DEVELOPMENT AND APPLICATION OF GUIDELINES FOR SITING, CONSTRUCTING, OPERATING AND MONITORING WIND TURBINES

This session provided a comparison of wind project guidelines developed by the U.S. Fish and Wildlife Service (May 2003) and the Washington State Department of Fish and Wildlife (August 2003). Is there a need or desire for uniform national or state criteria? Can other states learn from Washington State's example, or from the USFWS voluntary guidelines? Should there be uniform requirements/guidelines/check-lists for the siting, operation, monitoring, and mitigation to prevent or minimize avian, bat, and other wildlife impacts?

Development and Application of USFWS Guidance for Site Evaluation, Siting, Construction, Operation and Monitoring of Wind Turbines

by
Albert M. Manville, II, Ph.D., *U.S. Fish and Wildlife Service*[37]

Although wind turbines are not new to the United States (over 1,000 windmills were reported on Cape Cod, Massachusetts, in the late 1800s), the development of large scale "wind farms" or wind plants and their impacts on birds and bats is a relatively recent phenomenon. Compared to the decades of documented impacts of power lines and communication towers on birds and bats, wind farm impacts are certainly recent.

The US Fish and Wildlife Service (USFWS or "the Service") took notice of avian-wind turbine collisions in the late 1980s and early 1990s as a result of events at Altamont Pass Wind Resource Area, California (APWRA). It was estimated that several hundred raptors were being killed each year at APWRA due to turbine blade collisions, guy wire strikes, and electrocutions. While mortality has been somewhat reduced at APWRA, the problem has yet to be resolved at that site. In addition to direct collision threats, concerns began to be raised in the late 1990s about wind plants disturbing and fragmenting habitats and disrupting birds. Breeding grassland songbirds and prairie grouse, particularly lek-breeding prairie grouse (*e.g.*, Greater and Lesser Prairie Chickens and Sage Grouse), all appear to be adversely affected. Studies on habitat impacts are ongoing. More peer-reviewed published research is needed to determine the extent and implications of impacts.

USFWS' involvement in wind power and issues related to its development began with the Service's Office of Law Enforcement in the late 1980s as a result of events at Altamont Pass. In addition to 1980s investigations, USFWS partnered with the wind industry in 1995 when it joined the Avian Subcommittee (now called the Wildlife Work Group) of the National Wind Coordinating Committee (NWCC). In 1997, Al Manville was designated the USFWS representative to NWCC. In 2002, the Service recognized the need for voluntary guidance to assess, rank, site, place, monitor and conduct research pre-and post-

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construction at wind power developments. Mr. Manville was tasked to chair the Service's Turbine Siting Working Group – represented by all seven Service Regions and the Washington office – including representatives from Ecological Services, Permits, Law Enforcement, Habitat Conservation, and Migratory Birds. The creation and release of USFWS wind power guidance was fast-tracked as part of the President's National Energy Policy addressing renewable energy, and the Interior Secretary's 2001 Renewable Energy on Public Lands Initiative.

In July 2002, the USFWS Turbine Siting Working Group held a three-day meeting with fifteen Service representatives. The meeting resulted in the creation of draft interim voluntary guidance for wind power development. The guidance was critically reviewed by all Service Regions, later by the Washington Directorate, and finally by the Department of the Interior. The interim voluntary guidance for land-based wind turbines was completed and approved in July 2003, when it was announced in the Federal Register. The complete guidelines can be found at: http://www.fws.gov/r9dhcbfa/windenergy.htm.

There are a variety of reasons why USFWS's guidance on wind development are voluntary rather than regulatory. Given the opportunity, the Service prefers partnerships over a regulatory approach when working with industry. This is how the Service has worked with the electric utility industry since the 1970s (in a partnership formalized in 1989 through the Avian Power Line Interaction Committee [APLIC]) and with the communication tower industry since 1999 (through the Communication Tower Working Group); the same model likely will be used with the commercial and recreational fishing industries in the near future. With respect to the electric utility industry, USFWS helped develop voluntary guidance with APLIC through "suggested practices" for strike and electrocution avoidance (published in 1994 and 1996 respectively). The Service, with feedback from industry and academics, developed voluntary guidance for siting and placement of communication towers in 2000.

