

U.S. Fish and Wildlife Service

Wind Turbine Guidelines Advisory Committee Recommendations

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March 13, 2009

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D. WTGAC Landscape/Habitat Subcommittee, Summary of Metadata for Data Layers Mapped, October 21-23, 2008

E. WTGAC Scientific Tools & Procedures Subcommittee, General Framework for Minimizing Impact of Wind Development on Wildlife in the Context of the Siting and Development of Wind Power, October 21-23, 2008

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U.S. Fish and Wildlife Service

Wind Turbine Guidelines Advisory Committee Recommendations

March 13, 2009

Executive Summary: *(to be written)*

Chapter 1: Introduction

A. Background

In response to the nation’s growing demand for production of electricity by wind power and in recognition of the U.S. Fish and Wildlife Service (USFWS) mission “Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people,” the Secretary of the Interior (Secretary) authorized USFWS to charter the Wind Turbine Guidelines Advisory Committee (Committee) to recommend effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy facilities.

Herein are Committee’s recommendations (Recommendations) based on two-years of deliberations and judgments regarding siting large wind developments while minimizing impacts to wildlife and their habitat. The Committee is composed of a broad array of representatives selected for their outstanding experience on these issues and are among the most informed in the country. These Recommendations are the Committee’s best attempt to present the most effective, feasible and appropriate approaches that are available to the Department of the Interior (DOI), states, local jurisdictions, and the wind industry, to address USFWS responsibilities to protect wildlife resources while encouraging responsible siting of wind energy projects.

B. Description of context and need for Recommendations

As of the end of 2007, the United States has the second highest cumulative wind capacity globally. Wind development in the United States was expected to increase by 25-30% in 2007, but it increased by 46% (NREL 2008). This rate of development is expected to continue, and perhaps to accelerate, as United States energy policy emphasizes independence from foreign oil. USFWS recognizes that wind-generated electrical energy is renewable, produces no emissions, and is considered to be generally environmentally-friendly technology.

Wind energy is a clean, renewable energy source that produces electricity without air pollution, greenhouse gas emissions, water consumption, or the mining, drilling, refining, and waste storage problems associated with most traditional forms of energy generation. Wind power has recently garnered increased attention because of two major advantages that it affords over other types: 1) it is a domestic source of energy and therefore not subject to geopolitical interference, and 2) carbon dioxide emissions from the combustion of fossil fuels is the leading cause of anthropogenic climate change that is likely to have serious negative impacts on ecosystems and wildlife (Intergovernmental Panel on Climate Change 2007). The U.S. Department of Energy (DOE)

131 estimates that a single 1.5 MW wind turbine displaces 2700 metric tons of CO₂ per year compared
132 with the current U.S. average utility fuel mix (20% Wind Energy by 2030 2008). Due to these
133 advantages, wind is expected to play an increasingly important role in meeting the Nation's energy
134 goals in the coming years.

135
136 Nevertheless, wind energy production can negatively impact wildlife and their habitat. As the U.S.
137 moves to expand wind energy production, it also must maintain and protect the Nation's wildlife
138 and their habitat. With proper diligence to siting, operations and management, it is possible for
139 facilities to avoid, minimize and mitigate these impacts. As with all responsible energy
140 development, wind power facilities should be required to adhere to high standards for
141 environmental protection. The Committee recommends that USFWS develop and implement its
142 wind power siting and operation policies and guidelines with joint emphasis on minimizing
143 wildlife impacts from wind energy development, and realizing the potential of wind energy to
144 minimize the environmental impacts of energy production and mitigate climate change.

145
146 The Committee recommends that the Secretary apply the USFWS guidelines for review of wind
147 power development, and make management and mitigation decisions, with appropriate
148 consideration of wind energy's carbon reduction benefits. In addressing wind project impacts on
149 wildlife, the Committee urges the Secretary to consider the larger effects of climate change that are
150 posing significant and growing threats to birds and other wildlife species. For example, the IPCC
151 recently concluded that climate change caused by human activity is likely to seriously affect
152 terrestrial biological systems (IPCC 2007).

153
154 USFWS released voluntary, interim guidelines in July of 2003. The interim guidelines were
155 opened to public comment to help inform the revision process. In March of 2007, USFWS
156 published a notice in the *Federal Register* to announce the establishment of the Committee to
157 provide advice and Recommendations on developing effective measures to avoid or minimize
158 impacts to wildlife and their habitats related to land-based wind energy facilities. It is anticipated
159 that the Committee’s advice and Recommendations will be used by the Secretary to develop final
160 national recommendations.

161
162 Pursuant to the requirements of the Federal Advisory Committee Act (FACA), the Committee
163 Charter was signed by the Secretary on October 24, 2007, and was filed with the Library of
164 Congress; Committee Management Secretariat; General Services Administration; the Committee
165 on Environment and Public Works, United States Senate; and the Committee on Resources, United
166 States House of Representatives and became effective on October 26, 2007. The Charter states the
167 Committee’s scope and objective:

168

169 **Wind Turbine Guidelines Advisory Committee Charter (October 24, 2007):**

170

171 **“Scope and Objective:** The Committee will provide advice and recommendations to the
172 Secretary of the Interior (Secretary) on developing effective measures to avoid or
173 minimize impacts to wildlife and their habitats related to land-based wind energy
174 facilities.”

175

Consistent with FACA, the Charter will expire on October 26, 2009, two years from the date it was filed. The Committee will be terminated at that time unless the Charter is renewed. The Committee Charter is included as Appendix --.

Overview of members of FAC

FAC members are composed of a broad group of stakeholders carefully selected by the Secretary from a large pool of candidates.

C. Guiding Principles

In its development of these Recommendations, the Committee accepted by consensus the following principles and recommend these be incorporated into the final guidance published by the USFWS. The Guiding Principles were adopted on -----, **2008**):

1. The Guidelines should provide a consistent methodology for conducting pre-construction risk assessments and post-construction impact assessments to guide siting decisions by developers and agencies
2. The Guidelines should encourage communication and coordination between the developer and relevant state and federal agencies during all phases of wind energy project development
3. The Guidelines should provide mechanisms to encourage their adoption and use by all federal agencies, as well as the wind energy industry, while recognizing the primary role of the lead agency in coordinating specific project assessments
4. The Guidelines should complement state and tribal efforts to address wind/wildlife interactions and provide a voluntary means for these entities to coordinate and standardize review of wind projects with the USFWS
5. The Guidelines should provide a clear and consistent approach that increases predictability and reduces the risk of liability exposure under federal wildlife laws
6. The Guidelines should provide sufficient flexibility to accommodate the diverse geographic and habitat features of different wind development sites
7. The Guidelines should present mechanisms for determining mitigation, when appropriate, in the event of unforeseen impacts to wildlife during construction or operation of a wind energy project
8. The Guidelines should define scientifically rigorous and cost-effective study designs that improve the ability to predict direct and indirect wildlife impacts locally and regionally

The Guidelines should include a formal mechanism for revision in order to incorporate experience, technological improvements, and scientific advances that reduce uncertainty in the interactions between wind energy and wildlife

D. Benefits of using the recommended Guidelines

As our Nation moves to achieve its renewable energy commitments, it must also maintain and protect our wildlife resources. It is intended that the Committee’s recommended guidelines will facilitate wind energy development and while protecting wildlife and habitats. The guidelines will provide best management practices for wind energy-wildlife issues and result in greater regulatory certainty for the developer by:

1. Reducing Ecological Impacts

The guidelines offer a science-based reference for use by industry, federal, state, tribal and local agencies, and other stakeholders, in the siting and permitting of wind projects. The guidelines focus on reducing bird and bat collisions with wind turbines, and minimizing other potential impacts to wildlife and habitats, by describing the kind of information needed to adequately identify, assess, mitigate, and monitor the impacts of developing new wind energy projects and repowering existing facilities. The recommended guidelines will promote scientifically sound, cost-effective study designs; produce comparable data among studies throughout the nation; allow for analyses of trends and patterns of impacts at multiple sites; and ultimately improve the ability to estimate and resolve impacts locally and regionally.

