

## Results Summary

### *Report on Bat Fatality Data in AWWIC*

**July 10, 2018**

AWWI's first report from the American Wind Wildlife Information Center (AWWIC) database summarizes bat fatality rate (bats per MW per year) and fatality incident (individual fatalities) data from wind energy facilities in the U.S. AWWIC is the most comprehensive database of post-construction fatality data from U.S. wind projects, incorporating both publicly available and contributed data. This first report sets the foundation for further studies of which bat species are at risk, where, and why.

### **ABOUT AWWIC**

Many post-construction fatality monitoring (PCM) study data are publicly available, but some are confidential and unavailable for analysis. AWWIC maintains data confidentiality, encouraging voluntary data contributions from wind energy projects across the U.S. The result is more data available for analysis, including meta-analysis of post-construction fatality data from multiple wind energy projects. For each study, PCM data includes project site, adjusted fatality estimates, and species fatality incidents. AWWIC also captures useful supporting data from PCM studies on methodologies and details of fatality incidents. This detailed picture of how each study was conducted and its findings facilitates a greater ability to compare results between wind energy projects.



This first analysis focuses on bats and wind energy, and aims to answer the questions:

- Does adding more data from a new source change what we know about bat fatalities at wind farms?
- Does regional data representation matter?

AWWI will release a technical report on birds and wind energy with a similar scope in the fall of 2018.

### **KEY TAKEAWAYS**

- **AWWIC has sufficient data, with enough geographic coverage, for us to pose reasonable hypotheses about the impacts of wind energy on bat species in the U.S.** These can be evaluated with data from additional PCM studies.
- Findings indicate **substantial variation in collision risk among bat species**.
- Species composition of fatalities and adjusted fatality estimates **vary substantially across geographic regions**. Evaluation of this variation may improve our knowledge of why some bats and some regions have high collision risk.
- **Geographic representation of data can affect cumulative assessments of wind energy's impacts on bats.**

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## NEXT STEPS

PCM protocols typically vary by regulatory jurisdiction, possibly resulting in systematic bias in regional fatality estimates. AWWI is evaluating this potential bias and other factors that underlie the patterns seen in the data to distinguish variation in fatality risk from differences in PCM protocols. Next steps for this analysis also include:

- Where possible, recalculating fatality estimates in AWWIC using a new generalized fatality estimator (GenEst – to be released fall 2018).
- Based on evaluation of the current data, estimating the number of studies needed to accurately and reliably estimate bat collision fatalities within a region.

## STUDY DESIGN

AWWI compiled and evaluated 227 PCM studies for inclusion in this report. Studies were included that met criteria for a basic level of standardization. Fatality rates used in this report are adjusted for detection biases and are “as reported,” with no additional adjustments to correct for among-study variation in sampling period, plot size, or estimator used in the adjustments made to raw counts.

We summarized and plotted protocols, species composition, and fatality rates by U.S. Fish and Wildlife Service (FWS) regions and selected Environmental Protection Agency Ecoregions. By observing the variation of results in each region we gained insights on patterns that will spur future data collection and research.

## STUDY RESULTS

AWWIC data indicate that most bat species are rarely detected as fatality incidents (22 species out of 46 have been detected in the U.S. by PCM). Bat fatality estimates for the entire U.S. have a skewed distribution with 75% of studies reporting fewer than 5.3 bats per MW per year. The median fatality estimate for all regions is 2.7 bats per MW per year. 44 studies (22%)

estimated less than one bat fatality per MW. Studies considered outliers reported 11.6 to 49.7 bat fatalities per MW.

Hoary bats had the highest overall percentage of fatality incidents (32%) and were detected in the most PCM studies (180 of 190 studies). Three migratory tree bats (hoary, eastern red, and silver-haired bat) collectively accounted for 72% of all fatality incidents. The eight bat species with the highest number of fatalities accounted for 96% of all fatality incidents.

Results show substantial variation within and between regions in bat fatality estimates (see table).

Region	Fatality Rate Bats per MW per year		
	Median	Range (# of studies)	
Midwest	6.2	0.4-32	(36 studies)
Northeast	3.5	0.1-49.7	(52 studies)
Southwest	3.3	0.1-36.9	(22 studies)
Pacific	0.7	0-4.2	(35 studies)
Pacific SW	1.4	0-5.2	(30 studies)

*AWWI would like to thank the wind companies who voluntarily contributed data to AWWIC, our Partners and Friends, and the National Renewable Energy Laboratory for supporting this work.*