The voluntary guidelines[38] are based on the best available science, and will be updated in July 2005 based on comments received from the public and when new information becomes available (with the exception of National Wildlife Refuge policies regarding grassland easements in Region 6, found in Appendix 6 of the USFWS guidance document, pp. 39-44). Comments received on the guidelines will become part of the Service's administrative record. Two public meetings/briefings have been held on the guidelines to date, and the Service anticipates holding others. Much of the guidance is based on studies conducted by, information collected from, and recommendations presented by the NWCC, including input from the American Wind Energy Association (AWEA).[39] General recommendations regarding siting, design, and operations are intended to *suggest* (based on the best available science) the sorts of analyses that should be performed. These are recommendations, *not binding, bright-line rules.*

While the USFWS guidelines are voluntary, there are applicable Federal statutes and

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[38] The terms "guidelines," "guidance," and "guidance document" hereafter are used interchangeably.
[39] See Partial List of Literature Reviewed, below.

regulations which the wind industry must obey. These include the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA), and the regulations applicable to these statutes. With respect to the ESA on public lands or where Federal funding or Federal permits are involved, USFWS strongly recommends that the applicable Federal agency or the turbine company/contractor – if designated as a non-Federal representative – consult with USFWS through Section 7. On private lands, particularly in the East, USFWS suggests contacting the local Ecological Services Office for guidance regarding Sections 9 and 10 of ESA. To avoid problems, it is best to contact the nearest Ecological Services Office at the outset.

The MBTA is a strict liability statute, meaning that *proof of intent* to violate any provision *is not required* to establish that a party is in violation of the law. The killing of any bird is not allowed under the law unless permitted, and the USFWS does *not* issue "incidental" or "accidental take" permits under MBTA. However, on page 2 of the Director's memo to the Regional Directors, signed May 13, 2003, the guidance does state:

> "While the Act has no provision for allowing unauthorized take, it must be recognized that some birds may be killed at structures such as wind turbines even if all reasonable measures to avoid it are implemented."[40]

Because of these stipulations, USFWS encourages a pro-active, partnership approach in order to avoid potential problems. BGEPA, like MBTA, is a strict liability statute protecting Bald and Golden Eagles. It is important to contact the nearest Ecological Services Field Office for issues regarding either act.

Migratory birds are a trust responsibility of USFWS. The Service is currently responsible for the conservation and management of 836 species of migratory birds. In 1995, USFWS listed 124 "nongame species of management concern" representing birds whose populations were declining, some precipitously. This list represents an "early warning" system. The next step for species of management concern could be listing as candidates under the ESA, which USFWS would rather avoid. As of 2003, the Service raised the number from 124 to 131 species in the publication, *Birds of Conservation Concern 2002*. This is not good news. In addition, there are 77 endangered and 15 threatened birds listed on the ESA, and these numbers continue to increase. This means that at least a total of 223 of the 836 species of migratory birds in the U.S. are in trouble, while the status of fully one-third of the other species is not known. As a trust agency tasked to protect and manage migratory birds, USFWS must do everything it can to reverse these population trends (the vast majority of which are human-caused), whether impacts appear to be large or small, on public or on private lands. The issue involves cumulative impacts as well, including those from wind farms, communication towers, buildings, automobiles, power lines, and other sources of mortality related to human activity.

Generally speaking, estimated nationwide avian mortality due to wind turbines appears to low with the exception of Altamont Pass. USFWS wants to ensure that impacts stay low.

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[40] USFWS Director's memo to Regional Directors introducing the Service's voluntary land-based wind turbine guidance, May 13, 2003, 2 pp.

Because the wind industry is still in its infancy, the Service hopes to prevent any new problems from developing as the industry and the nation gear up for exponential turbine growth. The bottom line: USFWS encourages the wind industry to work with the Service to help prevent avian and bat impacts, especially as electricity demand (and wind energy development) increases in the US. To make this happen, the industry's review process needs to be transparent, especially concerning the protocols being used to assess wind sites for bird and bat impacts (e.g., Phase I and II risk assessments, and pre- and post-construction monitoring protocols). USFWS and other agencies would like the opportunity to review them as well. This is one reason why USFWS recommended that a professional Federal and/or State biologist be involved in the pre-development review process. USFWS strongly encourages wind energy developers and trade associations to work directly with Robert Willis (of the Division of Habitat Conservation, Arlington, VA, office); Rob Hazelwood (of the Helena, MT, Field Office), Al Manville, and all 78 Ecological Services Field Offices from the outset of the project development process. By working together at the local level to properly site and design wind turbines, we have the potential to reduce loss of migratory bird trust resources and habitats, listed bats, and other listed species by replacing more disruptive forms of energy development with wind energy.