2. Increased Compliance and Reduced Regulatory Risk

This document is a tool to facilitate compliance with relevant laws and regulations by recommending methods for conducting site-specific, scientifically sound biological evaluations. The recommended guidelines provide standardized guidance on how to collect information on potential wildlife impacts will facilitate compliance with state and federal wildlife laws. Because this document complements existing NEPA guidance, following the guidelines supports NEPA compliance, facilitates permit review, and provides a measure of regulatory certainty for wind energy developers. Using the methods described in the *Guidelines* will provide information for impact assessment and mitigation (if needed) for the application of wildlife protection laws and will demonstrate a good faith effort to develop and operate wind projects consistent with the intent of local, state, and federal laws. Such good faith efforts would be considered by the USFWS before taking enforcement actions for violation of wildlife protection laws.

3. Improved Predictability of Wildlife and Habitat Impact

The goal of the recommended guidelines is to provide a relatively consistent, predictable approach to assessing impacts to biological resources from wind energy projects, while still providing sufficient flexibility to accommodate the unique circumstances of each project. As comparable information from projects using consistent and standardized methods and protocols becomes available from projects around the Nation, meta-analysis will increasingly provide information that allows better predictive modeling. This growing database will assist in valuable information on “use” of wind energy sites by and potential impacts to birds and bats. Over time this growing database should decrease the need for some monitoring studies.

4. Cost Savings

Using the protocols recommended herein will promote scientifically sound, cost-effective study designs; produce comparable data among studies within the nation; allow for analyses of trends and patterns of impacts at multiple sites; and ultimately improve the ability to predict and resolve

impacts locally, regionally and nationally. This will reduce the need for some monitoring studies and will reduce project costs. Further, initiating pre-construction surveys early will help to avoid unnecessary and costly delays during permitting. The guidelines advise cost-benefit considerations when developing the monitoring efforts needed for each project site. Some monitoring methods and/or technologies are expensive and should only be recommended when necessary.

Chapter 2: Preamble to Recommended Guidelines

A. Intended use of these recommended Guidelines

The Recommendations described in this report are intended to be used by all prospective developers of wind energy projects. The Recommendations also are intended to provide a useful, suggested approach for local and state officials.

The primary purpose of these Recommendations is to outline the nature of information typically needed to identify, assess, mitigate and monitor the potential adverse effects of wind energy projects on wildlife and their habitat, especially migratory birds, bats and species at risk, in order to:

- Guide the wind energy industry to make the best possible choices on wind energy installation location, design, and operation to minimize the risks to wildlife and their habitat.
- Ensure that the responsible regulatory agency or advisory agency for any wind energy installation is aware of and can consider the factors that present risks to wildlife and their habitat in order to ensure that the best possible advice can be given and the optimal mitigation suggested.
- Specify the types and amount of baseline information that is required for adequate review of a wind project; and describe the likely extent of follow-up that would be necessary after construction.

Other purposes include:

- To promote responsible development of wind facilities across the country;
- To enable states, USFWS, developers and stakeholders to share information and data regarding avian and bat studies, mitigation and siting practices, and monitoring of habitat/species impacts to increase understanding of risks and the effectiveness of siting decision-making;
- To develop effective, consistent, cost-effective methods and protocols to guide project-specific studies to improve assessment of risk and impacts by producing comparable data; and
- To allow for comparison among field studies from around the country.

The Committee’s Recommendations have been written to be as specific as possible with regard to the expectations, requirements, and assessment need for developing a wind energy project. They, must, however, apply to a large diversity of projects in many different habitats. The Recommendations are intended to provide flexibility in their application and not be rigidly

applied in every situation, but rather applied in a way that is appropriate to the context for project specific factors.

B. Mitigation policies and principles

These Recommendations contain scientifically valid, economic and technically feasible and effective methods and metrics intended to evaluate risk and estimate impacts to wildlife, inform permitting decisions, and satisfy environmental assessment processes. The objectives of mitigation are to avoid or minimize impacts to fish, wildlife and their habitats, and, if necessary, to compensate for those impacts not avoided or minimized. Wind projects should be planned, developed, and operated with consideration of the overall mitigation policy of the USFWS (USFWS Mitigation Policy, 46 FR 7656 (1981)). The policy preamble describes the effect of the policy as not dictating actions or positions that wind developers must accept. However, the USFWS policy provides a common basis for mitigation decision-making and facilitates earlier consideration of wildlife values in wind project planning. The fundamental principles that will guide mitigation sequencing and recommendations by the USFWS are reflected in Chapter 4. Wind developers also should consult with appropriate state agencies to ensure compliance with state mitigation requirements.

C. Introduction to the decision-framework using a tiered approach

(Please see Appendix -- for DOI WTGAC Scientific Tools & Procedures Subcommittee General Framework for Minimizing Impact of Wind Development on Wildlife in the Context of the Siting and Development of Wind Power, October 21-23, 2008).

To evaluate and minimize the risk of potential wind projects to wildlife the Committee recommends using a tiered approach. The tiered approach is a decision framework for collecting information in increasing detail to minimize risk and make siting decisions. The tiered approach provides opportunity for evaluation and decision-making at each tier, enabling a developer to abandon or proceed with project development, or to collect additional information if required. This approach does not require that every tier, or every element within each tier, be implemented for every project. Instead, a tiered approach allows an efficient utilization of developer and wildlife agency resources with increasing levels of effort until sufficient information and the desired precision is acquired for the risk assessment.

1. Application of the tiered approach and possible outcomes

We have defined five tiers that comprise the preconstruction risk assessment and post-construction impact assessment phases of a wind project. Tiers 1-3 would occur as pre-construction activities and are typically sequential investigations. Tiers 4-5 occur as post-construction activities and may occur simultaneously.

The tiered approach is an iterative process for quantifying the risks to wildlife of a potential wind energy project. At each tier, problem formulation guides the decision process. This formulation includes the need for additional data collection and identification of potential problems associated with developing or operating a project. If sufficient data are available as a result of the analysis at a tier, the following outcomes are possible based on the analysis of information

gathered: 1) the project is abandoned because the risk is considered unacceptable, 2) the project proceeds in the development process without additional data collection, or 3) an action or combination of actions, such as project modification, mitigation, compensation or specific post-construction monitoring, is indicated. If sufficient data aren’t available at a tier, more intensive study is conducted in the subsequent tier until sufficient data are available to make a decision to proceed or abandon the project, modify a project, or expand a project. The tiers are listed as follows:

- ✓ Tier 1 - Preliminary evaluation or screening of potential sites
- ✓ Tier 2 - Site characterization
- ✓ Tier 3 – Quantitative metrics for predicting risk and estimating impact
- ✓ Tier 4 – Post-construction fatality studies
- ✓ Tier 5 – Other Post-construction Studies

2. Research Questions

Much uncertainty remains about predicting risk and estimating impacts of wind energy development on wildlife. It is in the interests of wind developers and wildlife agencies to improve these assessments to better avoid and minimize the wildlife impacts of wind energy development. The committee recommends research that improves predictions of pre-construction risk and estimates of post-construction impact. One potential purpose of research is to provide data on operational factors (e.g. wind speed, weather conditions) that are likely to result in fatalities. Research would usually result from collaborative efforts involving appropriate stakeholders, and could include studies of cumulative effects of multiple wind projects, or the comparisons of different methods for assessing avian and bat activity relevant to predicting risk. Research projects may occur at the same time as project-specific Tier 4 and Tier 5 studies.

