NATIONAL WIND COORDINATING COMMITTEE

Wildlife Workgroup Meeting May 4-5, 2005 Aurora, Colorado

Meeting Summary

DAY 1:

Welcome and Purpose

Abby Arnold, RESOLVE, welcomed attendees to the National Wind Coordinating Committee Wildlife Workgroup meeting and described the objectives of the NWCC. The meeting attendees went around the room to introduce themselves and describe their interest in wildlife/wind power interactions. Meeting participants and their contact information is at the end of this summary.

The group reviewed and approved the agenda and meeting objectives. The meeting agenda is provided at the end of this document.

Meeting Objectives:

- Review Wildlife Workgroup Subgroup Activities and Approve Next Steps
  - Grassland/Shrub Steppe Species
  - Nocturnal Methods and Metrics
  - Risk Assessment
  - Peer Review
  - Mitigation Toolbox
  - BWEC
- Report On Sector Activities and Interests
- Presentation of New Research

Grassland/Shrub Steppe Species Subgroup: Activities Update

John Bridges from Western Area Power Administration (WAPA) reported on the formation and initial activities of the Wildlife Workgroup's Grassland/Shrub Steppe Species Subgroup. The Subgroup's purpose is to develop a research plan to better understand the potential impacts of wind projects on grassland and shrub steppe species. A first meeting was held March 29-30 in Wichita, Kansas and included presentations on the wind power development process and on factors influencing grassland birds, discussion of ideas for new research, and development of a work plan. The short term work plan entails sponsoring a critical literature review, as well as Spring/Summer 2005 research on small grassland birds and identifying prairie grouse lek locations. In the long term, the Subgroup plans to conduct management experiments and engage the participation of others including developers, academics, and government scientific community. Next steps proposed consist of:

- Creating and reviewing research plans, one for prairie grouse and one for other grassland and shrub steppe birds
- Sponsoring a critical literature review
- Securing research funding and determining a way to administer those funds

- Holding a Fall 2005 workshop to finalize research plans, inviting other interested technical experts to participate.

In response to member questions, John Bridges stated that:

- Information on impacts of wind facilities on grassland and shrub steppe species is not considered readily available by Subgroup members.
- Development is already happening in grassland species habitat such as the Flint Hills in Kansas and other parts of the Midwest.
- The critical literature review will not be done by the Subgroup; rather, a request-for-proposals will be put out based on criteria developed by the Subgroup.
- Cumulative impacts, while important to study, are not currently in the study plans.

Another Subgroup member related that numerous confounding variables like oil wells, tree growth, and prescribed burning make isolating the effects of wind developments difficult. Participants discussed which people might need to be involved in reviewing information collected by the Subgroup, with state agencies suggested as one party to consult. Funding for the literature review may be provided by the NWCC, but other funding sources will be needed to carry out additional research. USGS has emergency research funds that the Subgroup is working to obtain. The NWCC will develop a proposal on having RESOLVE serve as the research funds administrator.

Nocturnal Survey Methods and Metrics for Birds and Bats

Steve Ugoretz from the Wisconsin Department of Natural Resources described the focus of the Nocturnal Methods and Metrics Subgroup, which is to develop a companion document to the NWCC publication *Studying Wind Energy/Bird Interactions: A Guidance Document* covering nocturnal activity of birds and bats. The Nocturnal Methods and Metrics Subgroup drafted an outline for the companion document and Steve led the group through the outline. Chapter 1 details what is known about nocturnal activity patterns. Chapter 2 separates birds from bats and looks at issues and parameters relevant to wind interactions such as flight altitudes and activity patterns, stopover areas, timing of movements, weather, large scale patterns like coastal vs. continental, physiographic regions e.g. desert Southwest, and funneling features. Information limitations are explored in chapter 3, including what researchers do not know and what they have difficulty getting information on. Chapter 4 explores the strengths and weaknesses of various methods for evaluating nocturnal use of sites such as observational studies, radar, acoustic, and and others. Level 1 studies and experimental design are covered in chapter 5. Chapter 6 discusses real world application of data for site selection and evaluation, determination of population effects, and developing and evaluating risk reduction methods.

In response to member questions, Steve Ugoretz stated that:

- Chapter 5 could be expanded to include Level 2 studies.
- This outline is only a draft and is open for revision.
- The cost and availability of funds to do this kind of addendum have yet to be determined.

