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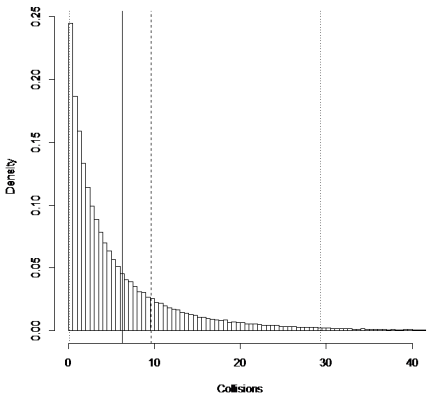
Patuxent Wildlife Research Center

Modeling, Estimation, and Adaptive Management of Golden and Bald Eagle Fatalities on Wind Facilities

Photo by: T. Jones

The Challenge: Golden and bald eagles are at risk of collision with operating wind turbines located within their habitat. Under the Bald and Golden Eagle Protection Act (BGEPA), any harassment or lethal take of the eagles in prohibited by law. Wind facility operation is an otherwise legal activity, so the USFWS is seeking a quantitative assessment of eagle collision risk and predicted fatalities at proposed wind projects. This will enable decisions to be made regarding the permitting and mitigation requirements for potential wind installations.

The Science: Working with the USFWS, scientists at Patuxent have developed a model to predict eagle fatalities at wind facilities in the US. The model incorporates existing biological information, data on the eagles' use of a proposed wind resource area, and project specific details, such as operational hours and turbine type. The modeling framework allows for the estimation of fatalities even in data sparse situations. Prediction at the 80th quantile is recommended to account for the uncertainty that still surrounds the relationship between eagles and operating wind installations. Results from Patuxent's modeling work are being used to predict eagle fatalities at proposed wind facilities across the US.



A distribution for collision fatalities when data are only available on project details, such as turbine number and size. The mean (solid line), 80th quantile (dashed line) and 95% credible intervals (dotted lines) are indicated.

The Future: Patuxent scientists are currently working to expand the existing eagle fatality model to take into account auxiliary data, such as habitat type, turbine characteristics, and local topography that may affect eagles' probability of colliding with an operating turbine. In addition, uncertainty in the model predictions will be reduced as data are collected on the actual fatalities, allowing for better determination of collision risk. To address the cumulative impacts of multiple wind farms within a BCR, a model is in development to account for the potential effects of both lethal and non-lethal take of eagles at the population level. All of these advancements will provide tools for the USFWS' regulatory decisions regarding the permitting of wind energy development within the US.

Photo by: B. Millsap

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