

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document. *Journal of Wildlife Management* 71:2449-2486.

Abstract: Our purpose is to provide researchers, consultants, decision-makers, and other stakeholders with guidance to methods and metrics for investigating nocturnally active birds and bats in relation to utility-scale wind-energy development. The primary objectives of such studies are to 1) assess potential impacts on resident and migratory species, 2) quantify fatality rates on resident and migratory populations, 3) determine the causes of bird and bat fatalities, and 4) develop, assess, and implement methods for reducing risks to bird and bat populations and their habitats. We describe methods and tools and their uses, discuss limitations, assumptions, and data interpretation, present case studies and examples, and offer suggestions for improving studies on nocturnally active birds and bats in relation to wind-energy development. We suggest best practices for research and monitoring studies using selected methods and metrics, but this is not intended as cookbook. We caution that each proposed and executed study will be different, and that decisions about which methods and metrics to use will depend upon several considerations, including study objectives, expected and realized risks to bird and bat populations, as well as budgetary and logistical considerations. Developed to complement and extend the existing National Wind Coordinating Committee document "Methods and Metrics for Assessing Impacts of Wind Energy Facilities on Wildlife" (Anderson et al. 1999), we provide information that stakeholders can use to aid in evaluating potential and actual impacts of wind power development on nocturnally active birds and bats. We hope that decision-makers will find these guidelines helpful as they assemble information needed to support the permitting process, and that the public will use this guidance document as they participate in the permitting processes. We further hope that the wind industry will find valuable guidance from this document when 1) complying with data requirements as a part of the permitting process, 2) evaluating sites for potential development, 3) assessing impacts of operational wind-energy facilities, and 4) mitigating local and cumulative impacts on nocturnally active birds and bats.