Consistency between the current Guidance Document and the proposed nocturnal update was discussed. One participant pointed out that experimental design is already covered for Level 1

and 2 studies in the current Guidance Document. It was also pointed out that nocturnal activity is already addressed in the Guidance Document, but that the discussion warrants expansion. Others stressed the methods and metrics should be simple yet consistent. Topics not currently in the outline to consider adding include:

- Validation of methods
- Best management practices
- Duration of studies
- Effects of other similar developments
- Thermal imaging

Risk Assessment: Applying an Ecological Risk Assessment Framework to Wind Power

Jim Newman from Pandion Systems began by providing the dictionary definition of risk, which is the probability of some unwanted thing happening. The Risk Assessment Subgroup formed after Wildlife Research Meeting V in November 2004. The Subgroup's charge is to:

- Learn more about what ecological risk assessment (ERA) is
- Look at applicability of ERA to assess potential impacts of wind power development on wildlife
- Make recommendations on what, if any, next steps might be taken by the Wildlife Workgroup

Jim detailed challenges to estimating risk from wind energy projects, explained some of the aspects of the EPA approach to risk assessment, and described what he though a risk assessment approach similar to the EPA approach can provide. The Subgroup is preparing an informational document on what risk assessment is and various methods for measuring risk.

Jim Newman provided the following comments in response to participant questions:

- Impact is a general term, with risk a subset of the term impact. Quantifying the probability of an impact occurring falls into risk.
- For wind power, one needed component is to identify wind farm characteristics that help in predicting risk.
- The goal of risk assessment is to quantify the likelihood of a negative impact, though it is up to the individual analyst to determine how to interpret that number. I am not sure what this means?

Many attendees found value in pursuing a white paper on risk assessment, though some wondered if the topic is not already covered by environmental impact statements conducted pre-construction. The white paper would provide an opportunity to set out commonly accepted procedures for assessing risk and recommendations on how to conduct risk assessment.

One participant felt that despite the abundance of wind projects, few metrics are consistently studied. It has yet to be determined how useful common metrics like flight elevation and raptor active nest density are for estimating risk. Another person addressed this issue by noting that some of the measurements consistently done are useful for risk assessment, but without doing risk analysis, there is not a way to relate data to a proper response. The quality of data collected is another factor influencing the effectiveness of conducting risk assessment—poor data can lead to incorrect conclusions regardless of what assessment method is used.

Participants offered additional comments and asked clarification questions, summarized below:

- The Risk Assessment Subgroup might consider looking at the different methods of risk assessment presented at the November 3-4, 2004 NWCC Wildlife Research Meeting in Lansdowne, Virginia and identify the strengths and weaknesses of each method.
- It is unclear how uncertainty should be accounted for when measuring risk. Also, what level of uncertainty is acceptable?
- Avoiding detrimental impacts is a key factor in siting wind facilities a.
- Risk assessment at wind sites is about more than turbine effects; related habitat impacts such and direct and indirect habitat loss and habitat fragmentation are also an important consideration, though these impacts have not been well studied, and habitat fragmentation can be difficult to quantify.
- A clear understanding of the effects wind developments have is needed before risk can be assessed.
- Quantifying risk is challenging on a global scale, so a participant recommends looking at individual sites to validate risk assessment models and then try to extrapolate to other sites.

Peer Review in Wind Energy Studies

Ellen Paul, executive director of the Ornithological Council, led this discussion of peer review and its applicability to wind energy studies. She noted that while wind power is portrayed as a green energy option, scientific evidence is needed to support that claim. Peer review can serve as a means to assure quality of research to funders, legal institutions, academics, the public, and other interested parties. For peer review to have legitimacy, the reviewers should be experts in their field and expertise, while also being free of or correcting for any biases. Currently most reviewers are anonymous, though there is call for changing this practice among some members of the scientific community.

Ellen covered factors typically taken into account by reviewers and how they might apply to publications on wind. These include:

- Is this an important research question?
- Will it advance knowledge in the field?
- Was the study properly designed and conducted? Did the researcher have adequate knowledge and skill to conduct the survey properly?
- Are the results improbable? Do the findings support the conclusions?
- Is there plagiarism, failure to acknowledge sources, or unnecessary duplication of previous research?

Ellen distributed a one-page handout on peer review which includes a proposal for a government appropriation to create a fund used to conduct research on the impacts of wind power on wildlife. The proposal would stipulate that developers drawing from the fund to conduct research would re-pay the fund if a project is constructed (a revolving fund). However, federal funding means all research findings must be made available to the public and developers generally want to retain proprietary control over their findings.

Ellen responded to questions and comments with the following clarifications:

- When reviews provided by reviewers are not consistent, a journal editor generally steps in to resolve the discrepancy.
- For peer review to work appropriately, the reviewers need to have no stake in the outcome of research and publication. Technical advisory committees may be flawed if the parties participating want a certain outcome.
- Peer review might be of interest to the wind industry because they can make stronger arguments about their building and operational practices.
- Undergoing peer review can be a lengthy process as generally there are not set deadlines (privately financed peer review sometimes has deadlines).

Participant responses to the presentation are summarized below:

- The Green Building Council might serve as a model for the wind industry of a group that holds itself to a higher standard.
- Considering the difficulties scientists can face in finding research funding, the revolving fund might be beneficial for developers and scientists alike.
- Other industries seem to use government regulation to dictate their actions, not peer reviewed science. Therefore, the wind industry may want to consider developing its own design standards.

