BAT CONSERVATION INTERNATIONAL

Written Statement of
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Oversight Hearing on
"Gone with the Wind: Impacts of Wind Turbines on Birds and Bats"

Before the
Subcommittee on Fisheries, Wildlife, and Oceans
U.S. House of Representatives Committee on Natural Resources
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Introduction

Madam Chairwoman and Members of the Subcommittee, my name is Ed Arnett, Conservation Scientist and Co-Director of Programs for Bat Conservation International (BCI). I am also the program coordinator for the Bats and Wind Energy Cooperative (herein referred to as "the Cooperative") an alliance of state and federal agencies, private industry, academic institutions, and non-governmental organizations interested in cooperating to develop solutions to minimize or, where possible, prevent mortality of bats at wind facilities. The Cooperative was initiated by BCI, U.S. Fish and Wildlife Service (USFWS), the American Wind Energy Association (AWEA), and the Department of Energy's National Renewable Energy Laboratory (NREL) and is supported financially by these entities and a diversity of stakeholders including wind industry companies, clean state energy funds, and private individuals and foundations. The Cooperative seeks to secure and administer cooperative funding among interested parties and allocate those resources to promote research needed to address issues and develop solutions surrounding wind energy development and fatality of bats. I studied bat presence and habitat relationships in Oregon for eight years while serving as a research biologist for Weyerhaeuser Timber Company and for my Ph.D. dissertation research. I have led research efforts for the Cooperative since May 2004, which includes post-construction fatality searches at the Mountaineer, West Virginia and Meyersdale, Pennsylvania facilities, pre-construction assessments of bat activity at multiple sites in Massachusetts, Pennsylvania, and Wisconsin, and investigations on possible acoustic deterrent devices that may reduce fatality of bats at wind facilities. I currently am Chair of a technical review committee on wind energy impacts on wildlife for The Wildlife Society (final report due for public release by early summer 2007), serve as a committee member for the Wind and Wildlife Subcommittee for the Association of Fish and Wildlife Agencies, and provide technical input on bats and wind energy issues to several agencies, organizations, and private industry.

I am here at your request and appreciate the invitation to discuss impacts of wind energy development on bats and address questions from the Subcommittee. In my invitation, I was asked to address four topics and, after providing background information, I will focus most of my comments on these specific areas. My testimony is provided on behalf of BCI and my comments may not necessarily reflect the opinions of all entities associated with the Cooperative.

Background

Fatalities of bats have been recorded at wind facilities worldwide, first noted in Australia in 1972 by Hall and Richards (1972). Before 2001, relatively small numbers of bat fatalities were reported at wind energy facilities in the U.S. (Johnson 2005). These were first noted at facilities in California during avian fatality searches (e.g., Orloff and Flannery 1992). However, bat kills at wind facilities generally received little attention in North America until 2003 when between 1,400 and 4,000 bats were estimated to have been killed at the Mountaineer Wind Energy Center in West Virginia (Kerns and Kerlinger 2004). During that same year, a high kill rate of bats also was discovered at Buffalo Mountain in Tennessee in 2003 (Fiedler 2004).

Shortly after the reports from Mountaineer and Buffalo Mountain in 2003, representatives from the AWEA, BCI, NREL, and the USFWS met in late 2003 and established the Cooperative to further understand causes of bat fatalities at wind facilities and work toward developing solutions. A two-day workshop was held in February 2004 that brought together leading experts on bat ecology, radar and thermal imaging technology, and avian acoustical monitoring from the United States, Canada, and the United Kingdom. Experts concluded that causes and solutions would be extremely difficult to identify without more reliable information about 1) bat migration; 2) bat interactions with turbines, particularly their responses to moving versus non-moving blades and how they are being killed; 3) patterns of fatality in relation to location, topography, weather, and turbine characteristics; and 4) potential deterrents and/or avoidance mechanisms. Based on the recommendations of its experts, the Cooperative under took field research during the summer of 2004 to improve carcass search protocols and observe bat interactions with turbines. The Cooperative also has conducted extensive pre-construction assessments of bat activity at multiple sites in Massachusetts, Pennsylvania, and Wisconsin, and initiated investigations on possible acoustic deterrent devices that may reduce fatality of bats at wind facilities.

