which animals attach. Consequently there can be increases in the number of shellfish, and the animals that feed on them, including fish and marine mammals [8-11]. A second possible benefit is the sheltering effect. A safety buffer zone surrounding the wind turbines may become a de-facto marine reserve, as the exclusion of boats within this zone would reduce disturbance from shipping. Exclusion of some or all types of fishing could also result in local increases in prey abundance for top predators, whilst reducing the risk of bycatch in fishing gear [9]. Further research is required to understand the ability of wind turbines to attract marine species and the effect of excluding fisheries. Finally, there may also be opportunities in the future to combine offshore wind farms with open ocean aquaculture [12].

Over 2,000 wind turbines are installed in 69 offshore wind farms across Europe, with the greatest installed capacity currently in the U.K. (Figure 2) [3]. As the number of offshore wind farms has increased, approaches for environmental monitoring and assessment have improved over time.

However, there are still few studies that have measured the responses of marine species to offshore wind farm construction and operation, and none have yet assessed longer term impacts at the population level. In Europe, legislation requires consideration of cumulative impacts, defined as impacts that result from incremental changes caused by other past, present or foreseeable actions together with the project [13]. However, approaches for cumulative impact assessments currently vary in terms of their transparency, efficiency and complexity, and this is an active area of research development [14]. In addition to assessing and measuring impacts, it is also necessary to develop decision support tools that will assist regulators with determining whether a proposed development can be legally consented.

In this paper, we first briefly review the potential impacts of offshore wind developments on marine species. We then identify the key lessons that have been learned from our own studies and others in Europe, primarily focusing on marine mammals and seabirds. Much of the environmental research that has been conducted in relation to offshore wind energy has concerned the impact of sound exposure for marine mammals and the risk of collisions with turbines for seabirds. We identify where knowledge gaps exist that could help to improve current models and impact assessments. Finally, we discuss emerging technologies and make recommendations for future research to support regulators, developers and researchers involved in proposed developments, particularly in countries where the implementation of offshore wind energy is still in its early stages.

### Impact pathways

The potential effects of offshore wind farm construction and operation will differ among species, depending on their likelihood of interaction with the structures and cables, sensitivities, and avoidance responses. Studies have generally focused on marine mammals and seabirds because of stakeholder concerns and legal protection for these species and their habitats. The construction phase is likely to have the greatest impact on marine mammals and the activities of greatest concern are pile driving and increased vessel traffic [15]. Pile driving is currently the most common method used to secure the turbine foundation to the seafloor, although other foundation types are being developed [4]. The loud sounds emitted during pile driving could potentially

cause hearing damage, masking of calls or spatial displacement as animals move out of the area to avoid the noise [16,17]. Fish could similarly be affected by these sounds [17-20]. There is also a risk to marine mammals, sea turtles and fish of collision and disturbance from vessel movements associated with surveying and installation activities.

During operation of the wind turbines, underwater sound levels are unlikely to reach dangerous levels or mask acoustic communication of marine mammals [21,22]. However, this phase of the development is of greatest concern for seabirds. Mortality can be caused by collision with the moving turbine blades, and avoidance responses may result in displacement from key habitat or increase energetic costs [23,24]. This may affect birds migrating through the area as well as those that breed or forage in the vicinity.

During operation, cables transmitting the produced electricity will also emit electromagnetic fields. This could affect the movements and navigation of species that are sensitive to electro- or magnetic fields, which includes fish species, particularly elasmobranchs and some teleost fish and decapod crustaceans, and sea turtles [25-27]. Commercial fish species may potentially be positively affected if fishing is prohibited in the vicinity of the wind farm, although this could result in a displacement of fisheries effort and consequent change in catches and bycatch.

The specific species of greatest concern will differ among regions depending on their occurrence and protection status. For example, assessments of impacts upon marine mammals in Europe have generally focused on small cetaceans (particularly harbor porpoises (*Phocoena phocoena*)) and pinnipeds (primarily harbor seals (*Phoca vitulina*)). These species are common in such areas and the EU Habitats Directive (92/43/EEC) requires governments to establish Special Areas of Conservation for their protection. However, in other locations, marine mammal species listed under the Endangered Species Act, such as the North Atlantic right whale (*Eubalaena glacialis*), blue whale (*Balaenoptera musculus*), humpback whale (*Megaptera novaeangliae*), and fin whale (*Balaenoptera physalus*), may be of greater concern. Based on their call frequencies, these large whales are considered to be sensitive to the low frequency sounds produced during pile driving [16,28,29].

