

**Existing Guidelines Subcommittee
Report to the Wind Turbine Advisory Committee
July 23-24, 2008**

The language used in this document is for discussion purpose only

I. INTRODUCTION

The objectives of these recommendations are to provide information and protocols for assessing, evaluating, and determining the level of project effects on fish and wildlife resources, and to develop and recommend impact avoidance, minimization, and mitigation measures for wind power projects in the United States.

The purpose of these recommendations is to establish best management practices (BMP) for wind power projects, to enable individual states to develop their wind power guidelines at a lower geographical scale that minimizes adverse impacts to wildlife, habitats and natural resources through proper pre-project risk assessment, good project design and operation, and effective adaptive management practices. These recommendations include guidelines for preliminary screening of proposed wind energy project sites; pre-permitting study design and methods; assessing direct, indirect, and cumulative impacts to birds and bats in accordance with state and federal laws; developing avoidance and minimization measures; establishing appropriate compensatory mitigation; and post-construction operations monitoring, analysis, and reporting methods.

The document is organized around four basic project development steps:

- (1) The first stage involves project siting and development, where development should focus on avoiding and/or reducing potential adverse impacts of a site before the facility is constructed.
 - a. Gather preliminary information and conduct site screening
- (2) The second stage is construction where careful planning should avoid important habitat and reduce disturbance by conducting construction at appropriate times of year when practicable, and away from sensitive habitat areas.
 - a. Collect pre construction data using standardized monitoring protocols,
 - b. Identify potential impacts and mitigation
- (3) The third stage is operations, where measures should be implemented to minimize ongoing impacts.
 - a. Collect operations monitoring data and post construction data using standardized monitoring protocols
 - b. Implement on site mitigation strategies
- 4) The fourth stage is the decommissioning stage at the end of the project's useful life, where restoration measures should be implemented to return the project area largely to its pre-construction state in accordance with landowner requests and contracts.

II. BEST MANAGEMENT PRACTICES

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A. Preliminary Assessment

The goals of this stage of assessment are to provide early information on environmental issues to help (1) steer development away from sensitive or environmentally significant sites, and (2) to start the process of identifying environmental information and survey needs for potential development sites.

(1) Meet with qualified expert consultants and relevant agencies to identify potential environmental concerns listed below and whether the following occur within the general project study region:

- (a) Federal and State listed endangered and threatened species, candidate, proposed and special concern species
- (b) areas that support high numbers of endemic species and a high degree of threat, as indicated by the percentage of remaining habitat in a region
- (c) areas recognized as rare, declining, specialized ecosystems or state, regional or national conservation priorities (such as wetlands, old growth forests, bottomland hardwoods, native prairie grasslands)
- (d) mapped significant bird, bat, or large mammal migration corridors, stopover points
- (e) locations designated by local, state or federal authorities as incompatible with wind development (wilderness areas, etc.)

To the extent possible, this pre-project assessment may utilize existing information from projects in comparable habitat types in locations close to the proposed project. (See Appendix A for information sources, this could include some of the mapping information we are gathering,)

(2) For wildlife species at risk whose ranges overlap with the project study area, check existing information sources to determine whether *actual or potential habitat or residences* for these species are present in the study area. Assess level of effort required or needed for further work (Appendix B-Natural Heritage Database locations, Fish and Game Agencies)

(3) Conduct an appropriate number of site visits to characterize habitat types, habitat quality, and topographic features of the project study area and identify relevant habitat features (e.g., bat hibernacula, raptor nests). Note presence of shorelines, ridges, wetlands, landfills, caves, mines, etc. on or near study area that are viewable from public roads or shown on available databases and confirmed by site visit.

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B. Pre-construction Survey

Pre-construction studies should normally address the following key issues associated with wildlife and wind power: avian risk, bat risk, wildlife displacement, and habitat loss and fragmentation. In addition to these general areas, appropriate surveys should be conducted for other species protected by state and Federal endangered species that may be present at the site.

(1) Avian Surveys

The objective of avian surveys is to gather information about avian use of potential project sites to characterize risks associated with collisions between birds and wind turbines (displacement effects are addressed in section 4 below).