Meeting participants did not want to form a peer review subgroup at this time, but Ellen will continue to work with the NWCC on ways to add validity to NWCC publications and Abby Arnold agreed to explore how to improve review of all NWCC materials to ensure legitimacy of these documents.

Mitigation Toolbox

Lynn Sharp from Tetra Tech EC described the Mitigation Toolbox Subgroup's aim to provide a comprehensive reference on the types of mitigation that can be used by the wind industry to compensate for adverse impacts to wildlife. The reference is intended to be a living document, updated as new information comes available. Lynn described two types of mitigation, minimization and compensation. Siting plays a key role in minimizing impacts, on both a large scale and through micro-siting. Design and technology approaches are also minimization techniques. Compensation can be used for direct or indirect impacts and is typically habitat based. Developers may utilize on-site compensation (e.g. habitat restoration, grazing practices, weed control, prescribed burning) or off-site, which may be funded by the developer but carried out by other parties.

The mitigation toolbox could contain these descriptions of mitigation types, as well as case histories that detail successes and failures. Attendees noted the following areas for care, concern, and consideration:

- Making sure quality information and proven strategies are utilized, focusing on documented methods that work and not technical folklore.
- Clarify to the audience that mitigation methods must be adapted for individual projects and cannot be followed line-for-line.
- Recognize that no matter what steps are taken, wildlife may be adversely impacted. While some impacts can be avoided, it is impossible to avoid all impacts.

Additional topics participants mentioned adding to the toolbox are:

- Operational mitigation
- Risk capping
- Avoidance
- Case study of Colorado multi-party shortgrass prairie mitigation project successfully completed using off-site mitigation.

Sector/Participant Updates on Activities

Al Manville, U.S. Fish and Wildlife Service

The Avian Power Line Interaction Committee (APLIC), represented by the Service and the industry, has been working for the past two years on developing the template for voluntary guidelines for an avian protection plan. This is an opportunity for all members of the electric utility industry to develop voluntary avian protection guidelines specific to their location and industry needs dealing with strike and electrocution issues. More details are available on their website, http://migratorybirds.fws.gov/issues/TBLCONT.html.

USFWS voluntary guidelines on wind power/wildlife interactions were issued in July 2003. After concerns with the voluntary guidelines were raised, USFWS held several public workshops with representatives from AWEA, DOI, and others, most recently in March 2004. The USFWS acknowledges that the guidelines need to be updated and a public comment period is open through July 10, 2005. The NWCC will be advised of the next steps the USFWS will take to address concerns received from the industry and other members of the public.

An RFP has been submitted for Neotropical Migratory Bird Act funding. Contact Doug Ryan at Douglas_ryan@fws.gov for an application and more information. Deadline for receipt of grant proposals is early December 2005.

Steve Ugoretz, Wisconsin Department of Natural Resources

Wisconsin's utility commission is conducting its first state-funded study including wildlife areas. The final decision of the utility commission may be interesting because it also includes other factors like renewable portfolio standards.

Russ Mason, International Fish and Wildlife Agency

Many states are developing wildlife plans due out in October, check the IAFWA website http://www.iafwa.org/ for details. The IAFWA is trying to engage utilities on wildlife issues. Also, BLM and the Western Association of Wildlife Agencies are developing a clearing house on grassland/sage grouse habitats.

David Klute, Colorado Division of Wildlife

A ballot initiative last fall established a renewable portfolio standard of 10% renewables by 2015 for Colorado. The Colorado Division of Wildlife is looking for information on wind power and to find better ways to interact with industries.

Mark Woythal, New York State Department of Environmental Conservation

New York state has a renewable portfolio standard of 25% by 2012. To collect data on wildlife impacts, radar trucks have been collecting data at sites around the state.

John Bridges, Western Area Power Administration
New interconnections are coming in, with WAPA helping to facilitate that process.

Laura Miner-Nordstrom, U.S. DOE Wind Program
DOE wind program offers financial and logistical support to the NWCC and also works through its Wind Powering America program. Wind and wildlife is a key topic, as well as offshore. Future work depends on funding approved by Congress, though DOE anticipates being funded at current levels or above.

Tim Cullinan, Washington State Audubon
Audubon has two proposals out now seeking funding to allow greater Audubon participation in the NWCC. Another proposal is out to state fish and wildlife agencies requesting funds to support more local field volunteers. The outcome of these funding proposals will be known by the end of June.

Betsy Neely, The Nature Conservancy
TNC is working to identify areas of biological significance, as well as areas with the fewest confounding aspects, in an effort to collaborate with industries on determining sensitive areas where development might not be advisable. The federal National Heritage Program database is a source TNC encourages be used in making siting decisions. Gary Kania is TNC's lead contact on wind.

Ellen Paul, The Ornithological Council
The National Academy of Sciences is beginning a study in the mid-Atlantic on wind power and its influence on the environment and viewshed aesthetics.

Karen Kronner, Northwest Wildlife Consultants, Inc.
Karen is beginning a project with TNC looking at biological diversity and would welcome the participation of interested agency representatives.

