New report deepens understanding of wind-wildlife interactions

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The Judith Gap Wind Energy Center in Montana is comprised of 90 GE 1.5-MW turbines, for a total capacity of 135 MW. Credit: Invenergy LLC, NREL.

The Ecological Society of America (ESA) announces the publication of a new report, "Impacts to Wildlife of Wind Energy Siting and Operation in the United States," in ESA's *Issues in Ecology* publication.

An increase in the generation of wind energy is a key component of the U.S. strategy to reduce carbon emissions from the power sector. Approximately 97 gigawatts of wind energy production capacity are currently installed in the U.S., and in 2018, wind energy supplied about 6.5% of the nation's electricity. Scenarios developed by various groups, including U.S. Department of Energy, indicate that a four- to five-fold expansion over current levels of electricity produced by wind is needed by the year 2050 to help meet U.S. carbon emission reduction goals.

The report examines wind-wildlife interactions and places them within the larger context of climate change challenges, citing the need to balance wildlife conservation with the urgent need for rapid and deep cuts in greenhouse gas emissions. It summarizes what is known about wind energy impacts on sensitive wildlife and on where these species live, and it identifies areas where further research is needed.

"ESA's most recent peer-reviewed *Issues in Ecology* brings together the best available science on interactions between wildlife and wind installations. ESA is pleased to present the report along with the wide range of public and private partners who collaborated on this project. Understanding how to minimize the impacts to wildlife from renewable energy sources like wind energy are integral to address climate change and preserve ecosystems that sustain life on Earth," said ESA Executive Director Catherine O'Riordan.

The American Wind Wildlife Institute (AWWI), an independent nonprofit science organization that facilitates research and collaboration on issues relating to wind-wildlife interactions, contributed logistical and financial support for the report.

"AWWI is extremely pleased to announce the release of this report that synthesizes the trove of existing research on this important topic," said Executive Director Abby Arnold. "By providing a concise summary of current, accurate, and properly contextualized information about wind-wildlife interactions and efforts to find solutions, it highlights what we know, where more work is needed, and offers a road map for near term future investment and resources. We know wind power can mitigate climate change; we are focusing our attention on the most critical questions to support sustainable wind energy while conserving wildlife and habitat."

The report highlights the need to gather more research to better understand and address wind energy impacts on wildlife while summarizing key findings from available research on wind energy and wildlife interactions for both onshore and offshore wind energy. Wind energy—like any energy source—can have impacts on certain species of wildlife. Wind installations on land can affect some birds and bats, and more research is needed to assess whether there are risks to marine wildlife and fisheries from offshore installations. Studies suggest that properly-sited wind energy facilities that have put measures in place to reduce risk of impacts to wildlife, such as adhering to voluntary federal guidelines, have the lowest environmental impact of any energy generation source.

"Wind energy is an important tool to help fight climate change," remarked Garry George, clean energy director for National Audubon Society. "Climate change is *the* biggest threat to birds in North America, as revealed in our 2014 climate report. But if we're going to substantially expand wind energy in this country, we have to make sure that existing and new wind facilities avoid, minimize, and mitigate wildlife impacts to the greatest extent possible. This report will help utilize and prioritize research so we can make that happen."

Mexican free-tailed bats exit Bracken Bat Cave in Texas. The new report highlights the need for more research on wind energy impacts on bat populations and sensitive bird species. Credit: USFWS.

The *Issues* report details insights into wind turbine effects on birds and bats. For most songbird species in the U.S. for which there is data, it appears there is unlikely to be a population-level effect from collisions with wind turbines—these collisions represent less than 0.01% of estimated population size. However, groups of certain species like migratory tree bats may be more at-risk of population-level effects. Highlighted in the report findings is the need for more research on why these species are more sensitive than others in order to inform the development of technologies and strategies to minimize impacts.

There are such technologies and strategies currently in use or under development to avoid or reduce adverse impacts during wind energy construction and operation described in the report. These include siting wind farms in areas away from potential at-risk species, selectively or automatically shutting down turbines at certain times to reduce risk, and minimizing impacts through use of technologies or techniques akin to machine-learning technologies intended to detect certain species and technologies that aim to deter certain species collisions using sound or lights.

Taber D. Allison, director of research for AWWI and lead author of the *Issues* report, explained that the great level of detail of the report is made possible by unprecedented cross-sector research, "The significance of this report is that it distills the results of 25 years of collaborative, focused research that involves knowledge and data contributions from the wind energy industry, state and federal agencies, conservation groups, academia, and scientific organizations." Taber summarized its importance, "It establishes a foundation for the next stage of innovation and solutions."

Thirteen scientific experts in wind energy and wildlife science from organizations, agencies, and universities co-authored the report. Several initiatives are engaged in this collaborative effort, including AWWI, the Bats and Wind Energy Cooperative, the National Wind Coordinating Collaborative, and the Wind Wildlife Research Fund. Similar efforts are beginning to emerge for offshore wind-wildlife research, state-based and others, such as the Responsible Offshore Science Alliance and the Pacific Ocean Energy Trust.

State and federal agencies including the U.S. Geological Survey (USGS) were also involved in this collaborative research effort. "The USGS is directly involved in monitoring the health and well-being of our nation's wildlife populations, and we have made meaningful progress in

understanding how wildlife interacts with wind energy," commented Jay Diffendorfer, USGS research ecologist. "The knowledge contained in this report will help prioritize and focus future research efforts as demand for clean, emissions-free sources of electricity continues to rise, and ensure we are building scientifically-robust findings and recommendations."

State agencies will also benefit from the information in the *Issues* report as they engage in decisions around siting new wind farms. Ron Regan, executive director of the Association of Fish and Wildlife Agencies, observed, "This new report is a great resource because it synthesizes all of the current science on wind energy and wildlife and reviews the risks and the options for reducing impacts. This will help environmental regulators make informed decisions on the ground."

A unique aspect to this research is that the wind industry has proactively sought to collect data about its impacts on wildlife and to invest in solutions. As a result, more is known about how wind affects wildlife than about any other energy generation source.

"Thanks to the ongoing work of researchers in this field and cross sector investment and collaboration, we can now step back and see what's been accomplished, and what work still needs to be done," remarked Jenny McIvor, vice president of Environmental Policy and Chief Environmental Counsel at Berkshire Hathaway Energy Company and chair of AWWI's Board of Directors. "By establishing what we know, we can best direct our efforts so we can get the benefits of expanding wind energy while also understanding and minimizing our impacts on wildlife."

Provided by Ecological Society of America