



# Wildlife Workgroup

## History, Accomplishments, and Future

Fall 2011

[www.nationalwind.org](http://www.nationalwind.org)

**The NWCC Wildlife Workgroup provides a multi-stakeholder, neutral forum for discussing sustainable wind power development, including research needs and remaining questions about wind-wildlife interaction. It also seeks to compile accurate information and useful tools that will facilitate responsible wind power development with the least possible impact to wildlife.**

### Summary

Since 1994, the National Wind Coordinating Collaborative (NWCC) Wildlife Workgroup has been the premier collaborative group focused on addressing wind-wildlife and wind-habitat interaction issues to promote the development of commercial markets for wind power in the United States. Through the efforts of federal and state agencies, environmental and conservation organizations, industry, utilities, and academics, the Wildlife Workgroup has sustained its key objectives for over 17 years and provided a national model of collaboration. As the NWCC shifts its focus from a broad range of issues related to wind power to the more consolidated goal of addressing issues related to wind power and wildlife interactions, the Wildlife Workgroup continues to identify the most pressing issues, establish dialogue between key stakeholders to better understand these issues, support research and develop publications to inform these issues, and provide forums for all interested parties to gain a better understanding of how wind power and wildlife interact and how to minimize any impact on wildlife from wind power development.



Photos courtesy of US Fish and Wildlife Service.

*“For nearly two decades, the NWCC has provided an important venue for actively addressing wind power and wildlife issues, bringing together a range of key stakeholders to explore challenges and opportunities and finding and expanding common ground for facilitating responsible, timely wind power deployment.”*

Jeff Deyette

Union of Concerned Scientists

Of particular note, the NWCC Wildlife Workgroup has supported the following noteworthy meetings and publications:

- Eight Wind Wildlife Research Meetings (1994, 1995, 1998, 2000, 2004, 2006, 2008, 2010)
- The *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions* (2011), and its predecessor, *Studying Wind Energy/Bird Interactions: A Guidance Document; Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites* (1999)
- *Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document*, which was published in the *Journal of Wildlife Management* (2007)
- The consensus fact sheet, *Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions* (2010), and its predecessor, *Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions* (2004)

This paper outlines the outcomes, approach, history, and successes of the NWCC Wildlife Workgroup since its inception.

*The mission of the NWCC Wildlife Workgroup is to identify, define, discuss, and through broad stakeholder involvement and collaboration address wind-wildlife and wind-habitat interaction issues to promote the shared objective of developing commercial markets for wind power in the United States.*



Photo courtesy of NREL, PIX 06328.

## NWCC Approach Applied to Wildlife Issues

Throughout its lifetime, the NWCC has used an approach of education, issue identification, and action to address the most pressing issues affecting wind power development in the U.S. This approach has been applied to address issues related to wildlife and wind power interactions as follows:

- Educate NWCC participants about topics of concern related to wildlife and wind power;
- By learning more, identify priority research and education needs that NWCC wildlife activities have the capacity to address; and
- Develop and implement an action plan (which for the Wildlife Workgroup includes research meetings, studies, publications, education and outreach) to address the issues.

