

Wind Energy and Wildlife Resource Management in Iowa: Avoiding Potential Conflicts

Introduction

Iowa is on its way to ranking among the world's leading producers of wind-generated electrical energy. In our efforts to become less dependent upon fossil fuels, nuclear power, hydropower and other sources with frequent environmental concerns, the possibility of this "green" energy has caused much excitement. Many Iowans eagerly await expansion of this low-cost (after initial infrastructure investments) source of electricity as one step towards energy independence.

The Governor, General Assembly, and Department of Natural Resources all consider wind energy development in Iowa a high priority. With much open farmland upon which wind generators might be placed, and in a region of nation realizing relatively high average wind velocities, Iowa seems destined to be a national focal point for wind energy development. Many state and national conservation organizations also support increasing wind energy production.

No energy source has yet been found to be without some degree of environmental costs, however, and wind energy is no exception. It has been demonstrated that if proper siting of wind turbines is not carefully planned, certain locations may result in collisions with, and death of, both wild birds and bats. In one or two noteworthy instances, excessive mortality of hawks, eagles and other birds of prey has resulted in major modifications to both design and placement of wind turbines, or even periodic shut-downs of large facilities. Additional costs involved with such measures can reduce cost-effectiveness of energy production.

Iowa currently exercises minimal regulation on locating wind farms. Nevertheless, some energy companies recognize the benefits of consulting with wildlife resource managers *before* final decisions are made on siting of new facilities. Such actions will result in greater trust and cooperation between energy producers and those charged with protecting our wildlife resources. This can lead to an orderly and beneficial development of Iowa's wind energy.

An *ad hoc* Iowa wind energy and wildlife discussion group has met infrequently to review current developments regarding wind energy and wildlife interactions. The group consists of representatives from Iowa DNR's Wildlife Bureau and Energy Section, US Fish & Wildlife Service, several non-governmental conservation organizations, energy companies, the Iowa Renewable Energy Association and other interested parties. The group has no rule-making or regulatory authority; rather it simply works cooperatively to discuss mutual concerns and to learn of the latest developments.

Wildlife Concerns

Just what are the problems wind turbines might pose to our wildlife and other natural resources? The most obvious is direct collisions of birds and bats with rotating blades. Fortunately for

birds, the annual mortality rate at most Midwestern wind farms appears to remain relatively low and probably insignificant. An exception occurs when turbines are placed in or very near major migration corridors and pathways, such as large river valleys and ridgetops or bluffs. Because birds tend to follow or congregate along these natural landscape features during their semi-annual migrations, wind turbines placed near these features have potential for causing significant bird kills in spring and fall. A few examples of such landscapes in Iowa include the Des Moines River, Little Sioux River, Wapsipinicon River, Loess Hills, and Mississippi River bluffs. Still, with Iowa's mostly open landscape, birds generally are widely dispersed throughout much of the year and chance of interaction with turbines is small.

Bats present an entirely different situation. For reasons still mostly unknown, bat collisions and mortality is much higher than for birds at many wind farms. Early efforts are underway to attempt a better understanding of the problem, but little is known at this time. However, bats usually are associated with trees or wooded areas and wetlands, where the insects on which they feed are abundant. Wind turbines placed near woodlands and wetlands thus might reasonably be expected to result in more bat deaths than turbines situated in open farmlands.

An emerging concern for birds is wind turbines placed within or very near large expanses of grassland. In some western states, ground-nesting lesser prairie-chickens have been found to abandon their nesting grounds when wind turbines were erected and operated nearby. It is quite likely that Iowa's greater prairie-chickens, a state endangered species requiring large expanses of unbroken habitat, would exhibit similar behavior. Many other ground-nesting grassland birds have yet to be studied, but some of these species already are in steep decline nationwide and cannot risk another factor that might potentially threaten their survival. A leading cause of much bird decline is related to fragmentation, or "parcelization", of their remaining habitat, breaking it into parcels too small to meet certain birds' survival or reproductive needs. It has been suggested that wind turbines placed in the middle of a large grassland may similarly fragment habitat and greatly reduce its value. This is a question in need of much additional research.

In summary, adverse effects of wind turbines on birds and bats have been documented in some locations, but much remains to be learned. A few energy companies or developers have collaborated with wildlife researchers to conduct some desperately needed studies. They are to be recognized for their commitment to better conservation of all our natural resources. Nevertheless, much more research is needed, especially in comparing "before and after" effects upon wildlife where wind farms are constructed. Information garnered would be invaluable in helping with future wind farm siting decisions.

Wind Turbine Siting Recommendations and Guidelines

Until we more fully understand how wildlife interacts with wind turbines, interim guidelines have been prepared to help wind energy developers and producers do a better job of designing and siting their wind farms. The list of recommendations below will serve as a starting point for things that *should* be considered when planning wind energy developments. These have been collected from a variety of sources, chief among them the US Fish & Wildlife Service Interim Guidelines for siting and construction of wind energy facilities, and recommendations from the

National Wind Coordinating Committee. Keep in mind that this list is a *work in progress*, subject to change as new information is gained.