3. Adaptive Management (AM): definition of active versus passive AM and applicability of AM to the decision framework and tiered approach.

Adaptive management is a series of scientifically driven management actions (within economic and resource constraints) that use monitoring and research results to test priority hypotheses related to management decisions and actions, and apply the resulting information to improve management. Adaptive management (AM) can be categorized into two types: "passive" and "active" (Walters and Holling 1990, Murray and Marmorek 2003). In passive AM, alternatives are assessed and the management action deemed best is designed and implemented. Monitoring and evaluation then lead to adjustments as necessary. In active AM, managers explicitly recognize that they do not know which activities are best, and they then select several alternative activities to design and implement. Monitoring and evaluation of each alternative helps in deciding which alternative is more effective in meeting objectives, and adjustments to the next round of management decisions can be made based on those lessons. The Committee is not advocating that active AM be implemented at wind energy projects. Active AM may be appropriate if there is a specific research objective, and the Committee recognizes that accomplishing those objectives is outside the decision framework and would involve multiple stakeholders and funding sources.

Passive AM is the typical application of AM to wind energy development, and it can be readily integrated into the proposed decision-framework because the tiered-approach is an adaptive process. In the pre-construction environment, analysis and interpretation of information gathered at a particular tier influences the decision to proceed further with the project or the project assessment. If the project is constructed, information gathered in the pre-construction assessment guides possible project modifications, or the need for and design of post-construction studies. Analysis of the results of post construction studies tests design modifications and operational activities to determine their effectiveness in avoiding, minimizing, and mitigating impact.

For passive AM to work there must be agreement to adjust management and/or mitigation measures if the goals are not met. The agreement should include timeline for periodic reviews and adjustments as well as a mechanism to consider and implement additional mitigation measures as necessary after the project is developed.

4. Confidentiality of site evaluation process as appropriate

Some aspects of the initial pre-construction risk assessment including preliminary screening and site characterization occur early in the development process, when land or other competitive issues limit developers’ willingness to share information on the project with the public and competitors. Any consultation should include confidentiality agreements as described earlier in the Recommendations.

Chapter 3: Recommended Guidelines for Wildlife Assessment and Siting Decisions

The first three tiers describe studies in the pre-construction phase, and at each of the three tiers a set of questions is listed that we recommend developers attempt to answer for predicting the risk of a potential project. Some of these questions are repeated at each tier. Given the nature of the tiered approach, each additional tier represents a greater investment in data collection, which may be required to answer certain questions. For example, while Tier 1 and 2 investigations may discover some existing information on federally listed species and their use of the proposed development site, it may be necessary to collect empirical data in Tier 3 studies to determine the presence of federally or state-listed species.

A. Tier 1 - Preliminary evaluation or screening of potential sites

For many wind energy projects, the first stage in the assessment of potential risk to wildlife is to conduct a preliminary regional evaluation of potential site(s) for the purposes of identifying sites to avoid and sites to review further. Tier 1 questions are suggestions to developers for the kinds of studies to be pursued at this stage. Project developers would answer these questions by conducting a regional evaluation of potential sites using credible publicly available information. Developers are encouraged to consult with appropriate wildlife experts, who may include government agencies, the academic community, and/or local conservation organizations. The analysis of site suitability would be based on a blend of the information available.

As a result of this review developers may determine whether suitable sites are available in the region, and they can then decide whether to proceed to further tiers (See Tier 2-5 below).

1. Are there known threatened, endangered, federal "sensitive", state-listed, or other special status species present on the proposed site, and/or is habitat present for these species?
2. Does the landscape contain any areas of special designation, including, but not limited to, ‘area of scientific importance’; ‘of significant value’; federally-designated critical habitat; high-priority areas for non-government organization; or other local, state, regional, federal, tribal, or international categorization that may preclude energy development?
3. Are there known critical areas of wildlife congregation, including, but not limited to, maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?
4. Are there large areas of intact habitat or the potential for fragmentation of large habitat blocks, with respect to species with needs for large contiguous blocks of habitat?

Tier 1 Methods and Metrics to be inserted

B. Tier 2 - Site characterization

At this stage the developer has narrowed consideration down to specific sites, and additional data may be necessary to conduct a more detailed site characterization for a sufficient risk assessment. A distinguishing feature of Tier 2 studies is that they focus on site specific information and should include at least one visit to each of the prospective sites. Questions suggested for Tier 2 can be answered using credible publicly available information that includes published studies, technical reports, databases, and information from agencies, local conservation organizations, and/or local experts. Developers or consultants working on their behalf should contact the federal, state, tribal, and/or local agencies that have jurisdiction over the potential project.

1. Are threatened, endangered, federal "sensitive", state listed species, or other special status species present on or likely to use the proposed site?
2. Are there rare or unusual plant communities present or likely to be present at the site, or plant communities that otherwise have a special designation?
3. Which species of birds and bats, especially those known to be at risk of colliding with wind turbines, are likely to use a proposed site based on an assessment of site attributes?
4. Are there known critical areas of wildlife congregation, including, but not limited to, maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance associated with the proposed site(s)?
5. Are there large areas of intact habitat or the potential for fragmentation of large habitat blocks, with respect to species with needs for large contiguous blocks of habitat?

Tier 2 Methods and Metrics to be inserted

C. Tier 3. Field studies to document site wildlife conditions and predict project impacts

The need for Tier 3 studies should be determined from the results of site characterization at Tier 2. The primary purpose of Tier 3 studies is to provide quantitative data useful in designing a project to avoid and/or minimize risk. They may also allow a pre-construction prediction of risk, and may provide data useful in evaluating predictions of impact and risk through post-construction comparisons of estimated impacts to predicted impacts and risk (i.e., Tier 4 and 5 studies). Tier 3 studies provide information useful in the development of mitigation measures, if needed. The results of these particular Tier 3 studies also may determine that post-construction studies are unnecessary.

1. Do field studies indicate that threatened, endangered, federal "sensitive", state listed species, or other special status species present on or likely to use the proposed site?
2. Do field studies indicate that there are large areas of intact habitat or the potential for fragmentation of large habitat blocks, with respect to species with needs for large contiguous blocks of habitat?
3. What is the distribution, relative abundance, behavior, and site use of wildlife determined to be of interest in Tiers 1 or 2, and to what extent do these factors expose these species to risk from the proposed wind power project?

In answering the above questions developers should collect sufficient data to enable analysis that answers the following questions:

4. What are the potential risks of impacts of the proposed wind energy project to individuals and local populations. When appropriate (e.g., rare and/or endangered species) assessment of risk may also include possible impacts to entire species and their habitats.
5. If significant impacts are predicted, especially to wildlife of interest, can these impacts be avoided, minimized, or mitigated?
6. Are there studies that should be initiated at this stage that would be continued in either Tier 4 or Tier 5?

Tier 3 Methods and Metrics to be inserted

D. Site construction - site development and construction best management practices (BMPs)

During site development, significant attention should be given to reducing risk of adverse impacts to wildlife from turbines and associated infrastructure through careful site selection and facility design. The following best management practices can assist a developer in the planning process to reduce potential wildlife impacts. Use of these BMPs should ensure that the potential adverse impacts to most wildlife and habitat present at many wind development sites would be reduced, although additional mitigation may be required at a project level to address site-specific concerns and pre-construction study results.

