

# **Environment and Natural Resources Trust Fund**

# 2026 Request for Proposal

# **General Information**

Proposal ID: 2026-506

Proposal Title: Incidence of Avian Influenza in Minnesota Forest Birds

# **Project Manager Information**

Name: Mark Clark Organization: U of MN - Duluth Office Telephone: (218) 726-8358 Email: meclark@d.umn.edu

# **Project Basic Information**

**Project Summary:** Avian influenza is a virus threatening poultry, livestock, wildlife, and humans. Prevalence in wild birds is unknown. Information on present and past infections or coinfections in wild birds is needed.

ENRTF Funds Requested: \$234,000

Proposed Project Completion: June 30, 2028

LCCMR Funding Category: Small Projects (G) Secondary Category: Fish and Wildlife (D)

# **Project Location**

What is the best scale for describing where your work will take place? Region(s): NE

What is the best scale to describe the area impacted by your work? Statewide

When will the work impact occur? During the Project

# Narrative

#### Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Problem: Avian influenza has recently emerged as a viral disease infecting wildlife, livestock, and humans. In 2024, outbreaks of highly pathogenic avian influenza (HPAI) occurred in poultry, dairy cattle, and wild birds in Minnesota, and infection in humans occurred within the United States. However, prevalence in free-living bird populations is poorly understood. Current surveillance targets poultry, captive wild birds, suspect wild birds (e.g., visibly debilitated individuals) or their carcasses, or comes through opportunistic sampling from select groups (e.g., waterfowl) (Figure 1). Does individual condition or infection from other pathogens affect susceptibility of wild bird hosts to avian influenza? Broader surveillance for past exposure, trends in infection, and coincidence with other pathogens in wild birds is necessary to understand avian influenza dynamics.

Opportunity: Currently established programs monitoring other aspects (e.g., population trends) of wild bird populations in Minnesota provide a unique opportunity to survey a diverse number of species for evidence of influenza, past exposure to influenza, and infection with other pathogens. This information would provide unique information on past and current incidence, trends in influenza infection in free-living birds, identification of potential co-factors affecting infection, identification of at-risk species, and reference information for comparison during future outbreaks.

# What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

We will survey prevalence of avian influenza, influenza antibodies, and blood-borne Haemosporidian parasites (the most common blood parasites in birds, and vectors for avian malaria) in a large and species-diverse number of birds from northern Minnesota from 2026-2028. We will partner with existing monitoring programs (e.g., Hawk Ridge Bird Observatory MAPS) capturing free-living forest birds in northern Minnesota to obtain body measurements, blood samples, and buccal swabs from individual birds to analyze overall condition and test for active influenza infection, evidence of past influenza infection, and evidence of Haemosporidian parasite infection.

By analyzing these disease patterns across multiple species and habitats, we aim to establish baseline infection rates and identify potential geographic or seasonal trends in disease prevalence. Further, these data will allow us to identify species that are at higher risk of infection, providing critical insights for conservation and disease management efforts in Minnesota's avian populations.

# What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Outcome 1: We will quantify prevalence of active avian influenza infection, past avian influenza infection, and Haemosporidian parasite infection in birds from northern Minnesota.

Outcome 2: We will determine if body condition or infection with Haemosporidian parasites increases the likelihood of infection with avian influenza, quantify trends in prevalence over time, and identify at risk species in Minnesota. Outcome 3: We will disseminate our findings 1) to relevant agencies, 2) the Minnesota public through outreach activities, and 3) to the scientific community through peer-reviewed publication and presentations.

# Activities and Milestones

# Activity 1: Sample collection in northern Minnesota and preliminary lab analyses

#### Activity Budget: \$74,435

#### **Activity Description:**

We will obtain body measurements, blood samples, and mucous samples in conjunction with summer monitoring of bird populations during 2026-2028. Birds will be captured in mist nets, key morphological traits including mass, wing length, and skeletal length will be collected to assess body condition. A 10 ul blood sample and a buccal swab will be collected from each individual. Samples will be returned to the lab within 8 hours of collection for preliminary processing and storage. For at least two summers during the project, we aim to collect samples from at least 200 individuals totaling 400 over the course of the study. To maximize species diversity surveyed, once we have obtained 10 samples from a given species in a year, we will prioritize sampling from species with fewer than 10 samples.

