U.S. Fish & Wildlife Service
WIND TURBINE GUIDELINES ADVISORY COMMITTEE

Technical Workshop and Federal Advisory Committee Meeting

South Interior Auditorium
1951 Constitution Ave, NW
Washington, DC

February 26 – 28, 2008

– Meeting Summary –

On February 26 – 28, 2008, the Wind Turbine Guidelines Advisory Committee convened its first meeting at the Department of the Interior (DOI) in Washington, DC. A technical workshop constituted the first two days of the meeting, and the formal Federal Advisory Committee (FAC) meeting commenced on February 28. The summary of the FAC meeting begins on page 34. (See Attachment A for the meeting agenda and Attachment B for the participant list.)

For copies of the slides presented at the meeting, please visit the U.S. Fish & Wildlife Service website at www.fws.gov/habitatconservation/windpower/wind_turbine_advisory_committee.html.

WORKSHOP DAY 1: WEDNESDAY, FEBRUARY 26TH

Workshop Objectives:

- Review what is known and remaining questions about siting wind energy development projects on land
- Review federal and state guidelines relevant to siting wind facilities on land

I. Welcome and Overview of the Agenda

David Stout, Chief of the Division of Habitat and Resource Conservation at the U.S. Fish & Wildlife Service (USFWS) and Designated Federal Officer for the FAC, welcomed members of the FAC and of the public to the first meeting of the Wind Turbine Guidelines Advisory Committee (Wind FAC). He noted that the Wind FAC offers an opportunity for members to do something great for the country, and he aspires for the group to fulfill that potential.

Mr. Stout delivered an overview presentation in order to give the FAC members an understanding of the background for the tasks they would set out to accomplish. In 2003, the Service issued the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* and began its efforts to finalize those guidelines in 2005. The Service decided to convene a group of experts to help finalize the guidelines, and in 2007, the Secretary of the Interior approved the formation of the Wind Turbine Guidelines

Advisory Committee in accordance with the Federal Advisory Committee Act (FACA) and issued a call for nominations. Through the FACA, Congress established federal advisory committees as a formal means for federal agencies to receive input on important issues. On October 24, 2007, the Secretary appointed 22 members to the Wind FAC and signed the Committee's charter on October 26, 2007. The charter defines the Committee's scope and objective, which is to "provide advice and recommendations to the Secretary of the Interior on developing effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy facilities."

Mr. Stout informed the group that USFWS had made a concerted effort to recruit members to the Committee who represent a balance of perspectives and who have national-level policy experience. When technical issues arise, the group will turn to technical experts to provide analysis and comments to the Committee. Mr. Stout encouraged members to engage in a creative, open process in a relaxed atmosphere, and emphasized the importance of their role in drawing upon the knowledge and progress being made in various arenas on wind issues in order to fashion a national template. He added that it is also important that federal agencies have a complementary approach to wind issues.

He then introduced the members of the USFWS team that is working to support the Wind FAC:

- George Allen, Chief of the Policies, Permits & Regulations Branch, Migratory Birds
- Cheryl Amrani, Special Assistant to the Assistant Director
- Susan Goodwin, Office of Collaborative Action & Dispute Resolution, DOI
- Rachel London, Fish & Wildlife Biologist
- Ray Johnson, Administrative Assistant
- Cheri Morgan, Management Analyst
- Nick Throckmorton, USFWS Public Affairs (press contact)
- Jeff Underwood, Deputy Assistant Regional Director for the Northeast Region

He also introduced the group to Gary Frazer, Assistant Director for Fisheries and Habitat Conservation. Mr. Frazer welcomed the participants to the Department of the Interior and thanked them for the time and energy they are devoting to the Wind FAC. As wind power is a rapidly growing sector, he observed that it has the potential to impact wildlife unless it is well managed. The USFWS aims to benefit from the insight and experience of the Wind FAC members to learn how to mitigate those impacts, with the goal of developing good guidelines from the beginning of the process.

Mr. Stout invited members of the Committee to introduce themselves (see Attachment C for a list of member biographies). After a round of introductions, he turned the floor over to Wind FAC facilitator and Senior Mediator Abby Arnold. Ms. Arnold reviewed the agenda for the two days of the technical workshop and for the third day, which consisted of the first formal meeting of the Wind FAC. She encouraged participants to ask questions of the experts who would be speaking to the group over the next several days and to begin identifying questions that would require further investigation by the

Committee. She also drew attention to the attendance of participants from around the country, who were listening in to the meeting via phone conference.

Materials from the meeting are on the USFWS website at www.fws.gov or will be posted there following the meeting. Those with comments should email Rachel London at Rachel_London@fws.gov. In response to a question on the format of the meeting summary, Ms. Arnold explained that it would summarize the main points of the presentations and the question-and-answer sessions, but that it would not be a verbatim record or include attributions.

II. Overview of Wind Development

Presenter: *Wayne Walker, Wayne Walker Conservation Consulting LLC*

Wayne Walker introduced himself to the group, describing his seven years of experience in the wind industry with Horizon Wind Energy. He has also been involved with the American Wind Energy Association (AWEA) and the National Wind Coordinating Collaborative (NWCC), in addition to serving as a launch director of the newly formed American Wind Wildlife Institute.

To familiarize the group with the process of wind energy development, Mr. Walker gave some background on the wind industry and described the steps in the wind development process, as well as the challenges encountered at each of those steps. The wind industry is experiencing record growth, and is the second-fastest growing energy source in the U.S. The release this spring of the joint U.S. Department of Energy / AWEA 20% Vision Plan, which has as its goal for wind to supply 20% of the country's energy by 2030, will encourage wind's further expansion from its current position of slightly more than 1% of the nation's current energy supply. Among the drivers for the growth of the wind industry are increasing demand from a growing population, its environmental benefits, and rising energy costs due to a limited supply of fossil fuels. Not only can wind power be beneficial on the local level as it does not consume water or release emissions, and is often compatible with existing land uses, but it could also have a positive impact on a global scale. Extrapolating from a study by Stephen Pacala and Robert Socolow of Princeton University on the reductions necessary to stabilize carbon emissions by the year 2055, wind power in the U.S. has the potential to contribute greatly if the 20% vision is realized by avoiding 1 billion tons of carbon emissions (equaling one of the seven "wedges" needed to stabilize emissions).

In the sequence of a wind development process, there several key elements to be evaluated, each entailing challenges that can make or break the project:

- **Wind** – project viability is very sensitive to wind speed, and generally, an average speed of 16 – 19 mph is necessary to site a project, so this is the first, fundamental step in evaluating a wind project site. The "nameplate capacity" of the site is the number of megawatts per hour that the wind facility can produce if the wind is blowing at the optimum speed for the wind turbine being employed. The "net capacity factor" is a percentage of that total capacity, and it usually falls in the 30 – 40% range.

- **Land** – as developers do not have the power of eminent domain, they must negotiate with landowners for access to the land. Flexibility in the siting wind turbines is necessary, so large contiguous parcels of land are desirable.
- **Environmental Reviews** – risks to wildlife is a top issue, and those risks are evaluated through avian, wildlife, and environmental studies.
- **Permits** – developers must confront a range of issues in order to build local support for a project and to obtain permits, including environmental, visual, archeological, and military/radar issues.
- **Transmission** – transmission with adequate capacity, proximity to the site, and affordable costs are critical to siting a wind project.
- **Buyer** – many areas of the country have a growing need for power, and state Renewable Portfolio Standards (RPS) are helping fuel the demand for wind. For a developer, obtaining a Power Purchase Agreement (PPA) is the key milestone that indicates the project will be built.
- **Financing** – a developer must answer to all of the challenges in the above steps in the process in order to obtain project financing. One of the major questions developers confront at this stage is whether to sell or maintain ownership under build-transfer or PPA structures, respectively. Potential investors weigh the attractions of wind power, such as low operating costs and tax incentives, against its challenges, including the uncertainty of Production Tax Credits (PTC) and the uncertainty surrounding curtailment or operations shutdowns.

Mr. Walker highlighted the difficulty in overcoming the challenges at each of these steps, estimating that companies abandon over 50% of evaluated wind sites and observing that millions of dollars are written off when wind projects do not pass environmental reviews. Timing can also be critical – for example, many developers are currently rushing to complete project construction before the PTC expires. Without it, the projects may lose money.

Once these hurdles are cleared and the project enters the construction phase, the developer must locate a site that is accessible, contains adequate level ground for siting turbines, and is large enough to allow for sufficient spacing (1/3 to ½ mile) between rows of turbines. Mr. Walker described the facilities entailed in a wind power site and the sequence of construction of a wind plant.

He also discussed the economics of wind energy. Although the costs of wind power have decreased greatly over the past 20 years, they have risen again slightly in the past three years due to a decline in the dollar, as well as to increases in steel and labor prices. Wind energy has the advantage of offsetting natural gas, saving consumers money for each kilowatt-hour of wind power produced and each kilowatt-hour of natural gas saved. With the PTC, wind is one of the lowest cost forms of new power generation and provides a hedge against potential carbon caps. The majority of the costs of a wind facility lie with its construction and turbine procurement (75%), and operating costs make up only 25% of the total costs. Critical factors in determining a viable rate of return on a wind project, which is usually at least 9%, are wind speed at the site and the net capacity factor of the facility.

As part of its effort to address the wildlife issues raised by wind power, the industry is currently engaged in several industry/wildlife stakeholder regional initiatives, including the Bat Wind Energy Collaborative, the NWCC Grassland Shrub Steppe Species subgroup, and a USGS initiative in the Dakotas.

In closing, Mr. Walker observed that the wind siting is challenging, and that a project can be derailed at many points in the process. While developers are investing resources into investigating wildlife issues, progressive national policies are needed. He encouraged the Wind FAC to move forward quickly in developing guidelines to ensure that wind projects are sited responsibly.

Question-and-Answer Session for Presentation: Overview of Development

- **Cultural resources / Native American sites.** A participant asked whether in his years of developing wind projects, Mr. Walker had worked on any projects that conflicted with cultural resources or Native American sites. He replied that he had not personally encountered any significant issues. In some places, such as Oklahoma, developers have done shovel tests and notified local tribes prior to construction. At other sites, they have changed projects sites to accommodate archeological issues.
- **Environmental footprint of wind energy facilities.** A participant wondered how the group could move to a common view of wind facilities' environmental footprint, given the benefits of wind energy with regard to climate change and its potential costs as a threat to wildlife. Mr. Walker remarked that he is seeing potential for a common vision through the efforts of the Western Governors' Association, states, and NGOs to put together maps to steer developers to the areas where there is good wind, but where facilities would not affect conservation resources or ecological systems needing protection. More mapping activity stemming from these processes will steer developers to make good decisions.
- **Wind industry's perspective on the guidelines.** A Committee member asked Mr. Walker what issues the wind industry would like to see the guidelines address. He replied that ideally, the Wind FAC would generate good national guidelines that contain a basic framework for studies and methodologies for all projects, but allow enough flexibility to address issues region by region. The benefit of such guidelines would be that everyone could focus on one set of guidelines that function as a market standard; even if they are voluntary, Mr. Walker anticipates they will be widely used. On the industry side, the guidelines will level the playing field, and the wildlife community will have a baseline to evaluate developers' performance.
- **Curtailment.** In response to a question on how curtailment could be integrated into developers' financial plans, Mr. Walker observed that curtailment is very difficult for the wind industry because developers invest a significant amount of money into estimating a production profile with the assumption that every megawatt hour produced is paid for. Curtailment introduces uncertainty into that calculation, and many projects cannot accommodate the risk. In the case of bats, where the reason for their collisions with turbines is unknown, curtailment may

not resolve the issue. Newer projects may be better positioned to accommodate limited curtailment. Mr. Walker suggested that if the subject is discussed in advance and used as a backstop option, some developers might be amenable to considering it as an option, as long as limits are agreed to in advance and curtailment regimes are applied equally amongst different wind projects in similar geographic areas.

- **Land for wind development.** While Mr. Walker did not have statistics on the typical profile for land slated for wind development, his impression is that the vast majority of wind farms are sited on private land, as opposed to state, federal, or tribal lands. He asserted that developers tend to focus on the windiest sites rather than the type of landowner. He added that much of the development is on traditional agricultural land and grazing land in the Midwest and plains states. In terms of offsetting development by setting aside lands for wildlife conservation, he noted that some developers are doing it on a voluntary basis, and expressed the hope that the 20% Vision will encourage more to do so.
- **Costs of permitting.** According to Mr. Walker, the costs of permitting can vary depending on the region, and in some areas of the country, such as the Great Plains, permitting costs can be small relative to the overall costs of the wind project. Most of the money for permitting, he noted, is often spent on voluntary wildlife studies, which will determine whether the project is categorized as "risky" by potential investors.
- **Scalability of projects.** Due to the number of fixed costs and requirements to meet, Mr. Walker pointed out that it takes approximately the same resources to develop small projects (10 MW) as it does to develop large ones (500 MW), which is the reason developers prefer to build larger projects or ones with the capacity to expand. Furthermore, in the Northeast and possibly the Northwest, projects can be harder to develop – although a project might have fewer MW, it can have more requirements to fulfill.
- **Production Tax Credits.** In Mr. Walker's view, there is no downside to extending the PTC for a longer term, which would allow for a more rational pace for development. It would also help those in the development, manufacturing, and financial communities to make longer-term decisions. If incentives to conduct studies are provided and the requirements are not overly burdensome, he believes the industry will respond positively.
- **Project dropout rate.** A participant observed that developers drop a high percentage of potential wind projects in-house and asked how that rate could be reduced. Mr. Walker anticipates that improved efficiency in using development tools and effective policies on transmission and renewable energy could reduce the dropout rate for projects. A change in transmission policy could allow developers to move into desirable sites that are currently stranded development assets.
- **Storage.** Mr. Walker professed not to be an expert on the topic of storage, and Steve Lindenberg of DOE offered to arrange an expert presentation on recent developments on storage capacity, if the group is interested.

III. What is Known about Avian / Wind Power Interaction?

Presenters: *Dale Strickland, President and Senior Ecologist, Western Ecosystems Technology, and Michael Morrison, Professor and Caesar Kleberg Chair in Wildlife Ecology, Texas A & M University*

Dr. Strickland conveyed Dr. Morrison's regrets to the group for his inability to participate, as he was taking care of two of his graduate students who had been in an accident while on a field trip. Dr. Strickland noted that he and Dr. Morrison had developed the presentation slides in collaboration. Their presentation gave an overview of the known impacts of wind facilities on birds, as well as the methods and metrics used to measure those impacts.

To estimate the fatality impacts of wind facilities on birds, Dr. Strickland and Dr. Morrison drew on only those studies that were conducted over all seasons of occupancy during a continuous 12-month period. They used a less stringent standard to determine the fatality composition by species, using all the studies that reported fatalities by species. Passerines, the most commonly occurring group of birds at wind facilities, were the species experiencing the greatest number of fatalities, representing 74% of fatalities in all regions. Fatalities by species varied across regions, however, with raptors constituting a greater proportion of fatalities in the Rocky Mountain and Pacific Northwest regions than in the Midwest and East. Raptors are also represented disproportionately to their abundance when compared to passerines. Dr. Strickland noted that there were more studies in the Pacific Northwest reporting fatalities by species than any other region, potentially biasing the composition of the fatalities.

When the fatalities of all birds were divided by landscape type, the number of fatalities was similar at most sites, except for Buffalo Mountain, Tennessee, a site on a forested ridge top. He pointed out that this site was small when studied, having only three turbines, and differences in altitude influencing bird abundance could account for the higher fatality rate at this forested site, or it could simply be due to chance, given the small sample size. Most fatality rates occurred in the range of 1.0 to 3.3 fatalities per megawatt per year, with two projects reporting higher fatalities of 5.9 at Klondike One in the Pacific Northwest and 11.7 fatalities / MW/ yr at Buffalo Mountain.

As requested, Dr. Strickland also reviewed studies of other anthropogenic sources of avian fatalities, noting that there a number of shortcomings in most of the studies. Most of them are short-term, ad hoc studies, usually conducted in response to episodic events. Scavenging and detection biases were not taken into account, and projections were often made from very limited data. With those caveats in mind, Dr. Strickland cited the following fatality estimates:

- **Communication towers:** 4 – 50 million bird fatalities per year. Studies suggested that taller towers posed greater risk and the lighting type appears to affect fatalities. To date, wind turbine lighting has not proved an attractant for birds, however.
- **Vehicle collisions:** 60 – 80 million annual avian fatalities.
- **Buildings and windows:** 100 million - 1 billion avian fatalities annually.

- **High-tension lines:** 130 – 174 million bird fatalities per year.

In terms of habitat impacts, wildlife at a wind facility can suffer a direct loss of habitat to installations such as turbine pads and roads, or an indirect loss of habitat due to behavioral response to wind plant facilities. These impacts can be long-term or short-term – wildlife may return after construction activities have ceased, for example, or they may habituate to the facilities. Direct impacts likely vary significantly by site characteristics, turbine type, the reclamation plan in place, and the climate, although direct impacts have not been empirically measured.

While there have been limited studies of displacement effects, more research is needed. In studies of displacement of grassland songbirds, the effects have been relatively small, on the order of $\leq$ 150 meters. The ongoing study of prairie chickens in Kansas by Dr. Brett Sandercock of Kansas State University will be an important contribution to understanding displacement effects on that species. Studies of bird displacement in Europe have shown that some species are unaffected, while others are more sensitive; the pink-footed goose, for example, was displaced up to 600 meters. Appropriate siting of wind projects and specific turbines is likely the best way to minimize impacts to wildlife.

The methods and metrics used for the estimation and prediction of fatalities have evolved from the early 1990s, when predictions were principally based on studies from three projects in California, principally the Altamont Pass Wind Resource Area, and technological differences were confounded with biological ones. In 2007, Dr. Strickland and Dr. Morrison identified 19 studies with data suitable for making predictions. Although studies initially presented fatality rates using metrics of per turbine per year, recent analyses of fatality data have used the metric of fatalities per nameplate megawatt per year, or per rotor swept area (RSA). Metrics using actual power production or time of operation would be more useful.

Fatality monitoring studies have taken place around the country, but more information is still needed on fatality rates in developed areas with little data reported (e.g., the Southwest) and in previously undeveloped areas where new developments are proposed (e.g., coastal areas). While the 19 studies cited attempted to adjust for searcher detection and carcass removal biases, their estimates may still be subject to several field biases (e.g., biases in the carcass removal estimates, carcasses landing outside the search plot, unknown background mortality).

Pre-construction fatality estimates are rarely followed up with post-construction empirical estimates, limiting researchers' ability to predict fatalities. At seven sites, however, Dr. Strickland and Dr. Morrison were able to make the comparison, and found that the pre-construction survey predictions based on estimates from existing facilities either were close to the post-construction estimates, or had over-estimated the fatalities. When they examined raptor use at several sites in the Northwest and California, a correlation between raptor abundance at the site and raptor fatalities emerged. In a context of little data and potential biases, the correlation is not definitive, but could be a promising method for predicting fatalities. Review of the available data also suggested

that raptor behavior, such as flight heights within the RSA, could be an indicator of risk. In an example at Foote Creek Rim in Wyoming, researchers observed that the majority of eagle use of the site was taking place at the edge of the rim. The developer accordingly removed turbines from the birds' risk zone, and the site experienced a lower level of fatalities than predicted based on the birds' use of the site.

Three wind projects have conducted radar studies for nocturnal migrants where fatality data exist. Although the radar surveys have several limitations (do not cover all seasons and weather conditions; are subject to detection bias; cannot distinguish birds from other flying organisms, e.g., bats and large insects), the studies indicated very low fatality rates as a function of total passage rates (less than 0.01%). Dr. Strickland offered a potential model for predicting fatalities by using radar data and the probability that a flying bird would strike a turbine when flying through the zone of risk (RSA), acknowledging that the probability that the birds will take action to avoid the RSA remains an important and unknown factor.

Thus far, there have been few studies attempting to evaluate cumulative, or population-level, impacts of wind facilities. Under a scenario of future wind development, an example from the Columbia Basin illustrates that an accumulation of impacts could lead to potential population-level effects on certain bird species. Dr. Strickland emphasized that more research needs to be done to determine whether impacts will have biological significance for populations.