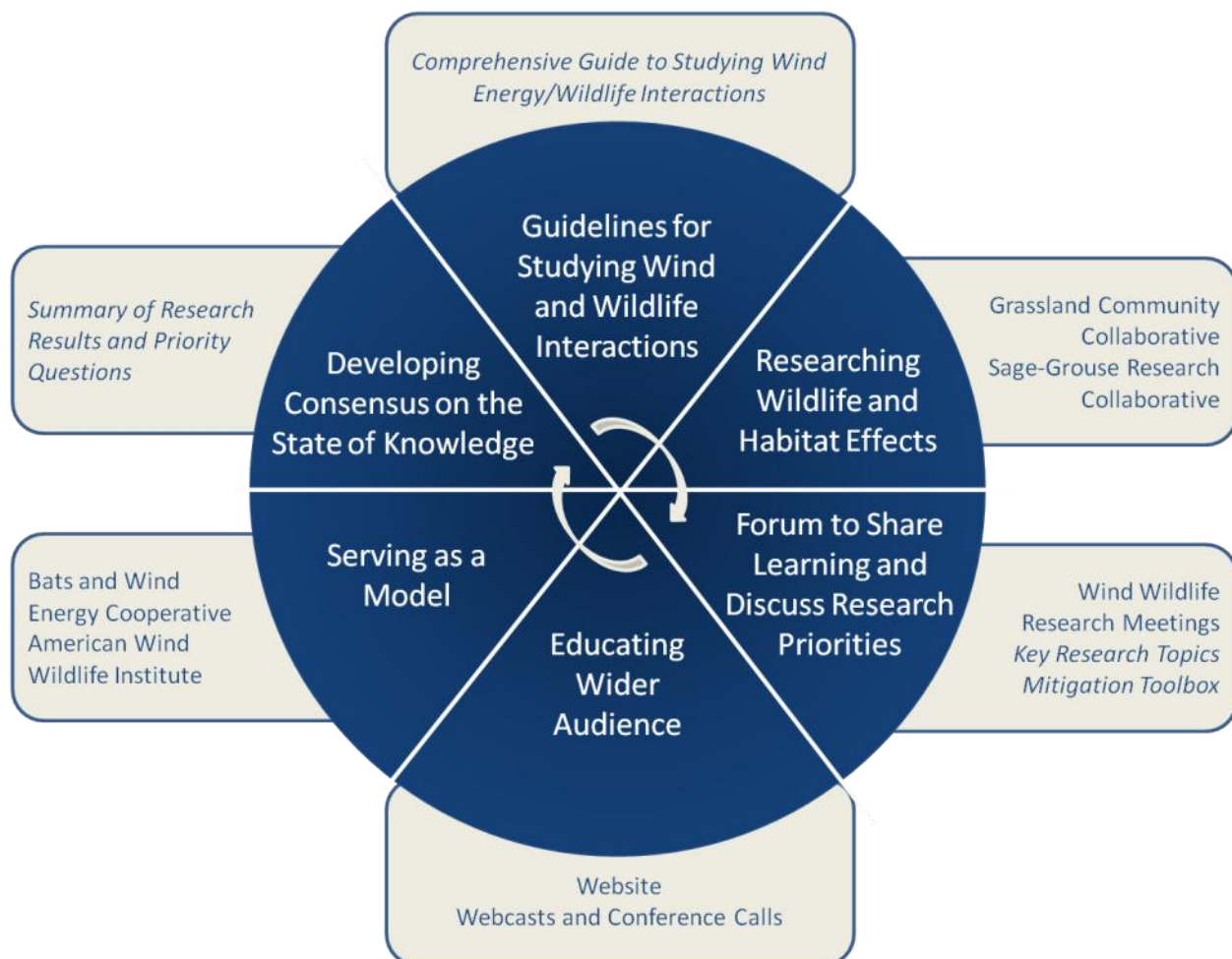


Photo courtesy of NREL, PIX 16708.

## Outcomes and Products of the NWCC Wildlife Workgroup

The NWCC Wildlife Workgroup generates many valuable outcomes and products, including

- forums to share learning on wind-wildlife issues and discuss research priorities;
- guidelines for studying wind and wildlife interactions;
- consensus on the state of knowledge related to bird and bat interactions with wind turbines;
- research into pressing wind power and wildlife interaction issues;
- serving as a model for other organizations; and
- educating a wider audience.



## Forum to Share Learning and Discuss Research Priorities

### Wind Wildlife Research Meetings

The biennial Wind Wildlife Research Meetings are the pinnacle of the Wildlife Workgroup's activities and bring the community of stakeholders together to learn about the research being done to understand the interaction of birds, bats, and other wildlife with wind energy development; to look at what we've learned about ways to minimize or mitigate wind energy's impacts on wildlife; and to identify gaps in knowledge and research needs.

These first meeting was convened in 1994 as the National Avian-Wind Power Planning Meeting and was sponsored by the National Renewable Energy Laboratory (NREL) and Department of Energy (DOE), American Wind Energy Association (AWEA), National Audubon Society, Electric Power Research Institute (EPRI), and Union of Concerned Scientists (UCS). This diverse group of stakeholders agreed that it would be useful to convene a meeting to identify technical questions that needed to be answered to better understand the interaction between wind power plants and avian species and to discuss how to address these questions via scientific research. At this time, the NWCC's Avian Subcommittee was established to build on the results of the meeting and address the pressing issue of bird deaths at wind power plants.



Photo courtesy of National Renewable Energy Laboratory (NREL), PIX 15249.

