



Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-126

Proposal Title: Monitoring of Richardson's Ground Squirrels in NW Minnesota

Project Manager Information

Name: Joe Whittaker

Organization: Concordia College

Office Telephone: (218) 443-5218

Email: jwhittak@cord.edu

Project Basic Information

Project Summary: Richardson's ground squirrel (*Urocyon richardsonii*) populations have declined across Minnesota. I propose translocating individuals from at risk populations to a stable, protected site to conduct genetic rescue for that population.

ENRTF Funds Requested: \$241,000

Proposed Project Completion: June 30, 2030

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): NW

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

Region(s): NW

When will the work impact occur?

During the Project and In the Future

Narrative

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

Richardson's ground squirrel (*Urocitellus richardsonii*; RGS) are a large, colonial ground squirrel in Minnesota, resembling prairie dogs. These squirrels play a significant ecological role as prey and as ecosystem engineers through burrowing, soil cycling, and creating habitat for a variety of species. Unfortunately, RGS are often considered pests and have faced persecution such as poisoning, kill trapping, and shooting. Throughout Minnesota they have undergone significant population decline, and existing populations are often isolated and dwindling. There is poor documentation of existing populations, especially in protected areas. The species is being trapped and killed, or poisoned where they come into conflict with landowners, farmers, and developers. One of the state's largest and best protected populations suffered a mortality event during 2022. While the exact cause is unknown, flooding coupled with overgrazing is considered a likely cause. There are concerns with this population's long-term viability, even though the site is protected. Small, isolated populations are prone to a loss of genetic diversity and increased risk of extirpation, and this may be an issue across Minnesota.

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 propose conducting surveys to document new populations and assess these and other known populations of Richardson's ground squirrels (RGS). We would travel to possible sites and search for signs of colonies and conduct live trapping. Captured individuals would be tagged with passive integrated transponders (PIT) tags for individual identification. We will estimate population size and assess habitat and colony characteristics. Tissue samples (hair pulls or ear punches) will be taken for genetic analysis and examination of genetic diversity and for signs of inbreeding. For the protected site that experienced the colony collapse, we propose to conduct genetic rescue and translocation of individuals from at-risk locations to assist with population recovery. At-risk populations are sites undergoing development that would negatively impact colonies and are in current conflict with landowners (impacting agriculture or damaging property). Genetic rescue and translocation of individuals from outside the population are usually only considered when populations become critically low and endangered. However, recent research has supported the benefits of proactively using nearby populations, adapted to similar environmental conditions, to safely reinforce an at-risk population before they become critically endangered. Our goal is to better understand RGS populations and contribute to their long-term viability in Minnesota.

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?

1. Updated distribution and population data for Richardson's ground squirrels (RGS).
2. Colony and population monitoring.
3. Habitat and colony characterization to better understand RGS habitat needs.
4. Genetic baseline data for understanding population vulnerability or resilience in Minnesota.
5. Genetic rescue for population resilience and recovery.
6. Monitor habitat use and movements of resident and translocated individuals to assess success of translocations.
7. Conflict resolution with landowners and conservation action relocating conflict individuals.
8. Education and awareness of Richardson's ground squirrels.
9. Design new and modify conservation strategies to increase likelihood of long-term persistence of RGS in Minnesota.

Activities and Milestones

Activity 1: Site identification, documentation of Richardson's ground squirrel occurrence, and surveys.

Activity Budget: \$93,931

Activity Description:

We will attempt to document historical, known, and potential Richardson's ground squirrel (RGS) populations. We will obtain relevant permits and landowner permissions needed to access sites. We will travel to these sites, conduct visual surveys for RGSs, burrows, and sign. When observed we will map these colonies and occurrences and keep track of sites without colonies. Once occupied sites are identified and mapped, we will conduct live trapping using Tomahawk-style traps, checked every 20-30 minutes. Trapped RGSs will be handled and sex, age, and mass recorded and then they will be marked using a passive integrated transponder (PIT) tag for individual identification. Individual identification will enable us to calculate recapture rates and make population estimations. We will document colony characteristics, such as burrow density and distribution and collecting environmental and habitat variables, including vegetation types and height. Collection of these data will help us understand how density of RGS may relate to colony and habitat variables. This information would be useful for future rapid assessment of colonies and likelihood for colony persistence and resilience. Population data will help us understand the potential for long-term survival of the populations. Maps will allow us to estimate potential migration between sites.

Activity Milestones:

Description	Approximate Completion Date
identify potential and historical populations	July 31, 2027
obtain Permits and landowner permissions	July 31, 2027
complete year 1 field surveys, trapping and data collection	August 31, 2027
complete year 2 field surveys, trapping and data collection	August 31, 2028
complete year 3 field surveys, trapping and data collection	August 31, 2029
finalize analysis and disseminate reports	June 30, 2030

Activity 2: Assess genetic diversity and inbreeding risk across known Richardson's ground squirrel colonies.