There is also a paucity of information on the effects of human-generated sound on fish [18,20,30,31]. Evidence of injury from pile driving sounds in a laboratory simulated environment has been reported for several fish species [32-34]. Recovery tended to occur within 10 days of exposure and is unlikely to have affected the survival of the exposed animals.

Common sole larvae (*Solea solea*) also survived high levels of pile-driving sound in controlled exposure experiments [35]. However, a behavioral response was triggered in cod (*Gadus morhua*) and sole by playbacks of pile driving sounds in the field and was initiated at a much lower received sound level [36]. This could consequently result in a large zone of behavioral response. The sounds produced by offshore wind farms may also mask fish communication and orientation signals [30]. These responses need to be investigated further to determine their potential effect on foraging, breeding and

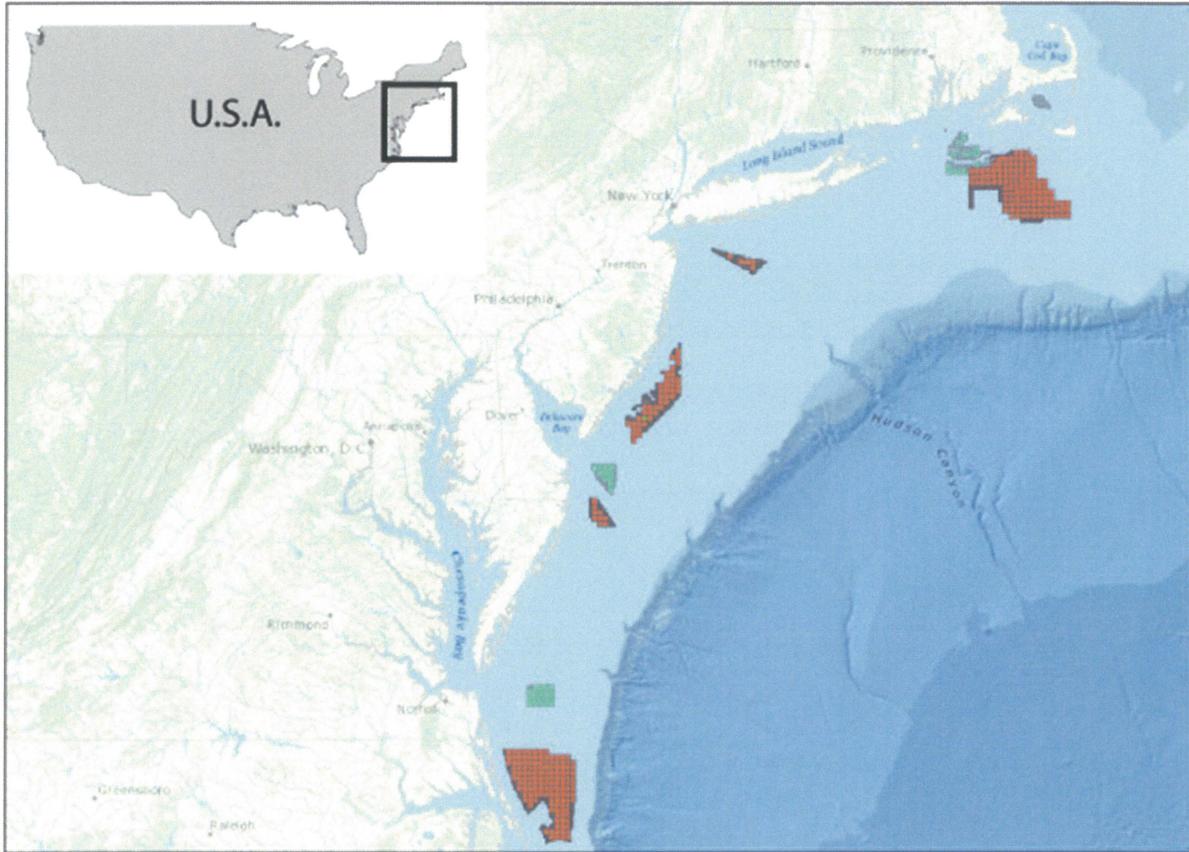
migration, and require the ability to record the movements of fish as well as the measurement of sound pressure levels and particle motion since fish are sensitive to both [18,37]. Some fish species are short-lived and highly fecund reducing the likelihood of any longer-term population level effects from wind farm noise and disturbance. **However, this is not true of all fish species and there are endangered species, such as the Atlantic sturgeon (*Acipenser oxyrinchus*), those listed as vulnerable, such as the basking shark (*Cetorhinus maximus*), and potential impacts to fisheries which may need to be taken into consideration.**

