
2022 WildTac Cost-Share Proposal for NorthWestern Energy (NWE) Project 2188 TAC Funds

Project Title: Breeding bird monitoring of riparian habitats and enhancement projects on the Madison and Missouri Rivers

Date: October 25, 2021

Applicability to Project 2188 License Article(s)

This project meets Project 2188 License Article 423 requirements to develop a wildlife monitoring and enhancement plan by continuing long-term monitoring of bird communities in riparian habitats of the Missouri and Madison Rivers. The project is specifically referenced in the updated Five Year (2018-2022) Project 2188 Wildlife Plan under article 423 and meets the purpose and intent of Article 423 by measuring bird community change over time as an indicator of riparian conditions for wildlife, identifying habitat and environmental factors critical for maintaining bird populations, providing feedback on techniques employed to enhance native plants and wildlife populations, and monitoring wildlife response at enhancement project sites funded by the Missouri-Madison Wildlife Technical Advisory Committee (WildlTAC).

Priority Classification

This project meets the criteria for a Priority 1 2188 license project because it is located within riparian habitats of the main stem of the Missouri and Madison River and floodplain wetland complexes, as well as Priority 2 because the sampled area also includes O’Dell Creek, a major tributary within 0.4 miles of the Madison River that contributes important habitat for wildlife within the river corridor.

Project Sponsor(s): University of Montana

Location of Proposed Project

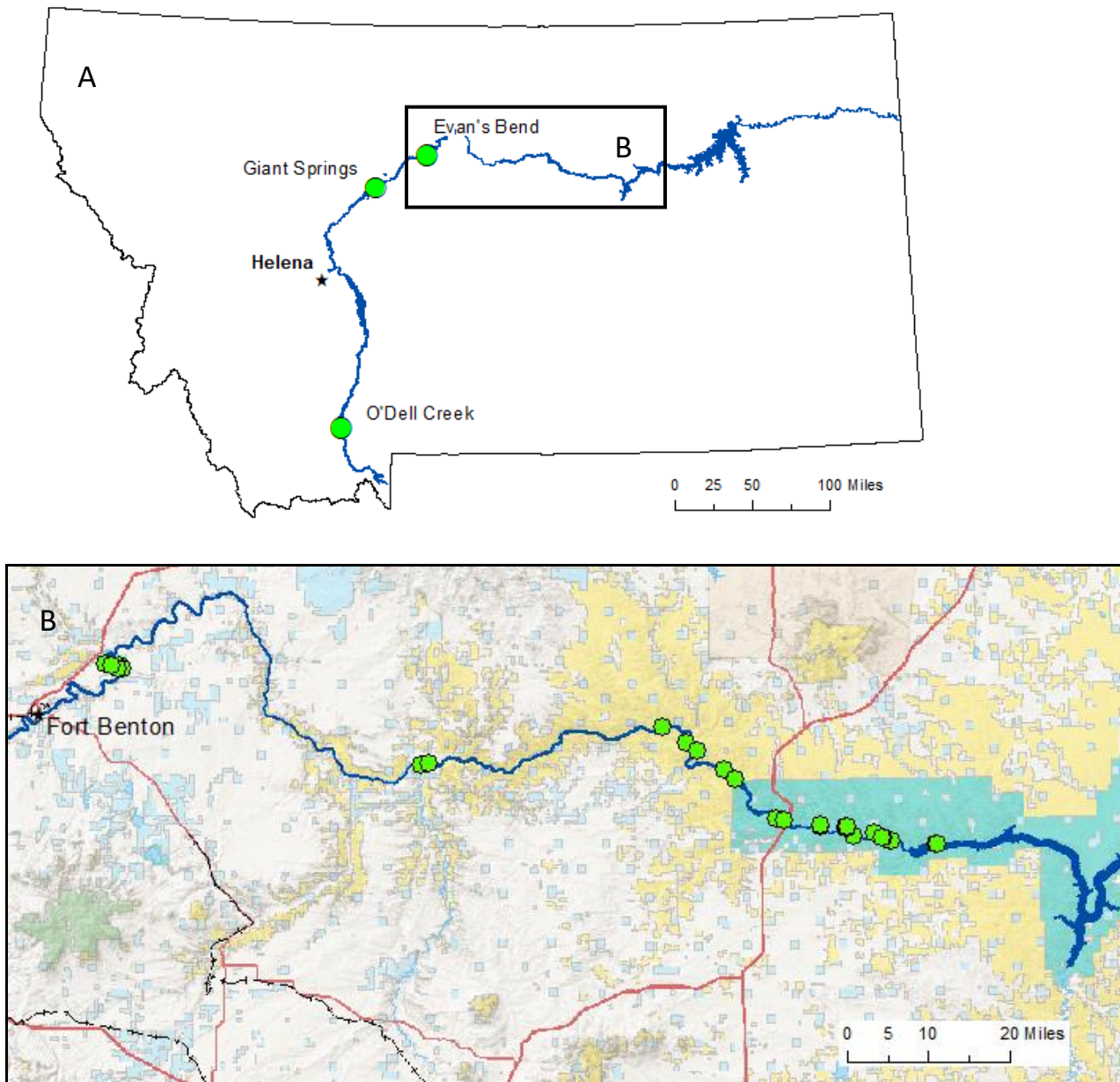
Habitat project areas on the Missouri River at Evan’s Bend downstream from Fort Benton, Giant Springs State Park east of Great Falls, O’Dell Creek five miles south of Ennis, and a subset of 38 long-term monitoring sites established within floodplain riparian habitats on the Missouri River from Fort Benton to James Kipp Recreation Area (Figure 1). Geocodes for project areas below.