These BMPs will evolve over time as additional experience, learning, monitoring and research becomes available on how to best minimize wildlife and habitat impacts from wind facilities. USFWS will work with the industry, stakeholders and the states to evaluate, revise and update

these best management practices on a continual basis and to maintain a readily available publication of recommended, generally accepted best practices.

1. Minimize, to the extent practicable, the area disturbed by pre-construction site monitoring and testing activities and installations.
2. Avoid locations identified to have the potential for high risk to birds and bats
3. Avoid using or degrading high value or large intact habitat areas, as identified in state wildlife action plans, etc.
4. Use maps that show the location of sensitive resources and the results of Tier 3 studies to establish the layout of roads, fences, and other infrastructure. Avoid using invasive species to the area for seeding or planting.
5. To reduce avian collisions, place low and medium voltage connecting power lines associated with the wind energy development underground to the extent possible, unless burial of the lines is prohibitively expensive (i.e., where shallow bedrock exists) or where greater impacts to biological resources would result.
 - a. Overhead lines may be acceptable if sited away from high bird crossing locations, such as between roosting and feeding areas or between lakes, rivers and nesting areas.
 - b. Overhead lines may be used when they parallel tree lines, employ bird flight diverters, or are otherwise screened so that collision risk is reduced.
 - c. Above-ground low and medium voltage lines, transformers and conductors should comply with the Avian Power Line Interaction Committee (APLIC) “Suggested Practices for Avian Protection on Power Lines.”
6. Communication towers and permanent meteorological towers should not be guyed at turbine sites. If guy wires are necessary, bird flight diverters or high visibility marking devices should be used.
7. Use construction and management practices to minimize activities that may attract prey and predators to the wind turbine site.
8. FAA visibility lighting of wind turbines should employ only red or dual red and white flashing lights, not steady burning lights.
9. Keep lighting at both operation and maintenance facilities and substations located within ½ mile of the turbines to the minimum required to meet FAA guidelines and safety and security needs.
 - a. Use lights with sensors and switches to keep lights off when not required.
 - b. Lights should be hooded and directed to minimize horizontal and skyward illumination.

- c. Minimize use of high intensity lighting, steady-burning, or bright lights such as sodium vapor or spotlights.

10. Establish non-disturbance buffer zones to protect raptor nests, bat roosts, areas of high bird or bat use, or specials-status species habitat identified in pre-construction studies. Determine the extent of the buffer zone in consultation with USFWS and state, local and tribal wildlife biologists, and land management agencies (e.g., BLM).
11. Locate turbines to avoid separating birds and bats from their daily roosting, feeding, or nesting sites if documented that the turbines’ presence poses a risk to species.
12. Use tubular towers (as opposed to lattice towers) or best available technology to reduce ability of birds to perch and to reduce risk of collision.
13. Minimize the number and length of access roads, use existing roads when feasible.

Where high impacts are expected or sensitive species will be impacted beyond a level of significance, 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.

E. Site operation - conduct Tier 4 and Tier 5 studies, as appropriate (Post-construction fatality studies and other post-construction studies)

Tier 4 and 5 Questions to be inserted

Tier 4 and 5 Methods and Metrics to be inserted

F. Retrofitting – Retrofitting is defined as replacing portions of existing wind turbines or project facilities so that at least part of the original turbine, tower, electrical infrastructure or foundation is being utilized.

1. Retrofitting of turbines should use installation techniques that minimize new site disturbance, soil erosion, and removal of vegetation of habitat value
2. Retrofits should employ shielded, separated or insulated electrical conductors that minimize electrocution risk to avian wildlife
3. Retrofit designs should prevent nests or bird perches from being established in or on the wind turbine or tower
4. FAA visibility lighting of wind turbines should employ only red or dual red and white flashing lights, not steady burning lights.
5. Lighting at operation and maintenance facilities and substations located within ½ mile of the turbines should be kept to the minimum required to meet FAA guidelines and safety and security needs. Use lights with sensors and switches to keep lights off when not required. Lights should be hooded and directed to minimize horizontal and

- 629 skyward illumination. Minimize use of high intensity lighting, steady-burning, or
630 bright lights such as sodium vapor or spotlights.
631 6. Remove wind turbines when they are no longer cost effective to retrofit so they
632 cannot present a collision hazard to birds and bats.
633

634 **G. Repowering Existing Wind Projects:** Repowering may include removal and
635 replacement of turbines and associated infrastructure.
636

- 637 1. To the greatest extent practicable, existing roads, disturbed areas and turbine strings
638 should be re-used in repower layouts.
639 2. Roads and facilities that are no longer needed should be stabilized and re-seeded with
640 native plants appropriate for the soil conditions and adjacent habitat and of local seed
641 sources where feasible, per landowner requirements and commitments.
642 3. Existing substations and ancillary facilities should be re-used in repowering projects
643 to the extent practicable.
644 4. Existing overhead lines may be acceptable if located away from high bird crossing
645 locations such as between roosting and feeding areas, or between lakes, rivers and
646 nesting areas. Overhead lines may be used when they parallel tree lines, employ bird
647 flight diverters, or are otherwise screened so that collision risk is reduced.
648 5. Above-ground low and medium voltage lines, transformers and conductors should
649 comply with the Avian Power Line Interaction Committee (APLIC) “Suggested
650 Practices for Avian Protection on Power Lines.”
651 6. Guyed structures should be avoided unless guy wires are treated with bird flight
652 diverters or high visibility marking devices, or are located where known low bird use
653 will occur.
654 7. FAA visibility lighting of wind turbines should employ only red or dual red and white
655 flashing lights, not steady burning lights.
656 8. Lighting at operation and maintenance facilities and substations located within ½ mile
657 of the turbines should be kept to the minimum required to meet FAA guidelines and
658 safety and security needs. Use lights with sensors and switches to keep lights off
659 when not required. Lights should be hooded and directed to minimize horizontal and
660 skyward illumination. Minimize use of high intensity lighting, steady-burning, or
661 bright lights such as sodium vapor or spotlights.
662

663 **H. Decommissioning**

664 During decommissioning, contractors and facility operators should apply best management
665 practices in grading and native plant reestablishment to ensure that erosion and overland flows
666 are managed to restore pre-construction landscape conditions. The facility operator, in
667 conjunction with the landowner and state and federal wildlife agencies, should restore the natural
668 hydrology and plant community to the greatest extent practical.
669

- 670 1. Decommissioning methods should minimize new site disturbance and removal of
671 native vegetation, to the greatest extent practicable.
672 2. Foundations should be removed to a depth of two feet below surrounding grade, and
673 covered with soil to allow adequate root penetration for native plants and so that
674 subsurface structures don't substantially disrupt ground water movements.

3. If topsoils are removed during decommissioning, they should be stored and vegetated until they can be replaced.
4. Soil profiles should be restored so that topsoils will establish and maintain pre-construction native plant communities to the extent possible.
5. Soil should be stabilized and re-vegetated with native plants appropriate for the soil conditions and adjacent habitat and of local seed sources where feasible, per landowner requirements and commitments.
6. Surface flows should be restored to pre-disturbance conditions, including removal of stream crossings, roads, and pads.
7. Surveys, by qualified experts, should be conducted to detect invasive plants, and comprehensive approaches to controlling any detected plants should be implemented and maintained as long as necessary.
8. Overhead pole lines that are no longer needed should be removed.
9. After decommissioning erosion control measures should be installed in all disturbance areas where potential for erosion exists.
10. Fencing should be removed unless the land owner will be utilizing the fence
11. Petroleum product leaks and chemical releases that constitute a Recognized Environmental Condition should be remediated prior to completion of decommissioning.

Chapter 4: Mitigation

The objectives of mitigation are to avoid or minimize impacts to fish, wildlife and their habitats, and, if necessary, to compensate for those impacts not avoided or minimized.