In conclusion, Dr. Strickland commented that more information is needed in several key areas - more fatality data, better estimates of exposure, more empirical testing of fatality predictions, further studies of displacement, a better synthesis of existing information, improved knowledge of mitigation effectiveness, and the development of models for the prediction of impacts and risk. He offered several recommendations to the Committee in developing the guidelines, including:

- Basing studies on specific objectives and using appropriate, site-specific methods, metrics, and study design;
- Verifying models, as predictions are best when using empirical data; and
- Employing tested monitoring tools that provide data relevant to the monitoring objectives.

Questions for Presentation: What is Known about Avian / Wind Power Interaction?

- **Adaptive management.** Dr. Strickland cautioned the group that adaptive management (AM) might not be a useful method for reducing avian fatalities at a wind facility. He pointed out that true, active AM entails setting up the project as an experiment with competing hypotheses to test, and everyone involved is willing to make changes based on the results. AM is most likely useful in the testing of mitigation measures and/or deterrents. Passive AM, on the other hand, which applies lessons learned from the application of single management strategy to, for example, phase one to phase two of a project, could have a place.

- **Minimum number of pre-construction surveys.** In certain cases, sufficient knowledge has been accumulated to establish a minimum number of pre-construction surveys, such as in the case of birds on agricultural lands and birds in the Pacific Northwest. In other landscapes and regions, particularly the Southwest, the state of the knowledge is still not sufficient.
- **Metrics.** Asked whether researchers should be looking at population-level impacts rather than megawatts per year as a metric, Dr. Strickland replied that the megawatt per year metric is still a useful one, and researchers need to begin determining the significance of a particular megawatt/year impact on the population as a whole or on site-specific subpopulations.
- **Habitat impacts of other forms of development.** Dr. Strickland explained that Dr. Robel's work examined the impact of roads, fences, and power plants on prairie chicken habitat use, which may be useful as a surrogate for displacement from wind facilities. Dr. Robel's work suggests displacement due to those facilities is more significant than ones Dr. Strickland showed for small birds, and indicates displacement of prairie chickens of up to half a kilometer or more. Dr. Strickland is currently looking at the effects of gas development on mule deer, which is showing a reduction in use of otherwise suitable habitat within several kilometers of well pads and roads. The question is whether such data would be consistent with the construction and operation of wind turbines – when using surrogate data, one must be cautious about extrapolating from other activities.
- **Pacific Northwest.** Even with the amount of pre- and post-construction and cumulative impact data accumulated in the Pacific Northwest, there are still locations where it would not be safe to extrapolate the data. With changes in landscapes or bird densities, the chances of witnessing different impacts increase (e.g., coastal sites would be different from eastern Washington).
- **Search intervals.** Dr. Strickland attested that researchers are working to develop effective search intervals to determine what works well for particular species. He indicated that search intervals of 30 days work well for raptors, but for small birds, once or twice a week might be more appropriate. The important issue is the rate at which carcasses are removed from study plots. Generally, the search interval should be no longer than the duration expectancy of a carcass.
- **Profile of avian fatalities.** Dr. Strickland confirmed that researchers collect as much data as possible on avian fatalities related to wind towers, and that there is nothing to indicate that the carcasses are older or infirm birds.
- **Species of concern.** A participant suggested that it would be useful to obtain more specific information on species of concern. A potential recommendation for the group is to prioritize certain species for further study.
- **Impacts with rotating vs. stationary blades.** There are no data to address this question. Dr. Strickland has heard of only one or two instances of someone actually observing a bird strike. His research teams assume that most bird strikes are collisions with moving blades. However, when estimating collision rates with physical models (e.g., the Tucker Model) there is an assumption that some birds strike the stationary tower and blades, albeit with a much lower likelihood than with the moving blade. In the estimates the researchers make, there is also an assumption that all bird carcasses found in a search plot are turbine-related

fatalities (unless the cause of death is obvious, such as a gunshot wound); i.e., there is no background mortality.

IV. What Is Known about Bat / Wind Power Interaction?

Presenter: *Paul Cryan, Research Biologist, USGS Fort Collins Science Center*

Paul Cryan delivered a presentation covering the impacts of wind turbines on bat species, behavioral factors that may influence bat mortality, methods and metrics for monitoring bat fatalities, and remaining areas of uncertainty with regard to bat / wind turbine interactions. Although bats are long-lived, Dr. Cryan pointed out that their reproductive rates are low and the process is slow, making it difficult for bats to recover from population-level impacts. There are 43 species of regularly occurring bats in the United States, with about half of those categorized as "species of concern" and six species and subspecies appearing on the endangered species list.

Dr. Cryan observed that bat fatalities have been found at every wind site that conducted rigorous, post-construction bat surveys. He described the characteristics of the bat species that have been involved in fatalities at wind turbines in North America - mostly migratory tree bats, which roost in trees throughout the year. These currently affected bat species are wide-ranging, and make massive seasonal movements between very different habitats. They are likely to concentrate in certain areas during their migration periods. For these species, important wintering and summering areas are located mostly within the U.S. and Canada, which, Dr. Cryan noted, means that their welfare lies in the hands of North Americans. Although endangered bat species (Indiana bats, gray bats, Ozark & Virginia big-eared bats, greater & lesser long-nosed bats, and Hawaiian hoary bats) have not yet appeared in fatality surveys in the U.S., observed fatalities in Mexico and in related species signal that there could be future impacts, particularly if more turbines are sited within the animals' ranges.

Looking at the estimated number of bats killed at wind sites, the number of fatalities is higher in the geographic areas of the Appalachian region, the Midwest, and in southern Alberta, Canada. Thus far, however, no consistent pattern of high fatalities has emerged in particular types of landscapes. Most fatalities tend to occur in the late summer and autumn, and peak in mid-August through mid-September, indicating a seasonal phenomenon. Low-wind nights and bigger turbines apparently pose greater risks to bats.

In terms of cumulative impacts, different scenarios of wind power expansion suggest potential mortality rates of tens of thousands of bats per year. As the sizes of these bat populations are unknown, it is unclear whether these mortality numbers indicate significant population-level impacts. Although the effects to bats of indirect impacts and habitat loss associated with turbines have not been studied, bats are known to be opportunistic creatures, and potential indirect mortality has not yet been cause for great concern.

Observations and anecdotal evidence suggest, however, that bat populations have been on the decline in recent decades. There is no evidence that other human-induced impacts

have caused rapid changes in populations, nor is there evidence that environmental contaminants or diseases are responsible for large-scale impacts. Bats suffer far fewer fatalities from collisions with human-built structures than birds, and collide much less frequently with buildings and communication towers than with wind turbines. The impact of wind turbines on the affected species of bats, therefore, appears to be far greater than any other form of human-induced mortality. Some evidence suggests that the reason for the high rate of wind turbine collisions could be behavioral, leading to the supposition that bats are attracted to the turbines. Among such possibilities, migrating bats could be attracted to the high wind "corridors" where turbines are built, to the presence of insects at the turbines, or to the turbines themselves as roosting or mating sites. If bats are indeed attracted to turbines, it could be very difficult to assess risk, and wind development will likely have a greater impact on bat populations.

Dr. Cryan reviewed different methods and metrics for monitoring bats and discussed their effectiveness as well as their shortcomings. Methods for monitoring bats at wind facilities include:

- **Visual methods** - light tagging, night vision imaging, and thermal infrared imaging are promising technologies
- **Radar** - cannot distinguish between birds and bats, best in combination with other methods
- **Acoustic monitoring** – cannot measure abundance or provide demographic information
- **Radio telemetry** – useful for monitoring individuals over short distances
- **Capture surveys** – good method for obtaining species identification, but subject to many biases

The goal of pre-construction monitoring for bats should aim to predict the probability and magnitude of bat fatalities. Researchers should determine the presence and activities of bats using the best available methods and information, while accounting for spatial and temporal variation. Pre-construction findings should then be compared to post-construction impacts, a step that has not yet been performed for bats (although some studies are currently in progress). With post-construction monitoring, the goal should be to determine the number of fatalities using the best available methods and accounting for potential biases. Once the wind facility is in place, possible mitigation measures to reduce the number of bats killed include operational changes, such as increasing the blade "cut-in" speed and shutting down operations in high-risk conditions, or using deterrents (ultrasound blasters are undergoing testing). Offsite mitigation is not a viable option for tree bats, and other possible mitigation methods require more testing.

Dr. Cryan warned that given the uncertainty surrounding the size of bat populations, it is a possibility that one or more of the affected species could be lost in the coming decades. To avoid that scenario, it is important to address questions regarding bat / wind turbine interactions proactively and to minimize bat fatalities.

Questions for Presentation: What Is Known about Bat / Wind Power Interaction?

- **Population effects and male fatalities**. The dynamic of males of the species suffering disproportionate fatalities at wind sites could lead to population-level effects if it is mating bats that are differentially killed. If there are fewer in landscape, there are fewer chances of mating. Not much is known about mating in bats, however. If it is not mating-related, the discrepancy might lead to selection against migratory behavior. Bats are quick to respond, however, and show significant variation in their behavior, including migratory behavior.
- **Research priorities.** The Bats & Wind Energy Cooperative is in the process of producing recommendations on research priorities. As there are a number of uncertainties regarding bats, it remains important to conduct samplings across regions.
- **History of bat populations in North America.** The history of bat populations in North American is largely unknown; when USGS held a workshop on the subject, it became apparent that existing data is inadequate to assess trends. Most evidence of their decline is anecdotal. Dr. Cryan stated that although genetics is not his expertise, his understanding is that genetic methods could be used to gain an historical snapshot of bat populations and to infer their size in modern times. Genetics could give a picture of bat populations from past hundred years, but might not reveal the effects of more immediate impacts. Procuring an estimate of recent population sizes would nevertheless help to interpret cumulative impacts.
- **Acoustic monitoring.** There are several pre-construction sites employing good acoustic monitoring methods. If the acoustic data correlates with the post-construction data that will be released over the next few years, it could prove a valuable method for pre-assessing risk.
- **White nose syndrome.** Last year in the Albany area, a little brown bat hibernacula was found with a new condition called white nose syndrome, which was causing large numbers of fatalities and has since spread to other caves. The phenomenon is already impacting the endangered Indiana bat and it could spread throughout the eastern karst region. This is the first time researchers have witnessed colony collapse of this magnitude. There is no evidence yet of direct effects from contaminants or disease, although indirect effects of such causative agents have not been ruled out, and scientists are working to determine whether it could be a cryptic pathogen or contaminant.
- **Wind turbine types.** Dr. Cryan said that as far as he knows, no one has studied vertical axis drag-type turbines and their impact on bats.
- **Other threats to bat populations.** A participant commented that wind turbines might not be the only major problem for bats. The second Ontario Breeding Bird Atlas and other surveys from North America show that aerial insectivore birds are in steep decline. Bats may be similarly affected, and this may be adding to severe population pressures.

V. What Is Known about Other Wildlife, Including Habitat Impact Considerations of Wind Power Interactions?

Presenter: *Jay Pruett, The Nature Conservancy*

Jay Pruett discussed the habitat impacts of wind energy on birds and other wildlife. The installation of wind power facilities can result in direct and indirect habitat loss for wildlife, and those impacts can be either short or long-term. Habitat can be lost directly to the installation of turbines, substations, roads and transmission lines, although this involves a small portion of the site, typically less than 10%, and is usually significant only if sited in a critical area. Indirect habitat loss takes place due to behavioral response by wildlife to wind facilities. The fragmentation of habitat through the installation of roads, transmission lines, and turbines can disrupt the area that individuals or species need for survival.

Prairie chickens, which evolved in the grasslands, have a fear response to vertical structures, as they recognize such structures as a potential perch for raptors. The lesser prairie chicken is a candidate species for listing, and their limited habitat is continuing to decline. One study of prairie chickens found that nesting females avoided human structures by up to 1,000 meters. Studies of other birds found a variety of avoidance and habituation responses among different bird species. While displacement is likely for some grassland nesting birds, the magnitude is uncertain. Potential displacement ranges from zero to several hundred meters for songbirds and is greater for other species, particularly prairie grouse.

Little research has been conducted on large mammals. Studies of deer, elk, and caribou in proximity to wind turbines and other human infrastructure have shown varied responses from habituation to avoidance. Large mammals tend to leave the area during construction, but are likely to habituate; thus direct habitat loss does not appear to be a significant issue for them. If habitat is in short supply, on the other hand, habitat fragmentation could erect barriers to their movement. Very little is known about fragmentation effects on other species, such as small mammals and reptiles.

Mr. Pruett emphasized that it is important to consider sensitive habitat early in the siting process. The lesser prairie chicken, for example, has suffered a significant diminution of its habitat, and planned development could seriously impact what remains. While wind energy and wildlife can exist in harmony, he maintained, it is our responsibility to ensure that it happens.

Questions for Presentation: What Is Known about Other Wildlife, Including Habitat Impact Considerations of Wind Power Interactions?

- **Habitat fragmentation in Eastern forests.** Humans have brought about dramatic changes in forest landscapes in the past hundred years, altering the conditions in which birds had evolved. Development creates an edge effect within the forest, giving more access points to predators. Such changes raise the question of whether we are leaving wildlife with sufficient land to survive.

- **Direct impact footprint of wind projects.** A participant pointed out that the 10% figure for a wind project's direct impact comes from a Bureau of Land Management study that is applicable to older wind projects. Today, with larger turbines, a lower percentage is more typical, closer to 2 to 5% of the project area.
- **Number of surveys for pre- and post- construction studies.** A Committee member expressed concern for the number of surveys that could be required of developers, and Mr. Pruett replied that the same studies would not be necessary at each site – the required studies could be determined on a site-by-site basis, depending on the issues present at the location. More research needs to be done, however, to understand fragmentation impacts, so it is important to invest in studies now to determine what to look for at other sites. Dale Strickland pointed out that many of the surveys to determine indirect impacts are the same ones conducted for direct impacts (abundance estimates, estimates of use, etc.). Paul Cryan added that although the immediate concerns for bats are direct impacts, indirect impacts are possible if turbines are sited close to roost colonies.
- **Impacts from other energy sources**. A participant asked about the impact of wind energy development compared to those of other energy sources. Mr. Pruett responded that conservationist groups are engaged in dialogue with other energy developers, not only with wind developers. Much of the infrastructure for other sources of energy is already in place, however. In the case of wind, turbines dominate the prairie landscape as no other structure does, and the potential impact of such structures is unknown.
- **Measurement of fragmentation impacts**. A group member pointed to the difficulty of defining and quantifying fragmentation, citing a study at the Buffalo Ridge site that showed apparent habitat fragmentation with no effect on songbird density, although they avoided certain features. Mr. Pruett concurred that measurement is difficult, and that fragmenting impacts may not always be negative.
- **Prairie chicken study**. Another member mentioned that the NWCC Grassland Shrub Steppe research project is conducting surveys of prairie chicken responses to anthropogenic disturbances. It is not clear whether knowledge of prairie chickens is transferable to sage grouse, but from a conservation point of view, the default should be to assume conservatively that it does. The NWCC Grassland Shrub Steppe subgroup has recently started to discuss whether to initiate a study on sage grouse.

VI. How Are Non-Governmental Entities Working to Avoid Negative Impacts from Wind Energy Development?

Presenters: *Jay Pruett, The Nature Conservancy, and Wayne Walker, Wayne Walker Conservation Consulting*

Jay Pruett detailed the roles and activities of NGOs involved in the wind development process. There are a number of different NGOs playing a role, including The Nature Conservancy, Bat Conservation International, Ducks Unlimited, and national, state, and local chapters of the Audubon Society. He listed several roles that these organizations undertake in the wind development process:

- Getting involved in the siting processes, for both wind facilities and transmission lines
- Advocating the conservation of wildlife
- Encouraging the avoidance, minimization, and/or mitigation of wildlife and habitat losses
- Participating in the development of guidelines and tools
- Providing information on wildlife resources to all parties
- Promoting appropriate research

In terms of NGOs' research and information role, Mr. Pruett highlighted the collection of data and mapping of sensitive species and habitats as an important activity. NGOs can also offer alternative suggestions. It is critical, he concluded, that wildlife issues are taken into account early in the process, and NGOs are often not involved in siting processes early enough.

Wayne Walker then informed the group of the founding of a new organization dedicated to promoting wind / wildlife research. The founders felt that in order to achieve the 20% wind vision designed by DOE and AWEA, wind and wildlife issues must be addresses proactively on a landscape scale rather than on a project-by-project basis. The mission of AWWI is to "create a widely respected institution, with shared industry / NGO governance, funded from industry and non-industry sources, that serves as a vehicle for programs to achieve wind / wildlife goals more cost-effectively, more expeditiously, and with better results – both actual and perceived – than industry members can achieve independently." The newly formed entity has received seed funding commitments and is holding scoping meetings on its four program initiatives:

- Research
- Sustainable growth planning, including mapping
- A biodiversity bank that would sell credits using science-based criteria
- Education, outreach, and training

Next steps for the organization include securing a sustainable funding base and establishing a form of governance. As industry will benefit from AWWI's research, the founders envision the bulk of the organization's funding coming from two industry sources – plant owners / operators as well as construction, service, and equipment suppliers. Additional money from foundations, NGOs, and government sources will supplement industry funding. To confront the question of how to establish credible governance, AWWI's founders plan to appoint a balanced board. They are considering the suggestion that the Industry and NGO Advisory Committees each select an equal number of representatives to the board. Furthermore, a separate Scientific Advisory Group will determine which projects to support. AWWI's founding members hope to make a final decision on governance this spring.

Mr. Walker concluded by enumerating the anticipated benefits of AWWI:

- Minimizing the long-term risk to and from rapid growth of the wind industry;
- Building the intellectual capital to move proactively on wildlife issues;
- Establishing communication between industry and NGOs;

- Initiating early action on transmission siting; and
- Offering a credible, scientifically sound forum for conducting research on the wind industry and publicizing the results.

WORKSHOP DAY 2: THURSDAY, FEBRUARY 27TH

VII. Models or Frameworks for Avoiding and Minimizing Wildlife Impacts from Wind Projects: National Approach

➢ USFWS Approach

Presenters: *Tim Sullivan, New York Ecological Services Field Office, USFWS and Michael Erickson, USFWS*

Tim Sullivan outlined the contents of the *USFWS Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* and described how they are being used in FWS region 5, which consists of 12 north Atlantic states. Part 1 of the interim guidelines offers recommendations on site selection, site development, wildlife studies, and turbine design, placement, and operation. In part 2, the guidelines make suggestions for wildlife professionals on how to conduct studies and evaluate wind development and reference sites. Currently, the guidelines recommend a procedure for looking at habitat on the ground but do not consider airspace as habitat. The approach taken in the document is a precautionary one.

In an informal survey of FWS region 5 field offices, Mr. Sullivan found that most staff are recommending and referencing part 1 of the guidelines, but are not referring to part 2. Respondents said that part 2 does not provide the necessary consistent, site-specific information on birds and bats. According to staff, wind developers are not using the guidelines. Furthermore, the FWS provides information pursuant to several pieces of legislation, including the Migratory Bird Treaty Act, Endangered Species Act, Fish and Wildlife Coordination Act, and the Clean Water Act.

Opinions and support for the FWS guidelines vary widely. Some north Atlantic states are creating their own guidelines. The New York State Department of Environmental Conservation, for example, has drafted state guidelines and is currently accepting comments on them. The New York draft guidelines differ in some aspects from the FWS guidelines, and do not reference or cite the Service's guidelines. The New York guidelines contain recommendations on when, where, and how studies should be performed. They recommend a 1-year timeline for preconstruction studies, while the FWS guidelines suggest a longer timeline. While FWS recommends site selection screening, the New York guidelines do not.

Resource issues in FWS Region 5 include resident and nocturnal migratory birds, resident and migratory bats, forest and grassland fragmentation, and displacement effects on wildlife. Of particular concern is bat mortality, where Eastern wind energy projects kill a much greater number of individuals. Field offices need information on the

temporal and spatial use of project sites by birds and bats, and cumulative impacts remain understudied.

A state-by-state approach, Mr. Sullivan observed, lacks needed coherence. In the context of an expanding wind industry and a lack of information on wildlife, stakeholders are looking for reliable data and a consistent, predictable process in which to work.

Michael Erickson then described the perspective from the North Dakota and South Dakota Refuge field offices. According to the National Renewable Energy Lab, North Dakota ranks number one in wind energy potential in the U.S., and the wind industry is poised to expand rapidly in the state.

