Renewable Energy
Wildlife Institute

Wildlife Monitoring Workshop Results

A strategic conversation to increase the management value of post-construction wildlife monitoring at wind-energy facilities

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This workshop was organized by Shilo Felton and Taber Allison of the Renewable Energy Wildlife Institute in conjunction with the 14th Wind-Wildlife Research Meeting Kansas City, MO, November 15, 2022.

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About REWI

The Renewable Energy Wildlife Institute (REWI, formerly the American Wind Wildlife Institute) is an independent, nonprofit 501(c)3 organization that advances scientific research and collaboration to better understand renewable energy's risks to wildlife and related natural resources and develop solutions. Built on a strong partnership of leaders, REWI works collaboratively with the wind and solar power industries, conservation and science organizations, and wildlife management agencies to accelerate responsible deployment of renewable energy to mitigate climate change and protect wildlife and ecosystems.

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Overview

On November 15, 2022, in conjunction with the 2022 Wind Wildlife Research Meeting, the Renewable Energy Wildlife Institute (REWI) and National Renewable Energy Laboratory (NREL) convened a workshop to facilitate a strategic conversation and spur future actions to ultimately increase the management value of post-construction fatality monitoring.

Representatives from research institutes, federal agencies, and the wind energy industry provided background on the post-construction monitoring landscape, conservation, research priorities for birds and bats, and the challenges and opportunities in implementing fatality monitoring at wind energy facilities.

Breakout discussions produced a broad spectrum of ideas, questions, and solutions, reflecting the diverse backgrounds of participants.

Background

Monitoring is widely used and intended to evaluate the impacts of human activity on wildlife. However, monitoring is costly and can be an inefficient use of resources if the monitoring results do not inform management decisions.

One to two years of post-construction mortality monitoring (PCMM) for birds and bats at new wind energy facilities is recommended by the USFWS Wind Energy Guidelines released in 2012 and the results are used ostensibly to estimate project-level impacts to birds and bats. The results may be used to inform potential minimization strategies to reduce collision fatalities. Increasingly, questions are raised regarding the conservation value of PCMM.

Purpose

The workshop created a space for collaborative discussion among the wind energy and wildlife community to:

1. To identify which goals are most important for monitoring, and
2. To explore tangible, feasible options to change the PCMM approach in a way that best meets those goals.

Bringing Participants Up-To-Speed

We organized the workshop to encourage engagement among all participants, regardless of experience level or affiliation. We recognized that many participants at the Wind Wildlife Research Meeting may be new to the wind-wildlife field or have tangential careers in which wind-wildlife challenges are not the primary focus. With that in mind, we initiated the workshop with a series of presentations intended to give attendees the necessary background to engage in the conversations that followed.

Introduction (Cris Hein, NREL)

Cris Hein opened the workshop with a background on post-construction mortality monitoring (PCMM) and its purpose. He noted that the USFWS Land-based Wind Energy Guidelines (WEGs) recommend one to two years of post-construction mortality monitoring for birds and bats at new wind energy facilities to estimate the project-level impact on birds and bats. The results of PCMM can also be used to evaluate

measures to reduce collision risk. On a broader scale, the aggregation of PCMM data across several facilities can be used to inform the siting of future facilities. However, some stakeholders question whether PCMM, as currently conducted, is necessary or how it contributes to conservation and energy production goals.

Bird and Bat Conservation Priorities: What Do We Want to Know When It Comes to Conserving These Species? (Amanda Hale, WEST, Inc.)

Amanda Hale presented an overview of the conservation challenges for birds and bats and wind energy and the bird and bat conservation questions that PCMM can address. For birds, songbirds account for more than 60% of turbine-related fatalities, mostly during spring and fall migration. Diurnal raptors are also frequent fatalities at wind energy facilities, likely because of their flight and hunting behavior. For bats, migratory tree roosting species—specifically hoary bats, silver-haired bats, and eastern red bats, are the greatest source of fatalities observed at wind energy facilities. PCMM can tell us trends in species composition and level of impact over space, time, and varying turbine technologies. It can also indicate when minimization strategies may be needed and can help validate the effectiveness of minimization measures. While protocols for PCMM have become more standardized, study designs and reporting are not consistent across projects, limiting the reliability of the inferences we can make from the resulting data.

