

## DISCUSSION OF RESEARCH NEEDS

The Facilitator asked participants for their overall reaction to the research that has been presented during this workshop. Questions addressed by workshop participants included the following:

- How do you develop trust and confidence in the research?
- What are some of the specific gaps in our understanding of wind energy's impact on birds and bats?
- How do we prioritize and proceed with closing the data/research gaps? How do we “connect the dots” and bring various research and mapping efforts together?
- Given gaps in the data, what are the critical questions we need to answer to make project decisions now? How do we track/influence the policies that will shape wind energy development?

### ***How do you develop trust and confidence in the research?***

The first part of the discussion centered on the credibility and accessibility of research being done. Participants considered what guidance is available for protocol development and whether protocols and study results should be peer-reviewed. A peer review requirement raises several issues, including questions of confidentiality for proprietary information, what it takes to get research published, and the importance of timely reporting of research results – including findings of “no significant impact.” Participants concluded that the issue is not whether research is peer reviewed, but whether it is a) credible, and b) accessible. (It was noted, however, that the peer review process does provide both credibility and accessibility in a way that no other process does.)

### Guidance available for developing research protocols.

While industry has funded most of the research to date, one participant noted that some of the results we have been looking at come from publicly-funded research (e.g., NREL, CEC), and that the industry-funded research follows largely the same protocols. Another participant cited the NWCC's stakeholder-developed “Methods and Metrics” document (*Studying Wind Energy-Bird Interactions: a Guidance Document*) which was intended to facilitate the comparison of results from different studies. This guidance document is now three years old, and it would be useful to get feedback so that it could be updated.

### Questions and comments related to NWCC's Guidance Document:

1) Are the protocols described in the guidance document applicable to all terrestrial sites?

*Response:* Yes, but not to offshore sites. (See Jette Gaarde's presentation on offshore development in Denmark.)

2) Guidance document could be revised to address offshore research methodologies as well

as new imaging technologies – but the basic research principles apply no matter where you’re doing the research.

3) Are people using this document as intended? Are they drawing the correct inferences?

*Response:* The document just provides a toolbox; agencies have to draw the inferences.

#### Issue of peer review and the confidentiality and timeliness of research.

One participant noted that Phase I assessment protocols could be reviewed by an independent body (without publication), which also could review the inferences drawn from the results of Phase I studies. Another agreed that it would be helpful to get protocols as well as actual studies peer reviewed. A third pointed out that “we have to be clear about what is meant by peer review. Many documents that are peer-reviewed still wind up in gray literature; we’re talking about peer-reviewed literature.”

#### Confidentiality

With respect to confidentiality, one participant recommended considering the FIFRA process – EPA is dealing with proprietary information. The nature of the chemical is not even revealed to reviewers, yet a technical review committee process can review the science without breaching confidentiality. Other participants said it was best to proceed with caution when engaging the Federal or state governments in the review of proprietary information.

#### The research may be valid, but is it publishable?

The question was raised whether the kind of work being presented here would qualify to get into peer-reviewed scientific journals, or whether “we have to look for a different venue for “applied” science studies.” *Response:* There are many high quality journals (e.g., Ecological Applications) that publish applied research.

Reports that are useful to industry may not meet article standards, noted one research consultant. “Those of us who publish long reports have an obligation to summarize the information in a series of publishable reports, and go the publication/peer review route.” Another consultant observed that it takes a long time to get a research article published. “When we do a monitoring study, we try to get the information out there as soon as possible. [Researchers] may need to do three to four sites before [they] can get the information into a scientific journal.”

A participant with experience both as a research consultant and as an associate journal editor acknowledged that “an awful lot of what we do is not publishable... But we do have to start publishing in refereed journals.” However, as a consultant, he and his staff can’t afford to make publication (as opposed to billable work) their focus. “We’re not in the academic arena, so it is problematic.”

#### How do we reconcile the need for review with the need for timely decision-

making?

When it comes to wind energy project developments, timely decision-making is important, sometimes a statutory requirement. One participant emphasized the importance of having access to reports *as they come out*. (“We need to avoid ‘paralysis by analysis.’”)