A. Impact Avoidance and Minimization

State and federal wildlife laws and policies focus on avoidance and minimization of project impacts. Impact avoidance and minimization is often best achieved early in the project planning and design process, during pre-site selection planning (macro-siting) and during site layout planning (micro-siting). However, if these measures are demonstrated to be insufficient in avoiding or minimizing impacts, then additional measures such as adaptive management or compensation may be needed.

B. Compensation

A project developer should ensure that appropriate measures are incorporated into the planning and construction, and operation of a project to avoid and minimize impacts as much as possible. If these measures are insufficient to avoid or minimize estimated impacts to birds, bats and habitat, however, compensation may be one of the appropriate strategies to mitigate or offset such impacts, including cumulative impacts.

Development of effective compensation measures and recommendations should consider USFWS recommendations under its mitigation policy and involve consultation with the appropriate state agencies. Because a project’s operational fatalities cannot be forecast with precision, it may not be feasible to make compensation decisions until monitoring data is collected. However, the application, general terms, and commitments for potential future compensatory mitigation and the triggers or thresholds for implementing such compensation

should be determined before a project goes forward. If operational impacts exceed the expected levels, adaptive management strategies or additional compensatory mitigation may be necessary. However, additional compensatory mitigation and potential adaptive management strategies beyond that recommended prior to project construction should be well defined and feasible to implement, so that the developer will have an understanding of any potential future mitigation requirements.

The following potential compensation options may appropriate for consideration:

- Offsite and on-site conservation and protection of habitat
- Offsite and on-site conservation and habitat restoration
- Offsite and on-site habitat enhancement

Regardless of the form of compensatory mitigation, there should be a nexus between the level of impact and the amount of compensation. Any compensation should be biologically based and reasonable.

C. Mitigation Plans

Development of a formal mitigation plan should be an integral part of a wind energy facility project and completed prior to project construction. Mitigation plans are not necessary for low-risk projects or common species. A mitigation plan should include some or all of the following elements: mitigation measures, goals and objectives, implementation plan, performance standards, operation and maintenance plans, monitoring and evaluation plans, and plans for adaptive management. Mitigation plans directed at birds and bats may be in the form of an Avian and Bat Protection Plan (ABPP) designed to address project impacts to birds, bats, and their habitats. A sample ABPP can be found in Appendix.

Chapter 5: Advancing Use, Cooperation, and Effective Implementation of the Recommended Guidelines

The Committee recommends that USFWS collaborate and coordinate with other federal and state agencies to streamline and encourage consistent review of wind energy projects. It further recommends that USFWS develop best management practices that can be adopted by other federal and state agencies, and encourage consistent data collection methodology and reporting while also addressing individual site circumstances and practical limitations. USFWS should also establish a process to allow the national guidance to be used by interested state and local governments.

Further, the Committee recommends that the USFWS establish several specific mechanisms to promote wind industry use of the recommended guidelines (note: the Legal Subcommittee is exploring incentives under the MBTA, ESA, and BGEPA and the Incentives Subcommittee is exploring a few other mechanisms).

A. Recommendations on Incentives for Use of Guidelines (currently being drafted by Subcommittee):

- ESA

- MBTA
- BGEPA
- Other?

B. Federal-federal coordination and cooperation

USFWS should employ the following strategies to streamline the review and permitting process for wind projects by federal agencies:

1. Establish an interagency working group or advisory committee to develop specific recommendations and establish joint protocols to ensure federal coordination and use of the USFWS national guidelines. This will advance consistency and avoid duplication in the federal permitting process as it relates to wind development.
2. Work with other federal agencies to ensure that, to the extent practicable, other federal agencies use the USFWS national guidance as a foundation or resource for their approach to addressing wind development and wildlife interactions. Among other activities, the USFWS should work with other federal agencies to provide incentives for adoption and use of USFWS guidance, encourage early coordination with the USFWS for projects that may potentially affect wildlife resources, and use interagency meetings to promote consistency among agency approaches.
3. Develop and maintain interagency best management practices. USFWS should establish a national repository of best management practices for wind/wildlife interactions. A single repository where this information could readily be accessed would help to increase efficiency, interagency coordination, and state and developer use of best management practices.
4. Coordinate with other agencies that require data collection at a wind energy site to promote consistent methodology and reporting requirements, while also accommodating individual site conditions and practical limitations.

C. Federal-state coordination and cooperation

USFWS should work with states with the goal to increase compatibility between state and federally recommended wildlife protocols, data collection methods, and requirements relating to wildlife and wind energy. These wind energy guidelines contain recommendations that are generally applicable at the federal, state and local levels across the country, as well as policies, measures and incentives that are focused on USFWS policies, procedures, goals and regulations, and those of other federal agencies. Some of the specific recommendations may not be applicable at the state and local government level. Those states who desire to or who have formally adopted wind energy siting, permitting or environmental review regulations or guidelines should contact USFWS for assistance in order to minimize conflicting or unnecessary requirements resulting from different state versus federal practices. In addition, USFWS should confer, coordinate and share its expertise with interested states when a state lacks its own guidance or program to address wind/wildlife interactions.

The Committee recommends that USFWS establish a voluntary state/federal cooperation program to advance cooperation and compatibility between USFWS and interested state and local governments for coordinated review of wind projects under both federal and state wildlife laws. Formal agreements between USFWS and states may be explored. Cooperation between states and USFWS could include the following elements:

- Cooperation agreements with interested state governments to ensure coordinated, consistent review of wind projects for compliance with state and federal wildlife laws.
- Joint agency reviews, and other appropriate measures to reduce duplication and increase coordination between state agencies and USFWS in reviewing wind projects.
- Communication between States and USFWS to ensure that the party first obtaining the information about a prospective wind project will notify the other party to enable joint planning on how to coordinate review of the project.
- Identification of a lead state agency designee responsible to work with the USFWS regional office to coordinate review of proposed wind activities under wildlife laws.
- Establishment of consistent and predictable joint protocols, data collection methodology, and study requirements that can be used by USFWS and state agencies to satisfy wind project permitting and environmental review requirements.
- Designation of a USFWS management contact within each regional office (or nationally) who is available as a resource to the field offices to work with states and local agencies to resolve significant wildlife-related issues that may arise at wind energy projects that cannot be resolved at the field office.
- As part of USFWS/state cooperation, the law enforcement authorities of USFWS and interested states will cooperate in the identification, resolution, and enforcement of violations of state and federal wildlife law applicable to wind projects.
- Cooperative state/federal/industry research agreements relating to wind project-wildlife interactions.
- Notification by USFWS to the state wildlife agency prior to issuing any incentives or written assurance to developers pertaining to the likelihood of enforcement under the ESA, BGEPA, and MBTA. State agencies should have the opportunity to ensure developers are considering state resources that may be at risk and to ensure that state regulatory processes or mitigation requirements are being addressed in project development.