Much of the early work investigating impacts upon bird populations at European sites has focused on species of migratory or wintering waterfowl [23,38]. There is much less known about potential collision risk or displacement for the broader suite of seabird species that occur in many of the areas currently being considered for large scale wind farm developments. **Migrating bats have also been found to occur offshore [39,40], although relatively little research on their offshore distribution, collision risk and potential displacement by offshore wind farms has been done compared to that for wind farms on land [39,41].**

**Other taxonomic groups such as sea turtles are rare visitors to coastal European waters, and have not been considered at high risk from the effects of offshore wind farms.** However, in other areas, for example along the North American coast, there may be sea turtle nesting or breeding grounds in the vicinity of proposed sites [42]. **It has recently been determined that the hearing sensitivity of leatherback turtles overlaps with the frequencies and source levels produced by many anthropogenic sounds, including pile-driving [43]. This highlights the need for a better understanding of the potential physiological and behavioral impacts on sea turtles.**

### Lessons learned

Environmental research for offshore wind energy has evolved over time in Europe as a better understanding of the type of information and analysis that best informs decisions about the siting of offshore wind facilities has been developed. Other countries interested in offshore wind energy, such as the U.S.A. (Figure 3), may therefore benefit from the European experience and hindsight to maximize the potential success of their projects [44]. Based on our experiences relating to marine mammals and seabirds, the key lessons learned that we have identified are:



[Open in a separate window](#)

Figure 3

**Potential wind energy areas in the Mid-Atlantic off the U.S.A.(source BOEM).** There are no commercial wind farms currently on the Atlantic outer continental shelf off the U.S.A., but the Bureau of Ocean Energy Management (BOEM) has designated wind energy areas, which are in the planning (orange squares) and leased (green squares) stages (July 2014).

## 1. Define the area of potential effect

- Identifying the area over which biological effects may occur to inform baseline data collection.
- Determining the connectivity between key populations and proposed wind energy sites.

## 2. Identify the scale and significance of population level impacts

- The need to define populations, identify which populations occur within the wind energy site and the area of potential effect, and their current status.
- The requirement for demographic data and information on vital rates to link individual responses to population level consequences.
- Research to test and validate modeling assumptions and parameters.

### 3. Validate models through measuring responses in the field

- Use of a gradient design to determine the extent of spatial displacement as a result of offshore wind energy development and how this may change over time.
- Utilization of techniques with the power to detect changes.
- Coordination of human activities and monitoring in the vicinity of wind energy sites.

### 4. Learn from other industries to inform risk assessments and the effectiveness of mitigation measures.

- Onshore wind energy, seismic surveys and floating oil platforms.

We will discuss each of these lessons learned in more detail and then provide recommendations for further research to fill identified knowledge gaps, test existing models and improve future environmental impact assessments (EIA).

SEE LINK FOR FULL ARTICLE

For birds, the operational phase of wind farms is likely to present the biggest risk. Vulnerability and mortality at onshore wind turbines has been identified as being related to a combination of site-specific, species-specific and seasonal factors [59]. The development of collision risk models for seabirds requires information on their spatial distribution and flight heights to determine the likelihood of co-occurrence with the wind turbine blades, and their avoidance response to estimate the mortality risk [60]. However, much of this relies on expert-based estimates because there are very few empirical data on flight heights for different seabird species [24]. Although there have been estimates of flight heights during ship-based surveys where they are classified into altitude categories there can be large inter-observer differences [61]. One recent approach to address this data gap is to model flight height distributions based on compilations of survey data [62,63].

While information on site-specific flight heights of bird species is lacking, there is even less information on avoidance responses to large offshore wind farms by birds. The few studies examining avoidance behavior involved tracking eider ducks (*Somateria mollissima*) and geese by radar. These studies documented a substantial avoidance response by these migrating birds, which reduced the collision risk [23,64]. There is a need for empirical data on both broad and fine-scale avoidance responses to improve the reliability of predictions from collision risk models [65]. There should also be a focus not only on estimates of mortality, but also of the energetic consequences of avoidance and displacement behaviors [66], and their impacts on survival and fecundity. The cumulative impacts of different disturbance activities (such as ship and helicopter traffic) and multiple wind energy sites within the migration pathway or home range of a population should also be considered [67].

