

## ABC's Bird-Smart Wind Energy Campaign: protecting birds from poorly sited wind energy development

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**Abstract:** This article summarizes American Bird Conservancy's (ABC's) strategies and goals for achieving Bird-Smart wind energy in the United States. We describe the current and projected impact of wind energy development on birds and bats in the United States. We also discuss how bird (and bat) conservation goals could be made more compatible with wind energy development through improved science and regulation. We provide examples of poorly sited wind energy projects, existing and proposed, which call into question the efficacy of current voluntary federal permitting guidelines. We discuss the need for improved transparency and independent site-by-site pre-construction risk assessment, science-based decision-making, independent collection and reporting of post-construction bird (and bat) fatality data, and consideration of cumulative impacts.

**Key words:** American Bird Conservancy, compensation, mitigation, policy, regulation, risk assessment, siting, turbines, wind energy

THE UNITED STATES is a global leader in wind energy development. As of September 2014, there were 46,600 operational wind turbines, with a total generating capacity of 62,300 MW. An additional 1,254 MW came online in 2014. There are currently 13,600 MW under construction (Anonymous 2014), and many more turbines are planned, onshore and offshore.

Wind energy is seen as a possible solution to anthropogenic climate change, the goal being to reduce our reliance on fossil fuels, such as coal and gas, and to move rapidly to clean and renewable sources of energy. Renewable energy produces few, if any, greenhouse gas emissions, and therefore contributes little to global climate change. Wind energy development, along with solar energy, have therefore become important to the so-called green revolution. But, wind energy has a dark side—significant numbers of ecologically important birds and bats are being killed by wind turbines. Deaths occur from collisions with the rapidly moving blades that capture wind energy, or, in the case of bats, even by sudden changes in air pressure and the powerful air turbulence created by the blades (Baerwald et al. 2008).

To address this growing threat, American Bird Conservancy (ABC) established its Bird-Smart Wind Energy Campaign in 2010, following receipt of a grant from the New York-based Leon Levy Foundation. ABC, one of the Western Hemisphere's leaders in bird conservation, has programs that address many major sources of bird mortality in the Americas, including habitat loss, predation by feral cats, collisions with buildings, pesticides, electrical transmission towers and lines, and wind energy. ABC has focused primarily on issues that are large-scale, complex, nuanced, often difficult to address, and for which others do not possess either the expertise or willingness to tackle.

Our intent in this paper is to summarize the Bird-Smart Wind Energy Campaign's core goals and the various strategies by which it is addressing them. More specifically, we define what ABC means by the term "Bird-Smart Wind Energy" and explain why it is concerned about the way that wind energy development is currently being implemented in the United States.

ABC supports wind energy development to address anthropogenic climate change



**Figure 1.** One of the earliest wind facilities, Altamont Pass Wind Farm in northern California, contributes to hundreds of thousands of native birds and bats killed annually in the United States. (Photo courtesy of Mike Parr)

but is concerned about its impact on birds and bats. It is critical that we begin to replace fossil fuels with renewable sources, and wind offers tremendous potential for the future. New designs and mitigation methods may eliminate bird and bat impacts altogether at some point, but for now, serious concerns remain. ABC is first and foremost a bird conservation organization; it is our contention that wind energy development in the United States has gotten way out ahead of the science and regulatory framework. Consequently, our nation's ecologically important native birds and bats are not receiving the kind of protection they deserve from this rapidly proliferating and largely unregulated industry.

### The challenge

The wind energy industry has done a remarkable job of selling itself as a “green” method of energy production. However, wind turbines kill hundreds of thousands of ecologically important native birds and bats annually. This has been confirmed by several peer-reviewed studies. Smallwood (2013) reviewed bird and bat fatalities from 31 different wind facilities in the United States (Figure 1). After correcting for observer error and predator removal of carcasses, he estimated that 573,000 birds and 888,000 bats were being killed annually by U.S. wind energy facilities at 2012 build-out levels. There are vastly more

wind turbines on the landscape now, and that number is expected to swell exponentially as the country moves toward its goal of having 20% of its electrical energy supplied by wind by 2030.