Siting Recommendations:

- Avoid placing turbines at locations where any species of fish, wildlife or plants protected under the federal Endangered Species Act have been documented. Information may be obtained by contacting the Iowa Department of Natural Resources Endangered Species Coordinator or Wildlife Bureau staff. Any action resulting in losses to federally-listed species could result in substantial fines or other penalties.
- Avoid placing turbines in or near recognized bird concentration areas or migration pathways, including lakes, wetlands, forests, river valleys, ridge tops or bluff tops, large grasslands, known bird roosting areas, public wildlife areas, parks, and areas with frequent incidence of fog mist or low clouds. While there is no firm information on the amount of buffer zone needed between turbines and these habitats, a separation distance of at least one mile might be considered an absolute minimum (more for prairie-chickens—see below).
- Avoid placement of turbines in or near areas where highly “area-sensitive” wildlife species, such as prairie-chickens, are known. Area-sensitive species *require* expansive, unfragmented habitat. For prairie-chickens in particular, a separation distance of at least 5 miles from all known leks (breeding grounds) is *strongly* recommended.
- Avoid placing turbines near documented bat hibernation, breeding or nursery colonies and in migration corridors (see bird recommendation above) or between known colonies and feeding areas.
- Avoid placement of multiple turbines in close proximity to one another or perpendicular to known migration pathways (typically north-south). Widely spaced turbines, in arrays parallel to normal bird migration routes, can reduce collisions.
- Reduce or eliminate availability of carrion within wind farms, to reduce chances of attracting eagles, vultures and other raptors colliding with turbine blades. Neither dead livestock nor wildlife should be left within or near wind farm boundaries.
- Place wind turbines in areas already fully developed for agriculture, especially row-crop farming, where there is minimal extant wildlife habitat—Iowa is especially rich in such lands, and it has been estimated that as much as 80% of Iowa’s landscape might be considered suitable for wind energy development with few adverse effects upon wildlife.
- If wildlife habitat losses or fragmentation must be mitigated, develop a plan to create or restore habitat *away* from the wind farm site. This will serve to attract birds, bats and other wildlife away from the development and reduce collisions. Wherever possible, coordinate habitat mitigation sites with other public or private wildlife lands, to connect, enlarge or enhance those areas.
- Certain landscapes, such as the Loess Hills in western Iowa and the “Iowa Great Lakes Region” in northwest Iowa, are known for their beauty, rarity *and* for extensive wildlife breeding and migrating activities. Such landscapes should be avoided entirely both for biological and aesthetic reasons.
- Consider possible *cumulative* regional effects of multiple wind energy projects. While one project alone may result in few concerns for wildlife, multiple projects across one landscape could significantly multiply adverse effects.

- A map of Iowa, denoting areas of particular concern for possible adverse effects by wind turbines upon wildlife and habitat, has been developed and is updated periodically. Construction within these areas may not necessarily result in wildlife conflicts, and consultation with DNR wildlife biologists can assist developers in finding suitable sites within these potentially sensitive landscapes, or in suggesting plan modifications to minimize adverse effects.

Turbine Design and Operation Recommendations:

- Tubular support towers with pointed tops, rather than lattice supports, greatly reduce opportunities for birds to perch or nest upon the structures. Avoiding placement of permanent external ladders or platforms on tubular towers also reduces nesting and perching.
- Avoid use of guy wires for turbine or meteorological tower supports. Any existing guy wires should be marked with recommended bird deterrent devices (Avian Power Line Interaction Committee 1994).
- Taller turbines, having a top-of-rotor sweep exceeding 199 ft., may require lights for aviation safety. The minimum amount of pilot warning and avoidance lighting necessary should be used, and unless otherwise required by the Federal Aviation Administration, only white strobe lights should be used at night. These should be minimized in number, intensity, and number of flashes per minute. Solid red or pulsating red lights should *not* be used, as they appear to attract more night-migrating birds than do white strobes.
- Electric power lines should be placed underground wherever possible, or should utilize insulated, shielded wire when placed above ground, in order to reduce bird perching and electrocution.
- Where the height of rotor-sweep area produces high wildlife collision risks, tower heights should be adjusted to lower risks.
- If wind turbine facilities absolutely must be located in areas known for high seasonal concentration of birds, it is essential that a bird monitoring program be established, with at least three years of data collected to determine peak use periods. Data may be collected by direct observation, radar, infrared or acoustic methods. When birds are highly concentrated in or near the site, turbines should be shut down until birds have dispersed.
- When older facilities must be upgraded or retrofitted, the guidelines above should be employed as closely as possible.

Ideally, a site study plan and description of turbine structural and lighting design should be submitted to Iowa DNR well in advance of final siting decisions, for review by staff wildlife experts and advisements on acceptability or suggestions for modifications and/or monitoring. Hiring a reputable environmental consultant with a strong background in bat and bird ecology is strongly recommended. A baseline inventory of wildlife and evaluation of habitat should be considered for every site under serious consideration for windfarm development. Use of National Wind Coordinating Committee study guidelines will allow for comparison with other studies. Special attention should be paid to Spring and Fall migration seasons, reviewing

migrational use of the proposed site by raptors, waterfowl, shorebirds, gulls, songbirds and bats. Upon completion and startup of wind energy generation, monitoring wildlife populations and migrations should be conducted for at least 2-3 years.

Related Links

The following websites of other agencies and organizations may be useful in further understanding of potential wind energy and wildlife conflicts, and how to reduce or mitigate threats to wildlife:

<http://www.fws.gov/habitatconservation/wind.pdf>

<http://www.nationalwind.org/publications/siting.htm>

<http://www.dnr.wi.gov/org/es//science/energy/wind/guidelines.pdf>

<http://www.aplic.org>