Post-construction Monitoring Methods (Sara Weaver, Bowman)

Sara Weaver provided a background on the methods used to conduct PCMM. She introduced the various decision points in study designs, including those related to the percent of turbines surveyed, the area searched around each turbine, sampling frequency (noting few studies search daily), search method (human vs. dog), bias trials to account for incomplete detection due to searcher efficiency and carcass persistence, and the various estimators used to incorporate these variables into a fatality estimate from raw data. The General Mortality Estimator, or GenEst, is considered the most accurate estimator available. Publicly disseminating reports and providing data into established databases is important.

Wildlife Monitoring: The Industry Perspective (Andrew Pinger, EDP Renewables)

Andrew Pinger described the drivers and objectives for monitoring from the wind energy developer perspective, as well as the challenges associated with PCMM. Developers conduct PCMM to maintain compliance with state and federal regulations and fulfill commitments to their own corporate standards and investment partners. Although the 2012 USFWS Land-based Wind Energy Guidelines suggest at least one year of PCMM, it also suggests that monitoring may not always be necessary. He agreed that monitoring held value for evaluating impacts at a project level and for testing the efficacy of collision minimization technologies, but questioned the conservation value of monitoring if the resulting data across projects is not useful to inform bird and bat conservation questions.

Breakout Discussions

Format

The workshop participants broke out into groups of approximately five to ten participants. We urged participants to sit with people they did not know to ensure a broad spectrum of perspectives in each group. We devoted 30 minutes to break-out group discussions and another 30 minutes for groups to

report on the results of their discussions. Each group was assigned one of five discussion questions to focus on to ensure each group had plenty of time to delve deeply into the topic. Groups were encouraged to pick an additional question to tackle if they finished discussing their assigned question early. We asked that each group assign its own facilitator and scribe to summarize the group's discussion and for the full workshop. REWI staff also collected notes from each group's report. Workshop organizers set the following ground rules for break-out groups:

- Discussion is not for attribution
- Provide your own perspective (do not speak for others)
- Focus discussion on standard PCMM
- Avoid discussion of monitoring for incidental take permits (ITPs) and evidence of absence monitoring (EoA)

Questions and responses

1. Are the data collected during PCMM suited to answering the questions we're asking? If not, what changes would you recommend, and what process do you recommend to achieve those changes?

Participants largely agreed that baseline "generic" one-year fatality monitoring studies at wind energy facilities are not always providing useful information, whether they include only post-construction monitoring or both pre- and post-construction monitoring. Pre-construction studies do not always align with post-construction studies in terms of species risk assessments, and it's not always clear from the methods used if observations come from consistent monitoring or are incidental. Participants suggested the following changes to the current PCMM data collection:

- Tailor monitoring to specific problems or questions at a site
- Focus on predictive factors for understanding local and population-level impacts
- Focus on timing and effectiveness of minimization measures

To implement these recommendations, some participants recommended a regimented national monitoring approach that monitors a random subset of wind projects over a longer period of time to better understand interannual variation.

2. What are the benefits and constraints of switching to a national monitoring approach to improve comparability across projects?

Participants cited the following benefits of switching to a national monitoring approach:

- More cost-effective
- Better data standardization across monitoring efforts
- Better for answering questions about wind-energy impacts that cannot be answered at the site level, including understanding long-term impacts
- Could better define monitoring program goals
- Allow stakeholders to provide feedback on what is working or not working in the monitoring program

Participants stated the following potential hurdles and suggestions for overcoming them, associated with setting up a national monitoring approach:

Challenge: Companies that do the minimum may have to change their approach and/or invest more in monitoring. This could hold up development if each developer is waiting for another developer to go first.

Solution: Collaborative agreements across sectors and industry members.

Challenge: Companies may be less interested in buying into a national monitoring program if they are expected to share their data publicly.

Solution: Create assurance for participants to overcome the potential for legal repercussions.

Challenge: Site access may depend on who is in control of or leading the "national" effort.

Challenge: Differences in species composition and landscape features across regions could make it difficult to prescribe a single monitoring scheme nationally.