Since the inception of the Cooperative, we have learned that high bat fatality continued at the Mountaineer facility in 2004 (Arnett 2005) and that this site was not an isolated incident in the eastern U.S.; large kills also were reported at facilities in Pennsylvania in 2004 (Arnett 2005) and high fatality rates have continued at the Buffalo Mountain facility in Tennessee (J. Fiedler, Tennessee Valley Authority, personal communication). Colleagues in Europe also have reported widespread bat fatality at wind facilities, especially in Germany (Dürr and Bach 2004, Brinkman 2006), and, most recently, much higher than expected bat fatalities were discovered in mixed forest and agricultural lands in New York (Jain et al. 2007) and in open prairie in southern Alberta Canada (Robert Barclay, University of Calgary, unpublished data). Incidental discoveries by ornithologists in Oklahoma indicate that the Mexican free-tailed bat, the most abundant and economically valuable species of the Southwest, also is vulnerable to wind turbine kills (Piorkowski 2006), yet no formal studies have been conducted in this region.

While current estimated fatality rates of bats are highest for sites located on forested ridges (Johnson 2005, Kunz et al. 2007), it is now irrefutable that increased search efforts since the 2003 findings at Mountaineer have documented a more widespread problem than previously believed. These fatalities raise serious concerns about potential impacts on bat populations at a time when many species of bats are known or suspected to be in decline (Pierson 1998, Racey and Entwistle 2003) and extensive planning and development of wind energy is increasing throughout North America (Kunz et al. 2007). Future developments of wind energy facilities, and expected impacts, depend on complex interactions of economic factors, technological development, regulatory changes, political forces, and other factors that cannot be easily or accurately predicted at this time (Kunz et al. 2007). Current and projected fatality rates should provide an important wakeup call to agencies, developers, and decision makers to support additional monitoring and hypothesis-based research to address a growing concern of national and international importance.

Topics Requested by the Subcommittee

1) What steps are being taken by federal and state governments to ensure that this emerging technology is appropriately sited and monitored to limit or prevent the incidental take of bats, especially T&E species?

Key Points:

- There currently is little empirical evidence to determine what represents "appropriate siting" of wind facilities for bats. Extensive research in this area is needed immediately.
- Criteria and standards need to be established, determined based on the best available information, for high risk areas for bats (and other wildlife) that can be integrated into siting guidelines among states or regions so these areas can be protected in a consistent manner.
- Although there is a paucity of empirical evidence supporting actions to limit or prevent incidental take of bats, what evidence and recommendations are available (e.g., curtailment of operations during predictable high risk periods) have not been implemented and remain untested.
- Some states are beginning to integrate mitigation measures into permits (e.g., limited curtailment during low wind periods when most bats kills occur), but these measures still have not been tested in the field.
- Bats usually are protected under state laws pertaining to "nongame" animals, but most states do not enforce take of bats. Bats that have been killed most frequently by wind turbines are not protected under federal law.
- There are no consistent guidelines or processes for siting, permitting, or monitoring and little commonality among states, although several states have embarked on developing voluntary guidelines for siting and monitoring wind facilities.
- Numerous steps have been taken to improve working relationships, cooperation, and information exchange that include developing and participating in state and national working groups, research partnerships, and greater involvement in consultation during permitting.

Federal resource and land management agencies, non-governmental organizations, contractors, developers, and utilities have dominated the discussion about wildlife interactions with wind energy facilities. Until recently, state fish and wildlife agencies have not been deeply or proactively involved. This limited participation reflects a variety of factors, including more immediate management priorities, lack of fiscal and human resources, and the limited regulatory authority to apply wildlife considerations to these decisions. These facts notwithstanding, wind energy permitting and regulation in most of the U.S. is primarily the responsibility of state and local governments, and wildlife agencies have served only in an advisory capacity with no regulatory authority. Often times, wildlife agencies are not consulted or their recommendations considered during permitting. This situation is beginning to change, as several states have embarked on developing guidelines for siting and have set up wind working groups to address issues and advise legislators and regulators about the potential impacts and benefits of wind development, including effects on wildlife resources.

Unfortunately, there currently is little commonality from state-to-state regarding permitting or requirements for pre- or post-construction monitoring. While several states have embarked on developing guidelines for siting, consistency and coordination among states is critical and as yet rare. Developing consistent guidelines for siting, monitoring and mitigation strategies among states and federal agencies would assist developers with compliance with relevant laws and regulations and establish standards for conducting site-specific, scientifically sound biological evaluations. Renewable Portfolio Standards should account for wildlife impacts and inclusion of guidelines in the permitting process would further strengthen agency participation and implementation of guidelines. Permits for wind projects should

contain language regarding monitoring and mitigation requirements; recently, some states have integrated these requirements into permits (e.g., curtailment for a specified period of time and under certain conditions), although mitigation measures remain untested and some may be inadequate.