Geocodes:	O’Dell Creek Project Area:	45.246600	-111.727240
	Giant Springs Project Area:	47.534328	-111.228997
	Evan’s Bend Project Area:	47.852479	-110.575591

Total Project Cost: \$50,448

TAC Funds (Cost-Share) Requested for Project: \$30,448

Figure 1. Map of habitat project areas proposed for bird monitoring (A, upper map) and proposed sites for cuckoo surveys (B, inset, lower map) on the Madison and Missouri Rivers in 2022.



I. Introduction

Since 2004, the University of Montana (UM), with funding from Northwestern Energy and the Bureau of Land Management (BLM), has monitored bird populations and riparian vegetation on over 500 miles of the Madison and Missouri Rivers within the Project 2188 License area. Birds are ideal indicators of natural resource conditions because they have diverse habitat requirements, are relatively abundant within a small area and easily surveyed, and provide feedback from an entire community rather than a single species¹. In addition, birds are a priority for monitoring in riparian areas, because riparian and wetland habitats support a large number of bird species during breeding, dispersal, and migration, including at least 134 (55%) of Montana's 245 bird species and 30 of the 66 Montana Species of Concern.

Habitat Project Monitoring--We propose to continue monitoring breeding and migratory bird populations within habitat enhancement and protection projects funded by the WildTAC and supported by a broad partnership of federal and state agencies, non-governmental organizations, and private landowners on the Madison River including the O'Dell Creek Project and adjacent public and private lands. We also propose to collect baseline data on the status of breeding bird populations at two new habitat projects proposed for 2022 on the Missouri River at Evans Bend downstream from Fort Benton and Giant Springs State Park near Great Falls.

Cuckoo ARU Surveys--Since 2012, we have worked with state and local partners to collect data on the population status and distributions of Black-billed (*Coccyzus erythrophthalmus*) and Yellow-billed (*Coccyzus americanus*) Cuckoos while conducting standard point counts for all bird species at long-term monitoring sites on the Madison and Missouri Rivers. BLM recently added Black-billed cuckoos to the Sensitive Species List, and the western distinct population segment of the Yellow-billed cuckoo is federally listed as Threatened. Both species are listed as Montana Species of Concern (S3B) and designated as high inventory need in Montana. Yet surveys have proven logistically challenging because they are difficult to detect in a single survey and much of their habitat is hard to access. In 2021, we set up Automated Recording Units (ARU's) at long-term monitoring sites on the Missouri River to determine if recordings could improve species detection over point count and playback methods. We propose to repeat this effort in 2022 at additional sites. Results will provide information on breeding distributions of cuckoos in surveyed areas of the Missouri River, and contribute specific guidance and recommendations for using ARU's for inventorying and monitoring cuckoo species across the license area as well as potential habitat throughout the region.

