

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

USDA National Wildlife Research Center - Staff  
Publications

U.S. Department of Agriculture: Animal and Plant  
Health Inspection Service

---

February 2004

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

George M. Forcey

*North Dakota State University, Fargo, ND*

George M. Linz

*USDA NWRC Great Plains Field Station, [george.m.linz@aphis.usda.gov](mailto:george.m.linz@aphis.usda.gov)*

William J. Bleier

*North Dakota State University, Fargo, ND*

Follow this and additional works at: [http://digitalcommons.unl.edu/icwdm\\_usdanwrc](http://digitalcommons.unl.edu/icwdm_usdanwrc)



Part of the [Environmental Sciences Commons](#)

---

Forcey, George M.; Linz, George M.; and Bleier, William J., "Large-scale Climate and Land Cover Influences on Blackbird Populations in the Prairie Pothole Region of the United States and Canada" (2004). *USDA National Wildlife Research Center - Staff Publications*. 363.

[http://digitalcommons.unl.edu/icwdm\\_usdanwrc/363](http://digitalcommons.unl.edu/icwdm_usdanwrc/363)

This Article is brought to you for free and open access by the U.S. Department of Agriculture: Animal and Plant Health Inspection Service at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in USDA National Wildlife Research Center - Staff Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Published in **National Sunflower Association Research Forum Papers 2004.**

The annual NSA Research Forum is highly regarded as the premier conference at which private and public researchers present the results of their latest sunflower research. For nearly a quarter of a century, the National Sunflower Association has produced the workshop as a forum for sunflower research to be shared with the public.

Papers from NSA Research Forums 2003 and later are online at:

<http://www.sunflowernsa.com/research/default.asp?contentID=70>

NSA Contact Information

**National Sunflower Association**

**4023 State Street**

**Bismarck, ND 58503-0690**

**(701) 328-5100**

**(888) 718-7033**

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

Greg M. Forcey<sup>1</sup>, George M. Linz<sup>2</sup>, William J. Bleier<sup>1</sup>

1. North Dakota State University, Fargo, ND 58105 2. USDA NWRC Great Plains Field Station, Bismarck, ND 58501

## 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 habitats make 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.



Male Red-winged Blackbird and Yellow-headed Blackbird Among Cattail



Blackbird Depredation to a Sunflower Head

## Study Area

Our study area is the Prairie Pothole Region (PPR) of the United States and Canada which covers over 715,000 km<sup>2</sup> 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.



Prairie Pothole Region of the United States and Canada



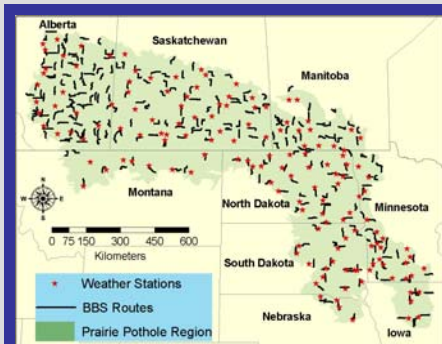
Typical Wetland Habitat Within the Prairie Pothole Region

## Methods

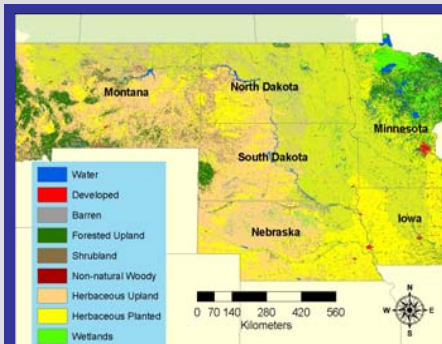
We will analyze landscape-level influences on blackbird populations using data from several large scale, long-term datasets. Bird data were obtained from the North American Breeding Bird Survey (BBS), climatic data were acquired from the National Climatic Data Center and the National Climate Data and 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 will be quantified in a 10-km buffer area surrounding each BBS route using land cover spatial data. Each grid cell within the 10-km buffer will be classified into one of nine general land cover types likely to be found in the PPR.

## Methods (cont.)

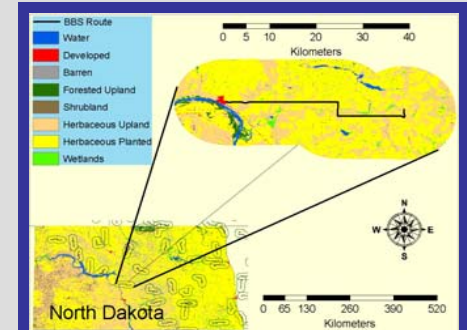
Because habitat area per se has not been an adequate predictor of bird abundance changes, other landscape-level factors such as habitat diversity and edge effects also will be examined. Spatial organization of features will be incorporated into landscape analyses by measuring contagion of land use types (the degree which land types are found within continuous patches), landscape dominance (the degree which one or a few land cover types dominate the landscape), fractal dimensions (an index of land use shape complexity in the landscape), and diversity/evenness measures of landscape pattern. Models incorporating 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.



Breeding Bird Survey Routes and Selected Weather Stations in the Prairie Pothole Region



Land Use Data for States Within the Prairie Pothole Region



Land Use Within a 10-km Buffer Surrounding a Breeding Bird Survey Route

## 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 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.

USDA National Wildlife Research Center  
Great Plains Field Station

ND COLLEGE OF  
SCIENCE AND MATHEMATICS  
NORTH DAKOTA STATE UNIVERSITY 1882, N.D.