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Amanda R. Lipinski
University of Nebraska, Lincoln

Joseph J. Fontaine
University of Nebraska, Lincoln

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AN ANALYSIS OF THE INTERACTIONS BETWEEN WEATHER AND LAND USE ON MIDWESTERN GAMEBIRD POPULATIONS USING HISTORICAL DATA—A PRELIMINARY REPORT

Amanda R. Lipinski¹

Nebraska Cooperative Fish & Wildlife Research Unit, University of Nebraska–Lincoln, 013 Hardin Hall, 3310 Holdrege Street, Lincoln NE 68583-0984, USA, Lincoln NE 68583, USA

Joseph J. Fontaine

U.S. Geological Survey Nebraska Cooperative Fish & Wildlife Research Unit, 511 Hardin Hall, 3310 Holdrege Street, Lincoln NE 68583-0984, USA, Lincoln NE 68583, USA

ABSTRACT

Concern surrounding species' abilities to cope with a changing climate and variable land use presents opportunities to look forward toward solutions while investigating historical trends to assess the interaction of land use and weather. Uncertainty surrounding population responses to increased severity and frequency of severe weather associated with climate change presents challenges for making informed management decisions for a suite of already declining bird populations, including huntable populations of socially and economically important game birds, such as northern bobwhite (*Colinus virginianus*). Historical data are a rich resource for developing *a priori* hypotheses and models predicting species' responses to climate change and continued variation in land use. We are utilizing 30 years of historical data to model the responses of northern, ring-necked pheasant (*Phasianus colchicus*), and wild turkey (*Meleagris gallopavo*) to land use change and weather within a gradient of land use and climate in Nebraska, Kansas, Iowa, and Missouri. Mixed models incorporating agricultural acreages, relative abundances of gallinaceous birds from the annual Breeding Bird Survey, and historical precipitation and temperature data built at the county-level will illuminate broad scale trends and enable us to draw conclusions about future population responses. We are finding expected differences in population trends between states within a climatic gradient, and varied responses to temperature and precipitation among gallinaceous species, where different annual periods are more or less crucial for different species despite similar life history characteristics. We expect that further modeling will continue to elucidate critical thresholds for birds in the Great Plains in terms of weather and habitat, allowing us to make strong recommendations to managers preparing to deal with the implications of climate change.

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Key words: *Colinus virginianus*, northern bobwhite, climate change, severe weather, land use, population trends, mixed modeling, Great Plains ecology, Program R

¹ Email: alipinski2@unl.edu

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