



AWWI Webinar Audience Q&A Panelist Responses
Bat Impact Minimization Part 1, Curtailment

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Often curtailment is applied after a year of operation and post-construction surveys show a large amount of fatality. How do we isolate the effects of curtailment vs. potential decreases in the population from the previous year's operation?

- **Winifred Frick, Bat Conservation International:** Well-designed studies with randomized treatment/controls and adequate sample sizes should be able to disentangle treatment (curtailment) effects from other sources of variation.

When looking at these meta-analyses is there any way to account for the bias toward publication of significant results? I.e. only publishing results that show a significant reduction?

- **Michael Whitby, Bat Conservation International:** We tested for publication bias and found none. Because we use gray literature in addition to peer review, the likelihood for publication bias is less.

Is there any information on whether the cut-in rates to reduce fatalities in windier places needs to be higher to achieve the same reduction in fatalities? I.e., does baseline/average wind speeds in an area impact efficacy of cut-in speeds? Does the "region" variable address that? Are these studies grouped regionally as well?

- **Evan Adams, Biodiversity Research Institute:** We had an ecoregion variable that we grouped the 36 sites into. It was a fairly coarse analysis and we didn't find that those regions explained much in the way of fatality reductions. There are likely strong site-based effects (like windier sites having different relationships between curtailment and fatality reduction), but we had a limited capacity to test a question like that at this scale. I would recommend more site-scale studies for delving into those issues.

Have you considered methods for regional scale studies to understand inter-facility influences to curtailment and mortality reduction?

- **Winifred Frick, Bat Conservation International:** A better understanding of spatial variability in fatalities and efficacy of curtailment will always be helpful. Making data publicly available from monitoring efforts will continue to help improve modeling efforts.

Fundamentally, curtailment works because risk to bats is eliminated when turbines are not spinning. Triggering shutdown can be accomplished in many ways using one or more variable, but how much curtailment actually occurs is a function of weather or conditions. Would it be possible/useful to model strategies based on their “actual” amount of downtime instead of the designed cut-in speed?

- **Winifred Frick, Bat Conservation International:** Yes. This is a great idea.

Everything I've heard so far is that acoustics don't predict bat activity and mortality esp. during migration. I'm curious if you have any insight as to why DOE is focusing on using acoustics--do you know what info is out there (other than these projects) supporting acoustics can be predictive?

- **Cris Hein, National Renewable Energy Laboratory:** Acoustic data collected prior to construction does not appear to be a good predictor of mortality. There are a lot of reasons why this might be the case. It's different when you measure acoustic data post-construction. There does appear to be a better relationship between post-construction activity and mortality.

In reference to the DOE-supported studies, can you elaborate on how many acoustic detectors inform the curtailment and how many turbines are curtailed? Is resulting curtailment site wide?

- **Cris Hein, National Renewable Energy Laboratory:** It varies by project, and it may be best to ask the question to each PI. This is my understanding: EPRI used 4 detectors to inform decisions at 18 turbines. Natural Power used 5 detectors to make decisions across the 69 wind turbines. Stantec used 15 nacelle mounted turbines at each of 2 sites plus 15 detectors at the ground (split between 2 sites) to measure activity and exposure. AWWI collected data at 10 wind turbines.

Were acoustic files manually vetted? Or did you rely on auto-id?

- **Andrew Farnsworth, Cornell Lab of Ornithology:** Regarding acoustic files, I believe all acoustic data were processed by Heist et al. using Kaleidoscope, the Wildlife Acoustics Software.
- **Rhett Good, Western EcoSystems Technology, Inc.:** All calls were manually vetted.

Is there a central record anywhere of what the curtailment regime is at various sites?

- **Evan Adams, Biodiversity Research Institute:** AWWIC (the American Wind Wildlife Information Center) has information on all the curtailment regimes as do other databases. But there isn't a single central database that handles these things.

What is/are the primary barrier(s) to curtailment being implemented?

- **Winifred Frick, Bat Conservation International:** From my understanding, a primary barrier to curtailment being implemented is lack of economic incentives and absence of regulation to 'even the playing field.' I feel this question is best answered by industry as they can speak to the complexity of the market forces better than I can. I'd be interested to see learn more from industry on what they see the barriers are and discuss ways to remove them. This was a major

topic of discussion at the DOE and NREL workshop on the [State of the Science and Technology for Minimizing Impacts to Bats from Wind Energy](#).

How can we encourage industry operators to proactively implement some form of curtailment as a standard best management practice, such that their power generation estimates include a slight reduction to account for curtailment?

- **Winifred Frick, Bat Conservation International:** The tough reality is that there is no economic incentive for industry to proactively implement curtailment (in fact, there's disincentive). Until we can solve that problem, I believe it is unrealistic to expect industry to adopt measures on a voluntary basis as a standard best management practice. That doesn't mean we shouldn't try to find ways to create incentive. If anyone has great ideas on how to do that, I'd be keen to learn more.