*"Hosting the 2008 Wind Wildlife Research meeting is still viewed quite favorably by the company because of its significant contribution to a greater understanding of wildlife interactions with wind development, and because of our increased interest in the interactions between bats and wind turbines in Wisconsin, the efforts of the NWCC to provide a forum for shared learning among a wide variety of stakeholders have been invaluable."*

Noel Cutright  
We Energies

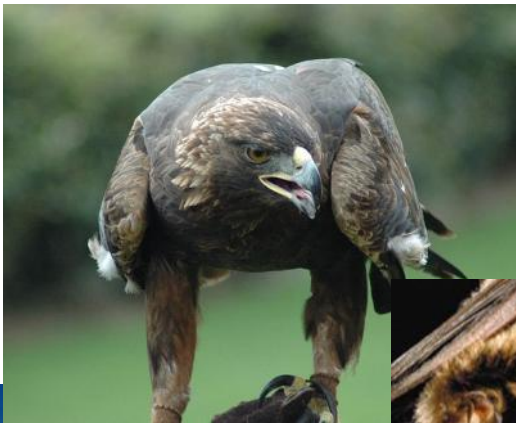


Photo courtesy of J. Glover, Wikimedia commons.



Photo courtesy of US Fish and Wildlife Service.

Since the 1994 meeting, the Wind Wildlife Research Meetings have explored a variety of issues, including:

- a conceptual model or framework of the principal causes of avian mortality at wind plants;
- a common set of metrics or statistics that researchers can use to characterize the potential or existing impact from a wind development;
- accurately measuring fatality;
- short- and long-term impact studies;
- risk assessment;
- behaviors that lead to collisions;
- local topographic/geographic influences on bird migration;
- effects of turbines on bats;
- displacement effects of wind developments on grassland birds;
- effects of wind development on nesting;
- habitat displacement;
- population impacts;
- on-site impact reduction techniques and offsite mitigation;
- curtailment studies;
- cumulative and landscape-scale impacts; and
- whether and how to apply adaptive management to avian-wind power interactions.



Photo courtesy of NREL PIX 16112.



Photo courtesy of NREL, PIX 12704.

## Guidelines for Studying Wind and Wildlife Interactions

The Wildlife Workgroup authored the seminal document, *Studying Wind Energy/Bird Interactions: A Guidance Document*, in 1999, providing for the first time a standardized approach to studying wildlife at wind facilities. This standardization facilitated comparison of study results as well as improved wildlife protection through siting and mitigation measures. The NWCC further updated the Methods and Metrics in 2007 to include nocturnal wildlife species. This guidance document, which was known as the Methods and Metrics Document, became "THE" resource informing the wind-wildlife community on how to study impacts of wind development on wildlife.

As research progressed and new technologies and techniques were developed, the Workgroup decided to commission an update of this document. In 2011, the Workgroup released a *Comprehensive Guide to Studying Wind Energy/Wildlife Interactions*. This resource document is intended as a guide to persons involved in designing, conducting, or requiring wind energy/wildlife interaction studies. The document follows a general framework for progressing through the decision process for a proposed wind project and is a guide to methods and metrics for use in the necessary studies. The guide is relevant to the study of any wildlife species, although the focus is on birds and bats.

The concept for the framework for studying risk and progressing through the decision process for a proposed wind project was developed at the NWCC's **Probability of Impact Workshop** in 2007. The purpose of the meeting was to review methods used to determine impacts, assess the strengths and weaknesses of each, and lay common groundwork by identifying mutual terminology and priority issues—allowing participants to begin to determine which impact prediction methods most closely assess actual impacts experienced once wind facilities are operational.

*“For the past decade, Ridgeline Energy has been involved with a number of organizations dealing with avian and bat issues related to wind energy development. In those collaborative efforts, Ridgeline Energy has found the NWCC to be an essential factor in effectively working with agencies, environmental organizations, and fellow developers that are all interested in understanding through science and proven measures how to minimize impacts to avian and bat species. We look forward to continuing this cooperative effort with NWCC and fully support its future efforts.”*

Kevin Harper, Vice President of Environmental Permitting  
Ridgeline Energy

### Publications

#### Research Priorities

In addition to discussing research priorities at the Research Meetings, NWCC also published a white paper, *Wind and Wildlife: Key Research Topics*, which synthesizes key research needs identified by the NWCC Wildlife Workgroup and other research and technical institutions. Research topics are grouped within eight categories: pre-construction tools, methods, and metrics; post-construction tools, methods, and metrics; mitigation measures; comparative alternatives analysis; impacts to habitat; impact, population, migration and behavioral data; bat-specific needs; habitat and resource development land-use mapping; and cumulative/population impacts.