In the Dakotas, habitat protection is the cornerstone of FWS activities. As approximately 95 percent of the land is in private hands, the Service regularly works with landowners and maintaining good relationships with them is essential. Through the small wetlands acquisition program and the grasslands easement program, the FWS works to protect wildlife and habitat by purchasing fee titles and establishing perpetual easement contracts. The goal of wetland easements is to ensure the long-term protection of waterfowl breeding habitat. Grassland easements aim to maintain upland cover on erodible soils, improve water quality, and provide feeding, nesting, and resting habitat for birds. While millions acres of habitat have been protected through these programs, much remains to be done. The FWS has identified 1.4 million acres of priority wetlands and over 10 million acres of priority grasslands that are at risk and require protection.

The FWS priority areas, however, frequently overlap with the best areas for wind power. This overlap raises the question of how to manage wind/wildlife coexistence, which, Mr. Erickson admitted, is difficult to balance. The case of the whooping crane, which was brought back from the brink of extinction, illustrates both a success story and a new concern regarding wind / wildlife interaction. To protect the endangered crane, federal agencies, developers, and others consult with FWS on all activities that may adversely affect whooping cranes if there is a federal nexus. If there is no federal nexus, private parties must meet their obligations under the Endangered Species Act (ESA) by participating in conservation plans; however, due to a lack of state siting requirements and/or state laws or requirements, many wind developments are constructed with minimal or no consultation with USFWS.

Although these protective actions concerning the whooping crane achieved success in avoiding species extinction, they also demonstrate challenges for the FWS guidelines. ESA compliance is mandatory, but the current FWS guidelines are not. Often the Service is not involved in the early planning stages of wind projects, when wildlife / habitat considerations are critical. Moreover, Mr. Erickson emphasized that staff must balance regulatory responsibilities with the imperative of preserving good relationships with landowners. If landowners are unable to site wind turbines on their property, they may no longer enter into easements, which could result in greater impacts to wildlife. In Mr. Erickson's view, therefore, collaboration between landowners and the Service is the best approach for keeping the landscapes intact.

Questions for Presentations: The USFWS Approach

Participants addressed questions on the following issues to both Mr. Sullivan and Mr. Erickson, who represent two of the eight FWS regions:

- **Whooping cranes.** Referring to Mr. Erickson's presentation, a participant inquired about the status of whooping cranes in North Dakota. Mr. Erickson said that he is not intimately familiar with the issue, but is aware that the Ecological Services Office is concerned for the birds' staging and roosting sites, particularly if a number of wind plants are in installed in North Dakota.
- **Tools for implementing guidelines.** Committee members expressed concern that the current regulatory and non-regulatory tools FWS field staff have do not seem sufficient to ensure the guidelines are implemented and asked the speakers what tools would help them become involved early in the siting process. The presenters cited some of the obstacles to applying the guidelines as uncertainty regarding the research needed and the fact that the current guidelines are both voluntary and considered draft. The speakers agreed that direction – a basic framework applicable to most cases, standardized best management practices, standard methodologies for data collection, a standard method for data-sharing, and a FWS team that focuses on providing wind/wildlife expertise to states that need it – would indeed be helpful. They also highlighted several elements that field offices need:
  - Minimum, predictable standards for developers to follow, with additional guidance for site-specific issues
  - Technical advisory committees to help field staff identify issues, species of concern, and habitat at risk
  - Standard, or at least similar, methods and metrics
  - Guidance on reconciling state and Service guidelines
- **Relationships with landowners in North Dakota.** In response to a participant's question, Mr. Erickson clarified that the FWS is not in competition with developers for land, but is attempting to preserve a positive image of easements among landowners. It is important that easements continue to be perceived as not conflicting with farming and wind energy, but as offering an opportunity for additional income while preserving valuable wildlife habitat.
- **Transmission.** A participant raised the question of how to incorporate considerations of transmission line development into the guidelines, which could be a topic for later discussion by the Committee members.
- **Buffer zones.** A participant asked whether there are buffer zone locations along Lake Ontario or other major streams where turbines are prohibited, and Mr. Sullivan replied that there are not, except as provided by state or local law. The New York State Department of Environmental Conservation's Draft Guidelines for Conducting Bird and Bat Studies at Commercial Wind Energy Projects identifies landscape features and resources of concern, which include "Proximity of the project (approximately 5 miles) to the Atlantic coastline or the shoreline of one of the Great Lakes." The three other categories include known location of a state listed species; presence of wildlife concentration areas; and presence of a feature that funnels or concentrates birds or bats during migration. Wind

energy projects in or near these locations are requested to do expanded wildlife studies but are not prohibited. The NYSDEC Guidelines are available on the web at: http://www.dec.ny.gov/energy/40966.html

- **Overview of Other Federal Guidelines**

Presenter: *Ray Brady, Energy Policy Team, Bureau of Land Management*

Ray Brady addressed the wind energy policies of other federal agencies, noting that less than 5% of current installed wind capacity is on federal lands. In addition to the FWS, the federal agencies with authority in wind siting and permitting are the Bureau of Land Management (BLM), the US Forest Service (USFS), and the Minerals Management Service (MMS), which wields authority with respect to offshore wind. The Energy Policy Act of 2005 provided guidance to the agencies on renewables policy, as well as directed the BLM to develop 10,000 MW of renewables on BLM public lands. Federal agencies must also comply with the National Environmental Policy Act (NEPA), ESA, the Migratory Bird Treaty Act (MBTA), other federal statutes.

The three agencies are all developing policies, BMPs, or directives concerning renewables and/or wind energy, which are in different stages of development. Mr. Brady detailed the components of each agency's policies. These agencies are working closely with the FWS as the Service finalizes its own guidelines. Agency goals in shaping renewables / wind energy policy include the following: responding to the Energy Policy Act of 2005 and renewable energy priorities; balancing resource use with protection of resources; streamlining permitting processes; establishing internal agency consistency; facilitating inter-agency coordination; responding to local community and broader public needs.

The federal agencies are experiencing varying levels of wind development activity in the areas under their authority. BLM and USFS both have authorized leases, while MMS has lease nomination areas for wind site testing purposes, and all have applications pending. Furthermore, each agency is confronting wildlife issues that could pose challenges for wind development, including sage grouse management (BLM); bat and migratory bird impacts (USFS); and seabird, migratory bird, and fish and marine species impacts (MMS).

Questions for Presentation: Overview of Other Federal Guidelines

Facilitator Abby Arnold informed the group that Mr. Brady and the other federal agencies will be working with Dave Stout for a coordinated approach on the FAC and invited questions from the participants for Mr. Brady.

- **USDA.** A participant asked about the US Department of Agriculture's control over private lands, and a USDA representative replied that the agency would be concerned with financial impacts and adhering to state regulations for development on private lands.
- **FERC.** The Federal Energy Regulatory Commission has regulatory and permitting responsibilities for transmission lines and pipelines. Other agencies

have interagency agreements and MOUs on how to cooperate with FERC and ensuring permitting timelines dovetail.

- **BLM's guidance for 10,000 MW of renewables.** In light of the guidance, BLM has received numerous applications, including 135 new applications for solar energy installations in the west, over the past year. In the case of geothermal, BLM offered the first competitive leases late last year, and has received bonus bids in excess of $20 million. A high demand for renewables development has been unleashed, and the agency has limited resources with which to respond.
- **Denial of applications on federal lands.** Asked whether any applications had been rejected, Mr. Brady replied that some had; a number of projects are not carried forward from the site-testing phase, some for transmission reasons and others for environmental ones. Of the solar applications to BLM, 15 have already been denied due to potential wildlife impacts.

Canadian Federal Perspective

Presenter: *Lyle Friesen, Canadian Wildlife Service*

Bringing another federal perspective to wind / wildlife issues, Lyle Friesen of the Canadian Wildlife Service (CWS) outlined the approach taken to wind power and wildlife in Canada. The Canadian federal and provincial governments are encouraging wind power as a clean source of renewable energy, while recognizing the need to minimize wildlife impacts. CWS, which is part of Environment Canada, is charged with protecting migratory birds under the Migratory Birds Convention Act and the federal Species at Risk Act. The Canadian Environmental Assessment Act applies to projects on federal lands, but most wind development takes place on non-federal lands, and therefore falls under the purview of the provinces. In either context, CWS does not have the authority to approve or deny projects (rather, it provides 'expert advice'), but the provinces request the Service's involvement nonetheless, due to staff expertise in migratory birds.

Under Ontario's provincial Environmental Assessment (EA) process, the proponent prepares an Environmental Impact Statement, which is then submitted to government agencies for review. The government consults with experts and stakeholders to determine whether any adverse impacts can be mitigated, and then makes a decision to approve, request more information, subject the project to a higher level of EA, or deny project approval.

In order to help frame the EA process for birds, the CWS issued "Wind Turbines and Birds: A Guidance Document for Environmental Assessment." Developed in cooperation with federal biologists and EA practitioners (and with industry input later on in the process), the guidance is used for all wind development projects in Canada. The document is intended for use in conjunction with CWS experts, who help developers to consider site-specific concerns. As a first step, the guidance recommends conducting a preliminary assessment of the site to determine potential risk factors. The assessment is then used to categorize the site sensitivity at one of four levels: very high (presence of at-risk species, large breeding colonies or bird concentrations); high (a geographic

concentration area or important habitat); medium (with regionally or locally significant habitats or bird numbers); or low (containing none of the previous risk factors).

To assist with the monitoring stage, the CWS also developed standardized monitoring protocols, "Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds."[1] It is intended for use in consultation with CWS biologists, who determine the appropriate protocols and level of monitoring for a particular site. In the pre-construction monitoring phase, the guidelines generally require one year of monitoring, although more could be required in high-risk areas, such as offshore developments. Potential surveys to be performed include breeding bird surveys, migration / stopover / wintering surveys, and passage migration counts. Due to the current lack of sufficient data to allow meaningful interpretation, radar surveys are not generally expected. In the post-construction monitoring phase, which can last between one to three years, proponents conduct surveys of bird usage of the area, as well as mortality studies. Data from each project will be stored in a centralized database that is being developed by CWS and industry partners. While confidential information is protected, CWS and approved researchers can gain access for data analysis.

Finally, CWS performs targeted research projects into areas of uncertainty, such as migration patterns. Although industry assists with funding, it does not get involved with the research. Mr. Friesen concluded with the observation that a desire for consistency in policy and a desire to minimize future impacts were the drivers allowing CWS, the Canadian Wind Energy Association, and industry to collaborate on the elaboration of useful wind / wildlife polices.

Questions for Presentation: Canadian Federal Perspective

- **Revisions to the guidelines.** The guidelines are living documents that will be revised periodically.
- **Public access to data.** In the early stages of the EA process, the data are not public, but they become so later on, as public access to the data is an integral part of the EA process. The proponent must take comments from both CWS and the public into account.
- **Guidance for bats.** In Canada, provinces have legal jurisdiction over bats, and a number of provinces have developed their own guidance documents for bats. In Ontario, the province patterned the bat guidance after the one for birds. All animal groups must be considered in the EA.
- **First stage of EA.** The first step in the process is to determine a level of concern for the site. When proponents contact CWS, staff directs them to the guidance document, which contains a matrix combining site sensitivity with its size to get a level of concern. Before beginning to conduct surveys, the proponent places the site in a category and sends CWS their proposal for bird surveys.

[1] The guideline and protocols are available on the Internet at http://www.cws-scf.ec.gc.ca/publications/eval/index_e.cfm (accessed 3/14/08).

VIII. Models or Frameworks for Avoiding and Minimizing Wildlife Impacts from Wind Projects: Development on Tribal Lands

Presenter: *Stephen L. Simpson, Division of Indian Affairs, Department of the Interior*

In describing the frameworks for wind energy development on Indian lands, Stephen Simpson emphasized that Indian land is very different from federal land. There are 580 federally recognized tribes in 34 different states, with over 280 land areas recognized as reservations. Some of the land, particularly in the West, is ripe for wind energy and is attracting the interest of developers.

There are three types of Indian land ownership: tribal trust land (held in trust by the U.S. for tribes), individual restricted land (cannot be conveyed without U.S. approval), and tribal fee land (not held in trust). As a trustee, the United States must act in the best interests of the Indian beneficiary. The U.S. is not required to supersede statutes and regulations, but it must balance its trust responsibility with other obligations. In practice, Mr. Simpson said, the trust responsibility entails consulting with the tribes and working closely with them to co-regulate the land.

To develop wind energy on tribal trust land, which constitutes the majority of Indian lands, the tribe can undertake development on its own, enter into a lease or contract, or engage in new legal framework called a Tribal Energy Resource Agreement (TERA). For individual restricted land, the options are individual development or leases. Case law seems to indicate that tribal fee land functions in the same manner as private land. If a tribe or individual wishes to develop on their own, they are not conveying an interest in trust or restricted land, and therefore the approval of the Secretary of the Interior is not necessary. In that case, NEPA and the National Historic Preservation Act (NHPA) do not apply, although other federal environmental laws do (e.g., ESA, MBTA). If a third party wishes to develop on Indian land, however, the tribe would be conveying an interest in the land, and thus Secretarial approval is required. NEPA and NHPA, as well as other federal environmental laws, would then be applicable.

Under the Energy Policy Act of 2005, a tribe on tribal trust land may also enter into a TERA with the Secretary of the Interior. The legal structure for a TERA is new, and the regulations on it are still being finalized.[2] With a TERA, a tribe can grant rights-of-way for energy resource development and enter into leases and business agreements without Secretarial approval. Again, NEPA and NHPA would not apply, but the Act requires tribes to establish an environmental review process similar to NEPA and to provide for public comment. The Act also specifies that development under a TERA remains subject to all federal environmental law.

[2] The regulations have since been finalized and can be found in the 73 FED.REG 12808 from March 10, 2008.

Questions for Presentation: Development on Tribal Lands

- **Recipients of lease fees.** Lease fees, royalties, and rentals accrue to the landowner directly. In some cases, the money goes into trust accounts held at DOI for the benefit of the landowner.
- **TERA considerations for power distribution.** TERA does not specify where the power from energy development on tribal land should be distributed.
- **PTCs under TERA.** Mr. Simpson was uncertain whether a third party would be entitled to PTCs under a TERA, but anticipates that it will likely work in the same manner as a lease agreement and that the PTCs will still apply.
- **The public on tribal lands.** Asked who constitutes the "public" on tribal lands, Mr. Simpson replied that the public is composed of the same individuals and entities as elsewhere – e.g., states, citizens, tribal members, tribal governments – but added their viewpoints are weighted differently. As state law does not apply on tribal lands, for instance, the tribe's opinion carries more weight than that of the state.
- **Wildlife considerations in a trust decision.** When making trust decisions, DOI is required to look at environmental impacts, in addition to NEPA, as part of a best interest determination.
- **Relevance of guidelines on Indian land.** Mr. Simpson advised the group that the best way to see the guidelines implemented on tribal lands is to work with the tribes and to persuade them to adopt the guidelines as part of their environmental code. If FWS guidelines become mandatory, they will be part of federal law that applies to trust lands.

IX. Models or Frameworks for Avoiding and Minimizing Wildlife Impacts from Wind Projects: Overview of State Approaches

Presenter: *Deb Hahn, Association of Fish & Wildlife Agencies*

Deb Hahn discussed the various approaches taken to wind and wildlife interactions by state fish & wildlife agencies, summarizing the findings in an October 2007 report on state wind and wildlife guidelines (included in the binders distributed to Committee members). The state agencies have a legal mandate to manage the fish and wildlife resources within the state. The entities with permitting authority over wind siting vary from state to state, ranging from local communities, counties, public utility commissions, to those with no permitting process. There is also a diversity of legal and regulatory frameworks concerning wind development – three states have mandatory siting requirements, 15 have draft or final guidelines, and 16 states have State Environmental Quality Acts.

Ms. Hahn gave an overview of the guidelines from six states – Washington, California, Pennsylvania, Texas, New York, and Wisconsin.[3] Summarizing the common elements in these guidelines, she mentioned that the guidelines are voluntary, developed in consultation with stakeholders, and recommended early consultation with state fish &

[3] Copies of the guidelines from California, Washington, and Pennsylvania can be found in Committee members' notebooks.

wildlife agencies. The guidelines also contain best management practices, standardized surveys and monitoring methods, and include provisions for sharing data. She also drew attention to some notable elements unique to the guidelines of particular states:

- **Incentives:** Pennsylvania's guidelines have a provision for limited liability for bird and bat mortality as long as there is no "malicious intent," in exchange for the developer agreeing to work in cooperation with the Game Commission and sign the Cooperative Agreement.
- **Funding recommendations and emphasis on mitigation:** The state of Washington has traditional and alternative mitigation options for developers.
- **Discussion of transmission lines** (Texas)
- **Identification of sensitive areas** (Wisconsin & New York)

Drawing on state experiences, Ms. Hahn offered Committee members suggestions for their process and urged members to work collaboratively from the beginning. She advised them to keep in mind that state fish & wildlife agencies have differing amounts of authority and that industry does not necessarily consider the state voluntary guidelines. In designing the FWS guidelines, Ms. Hahn encouraged the Committee to consider the following: options for mitigation; bird, bat, and habitat issues; cumulative local and regional effects; the participation of states in national-level guidelines; links between wind incentives and conservation; regulatory guidelines; a funding source for research; and methods for dealing with private lands.

Questions for Presentation: Overview of State Approaches

To respond to participants' questions regarding state approaches, an informal panel composed of the following state representatives was assembled: Kathy Boydston, Texas Parks & Wildlife Department; Deb Hahn, AFWA; Greg Hueckel, state of Washington; Tracy Librandi Mumma, Pennsylvania Game Commission; Keith Sexson, Kansas Department of Wildlife & Parks; and John Sherwell, Maryland Department of Natural Resources.

- **Areas of critical concern.** Referring to federal areas of critical concern that are closed to development, a participant asked if states have looked at identifying areas of critical concern and, if so, whether it has conflicted with private property rights. The state of Washington has attempted to approach this question through incentives and mitigation. If developers wish to move into a sensitive area of low or medium value (high value areas are not included), the replacement value ratio for that land is 2 to 1. The state makes an effort to have projects sited on disturbed lands where the wildlife value is not as high. Using this approach, Washington has not encountered significant conflicts with private property rights.
- **Comprehensive state wildlife conservation strategy.** Pennsylvania did consider the wildlife conservation strategy in designing guidelines in order to determine what species could be impacted. Representatives from the other states present attested that their states either made efforts to integrate state wildlife plans with the guidelines or plan to do so in the updates to the state guidelines.
- **Needs of the states.** A group member asked the state representatives what the FWS can do to add value to what the states are doing and what is needed from a

state perspective (e.g., research, funding). Facilitator Abby Arnold flagged this topic as a question the Committee might like to follow up on with the states. In Texas, Kathy Boydston said that the wind industry needs consistency and predictability, so offering to level the playing field could serve as an incentive. From the state's point of view, it is important to have data collected in a consistent manner to understand what impact the industry is having on wildlife resources. Greg Hueckel agreed that the same elements are important in Washington and added that a useful role for FWS staff would be taking part in the TACs on the ground.

- **Analysis of mandatory guidelines.** Committee members expressed interest in receiving an analysis comparing the experiences of the three states with mandatory siting requirements to those with voluntary guidelines.
- **Federal / state enforcement responsibility.** A participant raised the question of the federal /state relationship with regard to the protection of conservation species.

X. Models or Frameworks for National or State Approaches to Avoid and Minimize Wildlife Impacts from Other Kinds of Projects: Avian Power Line Interaction Committee

Presenters: *Jim Burruss, Pacificorp, and Al Manville, Division of Migratory Bird Management, USFWS*

Jim Burruss and Al Manville briefed the group on the work of the Avian Power Line Interaction Committee (APLIC) to reduce or eliminate avian mortality caused by electrocutions and collisions with power distribution and transmission lines. In their view, the Avian Protection Plan (APP) Guidelines jointly developed by the USFWS and APLIC and released to the public in 2005 are a model that could be adapted by the commercial wind industry for wind turbines.