### Population level impacts

The regulatory requirements for assessing the impacts of a proposed activity and determining whether it is biologically significant will vary among countries. However, in general this process will require populations to be defined, identifying which of these populations occur within the

area of potential effect, and understanding their current status to determine whether the impact will be significant. The complexity of approaches, models and simulation tools to support these assessments has greatly increased over time [24,58,68]. However, there are still many knowledge gaps concerning behavioral responses, particularly on the consequences of any behavioral change on vital rates. For example, there is a growing understanding that anthropogenic noise, such as pile-driving, may affect the behavior of marine mammals and lead to spatial displacement [69]. However, there have been no empirical studies linking the consequences of this behavioral response to longer term population change. Similarly, there are concerns that the presence of wind farms may displace seabirds from preferred foraging areas [24], but there is limited understanding either of the extent of such effects or of the individual and population consequences of displacement, should it occur.

For other management issues, such as bycatch, estimates of Potential Biological Removal have provided management limits for human-caused mortality in mammals [70,71], but this approach cannot be used for assessing non-lethal impacts. To address this, a framework was developed called “Population Consequences of Acoustic Disturbance” (PCAD) [29,72]. The aim of this approach is to link behavioral responses by individuals and their vital rates to determine the consequences for the population. In addition to the spatially-explicit information on distribution and abundance typically collected for impact assessments, this approach also requires knowledge of dose–response relationships to link behavioral responses and demographic parameters. Since a general characterization of the dose–response relationship between received noise levels and changes in vital rates does not exist for marine mammals, expert judgment has been used to link individual impacts to changes in survival or reproductive rates [73].

Given the uncertainties involved, the population level assessments required from developers by U.K. regulators have been very conservative, and are expected to overestimate the impacts to populations. Nevertheless, the application of such an approach to a harbor seal population suggested that the population trends were largely driven by the baseline dynamics of the population and, even in a worst-case scenario of impacts, only a short term reduction in numbers would be expected to occur [58]. The long-term dynamics appeared relatively robust to uncertainty in key assumptions, but there is still a strong reliance on expert judgment and many assumptions are made. Focused studies around subsequent developments are now required to test these modeling assumptions and frameworks to ensure they are robust and, if appropriate, made less conservative in the future.

There is also a strong reliance on expert judgment in seabird collision risk models and sensitivity indices [24,60]. Avoidance rates are applied to collision risk models, but for many species they are not based on empirical data. Work is ongoing to provide estimates of these, but has been hampered by a lack of suitable techniques. The importance of this human-induced mortality on seabirds may depend on the current status of the population, with conservation concerns potentially being greater for populations that are currently in decline. For example, black-legged kittiwakes (*Rissa tridactyla*) have declined by more than 50% since 1990 in the North Sea [74]. The cause of this decline has mainly been attributed to poor breeding success as a result of reduced recruitment of their prey species, the lesser sandeel (*Ammodytes marinus*), linked to warm winters and the presence of a local sandeel fishery [74]. Black-legged kittiwakes generally fly below the minimum height of any turbine’s rotor blades, but there were approximately 15.7% of flights that occurred within a generic collision risk height band defined as 20–150 m above sea level [62] and their avoidance response is unknown. The potential additional mortality that

offshore wind farms could induce for this declining population makes this species of particular concern in the environmental assessment and consenting process.

Seabirds are considered at their most vulnerable when wind energy sites are proposed near their breeding colonies. During the breeding season, they make regular trips between their nest and foraging grounds. This could reduce the collision risk for wind farms proposed further offshore, but there is generally less known about the distribution and habitat use of seabirds in these areas outside of the breeding season, and their connectivity with any protected areas. As wind farms move further offshore such knowledge gaps will need to be addressed.

# The Toledo Blade

## Green energy or bird choppers? Lake Erie wind farm needs closer look



By [Matt Markey](#) | BLADE OUTDOORS EDITOR

Published on July 9, 2018

CLEVELAND — There is a “green” issue boiling in the waters off this large city on the shore of Lake Erie, and this time it does not involve algae.

It is a long-running skirmish among groups with a seemingly common conservation-rooted agenda, but markedly disparate priorities when it comes to the placement of electricity-generating wind turbines. The debate has grown from a clash of conflicting data sets to what is now pushing toward a feather-strewn philosophical slugfest.

On one side we have the wind energy movement, which has been given considerable lift by political forces, intense lobbying, and its ability to slurp up federal grants and tax money along the way. Many of the wind energy projects also have been championed by big labor, seduced by the sirens’ song of jobs, jobs, jobs.

At odds with some of the wind farm projects we have found adjacent landowners concerned about the potential loss of property values, the constant companionship of that non-Gregorian hum created by the huge blades, and

the lack of information on the long-term health risks, if any, associated with living near a 500-foot-tall twirling Goliath of an erector set.

