Marshbird Response to Invasive Cattail Control Using Grazing, Mowing, and Herbicide Application in the Prairie Pothole Region of Minnesota[1]

2014 Annual Report

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Abstract: We initiated this project in 2014 by establishing funding agreements and the Research Work Order that supports this research at the Minnesota Cooperative Fish and Wildlife Research Unit. We have advertised an M.S. student position associated with this project, and plan to have a student selected and working on this project in early 2015, with the objective of beginning field work in spring 2015.

INTRODUCTION

Secretive marshbirds, including rails, bitterns, and snipe, are arguably the least monitored group of North American birds due to their cryptic behavior and low detectability. Over the past 15 years, stakeholders have made considerable progress in better monitoring marshbirds; however, many of these efforts have not focused on estimating marshbird response to wetland management. In 2011, participants at a national marshbird monitoring workshop recommended that future monitoring efforts be directed toward assessing marshbird response to management. Our proposed research is focused on assessing the response by marshbirds to invasive wetland vegetation management techniques in the Prairie Pothole Region of Minnesota.

The Prairie Pothole Region, an important breeding area for many marshbird species, is facing serious threats, including wetland loss through drainage and declining habitat quality of remaining wetlands primarily caused by invasive vegetation. Narrow-leaf (*Typha angustifolia*) and hybrid (*Typha x glauca*) cattail and reed canary grass (*Phalaris arundinacaea*) have dramatically changed the character of many western Minnesota wetlands. These invasive species often form dense monotypic stands that reduce plant diversity and change the vegetative structure in both the emergent and wet meadow zones of prairie pothole wetlands. Wetlands with invasive vegetation are often characterized as having low plant diversity, structural homogeneity, low edge-to-area ratios, limited interspersion of vegetation and water, and no mudflats. Due to the concern about the effects of invasive wetland vegetation on marshbirds, The *Midwest Marshbird Monitoring Working Group* has hypothesized that the alteration of wetland vegetation and structure due to invasive species may reduce the attractiveness of wetlands to breeding marshbirds in the Midwest.

Our proposed research has two primary goals. First, we will examine the effect of different management treatments (herbicide application, mowing, grazing, and no treatment) on wetland use by secretive marshbirds. Second, the Minnesota Department of Natural Resources

(MNDNR) will use resulting data to calculate baseline population estimates of marshbirds in western Minnesota. We will focus our monitoring activities on game bird species including sora (*Porzana carolina*), Virginia rail (*Rallus limicola*), and Wilson's snipe (*Gallinago delicata*); however, we will also record other marshbird species encountered during surveys including the following Prairie Pothole Joint Venture (PPJV) Region 3 Focal Species: Wilson's phalarope (*Phalaropus tricolor*), pied-billed grebe (*Podilymbus podiceps*), American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), yellow rail (*Coturnicops novebaracensis*), black tern (*Chlidonias niger*), and all waterfowl species encountered. We will share the results and management recommendations developed from this project with wetland managers throughout the Prairie Pothole Region via workshops, webinars, and other scientific conferences.

STUDY AREA

For the proposed project, we plan to focus our treatments and survey efforts in northwestern Minnesota, primarily in the vicinity of Glacial Ridge National Wildlife Refuge. Glacial Ridge National Wildlife Refuge (NWR) and surrounding managed public and private lands (collectively, the Glacial Ridge complex) comprise one of over 30 core areas outlined in the Minnesota Prairie Plan (Fig. 1). The plan is a multi-agency/non-governmental organization effort to conserve remaining native prairies across Minnesota, increase prairie-dependent wildlife populations, and integrate working lands (e.g., grazing) into wildlife conservation.

The Glacial Ridge complex consists of Glacial Ridge NWR, several MNDNR Wildlife Management Areas (WMA), U.S. Fish and Wildlife Service (USFWS) Waterfowl Production Areas (WPA), and parcels owned by The Nature Conservancy (Fig. 2). Currently, the USFWS and MNDNR, along with researchers at the University of Minnesota Crookston, are coordinating research on the control of cattails within Glacial Ridge NWR and our proposed research will be coordinated with that effort. Additionally, Glacial Ridge NWR has a 2,100 acre patch-burn grazing experimental area. Several WMAs are already fenced and being grazed and funding has been secured to fence and graze additional WMAs.