*Suggestions:*

- 1) Some research would add to the scientific knowledge base without necessarily having to be tied to a particular project’s development. Night radar monitoring, for example, would be useful to help us learn more about the ratio of flyover rates to mortality data.
- 2) A common post-construction monitoring practice is to have a Technical Review Committee. Is that an appropriate level of review?
- 3) A variation on this suggestion was described as “pseudo” peer review by stakeholder committees when permitting requirements create time pressure.
- 4) It might be useful for this group to establish its own publishing forum.

Other participants followed up on this last idea. One made the point that, while the peer review process takes time, a group of people such as those represented at this Workshop could “certify” research findings and make them accessible. It was suggested that the NWCC could be a central repository for research, providing access to the information, with a review process being conducted in parallel. Such a forum also would enable researchers to publish findings of “no significant impact,” which might be of legitimate interest to the industry, agencies, and environmental groups, but not to scientific journal editors. (One consultant noted that an article which reported an absence of fatalities at Vansycle Ridge was rejected as not having a sample size large enough.)

One participant noted that the two main issues are credibility and accessibility – both of which are necessary. “We need to think creatively as a community about how to provide credibility for a body of work, an agreed-upon process for conferring credibility.” Because accessibility is sometimes at odds with getting stuff published in peer-reviewed literature, this participant suggested various other outlets, including Web-related activities, access to technical reports with associated databases (e.g., via NREL), etc. A “technical working group” of half-a-dozen qualified individuals (perhaps set up by a group such as was gathered for this workshop) could perform the function of a peer review committee. It was suggested that the committee could even publish the review comments, allowing the work itself to be presented as it is.

Another participant summed up this discussion by noting that “peer review is just a tool to make sure you have good science. Good science, not peer review, is what we really care about.”

What are some of the specific gaps in our understanding of wind energy’s impact on birds and bats?

This question yielded a wide range of responses.

*How do birds detect turbines?* There is a presumption is that it's visual, but do they use sound? Under what conditions do birds not detect turbines? Are there things that can be done to make sounds that would help birds avoid turbines?

*When during the night do fatalities occur?* Do they occur early, when birds are leaving habitat, during mid-stream, or when birds are putting down? Need to know more about the impact of weather and how birds interact with lights and objects.

*Responses:* 1) We need to collect concurrent information on weather, and passage rates in zone of exposure and mortality. That will help us to predict weather impact. 2) Diurnal use should also be collected concurrently.

*Are bigger turbines necessarily better for birds and bats? What about lighting?* Look at Podolsky's Avian Risk of Collision (ARC) model determining risk of birds flying through different rotor swept areas. We can expect to get more definitive answers about red strobe lights from Paul Kerlinger's Michigan study and from other studies; this will be very valuable.

*Studies of grouse are needed.* Two participants underscored this point, citing the need to look at prairie grouse in particular, look at the impact of human activity on grasslands, other grouse habitat impact.

*We need to know more about cumulative effects of wind farm development.*

- 1) Can we start to model what would happen to bird and bat populations if we were to start building out wind energy potential?
- 2) We should look at wind energy's cumulative effects in the larger context – i.e., the impact on wildlife of all power generation technologies.

*Information about migration patterns means looking at the bigger picture.*

Some research requires a more proactive statewide approach, as opposed to project-specific studies. For example, it would be useful to the wind industry and consultants, as well as to wildlife and permitting agencies, to learn more about avian-wind interactions in the context of migratory behavior (e.g., use of stopover habitat). Such information would help agencies know what additional sitework needs to be done for a given project. People are already working on this (e.g., the US Geological Survey's science support program), we need to help pull this together. The National Fish & Wildlife Foundation's state wildlife program grant is another example (see [www.nfwf.org](http://www.nfwf.org)).

*We need more controlled experiments.*

Example of an experiment to test the effect of lighting on bird impacts, where a controlled experiment was actually built in to a project.

*Offshore and coastal wind development should be studied.*

We need to learn about the impact of offshore wind energy facility construction and operation on whales, how artificial reefs would affect marine wildlife, etc. So little is known about the coast (e.g., coastal Texas). It would be good to see some research on coastal sites.