#### Mitigation

In 2007, the Workgroup collected a *Mitigation Toolbox*—a compilation of mitigation policies, guidelines, and research that are either directly or indirectly applicable to the wind industry. This toolbox examines whether existing strategies are based on sound scientific research and indicates the effectiveness of various methods of avoiding, minimizing, or compensating for direct and indirect impacts on wildlife caused by wind power facilities.



Photo courtesy of NPS.

Photo courtesy of National Park Service (NPS).

Photo courtesy of William Leonard, NPS.

*“EDP Renewables staff have actively participated in the NWCC Wildlife Workgroup for over ten years and find great value in the collaboration of a variety of stakeholders to advance our understanding and address concerns regarding potential impacts of wind on wildlife. Importantly, the bi-annual Wind Wildlife Research Meetings are a central component to maintaining our knowledge base with respect to emerging issues. As part of our commitment to better understand wind energy’s impact on the environment, we helped form and have been active in both the Grassland Community and Sage-Grouse Research Collaboratives under the umbrella of the NWCC. The NWCC has been an important resource for common understanding of the questions and resolution of those questions surrounding wind and the environment. The Wildlife Workgroup offers an important source of information to key stakeholders and the public.”*

*Roby Roberts, Vice President Communications and Government Affairs  
EDP Renewables*



Photo courtesy of NREL, PIX 18453.

*“NextEra Energy Resources recognized the benefits of a collaborative approach to solving complex wind energy and wildlife interaction challenges from early on in the development of our wind energy fleet. The NWCC Wildlife Working Group offered the perfect forum for the wind energy industry, academia, state and federal wildlife agencies, and conservation organizations to work together toward common goals of developing clean, renewable energy while minimizing impacts to wildlife.”*

*Jim Lindsay  
NextEra Energy Resources*

## Developing Consensus on the State of Knowledge

The most widely accessed publication of the Wildlife Workgroup is the consensus fact sheet, *Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions*, which was released in June 2010 and has since been viewed almost 8,000 times on the NWCC website. This fact sheet summarizes what is known about bird and bat interactions with land-based wind power in North America, including habitat impacts and what key questions and knowledge gaps remain. It uses a three-tiered classification of wind-wildlife relationships based on the weight of the evidence and agreement, or lack thereof, among researchers in the field on each particular statement contained in the fact sheet. An earlier version of the fact sheet was released in 2004.

*“Audubon was a founder of the NWCC and has been involved throughout the past seventeen years. The NWCC has been an important forum where parties can raise, learn, and discuss issues associated with wind and wildlife. We have convened 8 research meetings where experts from around the U.S. and other countries have identified what we know and need to know about wind and wildlife. We very much appreciate the Department of Energy’s investment in the NWCC and the prioritization of wind-wildlife issues in support of the Wildlife Workgroup.”*

*Genevieve Thompson  
Audubon North Dakota*



Photo courtesy of NREL, PIX 16694.

## Researching Wildlife and Habitat Effects

The **Grassland and Shrub Steppe Species Subgroup (GS3)** consists of two voluntary cooperative endeavors to identify the impacts, if any, wind energy has on grassland and shrub steppe avian species. Established in 2005 as the National Wind Coordinating Collaborative (NWCC) Wildlife Workgroup Grassland/Shrub Steppe Species Subgroup, these voluntary cooperative endeavors include the Grassland Community Collaborative (GCC) and the Sage-Grouse Research Collaborative (SGC).

### Sage-Grouse Research Collaborative

In 2010, the GS3 formed a collaborative to support and coordinate studies examining the potential impacts of wind energy development on sage-grouse across their range with the goal of informing wind development and sage-grouse management strategies.

Through a competitive process, the Collaborative selected the following three research projects to support with funds raised from federal, state, and industry sources:

- “Response of Greater Sage-Grouse to wind power development,” led by Idaho Department of Fish and Game
- “A study of the impacts of a wind energy development on Greater Sage-Grouse populations in southeastern Wyoming,” led by Wyoming Wildlife Consultants LLC
- “Ecology of male Greater Sage-Grouse in relation to wind energy development in Wyoming,” led by University of Missouri and the Power Company of Wyoming

The Collaborative is overseeing the individual research studies and will support a combined analysis of data from all three studies to develop a more comprehensive understanding of the results. As of November 2011, the SGC had raised approximately \$1.5 million to support the three research projects.



Photo courtesy of SD Department of Tourism.

Photo courtesy of US Fish and Wildlife Service.