Al Manville provided a brief history of avian collision and electrocution problems, with documented incidents dating back to 1876 and 1922, respectively. Begun in the 1970s as an ad hoc initiative to address significant Golden Eagle electrocutions and Whooping Crane collisions, APLIC was created in 1989 as a more formal effort on the part of electric utility industry, USFWS, NGOs, and academicians to work collaboratively on solutions to these problems.

Since its creation, APLIC members have funded research on collision and electrocution minimization studies, tested specific deterrent and avoidance devices, developed new management strategies and protocols, published best management practice recommendations for existing and new equipment (including publication in refereed scientific journals), performed outreach efforts, and worked collaboratively to avoid or minimize "takes" of protected migratory birds under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the Endangered Species Act. Dr. Manville noted that the Service would much prefer to partner with industry rather than to regulate it.

To disseminate the results of that research and to better educate the industry and interested stakeholders, APLIC – with active Service participation – has developed short courses and materials to train utility employees and managers, resource agencies, and others on how to make electric facilities more bird-friendly. APLIC has also conducted APP workshops, most recently in February 2008 at the 4th International Partners in Flight conference.

Beginning in 1975, APLIC has released a number of suggested practices guidance documents, the most recent including *Mitigating Bird Collisions with Power Lines* (1994, currently being updated), *Suggested Practices for Avian Protection on Power Lines* (2006; published in Spanish in 2008), and the 2005 APP Guidelines. The APP guidance represents a new direction for the Service and the industry, moving away from utility-specific memoranda of understanding (MOUs) and a proposed national MOU for utilities, to a voluntary bird protection plan for the industry, intended to be stepped down for utility-specific use.

With a new proposal to authorize permits, "where take [of Bald and Golden Eagles] is associated with otherwise legal activities," including disturbance and lethal take, the Service anticipates issuing a limited number of eagle take permits. As proposed, these would be under a Service-reviewed and approved APP, which would include an implementation schedule, monitoring and reporting requirements, performance-based demonstrated effectiveness, and possibly other conditions. The permitting regulation is anticipated to be released to the public as a final rule by late 2008. Dr. Manville observed that this is an excellent opportunity for the wind industry to become fully engaged with USFWS in developing and implementing APPs, working collaboratively to address potential eagle issues.

The APP process, as explained below, involves 12 principles, and encourages the use of workshops to educate the industry and resource agencies. The same approach could be used by the commercial wind industry. Research is critically important and the efforts performed by APLIC and related entities have helped to reduce mortality significantly while maintaining power reliability. The same approach could be used by the wind industry, which has recently been funding research to address wildlife-habitat (e.g., Flint Hills, KS) and bat-wind (e.g., Bat Wind Energy Cooperative) issues. Admittedly, the wind industry lacks a comparable *Suggested Practices* document for wind. There are few scientifically valid "tools" in the "mitigation toolbox" that can be used to avoid or minimize impacts to wildlife. With ongoing research, that is changing.

The APLIC model could easily be used to help fill wind industry needs through development of collaborative Avian and Bat Protection Plans (ABPPs). While wind industry *Metrics and Methods* documents have recently been and are being updated, the Service suggests the need for a national impact assessment manual. The manual should be compatible with regional and local level wind energy guidance documents, and developed for use by all wind proponents. It should contain scientifically valid and acceptable risk assessment models, as well as valid and acceptable research protocols for pre- and post-construction monitoring. Ultimately, the manual could include science-

based turbine siting recommendations, proven tested deterrents, best management practices and best available technologies, and acceptable mitigation practices – focused on minimizing impacts to birds, bats, and their habitats.

In conclusion, Dr. Manville indicated that the partnership with the electric utility industry has been a long and productive one. Working proactively, the Service and the electric utility industry continue to work cooperatively to ensure bird-safe electric utilities. Through the National Wind Coordinating Collaborative, begun in 1995 with the Avian Subcommittee (now the called the Wildlife Workgroup), the same kind of cooperative effort has been taking place. The Service suggests that using the APP model could move that forward in a very positive direction.

Jim Burruss provided an overview of the components of the APP guidelines. Available at www.aplic.org and www.fws.gov, the APP guidelines contain 12 principles that are intended to help utilities develop their own program to manage avian power line interaction issues:

1) A **corporate policy** statement that identifies commitments, is endorsed by the management, and that provides employees with guidance on expectations and accountability
2) **Training** of all appropriate personnel on reporting, planning, and management procedures
3) Recognition of and compliance with all required **permits** on a county, state, or federal level
4) A commitment that all new and retrofitted facilities will meet or exceed APLIC recommendations for avian safe design in their **construction standards**
5) Established best management procedures and associated training for field personnel regarding **nest management**
6) An avian reporting system / **mortality tracking system**
7) A **risk assessment methodology** identifying areas of greatest risk to migratory birds
8) **Mortality reduction measures** (possibly stemming from risk assessment findings)
9) Avian **enhancement** options, including utility efforts to increase populations or habitat
10) **Quality control** plans for reviewing and updating practices
11) **Public awareness** plans for educating the public on avian and power line issues, as well as utility efforts to mitigate problems
12) Use of **key** internal and external **resources**, such as state and federal agencies, engineers and biologists, etc.

Critical to the success of the APPs are the elements of management support, agency involvement, engineering and biological expertise, sufficient funding, documentation, accountability and employee awareness, and the involvement and endorsement of affected groups within utilities. In conclusion, Mr. Burruss cited the following as the four major benefits of the implementation of APPs:

- Reduction in avian mortality;

- Improved service reliability;
- Favorable pubic perception; and
- Positive working relationships with agencies.

Questions for Presentation: Avian Power Line Interaction Committee

- **Siting of power lines.** In terms of siting new facilities, APLIC has looked at methods for siting power lines in order to minimize impact***s*** to birds.
- **MBTA enforcement.** Due to the strict liability nature of MBTA and BGEPA, working in partnership with USFWS cannot guarantee an individual, company, or agency will be absolved from liability under these statutes and their regulations. USFWS has indicated, however, that the Office of Law Enforcement (OLE) carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts to migratory birds. OLE and the Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals, companies, or agencies who have made good faith efforts to avoid the take of migratory birds.
- **Applying the APP process to wind power.** A participant raised the issue of the difficulty of applying the APP process in a competitive market (as opposed to in the case of utilities, which have monopolies in a prescribed area). Mr. Burruss and Dr. Manville agreed that this was a difficult issue, due to confidentiality concerns. Confidentiality can be maintained, however, as more than 30 electric utilities currently provide the Service with real-time mortality information that is used to correct site-specific utility problems. While that information could be requested under the Freedom of Information Act (FOIA), several FOIA exemptions would prohibit the release of that specific information, avoiding a breach of confidentiality and protecting the company. Although Dr. Manville maintained that many of the 12 principles are still applicable, he added that flexibility is also necessary. He also acknowledged the efforts of PPM / Iberdrola Renewables in sharing a draft ABPP with him and several other Service representatives, which is currently continuing under review.

XI. Models or Frameworks for National or State Approaches to Avoid and Minimize Wildlife Impacts from Other Kinds of Projects: Habitat Conservation Plans

Presenter: *Rick Sayers, USFWS*

Rick Sayers gave an overview of the provisions of the Endangered Species Act (ESA) that relate to the siting of wind facilities. Under the ESA, it is statutorily prohibited to "take" an endangered species; threatened species are also protected from take under regulations. The ESA defines "take" as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in these activities. "Harm" includes habitat destruction that kills or injures listed species. Violations of the ESA can result in civil or criminal penalties, and the statutes provides for citizens' lawsuits to enforce the ESA's provisions.

The USFWS issues permits for exemptions from these prohibitions under certain conditions. The Service can issue an incidental take permit if the take is not the purpose of the proposed action and will not appreciably reduce the likelihood of the survival and recovery of the species. Furthermore, the take must be minimized and mitigated to the maximum extent practicable. To receive such a permit, the applicant develops an approved Habitat Conservation Plan (HCP), and the Service conducts a NEPA analysis. The HCP process typically takes one to two years to complete.

Federal agencies must ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species or adversely modify critical habitat. If any aspect of an agency action may affect a listed species or critical habitat, the agency must consult with FWS or the National Marine Fisheries Service. If the action is not likely to jeopardize the species or habitat, the Service may issue an authorization under Section 7 of the ESA in the form of an incidental take statement. If, however, the action is likely to jeopardize the species or habitat, the applicant may request an exemption under Section 7 (h). Such exemptions are rare, and only four have been granted since the ESA entered into effect. Use of Section 7 has been limited in the case of wind power, as most wind projects do not require federal authorization.

The HCP process generally appears to work well for site-specific development activities. It could be streamlined, however, by creating species-specific best management practices. Although it has not issued many yet, FWS has offered general conservation permits, which expedite the process by allowing developers to apply under a single permit for a particular species, thereby avoiding additional NEPA studies.

Questions for Presentation: Habitat Conservation Plans

- **HCP memo.** A Committee member requested a copy of Dale Hall's memo on HCPs, and Mr. Sayer replied that he had a copy to circulate (available on the website at www.fws.gov/habitatconservation/windpower/wind_turbine_advisory_committee.html).
- **Habitat destruction as take.** Mr. Sayers concurred with the observation that it is much more difficult to identify the habitat destruction version of take and determine compliance with ESA's provisions on it. While FWS usually works with the applicant on the HCP, Mr. Sayers cautioned that the Service's approval is not the final answer and cannot prevent a third party from taking action under the ESA.
- **Examples of HCPs for wind.** There are a few HCPs for wind projects in the early stages of discussion in the Northeast and Southwest region, but Mr. Sayers was not certain when they would be permitted or available for public review. FWS must issue a notice of review in the Federal Register before considering a permit. A FWS representative added that there is a 25 MW wind project in Puerto Rico with an HCP and offered to provide a copy of it to the Committee.
- **HCPs and MBTA.** According to Mr. Sayers, FWS provides enforcement discretion for listed migratory birds covered by an HCP. Another FWS representative told the group that the HCP would serve as an MBTA permit in

region 8 with automatic renewal, provided the applicant is in compliance with the HCP. Other regions, however, may require a five-year review.

- **Other anthropogenic structures.** A participant pointed out that there are numerous other human-built structures without HCPs responsible for the take of birds and bats and wondered what repercussions might be entailed. Mr. Sayer replied that this topic is an issue of law enforcement, which Dave Stout indicated would be addressed at the next meeting.

XII. Public Comment

Four members of the public came forward to address the following observations to the Committee:

- Caitlin Coberly, an environmental consultant with Applied Ecological Services, suggested that the next step in risk assessment for birds and bats is population-level and cumulative impacts. She appealed to the Committee to consider making the risk assessment data publicly available in a central repository, emphasizing the need for coordinated research efforts.
- Geologist Pamela Dodds drew attention to the issue of cumulative impacts and water. She noted that more than 500 miles of mountain ridges, often home to the headwaters of rivers, are targeted for wind development. Clearcutting the ridgetops for development causes erosion and reduces the precipitation penetrating into the groundwater, perhaps permanently reducing groundwater renewal. She expressed concern that clearcutting the ridgetops will result not only in habitat fragmentation, but will also degrade the unique and delicate headwater areas, which support both humans and wildlife downstream. She and Arthur Dodds also submitted written comments to the Committee (see Attachment D).
- Arthur Dodds, a cartographer, observed that the standard for wind turbines has become horizontal axis devices using lift technology. He pointed out that there are other technological options, such as vertical axis drag-type devices, which can be shorter than standard wind turbines and have been shown to result in reduced bird and bat mortality. He recommended in investing in research on different types of wind turbines and evaluating them for their impact on bird and bat mortality. In addition, he mentioned the need more research into better technology for integrating volatile wind resources into the grid. He offered to provide more information to the Committee if needed.
- John Sease, a wildlife biologist with the Green Mountain National Forest, informed the Committee that the forest has a special use permit under consideration for a wind facility, and could serve as a resource for the Committee. The project is currently in the NEPA process and is likely the only forest to have reached that stage thus far. His wildlife concerns are typical for those of a forested ridgetop, although it was a surprise to discover that black bear habitat is a major issue. He is planning to convene bear experts to ask them for advice to present the forest supervisor, who is the decision maker in this case. Another major issue that is likely to emerge is that of the visual effects of turbines on ridgelines. Mr. Sease is available to provide the Committee with updates.

XIII. Review and Insights

Facilitator Abby Arnold asked the Committee members to reflect on their observations and concerns stemming from the past two days of the workshops. A number of Committee members expressed appreciation for the quality of the presentations, the amount they had learned during the workshop, and the diversity and balanced nature of the Committee. They also offered the following comments and suggestions for the group:

- Mitigating for bird mortality is practicable.
- Discuss pros and cons of voluntary vs. mandatory guidelines.
- Look into setting a standard and tie it to the production tax credit (PTC).
- Develop a broad framework that addresses development, operations, and maintenance.
- Consider whether the Committee wants to develop comments to Congress (e.g., on the PTC).
- Consider whether states want to support extending the timeframe of the PTC
- One challenge we have regarding development of the guidelines is that we are asked to create guidelines in the context of an unclear US energy policy.
- In light of uncertainty about the effectiveness of mitigation and other measures, if we do develop guidelines, we might not know what the real effects of our recommendations are and whether we could inadvertently hinder wind development.
- How ought we deal with uncertainty and incorporate it into the recommendations? The typology of the IPCC process could be a model of how to deal with uncertainty.
- What is the effectiveness of mitigation and what are the potential unintended consequences?
- The goal is that the recommendations can be implemented and are universally accepted.
- It is important to address differences throughout the states and regions of the country.
- We need to learn from science, not repeat what we know.
- We need an approach that is based on looking at what is necessary to identify indicators or risk.
- What are the commonalities and differences in state guidelines?
- The lack of data and uncertainty in some areas are worrisome.
- How can we encourage development in the right places and discourage it in the wrong places?
- Bring SCC / BCR / habitat mapping into play.
- Recognizing that federal guidelines are not being used, it is important to create something that works for industry and the FWS.
- Adequately addressing habitat issues is a challenge.
- Look at habitat fragmentation and cumulative effects.
- Bird mortality could be significant.

- It is important to have the early involvement of FWS and conservationists in order to avoid sites that impact birds and wildlife.
- A list of recommendations from each presenter would be useful.
- How can we best help tribes adopt recommendations?
- Review the impacts on larger mammals.
- Stay focused on our charter and keep a narrow focus despite the potential distractions of transmission implications and habitat impacts.
- There is a spectrum of motives among wildlife advocacy community and industry and our challenge is to speak to them all.
- How does the Service define success?
- How can we help the Service leverage resources?
- It would be useful to standardize the state and federal approaches.
- Bring other agencies (MMS / Corps / USFS) into conversation as our recommendations ought to apply to them
- Guidelines may not be necessary; rather, we may want to identify what FWS could add to the state approach.
- Encourage the wind industry to internalize this issue, as with the APLIC model.
- Aim to produce more than a guidance document that will simply sit on the shelf.
- Identify what each stakeholder group represented on the FAC wants out of the process.
- We need to hear more about developer perspectives and their needs, including those of small developers.
- Develop process guidelines that will be paid attention to and implemented.
- There could be problems with implementing regulations
- Look at voluntary tools and make use of federal authority to render them more effective (i.e., incentives).
- What is the scope of our process with regard to Interior jurisdiction?
- An overview of climate change and its impact on species would be helpful.
- We need to set our sights high – we could lay the foundation for federal wind power policy with this document.
- State managers need guidance, and we can develop recommendations that will provide leadership, as well as focus and cohesion at the state and county level.
- Ensure state / national / county (where applicable) consistency.
- The impact of new technology on development would be a helpful topic to discuss.
- Remember the recommendations are for a longer timeframe.
- Develop a process that is tailored, predictable, and consistent.

FEDERAL ADVISORY COMMITTEE MEETING
Thursday, February 28, 2008

Meeting Objectives:

- Discuss proposed approach and timelines for organizing the FAC on Wind / Wildlife
- Discuss Secretary of the Interior charge to the FAC
- Discuss groundrules for the FAC
- Discuss timelines and process steps

I. Welcome to the FAC Meeting

David Stout welcomed the Advisory Committee to its first meeting and set out the Committee's goal as providing recommendations for developing guidelines that are clear and wise enough to serve as a national template. He also thanked the audience for their attendance, acknowledging that their participation and assistance would be needed. Abby Arnold then reviewed the meeting objectives and the day's agenda.

II. Federal Advisory Committee Act Orientation

Presenter: *Cindy Cafaro, DOI*

Cindy Cafaro outlined the background to the Federal Advisory Committee Act (FACA) and its requirements. Passed by Congress in 1972 to regulate groups providing advice to the federal government, FACA designated federal advisory committees as groups established by the executive branch for the purpose of obtaining advice or recommendations. These groups fall under the management and control of the executive branch.

Under the FACA, federal advisory committees are required to:

- Fulfill advisory functions only;
- Be established by law, presidential, or discretionary authority;
- File a charter containing the committee's authority, mission, goals, objectives, and logistics;
- Maintain a balanced membership;
- Maintain all committee documents for public inspection;
- Hold open, public meetings;
- Allow the public to speak or file written statements;
- Announce all meetings in the Federal Register 15 days in advance;
- Create and certify detailed public minutes;
- Designate a federal government employee to call and attend each meeting (David Stout for the Wind FAC); and
- Terminate according to statute, when its purpose is completed, or after two years (unless renewed).

Ms. Cafaro further explained that subcommittees are defined as groups reporting to the full advisory committee and may include non-committee members. Although FACA

restrictions do not apply to subcommittees (e.g., the meetings are not required to be public or give public notice), they do not directly advise the president or any federal agency. Subcommittees are permissible only when they are reporting to the full committee for its consideration and deliberation.

If a FACA violation occurs, no criminal penalties or fines are involved, but the consequences could entail litigation, or the prohibition of future meetings and/or use of the group's past recommendations and documents.

Questions for Presentation: Federal Advisory Committee Act Orientation

- **Public status of documents & emails.** The division between Committee documents and personal ones lies in a grey zone. Ms. Cafaro expressed the opinion that a member's personal notebook would be more clearly on the personal side and that an email sent to an individual in compliance with one's duties as a committee member would not be considered a public document. She acknowledged, however, that others might argue differently and urged members to be thoughtful when corresponding on committee business, as well as to save copies of their correspondence as a precaution. Moreover, when three or more committee members are communicating through email, the correspondence starts to take on the public nature of committee business, and Dave Stout and Abby Arnold should be included on the correspondence. On the other hand, if a state advisory group is discussing the deliberations of the Wind FAC, Ms. Cafaro surmised that it would be unlikely that the state-level discussion would be considered public, as it would be several steps removed from the Committee. With regard to state FOIAs, she pointed out that states have their own FOIAs with different requirements.
- **Public access and subcommittees.** While subcommittee documents are not always considered public, anything presented to the full Committee by the subcommittee falls within the public realm.
- **Caucuses.** Caucusing, Ms. Cafaro admitted, falls in another grey area. A small group with similar interests doing prep work before a meeting would be fine, but it is important that it not become the forum where decisions are made (i.e., all the participants take up the same position). Members should ask themselves if they are preparing for the meeting or making decisions and/or doing analysis. A small group could, for example, talk amongst themselves and then bring the options discussed and their pros and cons back to the full Committee. The principle to keep in mind is that the heart of the discussion should take place before the full Committee and that no decisions should be rubberstamped.
- **Availability to the public.** While members of the public have the right to let the government know what their opinions, this principle does not require Committee members to be available at all times. The FAC fulfills this requirement by giving the public the opportunity to present oral comments to the Committee and by accepting written comments submitted to the Designated Federal Officer. The comments submitted should be shared with, discussed, and addressed by the

Committee. Committee members can direct interested members of the public to DFO David Stout or facilitator Abby Arnold to offer their comments.

- **Effect of the recommendations.** The recommendations formulated by the Committee constitute advice to the Secretary and do not entail any obligations.
- **Constituents.** Committee members are encouraged to consult with their constituents and to bear in mind their responsibility to represent the interests of a particular viewpoint.
- **Ethics.** Dave Stout observed that some of the questions raised the parallel issue of ethics, which will be the subject of a training at a subsequent meeting. In the meantime, he asked Committee members to review Tab 2 of the binder containing ethics information. If members have questions, they should contact Ed McDonnell at 202-208-5916 or Edward_mcdonnell@ios.doi.gov.
- **Financial disclosure.** In response to a question, Mr. Stout informed the group that there are two categories of Committee members. Almost all the members are representatives of a constituency and are not expected to disclose their finances. Dr. Robel, on the other hand, sits on the Committee as an independent, neutral party who qualifies as a special government employee. As such, he was required to file a financial disclosure.