Alex Hoar, US Fish and Wildlife Service
USFWS is in the early stages of a study looking at a landscape view of the Allegheny front. The goal is to develop criteria useful for many projects on how birds and bats fly over landscapes.

Tom Gray, American Wind Energy Association
AWEA held several siting workshops this year, aiming to increase knowledge about what is available and what information is still needed about siting wind facilities. More such meetings will be held in the future.

DAY 2:

Report out from Subgroups: Progress Made and Next Steps

Risk Assessment

Jim Newman from the Risk Assessment Subgroup reported back on the discussion last night over dinner about risk assessment. The following topics were recommended for inclusion in a paper or workshop from the NWCC on risk assessment:

- Discuss the use of risk assessment
  The aim of risk assessment is to quantify risk, but interpretation of that number is the actual risk assessment.
- Characteristics of risk assessment
  Determine what data are required, what level of uncertainty is acceptable, etc.
- Component on exposure
  Make a list of issues relevant to risk assessment, i.e. metrics used to determine exposure to risk.
- Review applicability of existing risk assessment models
  This would include models from Tucker, Podolsky, Kerlinger, WEST, and others who have developed methods for assessing risk.

One participant cautioned the Risk Assessment Subgroup against trying to address biological significance rather than interpret risk.

Nocturnal Methods and Metrics

Dale Strickland from the Nocturnal Methods and Metrics Subgroup presented a revised version of the outline Steve Ugoretz provided (described under Day 1) for a companion document to *Studying Wind Energy/Bird Interactions: A Guidance Document*. The new outline focuses more on methods and equipment available for studying nocturnal activity, such as radar, night vision equipment, acoustic, ceilometers (bright lights), moonlight, and thermal imaging. The type of data each method can collect and its strengths and weaknesses is to be included. Another section will detail metrics available to employ such as passage rates, behavior, species richness, etc. The companion document would conclude with information on assessing risk and impact to nocturnal wildlife.

Based on participant responses, the following clarifications were offered:

- The writers of the original Guidance Document were chosen by a committee. Several parties reviewed the document, including scientific experts not involved with wind issues, the USFWS regional offices, and the NWCC membership.
- The nocturnal behavior of most nighttime active birds and bats will be considered in the companion document, not limited to passerines. Nor will the document be limited to migrants but will also include resident activity like owls.

Participants provided several comments and suggestions:

- Add specific applications of the methods to the outline.
- Provide examples of species that can be studied using each method.
- Standardization of sampling is another methodological point to include in the outline.

- Add information about how the Guidance and companion documents are written and reviewed to give them more credibility as resources.
- Consider integrating this effort with other methods and metrics being designed for similar structures like communication towers.

The updated outline still needs to be reviewed by the entire Nocturnal Methods and Metrics Subgroup. Also, writers for each section have yet be determined. Comments or ideas on the current outline can be sent to Katie Kalinowski, NWCC, at kkalinowski@resolv.org.

Prioritization of Tasks and Core Group

One member suggested that the NWCC does not have the resources for all four Subgroup activities to proceed and therefore perhaps the activities should be prioritized. Another attendee felt prioritization would be helpful because members from non-prioritized Subgroups could assist with priority topics.

Another idea put forward was to form a core group of the Wildlife Workgroup, comprised of 2-3 representatives from each sector. The intent of the core group is to add continuity and structure to the Wildlife Workgroup, which has fluctuating participation levels.

The group decided to conduct a vote at lunch on how to prioritize Subgroups and to discuss the core group idea during the meeting wrap-up.

Report on USGS-USFWS Collaborative Research Efforts Using Radar and Other Technologies for Wind and Other Tall Structure Development

Al Manville from the U.S. Fish and Wildlife Service explained new joint efforts between USFWS and USGS to use radar, including NEXRAD and portable marine radars, for studying bird and bat conservation, habitat use, migration, and management. He began by providing background on the development of radar and its applications to studying birds and bats, specifically looking at their:

- Daily movement to and from nests and roosts.
- Seasonal migration patterns.
- Feeding ecology.

Other potential applications for NEXRAD radar include studying:

- Effects of habitat restoration.
- Effects of climate change on bird migration patterns.

Al described various types of radar available, what they can detect, and their limitations.

Goals of the USGS-USFWS collaboration in this field are:

- To identify migratory pathways and stopover sites.
- Simplify analysis of radar data to enable its use by a wider audience.
- Convey information about importance of functional landscapes and unobstructed airspaces for migrating wildlife.

At least five different projects are underway to achieve these aims. Continued outreach is planned to new partners like BLM, DOE, FAA, FCC, industry, and others, and new tools and software are slated for development. Ultimately these items are intended to provide:

- Ability to assess effectiveness of landscape-scale conservation practices.

- Ability to evaluate wildlife responses to long-term trends like habitat loss, climate change, development, etc.
- Raise awareness and support for agency conservation efforts.

