

# Summary of Bat Fatality Monitoring Data Contained in AWWIC (2<sup>nd</sup> Edition)

AWWI's 2<sup>nd</sup> edition bat report from the American Wind Wildlife Information Center (AWWIC) database summarizes bat fatality rate (bats per megawatt 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 monitoring data from U.S. wind projects, incorporating both publicly available and contributed data. The 2<sup>nd</sup> edition report adds 81 new studies to the data summaries to ensure that the most up-to-date data are available for generating hypotheses about bat collision risk at wind energy facilities.

The full report is available at: [www.awwi.org/resources/awwic-bat-technical-report/](http://www.awwi.org/resources/awwic-bat-technical-report/).

## DATA SUMMARY APPROACH

Many post-construction fatality monitoring (PCM) data are publicly available, but some results are confidential and unavailable for analysis. AWWIC contains both public and confidential data, and by maintaining data confidentiality, encourages voluntary data contributions from wind energy projects across the U.S. making more data available for analysis. The data for each PCM study contained in AWWIC, include information on project characteristics, raw carcass counts and individual fatality incidents, bias corrections, and adjusted fatality estimates. The detailed picture of how each study was conducted allows studies that do not meet a basic level of standardization to be removed, or further adjusted if comparative analyses are conducted.

The 2<sup>nd</sup> edition report contains the latest data summaries for:

- Regional representation of the AWWIC database
- Regional bat fatality estimates
- Species composition of bat fatalities
- Seasonal timing of bat fatalities
- Search effort and plot size
- Distance of carcass discoveries from turbines

### How to Use This Report

The purpose of this report is to provide a clear picture of the range of PCM data available in AWWIC and identify possible patterns in the data. The report is valuable as a reference for tracking the available information and as a guide for generating testable hypotheses. This report only summarizes fatality data resulting from scheduled fatality searches conducted during PCM, and we do not include incidental fatality finds or fatalities noted outside of scheduled searches, e.g., by operations personnel. As more PCM studies are added to AWWIC, the data summaries may change. If you have questions about how to use the report findings in your work, please contact AWWI at [info@awwi.org](mailto:info@awwi.org).

## KEY TAKEAWAYS

- **AWWIC has sufficient data, with enough geographic coverage, for investigators to pose reasonable hypotheses about the impacts of wind energy on bat species in the U.S.** These hypotheses can be re-evaluated as data from additional PCM studies are added to AWWIC.
- Findings indicate **substantial variation in collision risk among bat species** with most fatalities concentrated among a few species. Three species of migratory tree bat accounted for 72% of all bat fatality incidents in AWWIC, and the eight bat species with the highest number of fatalities accounted for 96% of all fatality incidents.
- 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 in some regions have apparent high collision risk.
- **Accurate cumulative assessments of wind energy's impacts on bats need to account for the geographic variation in numbers and variation among species in collision fatalities.**

## NEXT STEPS

PCM protocols typically vary by regulatory jurisdiction, possibly resulting in systematic bias in regional fatality estimates. AWWI is working with other scientists to evaluate the importance of this potential bias and other factors in affecting the patterns seen in the data to distinguish regional and interspecific variation in fatality risk from differences in PCM protocols. Next steps also include:

- Detailed analysis of fatality timing, carcass fall distance, and cumulative estimates.
- 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 340 PCM studies from wind energy facilities in the U.S. from both publicly available and confidential sources for inclusion in this report. Data in this report represented ~28% of installed U.S. wind capacity. 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. Species data summaries are based on

scheduled searches only; incidental finds are not included.

We summarized and plotted protocols, species composition, and fatality rates by U.S. Fish and Wildlife Service (USFWS) legacy regions. We recognized that these are administrative and not ecologically relevant regional designations. However, no formally recognized bird-conservation region equivalent exists for bats and this regional aggregation enabled maximum use of the data in AWWIC.

## STUDY RESULTS

Twenty-two of 46 bat species in the U.S. were reported by PCM studies contained in AWWIC – one additional species from the southwestern U.S. has been reported in a fatality study and two additional U.S. species have been reported from studies in Canada, but these data are not contained in AWWIC. Three migratory tree bats (hoary, eastern red, and silver-haired bat) accounted for 72% of all fatality incidents. Eight bat species accounted for 96% of all fatality incidents. Hoary bats had the highest overall percentage of fatality incidents (30%) and were detected in the most PCM studies (259 of 273 studies that meet inclusion criteria). Adjusted fatality estimates for the entire U.S. have a skewed distribution with 75% of studies reporting fewer than 7.7 bats per megawatt (MW) per year. The median fatality estimate for all regions is 3.0

bats per MW per year. Forty-eight studies (18%) reported less than one bat fatality per MW per year.

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

| USFWS Region     | Fatality Rate<br><i>Bats per MW per year</i> |                       |
|------------------|--|-----------------------|
|                  | Median                                       | Range (# of studies)  |
| Midwest          | 8.4  | 0.4-73 (70 studies)   |
| Mountain Prairie | 2.6  | 0.2-19 (44 studies)   |
| Northeast        | 4.0  | 0.1-60 (59 studies)   |
| Pacific          | 0.7  | 0.1-4.2 (38 studies)  |
| Pacific SW       | 1.6  | 0-5.2 (28 studies)    |
| Southwest        | 3.0  | 0.1-36.9 (42 studies) |

## CITATION

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