Activity Budget: \$138,213

Activity Description:

Colonies of Richardson's ground squirrels (RGSs) have become increasingly isolated to the point where gene flow may be limited or experiencing deleterious effects (e.g. genetic drift, inbreeding). To assess the current genetic diversity of RGS colonies, we will collect tissue samples (hair from the back and ear punches) and conduct both Sanger sequencing and microsatellite analysis. These collection techniques will be assessed to see which sample provides high quality DNA samples, and extracted DNA samples will be stored at -20C. We will be using known primers from other species of ground squirrels (e.g. cytB) and design new primers specifically for RGSs. We will identify genes of interest and use these sequences to conduct phylogenomic analyses to gauge the degree of biodiversity present and relatedness within and between colonies. Microsatellite data will provide a rich dataset to determine relatedness, population structure, and genetic diversity. In addition, we could see if certain pathogens are present/more abundant in one population compared to the other. Populations with higher pathogen loads would be considered more compromised and it could connect to a higher inbreeding ratio, indicating reduced fitness.

Activity Milestones:

Description	Approximate Completion Date
collect year one samples of DNA	August 31, 2027
isolate, sequence, and analyze DNA samples from year one	May 31, 2028
collect year two samples of DNA	August 31, 2028
isolate, sequence, and analyze DNA samples from year two	May 31, 2029
collect year three samples of DNA	August 31, 2029
isolate, sequence, and analyze DNA samples from year three	May 31, 2030
finalize analysis and disseminate reports	June 30, 2030

Activity 3: Implement genetic rescue or diversity enhancements through translocation between Richardson's ground squirrel colonies.

Activity Budget: \$8,856

Activity Description:

One of the largest populations of Richardson's ground squirrels (RGSs), in Polk County crashed suddenly. We partnered with Minnesota DNR to conduct translocation of RGSs to this site in an attempt to reestablish a vigorous population. Translocation, moving individuals from an outside population to a small population is a form of genetic rescue. Populations of RGS have declined throughout the state, leaving them vulnerable to isolation and lack of gene flow. These isolated populations are vulnerable to inbreeding and loss of genetic diversity. Isolated populations benefit from the translocation of new individuals from nearby populations. New individuals can provide a form of genetic rescue through increasing genetic diversity. These translocations have positive outcomes with low risk of complications from outbreeding (introducing variation from distant populations). Translocated individuals will be placed into small (approximately 0.75 x 0.75 m) individual enclosures to acclimate to their new colony. The enclosures will be stocked with food and have an artificial shelter. We will radio collar a subset of translocated individuals and residents to document and translocation success and look for changes in movement patterns. We will use at risk colonies to select individuals for translocation.

Activity Milestones:

Description	Approximate Completion Date
complete year one translocations and collection of movement data	August 31, 2027
complete year two translocations and collection of movement data	August 31, 2028
complete year three translocations and collection of movement data	August 31, 2029
finalize analysis and disseminate reports	June 30, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Emerson Towey	Concordia College	Assisting with genetic analysis and mentoring students conducting genetic analysis	Yes
Harshana De Silva Feelixge	Concordia College	Assisting with genetic techniques and mentoring students with genetic techniques and analysis	Yes
Hana Thixton	West Virginia University at Wise	Collaborator for Genetic Analysis	No
Amy Westmark	Minnesota Department of Natural Resources	DNR Staff Lead for the Project	No
Nathalie Rinehardt	Concordia College	Grants Office	No
Jillain Veil-Ehnert	Concordia College	Grants Office	No

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.

We will be keeping in contact with the Minnesota Department of Natural Resources (DNR) throughout the process as well as other stake holders including private conservation organizations (e.g., The Nature Conservancy), land owners and city and state officials. We will be presenting the results of our field work and genetic analyses at local, state, regional, and national conferences. We will prepare publication for scientific literature and provide communication at the local level through our Marketing and Communications office. The students have a lot of interest in also preparing educational material with background and our research (including future research) for the general public so they may come to recognize that Richardson's ground squirrels are far more important for ecosystem functioning and Minnesota prairies than they are typically given credit for.

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?

Results will be shared with the Minnesota Department of Natural Resources (MN DNR), other conservation organizations (e.g., The Nature Conservancy), and private landowners to be used to shape future conservation efforts. Data will enable more concentrated and better-informed decisions about land management and conservation priorities. We will also produce materials for public education about Richardson's ground squirrels and hope to improve the public impression of this fascinating and ecologically important species. Some continued monitoring would be possible through research endowments held by Concordia College. Additional funding, if needed, might be requested from the MN DNR in the future.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Minnesota Biodiversity Atlas - Phase 3	M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 03s	\$797,000

Project Manager and Organization Qualifications

Project Manager Name: Joe Whittaker

Job Title: Associate Professor of Biology

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

I am an associate professor in the Biology Department and Environmental and Sustainability Studies Program and field biologist that specializes in vertebrate, primarily mammalian, ecology. My current research focuses on the ecology of non-game small mammals. During 2024 and 2025, I conducted monitoring and a pilot study on translocating Richardson's ground squirrels.