Criteria and standards need to be established, determined based on the best available information, for high risk areas for bats (and other wildlife) that can be integrated into siting guidelines among states or regions so these areas can be protected in a consistent manner. An unfortunate reality is the fact that if a responsible developer decides to abandon a particular site because of environmental sensitivity, there are no state or federal regulations or guidelines that prohibit another developer from pursuing a wind project on that site. Unless the playing field is leveled and all developers are held accountable equally, through regulation or guidelines that are linked to permitting, renewable portfolio standards, and the Production Tax Credit, sensitive, high risk sites could be developed in the future.

The USFWS issued voluntary guidelines in 2003 to avoid and minimize wildlife impacts by wind turbines and consults with industry on project scope and issues, recommends studies and relevant information, reviews/comments on studies and applications, makes recommendations and coordinates with state regulatory and authorizing entities and interested parties. When incidental take is likely to occur, the USFWS recommends to the developer that a Habitat Conservation Plan be prepared pursuant to Section 10(a)(1)(B) of the Endangered Species Act, the preparation of which is voluntary. The Service also advocates for implementation of a pre-filing 3-stage consultation process that would include 1) scoping of wildlife issues, 2) studies to address issues raised in scoping, and 3) review of study results and recommendations. This is the same process codified in FERC regulations for hydroelectric projects (18 CFR 4.38).

State and federal agencies and other stakeholders have participated with processes like the National Wind Coordinating Committee and have sponsored or participated in conferences, workshops, and symposia at professional meetings. Federal and state agencies also have joined with other stakeholders in research partnerships like the Bats and Wind Energy Cooperative (http://www.batcon.org/home/index.asp?idPage=55) and the NWCC facilitated Grassland and Shrub Steppe Species Collaborative (http://www.nationalwind.org/workgroups/wildlife/gs3c_overview.pdf). These efforts are important, positive steps, but state and federal agencies require more support, including funding, to effectively participate in these endeavors.

Wind energy is expanding rapidly within the range of threatened and endangered species of bats such as the Indiana bat (*Myotis sodalis*), the gray bat (*Myotis grisescens*), and the Virginia big-eared bat (*Corynorhinus townsendii virginianus*). Although no threatened or endangered species have been found killed at existing wind facilities, not all sites have been searched thoroughly or for multiple years, and bats are very difficult to find during searches. Most biological assessments conducted at existing and proposed facilities have used literature searches, limited site visits and survey efforts, and present habitat conditions to speculate the potential impact on threatened and endangered species of bats; interestingly, almost all conclude no impacts with limited empirical evidence for support. New evidence from radio-telemetry studies in Pennsylvania and New York suggests that Indiana bats travel considerable distances across ridges and may in fact be at risk given their flight paths from hibernacula to summer habitat (see http://www.pgc.state.pa.us/pgc/lib/pgc/reports/2006_wildlife/71402-05.pdf for an example). Continued development of wind facilities will likely pose risks to these species and increase the probability of take. Some species could be pushed to threatened or endangered status resulting proximately, ultimately, or independent of wind energy development. More studies are needed to fully elucidate risk of all bats, including endangered species.

Better Coordination and Integration is Needed. Given projected increases in multiple sources of energy development, including biomass, wind, and oil and gas development, future conflicts surrounding land-use, mitigation, and conservation strategies should be anticipated. Habitat mitigation options, for example, when developing wind in open prairie may be compromised by development of other energy sources. State and federal agencies must partner with multiple stakeholders to implement regional assessments of existing and future land uses. Planning regional conservation strategies among industries, agencies and private landowners could reduce conflicts and increase options for conservation. Comprehensive monitoring and research programs are needed to gather required information to develop better siting guidance and mitigation strategies in the immediate future.

2) What is the status of bat populations?

Key Points:

- Little is known about historical or current populations of most species of bats, but many are believed to be in substantial decline.
- Bats are long-lived and have exceptionally low reproductive rates, population growth is relatively slow, and their ability to recover from population declines is limited.
- Although population impacts are unknown, given the level of fatalities at some wind facilities significant cumulative impacts must be considered for some species.
- Some species could be pushed to threatened or endangered status resulting proximately, ultimately, or independent of wind energy development.