USFWS employees in attendance offered the following in responses to audience comments and questions:

- There is Canadian involvement in these new ventures and the possibility of coordinating efforts.
- New information is needed on how birds use space over time and under certain weather conditions. Detection in the rain is a tremendous growth area, if the cost comes down. USFWS is planning a workshop on radar to discuss this and other related issues.
- Comparing study results, be it at a state or regional level, will be easier if the studies use the same protocols. USGS is using standardized protocols but at the same time developing new protocols.
- This collaborative effort is plugged in to National Park Service inventory and monitoring activities.

Report from Bats and Wind Energy Cooperative (BWEC) on Collaborative Work and Plans

Ed Arnett from Bat Conservation International and facilitator of BWEC began by reviewing the history of bat fatalities at wind facilities. Bat fatalities have been reported at all wind farms investigated in the US across a wide range of habitats. Estimated mortality in the West appears to be relatively low (<2 bats/turbine/year), but much higher mortality numbers have been recorded in the East. It is estimated that between 1,400 and 4,000 bats were killed in 2003 at the Mountaineer Wind Energy Facility in West Virginia. This event and others spurred the creation of BWEC and the convening of an experts meeting in December 2003. The experts identified a lack of reliable information on:

- Bat migration
- How bats are killed at wind facilities
- Patterns of fatality relative to weather, turbine characteristics, topography, etc.
- Bat interaction with turbine blades
- Response to moving and non-moving turbine blades
- Fatality search protocol development

A research plan was designed and carried out in 2004 and the research goals were to:

- Evaluate carcass search protocols
- Assess how bats interact with turbines
- Employ and assess different methods and tools for understanding bat-turbine interactions and fatalities

BWEC research sponsors include the American Wind Energy Association, Bat Conservation International, Florida Power and Light, Massachusetts Technology Collaborative, New York State, PPM, and others.

The 2004 research was conducted at the Meyersdale and Mountaineer wind facilities. Ed Arnett turned the presentation over to Wally Erickson from WEST to describe the research methods employed and results. Searches for bat fatalities were conducted at each site for six weeks, with

half the turbines searched daily and half weekly (the turbine sets were switched after 3 weeks, so all got the same monitoring). Researchers tested searcher efficiency for finding bat carcasses by using placed carcasses and distance sampling. Limited testing on the use of trained dogs to find bat carcasses also was carried out.

Researchers found over 760 bats across the two sites. Specific findings include:

- A relatively similar composition of bat species across sites. Hoary bats most prevelant in the carcass surveys, but red, eastern pipistrelle, and little brown bats also strongly represented.
- Bats were found at all turbines except one and that turbine was not operating.
- No difference in fatalities was identified between lit and unlit turbines.
- More adult male fatalities were found than juvenile males and both adult and juvenile females.
- Negative correlation between fatalities and wind speed, i.e. on lower wind nights, bat fatalities were higher.
- Detection rates decrease as distance from the turbine increases.
- Detection decreases with distance from the transect line; therefore, searcher efficiency trials will continue to be needed.
- Extremely low scavenging found at Meyersdale, but extremely high scavenging and carcass removal rates at Mountaineer.
- Estimated fatality rates at each site:
  Mountaineer: Daily mean, 38; weekly mean, 17
  Meyersdale: Daily mean, 25; weekly mean, 30
  Scavenging and periodicity of fatalities relative to search interval may explain the difference between the results.

Based on their results, the research team made several design recommendation to employ in future research. Summarizing the searcher efficiency testing and fatality count results, the team showed that:

- Timing and patterns of fatality are similar for the two sites, suggesting regional patterns
- No bats killed by non-moving turbines
- FAA lighting has no apparent influence on bats
- Post-construction monitoring strongly influenced by timing of fatality, habitat visibility, and scavenging
- Fatality appears related to all factors related to low-wind nights and passage of storm fronts and may be highly predictable.

Ed Arnett concluded the presentation by showing thermal images of bats interacting with wind turbines. The thermal imaging was done at one turbine around August 2004 for 10 nights. His team has recorded images of bats flying into blades, investigating non-moving blades, and following the tip of moving blades. Bat Conservation International is looking into ways to share this footage with the public on the web.

Areas for future research are:

- Testing moving vs. free-wheeling blades

- Taking a landscape context to examine the Eastern US vs. the West
- Examining relationships between weather variables and patterns of fatality

Ed Arnett and Wally Erickson offered the following clarifications based on audience questions:

- It is unclear why some bats have been shown to follow blades or blade tips. Bats may be attracted to the movement or possible sounds generated from moving blades. Other theories are that the bats may be chasing insects, that bugs concentrate on the end of blades, or that vortices are created around the blade tips.
- Harder surfaces like turbines may have different effects on the bats' echolocation system and could influence attraction to bats, so study is needed on sources of attraction and possible deterrents.
- The plot size available to searched varied depending on the topography, but each plot was about a square mile.
- Searcher efficiency was averaged across all turbines, as samples sizes for individual turbines were too small to evaluate searcher efficiency for each turbine.
- Not known what effect using systematic or pure random sampling of turbines would have, but this might be an area for future investigation.
- The use of nets under turbines to "catch" fatalities may be considered for future research, but nets can be difficult to use in most settings.