III. Proposed Dates and Milestones

Abby Arnold gave an overview of the "Draft Road Map for Wind Turbines Advisory Committee" (see Attachment E) and explained the proposed structure for the group's meetings. The process is envisioned as a series of seven meetings from February 2008 to May 2009, punctuated by subcommittee meetings dealing with specific questions and supplemented with technical expertise.

A member pointed out that the deadline to complete the Committee's work is not May, but October 2009, two years from the point the Committee was established. Dave Stout assured the group that additional meetings would be possible if necessary, but Committee members expressed a preference for completing work as soon as possible. The group considered condensing the meetings into a shorter timeframe than May 2009, but determined it would be impracticable. The Committee agreed to maintain the proposed schedule, and to work as efficiently as possible with the goal of finishing in May or even earlier.

Ms. Arnold reminded the group that the next meeting is scheduled for April 23 – 24 and solicited responses on potential dates for a July meeting. Most members indicated they are available on July 23 – 24; accordingly, USFWS will tentatively schedule a meeting for those dates.

IV. Proposed Groundrules for Wind Turbine Guidelines FAC

Ms. Arnold led the group through a draft of the proposed groundrules (see Attachment F). She emphasized that the goal was to gather Committee members' suggestions for improvements, which would be incorporated into the draft for review at the next meeting.

As there were still several Committee appointments pending, the Committee would not attempt to reach consensus on the document until the next meeting. Upon review of the document, the group identified the following changes:

- Add "tribal treaties" to line 29, section 1d
- Replace "any" with "the" on line 67
- Replace "declare" with "request" on line 102
- Strike "being considered" from lines 110-111
- Revise section 5b to reflect Cindy Cafaro's points on subcommittees
- Replace language paraphrasing the charter with the phrase "consistent with the Committee's charter" in section 6a
- Revise sections 6b and 6c on page 4, in light of Cindy Cafaro's observations on the advisory nature of the Committee's recommendations and the possibility that the Secretary will change during the Committee's tenure
- Refrain from designating the final form of the Committee's product in section 6
- Replace "discussions" with "Committee" on lines 179 and 186
- Consult with Steve Quarles on revising sentences on confidential information in section 7d
- Consult with Cindy Cafaro on revising sentences concerning electronic communication in section 7d
- Edit deadline on line 210
- Correct date on line 211 to read "October 26, 2009"

In order to expedite the process of reviewing the groundrules, Committee members requested that FWS edit the document, circulate it by email for the Committee's review and comment, incorporate the second round of revisions, and distribute the updated groundrules at the next meeting for final discussion and approval by the Committee.

During the discussion of the groundrules, the following questions and issues arose:

- **Form of the final recommendations.** Mr. Stout confirmed that it is up to the Committee to determine the form of their recommendations and whether to include options for their implementation.
- **Open Committee seats.** Mr. Stout informed the group that 18 of 22 seats on the Committee are currently filled, and three nominees – Ed Arnett of Bat Conservation International, Rene Braud of BP Alternative Energy, and Jackie Feninfield of the California Energy Commission - are pending the Secretary's approval. A candidate for a fourth position remains to be identified.
- **Agenda items.** If members would like to suggest a topic for inclusion in the agenda, Ms. Arnold proposed that the group generate a list of potential topics during the meeting, and then prioritize the topics to be covered at the end of the meeting.
- **Reaching consensus.** Ms. Arnold and Mr. Stout clarified that where the group is able to reach consensus, those recommendations will be forwarded to the Secretary. For those items on which consensus is not reached, a final report will include a description of the issues and the positions of various parties. The Committee can discuss whether and how to communicate the items on which

group members disagree. They emphasized, however, that it is important for members to flag any issues they have so they may be addressed, rather than abstaining from the discussion.

- **Communicating with the press.** Participants discussed several options for handling inquiries from the press, including designating point people as press contacts; agreeing to inform the press about the process, but not their thinking on the options; remaining silent; or developing a specific protocol. Some members stressed the importance of refraining from characterizing others' points of view or from speculation about the direction of the process. They also expressed confidence in Committee members' judgment when interacting with the press. A member suggested that FWS draft talking points for the Committee members to use after each meeting, which FWS staff agreed to do.

V. Review and Discuss Categories of Questions for the FAC to Address

Abby Arnold summarized the topics raised in the convening interviews for the Wind Turbine Guidelines FAC. She conducted 29 interviews with key stakeholders representing federal, state, environmental, industry, consulting, and academic entities. Their recommendations of topics for the Committee to address fell into five categories – process suggestions, policy topics, research coordination, research topics, and other issues.

Process suggestions:

- Clarify scope of Committee business early on
- Recognize differences in Committee member expertise and interests
- Set expectations for the use of recommendations
- Discuss holding meetings in various parts of the country

Policy topics:

- Federal and Interior role
- Consistency / coordination among federal agencies
- USFWS draft voluntary guidelines (see NGO / industry comments submitted in 2006)
- Coordination with state policy
- Leadership opportunities for Committee to take on
- Unique nature of siting on tribal lands
- Other models to inform FAC recommendations (HCPs, APLIC, other federal agency guidelines, state guidelines)
- Incentives for compliance
    - Regulation or voluntary
    - Mitigation
    - Voluntary in-house screening of sites
    - Certification
    - Safe harbors

Research coordination:

- How much research / monitoring is needed?
- Engaging the cooperation of leading research institutions in research / monitoring
- Coordinated research and publication program that incorporates what is learned into policy guidelines as federal, state, and local levels
- Ensuring monitoring data and research are collated, peer-reviewed, and used to inform policy
- The funding of research

Research topics:

- Draft NWCC Wildlife Workgroup Summary of Key Research Topics
- Pre-construction tools, methods, and metrics
- Post-construction tools, methods, and metrics
- Mitigation measures
- Comparative alternatives analysis
- Impacts to habitat
- Habitat and resource development land-use mapping
- Existing and needed impact, population, habitat, migration, and behavioral data
- Bat-specific needs (other wildlife)
- Cumulative / population impacts
- Risk-based determinations, in context of risk discussion
- Impact of adding many GW to grid
- Uncertainties in the data and how to address them

Other issues:

- Wind's relative impact to wildlife (direct and habitat) compared with other energy resources

Interviewees also suggested the Committee consider developing a set of principles that all members agree on to guide the group's deliberations and offered various ideas for possible principles.

VI. Visit by USFWS Director Dale Hall

Dave Stout introduced USFWS Director Dale Hall to the Committee, highlighting his long career with the Service prior to his appointment as director in 2005. Mr. Hall greeted the Committee members and underscored the importance of the work they are engaged in, noting that it will have long-term impacts. In the current climate, there is heavy pressure to find alternative energy resources, and, although wind is a clean source of energy, he observed that it does not yet qualify as "green"- and it will take significant effort for wind to fulfill that standard. The Committee has the opportunity to provide the right guidance and lead the industry down the path to becoming a green source of energy. Referring to the experience of hydropower in the West, Mr. Hall observed that these are difficult decisions with no easy solutions. Expressing confidence in the Committee, he affirmed that the members represented the best people to undertake the task, and he personally thanked them for their sacrifices they made to participate in the Wind FAC.

He encouraged members to ask FWS for any assistance they might need and to offer their unfettered advice to the Service.

Mr. Stout led the Committee members in a round of introductions and then invited them to ask questions. Mr. Hall offered the following responses to members:

- **Use of Committee's final product.** In Mr. Hall's opinion, the Committee's recommendations should become more than policy, and deserve to become an industry standard. In his testimony to Congress, he stated that he would be loathe to see the Committee's recommendations ignored. He acknowledged, however, that it is unlikely he will still be the FWS director when the Committee has completed its work, and advised the group to make recommendations regarding the form of their work product.
- **Priority level of the Wind FAC.** For FWS, the Wind FAC work is a high priority, given that protection of birds and bats is a high priority of FWS. Some of the funding for this project comes from the bird conservation arena. From DOI's perspective, the agency owns or manages 1/5 of the acreage in the US, and there is likely to be significant pressure to install wind farms on some of its land. The question for DOI is how to do so appropriately.
- **Context and scope of Committee's work.** Mr. Hall encouraged the Committee members to take a view as broad as the science supports and to take any projections the group feels comfortable with into consideration. As climate change projections are at a continent-wide scale, he observed they may not prove useful. He expressed optimism that technology can offer the capability to solve problems once they are understood. He invited members to be creative and innovative in giving the Service their best advice.
- **Vacancies on the Committee.** Mr. Hall told the group that FWS is considering filling the vacancies on the Committee with four additional members.

VII. Public Comment

Michael Fry of the American Bird Conservancy commented that the Committee is addressing the issue of siting wind facilities in order to minimize effects on wildlife and their habitat. In this context, the issue of federal nexus is an important one. He noted that financial institutions are working on their own guidelines to minimize their risks and navigate regulatory constraints. When writing its recommendations, Mr. Fry urged the Committee clearly to delineate and articulate their areas of agreement and disagreement in order to convey to FWS a full understanding of the options.

VIII. Next Steps and Action Items

In the Committee's discussion of the questions it would like to address, members generated the list of next steps and subcommittee topics outlined below. Members also volunteered to participate in the various subgroups as noted.

For FWS/RESOLVE

- Finalize Committee membership and alternates

- Update Committee Member list
- Revise draft FAC ground rules to reflect FAC discussion and circulate to Committee prior to the April meeting.
- Draft meeting summary for Technical Workshop and Meeting and circulate to presenters and Committee members
- Draft communication/talking points after each meeting and load on the web site for use by Committee members
- Develop protocol for reviewing documents and obtaining consensus from Committee
- Schedule, plan for and staff subcommittees meetings
- Schedule field trip to wind development site for interested Committee members.
- Collect examples of HCPs used for proposed wind development sites and provide memo on HCPs to Committee members
- Prepare analysis of mandatory vs. voluntary state guidelines
- Post document provided by Jeri Lawrence to website
- Work with Committee members to prepare matrix of state guidelines

For Federal Advisory Committee (FAC) Members

- Respond to electronic scheduling forms from Rachel London for Subcommittee conference calls *and,* if you not done so, send in scheduling form for Fall Committee meeting schedule.
- Identify additional expertise or experts that you want considered by the Committee to be invited to participate in subcommittee discussions. Send your comments to Rachel_London@FWS.gov by March 13, 2008.
- Participate in subcommittee activities as schedule unfolds (if any of you want to participate in the subcommittees and your name is not on the list, please send Rachel an e-mail asking that you be added to the list).
- Review and submit comments on revised groundrules.

Subcommittees Established by the FAC Members as of February 28, 2008 *(these committees will extend to the April 23-24 meeting; at the April meeting, the Committee will determine if the Subcommittees need to be extended).*

A. Comparison of Existing State, Federal, and Tribal Guidelines (Models), International (Canada)

Compare/contrast current guidelines, apply to federal level, and review most attractive attributes of each model and create a list. Additionally, members of the subcommittee will develop one or more approaches for the Committee to review. *(FWS facilitator TBD)*

FAC Members

- Kathy Boydston
- Greg Hueckel
- Aimee Delach
- Keith Sexson
- Mark Sinclair
- Jeri Lawrence

- Mike Azeka
- Andy Linehan
- George Allen, FWS

B. Other Models or Programs and How These Approaches Address Uncertainty *(FWS facilitator Cheryl Armani)*

FAC Members

- Patrick Traylor
- Taber Allison
- Winifred Perkins
- Jeff Underwood, for FWS

C. Landscape Habitat (Mapping) *(FWS facilitator Rachel London)*

- Which states maintain GIS data layers; what types of data layers exist; what resources are necessary to fund creation of new data; evaluation of demand for such data; evaluation of the extent of use of existing data
- Need guidance from FWS – what are your needs?
- Expertise in habitat fragmentation/displacement/avoidance/other behavior modification issues

FAC Members

- Aimee Delach
- Mike Daulton
- Keith Sexson
- Rich Rayhill
- Rob Manes
- Joanne Mills, for FWS

D. Legal

A reference team that will answer questions regarding what current law provides as well as identify additional opportunities under current law. This Subcommittee will also be a resource to review ability under current law to implement proposed frameworks as the Committee develops frameworks for discussion by the Committee. (FWS facilitator, Cheryl Armani)

FAC Members

- Jeri Lawrence
- Patrick Traylor
- Mike Daulton
- Steve Quarles
- Jill Birchell, FWS

E. Guiding Principles

Development of principles, based on recommendations from convening summary, which the Committee can agree upon to guide their work. What do we consider success?

FAC Members

- Rob Manes
- Winifred Perkins

- Jeri Lawrence
- Taber Allison
- Mark Sinclair
- Dave Stout, FWS

IX. Conclusion

In closing, Mr. Stout invited comments from the Committee members. A number of them expressed their enthusiasm for the quality and diversity of the Committee composition, as well as optimism for the collaborative work that is to be done. Mr. Stout thanked the Committee members and audience members for their participation, ending the meeting with the declaration that the Wind Turbine Guidelines Federal Advisory Committee is bound to achieve great things.

Attachments

A. Meeting agenda
B. Participant list
C. Member biographies
D. Public comments submitted by Arthur and Pamela Dodds
E. Draft Road Map for Wind Turbines Advisory Committee
F. Draft groundrules
G. Recommendations by speakers
H. References from Strickland & Morrison presentation

USFWS
WIND TURBINE GUIDELINES ADVISORY COMMITTEE
TECHNICAL WORKSHOP AND
FEDERAL ADVISORY COMMITTEE MEETING

DRAFT AGENDA
FEBRUARY 26-28, 2008

SOUTH INTERIOR AUDITORIUM
1951 CONSTITUTION AVE, NW
WASHINGTON, DC 20240

FEBRUARY 26-27 WIND TURBINE TECHNICAL WORKSHOP

- Review what is known and remaining questions about siting wind energy development projects on land
- Review federal and state guidelines relevant to siting wind facilities on land

FEBRUARY 26, 2008

USFWS Technical Workshop on Siting Wind Facilities
Invitees: FAC Members and designated alternates, staff of relevant organizations and technical experts, and members of the public who are involved in the wind turbine siting ongoing dialogue.

Days 1 & 2 – Technical Workshop
The Workshop is open to the public. The Workshop is an opportunity for the Federal Advisory Committee Members to be presented with up to date information about issues associated with development of wind power and issues associated with wind/wildlife interaction.

Protocol for Questions & Comments for Days 1 & 2
At designated times during the workshop, questions from the FAC Members will be invited and, as time allows, additional questions from the public will be taken. Questions that cannot be taken in the time available will be recorded and distributed to committee members.

Additionally, for members of the public who want to provide a comment to the Workshop Attendees, there is a designated time on the agenda during Day Two, February 27th for those parties who have signed a "Comment Sign-Up Sheet." Comments may need to be held to 3 minutes, depending on the number of parties who request time to comment. If time does not allow for all comments from the public in attendance or on the conference call line, members of the public will be asked to write their comments down on index cards or send them by email. Comments will be recorded electronically and distributed to all FAC members after the FAC meeting.

FEBRUARY 26, 2008, CONTINUED

Purpose for Day:

To hear about the most up to date research on what is known about wildlife impacts and how to minimize impacts from development of wind power when siting wind facilities.

7:30 – 8:15	**Registration**
8:15 – 9:30	**Introductions** *D.Stout, DFO/USFWS; A.Arnold, Facilitator* ➢ Introductions of FAC members ➢ Overview of why we are here *D.Stout, USFWS* o *Introduction to USFWS authority and responsibility* o *Charge FAC will undertake* ➢ Review purpose of workshop *A.Arnold, Facilitator* o *Role of technical workshop in setting stage for the FAC deliberations* ➢ Review two day workshop agenda ➢ Review groundrules for February 26-27 Technical Workshop *Questions and Answers (see page 1)*
9:30 – 11:00	**Overview of Wind Development** *Wayne Walker, Wayne Walker Conservation Consulting LLC* *(Brief overview of wind development planning, construction, operation stages for a wind power project)* ➢ *Overview of wind development process: including financing, economic, market, environmental, siting, state and federal policy or other considerations* ➢ *What considerations does a wind developer take into account when siting a wind development project?* ➢ *What are the wind industry's perspectives on wildlife impacts?* ➢ *Is there a difference in siting steps between a "smaller" facility (1-5 turbines) vs. a larger facility?* ➢ *What is the federal or state nexus? And under what authorities?* *Questions and Answers (See page 1)*
11:00 – 11:20	***Break***

11:20 – 12:30	**Review What Is Known and Remaining Questions About Impacts to Wildlife Habitat and Siting Wind Development Projects on Land** ***What is known about Avian/Wind Power Interaction?*** *M.Morrison, Texas A&M University (by phone); D.Strickland, Western EcoSystems Technology, Inc. (in person)* ➢ *What is the range of avifauna impacted, or suspected of impact?* ➢ *What do we know about the degree of impact? (direct mortality, habitat impact?)* ➢ *What do we know about cumulative impacts, from wind and other human induced affects?* ➢ *What do we know about available methods and metrics to predict probability of impact? What is our level of certainty that these methods are accurately predicting impacts?* ➢ *What do we know about habituation, or other behavioral aspects?* ➢ *What are the major areas of uncertainty?* ➢ *References and resources for the FAC to know about* *Presentation prior to lunch with time available for Questions and Answers after lunch.*
12:30 - 1:45	**Lunch** *(on your own)*
1: 45 – 2:10	***What is known about Avian/Wind Power Interaction?,*** *continued* *Questions and Answers (see page 1)*
2:10 – 3:30	***What is Known About Bat Wind Power Interaction and Remaining Questions*****?** *Paul Cryan, USGS* ➢ *What is the range of bats impacted, or suspected of impact?* ➢ *What do we know about the degree of impact? (direct mortality, habitat impact?)* ➢ *What do we know about cumulative impacts, from wind and other human induced affects?* ➢ *What do we know about available methods and metrics to predict probability of impact? What is our level of certainty that these methods are accurately predicting impacts?* ➢ *What do we know about habituation, or other behavioral aspects?* ➢ *What are the major areas of uncertainty?* *Questions and Answers (see page 1)*
3:30 – 3:45	***Break***

3:45 – 4:30	***What is Known About Other Wildlife, Including Habitat Impact Considerations of Wind Power Interaction?*** *Jay Pruett, The Nature Conservancy* ➢ *What is the range of wildlife impacted, or suspected of impact?* ➢ *What do we know about the degree of impact? (habitat, other?)* ➢ *What do we know about cumulative impacts, from wind and other human induced affects?* ➢ *What do we know about available methods and metrics to predict probability of impact? What is our level of certainty that these methods are accurately predicting impacts?* ➢ *What do we know about habituation, or other behavioral aspects?* ➢ *What are the major areas of uncertainty?* *Questions and Answers (see page 1)*
4:30 – 5:00	**How Are Non-Governmental Entities Working to Avoid Negative Impacts From Wind Energy Development?** *Jay Pruett, The Nature Conservancy; Wayne Walker, Wayne Walker Conservation Consulting LLC*
5:00 – 5:25 *(including break)*	**Discussion / Questions** *As time allows, FAC Members offer initial questions/thoughts about what they have heard (see page 1).*
5:25-5:30	**Next Steps and Adjourn**

FEBRUARY 27, 2008
USFWS Technical Workshop on Siting Wind Facilities, *continued*

8:00 – 8:15	**Registration**
8:15 – 8:30	**Review of Day One Activity, Introductions, & Day 2 Agenda** Follow up from Day 1 Workshop, insights/comments, next steps?
8:30-10:00 10:00-10:30	**Models or Frameworks to Avoid and Minimize Wildlife Impacts from Wind Projects** (*For each example, overview of the approach and examples of application)* National Approach ➢ USFWS *(Application & experience of current guidelines)* *Tim Sullivan and Michael Erickson, USFWS* ➢ Overview of other federal guidelines (USFS, BLM, MMS) *Ray Brady, BLM* ➢ Canadian federal perspective *Lyle Friesen, Canadian Wildlife Service* *Questions and Answers (see page 1)* Development on Tribal Lands *Steve Simpson, DOI*
10:30-10:50	***Break***
10:50-12:15	Overview of State Approaches W*ind Power Siting Regulations and Wildlife Guidelines in the United States* (AFWA report) *Deb Hahn, AFWA* Unique Approaches/features in state guidelines ➢ California ➢ Pennsylvania ➢ Texas ➢ Washington ➢ New York ➢ Wisconsin
12:15-1:30	**Lunch** *(on your own)*

1:30- 2:30	**<u>Models or Frameworks for National or State Approach to Avoid and Minimize Wildlife Impacts From Other Kinds of Projects</u>**, *continued* ➢ APLIC — *Jim Burruss, Pacificorp; Al Manville, USFWS* ➢ HCP — *Rick Sayers, USFWS*
2:30- 2:45	***Break***
2:45 – 3:15	**<u>Public Comment</u>** *Members of the public interested in commenting will need to keep their comments to 3 minutes and sign the "Comment Sign-Up Sheet" at the registration desk.*
3:15 - 5:30	**<u>Review and Insights From Two Days</u>** *<u>Committee members reflect on questions, ideas, next steps for Committee</u>*
6:00 pm	**Adjourn**

FEBRUARY 28, 2008

FIRST WIND TURBINE GUIDELINE ADVISORY COMMITTEE MEETING CONVENES

- Discuss proposed approach and timelines for organizing the FAC on Wind/Wildlife
- Discuss Secretary of the Interior charge to the FAC
- Discuss groundrules for the FAC
- Discuss timelines and process steps

Day 3 – Formal FAC Meeting

Comments Protocol for FAC Meeting

If you are a member of the public and want to make a comment to the FAC, please sign up on the "Comment Sign-Up Sheet" at the registration desk. Comments will be taken at the designated time on the agenda. Comments may need to be held to 3 minutes, depending on the number of parties who request time to comment. If time does not allow for all comments, then members of the public will be asked to write their comments down and submit them to the FWS staff at the registration desk. All comments will be made part of the public record and will be electronically distributed to all FAC members after the FAC meeting.

