



Wind Power and Wildlife in New Mexico

The New Mexico Audubon Council

Wind power is becoming an integral part of the nation's and New Mexico's renewable-energy future. Compared to traditional energy sources, wind power, along with other renewable-energy sources and energy conservation, provides significant environmental benefits for birds, wildlife, and their habitats. The New Mexico Audubon Council supports wind-power development provided that it is sited, designed, constructed, and operated to responsibly minimize harmful impacts on the environment. In particular, we believe that siting of wind-power development in New Mexico should contain appropriate stipulations regarding wildlife and avian resources inventory, mitigation, and monitoring, including the cumulative effects of expanded development in both space and time.

Maps of wind-power resources indicate that most of eastern New Mexico has potential for development of generating facilities. At the same time, National Wildlife Refuges at Maxwell, Las Vegas, Grulla, and Bitter Lakes and many state Wildlife Management Areas attest to the importance of eastern New Mexico for wildlife. The corridors of the Canadian and Pecos rivers and the reservoirs on those rivers serve to attract and funnel migrating birds on a north-south flyway through the eastern part of the state. The famous bats of Carlsbad Caverns migrate from the caverns to the Pecos River valley daily during the summer months to feed. This confluence of substantial wind-power potential and significant wildlife resources in the same part of the state suggests that wind-power development must be carefully managed to prevent negative effects on the state's wildlife heritage.

In May of 2003, the federal Fish and Wildlife Service (FWS) released interim guidelines for wind-power development¹. These recommendations are included in this policy as Appendix A. These guidelines address a number of the issues that are of concern with respect to the siting, construction, operation, and maintenance of wind-power facilities. Many conflicts between wind-power facilities and wildlife concerns can be avoided if these guidelines are followed carefully. However, the New Mexico Audubon Council has several specific concerns which are discussed below.

Siting

Substantial avian mortality has been observed at the Altamont Pass site in California² and more recently bat mortality has been documented at Backbone Mountain in West Virginia³. Both of these cases involved migrating animals. Other studies show very low mortality at another site⁴. Taken together, these studies suggest that direct wildlife

¹ Memo with attachment from Deputy Director, FWS to Regional Directors, May 13, 2003.

² J. Howell & J. DiDonato, Final Report to U.S. Windpower, Livermore, CA, 1991.

³ Scientific American, pp 20-21, February 2004.

⁴ R. G. Osborn, et al, American Midland Naturalist, 143 pp 41-52, 2000.

mortality is not an intrinsic feature of wind-power facilities but is dependent on the site selected and the type of turbine-support structure used. Surveys adequate to determine the presence of migrants, including nocturnal migrants, must demonstrate that there is no significant use of a proposed site by migrating birds or bats.

Even in the absence of direct mortality, the effect of wind-power facilities and associated infrastructure may extend over a large geographic area and have a broad area of influence. On native prairie and Conservation Reserve Program (CRP) lands, densities of nesting grassland birds have been demonstrated to be significantly reduced in the near vicinity of wind turbines (to less than 25% of that observed in comparable, more distant areas)⁵. Human disturbance, turbine noise, and physical movements of turbines during operation all may have contributed to the decline, but it is also likely that tall structure avoidance plays a key factor in nest site selection among breeding grassland birds.

Many grassland species are associated with large, relatively unbroken expanses of grasslands or shrublands. While some grassland species are able to tolerate a limited amount of habitat fragmentation, many factors (agricultural and petroleum developments, dispersed residential developments, power lines, roads, etc.) have already created a high degree of fragmentation in much of eastern New Mexico. Additional habitat fragmentation created by wind farms will exacerbate existing threats.

The primary focus of efforts at minimizing direct and indirect wildlife effects must therefore involve siting decisions. To avoid or minimize biological resource concerns, siting decisions should be made in consultation with the federal Fish and Wildlife Service (FWS), the New Mexico Natural Heritage Program, the New Mexico Department of Game and Fish (NMDGF) and other appropriate natural resource protection agencies and knowledgeable individuals. This would allow wind-power developers and agencies to determine the potential for biological resource conflicts and determine what studies or surveys are needed.