More than 1,100 species of bats worldwide account for nearly a quarter of all mammals, yet their populations are poorly understood. Many populations have been extirpated or have declined alarmingly (O'Shea and Bogan 2003). Eastern red bats, for example, are one the most frequently killed species, yet are already reported to be in decline (Whitaker et al. 2002, Carter et al. 2003, Winhold et al. 2005). There are nine species or subspecies of bats in the U.S. and territories that are listed as endangered under the U.S. Endangered Species Act, and 24 that are designated as species of concern (formerly Category 2 candidates for listing under the ESA; O'shea and Bogan 2003). Like birds, bats play essential ecological roles in maintaining the balance of nature. However, as previously mentioned, unlike birds, bats that are most frequently killed by wind turbines are not protected under federal law and, although bats usually are protected under state laws pertaining to "nongame" animals, most states do not enforce take of bats.

Little is known about historical or current populations of most species of bats. Better information exists for species of bats that primarily use caves for either winter hibernation (e.g., gray and Indiana bats) or summer maternity roosts (e.g., Mexican free-tailed bat). Most experts base inferences on population trends from indices on changes in capture rates over time, winter counts at hibernacula, trends in habitat loss or protection, and public submissions of species for examination by state health departments (e.g., Carter et al. 2003). Unfortunately, current techniques are ineffective to quantify populations and no long-term studies exist for documenting changes in trends of tree- and foliage-roosting species of bats (Carter et al. 2003).

Bats are long-lived and have exceptionally low reproductive rates (Kunz 1982), population growth is relatively slow, and their ability to recover from population declines is limited, thereby increasing the risk of extinctions (Barclay and Harder 2003, Racey and Entwistle 2000, 2003). Habitat loss and degradation, disturbance and/or loss of roosts, and persecution by fearful humans have contributed greatly to the decline of many species of bats (Kunz 1982, Pierson 1998, Racey and Entwistle 2003). Fatality of bats at wind turbines has been recognized only recently as a major conservation concern. Although population

impacts are unknown, given the level of fatalities thus far documented at wind facilities, biologically significant additive mortality must be considered for some species as wind power development expands and fatalities accumulate (Kunz et al. 2007). As previously mentioned, some species could be pushed to threatened or endangered status resulting proximately, ultimately, or independent of wind energy development.

Kunz et al. (2007) projected numbers of bat fatalities in the Mid-Atlantic Highlands from wind turbines expected in to be installed by 2020 (installed capacity of 2,158 MW based on National Renewable Energy Laboratory WinDS Model for the Mid-Atlantic Highlands for the year 2020 [http://www.nrel.gov/analysis/winds/]); they projected 32,818 to 64,281 would be killed in just one year in this region under the assumptions used. The potential for serious cumulative impacts is obvious in just this one region and when considering all regions continent-wide and over the full life of a project (20-25 years), the numbers escalate rapidly and heighten concerns.

3) To what degree does industry account for bats in their preliminary planning and subsequent construction and operation of wind turbines?

Key Points:

- Pre-construction studies are inconsistently implemented across states, ranging from no effort to intensive studies, but are typically short duration, lack clearly stated objectives, and are under funded to adequately evaluate true risks to bats and other wildlife.
- Correlations between pre-construction monitoring data and post-construction bat fatality rates currently do not exist, seriously limiting our understanding of risks.
- Post-construction studies vary in duration and intensity and often are seriously biased depending on how well investigators design the study and account for field sampling biases (e.g., searcher efficiency, scavenger removal, habitat variation, seasonality).
- Industry has collaborated with partnerships such as the Bats and Wind Energy Cooperative to conduct needed research to understand issues and develop and test mitigation strategies.
- There is an immediate need to increase support for research programs that address priority needs for pre-and post construction monitoring and to develop and test mitigation strategies.