Loss et al. (2014) looked exclusively at the impact of monopole turbines on birds. Based on the 68 studies they reviewed, they estimated that these turbines kill 239,000 birds annually. However, they also predicted that by 2030, wind turbines could be killing 1.4 million birds annually. Additionally, they

found that bird collision mortality is correlated with increasing hub height. Across a range of turbine heights from 36 to 80 m, the study predicts a staggering tenfold increase in bird mortality. This same article stated that wind turbine height in the United States has risen 50% in the past decade, which suggests that the threat is increasing, not decreasing.

Erickson et al. (2014) estimated that 238,000 birds were being killed in the United States annually by wind turbines, including 134,000 to 230,000 small passerines. However, this study did not include some of the worst-killing wind facilities, nor did it extrapolate its findings to future build-out. When this is done, the estimate still reaches 1 to 2.5 million birds killed annually.

Furthermore, it is likely that all of these studies represent underestimates of actual bird and bat kills. There are methodological issues, such as observer bias and loss of carcasses from predator removal, that make it difficult to obtain accurate data on bird and bat mortality (Smallwood et al. 2010). In the case of offshore wind energy, it will be particularly difficult to assess types and numbers of birds and bats killed, as the turbines lie over open water, thus making carcass retrieval nearly impossible (Bailey et al. 2014). However, new developing technologies (e.g., Flowers et al. 2014) might help with these assessments going forward. It should also be noted that these estimates do

not include deaths or reproductive failure from habitat loss or disturbance (Bailey et al. 2014). Shaffer and Buhl (2015) recently discovered that grassland birds in the Midwest were displaced from their habitat a year after turbine construction, and the displacement persisted for at least 5 years. They concluded that this has resulted in population level effects on several species. Furthermore, avian mortalities from collisions or electrocutions at the transmission towers and lines associated with wind facilities could run into the millions (Manville 2005, Loss et al. 2014). Many hundreds of miles of new transmission lines and towers are currently under construction or planned to carry wind- and solar-generated electrical energy into the grid (Magill 2014).

### **Bird-Smart wind energy**

So what does it mean for a wind energy facility to be “Bird-Smart”? ABC developed and supports the concept of “Bird-Smart” wind energy development, which ensures turbines are located away from high-collision risk areas, employs effective mitigation to minimize bird fatalities, and conducts independent, transparent post-construction monitoring to help inform mitigation and calculate compensation for the loss of ecologically important, federally protected birds (ABC 2016). ABC also recognizes and promotes the immediate need for innovative, scientifically valid research aimed at developing effective methods for pre-construction risk assessment and post-construction monitoring.

From a conservation perspective, there are some places that wind energy should be developed and some where it should be avoided at all costs due to unacceptable risks posed to our nation’s federally protected birds (and bats). Our nation’s wildlife is not owned by wind energy companies, whether they are on public or private lands; it is owned by the American public and held in trust for current and future generations. State and federal wildlife and natural resource agencies are charged with protecting those resources under existing state and federal laws, including the Endangered Species Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the National Environmental Policy Act.

Siting is critical when it comes to minimizing

the impact wind energy has on wildlife. ABC believes that wind energy development, in its current state of technological evolution, should be totally avoided in highly sensitive areas for birds, such as in or near major migratory congregation areas, critical breeding areas, and other sensitive habitats such as some wetlands, where risks are particularly high. This is especially true when the species in question are threatened, endangered or otherwise protected by state or federal law.

While ABC recognizes that some birds may be killed by any wind energy facility, regardless of location, risks can be reduced substantially through proper planning, siting, and mitigation. The key to Bird-Smart wind energy is a fully independent and transparent pre-construction assessment of the risks posed to birds, bats, and other wildlife and their habitats (ABC 2016).

To assist with Bird-Smart siting decisions, ABC developed a Wind Risk Assessment Map ([http://www.abcbirds.org/extral/index\\_wind.html](http://www.abcbirds.org/extral/index_wind.html)). This map used Google Earth as a platform and shows locations of important bird conservation areas that should be avoided by wind developers. Areas marked in red and orange represent 2 levels of risk that should either be avoided completely (red), or receive an especially rigorous pre-construction environmental impact assessment (orange) that may determine they are too high risk, or, that wind turbines can be built with proper mitigation. Though not a substitute for detailed site-by-site risk assessment, it is hoped that wind developers and state and federal regulatory agencies begin using this map and other available information as tools to aid in siting decisions.