The report on BWEC's 2004 research report is due out in June, along with a 6 page summary. More research is intended for this summer, though the plan of work has yet to be finalized.

Lunch Session: Local Wind Development Issues

During lunch, a number of participants from conservation, natural heritage, and environmental regulatory agencies from Colorado and the local area around Denver gathered for an informal briefing on wind energy and wildlife issues, with a particular focus on answering questions that these organizations had on NWCC workgroup activities and on broader issues concerning wind / wildlife interactions. The group was joined by representatives from WEST, AWEA, wind advocates and developers, and NWCC staff.

The discussion began by providing an opportunity for introductions and a brief description of each organization's relationship to wind & wildlife issues. Western Resource Advocates, a renewable energy advocate, described the current and upcoming landscape of wind energy development in the region, including describing existing wind farms, planned wind farms, and potential areas with wind resources that might be developed in the future. The participating wind developers and AWEA answered a number of questions about the total impacts of their projects, and about the impacts relative to other development types (such as cell towers, tall buildings, bridges, and other structures). WEST representatives discussed some of the research underway with regard to impact assessment and mitigation strategies, particularly focusing on siting and on micro-siting turbines within a designated resource area.

Colorado representatives described some of the issues they are facing and asked for resources to help evaluate project proposals that were being directed towards them, and AWEA and WRA provided information and a number of websites that could offer further information. Colorado Natural Heritage Program and Nature Conservancy staff spearheaded an offer to continue

dialogue among the local participants, in order to facilitate resource and information sharing when learning about and dealing with wind and wildlife issues. An email list was developed of the lunchtime briefing participants and the group agreed to continue to build on this dialogue.

Wrap-up and Next Steps

A vote was conducted just prior to lunch to guide prioritization of Wildlife Workgroup activities. The group voted unanimously for the work of the Grassland/Shrub Steppe Species Subgroup to proceed. Plans are being made for a fall technical workshop to review research proposals, though attendance will be restricted due to budget constraints and to provide for expert participation. Also, the Nocturnal Methods and Metrics and Risk Assessment Subgroups will be given top focus by the Workgroup, with the Mitigation Toolbox put on the back burner for the time being. Proposed work plans and timelines will be provided by the Nocturnal and Risk Assessment Subgroups and sent to the rest of the Wildlife Workgroup for review.

In addition, the group discussed the proposal to form a core group of the Wildlife Workgroup with a sampling of representatives from each sector participating. Meeting attendees generally felt the core group would be a good idea because it would provide balanced representation and make decision making easier. Core group participants would be decided by the Wildlife Workgroup. With the participants' approval, NWCC staff agreed to begin organizing the core group.

Finally, the group discussed whether to hold another wildlife research meeting in the upcoming year. Participants expressed interest in having a meeting and identified March 2006 as a good time based on availability of research results and scheduling of other events in 2006. NWCC participants will be asked to nominate topics for a 2006 meeting to determine if enough new information will be available to justify the expense of such a meeting.

Next Steps

Action items agreed to by meeting attendees include:

- Moving ahead with the Grassland/Shrub Steppe Species Subgroup's workplan, including creating proposed research plans, a technical workshop to review the research plans, and establishment of an independent collaborative to manage the research.
- Prioritizing the Nocturnal Methods and Metrics and Risk Assessment Subgroups, with the Mitigation Subgroup proceeding at a slower pace. Proposed timelines for the Nocturnal and Risk Assessment subgroups will be developed and distributed to the Wildlife Workgroup. The nocturnal methods subgroup proposes to manage drafting of a supplement to the existing *Studying Wind Energy/Bird Interactions: A Guidance Document*, covering methods for nocturnal species. The Risk Assessment Subgroup will provide an analysis of various risk assessment methods, including the applicability to assessing risk of collision and/or habitat impacts of wind facilities.
- Organizing a core group of Wildlife Workgroup members representative of the various stakeholder groups. Members of the core group will agree to regularly participate in Wildlife Workgroup planning. The goal of this group is to add structure and continuity to the planning process.

- Consider holding a Wildlife Research Meeting VI in March 2006; nominations for presentation topics will be collected to determine if a meeting is warranted.