There is also some serious trepidation expressed by avian experts, who fear that these gargantuan towers will too often become wolves in sheep's clothing in their dual role as smoke-free electricity generators, and bird choppers. They accuse the wind agents of expert shopping, and crafting studies simply to create the desired outcome, while ignoring the real threat these turbines pose to anything that flies.

The Tennessee Wildlife Federation reported that in just two months, the turbines at the Backbone Mountain wind farm sliced apart 2,000 bats. PacifiCorp Energy paid a \$2.5 million fine following its guilty plea to violating the federal Migratory Bird Treaty Act regarding the deaths of 38 golden eagles and 336 other protected birds at its wind farms.

While the siting of wind turbines has created legal wrangling and passionate dustups from San Diego County in Southern California all the way to Martha's Vineyard in Massachusetts, and one such debate now rages in the agricultural expanses of northwest Ohio's Seneca County, the issue here is the plan from Icebreaker Windpower and the Lake Erie Energy Development Corp. to place six huge wind turbines out in the lake, as a demonstration facility for wind-powered electric generation. Eventually, the entire project could involve as many as 1,400 or more wind turbines standing in Lake Erie.

The Ohio Power Siting Board's mission is defined as one that supports "sound energy policies that provide for the installation of energy capacity and transmission infrastructure for the benefit of the Ohio citizens, promoting the state's economic interests, and protecting the environment and land use." In short, the OPSB makes the call on approving or rejecting wind projects.

The panel will hold a public hearing on the proposed Lake Erie wind farm project at 6 p.m. on July 19 in Cleveland City Council chambers downtown, the timing of which is puzzling for some, considering the OPSB's technical staff has already recommended approval of the \$126 million project, subject to conditions. That conditional blessing came down on the eve of the Independence Day holiday, and the timing of the recommendation does satisfy OPSB protocol.

Another hearing is set for Columbus on August 6, with the OPSB's final decision on the project to be rendered at some point following that meeting. This notion might vary from the process flowchart the panel is following, but shouldn't these critical public hearings take place *before* a formal recommendation on the project is rendered? At a previous hearing, it did not take a fire marshal to figure out that organized labor put out the call to pack the room, and most of the 150 some people present gave a rowdy "harrumph" at the mention of the construction jobs such a project would likely involve. A victory by volume and sheer numbers should not be interpreted as a clear indication of the most pressing concerns being addresses, and the issue being settled.

It is also very shake-the-head-and-wince curious that in any discussions or studies into the potential harm these giant blades might do to birds, bats, and waterfowl, the best experts right there in the neighborhood were not consulted. Black Swamp Bird Observatory, located near Oak Harbor, has as its mission the study of the birds that make their homes along the lake, and those that pass through our region on their migratory route.

BSBO also has as its research director Mark Shieldcastle, widely considered the preeminent expert on the birds of this area, and the many species that use this flyway en route to their nesting grounds in the north country from their wintering grounds in the tropics. His 32 years as a wildlife biologist who has focused his life's work on avian research – wouldn't that make him someone you would consult before placing six massive metal obstacles out in the lake?

Mr. Shieldcastle has many concerns related to the project, and the apparently flimsy research that has been used to possibly minimize the turbines' impact on the lake's frequent fliers. Since he has done extensive studies on bald eagles, cranes, terns, rails, waterfowl, shorebirds, and migrating raptors and passerines, this subject seems to be right in his wheelhouse, but the wind turbine folks have not tapped into his expertise.

“This project represents a microcosm of what the concerns are with the wind industry as a whole,” he said. “Extremely poor studies are being conducted, and the conclusions they reach are not based on sound science.”

Mr. Shieldcastle pointed out what he considers egregious flaws in some of the avian impact studies related to the project that have been done to date.

“They concluded there were no birds, but they were looking at a time when birds were not moving,” he said.

“You need to get good information in order to make informed decisions, and the consistent thing I'm seeing in all of these projects is the use of poor science in order to make conclusions you can't support scientifically. They make it sound like it is fact, and expect everyone to accept it.”

There is also the concern over what demons from our heavy industrial past might we be awakened when the lake bottom is disturbed in order to anchor these behemoths.

This is the first Lake Erie wind turbine project that has been recommended for approval by the OPSB. They have placed some “conditions” on their approval of the project, but if those conditions are met with studies that lack transparency, or are built on flimsy science, or by cherry-picking numbers and portions of studies that push a favorable breeze on this wind farm, we all lose.

Going green is fine, but not appropriate in every circumstance or in every locale. In certain places, harnessing the wind just carries an unacceptable price tag. We need to be certain Lake Erie is not in that club.