Although developments on public land require environmental review in compliance with the National Environmental Policy Act, even developments on private land will require compliance with the Endangered Species Act (ESA), the Migratory Bird Treaty Act, and state wildlife statutes. We believe that conflicts between energy development and wildlife habitat needs can be avoided through the development of a comprehensive siting process. Such a siting process will also help wind-power developers avoid legal conflicts and delays.

Survey Objectives

New Mexico state agencies should establish clear procedures to ensure that sites are adequately assessed to avoid or minimize biological resource conflicts. Each proposed wind-power development site is unique and will require specific analysis. To ensure the adequacy of biological resource surveys and studies, wildlife use or migration patterns through an area should be surveyed over a period of several years.

⁵ K. L. Leddy, et al, *Wilson Bulletin*, **111** pp 100-104 1999.

Pre-decisional information should be gathered concerning the wildlife resources of any area being considered for wind-power development. It is important to recognize that in many areas, detailed information is lacking, and that absence of information is not equivalent to indication of the absence of use by wildlife. As a minimum, survey objectives should include the following:

- Identification of avian and bat species using the area, particularly during migration periods—fall and spring—when large numbers of birds may be moving through the area (*visual and acoustic observations and aerial surveys*);
- Quantitative and qualitative descriptions of the temporal and spatial use of the study area by the identified species, to include data on the altitude at which birds fly over the study area during migration, particularly at night. (*Fine-scale marine radar combined with acoustic monitoring during both fall and spring migrations.*);
- Identification of any high-avian-use areas (*resting or congregating areas, National Wildlife Refuges*) within the overall study area which may pose a higher risk to avian species from development.

Monitoring methodologies should also:

- Be site specific and statistically valid;
- Be peer reviewed by unbiased biometricians and ornithologists who have no financial relationship to the project;
- Include a formal-risk-assessment component that examines the probabilities of and the consequences to wildlife populations of worst-case outcomes;
- Identify the ranges and movement patterns of bird species included on the Partners in Flight Species of Continental Importance⁶ as well as state and federal threatened and endangered species and other bird species of management concern.

Specific Concerns

The indirect effects of wind-power development are of particular concern in the case of the Lesser Prairie-chicken in eastern New Mexico. The FWS has determined that the species is warranted for listing as a threatened species under the ESA, but that the species listing was precluded by the need to list other higher-priority species. The “warranted, but precluded” finding established the Lesser Prairie-Chicken as a “candidate species” under the ESA. Prairie-chickens are known to avoid nesting within sight of vertical structures on the horizon. Further, noise, such as might be associated with the operation of wind-power facilities, interferes with the breeding activity of Lesser Prairie-chickens, in which males attract females with “booming” sounds that are audible to humans for at least a mile, depending on wind conditions.

⁶ Rich, T. D., et. al. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY

No siting of wind-power development in or adjacent to Lesser Prairie-chicken habitat should be authorized. Specific concerns appear in central Roosevelt and north Curry counties (mean wind speeds 7.5-8.0 m/s at 50 m) and in south Roosevelt, east Chaves, and Lea Counties (mean wind speeds 7.0-7.5 m/s at 50 m).

The Sand-dune Lizard is endemic to a small area of the Shinnery Oak/sand dune community in parts of southeast New Mexico and adjacent Texas. The FWS has listed the Sand-dune Lizard as a Category 2 Notice of Review Species under the ESA. The lizard is currently listed as threatened by the New Mexico Department of Game and Fish. Any reduction of habitat will have at least a localized effect on populations of Sand-dune Lizards. Further fragmentation of habitat by roads and other structures that interrupt dispersal paths for juvenile Sand-dune Lizards will also lower the probability of continued survival of the species. No wind-power developments should be authorized within the Shinnery Oak/sand dune community. These areas largely overlap with Lesser Prairie-chicken habitat.