USFWS encourages the wind industry to follow the guidelines USFWS has developed and to conduct scientific research to provide additional information on migratory birds, prairie grouse, grassland songbirds, bats and other species. Specifically, USFWS asks contractors/developers to do the following:

- rank and evaluate each site;
- assess and monitor wildlife impacts;
- perform pre- and post-construction monitoring and mortality studies;
- use USFWS site development recommendations;
- use turbine design and operational recommendations; and
- address research needs.

In a memo to Regional Directors dated April 26, 2004, the USFWS Director noted that these actions

> "should be accomplished through flexible application of our voluntary guidelines based on local conditions, local knowledge, locally applicable scientific data, and technical feasibility (e.g. sufficient wind, lease space, transmission grid access).
>
> Where we recommend collecting 3 years of data prior to construction, this recommendation is ***not*** intended to be a *strict requirement* in all areas, especially if less time can be expected to yield sufficient data. However, where risk is considered sufficiently high due to variable weather, changing flight paths, and variable migration timing, then 3 years of data may be appropriate."

In other words, three years of pre-construction data is a recommendation, not a requirement.

There are some relatively new and very promising technologies that can be used individually or in tandem to monitor for birds and bats. These technologies include: a) thermal imaging equipment; b) fixed vertical beam radar; c) BIRDRAD (high resolution marine radar); d) WSR-88D (Doppler weather radar); e) acoustic monitoring; f) GIS; and g) GPS. Taken as a whole, these technologies are helping to better assess bird and bat presence, animal behaviors, altitudes of migration, patterns of movement, speed and direction of movement. USFWS reminds researchers that it is important to "ground the truth" by corroborating the findings of any one tool with data from other sources or tools. Despite the number and rigor of avian/bat studies that are conducted, from a wildlife and habitat perspective there are still fundamentally "good" and "bad" places to locate wind turbines. It is USFWS's fear that as the industry grows, more "bad" sites will be considered as "good" ones get developed. The site evaluation guidance developed by USFWS is designed to help make that "good"/"bad" determination and avoid potential problems.

USFWS hopes to achieve a range of goals with the development of the guidance document and the Service's overall involvement with wind the wind industry. The primary goal is to partner with the wind industry and consider developing voluntary avian protection plans (APPs) as is currently being done with the electric utility industry. The Service aims to keep bird and bat mortality low as the industry grows exponentially. It hopes to resolve issues at Altamont Pass and avoid similar scenarios in other locations. USFWS hopes to learn more about and answer questions about bat mortality at wind farms,[41] and to look much more closely at avian and bat migration in the Eastern US, particularly along the Appalachian Mountain ridge-tops. More radar and thermal imagery work are needed, and more replication is suggested. For example, one study found "roughly half the night [bird] migrants flew at altitudes below 125 m, putting them at risk of colliding with 112-m high wind turbines…" at proposed sites in New York (Cooper and Mabee 1999).

Overall, USFWS seeks more cooperation and collaboration from the wind industry from the beginning of development planning processes. The Service would like to see greater transparency incorporated into the industry's review process, especially with respect to research protocols used to assess wind sites for birds and bats during Phase I assessments. If the wind industry is to portray itself as "green," developers need to contact USFWS at the outset, not just as a second thought after a site has been selected, landowner agreement has been reached and a power agreement signed.

Several next steps are planned to develop and promote the guidance. The Service plans to:

- conduct more public workshops;

[41] The retrieval of 475 bats at Backbone Mountain, WV (fatalities estimated at 1,900-2,375 for the year 2003) is of concern. The level of mortality at Backbone Mountain has been reassessed by Dr. Merlin Tuttle of Bat Conservation International, indicating that the total number of fatalities could approach 4,000 (Tuttle 2004).

- implement a series of multi-stakeholder workshops (such as the Region 5 [Northeastern US] workshop which took place in September 2003 on Virginia's Eastern Shore) on use of USFWS guidance;
- encourage more dialogue between the wind industry and USFWS Field Offices;
- ask industry to encourage a 5+ year reauthorization of tax credit legislation;
- encourage the industry to continue funding bird and bat research (the industry has spent an impressive $6+ million on research since 1994) and to get their results published in peer-reviewed journals.

