

CONSIDERING NATURAL RESOURCE ISSUES IN WINDFARM SITING IN WISCONSIN A GUIDANCE

Windfarms pose different siting issues than combustion-based electric generation facilities (coal, oil and natural gas as well as biomass). They tend to require large areas of land, but disturb a limited portion of that acreage. Avian and bat mortality from collisions with the turbine blades, towers or related facilities is the best-documented natural resource impact. In landscapes dominated by previously disturbed habitats, the impacts of greatest concern may occur in the air, rather than at the land surface or in the water. In less disturbed areas, the more important impacts may be behavioral, due to disturbance of and avoidance by wildlife. Even with a relatively small footprint, there will be some alteration of habitat due to the installation of turbines, roads, and electrical facilities. Therefore, to address all of these impacts, technology-specific guidelines are needed to help developers minimize the potential adverse impacts on wildlife and habitat.

Following are Wisconsin Department of Natural Resources' (WDNR)-recommended guidelines for the environmentally sound siting of utility-scale¹ wind-electric generating facilities. These guidelines should be applied to identify and characterize the presence of resources that are considered sensitive to windfarm development in the area under consideration, and therefore aid developers in avoiding potentially significant adverse natural resource impacts. This guidance can be used together with guidelines developed by the U.S. Fish and Wildlife Service (see: <http://www.fws.gov/r9dhcbfa/windenergy.htm>) to the extent that they are compatible.

To help identify areas with good potential for energy development that have minimal potential for adverse impacts on natural resources, WDNR recommends that project proponents develop and use overlay maps, preferably on a GIS system, with the following resources delineated:

Wildlife Areas - Officially designated wildlife areas, such as State Natural Areas, Parks and Forests, private conservation properties, and areas that are not officially recognized, but are widely known to have significant use by wildlife, mainly birds and bats, should be avoided. This can often be accomplished by setting an appropriate setback distance that ensures that under normal meteorological conditions (e.g.: not during major storm front passages and other conditions that may concentrate bird flights at low altitudes), most of the normal flight activity is outside the blade-swept zone of the turbines. The purpose of this criterion is to minimize the potential for collisions with wind turbines and adverse behavioral impacts.

Setbacks should be sufficient to keep wind turbines away from most of the take-off and landing activity at marshes and other areas where large numbers of birds congregate, as well as major

¹ Utility-scale wind installations are considered to be those with capacities greater than 500 kilowatts (kW) **and** more than five turbines in one location

bat hibernation and staging sites. Traditional resting and feeding stops along migratory corridors (especially for neo-tropical songbirds and tree bats) should also be avoided. Siting should attempt to minimize facilities located within the normal low-altitude flight range around major staging areas, such as Horicon Marsh, of species found in large numbers (like Canada geese) whenever possible. “Low altitude” should be understood as within the height range swept by the turbine blades.

Migration Corridors - As a general rule, caution should be applied in considering sites along orienting features (such as the Niagara Escarpment, the Lake Michigan shore, or the Mississippi River valley) normally followed by migrating birds, as well as tree bats. Bird groups of concern include raptors, waterfowl, water birds (e.g.: herons and shorebirds), gulls and terns, and songbirds. This especially applies to corridors known to be used by state and federal endangered, threatened, and special concern species (eg: whooping cranes). Areas close to habitual resting stops along the corridors are of most concern. Normal paths in and out of major bird and bat aggregating areas, as described above, should also be avoided whenever possible. Consulting with WDNR (and other) wildlife experts should help to identify many of these areas. Height of towers and turbine blade swept areas should be considered in relation to normal clear and cloudy weather flight altitudes in order to evaluate whether specific areas are sensitive.

Current or Proposed Major State Ecosystem Acquisition & Restoration Projects - Because these areas are often targeted for ecological restoration, windfarms would be incompatible within the boundaries. Examples include the Baraboo Hills and the Pine Barrens of northwestern Wisconsin. State natural areas also fall into this category. Sites outside the boundaries can be considered based on their compatibility with the proposed uses of the project. Consulting with the DNR Office of Energy and local experts will help in considering these factors.

State and Local Parks and Recreation Areas - Windfarms are incompatible with some of the recreational and aesthetic values that these facilities provide. The major concern is whether the turbines will be visible or audible from camping, active use and educational areas. Normally, windfarms should not be placed where they would be visible or audible from these park facilities. However, windfarms may be compatible with some recreational trails and other areas where a natural setting is not critical. (eg: park headquarters) and they may enhance the educational value by providing suitable signs and displays. These should be considered on a site-specific basis.

Active Landfills - Because active landfills attract large numbers of birds, especially gulls, areas in the immediate vicinity of landfills should be avoided.

Wetlands - Wetlands tend to attract waterfowl and shorebirds, and are also major feeding sites for bats. For this reason, and to protect their hydrologic characteristics, windfarms should not be constructed within wetlands. Setbacks from the wetland boundary should be considered based on the size and functional values of the wetlands, especially those related to wildlife use, and the hydrological relationship to the surrounding area. This does not preclude construction in areas containing scattered small wetland patches as long as these features are protected from direct impacts and runoff. Where construction of turbine foundations may affect groundwater-

sensitive habitats and species, extra care should be taken in designing and constructing the wind farm.