Unfortunately, this is currently not the case. A recent study conducted by Mississippi State University and funded by ABC highlighted the problems with siting. Overlaying the ABC Wind Map with the U.S. Geological Survey (<http://eerscmap.usgs.gov/windfarm/>) and Federal Aviation Administration (<http://blog.aopa.org/vfr/?p=1252>) maps of existing and proposed turbines, respectively, this study showed that there are tens of thousands of turbines already existing in highly sensitive areas for birds and tens of thousands more planned (Anonymous 2015). For example, there are currently 5,500 turbines in the federally designated Whooping

Crane (*Grus americana*) Migratory Corridor and an additional 18,500 are planned, along with hundreds of miles of additional transmission lines. In a recent statement in the Federal Register, the U.S. Department of the Interior (DOI) and U.S. Fish and Wildlife Service (USFWS) admitted these shortcomings, stating that the current guidelines, in some cases, have “...not been successful in preventing wind energy facilities from being constructed in areas of high risk to wildlife.” They further stated that, “We are currently in the process of evaluating the efficacy and use of the Guidelines and the Service is considering regulatory options” (USFWS 2014).

The second critical component of Bird-Smart wind energy is mitigation. Even before a wind energy facility is constructed, plans should be in place to reduce its impact on birds and bats. The wind industry, and its representative, the American Wind Energy Association, frequently assert that it knows how to mitigate bird and bat deaths (American Wind Energy Association 2015). Types of mitigation include using radar or observers to detect the presence of large flocks of birds and then shutting down turbines either temporarily or seasonally (e.g., during peak migration); using lighting that does not attract birds or bats at night; managing habitat under turbines (e.g., no vegetation or water that might attract birds or bats); reducing prey species (i.e., to reduce attractiveness to raptors); and retrofitting of associated transmission lines and towers to reduce probability of collisions or electrocution (APLIC 2012). Unfortunately, with few exceptions (e.g., ultrasound deterrents for bats), few of these methods have been systematically tested for their efficacy and even fewer are actually in use. The U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy stated that, “...technologies to minimize impacts at operational facilities for most species are either in early stages of development or simply do not exist” (DOE EERE 2014). It is therefore important that research on the efficacy of various mitigation methods is initiated as soon as possible (Arnett et al. 2007).

The third and last component of Bird-Smart wind energy development is compensation. If public trust resources, such as federally protected birds and bats, are taken incidentally

even after appropriate siting and mitigation, then it would be equitable for wind energy companies to pay for this privilege. This could take the form of procurement of appropriate habitat away from the site, or other legitimate conservation-related activities. Under a permitting system, such as that proposed by ABC, wind operators would make a contribution to funds managed by the USFWS under the Neotropical Migratory Bird Conservation Act. If it has been estimated that each turbine will kill 2 birds per year, then a permit could, for example, charge \$500 per bird, or \$1,000 per turbine per year (comparable to a fine that could be levied under the Migratory Bird Treaty Act, of which these deaths are a violation). This would cost each turbine operator around \$3 per day per turbine, but at current build-out would secure \$50 million per year to migratory bird conservation and toward a critical fund that has struggled to maintain Congressional appropriations at around \$5 million annually. Such permits could be extended to other industries impacting migratory birds to create sufficient funding to begin reversing the declines currently underway.

### **Current U.S. national policy and protocols for wind energy development**

It is ABC’s opinion that our nation’s push to install renewable energy, especially wind energy, is ahead of the evolving science and regulatory framework. When it comes to bird and bat deaths, current permitting guidelines for wind energy development are voluntary rather than mandatory (USFWS 2013). Several aspects of the process are problematic. First, developers are not required to obtain a permit to kill federally protected birds or bats pre-construction. They are instead encouraged to work cooperatively with state and federal wildlife agencies to study possible impacts associated with specific sites before beginning construction. They are also encouraged to obtain incidental take permits if risk to protected birds is thought to be sufficiently high. The trigger for such actions is currently ill-defined, although the goal of USFWS—at least in the case of eagles—appears to be to maintain the status quo. That means no net loss in current population size, rather than to formulate a

viable conservation plan (USFWS 2013).

The taking of even one individual under the Endangered Species Act or Bald and Golden Eagle Protection Act is unlawful and carries risk of prosecution if an incidental take permit has not been applied for and granted. The Migratory Bird Treaty Act also offers some protections for migratory bird species, although no incidental take permit is currently available. The U.S. Justice Department levied a \$1 million fine on Duke Energy in late 2013 for killing protected birds at 2 poorly sited wind energy projects in Wyoming—the first prosecution of its kind (Lieberman 2013). In 2014, PacifiCorp was assessed a \$2.5 million fine and mitigation requirement for killing federally protected birds at their wind energy facilities in Wyoming (Associated Press 2014a). Several other investigations and possible prosecutions are reportedly in the queue.