Solution: Account for differences across regions in monitoring design.

3. What other approaches for data collection (e.g., technologies, roads, and pads) are promising and should be considered? What is needed to gain acceptance for the proposed changes?

Participants noted the following approaches to consider for collected PCMM data:

- Dogs for carcass searches—some evidence that this is a necessary approach to collect robust fatality data on bats and small birds
- Drones for eagle carcass searches—though this may not be acceptable to all landowners (e.g., there has been some pushback from landowners in Texas)
- Integrated bias trials—some have used these to cut down on time and cost of monitoring
- Real-time collision monitoring—this is viewed by some as a need for bats and a need for offshore wind where carcass searches are not possible
- Paired acoustic-thermal video monitoring with fatality monitoring to improve our understanding of the relationship between exposure or risk to collision rates

Given that integrating new technologies or methods into monitoring can be challenging, participants provided the following potential pathways toward acceptance:

- Investments in research—allowing the time, money, and effort for new technologies and methods to be tested across multiple facilities, landscapes, and circumstances
- Stakeholder support—need stakeholders to rally around and provide support for the development, validation, and deployment of these methods
- Agency guidance—regulatory agencies play a big role, and they need to define what validation they will accept
- Cost-efficiency—new methods need to be less costly than the status quo
- Technical support from engineers—it will be important to provide adequate maintenance and troubleshooting support to install and keep these technologies running properly after deployment

- Demonstrated reliability, robustness, and accounting for sources of error—new approaches need to be comparable to previous data collection and will need to articulate and account for biases and imperfect detection, just as with human searches that incorporate searcher efficiency and carcass removal trials
- Thresholds for acceptable levels of uncertainty around success—regardless of the process, both regulators and members of the industry will need to be able to work with a level of uncertainty and manage adaptively when incorporating these technologies into practice

4. How do we know when we've achieved our monitoring goals? And if/when that happens, how do we shift gears and stop monitoring?

Some participants acknowledged a difficulty in answering this question definitively, as the answer is largely dependent on the monitoring goals and the perspective of the entity involved. For some stakeholders, monitoring may only be done to satisfy regulatory compliance commitments, in which case, the regulation dictates when monitoring goals are met. However, when answering research questions or questions that may inform management decisions, monitoring goals may not be achieved until the data collected can provide an agreed-upon level of certainty.

Given the variability in species composition, turbine technology, landscape characteristics, and prey base, across wind energy facilities, answering these questions can take a significant investment in monitoring across multiple projects and years. Some participants offered that monitoring goals are achieved when no additional information is gained from further monitoring. If, for example, the goal is to quantify impact, then the monitoring is complete when the data from monitoring can inform a model that can predict the mortality of the next wind energy facility—if one could predict with a reasonable degree of accuracy and precision what the mortality at a wind energy facility would be, PCMM would become unnecessary. One group also offered that monitoring efforts could theoretically be discontinued if previous monitoring has shown that bird and bat populations of interest have leveled off or stopped declining. In reality, it is unlikely that monitoring could reasonably achieve these goals given that technologies are likely to change over time, which may change the level of risk posed to various species. Additionally, our knowledge of the population size for impacted species and the composition of species impacted are likely to change, which would require additional monitoring. Further research would be necessary to confirm if there is a consistent relationship between pre-construction activity, exposure, and fatality rates. In cases where decision-makers are employing adaptive management, some degree of monitoring would be an ongoing need.

Participants responded that PCMM may always be necessary, but we could potentially reduce the intensity of PCMM and instead use monitoring to address specific questions or impacts. Some participants shared concerns about regulatory compliance and legal challenges that would need to be addressed to discontinue monitoring. Currently, adherence to the WEGs and Migratory Bird Treaty Act (MBTA) enforcement discretion require PCMM for 1-2 years. Liability protection would be required for industry to be able to stop monitoring. Others voiced concerns that federal and state policies remain necessary to protect wildlife from wind energy impacts, at least until the USFWS offers an incidental take permit under the MBTA. Some participants also suggested that post-construction monitoring could shift from PCMM to activity monitoring if the goal is to inform minimization strategies. The money saved from monitoring could be applied toward species conservation. Doing so would also require validating that post-construction activity is a reliable predictor of fatality rates.