Turbines located on ridges and upwind slopes may utilize the same air currents that are commonly used by soaring birds in migration, including but not limited to raptors. New Mexico is astride several migratory flyways, and many migrating birds pass through the state each year. No siting of wind-power developments within migratory corridors or close to concentrations of migratory birds (National Wildlife Refuges, NMDGF Wildlife Management Areas, reservoirs, river corridors) should be allowed. It may be necessary to provide setbacks and buffers from these important bird and wildlife areas. Specific concerns arise in areas of the Pecos River valley in Guadalupe County (mean wind speeds 7.5-8.0 m/s at 50 m), along the eastern front of the Rocky Mountains, reservoirs in the Canadian River valley, and possibly in Union County.

Locating wind farms in areas that are already used as cropland is appropriate. Croplands are biologically disrupted and, as a consequence, negative effects on wildlife from wind power generation are minimized. If a minimum of 75% of the land within a 3-mile radius of each wind turbine were composed of farmed cropland, negative impacts to wide ranging species such as prairie chickens might be minimized. This 3-mile buffer should exclude any parts of large blocks of grassland, whether they be native prairie or seeded grasslands such as those established through the CRP.

Summary

The New Mexico Audubon Council believes that *with appropriate siting*, wind-power development in eastern New Mexico can be accomplished without significant damage to our wildlife heritage. We urge the Department of Energy, Minerals, and Natural Resources, the State Public Regulation Commission, and the State Land Office to ensure that appropriate considerations for our wildlife heritage are taken into account as New Mexico enters a future as a major source of renewable energy.

Appendix A: U.S. Fish and Wildlife Service, May 13, 2003

INTERIM GUIDELINES TO AVOID AND MINIMIZE WILDLIFE IMPACTS FROM WIND TURBINES

Introduction

Wind-generated electrical energy is renewable, produces no emissions, and is generally considered to be an environmentally friendly technology. Development of wind energy is strongly endorsed by the Secretary of the Interior, as expressed in the Secretary's Renewable Energy on Public Lands Initiative (May 2002). However, wind energy facilities can adversely impact wildlife, especially birds (e.g., Orloff and Flannery 1992, Leddy et al. 1999, Woodward et al. 2001, Braun et al. 2002, Hunt 2002) and bats (Keeley et al. 2001, Johnson et al. 2002, Johnson et al. 2003). As more facilities with larger turbines are built, the cumulative effects of this rapidly growing industry may initiate or contribute to the decline of some wildlife populations (Manes et al. 2002, Johnson et al. 2002, Manville 2003). The potential harm to these populations from an additional source of mortality or adverse habitat impacts makes careful evaluation of proposed facilities essential. Due to local differences in wildlife concentration and movement patterns, habitats, area topography, facility design, and weather, each proposed development site is unique and requires detailed, individual evaluation.

The following guidance was prepared by the U.S. Fish and Wildlife Service (Service). Like the Service's voluntary guidance addressing the siting, construction, operation, and decommissioning of communication towers (<http://migratorybirds.fws.gov/issues/towers/comtow.html>) and the voluntary guidance developed in cooperation with the electric utility industry to minimize bird strikes and electrocutions (APLIC 1994, APLIC 1996), this guidance is intended to assist the wind energy industry in avoiding or minimizing impacts to wildlife and their habitats. This is accomplished through: (1) proper evaluation of potential Wind Resource Areas (WRAs), (2) proper location and design of turbines and associated structures within WRAs selected for development, and (3) pre- and post-construction research and monitoring to identify and/or assess impacts to wildlife. These guidelines are based on current science and will be updated as new information becomes available. They are voluntary, and interim in nature. They will be evaluated over a two-year period, and then modified as necessary based on their performance in the field, on comments from the public, and on the latest scientific and technical discoveries developed in coordination with industry, states, academic researchers, and other Federal agencies. After this period, the Service plans to develop a complete operations manual for evaluation, site selection, design, construction, operation, and monitoring of wind energy facilities in both terrestrial and aquatic environments.