856 • **Additional Optional Arrangements between States and USFWS:**

857 USFWS should support and promote the establishment of negotiated agreements with
858 interested states that specifies additional coordination, review and compliance responsibilities
859 for ensuring wind project compatibility with wildlife laws.¹

860
861 In administering this state/federal partnership program, the Committee recommends that USFWS
862 and the states play differing but complementary roles:

863
864 **USFWS Role**

- 865 • Provide training to states
- 866 • Support and/or manage a national database for reporting of mortality data on a consistent
867 basis.
- 868 • Establish and maintain national “best management practices” for wind project siting and
869 operation based on project experience and learning
- 870 • Establish and revise recommended guidance on study protocols, study techniques, and
871 measures and metrics for use by all jurisdictions
- 872 • Assist in identification and pursuit of funding for national research priorities

873
874 **States and Local Role**

- 875 • Employ national guidance as minimum foundation of state approach to wind/wildlife
876 review
- 877 • Report project monitoring data and results received from the project developer to national
878 database at USFWS

879
880 See Appendix --: *Sample Memorandum of Understanding Between USFWS and State*

881
882 **D. Federal-tribal coordination and cooperation (to be inserted)**

883
884 **E. USFWS-developer coordination and cooperation (incomplete section: remainder is
885 being drafted)**

- 886
887 • Project-Specific Agreements

888
889 USFWS should encourage the negotiation of basic contracts with interested project proponents
890 through a memorandum of understanding in which USFWS endorses a project plan in exchange
891 for a developer’s commitment to implement the voluntary guidelines, best management
892 practices, and/or an ABPP. The agreement would provide the developer with written assurances

¹ For example, under this kind of voluntary, negotiated framework, USFWS could agree to give primary programmatic review responsibilities for the implementation of the national guidelines to the state to review proposed developments and ensure wind energy compliance with state and federal wildlife laws. This state “primacy” arrangement could be predicated on: (1) a state adopting wind energy and wildlife guidance or program that is consistent with or more stringent than USFWS national guidance; (2) USFWS setting forth appropriate measures and incentives intended to encourage following the voluntary guidelines that can be feasibly implemented by the state; (3) the state agreeing to implement its program with a good faith effort; (4) in order for this approach to be successful, there would need to be adequate funding to support personnel, and technical expertise resources, and (5) the state reporting periodically to USFWS on how the program is working. The state and USFWS would retain discretion to discontinue the formal coordination arrangement at any time. Under such agreement USFWS would not relinquish its jurisdiction or enforcement authority with regard to federal laws and regulations.

by USFWS that compliance with the guidelines, best management practices, and/or ABPP will result in use of enforcement discretion and reduced threat of enforcement under the MBTA.

While each agreement would be tailored to the particular project, an agreement could include the following elements:

- A developer commitment to share all relevant information concerning the wildlife resources in the project area and the potential impacts to these wildlife resources. Shared information should include all known, publicly available data and pre- and post construction study results related to the proposed project.
- A developer commitment to use due diligence to comply with USFWS guidelines and best management practices, subject to appropriate modification based on the characteristics of the proposed project site and consultation with USFWS.
- A USFWS commitment to use its enforcement discretion provided the developer remains in compliance with the terms and conditions of the agreement, and the developer has made a good faith effort to avoid and minimize potential adverse impacts by way of implementing USFWS guidelines and best management practices.
- A developer commitment to provide coordinated access, upon prior notice, to the wind energy project as requested by USFWS staff in order to ensure compliance with the agreement, provided that such access was coordinated in advance as much as possible and subject to normal safety precautions implemented by the developer/project owner.

F. Use of Avian and Bat Protection Plans

USFWS should support the use of Avian and Bat Protection Plans as one tool that can be useful as a proactive and innovative approach to reducing risk to bird and bat and associated habitat in a project specific and/or company wide context. An ABPP is a purely voluntary project or company-specific program of best management practices designed to protect and conserve birds and bats. Based on compliance with an approved ABPP, USFWS would agree to provide assurances to use its enforcement discretion and not recommend prosecution under the MBTA.

An ABPP can be either a company-specific or project-specific document. In either context, the ABPP delineates a program designed to reduce the risks that result from avian interactions with wind facilities. A company-wide ABPP provides an opportunity for a company to address bird and bat issues on a broader scale than afforded by a project by project approach. It would establish company policies and processes that will help the company ensure compliance with wildlife laws. A project ABPP, on the other hand, provides more site-specific best management practices and measures to minimize impacts to wildlife resources at a particular project site. A project-specific ABPP may or may not supplement a company ABPP.

Recommended elements for an ABBP and a sample ABBP can be found in Appendix --

G. NGO Actions

There are a variety of non-governmental organizations that have an interest in improving siting procedures for wind energy projects. Some groups, such as industry trade organizations, support expanded wind energy development, and other groups have primary interest in reducing wildlife impacts of wind energy development – these groups are not mutually exclusive.

Such groups do not have a formal role in the assessment of specific projects but can play a useful role in a variety of ways including providing information for the assessment of individual projects, particularly at the preliminary site screening phase to help steer development away from sensitive sites, by helping to design mitigation or offset strategies that lead to faster project review and approval, or to help define and fund research priorities that lead to improve predictions of risk and impact assessment and ultimately more cost-effective evaluation of wind project development that minimizes impact to wildlife.

Chapter 6: Revisions to Recommendations

This document reflects the current state of knowledge about the interactions of wind turbines with birds, bats and wildlife in general. Ongoing and future research and actual experience in Preliminary Site Screening and Evaluation and Selection, Project Design and Permitting Process, Site Build-out and Operations Post-construction Evaluation of wind energy projects will refine, expand and alter that knowledge. The document will be reviewed and revised, as necessary, approximately every five years. During the five-year period between revisions, if substantive new information becomes available it should be utilized immediately, and an addendum will be posted on the web-site updating the USFWS guidelines. Interested parties will have the opportunity to participate in the update and revision process. Consult the USFWS web page for information about proposed updates, revisions and participation (*include web hyperlink*). For questions about this document or to contribute information to the current body of knowledge, please contact the U. S. Fish and Wildlife Service at 703-358-2161.

Chapter 7: Recommendations for Effective USFWS Administration of Recommendations

A. Consistent application

The Committee recommends that USFWS inform all Regional and Field staff of the philosophy, premises and principles with which these Recommendations were developed. It is anticipated that USFWS will provide guidance to the field for the implementation of final USFWS guidelines to promote their consistent application, and to facilitate agency and industry understanding of recommended actions. Such guidance should include the need for flexibility to address diverse geographic regions, habitat types, and wind energy development projects.

USFWS should continue to be involved with the development of best practices for project design, operation and mitigation, based on best available science and information and intended to minimize impacts to birds and bats from wind projects. Best practices will be reviewed periodically and revised as necessary to reflect new knowledge gained from current science, monitoring results, and experience with constructing and operating wind projects. All USFWS staff involved in review of wind projects should be trained in use of the best practices.

B. Training

USFWS should provide training to ensure that all Regional and Field staff have the knowledge, skill, and ability to accurately implement the final wind turbine guidelines developed in accordance with the Committee’s Recommendations. Training will be provided through a series of hands-on workshops conducted in each USFWS Region, with priority for the first series of workshops to be scheduled in areas of high wind energy development activity. Each workshop should be open to participants from USFWS, industry, states, tribes and other appropriate participants, with the goal of developing partnerships to minimize impacts to wildlife and their habitats while allowing flexibility for wind energy development.

C. Staff support

USFWS should work within its budget constraints to provide staff support to review wind energy development projects in a timely and efficient manner. To supplement its staff efforts, USFWS will assist and encourage state cooperative arrangements and participation in review of the potential impacts of wind energy projects on wildlife. USFWS encourages wind energy project proponents to coordinate early in the project development process to facilitate timely involvement and feedback. USFWS should also explore the option of co-locating additional staff in BLM offices for renewable energy. USFWS should continue to explore cutting edge technological applications to further streamline the review process.