Wooded Corridors – Many wildlife species use wooded corridors for a variety of purposes, including travel routes and foraging. Therefore, it is desirable to maintain an adequate separation from wooded corridors, especially those that are oriented in the direction of migratory movements (as described earlier), or between roosting/resting and foraging areas, such as wetlands and croplands post-harvest. Determining a reasonable setback is probably best done in consultation with local experts who are familiar with local wildlife use and movement patterns.

Major Tourist/Scenic Areas - Because of the potential for aesthetic and noise conflicts, constructing windfarms close to intensively used tourist areas is discouraged. Examples include portions of the Door and Bayfield Peninsulas, the Mississippi River Bluffs, Lake Winnebago and other water features. Sites that are not visible from heavily used tourist areas, or sites with adequate setbacks or vegetated edges to screen the turbines from lower areas, can be considered on a site-specific basis.

Airport/Landing Strip Clear Zones and other lighted facilities - To reduce the possibility of light attraction of birds and bats and avoid conflicts with aviation activities, windfarms should not be constructed within designated clear zones. Other facilities that are brightly lighted throughout the night may also contribute to attracting birds, and should be considered when laying out wind facilities.

Site Characterization Studies

Site characterization is an important step in considering and evaluating potential windfarm locations. In this context, it consists of identifying habitat resources in the area, the communities and species likely to use them, and the numbers and timing (seasonal and daily) of use.

For flying animals like birds and bats, as well as ground-dwellers, applying the criteria listed in this guidance should help to eliminate most areas with the greatest potential for adverse impacts of all kinds. Using a mapping or GIS approach is highly recommended to identify potentially acceptable areas. This can be compared with wind potential maps to pinpoint sites for more detailed site specific evaluation. Studies should be consistent with those described in the U.S. Fish & Wildlife Service guidelines for wind development and the guidelines for wind evaluation studies developed by the National Wind Coordinating Committee, <http://www.nationalwind.org/publications/avian.htm> American Bird Conservancy <http://www.abcbirds.org/policy/windenergy.htm> , and others (see references).

A baseline wildlife evaluation should be conducted for each site under serious consideration for windfarm development. To allow comparison with other studies, this evaluation should follow accepted standard protocols for windfarm evaluations (such as the NWCC study guidelines). Using the USFWS Guidelines should also incorporate WDNR considerations.

The study should characterize resident and migratory bird and bat populations on a seasonal and day/night basis, including migrations and breeding seasons. Use by raptors, waterfowl, shorebirds and wading birds, gulls and terns, songbirds and bats should be evaluated for at least one year, with emphasis on the Spring and Fall migrations. This is especially important when protected and special concern species are likely to use the area. Observational (including radar and acoustic bat detection) and capture (eg: mist netting for songbirds) methods should be used to carry out this study. Habitat features commonly used by and attractive to birds should be noted and characterized. Likely sources and levels of mortality occurring without the project should be evaluated on a theoretical basis (e.g.: communications towers). Area dependent and disturbance-sensitive species should be considered. An overview of other wildlife use (e.g.; mammals and herptiles) should be carried out, with some emphasis on the small mammals and other animals that may be the prey base for raptors.

Potential windfarm developers are strongly encouraged to contact the DNR Office of Energy as early in the process as practicable. The Office will put them in touch with agency wildlife and endangered resources experts. Other knowledgeable sources, such as Audubon Society chapters and other ornithological experts, should be contacted regarding wildlife use patterns around the site. Natural Heritage Inventory information on the site area should be obtained from the DNR Bureau of Endangered Resources, and evaluated to determine if the site has important habitat features or may affect protected or special concern species. This should happen as early in the site selection/development process as possible. Confidentiality agreements can be signed with the developing company to protect the its financial interests.

The site study plan should be submitted in advance to the DNR and discussed with staff experts to ensure its acceptability. Hiring a reputable environmental consultant with ornithological and bat ecology expertise is highly recommended. The study results should be provided to and discussed with the DNR experts. Mitigation measures proven to minimize collisions and mortality should be designed into the windfarm. Towers and electric lines should also be sited, designed, and installed using measures to reduce the likelihood of bird and bat mortality. Placing electric lines underground is highly recommended, as is the use of perch guards on above ground poles, and other Avian/Powerline Interaction Committee (APLIC) endorsed technologies (see: <http://www.aplic.org>). This should help to ensure that developing the site has little chance of causing unacceptable adverse impacts on wildlife.

Bird and bat use and interactions with wind turbines and supporting facilities should be monitored for an adequate period (at least two years is recommended) after installation, using accepted standard methods. This should be done for the first wind farms in any ecological region of the state. The monitoring should evaluate any collisions and mortality that occur to determine whether the facility can be modified to prevent future collisions, or if mitigation is needed. Wildlife avoidance and other behavioral changes should also be evaluated. An adaptive management approach to planning, design, construction and operations is highly recommended. Presence of bat hibernation and roosting sites and habitats should also be noted, and an evaluation should be made of bat foraging activity in and around the proposed site.

DNR staff will evaluate the results of wildlife studies and post-construction monitoring to revise these guidelines as needed. If problems are not occurring, it is likely that later installations with similar characteristics will not require as much detailed study as the initial wind farms.

References

Site studies

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