Population Trends Analysis--We have documented significant population declines for many bird species as well as changes in local habitat conditions since we began monitoring in 2004². Protection, mitigation, and enhancement techniques aimed at conserving species in decline requires understanding what factors are driving observed trends. We recommend conducting analyses to determine which environmental factors explain spatiotemporal variation in bird populations in this system. The results of these analyses will inform habitat project priorities on the river system.

¹ Hutto, R.L. 1998. Using landbirds as an indicator species group. Pp. 75-92 in Marzluff, J.M. and R. Sallabanks (eds.), Avian conservation: research and management. Island Press, Covelo, CA.

² Noson, A. C., A. D. Flesch, and M. M. Blake. 2019. Trends in populations of breeding birds and habitat conditions in riparian areas along the Madison and Missouri Rivers, Montana 2004-2019. Report to Northwestern Energy Wildlife TAC. University of Montana Bird Ecology Lab, Missoula, MT. 41 pp.

This proposal merits a high priority for funding because it contributes scientifically robust measures of wildlife response to habitat enhancement and protection projects supported by the Wildlife TAC, identifies breeding locations for species of concern, and provides science-based guidance for enhancement and protection strategies in the license area as required by 2188 license 423 and described in the updated 2188 Five Year Wildlife Plan.

II. Objectives

1. Conduct multi-species monitoring of the bird community as an indicator of wildlife conditions in habitat enhancement and protection projects on Madison River and adjacent O'Dell Creek.
2. Collect baseline data on the status of breeding bird populations at two new habitat enhancement projects on the Missouri River: Evans Bend and Giant Springs State Park.
3. Inventory potential breeding sites for Black-billed and Yellow-billed Cuckoos on the Missouri River and evaluate the use Automated Recording Units (ARU's) to improve species detections.
4. Conduct analysis of environmental factors driving population declines measured for bird species on the Madison and Missouri River since 2004.

III. Methods

Bird Surveys--At habitat enhancement projects, we will conduct point count surveys of breeding land birds following standard point count procedures. Observers will record all birds seen or heard during a 10-minute period, and distances to birds measured using a rangefinder. Breeding surveys for waterfowl will include adult and brood counts following Gollop and Marshall³. We will conduct systematic playback surveys for secretive marsh birds at survey locations over 400 m apart with suitable habitat, following the Standardized North American Marsh Bird Monitoring Protocol.

We will conduct standardized playback surveys for Black-billed and Yellow-billed Cuckoos following protocols developed by Montana Natural Heritage. Surveys entail 5 minutes of passive listening followed by five broadcast playbacks of each species at one-minute intervals, and will be conducted during the potential breeding period from late May-mid-August. We will also deploy Audio Moth ARU units (<https://www.openacousticdevices.info/audiomoth>) programmed to record daily for four 30-minute recording periods at 1:00, 7:00, 9:00, and 23:00 (24 hour time).

Data Analyses--We will evaluate wildlife response to habitat enhancement projects by comparing baseline data collected prior to project start to changes over time using a Before-After-Control-Impact (BACI) study design⁴. BACI sampling designs are particularly useful tools for evaluating bird assemblage responses to riparian restoration because they address the problem of high natural variability and year-to-year changes in river systems by effectively separating the absolute year-to-year change from treatment effects. To account for natural annual variation and potential correlation between repeated measures across years, we will evaluate model fit with year of survey and point included as random effects using a generalized linear mixed model (GLMM).