NWCC Wildlife Workgroup Meeting
Aurora, CO May 4-5, 2005
Final Participants List

Dick Anderson
2850 Layton Dr
Davis, CA 95616
530-758-4672
Danderson@cal.net

Ed Arnett
BWEC Director
Bat Conservation International
P.O. Box 162603
Austin, TX 78716
512-327-9721
earnett@batcon.org

Mike Azeka
Sr. VP Project Development
AES SeaWest
1455 Frazee Rd. 9th Floor
San Diego, CA 92108
619-908-3418
mazeka@seawestwindpower.com

John Bridges
Terrestrial Biologist
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228
720-962-7255
bridges@wapa.gov

William Burnidge
Grasslands Project Director
The Nature Conservancy
2424 Spruce St.
Boulder, CO 80302
720-974-7022
wburnidge@tnc.org

Paul Cryan
Research Biologist
USGS-BRD
2150 Centre Ave., Bldg. C
Fort Collins, CO 80526
970-226-9389
paul_cryan@usgs.gov

Tim Cullinan
Director of Bird Conservation
Audubon Washington
421 Washington Harbor Rd.
Sequim, WA 98382
360-683-6257
tcullinan@audubon.org

Noel Cutright
We Energies
333 W. Everetta 231
Milwaukee, WI 53203
414-221-2179
noel.cutright@we-energies.com

Bob Dach
Federal Activities Specialist
US Fish and Wildlife Service
134 Union Blvd., Suite 645
Lakewood, CO 80228
303-236-4264
robert_dach@fws.gov

Aimee Delach
Senior Policy Associate
Defenders of Wildlife
1130 17th St. NW
Washington, DC 20036
202-772-0271
adelach@defenders.org

Gary Drendel
Senior Environmental Scientist
Tetra Tech
143 Union Blvd., Suite 1010
Lakewood, CO 80228
303-980-3546
gary.drendel@tteci.com

Rebecca Efroymson
Senior Scientist
Oak Ridge National Laboratory
P.O. Box 2008 (Bethel Valley Rd) MS 6036
Oak Ridge, TN 37831
865-574-7397
efroymsonra@ornl.gov

Michael Fry
Sr. Managing Scientist
Stratus Consulting
1881 Ninth St., Suite 201
Boulder, CO 80302
303-926-0136
mfry@stratusconsulting.com

Brianna Gary
Wildlife Ecologist
NYS Dept. of Environmental Conservation
625 Broadway, 5th floor
Albany, NY 12233
518-402-8858
bmgary@gw.dec.state.ny.us

Chris Gaughan
Zoologist
Colorado Natural Heritage Program
254 General Services Building, CSU
Fort Collins, CO 80523
970-491-3342
gaughan@lamar.colostate.edu

Scott Gillihan
Rocky Mountain Bird Observatory
14500 Lark Bunting Lane
Brighton, CO 80603
303-659-4348
scott.gillihan@rmbo.org

Tom Gray
Deputy Executive Director
American Wind Energy Association
P.O. Box 1008
Norwich, VT 5055
802/649-2112
tomgray@igc.org

Theresa Gulbrandson
Wildlife Biologist
Tetra Tech
143 Union Blvd., Suite 1010
Lakewood, CO 80228
303-980-3600
Theresa.Gulbrandson@tteci.com

Alex Hoar
Northeast Wind Energy Coordinator
US Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035
413-253-8631
Alex_Hoar@fws.gov

Susan Innis
Green Power Marketing Director
Western Resource Advocates
2260 Baseline Rd, Suite 200
Boulder, co 80302
303-444-1188 x.221
susan@westernresources.org

David Klute
Bird Conservation Coordinator
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216
303-291-7320
david.klute@state.co.us

Karen Kronner
President and Senior Wildlife Biologist
Northwest Wildlife Consultants, Inc.
815 NW 4th St.
Pendleton, OR 97801
541-278-2987
kronner@oregontrail.net

Ronald Lehr
Attorney
American Wind Energy Association
4950 Sanford Circle West
Englewood, CO 80113
303-504-0940
rllehr@msn.com

James Lindsay
Principal Biologist
FPL Energy
700 Universe Blvd
Juno Beach, FL 33408
561-691-7032
jim_lindsay@fpl.com

Al Manville
Senior Wildlife Biologist
Division of Migratory Bird Management
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, MBSP-4107
Arlington, VA 22203
703-358-1963
Albert_Manville@fws.gov

Russ Mason
Director
IAFWA
444 N. Capitol Street, Suite 725
Washington, DC 20001
202-624-5853
rmason@iafwa.org

Misti Miller
Environmental Protection Assistant
WAPA
P.O. Box 281213
Lakewood, CO 80228
mmiller@wapa.gov

Laura Miner-Nordstrom
DOE
1000 Independence Ave SW MC EE-2B
Washington, DC 20585
202-586-9940
laura.miner-nordstrom@ee.doe.gov

Betsy Neely
Senior Conservation Planner
The Nature Conservancy
2424 Spruce Street
Boulder, CO 80304
720-974-7015
bneely@tnc.org

Jim Newman
Principal Scientist
Pandion Systems, Inc.
5200 NW 43rd St., Suite 102-314
Gainsville, FL 32606
352-372-4747
jnewman@pandionsystems.com

Ellen Paul
Executive Director
Ornithological Council
8722 Preston Place
Chevy Chase, MD 20815
301-986-8568
ellen.paul@verizon.net

