

## Wind Energy and Wildlife

### Did you know...?

A single 1-MW turbine displaces 1,800 tons of carbon dioxide, the primary global warming pollutant, each year (equivalent to planting a square mile of forest), based on the current average U.S. utility fuel mix.

To generate the same amount of electricity as today's U.S. wind turbine fleet (25,170 MW as of the end of 2008) would require burning 34.4 million tons of coal (a line of 10-ton trucks over 13,700 miles long) or 112 million barrels of oil *each year*.

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As America and the world grapple with the immense problem of climate change, one energy source stands out as an abundant, affordable and readily available supply option: wind power. In May 2008, the U.S. Department of Energy released the *20% Wind Energy by 2030 Technical Report* ([www.20percentwind.org](http://www.20percentwind.org)), finding that wind power can supply 20 percent of America's electricity by 2030 and reduce projected emissions of carbon dioxide (CO<sub>2</sub>), the leading greenhouse gas, by 25 percent.

This fact sheet is one in a series aimed at informing decision-makers and the public about this critically important option for America's energy future.

Wind, a 100% clean energy source, is one of the healthiest energy options, and one of the most compatible with animals and humans. While birds do collide with wind turbines at some sites, modern wind power plants are collectively far less harmful to birds than are radio towers, tall buildings, airplanes, vehicles and numerous other manmade objects. Bird deaths due to wind development will never be more than a very small fraction of those caused by other commonly-accepted human activities, no matter how extensively wind is used in the future.

Avian studies have been carried out at many wind farm sites. They show that bird kills per megawatt (MW) average one to six per year or less, with the exception of a single 3-turbine plant in Tennessee that has recorded 11 per MW per year. These include sites passed by millions of migrating birds each year. At a few sites, no kills have been found at all.

A reasonable, conservative estimate is that of every 10,000 human-related bird deaths in the U.S. today, wind plants cause less than one. The National Academy of Sciences estimated in 2006 that wind energy is responsible for less than 0.003% of (3 of every 100,000) bird deaths caused by human (and feline) activities.

Individual bird deaths due to wind development will never be more than a very small fraction of those caused by other commonly accepted human activities and structures--house cats kill an estimated 1 billion birds annually in the U.S. alone, buildings 100 million to 1 billion, automobiles 60-80 million, power lines hundreds of thousands to as many as 175 million, according to the U.S. Fish & Wildlife Service (<http://birds.fws.gov/mortality-fact-sheet.pdf>) and other sources.



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Despite the minimal impact wind development has on bird populations generally, the industry takes potential wildlife impacts seriously and continues to assess ways in which impacts can be lessened. Since the first concerns about wind energy and wildlife were raised, the wind industry has taken numerous steps to address legitimate concerns and ensure problems are not repeated at other wind projects.

### **National Wind Coordinating Collaborative**

In 1994, shortly after raptor deaths in the Altamont Pass became a general concern, the wind energy industry joined with other stakeholders (government officials, environmental groups, utilities) to form the National Wind Coordinating Collaborative (NWCC), a multi-stakeholder collaborative aimed at addressing the wind/avian issue as well as other issues affecting the industry's future. NWCC has sponsored numerous meetings and academic papers to better understand wind energy's wildlife impacts - including updates to the environmental community about the latest wind-related research, events related to the biological significance of wind's impacts and a wind project permitting handbook. More information on NWCC activities is available at <http://www.nationalwind.org>.

### **Altamont Pass**

The Altamont Pass was one of the first wind projects installed, and it remains the only wind development area in the U.S. that experiences significant bird deaths, specifically those of raptors or birds of prey (with "significant" defined as deaths of individuals of particular species that are numerous enough to possibly impact local populations of those species). While the industry recognizes that this situation is a real problem, it is largely limited to this one area and is not widespread. The Altamont Pass is unique - no other wind project combines a similar topography, very high raptor population, and old turbine technologies - and even at Altamont, the total number of bird collisions is quite low. Unfortunately, media coverage about Altamont often gives the impression that all wind power projects have a significant effect on birds, despite overwhelming evidence to the contrary.

Wind businesses have implemented many strategies to attempt to reduce bird impacts at Altamont Pass. Over the years, wind companies have painted wind turbine rotor blades, reduced rodent populations, added "perch guards" to prevent perching on turbine towers, and tested raptors' hearing, vision and avoidance capabilities to learn how to reduce bird impacts. One particularly successful strategy greatly reduced raptor electrocutions--based on earlier research, project owners modified their equipment by insulating wires, covering some exposed electric components on poles, and relocating overhead power lines to protect raptors. New projects that are built today have virtually all power lines within the project area buried. The industry is continuing to test new measures to reduce bird kills and to put into effect those that are helpful.

Even sites with high use by protected species need not necessarily be off limits to wind. At Foote Creek Rim in Wyoming, pre-construction surveys found that golden eagles frequently used the mesa's edge for hunting. The wind farm developer voluntarily redesigned the site to move the planned turbines 50 meters away from the rim, and the subsequent number of eagle deaths at the site was so small that the technical advisory committee was discontinued. A baseline and final mortality study for this project can be found at [http://www.west-inc.com/wind\\_reports.php](http://www.west-inc.com/wind_reports.php).

Following the realization that a problem existed with raptor kills in Altamont Pass, the wind industry has gone on to establish a record of building projects across the U.S. that are safe for birds. The industry has now responded rapidly to the discovery of a similar problem with bats in Appalachia.

