

WIND ENERGY FACT SHEET

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FACTS ABOUT WIND ENERGY & BIRDS

From the American Wind Energy Association

The impact of wind energy development on bird populations has become an issue because of bird deaths in California's Altamont Pass, one of the world's largest wind development areas. Altamont Pass, located east of San Francisco, is an area with high raptor activity year-round and a high population of ground squirrels and other rodents that furnishes an abundant prey base for raptors.

Birds collide with numerous other obstacles, both natural and of human manufacture, that are located along their flight paths. Some of these collisions are attributed to visual problems such as reflections from glass windows or the shrouding of stationary structures by fog. Raptors in pursuit of prey have crashed into buildings and natural obstructions such as trees. Some believe raptors fly into wind turbines under similar conditions of "target fixation" during "hot pursuit."

Q: How widespread is avian mortality associated with wind projects?

A: To date, large-scale wind development within the U.S. has only taken place at a few areas. However, there is evidence that this is a site-specific problem which does not affect wind turbines generally. Limited studies at other wind sites in California and Minnesota where raptor activity is low have found few or no kills. The California Energy Commission is currently planning detailed studies of that state's two other major wind development areas—Tehachapi Pass near Bakersfield and San Geronio Pass near Palm Springs—to develop data that can be compared with Altamont Pass.

Q: How many birds collide with wind turbines?

A: Only a few studies have examined the frequency of bird collisions for significant numbers of wind turbines — one in Denmark and two in California. These indicate that a bird will collide with a given wind machine no more than approximately once every 8 to 15 years.[1] Higher levels of mortality have been found by some studies of smaller numbers of turbines in coastal locations with large concentrations of waterfowl,[2] and it seems appropriate to use greater caution in siting wind projects in such areas or in known areas of high migration.[3]

In the Altamont Pass Wind Resource Area (which has some 7,000 wind turbines), a two-year study found 182 dead birds, of which 119 were raptors. The study attributed 55 percent of raptor deaths to collisions with turbines, eight percent to electrocutions from power lines, 11 percent to collisions with wires, and 26 percent to unknown causes.[4]

Q: How many birds die in collisions with other human structures?

A: It is estimated that each year, 57 million birds die in collisions with vehicles; 1.25 million in collisions with tall structures (towers, stacks, buildings); and more than 97.5 million in collisions with plate glass.[5]

Q: What are the effects of other energy sources on birds?

A: In a single oil shipping accident, the Exxon Valdez oil spill in Alaska’s Prince William Sound, more than 500,000 migratory birds perished — or about 1,000 times the estimated annual total in California’s wind power plants.[6] And a study at a single Florida coal-fired power plant with four smokestacks recorded an estimated 3,000 deaths in a single evening during a fall migration.[7]

Although the larger effects of fossil fuels, such as air pollution, acid rain, and global climate change, are difficult to measure with precision, they are much more far-reaching than those of wind energy. Here is what the environmental group Public Citizen had to say on the subject in a 1989 statement supporting a proposed wind power plant:

“ . . . U.S. reliance on coal, oil, and nuclear power is posing grave threats to society: acid rain, urban smog, radioactive waste, and global warming. Sulfur emissions from coal have damaged or destroyed whole life systems in hundreds of lakes and streams and thousands of acres of forests.

“Global warming threatens many species which may be unable to survive even a gradual change in climate — a virtual certainty unless reliance on fossil fuels is greatly reduced within the next decade. In the worst case, whole ecosystems may disappear as a result of rising tides and shifting weather patterns.”[8]

While no numbers are available on the number of birds killed by collisions with nuclear power plant cooling towers, scientists have documented severe effects on marine habitats from the discharge of heated water from nuclear facilities. In one widely-publicized study reported in 1989, for example, a neutral committee of three biologists found that a single nuclear power plant, the San Onofre Nuclear Generating Station in California, killed some 21 tons of fish each year, including “several billion” fish larvae.[9]

Q: Do wind turbines affect birds in other ways?

A: Yes. Both positive and negative impacts of wind energy development on birds have been identified. Positive impacts include retaining natural habitat and providing birds with an

environment safe from human harassment. Negative impacts include loss of habitat, electrocution, and collisions with associated equipment such as wind measurement towers.[10]

Q: Can anything be done to reduce the impact of wind generating facilities on birds?

A: In large wind power plant development areas, the general strategy is to try to make the plant safer for the birds. In smaller project areas, it may be more practical to try to keep the birds out of the facility by employing warning techniques. Other measures include:

- ❖ Several avian experts have suggested that raptor activity around wind turbines can be reduced by taking measures to reduce the number of perches available to birds on the turbine and tower. Many turbines in Altamont Pass, for example, have steel “lattice” towers with flat crossbars that are ideal for perching. It is clear that the tubular tower greatly reduces opportunities for perching and is rapidly becoming the structure of choice for new wind energy projects.
- ❖ Wind turbine manufacturers have reduced the amount of noise produced by their machines.[11] Although this is being done primarily to avoid disturbing residents of areas surrounding windfarms, it is likely to also reduce the disturbance to nesting birds.
- ❖ European studies suggest that the configuration of windfarms and placement of turbines can be carried out in such a way as to reduce bird collisions.[12] For example, if a wind plant is sited in an area of heavy bird migration, turbines can be spaced more widely as seen from the direction of migration. This is still an area which needs much more study. The more that is known about the “micrometeorology” of a site (how the wind flows across the area to be developed) and how birds use the area, the easier it will be to reduce the level of risk for birds in a wind facility.
- ❖ One wind company has tested a blade painting pattern that will provide a high level of contrast between turbine blades and the general background in a variety of lighting conditions.
- ❖ The Electric Power Research Institute has reported that experiments indicate that it may be possible to use broadcasts of a certain radio frequency to discourage birds from entering areas such as wind plants or airports where there is a risk of collision.