5. If given the opportunity to shift resources from monitoring to conservation (e.g., minimization), how would we implement that shift, and what would be your concerns?

Industry participants noted the collective cost may not be worth the benefit because monitoring is largely reactionary. Shifting the monitoring paradigm might require a more forward-looking approach that anticipates that future risks may not be the same as they are now. For example, turbine sizes and rotor-swept zones are increasing; the footprint of wind energy deployment is likely to expand across the landscape, though we don't know the locations where all future projects will be built; climate change may increase the vulnerability of some species and is also likely to lead to shifts in species ranges and migration patterns.

Resources could be shifted from monitoring to developing and implementing minimization strategies (e.g., curtailment and deterrents), compensatory mitigation (e.g., land conservation and habitat enhancements), or increasing our understanding of focal species (e.g., species-specific habitat use, movement patterns, or population demographics), recognizing that these actions don't eliminate the need for monitoring.

Participants voiced several concerns about the implications of addressing knowledge gaps or data sharing if resources are shifted away from monitoring to conservation.

Knowledge gaps

- Concerns about shifting resources toward minimization strategies largely centered on the uncertainty of the effectiveness of this technology across facilities.
    - How to keep up with technologies that are constantly changing
    - It is unclear if the current research documenting the effectiveness of these technologies can be extrapolated to other areas
- Compensatory mitigation that could effectively "grow more bats" may be difficult to prescribe given that affected species' ecologies are poorly understood. Additionally, the magnitude of mortality for migratory tree bats may be difficult to offset with compensatory mitigation.

Data Sharing

- How would we ensure research results are publicly available?
- Research may not benefit all funders if research priorities are geared toward certain geographies—regional differences in wildlife issues would need to be addressed.
- Using a mitigation bank could create a bottleneck if regulatory agencies are responsible—agencies generally have limited resources and may not be able to allocate funds efficiently.
- Would need buy-in from both regulatory agencies and the industry.

Charting a path forward

Following the reports from break-out groups, we opened the floor for suggestions of next steps and actionable items for shifting the current monitoring paradigm. Participants asked for 1.) the results of the workshop to be shared broadly and 2.) the formation of a working group to work toward solutions to the challenges addressed in the workshop. Participants offered suggestions as to the structure and topics that a potential working group might need to address, including methods for data collection and sharing, implications for mitigation, and pathways for implementing recommendations.

Working group structure

- Include representatives from all stakeholder groups, e.g., conservationists, scientists, industry and agency staff
- Form subgroups that could tackle the various topics

Topics for a working group to address

Implementation

- Update the Comprehensive Guide to Studying Wind Energy/Wildlife Interactions (Strickland et al. 2011; sometimes referred to as the "Methods and Metrics").
- Incorporate changes into updated USFWS Land-based Wind Energy Guidelines (WEGs)—USFWS has expressed plans to update the science and references included within the WEGs.
- Consider implications of changes in enforcement of incidental take: In October 2021 USFWS announced its intent "to develop proposed regulations to authorize the incidental take of migratory birds under prescribed conditions and prepare a draft environmental review pursuant to the National Environmental Policy Act of 1969, as amended."

Data collection methods and sharing

- Synthesize information on the efforts already underway to collect, analyze, and share data; communicate those efforts to the broader community
- Data accessibility, including acceptance by industry and assurances by regulators
- Data standardization
- Technological development and compatibility, including monitoring technology for offshore wind
- Regional monitoring approaches that upscale to national monitoring approaches

Mitigation Implications

- Discuss the possibility of a wind-wildlife conservation fund to direct funding to conservation projects.
- Discussion could inform offshore wind monitoring and mitigation, where strike detection technologies may be the only form of accounting for fatalities.
- Export knowledge to countries that are building wind energy in other parts of the world (e.g., Latin America, Africa, etc.) where there could be potentially large impacts but limited funding for research and mitigation. NOTE FROM ORGANIZERS: IFC funded Natural Power and WEST, Inc. to develop a tool and guidance document for setting up a monitoring protocol specifically for emerging countries—expected in 2023.