

2023 Cost-Share Proposal Form for NorthWestern Energy (NWE) Project 2188 TAC Funds

Project Title: Monitoring Bird Populations and Habitat Conditions in Riparian Areas on the Madison and Missouri Rivers

Date: October 25, 2022

Applicability to Project 2188 License Article(s):

This project meets Project 2188 License Article 423 requirements by continuing long-term monitoring of bird communities and vegetation in riparian habitats of the Missouri and Madison Rivers, and is specifically referenced in the most recent Five Year Project 2188 Wildlife Plan under article 423. The project 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 (WildTAC).

Priority Classification:

This project meets the criteria for a Priority 1 2188 license project because monitoring 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 locations also include habitat enhancement and protection project areas within 1 mile of the main stem at Giant Springs State Park and Beaver Creek, a primary tributary of the Missouri River.

Project Sponsor (submitted by): University of Montana

Location of Proposed Project:

Madison and Missouri River monitoring will be located at 244 long-term monitoring points and 17 habitat enhancement and protection project areas within riparian habitats on public and private lands from Hebgen Reservoir to Fort Peck Reservoir (Fig.1, Table1).

Geocode: Lat: 45.23691 to 48.03065 Lon:-108.63146 to -111.877
(see Table 1 for a list of project locations)

Total Project Cost: \$76,522

TAC Funds (Cost-Share) Requested for Project: \$39,501

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 conditions on over 500 miles of the Madison and Missouri Rivers. Birds are ideal indicators of natural resource conditions because they have diverse habitat requirements, are easily surveyed, and provide feedback from an entire community rather than a single species^{1,2}. 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. As the largest river system in the state, the Madison and Missouri rivers are critical to the future of Montana's bird populations.

In 2023, we propose to continue monitoring bird populations and vegetation conditions within the license area at 244 established long-term monitoring locations (Fig. 1). Locations for long-term monitoring include private, Montana State, BLM, US Fish and Wildlife Service, US Bureau of Reclamation, US Forest Service (USFS), and local public ownership. We propose to begin baseline monitoring of a new habitat project at Carter Ferry Fishing Access Site, and continue monitoring WildTAC-funded habitat project areas, including Beaver Creek on USFS, Giant Springs State Park, Evans Bend on BLM, Wood Bottom on a mix of private, State, and BLM lands, as well as 12 livestock enclosures within the UMRBNM. (Table 1, Fig. 2). We will also continue to capitalize on opportunities to fill data gaps on rare and priority bird species, while completing long-term monitoring objectives. Specifically, we will collect presence data for two Montana Species of Concern: Black-billed and Yellow-billed Cuckoos as part of a collaborative inventory effort with BLM, Montana FWP, and the Smithsonian Conservation Institute.