A variety of other innovative approaches are possible. However, because of the relatively small number of birds that die in collisions with any given turbine or group of turbines, it may take an extended period of time to determine whether a given technique is successful or not.

Q: What else is the wind industry doing to address this problem?

- A:** The wind industry is committed to taking the necessary measures to reduce avian mortality.
- ❖ Leading companies in the U.S. wind energy industry, in conjunction with AWEA, have established an Environmental Task Force to coordinate industry research, education, and

mitigation efforts. The task force lobbied successfully to have \$2 million of the federal Department of Energy's wind energy research funds set aside for avian research projects, and has worked with DOE and National Renewable Energy Laboratory staff and environmental groups to develop research priorities. AWEA is also collaborating with other groups in Minnesota to establish a baseline avian population assessment in wind development areas. Current research activities include work to develop a method of scientifically measuring the risk to birds presented by a given wind plant, to determine the raptor vision acuity, and to find out how bird populations are affected by wind plant kills.

- ❖ The National Wind Coordinating Committee (NWCC), a multi-stakeholder group formed in 1993 to “ensure the responsible use of wind power in the United States,” has established a Subcommittee on Avian Issues that includes representatives from the U.S. Fish and Wildlife Service and the National Audubon Society. The Subcommittee has coordinated the work of several leading experts on wind/avian interactions to develop standard terms and formulas ("metrics") to describe the extent to which birds use a given area of land and the risk that they face from human construction (whether wind plants, freeways, buildings, or other structures) on that land.
- ❖ Following the subcommittee's work on metrics, AWEA members are helping to fund a major effort by the California Energy Commission to examine avian mortality in San Geronio Pass and Tehachapi Pass. The Commission study is using the metrics to evaluate bird risk in these wind development areas. AWEA member companies have committed to contribute \$50,000 toward the cost of this work, have opened their facilities to the studies, and have assisted Commission staff in carrying out the studies.
- ❖ Early research indicated that lattice towers that permit perching might contribute to bird kills, and as a result, industry is largely using tubular towers in new installations.
- ❖ AWEA's Environmental Task Force commissioned ornithologist Edward Colson to prepare a summary of literature on avian effects of windpower. Colson's report, "Avian Interactions with Wind Energy Facilities: A Summary," is now available from AWEA.
- ❖ Kenetech Windpower established an Avian Research Task Force that included several noted ornithologists. The Kenetech Task Force initiated a series of studies to attempt to determine what birds see and hear, and what mitigation measures might be effective. Those studies were carried out at Kenetech's Altamont Pass facilities and at Boise State University in Idaho, and their results have been compiled for publication.

Avian mortality is an issue that demands, and is receiving, continuing attention and mitigation efforts from the wind industry, government and the environmental community.

REFERENCES

- [1] "Impact of Wind Turbines on Birdlife: An Overview of Existing Data and Lacks in Knowledge in Order of the European Community," Benner, J. H. B., et al, Concept (Draft) Final Report, July, 1992, pp. 22-23. Consultants on Energy & the Environment (CEA), Rotterdam, The Netherlands.
- [2] "Impact of Wind Turbines on Birdlife," note 1, supra.
- [3] This is intended only as a general caution. At many locations within known migratory routes, migrating birds fly at levels well above wind turbine rotor heights and are not threatened by wind project development.
- [4] "Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991," Orloff, S., and Flannery, A., 1992, Executive Summary, p. x. Biosystems Analysis, Inc., Sacramento, Calif., 1992.
- [5] "Kenetech Windpower Avian Research Program Update," 1994, p. 3. Kenetech Windpower, Washington, D.C.
- [6] Conversation with Donald Aitken, Union of Concerned Scientists, February 2, 1995.
- [7] "Bird Casualties at a Central Florida Power Plant," Maehr, D. S., et al., *Florida Field Naturalist*, 11:45-49, 1983. Florida Ornithological Society.
- [8] "Public Citizen Endorses Gorman Windfarm," note 8, supra.
- [9] "Committee Finds Massive Sea Life Kills from San Onofre," Groundswell, Vol. 11, No. 2&3, Autumn, 1989. Nuclear Information and Resource Service, Washington, D.C.
- [10] "Avian Interactions with Wind Energy Facilities: A Summary," Colson & Associates, January, 1995, Executive Summary, p. ii. American Wind Energy Association, Washington, D.C.
- [11] "Comments, Questions and GMP's Responses Concerning Its Wind Development Ideas," September, 1992, p. 4. Green Mountain Power Co., South Burlington, Vt.
- [12] "The Impact of the Experimental Windfarm at Oosterbierum on Birds," Winkelman, J. E., 1990. DLO Institute for Forestry and Nature Research, Arnhem, The Netherlands.