8:00 – 8:15	**Welcome & Overview of Agenda** *D.Stout, DFO/USFWS / A.Arnold, facilitator* Introductions of all FAC members ➢ Review and agree on agenda for the day
8:15 – 8:45	**Federal Advisory Committee Act Orientation** *Cindy Carafalo, DOI* *Objectives: Review expectations and procedures under the Federal Advisory Committee Act (FACA).* Presentation by DOI expert on FACA
8:45 – 9:45	**Proposed Dates and Milestones for FAC** *A.Arnold, facilitator* *(Objectives: Review preliminary plans, structure of FAC, and possible milestones. Agree on proposed meeting dates in 2008)*
9:45 – 10:05	***Break***
10:05 – 10:50	**Proposed Groundrules for Wind Turbine Guidelines FAC** *A.Arnold, facilitator* *(Objectives: Review the proposed groundrules for the Wind/Wildlife FACA and identify any suggested changes needed to ensure a productive process.)*
10:50 – 11:30	**Review and Discuss Categories of Questions for FAC to Address** *A.Arnold, facilitator* ➢ *Overview of questions raised during convening calls* ➢ *What additional questions or topics would you like the FAC to address?* ➢ *Outside of the FAC, what technical expertise will be needed?* *(Review categories of questions, so that we can begin to identify technical expertise*

	outside of the FAC that we want to invite to advise the FAC)
11:30 – 1:00	**Lunch** *(on your own)*
1:00 – 2:15	**Review and Discuss Categories of Questions for FAC to Address**, *continued*
2:15 – 3:00	**Discuss Organizing Subcommittee/Technical Expertise** *A.Arnold, facilitator* *(Discuss approach to identifying technical experts and how to create agreement on charge to experts*
3:00 – 3:30	**Public Comment** *(may be earlier, depending on FAC schedule)* *(Members of the public are invited to speak to the FAC; Please sign up on the Public Comment Form; time permitting each party will be asked to keep their comments to 3 minutes each. Written comments will be accepted by the Committee.*
3:30-4:00	**Wrap Up and Review Next Steps** *A.Arnold, facilitator*
4:00	**Adjourn!**

WIND TURBINE GUIDELINES ADVISORY COMMITTEE: TECHNICAL WORKSHOP AND COMMITTEE MEETING

February 26 – 28, 2008
Washington, DC

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Wind Turbine Guidelines Advisory Committee

Committee Member Biographies
(in alphabetical order)

Taber Allison
Massachusetts Audubon Society

Taber Allison is Vice President for Conservation Science and Ecological Management at the Mass Audubon. Taber has an M.S. in Forest Ecology from Yale School of Forestry and Environmental Studies, and a Ph. D in Ecology from the University of Minnesota. Taber has served on the faculty in the Plant Biology Department at The Ohio State University, and he was a research associate at the Harvard Forest where he employed paleoecological techniques to study the impact of climate change and land-use history on the forests of New England. Taber served as Program Officer at the National Science Foundation for three years where he managed the Ecology Program and the Population Biology Program. Before coming to Mass Audubon, Taber was the Director of the Rocky Mountain Biological Laboratory in Crested Butte, Colorado and taught Plant Systematics at the University of Colorado-Boulder. At Mass Audubon, Taber coordinates scientific support for bird conservation programs and land management, as well as overall scientific support for Mass Audubon's advocacy, education, and land conservation activities.

Michael T. Azeka
AES Wind Generation

Mr. Azeka is in charge of project planning, permitting and environmental compliance at AES Wind Generation (formerly AES SeaWest). Mr. Azeka joined AES SeaWest in 1994 and has nearly 20 years of experience planning energy projects throughout the western U.S. His expertise specifically covers the environmental and wildlife issues related to wind energy projects. Mr. Azeka is responsible for land planning, National Environmental Policy Act and local environment regulatory analysis and compliance, civil engineering design and permitting of wind plant projects. Since 1994, Mr. Azeka has managed all permitting and regulatory activity on wind energy projects in California, Oregon, Texas, Colorado and Wyoming, encompassing over 800 MW of constructed wind projects. Mr. Azeka holds Bachelor of Science degrees in Environmental Engineering and Civil Engineering from the University of California, Irvine.

Kathy Boydston
Texas Parks and Wildlife Department

Ms. Boydston has worked for TPWD for 20 years, since 2003 has been the representative on wind energy and other related energy issues. She has worked extensively with wind industry on several proposed locations, visited wind farm sites and coordinated with the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and Texas General Land Office on both onshore and off shore wind farms and the potential

impacts on natural resources. She has worked diligently with wind industry to address potential impacts to natural resources in Texas and other surrounding states and has developed and funded research projects to address the potential impacts of wind energy on different species across the state. Ms. Boydston has extensive experience in working with industry of all types and works on a daily basis with other state and federal agencies on resource issues. She supervises a statewide program that reviews development projects across Texas, adjacent states and Mexico. Ms Boydston has extensive experience as liaison between industry, the state and the environmental community and has developed policy and implemented change at the state and federal level. She represents Texas in the Association of Fish and Wildlife Agencies on the Energy and Wildlife Policy Committee and the Wind and Wildlife Subcommittee.

During her tenure with TPWD she was instrumental in developing the Mineral Recovery Guidelines that are now TPWD policy. These guidelines were coordinated in conjunction with industry and other state and federal agencies for oil and gas development on state properties and were given blanket approval for Section 7 by the U.S. Fish and Wildlife Service Region 2. In 2005 she worked with the mining industry in Texas and the Texas Railroad Commission to implement a change in the federal mining reclamation standards in Texas to support reclamation of abandoned mine lanes to benefit Bobwhite Quail and other grassland birds.

Michael Daulton
National Audubon Society

Mike Daulton has been Director of Conservation Policy for the National Audubon Society since January 2005 and previously served as Audubon's Assistant Director of Government Relations since August 1999. Mr. Daulton directs Audubon's policy efforts on a wide range of public lands and bird conservation issues. Prior to his current position, Mr. Daulton served as an analyst for the U.S. Government Accountability Office focusing on water quality and ecosystem management issues facing federal land management agencies. Mr. Daulton holds a Master's degree in Public Policy Studies from Duke University and a Bachelor of Science degree in Ecology, Behavior and Evolution from the University of California at San Diego.

Aimee Delach
Defenders of Wildlife

Areas of Expertise: invasive species, climate change and renewable energy, agriculture, and bird conservation
Aimee develops and analyzes policies to improve incentives for wildlife conservation on agricultural lands, prevent the entry and spread of ecologically damaging invasive species, and expand renewable energy production while minimizing harm to wildlife. She also creates educational materials on the impacts of climate change on wildlife, and coordinates Defenders' biennial Carnivores conferences. Aimee joined Defenders as an intern in 1997. She holds a B.S. in biology from the University of Notre Dame and an M.S. in environmental and forest biology from the State University of New York College of Environmental Science and Forestry.

Greg Hueckel
Washington Department of Fish and Wildlife

Greg Hueckel has worked for the Washington State Department of Fish and Wildlife since 1979 as a marine research biologist, resource program manager, and has been the Assistant Director for the Habitat Program for the past 10 years. Greg is also adjunct faculty for Centralia Community College, and teaches Biology, Marine Biology, Environmental Science, and Environmental Policy.

Greg earned B.S. and M.S. degrees in marine fisheries science from the University of Washington, and also graduated from the University of Washington's Cascade School for Public Policy.

Jeri Lawrence
Blackfeet Nation

Steve Lindenberg
Department of Energy

Steve Lindenberg, Acting Program Manager, Wind & Hydropower Technologies, U.S. Department of Energy, has directed research and development in the electric utility industry for more than twenty-five years. Prior to joining DOE in 2005, his employment included NRECA (6 years), EPRI (14 years) and Cooperative Power Association (5 years) helping to prepare him for his present responsibilities. He is currently a Team Leader in the Wind and Hydropower Technologies Program at the US Department of Energy. His responsibilities are to lead six Federal staff, numerous national lab and state energy researchers, and wind advocates to support siting and licensing options and market awareness of wind facilities, support interconnection with electrical systems and enhance wind development across the Nation. The scope of Steve's team includes utility business studies, transmission and distribution operations, environmental issues, siting methods and technology deployment efforts.

Andrew O. Linehan
PPM Energy

Andy Linehan is the Director of Permitting for wind energy projects at PPM Energy, a part of Iberdrola Renewables. He has been involved in the environmental and permitting studies for wind projects throughout the United States at PPM Energy (where he has been since 2004) and in his previous position at the consulting firm CH2M HILL (where he was for 16 years). At PPM Mr. Linehan has led PPM Energy's involvement in a number of policy activities, including taking an active part in the development of siting guidelines for wind energy in California, Texas, and Washington. He has a BA degree from Reed College and a Masters Degree in Public Affairs from the Woodrow Wilson School at Princeton University.

Robert Manes
The Nature Conservancy

Winifred G. Perkins
Florida Power and Light

Winifred Perkins is the Manager of Environmental Relations for Florida Power and Light Company, (FPL), one of the nation's largest and cleanest electric utilities. Ms. Perkins graduated from the University of California, Berkeley, and has worked for over 25 years for a variety governmental agencies, consulting groups and the private sector. She has worked for FPL since 1984. She has been instrumental in a number of environmental projects FPL has been involved with, including extensive programs to promote endangered species education and awareness, reduce emissions associated with climate change, and the development of extensive renewable energy programs.

In her capacity as Manager of Environmental Relations, Ms. Perkins has dramatically expanded FPL's environmental outreach programs and increased the company's commitment to environmental stewardship. She has also initiated partnership programs with a number of agencies, educational institutions and non-profit organizations to promote better environmental stewardship throughout the US. Ms. Perkins also serves on the Board of several non-profit environmental organizations.

Steven Quarles
Crowell & Moring LLP

Steve Quarles is a partner in, and former chair of, the Environment & Natural Resources Group of the Washington, DC law firm of Crowell & Moring LLP. His practice includes counseling, litigation and legislative representation for a wide range of natural resource and energy associations and companies, state and local governments, and land conservation trusts. He handles a broad array of environmental issues, but with a focus on wildlife-related law, including the Endangered Species Act (ESA), Migratory Bird Treaty Act, and National Environmental Policy Act.

Steve has an active docket of ESA, Clean Water Act, and federal lands litigation. His administrative practice includes such innovative efforts as working to establish, and then counseling the pork industry representatives in, the National Environmental Dialogue on Pork Production (with representatives from the USDA, EPA, and the States) and serving as principal author of its report "Comprehensive Environmental Framework for Pork Production Operations." He also worked with EPA on the Nationwide Clean Water Act Enforcement Agreement that honored agriculture's first industry-wide environmental audit program. In his legislative practice, Steve served as general counsel to the Endangered Species Coordinating Council, a coalition of numerous trade associations, companies, and labor unions seeking to reform the ESA. He also has worked with land conservation trusts and landowners to secure statutory direction for federal land exchanges and appropriations for federal land acquisitions.

Steve held several Executive Branch and Congressional positions, ultimately serving as Deputy Under Secretary of the Department of the Interior in the Carter Administration and as special counsel to the U.S. Senate Committee on Energy and Natural Resources under Chairman Henry M. (Scoop) Jackson. He has been a member of the Board of Mineral and Energy Resources of the National Academy of Sciences and served on two National Resource Council committees. Steve was an invited participant in the ESA at Thirty project of the University of California at Santa Barbara, Columbia University and University of Idaho (2003), the Stanford University Forum on the ESA and Federalism (2005), and the ESA Working Group on Habitat Issues sponsored by The Keystone Center (2006).

Steve graduated from Princeton University and Yale Law School, and received a Fulbright Scholarship to Aligarh Muslin University, India.

Rich Rayhill
Ridgeline Energy

Rich Rayhill is the vice president of Ridgeline Energy, a wind energy development company focused on projects in the western United States. Rich is responsible for permitting, environmental oversight, policy, legislation, outreach, and project development. Rich has drafted several pieces of legislation that are now law in Idaho and contributed to one piece of legislation in Utah. In 2007, Rich received Governor C. L. "Butch" Otter's Idaho renewable energy award. Prior to the start of Ridgeline Rich was in private practice pursuing land use, environmental and general litigation. From 1989 to 1994, Rich served as staff attorney to the Honorable Edward J. Lodge, D. Idaho. The last case he worked was United State v. Randy Weaver (Ruby Ridge). He attended Middlebury College and the University of Idaho Law School. He lives in Boise, Idaho and serves on the board of directors of several local environmental groups. Recently, he was pleased to join the National Wind Coordinating Collaborative's Wildlife Working Group.

Robert J. Robel
Kansas State University

ROBERT J. ROBEL is a Professor Emeritus of Environmental Biology in the Division of Biology at Kansas State University in Manhattan, Kansas. He received a B.S. from Michigan State University, an M.S. from the University of Idaho, and a Ph.D. from Utah State University. He served on the KSU faculty from 1961 until his retirement in 2003. He was a project manager of energy programs in the Office of Technology Assessment of the U.S. Congress and was the Science Advisor for Governor Docking and Governor Bennett of Kansas. He was a Senior Fulbright Research Scholar and has conducted research on grouse and grassland birds for the past 40+ years. His scientific publications in professional journals exceed 250 and he has been a Distinguished Visiting Professor at numerous foreign universities and invited speaker at several international conferences. Honors include: Distinguished Service Award from the Grouse Research Unit in Scotland, Conservationist of the Year in Kansas, Centennial

Distinguished Alumnus Award of the University of Idaho, Professional Award of the Kansas Chapter of The Wildlife Society, Inducted into the Alumni Hall of Fame by the University of Idaho, The Hamerstrom Award from the Prairie Grouse Technical Council, a Fellow of the American Association for the Advancement of Science, and Lifetime Achievement Award from Utah State University

Keith Sexson
Kansas Department of Wildlife and Parks

In his current position as Assistant Secretary for Operations, Keith Sexson serves under the Secretary for Kansas Department of Wildlife and Parks and supervises the Department's Fish and Wildlife Division, Parks Division, Law Enforcement Division, Information / Education Section, and Environmental Services Section. Nearly 300 of the 400 total department employees are located in the Operations Branch of the department.

Major responsibilities as Assistant Secretary involve oversight and development of department policy, issue positions, state statutes and regulations, budgets, planning, grant preparation and management, public relations, legislative liaison, personnel, and providing leadership toward improving natural resource management and constituent services and opportunities.

Keith currently serves as 1) State Director Representative to the State and Federal Task Force for Federal Assistance; 2) Chair for the Hunting and Shooting Sports Participation Committee (AFWA); 3) Chair the Habitat Committee for the Western Association of FW Agencies (WAFWA); 4) serves as Director Sponsor for the Private Lands Committee for the Midwest Association of FW Agencies (MAFWA); and serves as Chairman for the Wind Energy Subcommittee (AFWA).

Keith received his BS degree as a Wildlife Biologist from Fort Hays State University in 1968 and completed Post Graduate Studies at Fort Hays State University and Emporia State University. Keith's off time enjoyment includes activities with grandchildren, hunting, fishing, canoeing, hiking, and biking.

Mark Sinclair
Clean Energy Group

Mark Sinclair is vice president of the Clean Energy Group (CEG), a nonprofit organization established in 1998 to increase the use of cleaner energy technologies in the U.S. and abroad through creative financing, public policy and advocacy. At CEG, Mark also is responsible for managing the Clean Energy States Alliance (CESA), a multi-state coalition of state programs working together to support clean energy technologies and markets.

Prior to his work with CEG, Mark was senior attorney with Conservation Law Foundation (CLF), a New England-based regional environmental organization. Mark also has served as general counsel to the State of Vermont environmental agency. Mark has practiced environmental and energy law for twenty years. Before becoming an attorney, Mark worked as a park ranger with the National Park Service. He attended

Williams College and Cornell Law School. Mark serves on the board of directors for several environmental organizations.

David J. Stout
U.S. Fish and Wildlife Service

Dave Stout is the Chief of the Division of Habitat and Resource Conservation, US Fish and Wildlife Service. Dave has been with the Service since 1977 and has been in involved with wetlands protection, hydropower, coastal planning, and fisheries management. He has worked primarily in the Mid-Atlantic and Northwest, and in Washington, DC.

In his current capacity, he is responsible for programs related to wetlands protection and restoration, wetlands mapping, conservation planning with federal agencies, marine mammals, coastal barrier protection, and most energy-related issues, including windpower, hydropower, and oil and gas production and transmission.

Dave is married and has four daughters and five grandkids in the great Northwest, where he plans to return when his stay in Washington, DC is completed.

Patrick Traylor
Hogan & Hartson, LLP

Patrick Traylor practices in the area of environmental law, with a particular focus on energy infrastructure, Clean Air Act compliance, litigation, and carbon trading. As counsel for numerous international and domestic energy companies, Patrick has counseled clients on the development of over 5,000 MW of coal-fired, gas-fired, and renewables-driven energy projects. As counsel for a Global 10 corporation, Patrick developed and implemented an air permitting strategy that facilitated the shutdown of a legacy plant and its replacement with a state-of-the-art manufacturing facility. As counsel for a large Eastern U.S. utility company, Patrick managed the environmental components of more than $2 billion in equity and asset transactions, and has developed strategic environmental approaches to restructure merchant energy facilities. As counsel for several large utility companies, Patrick managed the administrative, litigation, and settlement elements of the Environmental Protection Agency's (EPA) New Source Review (NSR) enforcement actions and related citizen suit challenges. As counsel for several large utility companies nationwide, Patrick implemented a sophisticated NSR risk management program that aims to minimize the risk posed by the EPA's uncertain NSR program to utility maintenance projects. As counsel for a large domestic energy company, Patrick managed the safe return to service of a pipeline that had failed catastrophically. As counsel for Kyoto Protocol-related trading and project finance client, Patrick provides advice on all aspects of rapidly developing international emission credit trading. As counsel for domestic importers of commercial tropical hardwoods, Patrick engages in offensive and defensive litigation under the Convention on International Trade in Endangered Species.

Some of Patrick's prominent clients include AES Corporation, Duke Energy, DaimlerChrysler Corporation, Iberdrola Energias Renovables, Louis Dreyfus Holding Co., Inc., North American Development Bank, MarkWest Energy Partners, PSEG Fossil, and Sithe Global.