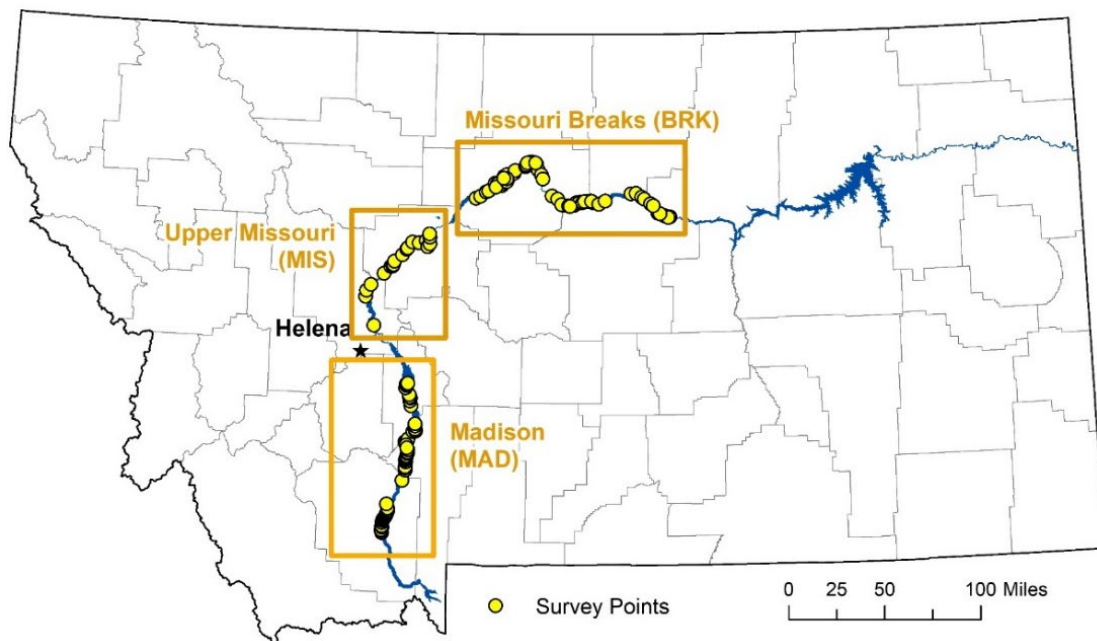


Figure 1. Long-term bird and habitat monitoring locations (yellow points) stratified as Madison River, Upper Missouri River, and Missouri Breaks.

¹ Carigan, V., and M.A. Villard. 2002. Selecting indicator species to monitor ecological integrity: a review. *Environmental Monitoring and Assessment* 78:45–61.

² 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.