The current guidance will be updated in July 2005. USFWS hopes to participate in more meetings like the Wind Energy and Birds/Bats Workshop, and encourages industry members not already involved to engage in the process.

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Partial List of Literature Reviewed, Portions of Which Used to Develop the Fish & Wildlife Service's Voluntary Wind Turbine Guidance

[*compiled for this presentation by Albert M. Manville, II, Ph.D., Wildlife Biologist, Division of Migratory Bird Management, USFWS, Chair, (FWS) Wind Turbine Siting Working Group*]

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Plus numerous other sources referenced in Literature Cited Section of Guidance.

Discussion, Questions and Answers, USFWS Guidelines

Noted: Proceedings from a National Wind Coordinating Committee (NWCC) meeting held to help guide development of the USFWS guidelines will be available on the NWCC website in the near future (www.nationalwind.org). AWEA also has commented on the USFWS guidance and these comments are available for review at www.awea.org.

Noted: APLIC is developing research methods and protocols for bat monitoring around power lines. The group is working on developing sensors/markers to put on power lines to deter birds and bats.

Does the USFWS website present recommendations to developers of coal-fired power plants?

Response: USFWS tried to get involved with the mountaintop mining issue in the past and was ignored. Different energy development pursuits are regulated in disparate ways… i.e., wind power development is being constrained because of bird and bat impacts while

mountaintop mining, while clearly destructive of bird and other wildlife habitat, continues.

Noted: People in the wind industry are beginning to understand that USFWS recognizes some of the industry's concerns regarding regulation. Industry people hope to continue working with USFWS.

Could the presenter say something about the Cuban Bill?

Response: This bill was an extension of tax credit authorization for all energy sectors except wind to five years rather than two.

How has USFWS prepared its field offices to respond to the inquiries of the wind industry regarding the guidance?

Response: Regional Directors report to the USFWS Director, and all Regional Ecological Services field officers commented on the guidelines before they were published. Part of the guideline development process may be considered an opportunity to educate everyone involved – USFWS, environmentalists, and industry people. USFWS is striving for coordination. All field offices have been provided with the guidelines and were instructed to apply them and get feedback from the wind industry. Additional guidance was sent to field offices based on feedback and questions the Service was receiving. Basically, USFWS is doing its best to develop consistency throughout in the advice it provides with respect to the guidance, but it is a work in progress. The Service Director is encouraging field office people to familiarize themselves with the wind industry, and the Service plans to hold more workshops in the future.

Given that the guidance has been out for nearly a year as of May 2004, what has the response been to the suggestion of looking at and ranking multiple potential sites?

Response: USFWS has not received much feedback on that point to date. Most comments from the West have been positive, but it is too early to tell for the East. One developer did complain about the recommendation to conduct three years of pre-construction wildlife studies; however, this developer and the state involved have been working on getting the project in question moving for six years.

How did USFWS come up with its nationwide mortality estimate?

Response: USFWS does not use an estimate, but rather a range – and even if it is off by a couple orders of magnitude, mortality is still significantly less at wind turbines today than it is at communication towers.

Comment: More outreach by public utility companies may help direct developers to USFWS sooner than in the past.

Response: Yes, this is a good idea.

Wind Power in Washington State

by
Greg Hueckel, *Washington State Department of Fish and Wildlife*[42]

The Washington State Department of Fish and Wildlife (WDFW, or the Department), in consultation with representatives from the wind power industry and environmental groups has developed Wind Power Guidelines that achieve ways to reconcile support for renewable wind power projects with the need to protect wildlife and the State's habitat. These Wind Power Guidelines include innovative provisions that not only protect our native habitats, but also greatly improve habitat value with mitigation expenditures. There is currently little operational experience with wind projects in Washington State, and these Wind Power Guidelines are designed to add important studies and operational knowledge to our understanding of how to site, design, and operate wind projects to avoid and minimize impacts.