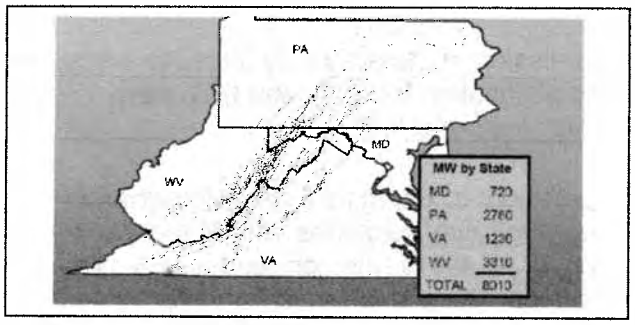
WINDMILL "FARMS" FAIL AS "GREEN ENERGY"

by Pamela C. Dodds, Ph.D., R.P.G., and Arthur W. Dodds, Jr.
www.laurelmountainpreservationassociation.org

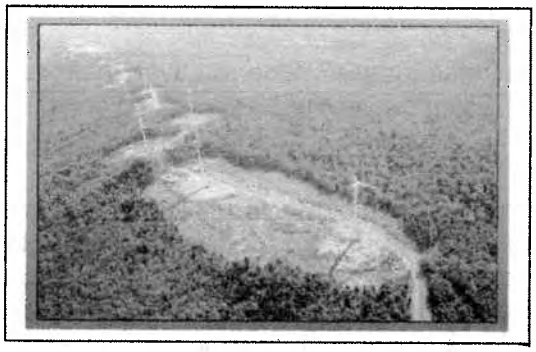
INTRODUCTION: WINDMILL "FARMS" CANNOT SUPPLY "GREEN" ELECTRICITY

With the advent of enormous monetary incentives available for constructing wind turbine facilities, the excitement for using wind power as an alternative energy overwhelmed the rational evaluation of performance and potential negative impacts. Federal tax benefits pay as much as 65% of the cost of building wind turbine facilities in the U.S. This explains why there is so much interest by big business in constructing wind turbine facilities. However, citizens who care about the environment are also embracing wind energy as the answer to our electrical needs in the U.S. Through rational evaluation, it is clear that current wind energy technology simply is not the answer to our electrical needs in the U.S. and that windmill "farms" result in negative impacts to U.S. taxpayers, to our health, and to our environment.

In spite of the evidence that wind power cannot supply the electrical needs of the U.S. and that windmill "farms" have negative cumulative impacts on wildlife and the environment, the PJM Interconnect regional transmission organization is planning numerous mountain ridge sites in West Virginia and other Appalachian mountain states for wind turbine facilities. The U.S. Department of Energy's "Wind Powering America" initiative has set as a goal increasing wind capacity to 10,000 megawatts by 2010 (NREL/CP-500-29164, January, 2001).



All Mountain Ranges are Targeted
For Wind Turbine Installations
(Compiled by Dan Boone, www.VaWind.org)



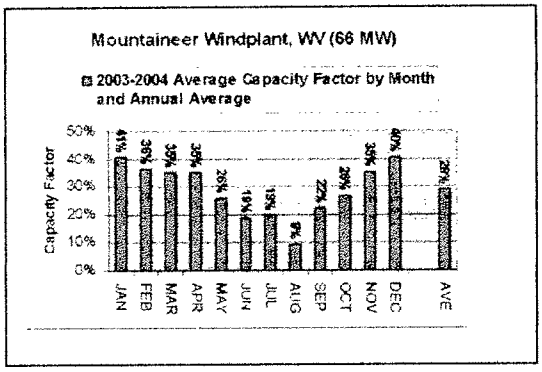
Wind Turbine Project in Tucker County,
West Virginia
(Dan Boone, www.VaWind.org)

WIND ENERGY WILL NOT CAUSE ANY COAL-FIRED PLANT TO GO OUT OF SERVICE AND THEREFORE WILL NOT REDUCE GREENHOUSE GASES

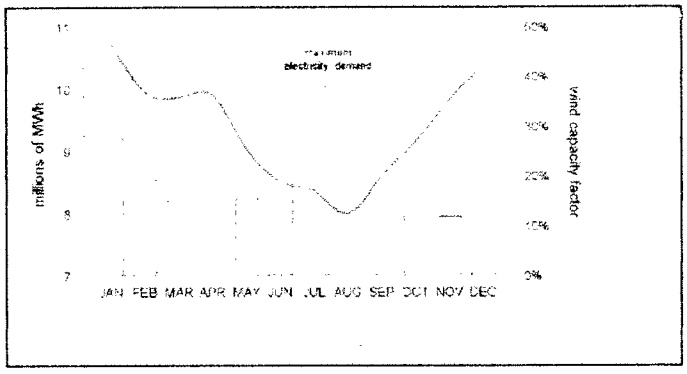
Wind energy is unreliable because the wind is not constant. Additionally, wind energy is greater during off-peak times of electricity demand. Reliable energy from coal-fired or nuclear power plants is necessary to provide electrical demand in the U.S. and is required as a backup for unreliable energy sources such as wind power.

Wind generated electricity is consistently below the rated capacity of the windmill because of the variability of the wind. Considering a typical 1.5 megawatt wind turbine operating with 30% annual capacity factor, which is the highest average efficiency in the Appalachian region, over 4,000 wind turbines would be necessary to equal the output of a coal-fired power plant operating at 70% annual capacity factor. Based on the typical spacing of wind turbines, this would require approximately 590 miles of mountain ridge areas.

Also, wind velocities are not synchronized with peak "load" times. Wind velocities are too low in the summer peak "load" times to provide meaningful electricity (http://www.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html).



Capacity factors are low due to wind variability.
(From: Dan Boone, www.VaWind.org)



Wind velocities are too low during peak summer demand.
(From: Dan Boone, www.VaWind.org)

The most recent issue of the U.S. Department of Energy's annual energy review, "U.S. Energy Flow Trends – 2002", published in 2004 (http:/faculty.olin.edu/~jtownsend/Renewable%20Fall%202006/docs/llnl%20energ%20flows.pdf), stated that coal provides most of the energy used to produce electricity. Coal fires the furnace used to produce steam in coal-fired power plants. The steam is used by the turbine to convert the heat into mechanical energy which then is converted into electrical energy by the generator. The most important observation to consider in this report is that for the 38.2 quadrillion BTUs of energy generating electricity in 2002, there are 26.3 quadrillion BTUs of electrical system energy losses. This constitutes an approximate 68% loss.

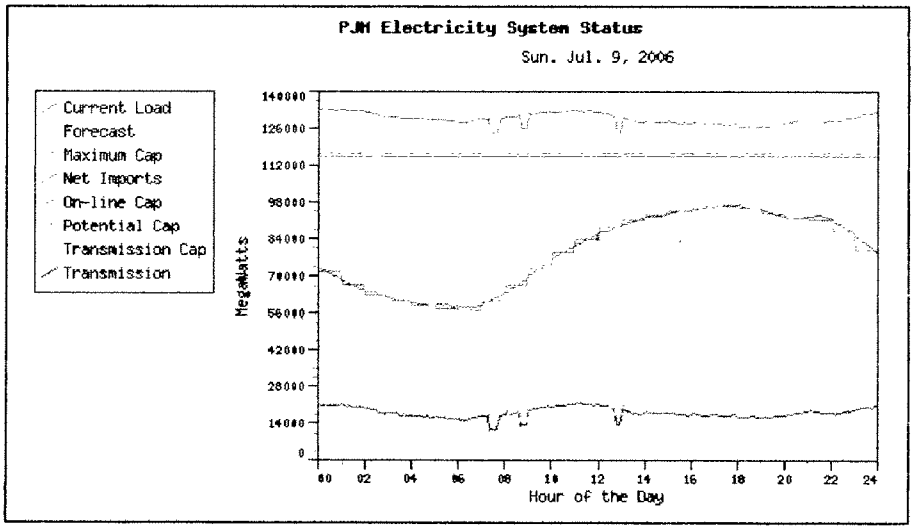
What causes these losses? One relatively minor cause is the transmission of the electricity because electricity is lost due to resistance in the transmission lines. Transmission and distribution losses in the U.S. were estimated at 7.2% in 1995 (http://en.wikipedia.org/wiki/Electric_power_transmission).

There are other sources of electricity waste, as well. The U.S. Department of Energy's Energy Information Administration (EIA) (http://www.eia.doe.gov/cneaf/electricity/epa/epat3p2.html) provides annual reports, the most recent of which showed a capacity margin as of October, 2005, of 15.4% for the contiguous U.S. The capacity margin is defined by EIA as "the amount of unused available capability of an electric power system at peak load as a percentage of capacity resources." The capacity resources at this time were 882,125 megawatts. The capacity margin is associated with the "Reserve generating capacity: Amount of generating capacity available to meet peak or abnormally high demands for power and to generate power during scheduled or unscheduled outages"; and "Reserve margin (operating): The amount of unused available capability of an electric power system (at peak load for a utility system) as a percentage of total capability".

Additionally, the Federal Energy Regulatory Commission has provided regulations for "spinning reserve" or "synchronized reserve" (http://tdworld.com/news/power_spinning_reserve_black/). Synchronized reserve (formerly spinning reserves) is capacity (generation or usage reduction) that is available in 10 minutes. It can be called upon virtually instantly to replace a power plant or transmission line that unexpectedly trips out of service (http://www.pjm.com/contributions/news-releases/2006/20060501-dr-in-ancillary-services-markets.pdf). Plants providing spinning or synchronized reserve "spin" under no-load (or partial load) conditions and are not actually producing any substantial amounts of electricity although their rotating generators are electrically connected to the grid (http://ewh.ieee.org/r7/ottawa/ea/IEEE_Stan_Seminar_v1.pdf). Power suppliers will be paid a per megawatt hour market clearing price to provide spinning reserve services - a pricing schedule that has been approved by the Federal Energy Regulatory Commission (FERC). The manager of market development for PJM stated, "We must have sufficient spinning reserve at all times to allow quick recovery from the largest single outage anticipated, and that would be the possible loss of a large nuclear unit of more than 1000 megawatts".

PJM Interconnection is a Regional Transmission Organization (RTO) which manages a regional planning process for generation and transmission of electricity. PJM Interconnection facilitates a collaborative stakeholder process. The stakeholders include participants who produce, buy, sell, move, and regulate electricity (http://www.pjm.com/index.jsp).

Until recently, PJM Interconnection supplied operational data which was updated at least every 5 minutes and made available on the PJM website. The data included the current demand (or "load"), a forecast of the "load" based on typical usage, a maximum capacity based on how many generators are available in the service area, on-line capacity based on how many generators are actually in operation, potential capacity including a reserve margin of 7% of the load, and transmission detailing the actual flow of electricity. The Lawrence Berkeley National Lab presented the PJM data as a graph, which used to be available on the website: http://currentenergy.lbl.gov/pjm/index.php.



In the graph, it is possible to observe the amount of wasted electricity, especially during time periods of non-peak usage. Using the graph for July 9, 2006, the wasted electricity for the greatest non-peak usage time was approximately 56,000 megawatts. The total amount of wasted electricity for the day was approximately 779,000 megawatts. Considering the goal of the U.S. Department of Energy's "Wind Powering America" initiative if for wind to supply 10,000 megawatts, it is obviously far more important to simply determine a method to stop wasting so much electricity every day.

Additional information provided by PJM concerns the instability in the grid caused by unreliable production of electricity by wind turbines. For example, in the PJM impact study report for the Queue #J07/K26 interconnection for the proposed Jack Mountain wind turbine facility requested by Liberty Gap Wind Force, LLC, in Pendleton County, WV, there would be a 138 kV interconnection into the Allegheny Power North Franklin substation. In the report, PJM stated that, "With outages of [any] transmission facilities in the area, output limits for the proposed project would be of the order of 35 MW to meet the dynamic performance requirements of the reliability criteria." That is, instead of being able to contribute the proposed amount of 200 MW, the site would be restricted to contributing only 35 MW because of the instability which would otherwise be created in the grid.

RESEARCH IS NEEDED FOR BETTER WIND TURBINE DESIGN, NOT JUST LARGER VERSIONS OF OLD TECHNOLOGY

Although the electrical engineering technology has advanced, wind turbines use mechanical technology that was developed over 60 years ago. The only change is that the wind turbines are much larger and taller.

Net generation of electricity in 2005 was 4,055 billion kWh. Wind contributed 17.8 billion kWh in 2005, which is less than 1% of electricity used in the U.S. (http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html).

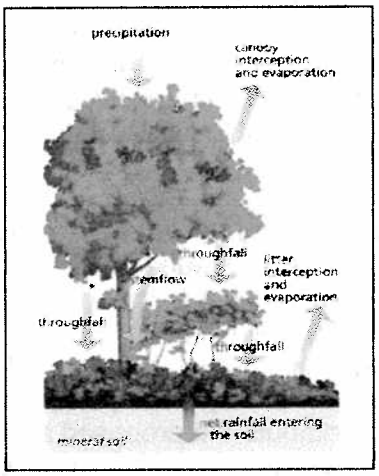
Additionally, windmills use electricity from the electric grid system, referred to as "parasitic" loads. Such parasitic loads include electricity from the grid for the electric pitch system yaw motors, oil heaters, oil pumps for bearings and gearbox, cooling van for generator and turbine controller. Unfortunately, if electricity is not supplied for these components, disasters can occur, such as ice throws when the blades are not heated during winter and total destruction of the blades if the brake does not work to stop the turbine during wind speeds exceeding 57 miles per hour.

WIND TURBINES CAUSE CUMULATIVE NEGATIVE IMPACTS

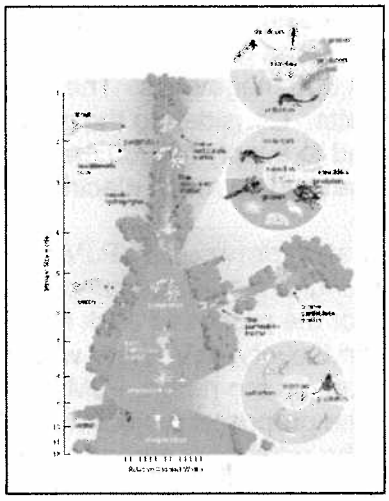
In the Appalachian mountains extending through West Virginia and adjacent states, extensive areas are cleared for windmill placement. As more mountain ridges are cleared, the negative impacts become cumulative.

The Government Accountability Office (GAO) determined in its report, "WIND POWER: Impacts on Wildlife and Government Responsibilities for Regulating Development and Protecting Wildlife", at the request of Representative Mollohan and Representative Rahall, that "no one is considering the impacts of wind power on a regional or 'ecosystem' scale" and that state and local officials have no guidelines for considering the negative environmental impacts caused by wind turbine facilities (www.gao.gov/new.items/d05906.pdf).

This equates to cumulative impacts on a watershed, such as the Tygart Valley River watershed and the Cheat River watershed (both of which are part of the Monongahela watershed). Laurel Mountain provides the headwaters for these watersheds. The overhead trees intercept rainfall so that it gently penetrates the ground as groundwater rather than flowing overland as runoff. This means that 1) the rain will gently fall to the ground and recharge groundwater and 2) the surface flow of rainwater on the ground will be slower than in cleared areas, thereby reducing the velocity and quantity of stormwater drainage. Conversely, in cleared areas, increased stormwater drainage results in habitat destruction within streams and the consequent death of aquatic organisms, including trout. The watershed headwaters are so important because they create habitats where the food chain begins: the overhead trees provide shaded areas which create conditions suitable for organisms at the bottom of the food chain - primarily insects which shred organic materials to provide organic compounds for flora and fauna downstream.



Mountaintop tree canopies protect groundwater recharge for the entire watershed.



Mountaintop headwaters are essential to the food chain.

(From "Stream Corridor Restoration: Principles, Processes, and Practices", USDA)

Federal laws were enacted because legislators recognized the critical importance of watersheds to protect against catastrophic floods:

- The Flood Prevention Act of 1944 (U.S. Public Law 78-534): and
- The Watershed Protection and Flood Prevention Act of 1954 (U.S. Public Law 83-566): one provision of this law (http://www.nrcs.usda.gov/programs/watershed/pl56631705.pdf) was for conservation and proper utilization of land. This act encompasses over 1,500 active or completed watershed projects. In 1992, the Natural Water Resources Council of the U.S.D.A. published a National Watershed Manual (http://www.nrcs.usda.gov/programs/watershed/NWSM.html).
- Section 305(b) of the Clean Water Act requires states to report to the U.S. Environmental Protection Agency on the designated uses of their waters, the extent of the impairment of those uses, and the causes and sources of impairment.

Laws were enacted in West Virginia to protect watersheds and all wildlife:

- The Water Pollution Control Act (§22-11-2) is "declared to be the public policy of the state of West Virginia to maintain reasonable standards of purity and quality of the water of the state consistent with (1) public health and public enjoyment thereof, (2) the propagation and protection of animal, bird, fish, aquatic and plant life..." and includes "setting standards of water quality applicable to both the surface waters and groundwaters of this state. The Water Pollution Control Act specifically protects against the loss of any game fish or aquatic life.
- The Groundwater Protection Act (§22-12-2) provides for the protection of groundwater because over ninety percent of the state's rural population depends on groundwater for drinking water. This Act further recognizes that "West Virginia's groundwater resources are geologically complex, with the nature and vulnerability of groundwater aquifers and recharge areas not fully known." Construction of the turbine towers includes excavating an area approximately 50 feet in diameter and at least as much as 50 feet deep. This excavation into bedrock requires blasting, which typically causes changes in groundwater flow. Additionally, the material excavated from these foundation areas must be placed somewhere, probably on the hillside. This results in disturbing the natural habitats and allowing a tremendous threat of sediment entering streams. Storm drainage ditches or ponds, as well as sediment, will cause changes to groundwater flow and will harm stream habitats. Storm water drainage channels greater quantities of surface water at greater velocities to streams. This greater quantity and velocity of water destroys stream habitats.
- The Natural Streams Preservation Act (§22-13-2), which is to "secure for the citizens of West Virginia of present and future generations the benefits of an enduring resource of free-flowing streams possessing outstanding scenic, recreational, geological, fish and wildlife, botanical, historical, archeological or other scientific or cultural values." Again, the activities associated with excavation and storm water control will negatively impact streams and thereby negatively impact geological, recreational, fish and wildlife, botanical, historical, and archeological values. This Act also provides for preservation of scenic qualities. Registered historical districts and also Civil War reenactment areas on or near Laurel would be negatively impacted by the view of windmill "farms".
- The State Natural Resources Law (§20-2-1), which assigns protection and "ownership of and title to all wild animals, wild birds, both migratory and resident, and all fish, amphibians, and all forms of aquatic life in the state of West Virginia", such that it is illegal to "kill, destroy,... wound or injure any wildlife". It is well known that unacceptably high numbers of birds and bats, including endangered species, are killed by industrial sized windmills.
- In 1997, the U.S. Environmental Protection Agency published the approximately 200-page "Volunteer Stream Monitoring: A Methods Manual" (http://www.epa.gov/volunteer/stream/), which emphasizes that watersheds are important because if natural land becomes impervious:
    - "Less precipitation is evaporated back to the atmosphere. (Water is transported rapidly away via storm drains and is not allowed to stand in pools.)
    - Less precipitation is transpired back to the atmosphere from plants. (Natural vegetation is replaced by buildings, pavement, etc.)
    - Less precipitation percolates through the soil to become ground water. (This can result in a lower water table and can affect baseflow.)
    - More surface runoff is generated and transported to streams. (Streamflow becomes more intense during and immediately after storms.)"

WIND TURBINES KILL BATS WHICH CONTROL DISEASE-CARRYING INSECTS

All bats found in West Virginia are *insectivores*, which is an animal that only eats insects. Bats often eat more than 50% of their body weight in insects each night and nursing female bats eat enough insects to equal their body weight. A single bat can eat over 4,500 insects in a single night! Because bats eat so many insects, they are a very important part of our ecosystem. The Virginia Big-Eared bat and the Indiana bat are both Federally listed endangered species known to inhabit Randolph County. Numerous species of bats inhabit Randolph and Barbour counties, as well as in most areas in West Virginia where wind projects are designated. The bats may roost in trees or near caves or ledges in warm weather, but they hibernate in local caves. The West Virginia Cave Protection Act WVC 20-7A-4 states, "It is unlawful to remove, kill, harm or disturb any plant or animal life found within any cave" (http://www.legis.state.wv.us/WVCODE/20/masterfrmFrm.htm).