D. Research

Bird and bat interactions with wind turbines are an area of active research and collaboration. For example, the National Wind Coordinating Committee, the Bat and Wind Energy Collaborative, the American Wind Wildlife Institute, and the California Energy Commission’s Public Interest Energy Research Program all support research in this area. USFWS should promote collaboration and information sharing with these and other research efforts to advance science on wind/wildlife interactions. Subject to appropriations, USFWS should work with other federal agencies, stakeholders, and states to develop a national research plan, to identify research priorities designed to reduce impacts to wildlife resources while allowing construction and operation of wind facilities. The research plan should include a description of major research issues and recommendations for support of specific research activities. The research plan can be used to identify opportunities to leverage research funding and support collaborative efforts with stakeholders, including states, conservation groups, and industry.

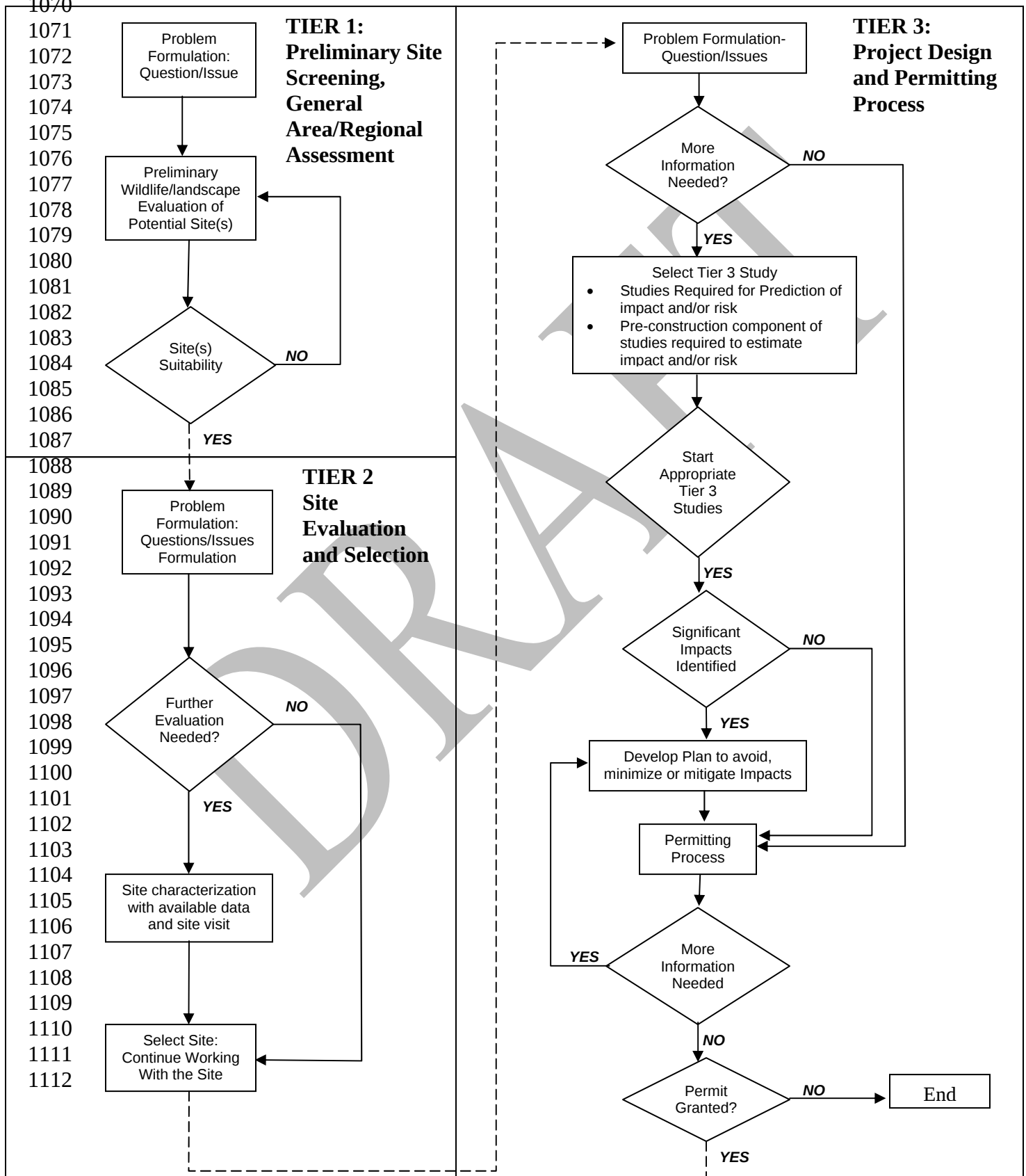
List of Appendices (*incomplete*)

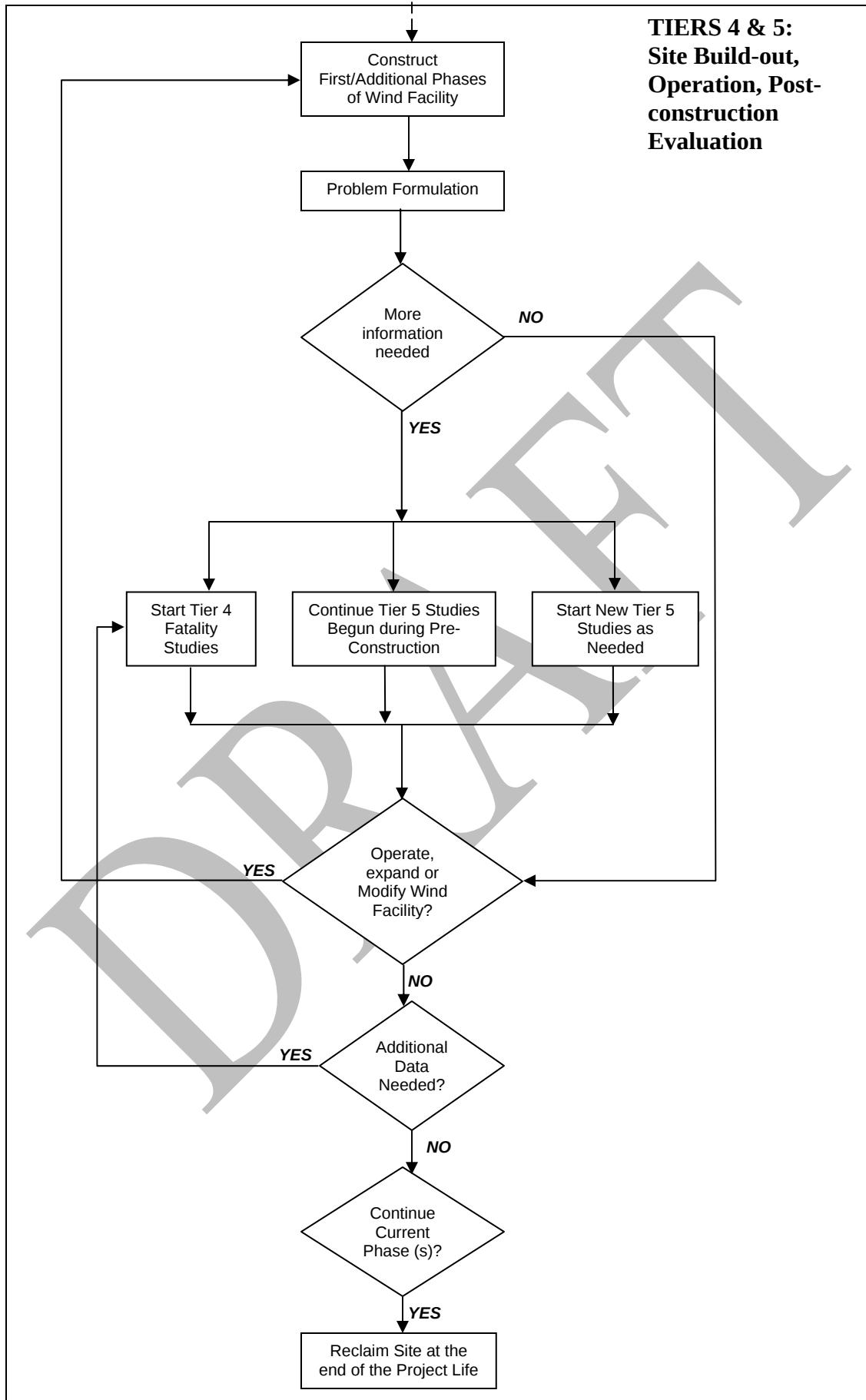
- A. Department of the Interior (DOI) Wind Turbine Guidelines Advisory Committee (WTGAC) Other Models Subcommittee Matrix October 21-23, 2008
- B. WTGAC Legal Subcommittee White Paper October 21-23, 2008
- C. WTGAC Landscape/Habitat Subcommittee, “Mapping Tools Case Studies” October 21-23, 2008 (will be attached)
- D. WTGAC Landscape/Habitat Subcommittee, Summary of Metadata for Data Layers Mapped, October 21-23, 2008
- E. WTGAC Scientific Tools & Procedures Subcommittee, General Framework for Minimizing Impact of Wind Development on Wildlife in the Context of the Siting and Development of Wind Power, October 21-23, 2008
- F. First Draft Recommended Elements of an Avian and Bat Protection Plan, October 21-23, 2008
- G. Glossary (to be written)