#### **Activity Milestones:**

Description	Approximate
	Completion Date
Identify and coordinate with project partners throughout the state	August 31, 2026
Develop and train common methodology for measurements and sample collection	September 30, 2026
Collection of blood samples and buccal swabs from n = 400 birds	May 31, 2028
Quantify condition of individual birds sampled	May 31, 2028

# Activity 2: Laboratory analysis of blood & tissue samples at University of Minnesota Duluth

Activity Budget: \$108,392

#### **Activity Description:**

During Fall 2027 (immediately after the summer 2027 field season), we will use a small number of previously collected avian blood samples (collected prior to summer 2026) to fine tune the assays we will use to detect infections of influenza or Haemosporidians. After analyzing the preliminary samples, we will proceed with analysis of samples collected during Summer 2027. We will use real time PCR methods to analyze samples for the presence of avian influenza DNA, which indicates active infection in the individual. We will also use real time PCR to analyze samples for DNA from Haemosporidian parasites, which indicates presence of the parasites in the blood. Finally, we will use Enzyme-linked immunosorbent assay (ELISA) to determine if avian influenza antibodies are present, which can indicate prior infection with avian influenza. All lab analyses will be conducted at UMD.

#### **Activity Milestones:**

Description	Approximate Completion Date
Obtain PCR system for lab at the University of MN Duluth	December 31, 2026
Complete lab work for samples collected from 1st Summer field season	May 31, 2027
Complete preliminary lab work for influenza and Haemosporidian parasites	December 31, 2027
Complete lab work for samples collected from 2nd Summer field season	May 31, 2028

# Activity 3: Analyze data, write & publish results in scientific journals; disseminate results to the public

#### Activity Budget: \$51,173

#### **Activity Description:**

We will analyze the data to identify species at higher risk of infection, offering valuable insights for conservation and

disease management in Minnesota's avian populations. Understanding infection patterns and susceptibility will help inform broader conservation efforts to protect the state's bird diversity. Our findings will be disseminated through scientific manuscripts submitted to peer-reviewed journals, presentations at scientific meetings, and outreach efforts to engage both the scientific community and the public. Through these efforts, we aim to advance knowledge on avian disease ecology and inform strategies for protecting bird populations in the region.

#### **Activity Milestones:**

Description	Approximate Completion Date
Analyze data, write manuscripts, submit findings to scientific journals	June 30, 2028
Conduct outreach activities to present findings to public	June 30, 2028
Attend scientific meetings to present findings	June 30, 2028

# **Project Partners and Collaborators**

Name	Organization	Role	Receiving
			Funds
Alexis Grinde,	Natural	Co-PI: Dr. Grinde leads the Avian Ecology Lab at NRRI and is a graduate faculty	No
PhD	Resources	member at UMD and UMN. Specializing in avian ecology, she develops	
	Research	conservation strategies for Minnesota bird species. She will contribute to data	
	Institute	collection, analysis, and student mentorship for this project.	
Emily Pavlovic,	Hawk Ridge	Co-PI. Emily Pavlovic is the Research Director for Hawk Ridge Bird Observatory in	No
MS	Bird	Duluth, MN. She conducted her thesis research at Hawk Ridge on determining	
	Observatory	natal origins and migratory patterns of raptors using stable isotope analysis. She	
		will assist in data collection, analysis, and mentoring of students.	

# Long-Term Implementation and Funding

# Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Our findings will be disseminated to managers and the scientific community through peer-reviewed publications, and to the public via outreach to local stakeholders (Activity 3). We have budgeted for these activities, and do not anticipate additional work will be needed. Our results will be archived through publications, linked to web pages maintained at UMD and HRBO, to establish a reference of influenza incidence in Minnesota forest birds for comparison should outbreaks occur in the future.

# Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Understanding Native Fishes in the Bowfishing Era	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 03s	\$588,000

# Project Manager and Organization Qualifications

#### Project Manager Name: Mark Clark

#### Job Title: Professor

## Provide description of the project manager's qualifications to manage the proposed project.

Mark Clark is a Professor in the Department of Biology at UMD, with research expertise in population biology. He has been a faculty member for over 23 years, advising 15 graduate students (3 Ph.D., 12 M.S.) and 1 postdoctoral fellow. His research projects have spanned a diverse array of vertebrates, including effects of timing of nesting on colonial waterbirds, life history variation in several fish species and waterborne parasite dynamics in small mammals. His work especially emphasizes the development of population models incorporating individual physiology and behavior (see https://sites.google.com/site/clarkreedecologylab/). Recent work from his lab highlights longevity in Bigmouth Buffalo, including changes in the immune function with age, and variation in immune function and plumage color in Redpolls.

#### Organization: U of MN - Duluth

#### **Organization Description:**

The University of Minnesota Duluth is a highly-ranked regional research and liberal arts university with a global reputation for freshwater research. A campus size of approximately 10,000 people, UMD students can choose from more than 93 undergraduate and post-baccalaureate degrees, and from graduate programs in more than 20 different fields. The Department of Biology is within the Swenson College of Science and Engineering (SCSE), the largest college at UMD and the third largest in the University of Minnesota System. It currently has an enrollment of more than 3,200

undergraduate and 200 graduate students. This research aligns with a major goal of research for SCSE, i.e. address realworld challenges and opportunities with real-world solutions that directly address regional issues but that also translate and scale to related national and global issues.

# Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineli gible	% Bene fits	# FTE	Class ified Staff?	\$ Amount
Personnel								
PI, Mark Clark		Supervise graduate student, assist with sample collection, supervise lab analysis, conduct data analysis and contribute to manuscript writing, presentations and outreach.			27%	0.04		\$5,997
Annie Bracey, NRRI		NRRI team member, assist in logistics of sample collection			27%	0.06		\$8,319
Stephen Nelson		Technical staff at NRRI who will coordinate field crews working at NRRI in conjunction with project.			24%	0.12		\$8,057
GRA, summer and academic year		Assist with sample collection and conduct lab analysis, data analysis, manuscript preparation.			45%	1		\$110,870
Undergrad research assistant		Lab & Field Assistants; Assist with sample collection and lab analysis; gain lab and field experience. Funding for 4 undergraduate field assistant at 50% time (20 hours per week) for 12 weeks during both summers, and funding for undergraduate lab assistant(s) (total of 15 hours per week) for 15 weeks in fall and 15 weeks in spring semesters in each academic year			0%	1.36		\$43,649
							Sub Total	\$176,892
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Tools and Supplies	Miscellaneous lab supplies include DNA extraction kits (\$1,000 per 100 samples), AI ELISA kits (\$1,000 per 100 samples), PCR supplies (\$500 per 100 samples), storage vials & amp; pipette tips (\$100 per 100 samples), and disposable lab materials (\$100 per 100 samples) for a total of \$2,700 per 100 samples and we assume 250 samples per year (200 per year	Expendable items used to process samples, kits are used to extract DNA and test for influenze. Benchtop portable ultracold freezer is needed to transport & amp; store samples from field.					\$17,198

