Migratory *Lasiurus* Bats

Hoary bat	*Lasiurus cinereus*	**Southern red bat**	*Lasiurus blossevillii*
Eastern red bat	*Lasiurus borealis*	**Southern yellow bat**	*Lasiurus ega*

Proposed action: Inclusion on CMS Appendix II
Proponents: Peru

HOARY BAT / M. BROCK FENTON

Overview

Bat species around the world face a myriad of threats, from climate change and habitat loss to infectious disease. Recently, a new threat to migratory bat species has emerged: wind energy production. Although a critical source of renewable energy, research from the last decade has shown that, in just the United States and Canada, over half a million bats are killed each year by wind turbines. New research indicates that mortality at wind turbines has the potential to cause dramatic population-level declines in hoary bats, the species most frequently killed at wind turbines. Technological solutions are in development and operational changes at turbines can be immediately adopted, but most bat species killed by wind turbines do not have any formalized protection, so there is little incentive for wind energy facilities to adopt potentially costly measures that can drastically reduce bat fatalities. CMS Appendix II listing can catalyze protection for these species and encourage research into these migratory bat species and how best to protect them.

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Biology and Distribution

These four species of migratory bats predominantly roost in trees, emerging at night to forage on insects. Adult bats are solitary, although females may temporarily live in small groups with newborn pups. These bats are relatively understudied, lacking basic demographic information.

The hoary bat, named for its white-tipped fur that resembles hoar frost, is the most widely distributed bat in the Americas, found from Canada to Argentina and Chile, with a gap in Central America. Hoary bats can migrate over 1,500 km each year and are the only terrestrial mammal to have reached the Hawaiian Islands without human assistance. An estimated 2.5 million hoary bats live in North America.

The eastern red and southern red bats were thought to be the same species until 1988. Eastern red bats live in southeastern Canada, the eastern U.S., and northeastern Mexico. They winter in the southeast but expand their range north during summer. Southern red bats are found in parts of southwestern Canada down to central Argentina. They are migratory in part of their range, including portions of Canada, the U.S., and Argentina. Southern yellow bats are found from the southwestern U.S. to central Argentina, often roosting in dead palm fronds. Although southern yellow bats are year-round residents in parts of their range, others migrate towards the equator, including flying over water (they have been found over 300km out at sea).

Migratory Bats and Wind Energy

Research from the last decade has revealed that over half a million bats are killed at wind turbines each year in the U.S. and Canada, numbers unprecedented for human-caused bat mortality. Most of these bats are killed during low wind speeds, when insects are active and bats prefer to forage. The overwhelming majority of the bats killed (~80%) are migratory bats, which are disproportionately struck by turbine blades as they pass through wind farms to forage or migrate.

Bats seem to be attracted to wind turbines and have been documented to change course to inspect them. Although there is no scientific consensus on why bats are attracted to turbines—theories range from mistaking turbines as trees to roost in, to seeking out insect prey that congregate near turbines—this behavior puts them at increased risk for collision with the spinning blades.

Hoary bats and eastern red bats are the two most commonly killed bat species in the U.S. and Canada, representing 38% and 22% of all bats killed at turbines, respectively. Southern red bats and southern yellow bats are also killed by wind turbines, but most of the records are from a limited portion of their range.

Bats are long-lived mammals which reproduce slowly, so their populations are sensitive to losses of breeding-age adults. Recent demographic modeling for hoary bats shows that the level of mortality experienced at wind turbines in the U.S. and Canada is not sustainable: Using 2014 installed wind energy capacity and the best estimates for population size and growth rate, hoary bat populations will decline by 90% in the next 50 years due to mortality at wind turbines. As wind energy development continues, hoary bat populations could decline more precipitously if nothing is done to decrease bat mortality. Indeed, recent studies suggest populations of hoary bats and eastern red bats are already declining. Additional research is needed to determine whether population-level impacts to other migratory bat species from wind energy exist.

Because the threat from wind energy is so new, none of these bats have formalized protections at the national or international level.

Conservation Opportunities

Wind energy is critical to reducing greenhouse gas emissions and there are ways to limit bat fatalities at turbines so that green energy and migratory bats can coexist. Researchers and government agencies are collaborating with wind energy operators to create technologies to deter bats from approaching turbines. These technological solutions, which include high frequency sounds, lighting, and turbine coatings, are in development and being tested at pilot sites. Continued research and funding are needed to validate and commercialize these technologies.

Deterrent technologies are promising but not yet commercially available. Until these technologies are available, operational changes, such as "feathering" turbine blades so that they do not spin at low wind speeds (when bats are most active) during important migration periods, can drastically reduce bat kills. This practice, called operational curtailment, can reduce energy production at turbines by 1-3.5% (with a corresponding 50-90% decrease in bat fatalities). This energy loss can put wind facilities at a competitive disadvantage and is a disincentive for bat conservation. Additionally, because of the migratory nature of these bats, widespread adoption of conservation measures is needed. Saving migratory bats will be a group effort: the wind industry, power purchasers, conservation organizations, researchers, and governments need to work together to find solutions.

EASTERN RED BAT / MSKELLAM

SOUTHERN RED BAT / JOSÉ G. MARTÍNEZ

SOUTHERN YELLOW BAT / JOSÉ G. MARTÍNEZ

HOARY BAT / JENS RYDELL

CALL TO ACTION

Beneficial impacts from listing species under CMS Appendix II depend on concrete follow-up actions and specific regional agreements by range states. If properly implemented, listing these *Lasiurus* bats could:

- prompt research to determine population demographics, key habitat, and migration routes;
- facilitate regional cooperation toward conservation of shared populations and key habitats;
- incentivize development & implementation of technologies to reduce bat mortality at wind farms.

We urge CMS Parties to support inclusion of *Lasiurus* bats on CMS Appendix II at CoP12

References

Information in this fact sheet is based on the CMS listing proposal, relevant IUCN Red List assessments, and:

Arnett, E.B. & Baerwald, E.F. (2013) Impacts of wind energy development on bats: implications for conservation. Bat Evolution, Ecology, and Conservation.

Frick, W.F. et al. (2017) Fatalities at wind turbines may threaten population viability of a migratory bat. Biological Conservation, 209.