*"With increasing interest and development of renewable wind energy in a substantial portion of high quality sage-grouse habitat, it is imperative to understand the relationships between this renewable energy source and sage-grouse. NWCC has provided an ideal vehicle for facilitating the complex multi-state, multi-entity research collaborative developed in 2009 to conduct the rigorous science required to answer the pressing questions about the effects of wind energy development on the health of sage-grouse and how to best mitigate any negative effects."*

John Emmerich, Deputy Director  
Wyoming Game & Fish Department



Photo courtesy of NREL, PIX 16113.

### Grassland Community Collaborative

The Grassland Community Collaborative (GCC) brings together stakeholders to: 1) identify critical research questions related to grassland community species; 2) secure and administer cooperative funding to conduct research; 3) encourage peer-reviewed collaborative research; and 4) identify both potential impacts and mitigation strategies to address any impacts.

The GCC has teamed with Kansas State University (KSU) to perform a study on the potential impacts of wind power on Greater Prairie-Chickens. This multi-year, before-after-control-impact (BACI) study, which was started in 2006 and is located around the Meridian Way Wind Farm, a 201-megawatt wind facility recently built in north central Kansas. As of October 2010, the research team had captured and collected genetic samples from more than 1,300 prairie chickens; put radio collars on 320 females; located 380 nests; and collected 16,500 locations to describe movements and habitat requirements. The results of this study, which are expected in the Spring of 2012, will provide key information on the potential impacts of wind power development on Greater Prairie-Chickens. The ongoing relationship between the KSU research team and the GCC has enabled the Collaborative to provide valuable feedback to the researchers as they progress in their work and will help ensure that the research is seen as a legitimate source of information for informing wind power development. Along with the funds raised by the KSU research team, the GCC helped raise \$900,000 to support this extended research project.

In addition to supporting research on Greater Prairie-Chickens, the GCC has published the following documents: *Critical Literature Review: Impact of Wind Energy and Related Human Activities on Grassland and Shrub-Steppe Birds* and *Protocol for Investigating Displacement Effects of Wind Facilities on Grassland Songbirds*.

## Serving as a Model

The powerful model of the NWCC and the effective work of the Wildlife Workgroup have resulted in the formation of several non-profit groups organized around similar principles:

- **Bats and Wind Energy Cooperative:** NWCC's biennial wind and wildlife research meetings provided the initial forum for discussing bat fatalities associated with wind turbines. Building on the NWCC's collaborative model, the Bats and Wind Energy Cooperative was established in 2003.
- **American Wind Wildlife Institute:** The relationships and the dialogue fostered in the NWCC served as a springboard and inspiration for the creation of the American Wind Wildlife Institute.

*"My introduction to wind energy development and its interface with wildlife occurred at a timely NWCC meeting at NREL in 2007. It was a crash course where I met project managers, researchers, and policy makers and became aware of the many issues associated with this form of renewable energy. Since then, the continuing information stream from NWCC has been invaluable in my work in trying to find solutions that will accommodate wind projects, which are proliferating in Colorado, while avoiding and minimizing impacts to wildlife. NWCC has done an exemplary job of anticipating the needs of people working in the wind/wildlife field, funding studies to address data gaps, and determining the optimal way to provide information, whether through the well-attended biennial Research Meetings, webinar broadcasts, conference calls, publications, and of course, the website. I have always appreciated working with NWCC and hope that the organization continues to operate at its high standard."*

Celia Greenman, NE Region Energy Coordinator  
Colorado Parks and Wildlife



Photo courtesy of National Renewable Energy Laboratory (NREL), PIX 15223.

## Educating a Wider Audience

The NWCC Wildlife Workgroup counts over 500 individuals on its mailing list and has over 200 active participants. Workgroup activities and the website with all information developed by the Workgroup reach an extremely wide audience. Publications produced by the Workgroup, including *Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions* and *Studying Wind Energy/Bird Interactions: A Guidance Document* laid the groundwork for subsequent guidance on wind siting, including the AWEA Siting Handbook and the NACO *Wind Energy Guide for County Commissioners*.

To ensure that stakeholders have the opportunity to learn about the latest research in between Research Meetings and to offer a wider audience the opportunity to learn about wind and wildlife interactions, the Wildlife Workgroup hosts bimonthly conference calls and webcasts. The conference calls provide an opportunity to share updates on NWCC wildlife activities and interesting work that is occurring related to wind and wildlife issues and to give stakeholders an opportunity to share any updates they may have. Topic-specific webcasts provide an opportunity for more targeted learning and have included webcasts on compensatory mitigation, the latest wind-wildlife research, wind power siting and environmental issues, and state-specific initiatives.