#### Other Areas of Research on Which to Focus:

- We need more data from the Eastern US, especially about birds' use of ridges, passes, gaps.
- Bats – Don't forget the Bat Conservation International (BCI) research needs that have been identified.
- Crippling events and other "hidden" impacts – In the case of pesticides, for every bird that's killed, at least one is sub-fatally impacted. We don't seem to be measuring this for wind impacts, because it's hidden. (Also, what about the impact of electro-magnetic fields on birds?)
- We don't know that much about HOW birds and bats are being killed. Are they running into towers? Running into blades? Guy wires?

#### ***How do we prioritize and proceed with closing the data/research gaps?***

How do we "connect the dots" and bring various research and mapping efforts together?

Noting that "this is an ongoing process," one participant suggested that, rather than have workshop participants vote on research priorities, it might be better to set up an ongoing committee that tracks research priorities.

Referring again to the issue of who funds the research, a participant argued for working to get Federal and state governments to partner with industry to help close some of these research gaps.

#### Who connects the dots?

Another participant suggested that we might be able to "get smarter sooner" by looking at existing sources of data and how they might be tied together. With respect to the Appalachian ridges, for example, there are NEXRAD stations with data concurrent with radar studies that we've done already; if we can figure out how to "tie the data together," maybe we can learn what we need to know without doing another year of radar studies." This idea was greeted with enthusiasm, although one researcher noted that the NEXRAD technology has severe limitations for detecting birds, particularly in mountainous areas; it is more useful along coastal areas.

The Workshop Facilitator noted that people are starting use GIS to map bird migration and wind resource information in some parts of the country. "The question is, who connects the dots?"

One approach has been to map "areas of concern" – geographic areas where development either should not take place, or would require careful pre-development study to assess risk.

Yet focusing on “areas of concern” tends to be a somewhat piecemeal approach, and some environmentalists would argue for a more proactive approach.

Audubon has introduced the “important bird areas” (IBA) concept at the state, national, and continental levels. Forty-six states have IBA work ongoing, and some 5800 IBAs have so far been identified in this country. The National Audubon Society will be able to put together a national picture in a few years, which will help developers plan and also bring stakeholders together on the ground. (In a similar vein, the state of Pennsylvania has started implementing IMAs – Important Mammal Areas – and other states are thinking of establishing them as well.)

There are a number of people using NEXRAD to create regional maps as well as bird migration traffic maps for the entire US (maps showing density and direction of movement). There is a proposal in to the National Oceanic and Atmospheric Administration (NOAA) to develop a spatial model that looks at all the risk factors to migratory birds.

A participant representing The Nature Conservancy reported that the Conservancy has invested a lot in “biodiversity areas” but that “we don’t have a good handle on bird and bat ‘fly-ways’ or movement corridors. It isn’t the wind industry’s job to do this, but we need to close that gap.”

The group concluded that it is the NGOs that are taking the lead in coming up with the information—e.g., population numbers from IBA programs, the Natural Heritage Program (now NatureServe), the Nature Conservancy’s biodiversity programs. These are the dots that need to be connected, and a lot of that information is starting to come together.

### ***What are the Critical Questions We Need to Answer?***

Given gaps in the data, what are the critical questions we need to answer to make project decisions now? How do we track/influence the policies that will shape wind energy development?

Noting that “we’ll probably never have all the information we need,” a participant asked, “How do we react to wind development decisions that need to be made, given that there are and will always be gaps? What is an acceptable risk? Is it the same for all species? What are the questions we need answered to make project decisions?”

Another participant reminded the group that, from the industry’s standpoint, the question of bird and bat mortality is just one of the risks to be considered. How do we balance the need to assess the potential risk to birds and bats with developers’ need to “cap” or somehow manage the risk of having to shut down turbines once they are up and operating?

### **Areas of agreement**

Workshop participants agreed that, among the human activity-related threats to birds and bats, wind energy is at the margin. Nevertheless, it is important to understand where on the

margin it is. Other areas of agreement included:

- Need to address site selection criteria as well as guidance on site development.
- Need to be prepared with reasonable, practical protocols for studying proposed offshore sites.
- Research information needs to be both credible and readily available.
- Both habitat loss and mortality matter.
- There is a need for tools, techniques, metrics to address bats
- Do we need to develop a national strategy?