Developers should collect appropriate and pertinent information that takes into consideration factors associated with region and habitat and that is designed to capture species occurrence and abundance during all seasons of the year in which there is avian use. These studies are to be conducted on representative areas of the site that are expected to include wind turbines. Studies should typically be conducted for a year. A full year may not be necessary if there are sufficient existing studies completed for other projects or phases in comparable habitats the region. More than one year may be appropriate where preliminary assessment or initial preconstruction surveys indicate potential for high avian use and risk. Information should be collected that considers the following issues as appropriate:

1. Identify avian use of a project area by species;
2. Evaluate potential impacts from construction and operation of the proposed site;
3. Determine seasonal variation, if any; and
4. Collect data to aid in the analysis of impacts such as topographic features and weather conditions

Available tools for avian studies include diurnal point count surveys, raptor nest surveys, breeding bird surveys, area searches, mist netting, migration counts, and marine radar surveys, large Doppler surveillance radar, thermal infrared imagery, moon counts, spotlighting, and radiotracking. Which of these tools should be used at a particular site should be a site-specific determination. All surveys should follow protocols contained in the NWCC's Methods and Metrics document. A revision of this document is currently underway. The National Academy of Sciences also lists methods and metrics in its 2007 document on wind energy.

[Andy: Although I like the idea of a framework requiring more study at more sensitive and/or less understood sites, I'm not comfortable with all the categories and definitions currently in the Appendix]* If the project area falls within an area that exhibits characteristics for a very high, high or medium area for bird use, additional surveys may be required (Appendix C)]

(A) Standard Methods and Metrics (or these could be in the Appendices)

Comment [MSOffice1]: Our preliminary assessment process does not yet specify a framework or decision tree that would lead logically to this.

(1) National Wind Coordinating Committee, methods and metrics docs
(give website)

(2) Bat Surveys

The objective of pre-construction bat surveys is gather information about bat use of potential project sites to predict risks associated with collisions between bats and wind turbines.

Methods for preconstruction studies to effectively predict impact to bats have not been fully evaluated. In areas of known bat concentrations or near sensitive bat habitat, information should be collected that considers the following issues as appropriate:

1. Seasonal patterns of abundance and use of a prospective site by bats; and
2. Roosting areas and daily movement patterns.

Available methods for bat surveys are described in detail in Kunz et al. 2007's Journal of Wildlife Management paper.

*If the project area falls within an area that exhibits characteristics for a very high, high or medium area for bat d use, additional surveys may be required (Appendix D)

Comment [MSOffice2]: We will need to specify how this is to be determined. More detail than is currently in the pre-assessment will be needed.

- (A) Standard Methods and Metrics
 - (1) where they are located

(3) Displacement of species

Standard language regarding why it is important and what studies should be performed

Comment [MSOffice3]: Displacement is important to study but I'm not sure there is a lot of guidance on how to do so in most states existing guidelines.

- (A) Standard Methods and Metrics
 - (1) where they are located

(4) Habitat Loss and Fragmentation

Standard language regarding why it is important and what studies should be performed. Collect information about vegetation and land cover types, wildlife habitat, habitat quality, and physical and topographic characteristics of the project area should be collected and compiled using current state-of-the-art protocols

Comment [MSOffice4]: I swiped this language straight off of Washington guidelines. The landscape committee can probably feed more detail about what is needed here.

- (A) Standard Methods and Metrics
 - (1) where they are located-specify protocols for more detailed habitat surveys here

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C. Site Development and Operations

The risk of adverse impacts to wildlife from turbines can be reduced through careful site selection and facility design and operation. The following best management practices can assist a developer in the planning process to reduce potential wildlife impacts.