Pre-construction. Industry has performed pre-construction studies, but there are no consistent requirements and level of effort ranges from no work to extensive studies, the later being a rare extreme (see Arnett et al. 2006 as an example). Pre-construction studies have lacked consistent implementation of methods and often are fundamentally flawed in a number of ways. They are typically short duration, lack clearly stated objectives, and are under funded to adequately evaluate true risks to bats and other wildlife. Pre-construction surveys for bats commonly employ mist nets and acoustic detectors to assess local bat species presence and activity. However, using this information to predict bat fatality and, thus risk at a site has proved to be challenging. Mist netting may be useful for determining presence of a species on site, but multiple surveys are required (Weller and Lee 2007) and mist netting does not confirm absence of a species. Unfortunately, past and current efforts to acoustically monitor bat activity prior to construction of turbines may suffer from flaws in study design, including small sample sizes, poor temporal and spatial replication, and inappropriate inference because limitations and assumptions were not understood or clearly articulated (Hayes 2000). Also, there is a lack of information and lack of agreement among stakeholders, biologists, and scientists regarding what constitute different levels of risk in relation to bat activity and potential fatality of bats at wind facilities. Perhaps most importantly, we currently are unaware of any study that has correlated pre-construction monitoring data with post-construction fatality, a fundamental link necessary for extrapolating pre-construction data to predict potential risk of wind facilities to bats. More extensive pre- versus post-construction

comparisons are urgently needed to understand risk-levels and to develop criteria for high risk sites that should be avoided.

Post-construction. At least some post-construction monitoring for birds has been conducted at most existing wind facilities, though bat fatalities were typically recorded only incidentally. Nevertheless, bat kills have been documented at almost every facility where post-construction searches were conducted. However, until recently, efforts to specifically estimate bat fatality rates have been rare. Criticism of survey protocols used in past efforts centers on field sampling biases (e.g., small sample sizes, poor accounting for carcass removal by scavengers and searcher efficiency, and failure to account for detectability among habitats) that can profoundly bias the number of estimated fatalities. Searches are typically conducted at seven, 14 or 28-day intervals, and often do not adequately account for scavenger removal rates or searcher efficiency. During an intensive 6-week study at Mountaineer, West Virginia, scavengers removed up to 70% of killed bats within 24 hours, and at Meyersdale, Pennsylvania, searcher efficiency averaged only 25% on this heavily vegetated site (Arnett, 2005). With few exceptions, post-construction studies are conducted for just 1-2 years.

Both pre- and post-construction studies have lacked standardized procedures, thus making it impossible for broad comparisons that could facilitate an understanding of potentially cumulative impacts or of the relative risks associated with varied habitat and topography. Most have been conducted without adequate peer review of methodology, results, or interpretations of findings, and few studies have been published in the scientific literature, although that trend is starting to change.

It is critical that future post-construction monitoring be conducted using standard protocols for consistency so as to facilitate broad comparisons among facilities. Daily searches are required at some turbines in order to correlate fatality with weather variables. This is important because several studies have reported that most bat fatalities occur on low wind nights (Fiedler 2004, Arnett 2005, Brinkmann 2006) and understanding these patterns will help determine predictable periods of high fatality for implementation of mitigation measures such as curtailment of operations. More research is needed on fatalities in regions with existing wind facilities that have been poorly studied (e.g., eastern forested ridges, the southwest) and regions with new developments (e.g., coastal areas). There is an urgent need for increasing support for comprehensive, interdisciplinary research programs that address priority needs to quantify risks and document the success of potential solutions. Funding should emphasize cooperative efforts among private organizations, industry, and government agencies.

4) What legislative actions might Congress consider to ensure that an expansion of wind energy does not come at an unnecessary expense to bats and other wildlife?

Federal funding. Perhaps the most important and immediate legislative action involves funding support at two broad levels: 1) agency support for environmental review, permitting, and oversight; and 2) research initiatives to quantify impacts and find and test solutions.

Wind energy development is relatively new and emerging wildlife issues have created financial burdens on federal agencies responsible for public trust resources. It is our opinion that the USFWS, for example, is grossly understaffed and under funded to effectively handle the onslaught of permits for wind development on both private and public lands. As wind energy has now expanded beyond private lands and onto public lands, the Nation's resource management agencies, most notably the Bureau of Land Management, U.S. Forest Service, and Mineral Management Service, have now been dealt an additional land use objective that requires environmental review, permitting, and monitoring to evaluate and reduce environmental impacts and protect public trust resources. Unfortunately, land management agencies already are facing budget constraints and simply cannot deal effectively with a new management issue

like wind energy permitting without funding and staffing in addition to an already constrained situation. This situation creates potential threats to wildlife and costly delays for industry. Stream-lining or eliminating processes for environmental review on the impacts of wind energy on wildlife are unacceptable and both state and federal agencies need support to adequately participate.