Appendix D. WTGAC Landscape/Habitat Subcommittee, Summary of Metadata for Data Layers Mapped, October 21-23, 2008

Organization Managing File(s)	Map/Database Title
Existing information	
The Nature Conservancy	Portfolio Sites
The Nature Conservancy	Great Plains Untilled Landscapes
Platt/DOE/Local transmission councils	Current and Proposed Transmission
Unknown	Current and Proposed Wind Farms
National Atlas	Bat Distributions
National Audubon Society	Important Bird Areas
Natural Resources Conservation Service	Natural Resources Inventory (NRI)
Fish and Wildlife Service	Environmental Conservation Online System (ECOS)
Fish and Wildlife Service	Habitat and Population Evaluation Team (HAPET) modeling
Fish and Wildlife Service	Preliminary topographic and wildlife feature GIS screening
The Nature Conservancy	Wind & wildlife resource maps - Great Plains
Forthcoming:	
Western Governors Association	Wind-wildlife transmission maps
Audubon/NRDC	Western resources maps
North American Grouse Partnership	Prairie grouse habitats
The Nature Conservancy	Wind & wildlife resource maps - balance of US
Am. Wind & Wildlife Institute	Wind & wildlife resource maps
Playa Lake Joint Venture	Playas
Prairie Pothole Joint Venture	Prairie Pothole habitats

Appendix E. WTGAC Scientific Tools & Procedures Subcommittee, General Framework for Minimizing Impact of Wind Development on Wildlife in the Context of the Siting and Development of Wind Power, October 21-23, 2008





Appendix F. First Draft Recommended Elements of an Avian and Bat Protection Plan, October 21-23, 2008

The following are key elements that should be considered in developing an ABPP that are designed to ensure that the plan merits USFWS assurances regarding prosecutorial discretion. Not all of the recommended elements would need to be included in every ABPP because of the specific circumstances of a project or geographical area, and the adequacy of the ABPP should be determined by the site conditions or actual project performance with respect to wildlife impacts.

1. Corporate Policy

In the ABPP, a company should provide a commitment to develop and implement a specific company policy to address wind/wildlife issues. An ABPP should include a statement of company policy confirming a commitment to work cooperatively with state and federal agencies towards the protection of relevant avian species. The ABPP should institute clear and consistent procedures to minimize impacts to relevant avian species and their habitats, and to address impacts where they are identified. The ABPP should include commitments to:

- Implement and comply with the ABPP
- Ensure company actions comply with the Wind Turbine Recommendations and applicable wildlife laws
- Monitor and document bird and bat mortalities and injuries in order to assess project performance and implement adaptive management actions if warranted
- Provide training and information to staff on the ABPP and its implementation
- Take reasonable and appropriate efforts to construct and alter infrastructure and project operations to reduce the incidence of avian and bat mortality.

2. Compliance with Wildlife Laws & Permits

An ABPP should identify and implement a process under which a company will obtain and ensure compliance with applicable federal, state and tribal laws related to wildlife.

a. Risk Assessment Methodology, Site Selection, and Preconstruction Studies

In an ABPP, a company should agree to implement a rigorous method for evaluating avian and bat risks and to use an effective risk assessment methodology in making siting decisions. The risk assessment methodology should be used to identify sites where wind power development would pose high mortality risks or fragmentation of important habitats, and these sites should be avoided. A company should agree to assess risk to birds and bats from development at a wind project site(s) in order to avoid, minimize, and mitigate adverse impacts.

As a general matter, an ABPP should include a method for evaluating the risks posed to birds and bats in a manner that identifies areas and issues of particular concern. A risk assessment study should begin with a preliminary site assessment. The process then should include pre-construction surveys for avian and bat use, according to protocols and time frames recommended by states and national guidance. Finally, an avian and bat mortality reporting system should be an integral component of the risk assessment methodology.

b. Site Design and Development Practices

In the ABPP, a developer should agree to implement best site design, construction and management practices as identified by states and the USFWS. As appropriate to the project, the company should consider avian and bat interactions in micro-siting, design and installation of new facilities, as well as in the operation and maintenance of existing facilities. The company also should agree to use all reasonable and feasible generally accepted best management practices during construction and operation of the facility.

c. Consultation & Information Sharing

In the ABPP, a company should agree to share relevant non-proprietary site and study data and to work cooperatively with USFWS or relevant state wildlife agencies. Specifically, the company should agree to share relevant, non-proprietary information concerning wildlife resources in and around a wind project area and the potential adverse impacts to those resources. Shared information should include publicly available data from monitoring efforts and pre and post-construction study results relative to the project area. In the ABPP, a company should agree to work cooperatively with the USFWS or relevant state wildlife agencies in the future to avoid and minimize impacts to wildlife resources as new relevant project information becomes available.

d. Post-construction Monitoring and Avian/Bat Reporting System

In the ABPP, a company should commit to establish post-construction monitoring and a mortality reporting system. A company should agree to voluntarily monitor relevant avian and bat interactions, including mortalities, through the development of a formal avian and bat fatality reporting system. For example, the ABPP could identify thresholds of fatalities above which responses to reduce rates of avian fatalities would be implemented. A company also should agree to make the data reasonably available to the USFWS and the states, as much as possible in a compatible format to advance adaptive management, and site/regional comparison. The company also would commit to make specimens collected on site reasonably available to the state and/or USFWS. An ABPP should provide for the development of such a reporting system, which can help a company pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring and the extent of such mortalities. Data collected by company personnel should include avian and bat mortalities or injuries, as well as remedial actions taken.

e. Mortality Reduction Measures and Mitigation

In the ABPP, a company should agree to use the results of a risk assessment to revise siting decisions and identify and undertake appropriate mitigation. A company also should commit to review and provide post-construction mortality monitoring data and to work cooperatively with the states and the USFWS to take action if the data indicate a significant problem. In an ABPP, a company should commit to identify appropriate adaptive management mortality reduction or mitigation measures when an operating project results in unexpectedly high mortality or unexpected impacts to protected species or their habitats.

f. Quality Control & Adaptive Management

I
In the ABPP, a company should provide for future revisions or updating as new scientific methods and techniques become available. An ABPP should include a mechanism to provide periodic review of existing practices, ensuring quality control and effective management.

g. Sample ABBP

Appendix G. Glossary (to be written)