METHODS

Marshbird Surveys
We will follow the sampling design framework for secretive marshbird monitoring outlined by Johnson et al. (2009) that recommends a two-stage cluster sampling protocol. We may be partially constrained in this sampling because we need to include existing wetland treatments (i.e., we will be imposing an experimental design onto existing management activities and not applying treatments as part of this project) that may not occur within randomly located sampling units. We will likely stratify by "treatment" and "non-treatment" strata, which will allow us to assess the effect of treatments, while also enabling us to estimate marshbird abundance or occupancy throughout the survey area. Within each "treatment" strata, survey points will be assigned to the various treatment types.

We will conduct marshbird surveys following the Standardized North American Marsh Bird Monitoring Protocol developed by Conway (2011). Under this protocol, surveys consist of a five-minute passive listening period followed by a series of one-minute periods during which

specific secretive marshbird calls are broadcast over the marsh for 30 seconds and the observer listens for 30 seconds. Resulting data from Minnesota can be easily integrated into a national or continental monitoring program as we will be using a standardized sampling frame and protocol. Target game marshbird species will include sora, Virginia rail, and Wilson's snipe. In addition to sampling the target species, we will record detections of other species such as pied-billed grebes, yellow rails, American bitterns, and least bitterns. We will also note the presence of other species of conservation concern such as black terns and Wilson's phalaropes and all waterfowl encountered. All of these species listed have been identified as PPJV Region 3 Focal Species.

Vegetation and Habitat Surveys
In conjunction with the marshbird surveys, we will conduct habitat surveys associated with the survey points. We will collect data on the following variables: (1) vegetation diversity, (2) vegetation structure, and 3) water depth. We will also use a geographic information system to measure landscape-scale variables such as surrounding land use and wetland cover type. We will then relate these habitat variables to bird abundance/occupancy and diversity data. Additionally, we will seek guidance from the Midwest Marshbird Monitoring Working Group on what additional habitat variables should be measured.

The specifics of the experimental design, selection of sample wetlands, and statistical analysis will be completed by a graduate student, in cooperation with the project's principal investigators and collaborators, including other MNDNR, FWS, and USGS biologists familiar with marshbird monitoring protocols and data analysis. In addition, Doug Johnson, who was the lead author on the marshbird sampling framework paper, has agreed to be an advisor to the project.

RESULTS

To date, we have (1) established the intra-agency agreements and Research Work Order that support this project at the Minnesota Cooperative Fish and Wildlife Research Unit, (2) advertised for an M.S. student to conduct the project, (3) reviewed over 50 applications for that position, and (4) engaged collaborators in anticipation of our 2015 field season. We expect to have a student working on this project full time starting in early 2015, complete project design and organize logistics during by spring 2015, and initiate data collection in spring and summer 2015.

Literature Cited

Conway, C.J. 2011. Standardized North American Marsh Bird Monitoring Protocols. Waterbirds 34:319-346.

Johnson, D.H., J.P. Gibbs, M. Herzog, S. Lor, N.D. Niemuth, C.A. Ribic, M. Seamans, T.L. Shaffer, W.G. Shriver, S.V. Stehman, and W.L. Thompson. 2009. A sampling design framework for monitoring secretive marshbirds. Waterbirds 32: 230-215.

Figure 1. Map of Minnesota outlining the 36 core areas identified in the MN Prairie Plan. The focus of this project will be the Glacial Ridge Core Area (circled), adjacent core areas, and surrounding lands owned and managed by the USFWS and MN DNR.

Figure 2. Glacial Ridge Core Area (upper left) and surrounding FWS and DNR properties. Various DNR and FWS units within this landscape are currently being grazed, mowed, or treated with chemicals. Funding for additional fencing and chemical application has already been obtained.

Legend
- National Wildlife Refuges
- Core Area
- USFWS Waterfowl Production Areas (Current)
- State Wildlife Management Area Boundaries
- TNC

0   2.5   5   10 Miles