

Wind Power and Birds

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SUMMARY

Wind power is one of the cleanest, most environmentally benign, and most sustainable ways to generate electricity. Relative to the environmental effects of extracting and burning fossil fuels to generate electricity, wind power likely causes far fewer bird mortalities. However, wind power may have a variety of negative effects on birds including direct mortality caused by collisions with turbine blades. Site selection may be the most critical determinant in terms of limiting aerial wildlife mortality. WBCI recommends the USFWS Guidelines in the process of wind project site selection. Modern monopole wind turbine designs are less dangerous to birds than designs of the 1970s and 1980s. Wind power is generally a less important source of mortality for birds than those caused by free-ranging cats, collisions with window glass, or pesticides, but increasing wind power deployment may also increase the risks of mortality. The American Bird Conservancy has developed an extensive set of suggested guidelines for managing wind power effects on birds, and seeks to get cooperation from federal and state agencies to modify current practice. Other issues such as displacement of birds caused by habitat changes resulting from the construction and operation of the tower may have indirect but serious effects on birds.



INTRODUCTION

Though many studies report relatively low levels of mortality (with some notable exceptions), wind power has the potential to cause significant avian mortality. Careful siting of wind power installations has shown to be effective in managing the extent of mortality. Researchers have concluded that studies reporting an impact “are a clear warning that the inappropriate location of wind farms can adversely affect wild bird populations” (Drewitt and Langston 2006, p. 12-13). Land uses such as agriculture are generally compatible with the deployment of wind power installations, but issues such as displacement effects may have other serious consequences for bird populations.

DISCUSSION

Collisions with window glass and communications towers, pesticide-caused deaths, and predation by free-ranging cats each cause bird deaths and disruption several orders of magnitude greater than wind turbines. See this website for a comparison of varied sources and effects of mortality:

<http://www.stateofthebirds.org/abundance/anthropogenic> .

Wind turbines may cause mortality directly by birds colliding with the spinning blades. They may also cause indirect adverse effects on birds by making the surrounding habitat unsuitable or less suitable for use (e.g. foraging, sheltering/resting, breeding/displaying) by various species. Diving waterfowl and waterbirds such as the Long-tailed Duck, scoters, loons or grebes may avoid offshore wind farms, as prairie grouse may also do on inland wind farm sites (Drewitt and Langston 2006, Pruett et al. 2009).

Determining the location of wind power installations may be the most important consideration in regard to limiting bird (and bat) mortality and disturbance. Each proposed wind power installation should be scrutinized for its potential impact on nesting and migrating birds and other wildlife and native plant communities. Ideally, wind installations will be situated on already disturbed land (e.g. agricultural land) to minimize or eliminate the loss of habitat for wildlife.

Newer wind energy installations generally have much lower rates of avian mortality associated with them than those built 25 or more years ago. This may be attributable to both improvements in site selection and improvements in the designs of the turbines and towers themselves. No wind turbine design completely eliminates collision mortality of birds or other wildlife, including and especially bats. However, early wind turbine towers were often lattice-type structures that unwittingly provided perches for birds, especially raptors, and likely attracted additional birds into close proximity with the turbines. Nearly all utility-sized turbines are now mounted on monopoles which do not allow birds to perch and thus do not attract birds to the area.

Regulation in Wisconsin

The Wisconsin Department of Natural Resources (WDNR) has no regulatory power in the siting of wind power installations. They can only suggest voluntary guidelines. When wind farm facilities are 100 megawatts or more, the Public Service Commission of Wisconsin (PSC) has preemptive authority over local government decision-making authority. Local governments (county or town boards) have this responsibility when installations are below this threshold, but must adhere to PSC wind siting criteria. WDNR (see more at <http://dnr.wi.gov/topic/Sectors/Wind.html>) and the US Fish and Wildlife Service (USFWS) may however become involved in cases where threatened or endangered species are affected, or in trying to ensure that adequate studies are done. At least one local hearing would be held in a decision process, and interested parties may wish to participate in these hearings to affect their outcome.