³ Gollop, J.B. and W.H. Marshall. 1954. A guide for ageing duck broods in the field. Mississippi Flyway Council Technical Section Report, Minneapolis, Minnesota.

⁴ Schwarz C.J. 1998. Studies of Uncontrolled Events. In: Statistical Methods for Adaptive Management Studies. Res. Br, B.C. Min. For., Res. Br., Victoria, BC, Land Manage. Handb. No 42.

The Kitzes Lab at University of Pittsburgh will analyze ARU recordings to identify Black-billed Cuckoo vocalizations using the machine learning classifier they developed based on our recordings in 2021. We will calculate likelihood of detecting Black-billed Cuckoo presence per site per year for each survey method.

We will evaluate drivers of population trends using Linear Models with R statistical software. Each predictor will be tested alone (univariate ANOVA) as well as using a weighted linear model. To deal with possible collinearity between predictors and draw inferences about the likely causality of variables, we will perform a hierarchical partitioning analysis with the same predictors⁵. We will assess probability of independent contribution of the predictors with z-scores obtained using repeated randomizations and R2 goodness-of-fit measures.

IV. Schedule

This project will begin 1 May 2022 and will run until 30 April 2023 (see table below).

2022	
Jan-May	Field planning, coordination with local partners and private landowners, hire and train field technicians
June-Aug	Conduct bird surveys
Sep-Oct	Data entry, data management, and data analysis
Nov-Dec	Summarize field effort and present to WildTAC
2023	
April	Submit final report for WildTAC

V. Personnel

Erick Greene (Faculty, University of Montana Wildlife Program) and Anna Noson (Program Director, University of Montana Bird Ecology Lab) will serve as co-Principal Investigators of the project. Erick Greene will administer the project within UM. Anna Noson will supervise field data collection, conduct analyses, and complete reporting and dissemination. Two field technicians will be hired to complete data collection and data entry. The Division of Biological Sciences will provide facilities at the University of Montana.

⁵ Mac Nally R (2002) Multiple regression and inference in ecology and conservation biology: further comments on identifying important predictor variables. *Biodiversity and Conservation*, 11, 1397–1401.

VI. Project budget

The budget table below includes not-to-exceed cost estimates to perform the Scope of Work (SOW). The total cost is \$50,448. We have requested \$20,000 cost-share funding for 2022 from USDA Bureau of Land Management. Total project WildTAC request is \$30,448.

	TAC Funds Requested	Total Cost
Habitat Project Monitoring	\$18,883	\$28,311
Direct Labor	\$15,506	\$22,606
Travel and Living	\$3,102	\$5,155
Materials	\$275	\$550
Cuckoo Surveys	\$3,793*	\$7,587
Direct Labor	\$3,356	\$6,711*
Travel and Living	\$378	\$755
Materials	\$60	\$120
Bird Trend Analysis	\$3,800	\$7,600
Direct Labor	\$3,800	\$7,600
Total direct	\$26,477	\$43,498
Direct Overhead	\$3,972	\$6,950
Total	\$30,448	\$50,448

*In-kind contribution of recording identifier analyses by Smithsonian Institute and Kitzes Lab at University of Pittsburgh not included in total cost.

VII. Deliverables

We will summarize bird-monitoring results in an Annual Report that will include:

- Breeding bird population status within ongoing and proposed habitat enhancement project areas on the Madison and Missouri Rivers, including O’Dell Creek, Evan’s Bend and Giant Springs State Park
- Evaluation of automated recording units for improving detectability of secretive cuckoo species in riparian habitats
- Distributions of Black-billed and Yellow-billed Cuckoos in the Upper Missouri River Breaks National Monument
- Environmental drivers of population trends in riparian habitats along the Madison and Missouri Rivers from 2004-2021.

VIII. Cultural Resources N/A- no land-disturbing activity or building modification will occur as a result of this project.

IX. Water Rights N/A- no development, restoration, or enhancement of wetlands will occur as a result of this project.