Second, we sorely lack the scientific information required to make decisions. Federal funding has been minimal and sporadic at best and additional appropriations to support research initiatives will be critical in the immediate future. This should include appropriations to all federal agencies involved with wind energy development, and also to the National Science Foundation, National Fish and Wildlife Foundation, and other appropriate venues for supporting much needed research on wind energy and wildlife.

A second approach would involve establishing a federal fund for priority research on the impacts of wind energy on wildlife. This funding could be appropriated to and administered by the National Renewable Energy Laboratory, for example. Wind developers could draw funding for the wildlife research associated with a project and if that project is built, the developer would re-pay the fund. A scientific advisory committee would determine: (a) what research needs to be done at a given site; (b) how research should be done (e.g., the study design should be peer-reviewed); and (c) peer-review processes required for credibility of work performed. All research findings would be available to other wind developers and the public. This would lead to developing a body of well-designed, peer-reviewed, accessible research that helps evaluate potential impacts of wind energy on wildlife and that decision-makers can rely on to assess information for individual sites.

Federal Tax-Credit and links to wildlife protection. While realizing it is not the charge of this subcommittee, Congress should strengthen the Federal Productive Tax Credit (the tax credit extension HR 197 currently is in Ways and Means) by requiring wind projects to meet standards, including best management practices and guidelines, developed by federal agencies and other stakeholders to protect wildlife and their habitats. Such provisional conditions would help level the playing field among developers and provide equal consideration for wildlife among projects and over the duration (~20-25 years) of projects.

Although a state-level issue, we also believe that Renewable Portfolio Standards should account for wildlife impacts and inclusion of guidelines in the permitting process, further strengthening agency participation in permitting and implementation of guidelines.

Migratory Bat Treaty Act. Migratory bats currently are not offered laws for protection and conservation across borders similar to migratory birds. Given new threats to bats from wind turbines across the North American Continent, we believe it is now time for federal adoption of such a law similar to the Migratory Bird Treaty Act. Such an act would foster protection for bats and better collaboration for conservation.

CONCLUSION

In conclusion, Bat Conservation International recognizes threats to our environment from climate change and supports the development of clean, renewable energy sources. Nevertheless, current evidence has

lead to consensus among leading experts that cumulative impacts of wind energy development could become severe if facilities continue to operate without careful planning to minimize harm to birds and bats, both of which are ecologically essential. We believe that minimizing and mitigating harmful impacts to wildlife is an essential element of "green energy" and that developers of wind energy must substantially increase efforts to improve siting and develop and test methods to minimize harm to wildlife. Additionally, the federal government must increase its efforts and funding to support the responsible development of wind energy while protecting wildlife resources. Cooperation, access to study sites, funding, and transparency of information from industry have been mixed. We are pleased with progress of efforts such as our partnership on bats and wind energy and other collaborative efforts, and applaud those companies and organizations working proactively with resource agency specialists and scientists to solve problems. Unfortunately, more has to be done immediately to expand and improve the breadth of our cooperation in developing a sound, scientific basis for decision-making.

To quote from a distinguished colleague, Dr. Gary White, and a paper he published in 2001 (White 2001): "All too often in wildlife management, [we] are asked to resolve conflicts that are impossible because the basic biological knowledge to understand the issue is lacking. All stakeholders are right, under the assumptions each brings to the issue, but because the biological knowledge is inadequate to refute any of the assumptions, the conflict cannot be resolved in an objective fashion based on the biology of the problem." Thus, we must ask ourselves "would we rather collect knowledge up front to resolve the issue or pay for litigation to resolve the issue without knowledge? In the end…such 'train wrecks' prove even more expensive in time, money, and consternation among the players and all the while decisions will be made without reliable knowledge." History is replete with examples where science lags behind on-the-ground implementation. In the case of wind energy impacts on wildlife, the lag is due in large part to poor funding and commitment to priority research. We must increase cooperation, access to study sites, and logistical and financial support for research to gain the reliable knowledge needed for decision-making to solve wind energy and wildlife conflicts. This Subcommittee and Congress can make a difference through implementation of suggestions offered as part of this hearing.

Madam Chairwoman and Members of the Subcommittee, on behalf of Bat Conservation International I want to thank you for inviting me to share this information and assist you on this important issue. I would be happy to answer any questions you may have.

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