Each wind energy project site is unique, and no one recommendation will apply to all site selection and layout planning. However, consideration of the following elements in site selection, turbine layout and development and operation of a facility can be helpful to avoid and minimize impacts. *Developers should contact and consult appropriate affected state agencies and the USFWS early in the planning process for each proposed project to identify concerns and potentially sensitive uses.*

1. Avoid locations of state and federal T&E species and those areas identified to have the potential for high risk to birds or bats. Avoid using or degrading high value habitat areas.
2. As appropriate based on direct and indirect risk, establish non-disturbance buffer zones to protect raptor nests, bat maternity roosts and hibernacula, areas of high bird or bat use, or special-status species habitat. Determine the extent of the buffer zone in consultation with USFWS or state wildlife biologists.
3. Site a wind power project on disturbed lands where possible.
4. Minimize, to the extent possible, the area disturbed by pre-construction site monitoring and testing activities and installations.
5. Minimize habitat destruction, habitat fragmentation and disturbance of breeding, staging and wintering birds to the extent possible. Establish the layout of roads, fences, and other infrastructure so as to minimize disturbance of sensitive resources. In natural settings, maintain habitat at the site as close as possible to pre-construction conditions and for seeding or planting use only species compatible with plants and wildlife native to the area. .
6. Limit the number of access roads and minimize new road cuts as much as possible by using existing infrastructure where possible.
7. To prevent avian collisions, place connecting power lines associated with the wind energy development underground, to the extent possible, unless burial of the lines would result in greater impacts to biological resources. Overhead lines may be acceptable if they follow tree lines or are otherwise screened from collision risk. All above-ground lines, transformers and conductors should fully comply with the Avian Power Line Interaction Committee (APLIC).

Comment [EA5]: Maybe this is a no-brainer and doesn't need explicit statement, but the original had the "federal T&E" part in there so I added it...and included the states as well. The "high risk" areas could be independent of any state or federal status.

8. Avoid guy wires. Guyed structures pose a hazard to birds. Communication towers and permanent meteorological towers should not be guyed at turbine sites. If guy wires are necessary, bird deterrents should be used.
9. Keep lighting at both operation and maintenance facilities and substations to the minimum required to meet FAA guidelines and safety and security needs. Use white lights with sensors and switches to keep lights off when not required. Lights should be hooded and directed to minimize backscatter, skyward illumination, and outside illumination. Do not use high intensity lighting, steady-burning, or bright lights such as sodium vapor or spotlights.
10. Configure turbines to avoid creating extended barriers to bird movement to the extent possible. Align turbines to avoid separating birds and bats from their daily roosting, feeding, or nesting sites and to avoid location in high bird or base use areas.
11. Use tubular towers (as opposed to lattice towers) or best available technology to reduce ability of birds to perch and risk of collision.
12. Where warranted, develop a project-specific habitat conservation or restoration plan to avoid or minimize negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. When necessary and compatible with habitat plan, reduce habitat for prey near turbines and use construction and management practices to minimize activities that may attract prey and predators to the wind turbine site.
13. Remove wind turbines when they are no longer operational so they cannot present a collision hazard to birds and bats. Adopt a decommissioning plan and fund for removal of the turbines and infrastructure when it ceases operation, and for restoration of the site to approximate pre-project conditions. See section on Decommissioning.

Comment [EA6]: Mark...I combined these two because my thought it that the stand alone statements could conflict in some situations. If they are separated, the qualifier I provided (or some similar statement) seems to cover the issue.

Comment [EA7]: This is obviously part of decommissioning, so I think we could actually delete all together or at least the last part and then add the part on having a plan in that section.

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D. Post Construction Surveys

At a minimum, the primary objectives for post-construction monitoring are to determine:

- (1) Whether estimated fatality rates from the pre-permitting assessment were reasonably accurate from direct strikes with the wind turbines, or indirectly through the altering of wildlife habitats. This is a very expensive idea, and determining habitat effects should not be a primary objective because it is overreaching and not warranted, except in special circumstances. (I think this is a topic that needs to be discussed. I think it would be negligent of us to discount other impacts of windpower, i.e. footprint, roads, transmission lines, and only observe direct strikes in post-construction monitoring. G. Hueckel)

(2) Whether the avoidance, minimization, and mitigation measures implemented for the project were adequate or whether additional corrective action or compensatory mitigation is warranted.

