

Avian conservation in the Prairie Pothole Region, northern Great Plains: understanding the links between climate, ecosystem processes, wetland management, and bird communities

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There is concern about the future status of migratory bird populations dependent on wetland and riparian habitats across North America during migration and breeding seasons. Since 1900, a majority of wetlands across the Great Plains have disappeared or deteriorated due to agricultural development, water diversion, and other land use changes. These wetland ecosystems are also highly vulnerable to predicted changes in temperatures and precipitation across North America. Wetlands in the northern Great Plains provide important resources to many species of breeding wetland-dependent birds, including waterfowl, shorebirds, marsh dwelling birds, and songbirds. For several migrating species that stop only briefly during their long-distance migrations between South American wintering grounds and arctic breeding sites, the presence of critical resources can determine the season's breeding success or survival rates.

The future condition of wetland ecosystems is potentially threatened by pending climate change, increasing demand for water and agricultural lands, and invasion of exotic species. Scientists of the U.S. Geological Survey biology, water, and geology disciplines are examining the effects of climate and land use change on bird populations and their wetland habitats in the Prairie Pothole Region (PPR) of North America. In this project, scientists will downscale climate data using multiple approaches and produce ensemble climate models of the northern Great Plains, develop models to forecast climate effects on water quantity and quality and biological outcomes on selected National Wildlife Refuges in the PPR, and develop models that relate climate predictions to growth of native and invasive wetland plants. Further, scientists will predict migrant bird responses to changes in resources and habitats under various scenarios of climate and land use change, and look at habitat associations and life-history traits of all wetland-dependent bird species in the PPR to determine their relative vulnerability to climate change.

USGS scientists will integrate elements of climate, geomorphology, stream flow, ecological processes, vegetation, water and wetland management, and bird communities into synthesis document targeted to natural resource managers. Other products from this research will include technical reports and scientific manuscripts, presentations, and web-served climate databases. This research will assist managers and conservation professionals within federal, state, and nongovernmental organizations concerned with protecting migratory bird species and managing invasive species. The intended users include the North American Bird Conservation Initiative (NABCI), US Shorebird Conservation Plan (USSCP), federal entities such as the US Fish and Wildlife Service (FWS), Bureau of Reclamation (BOR), National Park Service, and Prairie Pothole Joint Venture (PPJV), state wildlife agencies, and nongovernmental organizations such as The Nature Conservancy, Western Hemisphere Shorebird Reserve Network, American Bird Conservancy, and others.

