

Inferences about Bat Populations: Mitigation Monitoring



Rafinesque's Big-eared Bat

The Challenge: Various human activities can be deleterious to bat populations. For example, wind farms can become a source of bat mortality, leading to questions about allowable “take” of threatened and endangered species. Sometimes it is possible to mitigate deleterious human activities by habitat protection and/or management. The key issue in such mitigation efforts is to assess the degree to which target populations actually benefit. That is, how much can a rate of population change be increased by mitigation efforts?



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The Science: Managers of the U.S. Fish and Wildlife Service have asked scientists at Patuxent Wildlife Research Center to work with them to develop methods for assessing change in bat populations for the eventual purpose of mitigation monitoring. An impressive variety of techniques has been developed over the years for estimating abundance and change in abundance of animal populations. The key is to borrow one such method or, more typically, adapt a method to the logistical constraints imposed by specific taxa and field situations. Estimators based on N-mixture models (originally developed at Patuxent) using data from exit and entrance counts at summer roost sites are being considered for use with species such as Indiana bats.



Indiana Bat Photo by Caroline Byrne

The Future: Patuxent research scientists will begin exploring the feasibility of N-mixture approaches to inference both via simulation and in the field. If the method appears to be useful, then we will make recommendations about sample sizes and other aspects of study design. Additional methods of population assessment that may warrant investigation include the use of remote bat detectors that record sounds of bat species. Such detectors hold great promise but may suffer from “false positives” (misclassification of species), possibly requiring models recently developed at Patuxent. Bats present some unique challenges with respect to population inferences, and future research will focus on development of methods that are useful for this taxonomic group.