Another concern with current federal guidelines, with the notable exception of Hawai'i, is that the USFWS relies solely on wind energy developers to inform them if protected wildlife is being killed. ABC considers industry self-reporting to be a conflict of interest.

There are other issues with the current voluntary process. The USFWS is now providing wind energy companies incidental take permits to kill protected wildlife post-construction, including endangered species. For example, the USFWS recently issued a permit to one of the worst-sited wind facilities in North America (located in Garret County, Maryland) to kill endangered Indiana bats (*Myotis sodalis*; Opalka 2012, Wheeler 2012). Granted, the permits impose limits on number of federally protected birds or bats that can be taken, and threaten consequences should those limits be exceeded. But, in the case of eagles, USFWS recently extended the length of permits from 5 to 30 years, to better meet demands of the wind industry. There will be 5-year reviews, but once these large arrays of turbines are actually operating, it is unlikely they will be shut down or successfully mitigated if risks prove too great. In addition, it is unclear how the USFWS would discover any violations if a wind energy developer chooses not to apply



**Figure 2.** Eagles remain an ecologically important and protected species in the wind energy landscape. (Photo courtesy of Louise Redcorn)

for a permit. Currently, there are no provisions for regular unannounced spot checks; USFWS relies entirely on industry self-reporting to uncover the deaths of federally protected species.

There are also issues with how risks to birds and bats are being evaluated pre-construction. Each potential site is different in that respect, depending on its location. For example, a wind energy project located in a major migratory route or in or near sensitive breeding habitat is not likely to be a good place to erect wind turbines. Many, though not all, developers conduct Environmental Assessments to obtain a preliminary measure of that risk. If, following the Environmental Assessments, the risk is determined to be high and the USFWS does not issue a Finding of No Significant Impact, then a more detailed Environmental Impact Statement may be required. If endangered species are involved, then consultation under Section 7 of the Endangered Species Act may also be recommended. Many of these steps are required under the National Environmental Policy Act, but developers have, for the time being, been given a circuitous way around these requirements, and wildlife protection laws are not being enforced, except under very special circumstances (Clarke 2014a).

Wind energy developers typically hire consulting firms to prepare Environmental

Assessments. Unfortunately, this has led to serious conflicts of interest, with consultants sometimes downplaying the potential impact on birds and bats to obtain approval. In one case, consultants for the New Era Wind Project in Minnesota reported that there were few eagles in the area, when in fact, many eagles were present. A local citizen's group and the USFWS were able to bring this to the attention of the local siting board, which promptly canceled the project (Marcotty 2013).

Another problem is the untested mathematical models being used by the USFWS to predict the impact of wind facilities on birds and bats (e.g., Korner-Nivergelt et al. 2013, New et al. 2015). One problem with modeling is that it depends on having accurate information. For example, with Golden Eagles (*Aquila chrysaetos*) in the west, we know little about the status of their populations, or details about their movements and breeding locations (Katzner et al. 2012). In addition, there are serious problems with the models being used to assess cumulative impacts of various natural and anthropogenic mortality factors on eagle populations. In making such assessments, regulators cannot just consider each project in isolation (e.g., Brabant et al. 2015).

The reality is that we do not have all the answers, and the newly revised 30-year Eagle Take Rule (USFWS 2013) can essentially be seen as a huge experiment, with viability of our native wildlife at stake. ABC recently sued the USFWS over the revised 30-year Eagle Take Rule, as the rule was issued without going through a National Environmental Policy Act process, which would typically involve an *a priori* detailed study of the rule's implications for federally protected species and a public comment period (Adler 2014). Instead, the USFWS argued that the change was merely "administrative" in nature and claimed a categorical exclusion from the National Environmental Policy Act, which ABC considered a dangerous precedent to be setting for major decisions affecting our nation's federally protected wildlife. ABC prevailed in the case in August 2015, effectively rescinding the 30-year Eagle Take Rule. What happens next is up to the USFWS, which may appeal the decision, but that may be unlikely because the court developed an extremely

strong and well-documented decision (United States District Court 2015). Hopefully, ABC and others who opposed the rule will be able to work cooperatively with the USFWS to engage in a proper process to create a new and stronger system — one that can both protect eagles and result in better siting and operation of wind energy projects (Figure 2).