THE INCENTIVES FOR WINDMILL CONSTRUCTION INSTEAD OF RESEARCH

The most recent (2007) West Virginia tax law pertaining to wind turbines restricts taxes to only as much as 79% of the salvage value of the wind turbine. Additionally, federal tax on wind turbines allows for double depreciation such that there is no tax after 5 years.

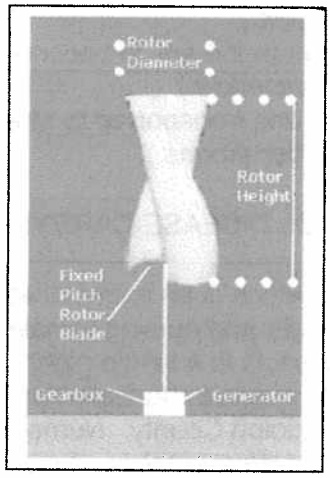
The Federal Production Tax Credit provides $0.019 per kWh of electricity estimated to be generated by a wind turbine facility during the first 10 years. A typical wind project with 50 wind turbines would make more than $5 million. AES Corporation has provided information on its website about wind investment characteristics. Concerning tax efficiency, AES points out that, "US equities optimize value of Production Tax Credit" and that there is a "Favorable tax situation in most other target country markets". Concerning cash flow, AES states that, "US equity structures projected to provide return on all capital and development fees within five years" and that, "Additional cash distributions to AES after third party equity achieves target return".

Capacity credits are awarded based on the commitment to provide electricity to PJM and the performance of generation when called upon by PJM dispatchers. Under the rule change, wind generators will receive capacity credits that they can sell to entities serving end-use customers. The sale of the capacity credits provides another source of income to the generators.

"Green Energy" brokers sell certificates for electricity produced by renewable energy sources, including wind and solar. The certificates for electricity produced by wind projects are based on the rated capacity of windmills. The brokers buy the certificates from the wind developer, who makes approximately $0.015 per kWh. This equates to as much as $5 million per year for a project with about 50 windmills rated at a capacity of 1.5 megawatts per windmill. The brokerage companies, such as Bonneville Environmental Foundation and Community Energy, Inc. are reaping great profits. Wind plants do not reduce the number of coal-fired electrical generating plants. Considering that carbon dioxide continues to be emitted by coal-fired backup plants, the green energy certificates are essentially meaningless and constitute a scam on the American public.

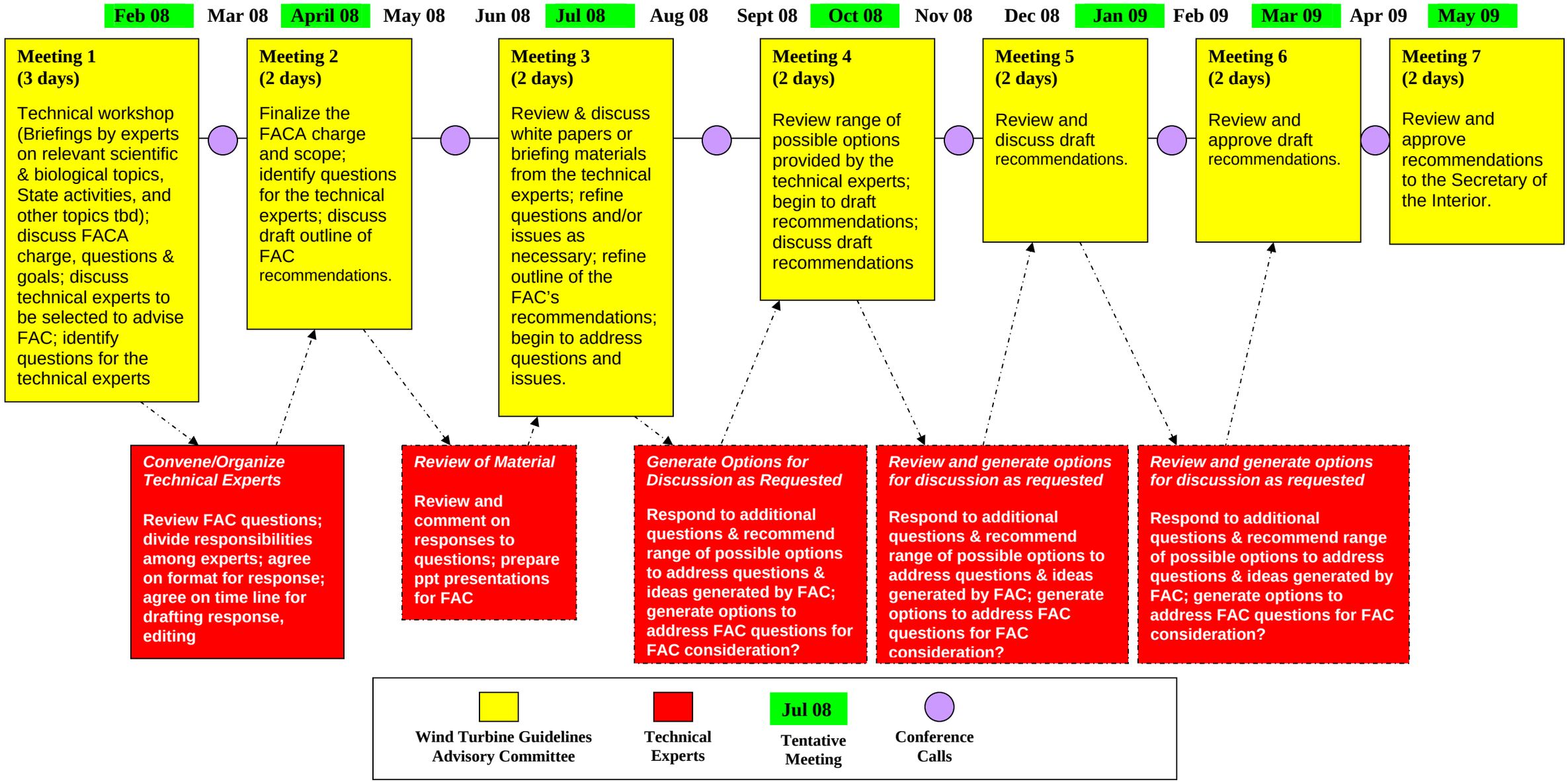
The West Virginia legislature needs to insure that the Public Service Commission is evaluating the proposed wind turbine facilities according to their cumulative effects. As more mountain ridges are clear cut for the wind turbines, cumulative negative environmental impacts will occur and will have lasting results. Additionally, state and federal agencies should be required to review siting applications with regard to existing laws and these agencies should enforce the existing laws.

Research is needed to explore new turbine technology. Such research has produced vortex turbines (http://www.eco-nex.com/32.html), which are urban micro wind turbines designed to work in unpredictable conditions. Additionally, incentives should be provided for conservation and for residential windmills, which have the capacity to store energy in batteries.



VORTEX WIND TURBINE

Draft Road Map for Wind Turbine Guidelines Advisory Committee



Number of meetings and conference calls is subject to the needs of the Committee

Index to the Draft Road Map for Wind Turbine Guidelines Advisory Committee

Wind Turbine Guidelines Advisory Committee
(Decision makers)

- Federal Agencies
- States
- Tribes
- Wind Industry
- NGO's
- Academics
- Utilities

Possible roles for the Committee

- Develop ***consensus*** recommendation in response to Secretary's charge to the Committee
  - Select Technical Experts
  - Charge to Technical Experts
  - Review and develop recommendations based on technical expert input via white papers and briefings

Technical Experts
(Advise Committee on technical issues)

- Federal/state/ngo/industry-technical experts
- Academics
- Consultants
- Wind Turbine Guidelines Advisory Committee Members

Possible roles for the Technical Experts:

- Review and assess existing data, including methodologies and findings, and draft ***consensus*** white papers and other briefing materials for Committee including all points of view
  - Assess risk factors identifiable from existing data
  - Review and assess available study methodologies (pre and post-construction), including role for peer review
  - Identify possible existing sources of information relevant to (project) risk assessment
  - Identify methods of distinguishing between critical and non-critical risk issues
  - Review and assess mitigation and adaptive management techniques

US Department of the Interior

Wind Turbine Guidelines Advisory Committee

Draft Groundrules

1. PURPOSE

The Committee charter describing the scope of the committee states:

"The Committee will provide advice and recommendations to the Secretary of the Interior (Secretary) on developing effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy facilities."

Further, the duties of the Committee are to provide advice and recommendations to the Secretary on:

a. the Service interim guidelines on how to avoid and minimize wildlife impacts from land-based wind energy facilities;
b. balancing potential impacts to wildlife with the cost of acquiring the information necessary to assess those impacts prior to selecting sites and designing facilities;
c. the scientific tools and procedures best able to assess pre-development risk or benefits provided to wildlife, measure post-development mortality, assess behavioral modification, and provide compensatory mitigation for unavoidable impacts; and,
d. a process for coordinating State, tribal, local, and national review and evaluation of the impacts to wildlife from wind energy facilities to standardize approaches and requirements, and achieve compliance with State and Federal laws and international treaties.

2. AUTHORITY

The Secretary has determined that the establishment of the Committee is in the public interest. The Committee is subject to the Federal Advisory Committee Act (FACA) as outlined in its Charter approved by the Secretary.

3. PARTICIPATION

a. The Wind Turbine Guidelines Advisory Committee. The Secretary will appoint committee members (Members) who can effectively represent the varied interests associated with a cross section of the interests that would be substantially affected by the issues to be addressed in development of wind power on shore in the United States. [See attached list]

b. Membership. Each Member must make a good faith effort to attend each full Federal Advisory Committee meeting (FACA meeting). The Member may be accompanied by such other individuals as that Member believes is appropriate. Alternate members may be selected and appointed by the Secretary. Alternates will attend FACA meetings as a member of the Committee only in the absence of the primary member. The Secretary may remove a Member of the Committee.

c. Chairperson/Designated Federal Official (DFO). The Chief of the Division of Habitat and Resource Conservation, Fisheries and Habitat Conservation, shall serve as Chairperson of the Committee and as the DFO. The Chairperson's responsibilities include establishing Committee priorities, opening and closing FACA meetings, approving agendas and certifying meeting summaries in consultation with the Committee, and other duties identified in the Committee Charter and Groundrules. Additionally, the DFO represents the Director, U.S. Fish and Wildlife Service, on the Wind Turbine FACA Committee and is the government's agent for all matters related to the Committee's activities.

d. Constituents Interests. Committee Members are expected to ensure that all significant issues and concerns are fully and clearly articulated during the FACA meetings, and that any agreement developed by the Committee is acceptable to the constituency that the Committee Member represents.

4. MEETINGS

a. Open Meetings. FACA meetings will be announced in the *Federal Register* prior to the meeting and, consistent with FACA requirements; will be open to the public. The public will be given opportunities at designated times during each meeting to make comments, raise questions, or submit materials for the record. A Member may lend his or her designated speaking time to a non-member in attendance with approval from the DFO.

b. Communication. Members are encouraged to communicate their opinions, ideas and concerns openly in order to foster a dialogue that will lead to the best possible decisions.

c. Video or Audio Recordings. The Members respectfully request that the Committee be notified of any audio or video recording of Wind Turbine Advisory Committee discussions.

d. Minutes. The DFO will approve the meeting summary prepared by the facilitator for each FACA meeting. The minutes will include a record of the persons present, including Members and the public who make written or oral presentation, and a description of the matters discussed and conclusions reached, including copies of all reports and other documents received, issued, or approved by the

Committee at the FACA meeting. Draft meeting summaries, prepared by the facilitator, will be circulated to Members for accuracy. Final meeting summaries will be made available to the public by request. Committee information will also be accessible through the US Fish and Wildlife Service Website.

e. Agenda. Preliminary FACA meeting agendas will be developed by the DFO in consultation with the Members. The preliminary agenda will be reviewed at the beginning of each meeting and will be revised, if necessary.

f. Caucus. Any Member can declare a break at any time subject to the DFO's approval. Members will be asked for an estimate of the time needed for the caucus.

5. DECISIONMAKING

a. Consensus. The Committee will operate by consensus of all Members present. Consensus is defined as "each Committee member can live with a decision being considered by the Committee". If a Member does have a major objection, the Member should make a serious effort to propose a reasonable alternative to the decision. All Members should remain at the table during deliberations to hear the full discussions in order to make informed judgments when decision making occurs. At the end of the process, in the event that consensus is not reached, a summary of the issue will be prepared by the facilitator, in consultation with the Members, and forwarded as part of the full set of recommendations to the Secretary.

b. Subcommittees. Subcommittees may be formed to address specific issues and to make recommendations to the Committee. Subcommittees can consist of Members and/or their designated alternates, as well as invited technical experts. Technical experts will be reviewed and agreed on by the Members before participating in Subcommittee meetings or conference calls. Subcommittees are not authorized to make decisions for the Committee as a whole. All Members will be notified of all Subcommittee meetings. Subcommittees will be asked to provide reports to the Committee in writing and through an oral briefing, when possible. Subcommittees will be asked to reach consensus. If the Subcommittee is not able to reach consensus, the facilitator will work with Subcommittee to provide a clear and concise explanation of the various Subcommittee views to the Members.

c. Discontinue Committee Discussions. The Committee may discontinue discussions at any time if they do not appear productive. In this event, the Secretary will continue to develop the guidance in the traditional manner.

6. AGREEMENT

a. Product. The Committee will report to the Secretary through the Director, U.S. Fish and Wildlife Service, and will function solely as an advisory body. The Committee will provide recommendations and advice to the Department and the Service on developing effective measures to protect wildlife resources and enhance potential benefits to wildlife that may be identified from wind power development. The product will include a list of the issues addressed by the Committee, what the Committee learned about the issues, and recommendations that address the issues. The Agreement of the Committee or any written document or other product(s) of the Committee intended for delivery to the Secretary will include appropriately authorized signatures from Wind Turbine Advisory Committee.

b. Use of Product. The Secretary, through the Director of the U.S. Fish and Wildlife Service, agrees to use the Committee's written agreement as the basis of his or her guidance to the maximum extent possible consistent with the Agency's legal obligations.

c. Final Guidance. So long as it is consistent with federal law, the Secretary also intends to promulgate final guidance consistent with the Committee's written recommendations, unless new information or comments submitted in response to the Notice of Proposed guidance require changes.

d. Support for the Agreement. All Members represented on the Committee agree that once the Committee's final consensus recommendation is submitted to the Secretary, each Member will honor that agreement by taking positions in other forums that are consistent with the agreement.

7. SAFEGUARDS FOR THE PARTIES

a. Good Faith. All parties agree to act in a good faith effort to reach agreement in all aspects of these discussions. Specific offers, positions, or statements made during the discussions may not be used by other parties for any purpose outside the discussions or as a basis for future or in current litigation. It is the intent of the Committee that other attendees of the Committee's meetings also voluntarily comply with this provision. This is intended to support the Wind Turbine Advisory Committee process by encouraging the free and open exchange of ideas, views, and information prior to achieving consensus. Personal attacks and prejudiced statements will not be tolerated.

b. Right to Withdraw. Any party may withdraw from the discussions at any time. However, prior to withdrawing the Member will communicate to the Committee the reasons for withdrawal in person, if practical. In the event a Member withdraws, their designated alternate will become the Member.

c. Other's Positions. No party will characterize the position of any other party in public statements or in discussions with the press, even if that party withdraws from the discussions. To the extent feasible, parties will refer others to the meeting summaries for information about the Committee's deliberations.

d. Information.
(1) All parties agree to share all relevant information to the maximum extent possible. If a party believes it cannot or should not release relevant information (e.g. because of its confidential or proprietary nature), it will provide the substance of the information in some form (such as by aggregating data, by deleting non-relevant confidential information, by providing summaries, or by furnishing it to a neutral consultant to use or abstract) or it will provide a general description of it and the reason for not providing it directly.
(2) Parties will provide information called for by this paragraph as much in advance of the FACA meeting at which such information is used as possible.
(3) All parties agree not to divulge information shared by others in confidence.
(4) To the extent possible electronic communication will be used throughout the FACA process. If Members do not have adequate access to electronic communication, other arrangements will be made.

8. SCHEDULE

FACA meetings will be held approximately four – six times/year, as determined by the Committee. Unless extended by the Secretary through the Director, U.S. Fish and Wildlife Service, the deadline for the discussions is _____. The Committee is chartered until March 13, 2009.

9. FACILITATOR(S)

a. Facilitator. Abby Arnold of RESOLVE will serve as the Facilitator and will work to ensure that the process runs smoothly. The role of Facilitator usually includes developing draft agendas, facilitating Committee and Subcommittee discussions, working to resolve any impasses that may arise, preparing meetings summaries, assisting in the location and circulation of background materials the Committee develops, and other functions the Committee requests. The Facilitator will take no positions on the issues before the Committee and serves at the will of the Committee.

Wind Turbine Guidelines Advisory Committee:
Recommendations to Committee

These recommendations have been synthesized from presentations made at the Wind Turbine Guidelines Advisory Committee technical workshop, February 26-27, 2008.

Suggested Research Priorities/Research Needs

- Better synthesis of existing information

- Fatalities and habitat-related impacts in unstudied and new locations and unstudied species are needed
- Estimation of exposure for nocturnal migrating passerines and bats
- Habitat fragmentation and cumulative impacts
- Models for prediction of impacts and risk
- Determine mitigation effectiveness
- Cumulative impacts - linkage of fatality and non fatality impacts to population dynamics and biological significance

Recommendations for Guidelines

Monitoring

- Studies should be based on specific objectives and use appropriate methods, metrics, and study design – "one-size does not fit all"
- Predictions are best made using empirical data on relative abundance and fatalities from existing facilities – models need verification
- Monitoring should use tools that have been evaluated and provide useful data to meet monitoring objectives
    - Continue evaluation (radar, NEXRAD; e.g. TX coast study)
    - Develop new tools (acoustic, IR, chemical and genetic markers)
- Use new developments in areas of uncertainty as learning opportunities

Paul Cryan

- Major Areas of Uncertainty
- How do we stop or minimize fatalities?
    - Mitigation methods need rigorous testing/development
- How can we better assess fatality and causes?
    - Hindered by lack of standardized, validated methods and the short-term nature of most studies
- Can we predict high-risk sites before construction?
    - Correlation between pre- and post- monitoring
    - Better understanding habits of affected species
- Are bats attracted to turbines?

- Will the affected species persist?

- Mick Erickson

- Challenges with current guidelines
- The current guidelines are voluntary.
- Service is not involved in the pre-planning of wind projects.
- Jurisdiction and private property
    - Lack of state laws or guidelines
    - Federal nexus versus no connection
    - Lack of adequate staff and funding to coordinate and act on all wind projects.
- Required research? How much? What kinds? Timing concerns. BACI research is fine but we tend to chase turbines
- Whatever guidelines we adopt, keep in mind that we may be jeopardizing landowner relationships, perpetual habitat preservation, and other future conservation opportunities.

Deb Hahn

- Need a strong facilitator during guidance development
- Set up ground rules prior to first meeting
    - Include desired outcome
    - Timelines to submit new information to be discussed at meetings
- Meet with members prior
    - ability to adhere to ground rules
    - ability to negotiate/compromise
    - ability to take broad view

- **For Consideration by the Advisory Committee**
- Work together from the beginning
- Discuss opportunities/options for mitigation
- Consider bird, bat, and habitat issues
- State guidelines are not necessarily considered by industry
- Consider cumulative local and regional effects
- Different amounts of authority within states
- How can states participate and be a partner in the national-level guidelines?
- Create an link between wind incentives and conservation
- Consider regulatory guidelines
- Discuss a funding source for research
- Consider how to deal with private lands.
    - Selected References
- National Research Council of NAS – Environmental Impacts of Wind-Energy Projects

- The Wildlife Society – Impacts of Wind Energy Facilities on Wildlife and Wildlife Habitat
- National Wind Coordinating Committee –
    - Studying Wind Energy/Bird Interactions: A Guidance Document
    - Nocturnal Methods and Metrics

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A Summary of Avian/Wind Facility Interactions in the US

Dr. Dale Strickland and Dr. Michael Morrison

February 26, 2008

Wind Turbine Guidelines Advisory Committee

Washington, DC

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