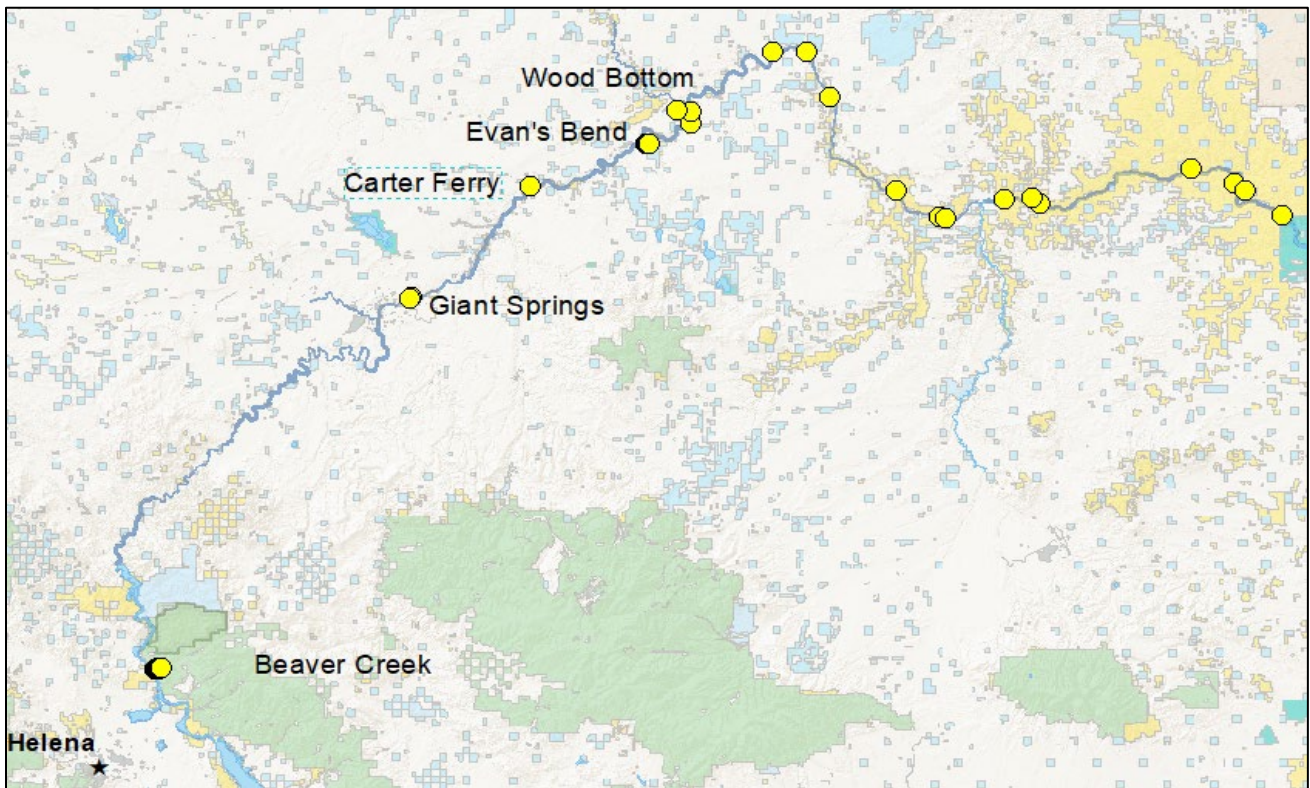


Figure 2. Habitat enhancement and protection project areas (yellow points) proposed for monitoring on the Missouri River.

Table 1. Location and ownership of habitat enhancement and protection projects proposed for monitoring in the Missouri River corridor.

Project Area Name	Ownership	Lat	Long
Anderson	Private/BLM	48.03065	-110.23188
Beaver Creek	USFS	46.78760	-111.89327
Carter Ferry FAS	State	47.76000	-110.90000
Cow Island	BLM	47.76592	-108.93939
DeMars	BLM	47.70730	-108.82186
Evan's Bend	BLM	47.84620	-110.57995
Hagadone	BLM	47.73437	-109.49371
Iron City	BLM	47.74221	-109.51003
Little Sandy	BLM	48.03045	-110.13908
Monroe	BLM	47.94152	-110.07506
Pablo	BLM	47.76167	-109.88866
Rowe Coulee	Private/BLM	47.90689	-110.45248
Sturgeon	BLM	47.79926	-109.06820
Giant Springs State Park	State	47.53390	-111.22313
Wagonbed	State	47.70758	-109.76571
The Wall	BLM	47.70434	-109.75418
Wood Bottom	Private/BLM/State	47.90334	-110.46169
Woodhawk	BLM	47.75753	-108.92258

To date we have recorded 32,091 individual birds and 159 species, including seven BLM Sensitive species, 25 Montana Species of Concern, and 29 U.S. Fish and Wildlife Birds of Management Concern. Data gathered from 2004-2021 show measurable declines for many riparian obligate and dependent bird species, with increasing trends restricted to a few common species. Habitat conditions have also changed significantly within the license area since 2004, including aging cottonwood forests, limited recruitment of young cottonwood, and declining shrub cover.

This proposal merits a high priority for funding because it builds on 19 years of monitoring investment by Northwestern Energy and partners that spans hundreds of miles of public and private lands and contributes scientifically robust measures of wildlife response to habitat enhancement and protection projects supported by the Wildlife TAC as required by 2188 license 423 and described in the updated 2188 Five Year Wildlife Plan. Continued monitoring will capitalize on this long-term dataset, providing a valuable tool for managers to evaluate the status and trends of migratory bird species and habitat conditions by administrative boundary and relative to specific management priorities along the river system, providing critical feedback on best practices for land managers working to restore wildlife habitats along Montana's large rivers.

II. Objectives

1. Evaluate the status and trends in bird populations and habitat conditions within main-stem riparian habitats of the 2188 license area.
2. Monitor bird community response to habitat enhancement and protection projects funded by Wild TAC, BLM, and project partners.
3. Inventory potential breeding sites for Black-billed and Yellow-billed Cuckoos on the Missouri River using Automated Recording Units (ARU's) to improve species detections.

III. Methods

The methods used for field sampling and analyses are described briefly below. Refer to our 2005 report³ summarizing monitoring protocols for more detailed information.