Renee Rondeau
Director
Colorado Natural Heritage Program
CNHP Campus Mail 8002
Fort Collins, CO 80523
970-491-3774
rjr@lamar.colostate.edu

Rob Schorr
Research Associate
Colorado Natural Heritage Program/CSU
254 General Services Building
Fort Collins, CO 80523
970-491-4273
rschorr@lamar.colostate.edu

Lynn Sharp
Tetra Tech EC
1020 SW Taylor, Suite 530
Portland, OR 97205
503-222-4546
Lynn.Sharp@tteci.com

Karin Sinclair
Sr. Project Leader II
NREL
1617 Cole Blvd
Golden, CO 80401
303-384-6946
Karin_sinclair@nrel.gov

Dale Strickland
Vice President and Senior Ecologist
Western EcoSystems Technology
2003 Central Avenue
Cheyenne, WY 82003
307-634-1756
dstrickland@west-inc.com

Robert Thresher
Center Director
NREL's National Wind Technology Center
1617 Cole Blvd., MS3811
Golden, CO 80401
303-384-6922
robert_thresher@nrel.gov

Steve Ugoretz
Environmental Analyst
WI Dept. of Natural Resources
P.O. Box 7921
101 S. Webster St.
Madison, WI 53707
608-266-6673
ugores@dnr.state.wi.us

Tom Weis
Consultant
enXco
P.O. Box 1232
Lyons, CO 80540
303-823-2447
tweis@enxco.com

Mark Woythal
Fish and Wildlife Ecologist
NYS Dept. of Environmental Conservation
625 Broadway, 5th floor
Albany, NY 12233
518-402-8847
mswoytha@gw.dec.state.ny.us

Terry Yonker
President
Marine Services Diversified, LLC
139 Jackson St.
Youngstown, NY 14174
716-745-9129
terryyonker@cs.com

NATIONAL WIND COORDINATING COMMITTEE
WILDLIFE WORKGROUP
May 4-5, 2005
Aurora, Colorado

Meeting Purpose:

- Review Wildlife Workgroup Subgroup Activities and Approve Next Steps
  - Grassland/Shrub Steppe Species
  - Nocturnal Methods and Metrics
  - Risk Assessment
  - Peer Review
  - Mitigation Toolbox
  - BWEC
- Report On Sector Activities and Interests
- Presentation of New Research

May 4, 2005

Note: Lunch will not be served, snack break provided at 2:15 pm

Noon	**Introductions and Welcome** • Introductions • Review purpose of meeting • Review and adopt agenda	*Abby Arnold, RESOLVE*
12:30-12:45	**Background on Past Wildlife Workgroup Activities**	*Dick Anderson, Chair*
12:45-1:30	**Grassland/Shrub Steppe Species Subgroup** • What's been done to date and next steps • Questions and comments on workplan	*John Bridges, WAPA*
1:30-2:15	**Nocturnal Methods and Metrics Subgroup** • What's been done to date and next steps • Questions and comments on workplan	*Steve Ugoretz, WI Dept. of Natural Resources*
2:15-2:30	**Break (snack provided)**	
2:30-3:15	**Risk Assessment Subgroup** • What's been done to date, and next steps • Questions and comments on workplan	*Jim Newman, Pandion Syst.*
3:15-3:45	**Peer Review** • Increasing role of peer review in the Wildlife Workgroup	*Ellen Paul, Ornith. Council*
3:45-4:15	**Mitigation Toolbox** • What's been done to date and next steps • Questions and comments on workplan	*Lynn Sharp, Tetra Tech EC*
4:15-4:30	**Break**	

4:30-5:15 **Sector/Participant Updates on Activities**

- AWEA
- USFWS
- States
- NGOs
- Others

5:15-7:15 **Informal Dinner (served on site)**

Break into subgroups to discuss details of workplans/Subgroup activities

- Grassland/Shrub Steppe Species
- Nocturnal Methods and Metrics
- Risk Assessment
- Mitigation

7:15 **Adjourn**

May 5, 2005

8:15 **Informal Coffee and Welcome**

8:30-9:30 **Report out From Subgroups**
Progress Made and Next Steps

- Grassland/Shrub Steppe Species
- Nocturnal Methods and Metrics
- Risk Assessment
- Mitigation Toolbox

9:30-10:30 **Report on USGS-USFWS Collaborative Research Efforts Using Radar and Other Technologies for Wind and Other Tall Structure Development** *Al Manville, USFWS*

10:30-10:45 **Break**

10:45-11:45 **Report from BWEC on Collaborative Work and Plans** *Ed Arnett, Bat Conserv. Intl.*

- What is result of Summer 2004 Research
- What is planned for Summer 2005

11:45-12:30 **Lunch (served on site)**

12:30-2:00 **Wrap-up and What are Next Steps for the Workgroup?**

- What are tasks to be conducted and what is the schedule?
- Are we prepared to raise funds to support this research? How will we do this? What is the timing?
- Should another research meeting be held?
- Other Questions
- Review of who will do what by when

2:00 **Adjourn**