				1			
		and additional 50 samples for assay refinement) for a					
		total of \$13,500 (\$6,750 per year) and \$3,698 in year					
		1 to purchase a benchtop portable ultracold freezer					
		to transport & amp: store samples from the field.					
	Tools and	Miscellaneous field supplies include capture nets	Various field supplies needed for				\$6,000
		wiscenarieous neid supplies include capture nets,	valious neid supplies needed to				<b>\$0,000</b>
	Supplies	poles and ropes (\$2,000 per year), notebooks,	sampling and storage of blood and				
		handling bags, banding material, blood & tissue	mucous samples.				
		collection items (\$1,000 per year) for a total of					
		\$6,000.					
						Sub	\$23.198
						Total	,
Conital						Total	
Capital							
Expenditures							
		Real-time PCR system	Real-time PCR equipment is necessary	Х			\$25 <i>,</i> 000
			for analysis of viral DNA and				
			Haemosporidian DNA to determine				
			infection				
						Sub	\$25 000
						Jub	Ş23,000
						Total	
Acquisitions							
and							
Stewardship							
						Sub	-
						Total	
Turnella						TOtal	
Travel In							
Minnesota							
	Miles/ Meals/	We assume 40 miles per trip @ \$0.70 per mile for 4	Trips to field sites to collect samples				\$2,240
	Lodging	days per week of 10 weeks to collect samples during					
		2 summers (\$2.240 total).					
						Sub	\$2.240
						Jub	ŞZ,Z40
						Total	
Travel							
Outside							
Minnesota							
	Conference	We have budgeted airfare costs of \$500 per person	To attend a national meeting at the end	Х			\$2,670
	Registration	(1 of the PIs and graduate student), along with 4	of the project to present findings of the				. ,
	Miles/Meals/	nights of lodging (\$137 per night) and 2 days per	study				
	Lodging	diam charges (CC) per day) and 2 travel days per	Study				
	Loaging	ulem charges (569 per day) and 2 travel days per					
		diem (\$52 per day), conference registration costs for					
		PI or Co-I (\$545) and conference registration costs					
		for graduate student (\$335) for total cost of \$2,670					

				Sub Total	\$2,670
Printing and Publication					
	Publication	Publication; page chares; OA fees. At least 2 manuscripts for scientific journals are anticipated from the study, with publication costs of \$2,000 per manuscript.	Dissemination of findings through peer- reviewed scientific journals.		\$4,000
				Sub Total	\$4,000
Other					
Expenses					
				Sub	-
				Total	
				Grand	\$234,000
				Total	

#### Category/Name Subcategory or Type Description Justification Ineligible Expense or Classified Staff Request Real-time PCR system Capital The current gPCR system at UMD Biology is for instructional use in classrooms. Expenditures Additional Explanation : This system would be dedicated to this project, yet enhance the UMD Department of Biology's overall research program. Presenting our findings at a national meeting will allow us to compare results with **Travel Outside** Conference We have budgeted airfare costs of \$500 per person (1 of the PIs and scientists monitoring AI in other areas. Most of the songbirds we propose to sample are Minnesota Registration migratory, and therefore comparing findings among other researchers on a continental Miles/Meals/Lodging graduate student), along with 4 scale is critical to understanding implications for future disease dynamics. For example, if nights of lodging (\$137 per night) and 2 days per diem charges (\$69 incidence is low in birds in breeding in Minnesota, but high in breeding populations per day) and 2 travel days per diem elsewhere, outbreaks in Minnesota could emerge later if the populations occupy the (\$52 per day), conference same wintering habitat. registration costs for PI or Co-I (\$545) and conference registration costs for graduate student (\$335) for total cost of \$2,670

### Classified Staff or Generally Ineligible Expenses

# Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub	-
			Total	
Non-State				
In-Kind	UMN unrecovered indirect costs are calculated at the UMN negotiated rate for research of 54% modified total direct costs.	Indirect costs are those costs incurred for common or joint objectives that cannot be readily identified with a specific sponsored program or institutional activity. Examples include utilities, building maintenance, clerical salaries, and general supplies. (https://research.umn.edu/units/oca/fa-costs/direct-indirect-costs)	Secured	\$93,417
			Non State Sub Total	\$93,417
			Funds	\$93,417
			Total	

#### Total Project Cost: \$327,417

# This amount accurately reflects total project cost?

Yes

# Attachments

## **Required Attachments**

*Visual Component* File: 3441588c-9d8.docx

#### Alternate Text for Visual Component

Avian influenza in poultry has been costly to Minnesota farmers and continues to infect many birds as indicated from the newspaper headline and incidence in poultry. However, incidence in songbirds is not well known because surveillance in wild birds relies on hunter harvest or finding carcasses....

#### Supplemental Attachments

#### Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
UMN Authorization Letter	<u>468a6c37-081.pdf</u>

# **Administrative Use**

Does your project include restoration or acquisition of land rights?

No

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the UMN Policy on travel applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

#### Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF? N/A

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

#### Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Claudia Carranza UMD, Michael Jacob UMD, Alexis Grinde NRRI and UMD, Emily Pavlovic HRBO

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

N/A