In the current system, there has also been a lack of transparency. Data on bird and bat fatalities at existing facilities, as well as risk assessments, have often been withheld from the general public on grounds that they represent competitive business information, like corporate trade secrets, which has led to calls for independent monitoring of bird and bat kill data (Clarke 2014c). One wind-energy company, PacifiCorp, recently sued the USFWS to block the release of information on bird mortality to the public (Associated Press 2014b). Withholding this information from individuals or organizations, however, limits their ability to effectively evaluate and comment on proposed wind facilities prior to construction, or to assess efficacy of mitigation or appropriateness of compensation for losses post-construction.

### Improving regulation and transparency

ABC has made specific suggestions to the USFWS and DOI about how it could improve its permitting processes regarding wind energy development and effectively create a Bird-Smart energy sector. Such changes are designed to improve pre-construction risk assessment, transparency, and post-construction monitoring, all critical to the goal of Bird-Smart wind energy. In a recent letter regarding USFWS and DOI's request for comments on Information Collection for Land-based Wind Energy Guidelines, ABC asked that USFWS institute a pre-construction risk assessment and bird mortality data collection based on (1) studies conducted by independent, qualified experts (Clarke 2014b) selected by the USFWS or a trusted consulting company hired by USFWS, with (2) costs being borne by wind energy companies; (3) that all reports go directly to the USFWS, and not through the wind energy company, which would then have no opportunity to edit or alter the reports to their advantage; (4) reports are made

available to the public as an additional layer of scrutiny; (5) that conducting Environmental Assessments and obtaining incidental take permits under the Endangered Species Act and the Bald and Golden Eagle Protection Act is mandatory when protected species are known to be present (ABC 2015).

### Stopping the worst-sited wind energy projects

ABC has successfully opposed several poorly sited wind energy facilities, including Camp Perry, Ohio (Henry 2014), and Mill Creek, Missouri (Bradley 2014), and exposed several others to increased scrutiny, including hundreds of turbines going up in major migratory bottlenecks for birds in Huron County, Michigan (ABC 2014) and on the southern shore of Lake Erie (Streeter 2014). Some of the facilities had no Environmental Assessment or consultation with USFWS or state wildlife authorities at all, or USFWS had recommended against construction.

### Discussion

Despite growing evidence, the wind industry and its allies have downplayed current and potential impact of wind energy development on birds, arguing that: (1) bird fatalities from wind energy are far less than those caused by other anthropogenic factors, including feral cats, pesticides, and collisions with buildings (Koch 2014); (2) incidental bird fatalities are a small price to pay to address human-caused climate change, which is a far more serious threat to birds and other wildlife than wind energy (Nijhuis 2014); and (3) that industry has learned how to effectively mitigate for bird and bat deaths (AWEA 2015).

How valid are these arguments? While it is true that other factors kill far more birds than wind energy (an estimated >4 billion annually), is this a cogent excuse for poorly sited and poorly managed wind energy development? Impacts of all of these factors are cumulative (Erickson et al. 2005), thus making it important that all are addressed to the extent possible. In fact, even populations of some common bird species are declining rapidly (North American Bird Conservation Initiative 2014), and killing threatened and endangered species leaves even less room for error. With endangered species,

like whooping cranes or Kirtland's warblers (*Dendroica kirtlandii*), the loss of even a few individuals can represent a significant blow to the population.

We dealt with the issue of mitigation earlier in the manuscript; even the U.S. Department of Energy does not agree that we currently know how to mitigate effectively for bird deaths at wind energy facilities. Furthermore, the argument that collateral damage to federally protected birds, including endangered species, is "acceptable" because climate change is worse is highly questionable. There is no doubt that climate change is having a major impact on wildlife and must be addressed. However, it is important to note that much of the conflict between wind energy development and bird and bat conservation could be alleviated by adopting Bird-Smart principles, developing new bird- and bat-friendly wind energy technology, improving research, and enforcing the nation's existing wildlife protection laws (Clarke 2014a). Birds and bats are important components of ecosystems and have many useful functions in pollination, seed dispersal, and pest control (Sekercioglu 2006, Sekercioglu et al. 2006). We could be doing so much better.

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