Data on wildlife use and mortality collected at one wind energy facility are not necessarily applicable to others; each site poses its own set of possibilities for negative effects on wildlife. In addition, the wind industry is rapidly expanding into habitats and regions that have not been well studied. The Service therefore suggests a precautionary approach to site selection and development, and will employ this approach in making recommendations and assessing impacts of wind energy developments. We encourage the wind energy industry to follow these guidelines and, in cooperation with the Service, to conduct scientific research to provide additional information on the impacts of wind energy development on wildlife. We further encourage the industry to look for opportunities to promote bird and other wildlife conservation when planning wind energy facilities (e.g., voluntary habitat acquisition or conservation easements).

The Service is guided by the Fish and Wildlife Service Mitigation Policy (Federal Register 46 (15), January 1981) in evaluating modifications to or loss of habitat caused by development. This policy follows the sequence of steps recommended in the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) in seeking to avoid, minimize, or compensate for negative impacts. Mitigation can involve (1) avoiding the impact of an activity by taking no action; (2) minimizing impacts by limiting the degree of activity; (3) rectifying an impact by repairing, rehabilitating, or restoring an affected environment; (4) reducing or eliminating an impact by conducting activities that preserve and maintain the resources; or (5) compensating for an impact by replacing or providing substitute resources or environments. Any mitigation recommended by the Service for wind energy development would be voluntary on the part of the developer unless made a condition of a Federal license or permit. Mitigation does not apply to "take" of species under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, or Endangered Species Act. The goal

of the Service under these laws is the elimination of loss of migratory birds and endangered and threatened species due to wind energy development. The Service will actively expand partnerships with regional, national, and international organizations, States, tribes, industry, and environmental groups to meet this goal.

Projects with Federal involvement may require additional analysis under the National Environmental Policy Act (<http://www.fws.gov/r9esnepa>), Endangered Species Act (<http://endangered.fws.gov>), or National Wildlife Refuge System Administration Act (<http://www.fws.gov/policyMakers/mandates/index.html#adminact>). This includes projects on federally owned lands (e.g., National Wildlife Refuges, National Forests), lands where a Federal permit is required for development (e.g., BLM-administered lands), or lands where Federal funds were used for purchase or improvement (some State Wildlife Management Areas).

These guidelines are not intended nor shall they be construed to limit or preclude the Service from exercising its authority under any law, statute, or regulation, and to take enforcement action against any individual, company, or agency, or to relieve any individual, company, or agency of its obligations to comply with any applicable Federal, State, or local laws, statutes, or regulations.

The guidelines contain a site evaluation process with checklists for pre-development evaluations of potential terrestrial wind energy development sites (Appendix 1). Use of this process allows comparison of one site with another with respect to the impacts that would occur to wildlife if the area were developed. The evaluation area for a potential development site should include the “footprint” encompassing all of the turbines and associated structures planned for that proposed facility, and the adjacent wildlife habitats which may be affected by the proximity of the structures, but excluding transmission lines extending outside the footprint. All potential development sites within a geographic area should be evaluated before a site is selected for development.

Pre-development evaluations should be conducted by a team that includes Federal and/or State agency wildlife professionals with no vested interest (e.g., monetary or personal business gain) in the sites selected. Teams may also include academic and industry wildlife professionals as available. Any site evaluations conducted by teams that do not include Federal and/or State agency wildlife professionals will not be considered valid evaluations by the Service.

The pre-development evaluation may also identify additional studies needed prior to and after development. Post-construction monitoring to identify any wildlife impacts is recommended at all developed sites. Pre- and post-development studies and monitoring may be conducted by any qualified wildlife biologist without regard to his/her affiliation or interest in the site.

Additional information relevant to these guidelines is appended as follows:

- [Appendix 1 – Protocol to Rank Potential Terrestrial Wind Energy Development Sites by Impacts on Wildlife. Title omitted in original]
- Appendix 2 – Definitions Related to Wind Energy Development and Evaluation
- Appendix 3 – Wildlife Laws Relevant to Wind Power Development Projects
- Appendix 4 - Research Needs on the Impacts of Wind Power Development on Wildlife
- Appendix 5 – Procedures for Endangered Species Evaluations and Consultations
- Appendix 6 – Guidelines for Considering Wind Turbine Siting on Easement Lands Administered as Part of the National Wildlife Refuge System in Region 6 (CO, KS, MT, NE, ND, SD, UT, WY)
- Appendix 7 – Known and Suspected Impacts of Wind Turbines on Wildlife
- Appendix 8 – Literature Cited