Developing Wind Power on the Great Lakes

An emerging issue of concern for potential impacts to birds and bats is the development of wind power installations on the Great Lakes. Besides possible bird mortality from outright collisions with wind turbine blades, there is also concern about displacement caused by disturbance, barrier effects of wind installations on bird movement, and loss of habitat, all of which may impact bird populations. For example, the existence of wind turbines in offshore areas has sometimes been shown to cause “displacement” of waterbirds and waterfowl from offshore foraging areas and habitat (Drewitt and Langston 2006, Boehlert and Gill 2010, Masden et al. 2010).

The PSC conducted an initial investigation into the feasibility of developing wind energy on the lakes in 2009. The resulting 195 page report, [Harnessing Wisconsin's Energy Resources](#), includes information on the “Environmental considerations for off-shore wind” (Section 5), with additional information pertinent to birds in Appendices E and F. The report can be found at:
<http://psc.wi.gov/initiatives/globalWarming/documents/WOWreport11509.pdf>

To prepare for the possibility of eventual offshore wind development on the Great Lakes, a group of researchers has been conducting offshore (in western Lake Michigan from one mile to 10 miles from shore) surveys for waterfowl and waterbirds across multiple years, seasons and areas on the lower Great Lakes for nearly the past decade.

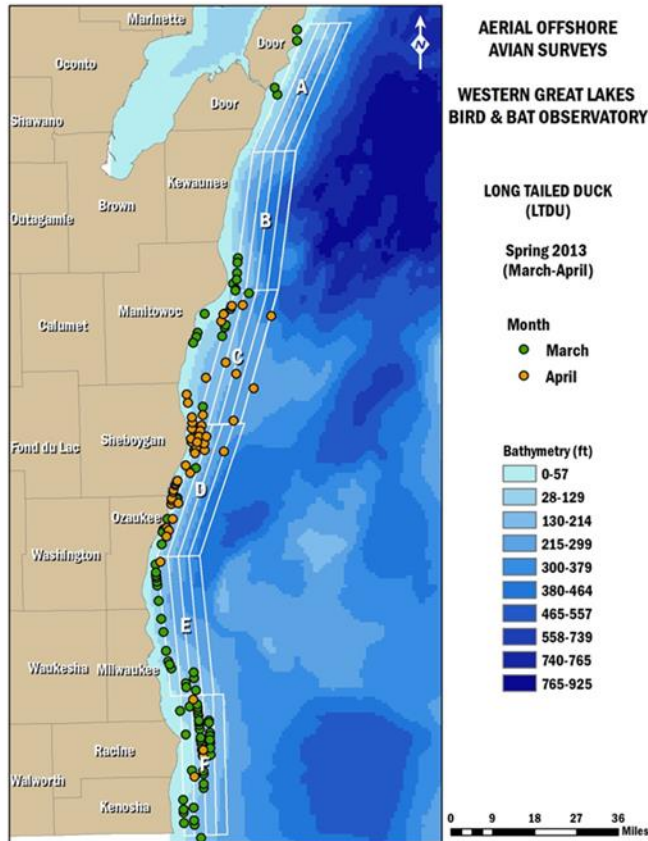


Figure 1 – Long-tailed Duck distribution in western Lake Michigan – Spring 2013

Map courtesy Western Great Lakes Bird and Bat Observatory © 2014

Little was previously known about the use of this offshore zone by waterfowl and waterbirds. Figure 1 plots the distribution of Long-tailed Ducks (*Clangula hyemalis*) observed in the near-offshore region along the western shore of Lake Michigan in the course of one of these surveys. These surveys show extensive use of some areas of this zone by large numbers of waterfowl and waterbirds, with numbers and distribution varying according to seasonal timing. It is hoped that these surveys will contribute information that will provide guidance for responsible wind development in the Great Lakes.

RECOMMENDED ACTIONS

WBCI strongly advocates the use of the USFWS Interim Voluntary Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines for site selection and construction of wind turbine installations. This document is available on-line at [USFWS Interim Guidelines](#).