The duration of operations monitoring should be sufficient to determine whether pre-permitting estimates of impacts to birds or bats were reasonably accurate and to determine whether turbines are causing unanticipated fatalities that require impact avoidance or mitigation actions. The duration and focus of operations monitoring studies should be based on the availability of existing, site-specific data; the species potentially affected; and the magnitude of the anticipated effect. Consult local, state, or federal scientists and appropriate stakeholders regarding study protocol and the duration of an operations monitoring program.

A Technical Advisory Committee is recommended to be responsible for reviewing results of monitoring data and making suggestions to the permitting agency regarding the need to adjust mitigation and monitoring requirements based on results of monitoring data and available data from other projects. The range of possible adjustments to the monitoring and mitigation requirements should be clearly stated in the project permit. Adjustments should be made if unanticipated impacts become apparent from monitoring data. Examples of such changes may include additional monitoring or research focused to understand the identified impacts.

E. Retrofit and Decommissioning

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F. Mitigation

Mitigation is defined as (a) avoiding the impact by not taking a certain action or parts of an action or limiting the degree or magnitude of the action and its implementation; (b) employing specific equipment, project designs, careful placement of facilities, or using corrective techniques that reduce or eliminate the impact; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments (from the President's Council on Environmental Quality as defined in the National Environmental Policy Act regulations).

- A. **Avoidance:** Avoiding adverse impacts through changes in project location, design, operation, or maintenance procedures, or through selection of other less damaging alternatives to the project or action.

- B. **Minimization:** Minimizing impacts by project modification, or rectification and rehabilitation to restore or improve impacted habitat to pre-project conditions, or through reducing or eliminating the impacts over time.

- C. **Compensation:** Compensating for unavoidable impacts by providing replacement or substitute resources (including appropriate management) for losses caused by project construction, operation, or maintenance.

Compensation should follow the sequence preference established by the USFWS as follows:

1. On-site, in-kind
2. Off-site, in-kind
3. On-site, out-of-kind
4. Off-site, out-of-kind

For off-site mitigation to be accepted, the project developer must demonstrate greater habitat function and value can be achieved off-site than on-site. It is recommended that compensation values or ratios be based on habitat types given priority according to state environmental regulations, ordinances, State Wildlife Action Plans or other environmental planning guidance, to provide compensation ratios:

a. Resource Category 1. Habitat to be impacted is of high value and is unique and irreplaceable on national basis or in the ecoregion section. The mitigation goal is to avoid impacts to these habitats.

b. Resource Category 2. Habitat to be impacted is of high quality and is relatively scarce or becoming scarce on a national basis or in the ecoregion section. The mitigation goal is no net loss of in-kind habitat value.

c. Resource Category 3. Habitat to be impacted is of high to medium value. The mitigation goal is no net loss of habitat value while minimizing loss of in-kind habitat value.

d. Resource Category 4. Habitat to be impacted is of medium to low value. The mitigation goal is to minimize loss of habitat value

(2) Mitigation Actions

(A) Mitigation Plans are integral part of construction and should be completed prior to or during project construction. Any mitigation plan should include some or all of the following: compensation for permanent, temporary and cumulative impacts to habitat(s) from the project, adequate replacement ratio, mitigation measures, goals and objectives, implementation plan, performance standards (survival percentage), operation and maintenance plans, and monitoring and evaluation plans. Mitigation sites should be protected for the life of the project.

Alternative Options for Mitigation Actions are:

- (1) purchase of appropriate acreage amount and type, in fee title
- (2) purchase of conservation easement containing appropriate acreage and habitat type
- (3) purchase buffers around or between areas with essential habitat (nesting and breeding areas, migratory areas, linkage between fragmented areas)
- (4) develop mitigation banks that conserve, restore or enhance priority habitats
- (5) voluntary monetary compensation, based on a per megawatt or per acre value, and should be based on compensation sequence as listed above:
- (6) Develop incentive program awarding certification to those entities that follow existing guidelines (either national or state), provide compensation as established above, then receive State Green Certification for Wind Energy Development Projects.

***Need to address other mitigation options/strategies (e.g. operational curtailment) in next version ***

III. Appendices

- Appendix A
- Appendix B
- Appendix C
- Appendix D
- Appendix E
- Appendix F

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