Site Evaluation

The site evaluation protocol presented in Appendix 1 was developed by a team of Federal, State, university, and wind energy industry biologists to rank potential terrestrial wind energy impacts on wildlife. There are two steps to follow:

1. Identify and evaluate reference sites, preferably within the general geographic area of the proposed facility. Reference sites are high-quality wildlife areas where wind development would result in the maximum

negative impact on wildlife (i.e., sites selected to have the highest possible rank using the protocol). Reference sites are used to determine the comparative risks of developing other potential sites.

2. Evaluate potential development sites to determine risk to wildlife and rank sites against each other using the highest-ranking reference site as a standard. Although high-ranking sites are generally less desirable for wind energy development, a high rank does not necessarily preclude development of a site, nor does a low rank automatically eliminate the need to conduct predevelopment assessments of wildlife resources or post-development assessments of impacts.

Studies to Assess and Monitor Wildlife Impacts

While ranking potential development sites, the site evaluation team referenced above may identify predevelopment studies that are needed to better assess potential negative impacts to wildlife. Ranking may also suggest the extent and duration of study required. Developers are encouraged to conduct any studies suggested by the team in coordination with Service and other agency wildlife biologists.

Post-development mortality studies should be a part of any site development plan in order to determine if or to what extent mortality occurs. As with pre-development studies, ranking may suggest the extent and duration of study needed. Studies should be designed in coordination with Federal and other agency biologists.

Site Development Recommendations

The following recommendations apply to locating turbines and associated structures within WRAs selected for development of wind energy facilities:

1. Avoid placing turbines in documented locations of any species of wildlife, fish, or plant protected under the Federal Endangered Species Act.
2. Avoid locating turbines in known local bird migration pathways or in areas where birds are highly concentrated, unless mortality risk is low (e.g., birds present rarely enter the rotor-swept area). Examples of high concentration areas for birds are wetlands, State or Federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Avoid known daily movement flyways (e.g., between roosting and feeding areas) and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility.
3. Avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies, in migration corridors, or in flight paths between colonies and feeding areas.
4. Configure turbine locations to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, Golden Eagles, hawks, and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include not locating turbines in a dip or pass in a ridge, or in or near prairie dog colonies.
5. Configure turbine arrays to avoid potential avian mortality where feasible. For example, group turbines rather than spreading them widely, and orient rows of turbines parallel to known bird movements, thereby decreasing the potential for bird strikes. Implement appropriate storm water management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species (e.g., Sage Grouse).
6. Avoid fragmenting large, contiguous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas.
7. Avoid placing turbines in habitat known to be occupied by prairie grouse or other species that exhibit extreme avoidance of vertical features and/or structural habitat fragmentation. In known prairie grouse habitat, avoid placing turbines within 5 miles of known leks (communal pair formation grounds).

8. Minimize roads, fences, and other infrastructure. All infrastructure should be capable of withstanding periodic burning of vegetation, as natural fires or controlled burns are necessary for maintaining most prairie habitats.
9. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors.
10. Reduce availability of carrion by practicing responsible animal husbandry (removing carcasses, fencing out cattle, etc.) to avoid attracting Golden Eagles and other raptors.

Turbine Design and Operation Recommendations

1. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Avoid use of guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (Avian Power Line Interaction Committee 1994).
2. If taller turbines (top of the rotor-swept area is >199 feet above ground level) require lights for aviation safety, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration (FAA) should be used (FAA 2000). Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.
3. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.
4. Where feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the Avian Power Line Interaction Committee (1994, 1996) for any required above-ground lines, transformers, or conductors.
5. High seasonal concentrations of birds may cause problems in some areas. If, however, power generation is critical in these areas, an average of three years monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites.
6. When upgrading or retrofitting turbines, follow the above guidelines as closely as possible. If studies indicate high mortality at specific older turbines, retrofitting or relocating is highly recommended.

(Appendices deleted)