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### Bats and Wind Energy Cooperative

Bats can also collide with wind turbines. Before 2003, bat fatalities at wind farms were also generally low. However, in 2003, avian studies at a new wind power plant in West Virginia discovered bat kills in numbers much larger than previously known. Since then, fatalities have been documented at higher than expected rates in Pennsylvania, Alberta, New York State and some other locations. After the initial 2003 discoveries, supporters of wind energy and bats reacted quickly, forming a new organization, the Bats & Wind Energy Cooperative (BWEC), in late 2003. BWEC includes AWEA, Bat Conservation International, the U.S. Fish and Wildlife Service and the U.S. Department of Energy's National Renewable Energy Laboratory. This initiative raises millions of dollars to fund studies designed to reduce bat mortality. BWEC is focused on finding good site screening tools and testing mitigation measures, including ultrasonic deterrent devices to warn bats away from turbines. More information on the research efforts of the Bats and Wind Energy Cooperative can be found on its website: <http://www.batsandwind.org/>.

### AWEA's Siting Handbook

AWEA's Siting Handbook ([www.awea.org/sitinghandbook](http://www.awea.org/sitinghandbook)) is an online resource with extensive links to additional information. The Siting Handbook is designed to provide technical information and useful tools based on the industry's collective experience in siting wind energy projects. Information on the types of possible project impacts, the various studies a developer can commission to understand those impacts and methods to mitigate them are also included.

### Environmental Impacts

New wind projects are carefully planned to minimize environmental impact, even though wind is already one of the cleanest, most environmentally friendly energy sources because it emits no air or water pollutants or greenhouse gases, requires no mining or drilling for fuel, uses no water and produces no toxic waste.

The wind industry welcomes scrutiny of, and comparison with, all of the impacts of all sources of electricity generation. Many extensive studies of bird collisions at wind farms have been carried out, a practice that stands in marked contrast to the lack of any systematic effort to monitor direct impacts on avian species from mining and drilling, power plant emissions or pollution, or habitat loss brought on by these activities. Any public or private research effort, regulatory effort or legislative proposal designed to quantify the impact of power generation on birds, bats and other wildlife should encompass all electricity sources - not just wind.

**Environmental Impacts of Electricity Sources**

	Wind	Nuclear	Coal	Natural Gas
<b>Global Warming Pollution</b>	None	None	Yes	Yes
<b>Air Pollution</b>	None	None	Yes	Limited
<b>Mercury</b>	None	None	Yes	None
<b>Mining/Extraction</b>	None	Yes	Yes	Yes
<b>Waste</b>	None	Yes	Yes	None
<b>Water Use</b>	None	Yes	Yes	Yes
<b>Habitat Impacts</b>	Yes	Yes	Yes	Yes

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The list of environmental and wildlife impacts of other energy sources is long and varied, including:

- Habitat impacts from mining (coal, uranium), drilling (natural gas, oil), and compressing fuel (natural gas). Some of these effects are local, while others can extend over fairly broad areas.
- Habitat impacts from air and water pollution: acid rain, smog, mercury, drilling wastewater disposal (fossil fuels).
- Habitat impacts from global warming (fossil fuels). Significant changes in some species' ranges are already occurring, particularly in northern latitudes.
- Habitat impacts from thermal pollution of water (nuclear and fossil power plants).
- Habitat impacts from flooding of land and streamflow changes (hydro).
- Habitat impacts from waste disposal (coal).

While wind plants and their construction definitely have local impacts, the use of wind energy largely avoids these more far-reaching effects. The picture with human health impacts is similar. Air pollution in particular has been linked to a number of human ailments, including heart and lung problems. Greater use of wind energy will reduce these concerns.

### **Commitment to Wildlife Protection**

The industry has been conducting avian studies at wind sites across the country for more than 20 years. Pre-construction wildlife surveys are common practice throughout the industry. Typically a wildlife consultant is retained, and efforts are made to contact state and federal fish and wildlife agencies and local wildlife groups (e.g., Audubon chapters, Izaak Walton League chapters) to identify any issues of possible concern. The consultant examines the proposed site and prepares a detailed report on impacts for review by the developer. Post-construction monitoring of bird kills at several wind sites in a wide variety of geographic locations (Vansycle Ridge, Oregon; Ponnequin, Colorado; Foote Creek Rim, Wyoming; Buffalo Ridge, Minnesota; Searsburg, Vermont; Garrett, Pennsylvania) has validated the industry's ability to assess risk to birds and build safe projects.

### **Land Use and Wildlife Habitat**

All fuel extraction and energy generation activities affect habitat and land use. Mining, drilling, fuel transportation and waste treatment for fossil fuels can all be land-intensive activities, while pollution from fossil fuel combustion can affect broad geographic areas. A wind energy project can also be land-intensive, but the land is used quite differently. The "fuel extraction" and electricity generation take place at the same site year after year. Wind projects occupy anywhere from 28-83 acres per megawatt depending on local terrain, but only 2-5% of the project area is needed for turbine foundations, roads or other infrastructure.

Habitat fragmentation can occur at projects in relatively pristine areas due to trees being removed around turbines; also, new "edges" created in a forest (when parts of it are cleared for turbines or service roads) are detrimental to some species, and the presence of turbines causes some species or individual animals to avoid previously viable habitats. The wind energy industry is partnering with conservation groups and government agencies to avoid, minimize and mitigate these impacts where possible.

Given wind energy's very low environmental impact (no air or water pollution, no global warming pollutants, no waste) compared with other energy sources, it should remain the energy source of choice for anyone concerned about preserving the natural environment.