Become involved in the discussion about wind power facilities proposed for your area. Participate in public hearings and ask questions about how the proposed facilities might impact birds and other wildlife. Communicate concerns you may have with your county and local governments, and the facilities' planners. If discussions with these parties are not constructive, notify the media and state bird conservation organizations and networks of your concerns. Contact the WDNR and USFWS if you have reason to believe that threatened or endangered birds are likely to be affected.

Support the use of sustainable/renewable sources of electricity whenever and wherever they are found to be bird-safe and otherwise ecologically responsible.

Since this paper was first published in 2005, the American Bird Conservancy along with several other organizations has campaigned for greater oversight of wind power projects, and a move from voluntary to a more thoroughly mandated rulemaking via USFWS. See ABC Bird-Friendly Wind Policy at:

http://www.abcbirds.org/abcprograms/policy/collisions/wind_farms.html

Additional research is needed regarding alternate lighting sources, long-term displacement effects, possible methods of mitigation, and the relative danger to birds posed by different wind power installation designs. Again, see the American Bird Conservancy policy and guidelines at:

http://www.abcbirds.org/abcprograms/policy/collisions/wind_farms.html

RESOURCES

The Wildlife Society Renewable Energy Working Group

<http://drupal.wildlife.org/renewenergy>

American Bird Conservancy – Birds and Wind Development

http://www.abcbirds.org/abcprograms/policy/collisions/wind_developments.html

American Bird Conservancy – Coal: Extraction and Energy Production Impacts on Birds

<http://www.abcbirds.org/conservationissues/threats/energyproduction/coal.html>

Public Service Commission of Wisconsin - Harnessing Wisconsin's Energy Resources, includes information on the "Environmental considerations for off-shore wind" (Section 5), with additional information pertinent to birds in Appendices E and F.

<http://psc.wi.gov/initiatives/globalWarming/documents/WOWreport11509.pdf>

Wind Turbine Interactions with Birds and Bats: summary and questions [NWCC Wildlife factsheet.pdf](#).

New Jersey Audubon position paper on wind energy and its effects on wildlife: [NJ Audubon wind energy and wildlife](#).

Wind power and birds statement from Curry and Kerlinger (consultants on wind energy and effects on birds):

[Curry & Kerlinger - wind energy and birds.](#)

BirdLife International - The design and siting of wind turbines can reduce the risk of collision to birds of prey: <http://www.birdlife.org/datazone/sowb/casestudy/533>

Windfarms and Birds: An analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues:

http://migratorysoaringbirds.undp.birdlife.org/sites/default/files/BirdLife_Bern_windfarms.pdf

State of the Science: An Assessment of Research on the Ecological Impacts of Wind Energy in the Great Lakes Region: <http://www.glc.org/files/docs/2011-scientific-assessment-wind-energy.pdf>

[Union of Concerned Scientists – Environmental Impacts of Wind Power](http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-wind-power.html#.VRsKePnF91Y)
http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-wind-power.html#.VRsKePnF91Y

The Avian and Wildlife Costs of Fossil Fuels and Nuclear Power
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2198024##

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REFERENCES

Boehlert, G.W., and A. B. Gill. 2010. Environmental and ecological effects of ocean renewable energy development – a current synthesis. *Oceanography* 23 (2): 68-81.

Drewitt, A.L. and R. H. W. Langston. 2006. Assessing the impacts of wind farms on birds. *Ibis* 148: 29-42.

Masden, E. A., D. T. Haydon, A. D. Fox, and R. W. Furness. 2010. Barriers to movement: modelling energetic costs of avoiding marine windfarms amongst breeding seabirds. *Marine Pollution Bulletin* 60: 1085 -1091.

Pearce-Higgins, J. W., L. Stephen, R. H. W. Langston, I. P. Bainbridge, and R. Bullman. 2009. The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology*. 46: 1323- 1331.

Pruett, C. L., M. A. Patten, and D. H. Wolfe. 2009. Avoidance behavior by prairie grouse: implications for development of wind energy. *Conservation Biology* 23 (5): 1253-1259.

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