Bird Surveys-- We will conduct point count surveys of birds during the breeding season (May- July) within 5 hours of sunrise on days with minimal precipitation and wind. Observers will record all birds seen or heard during a 10-minute period, and distances to birds will be measured using a rangefinder. We will conduct playback surveys for Black-billed and Yellow-billed Cuckoos. Surveys will entail five broadcast playbacks of each species at one-minute intervals. We will 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) during the potential breeding period from 1 June-15 August.

³ Fletcher, R., T. Smucker, and R. Hutto. 2005. Distribution of birds in relation to vegetation structure and land use along the Missouri and Madison River corridors. Final report submitted to PPL-Montana.

Habitat Measures- At each sampling location, we will measure vegetation composition and structure, including tree density (by species and size class), percent shrub cover (by species), tree and shrub height, invasive and noxious weed species cover, and an ocular estimate of grazing intensity.

Data Analyses-- Bird species densities (birds/ha) will be estimated using the program DISTANCE, with distance sampling analyses following Buckland et al⁴. The estimated density, population size, and variance for each bird species will be computed at three scales: site, river section (MAD, MIS, BRK), and across the license area. In 2013, we partially automated these analyses by developing code using Program R, which streamlined population estimates, and thereby reduced costs associated with providing population estimates for large numbers of species. To assess the presence, magnitude, and direction of trends in vegetation and populations over time, we will use a linear mixed-effects model to assess whether trends varied temporally as well as spatially among river sections.

We will evaluate wildlife outcomes of restoration project areas by comparing baseline data collected prior to project start to changes over time using a Before-After-Control-Impact (BACI) study design, with long-term monitoring sites serving as untreated controls⁵. 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.

The Kitzes Lab at University of Pittsburgh will analyze ARU recordings to identify Black-billed Cuckoo vocalizations using the machine learning classifier 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 in collaboration with the Smithsonian Conservation Institute in 2024.

IV. Schedule

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

2021	
May	Field planning, coordination with local partners and private landowners, hire and train field technicians
June-Aug	Collect field data on birds and vegetation
Sep-Oct	Data entry and data management
Nov-Dec	Summarize field effort and present to TAC
2022	
Jan-Feb	Complete data analyses
April	Submit final report to Wild TAC

⁴ Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2001. *Advanced Distance Sampling*. Oxford University Press, New York. 416 pp.

⁵ 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.

V. Personnel

Anna Noson (Research Director, UMBEL) will serve as Principal Investigator of the project. Anna Noson will supervise field data collection and complete reporting and dissemination of findings. Dr. Aaron Flesch (University of Arizona) will be contracted to complete population trends analysis. We will hire two temporary technicians from May-August to collect field data and enter data. The Division of Biological Sciences will provide facilities and equipment at the University of Montana.

VI. Project budget

	TAC Funds Requested	Total Project Cost
Direct Labor	\$23,766	\$47,131
Travel and Living	\$3,540	\$6,694
Materials and supplies	\$450	\$650
Other Direct Expenses:		
Population Analysis	\$6,693	\$10,386
Direct Overhead	\$5,167 (15%)	\$10,489
Total	\$39,616	\$75,821

Cost-share funding sources and amounts for this project:

\$35,734 from USDA Bureau of Land Management (5-year agreement in place through 2027).

In-kind contribution of 30 ARU's and recording identifier analyses by Smithsonian Institute and Kitzes Lab at University of Pittsburgh not included in total cost.

VII. Deliverables

Results will be summarized in a Final Report that will include:

1. Breeding bird population status and trends for riparian areas within the main-stem Madison and Missouri Rivers;
2. Riparian vegetation condition status and trends for riparian areas within the main-stem Madison and Missouri Rivers;
3. Bird population and habitat condition status within identified restoration project areas.
4. Distribution information for priority riparian bird species, including Black-billed and Yellow-billed Cuckoo species

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.