February 2004

Large-scale Climate and Land Cover Influences on Blackbird Populations in the Prairie Pothole Region of the United States and Canada

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Introduction
Blackbirds are ubiquitous members of the avian fauna in the Prairie Pothole Region of the United States and Canada. Their abundance combined with their food habits makes blackbirds significant agricultural pests on sunflower. Cost estimates for blackbird damage to sunflower in the northern Great Plains range from 4-11 million dollars per year. Because of their economic impact on agriculture, it is imperative to understand the environmental factors that influence their abundance. This study attempts to quantify the effects of landscape-level climatic and land use patterns on blackbird population dynamics in the Prairie Pothole Region of the United States and Canada.

Study Area
Our study area is the Prairie Pothole Region (PPR) of the United States and Canada which covers over 715,000 km² across five states and three Canadian provinces. The landscape of the PPR was formed approximately 12,000 years ago when the last glaciers melted and left behind a landscape of small wetlands or sloughs. Because blackbirds show an affinity for wetland habitats, the PPR provides an ideal study area to examine land use and climatic effects on blackbird populations.

Methods
We will analyze landscape-level influences on blackbird populations using data from several large-scale, long-term datasets. Bird data were obtained from the North American Breeding Bird Survey (BBS), climatic data were acquired from the National Climatic Data Center and the National Climate Data and Information Archive, and land use data were gathered from the USGS National Land Cover Data Set and the North Dakota State University Agricultural Extension Service. Climate and land use data will be related to bird abundance information using ArcInfo v8.3 and SAS v8.2. We will summarize weather variables across each breeding season by averaging temperature data and summing precipitation data over the same period. In addition, the effects of weather over the entire year as well as from the previous season will be examined because past weather might affect vegetation the following year thereby influencing blackbird abundance. Landscape-level habitat variables to estimate blackbird abundance within the PPR will be developed a priori before analyses begin. Model selection with maximum likelihood estimation and AIC will be used to select the best model from the candidate set for each blackbird species.

Management Implications
Blackbird populations in the northern Great Plains account for millions of dollars in damage to annual sunflower production. Research is needed to better understand the effects of the landscape-level habitat and environmental variables which influence breeding blackbirds in the PPR. Knowledge in this area will allow for more informed decisions to be made regarding blackbird management that ultimately will reduce damage to sunflower.

Acknowledgements
We thank Drs. Gary Clambey, Gary Nuechterlein, and Mario Biondini for their insight and suggestions with our study. William Clark provided pictures for this poster. This research was funded jointly by the National Wildlife Research Center, a unit within the Wildlife Services program of the United States Department of Agriculture, Animal and Plant Health Inspection Service, and the Department of Biological Sciences at North Dakota State University.