These Wind Power Guidelines, which will be used by the Department to shape its comments on wind power projects through the State Environmental Policy Act process, are divided into the following three sections:

1. *Baseline Monitoring Studies for Wind Projects:* calls for pre-project assessments of wind power sites with the goal of avoiding and minimizing bird and bat mortality from turbine strikes; operational monitoring; and a Technical Advisory Committee (TAC) to evaluate impacts and determine if additional measures are needed to address unexpected impacts.
2. *Wind Project Habitat Mitigation (conventional):* steers wind projects toward cropland and developed areas and away from undeveloped native habitat; provides ratios for replacement habitat as mitigation for temporary and permanent wind project impacts; adheres to the principle of no loss of habitat functions and values.
3. *Wind Project Alternative Habitat Mitigation Pilot Program:* creates an innovative option for wind developers (as an alternative to #2) to streamline the mitigation process and ensure that mitigation dollars are spent on acquiring, restoring, and managing strategically important habitat in central and eastern Washington State, where most wind projects are sited. The Alternative Mitigation Program is designed to use public funds for acquisition of the highest value habitat with annual payments from wind developers for stewardship of these lands, greatly increasing the value of mitigation expenditures over those of conventional on-site mitigation.

These Guidelines will be re-evaluated after five years and adaptively altered as needed. They provide wind project applicants with clarity and streamlined processes, require mitigation to not reduce our native wildlife and their habitats, and provide an option to partner with WDFW to protect and improve some of Washington State's most important native habitats.

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[42] 600 Capitol Way N., Olympia, WA 98501-1091

References

A complete copy to Washington State's Wind Power Guidelines can be obtained over the internet at: http://wdfw.wa.gov/hab/engineer/windpower/intex.htm

Or by writing to the Washington State Department of Fish and Wildlife at:

Habitat Program
Washington Department of Fish and Wildlife
600 Capitol Way N.
Olympia, WA 98502-1091

Discussion, Questions and Answers

How does WDFW determine the footprint that the $55/acre fee is applied to?

Response: It is applied to the actual footprint including roads and tower pads and the buffer around them.

Comment: In New Jersey, neither developers nor environmentalists have dealt with state-level guidance yet. Could any other workshop participants comment on the process of developing the Washington State guidelines?

Response (representative of Washington State Audubon): Our organization was given a copy of the guidelines to review, but I wish we had been more integrally involved in developing the alternative mitigation guidelines. We did not entirely agree with the guidelines regarding monitoring, and wondered whether research protocols had been peer-reviewed. We would have liked to have seen a minimum of two years (rather than one season) avian use assessments even for "low-risk" areas. In particular, we did not like the fact that if operation monitoring is "unfinanceable" (i.e., cost prohibitive), then it is not required. Basically, Audubon would have liked to have been party to negotiations and the guideline development process, rather than just being given a chance to review something developed by the wind industry and WDFW.

Response (WDFW): An Audubon representative was included on the review team.

What is meant by the term "unfinanceable"? If taking an operating turbine out of operation is not an option, what do you do if you start seeing high fatality levels post-construction?

Response: The industry has said that taking turbines out of operation after they're built is not a viable mitigation option because of the risk of such a possibility would make it impossible (or prohibitively expensive) to get financing for a project. The solution arrived at in Washington State was to list (at the pre-permit stage) options for operational changes that may be implemented to deal with mortality should it appear during post-construction monitoring.

Comment: There seems to have been much thought put into the Washington guidelines;

they should be used as a template for other states.

Has Washington State thought about statewide monitoring/review?

Response: The State is paying for eco-regional studies, but lack of staff is a real constraint. However, WDFW does have a staff biologist who helps developers put together the information they need for the permitting process.

Comment: The issue of conducting three years of pre-construction studies keeps coming up, and the idea of a three-year standard goes way back before USFWS guidelines. It is considered important for studying critical high-use habitat areas. However, as has been noted here today, when you have good data another three years worth is not necessary, and where you don't have high risk you don't need three years of studies.

In Maine it is entirely up to the developer to decide who gets involved in the site assessment process and whether to conduct pre-construction studies. Which is closer to the current norm, Maine or Washington State?

Response: Washington is definitely a leader for this type of regulation, and thus ahead of the norm.

Might the lack of mitigation demands for disturbed lands motivate developers to disturb an area and then come back later and identify the site for wind development without mitigation requirements?

Response: There is enough trust between parties in Washington State that this is not viewed as a problem.

Has the allowance of less than one full year of pre-project monitoring as outlined in the guidelines been an issue for concern?

Response: Pre-permit assessment in most current cases in Washington State has involved a review of existing information and contacting WDFW, with at least one year of pre-construction studies and, in some cases where there is a critical season, two years of data for that season.