## Summary

The NWCC has provided services to the DOE and its engaged stakeholders since 1994. The Wildlife Workgroup has been the only continual workgroup of the NWCC since its inception, and the collaborative, open nature of the group has allowed it to continually evolve and serve all interested parties. As the NWCC enters a new phase and focuses solely on wildlife, the attention to open dialogue, rigorous science, and collaboration will continue.



Photo courtesy of NREL, PIX 16051.

## Acknowledgements

The staff at RESOLVE and Kearns & West, who have guided the NWCC since its inception, are indebted to the leaders of the Workgroup. Their commitment, vision, and willingness to collaborate on often technically challenging and difficult issues are to be commended.

Below are representative collaborating organizations that have contributed to the success of the Wildlife Workgroup:

### Environmental and Conservation NGOs

American Wind Wildlife Institute  
American Bird Conservancy  
Audubon Society  
Bats and Wind Energy Cooperative  
Defenders of Wildlife  
Grouse Inc.  
Izaak Walton League of America  
North American Grouse Partnership  
Renewable Northwest Project  
The Nature Conservancy  
The Ornithological Council  
Union of Concerned Scientists  
Western Resource Advocates  
Wyoming Outdoor Council

### Federal Agencies

National Renewable Energy Laboratory  
U.S. Bureau of Land Management  
U.S. Department of Energy  
U.S. Environmental Protection Agency  
U.S. Fish and Wildlife Service  
U.S. Forest Service  
U.S. Geological Survey

### Other Collaboratives and International Partners

Canadian Wildlife Service  
Clean Energy States Alliance  
Great Lakes Wind Collaborative  
Intertribal Council on Utility Policy  
National Association of Regulatory Utility Commissioners  
U.S. Offshore Wind Collaborative

### State Representatives

Association of Fish and Wildlife Agencies  
California Department of Fish & Game  
California Energy Commission  
Colorado Division of Wildlife  
Idaho Department of Fish and Game  
Illinois Natural History Survey

Kansas Department of Wildlife, Parks and Tourism  
Nevada Department of Wildlife  
Nevada State Office of Energy  
New York State Department of Environmental Conservation  
New York State Energy Research and Development Authority  
Ohio Department of Natural Resources  
Oklahoma Department of Wildlife Conservation  
Oregon Department of Fish and Wildlife  
Pennsylvania Department of Conservation and Natural Resources  
Pennsylvania Game Commission  
South Dakota Department of Game, Fish and Park  
Texas Parks and Wildlife Department  
Vermont Department of Fish & Wildlife  
Wisconsin Department of Natural Resources  
Wyoming Game & Fish Dept

### Technical Experts

Colorado State University  
BHE Environmental, Inc.  
Curry and Kerlinger  
Ecology and Environment, Inc.  
Kansas State University  
Natural Resource Group  
Renewable Energy Consulting Services, Inc.  
Stantec  
Tetra Tech  
Texas A&M University  
TXESA Environmental Consulting  
University of Missouri  
University of Nevada  
Western EcoSystems Technology, Inc.

### Utilities

Nevada Power Company  
Electric Power Research Institute  
Next Era Energy  
We Energies  
Xcel Energy

### Wind Industry

AES Wind Generation  
American Wind Energy Association  
BP Wind Energy  
Clipper Windpower  
EDP Renewables  
Element Power  
enXco, Inc.  
Iberdrola Renewables  
Invenergy  
Pattern Energy  
RES Americas  
Ridgeline Energy

## About the National Wind Coordinating Collaborative

The National Wind Coordinating Collaborative provides a neutral forum for a wide range of stakeholders to pursue the shared objective of developing environmentally, economically, and politically sustainable commercial markets for wind power in the United States. Formed in 1994, this partnership of experts and interested parties identifies issues that affect the use of wind power. By establishing dialogue on current key topics and catalyzing activities that build consensus among its stakeholders, the NWCC has successfully addressed critical challenges in the areas of transmission, wildlife and habitat impacts, siting, power markets, and other aspects of wind development.

The production of this document was supported, in whole or in part, by the United States Department of Energy under Contract No. DE-AT01-07EE11218. Financial support by the Department of Energy does not constitute an endorsement by the Department of Energy on the views expressed in this document, nor do the views and opinions of authors expressed herein necessarily state or reflect those of the United States government or any agency thereof.