I completed my undergraduate degree in biology major at DePauw University in 1989. I completed a Master's in 1995 from The University of Minnesota-Duluth and my PH.D. in 2003 from Southern Illinois University in Carbondale working with small mammals. I taught at Pikeville College (Pikeville, Kentucky) from 2001 until 2011 and mentored 28 student research projects on field ecology and received \$124,580.00 in research support funding (primarily from small undergraduate research grants). I have taught Field Studies in Mammalogy at The University of Minnesota's Itasca Biological Station since 2004 and conducted independent research with 11 students and received \$5,400.00 in research support. I have been teaching at Concordia College since fall of 2011 and have mentored a total of 106 undergraduates in 41 research projects with a total of \$300,440.20. I have also mentored one graduate student.

In addition to my teaching, I have worked as a Field Assistant for the Minnesota Department of Natural Resources with the County Biological Survey for two summers (1992 and 1993), with the Natural Resources Research Institute in Duluth, MN (1993). I also served as a Regional Zoology Specialist for The Midwest Regional Office of the Nature Conservancy (1993 – 1994). I have also worked as Research Assistants and/or Consultants on projects involving small mammal trapping and documentation.

Organization: Concordia College

Organization Description:

Concordia College is a global liberal arts college rooted in the Lutheran intellectual tradition. We are an open and respectful community that nurtures students in their quest for authentic identity and life purpose. Concordia welcomes students from all spiritual and cultural backgrounds and seeks to prepare them for the great work of life.

Mission Statement: The purpose of Concordia College is to influence the affairs of the world by sending into society thoughtful and informed men and women dedicated to the Christian life.

Biology is one of Concordia's signature programs with a stellar reputation for placing students in prestigious graduate programs and careers. Our faculty members share their knowledge as you work side-by-side on research projects. There are many opportunities including annual summer research programs and many external programs.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Project Manager		Coordinator, overseeing fieldwork and sample collection			8%	0.72		\$18,000
Co-Director of Genetic Analysis		Teach and mentor students on genetic techniques and data analysis			8%	0.72		\$18,000
Co-Director of Genetic Analysis		Teach and mentor students on genetic techniques and data analysis			8%	0.72		\$18,000
Undergraduate Student Workers		Conduct field work, live trapping, data collection, translocations, conduct genetic research, and analysis (18 students over 3 years)			8%	29.97		\$106,200
							Sub Total	\$160,200
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	Radio Collars (60)	Collars to monitor and compare movements of translocated and resident ground squirrels					\$8,856
	Equipment	Passive Integrative Transponder (PIT) Tags - 700	individually mark squirrels with sub-dermal microchip					\$775
	Tools and Supplies	Bait - Peanut Butter, fruit, and Granola (multiple containers over 3 years)	bait for live trapping squirrels					\$1,350
	Tools and Supplies	Flagging (1200 stake flags) - over 3 years	mark trap locations					\$150
	Tools and Supplies	Lab supplies for genetic testing; DNA extraction, PCR primers and reactants, DNA sequencing, shipping of samples, analysis.	Kits and resources for genetic analysis including preparation or genetic samples, amplification, sequencing, and shipping of samples. Estimating \$15,121 per year for 3 years.					\$45,363
							Sub Total	\$56,494

Capital Equipment								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Van rental is \$15.00/day; mileage is 0.65/mile for 10 weeks over 3 years	travel to field sites for live trapping, data collection, translocations					\$14,100
	Miles/ Meals/ Lodging	Camping (campground charge + permit = 37.58/night) near remote field sites (4 days, 6 weeks, over 3 years); camping 6 out of 10 weeks)	Camping near remote field sites so we can spend more time in the field					\$2,706
	Conference Registration Miles/ Meals/ Lodging	1-2 in state conferences per year, van rental (6 days over three years), mileage ~400 at 0.65 per mile, registration for 27 people over three years - assuming ~\$100)	Dissemination of results of in progress research, meeting at collaborating with state scientists					\$4,500
							Sub Total	\$21,306
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Poster for scientific meetings	Dissemination of in progress research at scientific meetings					\$600
	Publication	Page charges for journals	Page charges for printing in journal, dissemination to the broader scientific community					\$2,400
							Sub Total	\$3,000
Other Expenses								
							Sub Total	-
							Grand Total	\$241,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	Minnesota Department of Natural Resources (please see attached letter)	Set aside for consultation with, or participation by Amy Westmark	Potential	\$4,000
			State Sub Total	\$4,000
Non-State				
Cash	Biology Department, Concordia College	Radio collars for preliminary research (7 over two summers)	Secured	\$1,138
			Non State Sub Total	\$1,138
			Funds Total	\$5,138

Total Project Cost: \$246,138

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [d81c7976-0b8.pdf](#)

Alternate Text for Visual Component

This graphic represents a flow chart version of our experimental plan. It starts with locating, tagging, and characterizing the habitat of RGSs, then processing DNA from tissues using Sanger sequencing and microsatellites. Then it discusses phylogenomic analyses and ends with a plan to implement genetic rescue....

Financial Capacity

Title	File
2005 Concordia College Financial Statements	b5d6b776-cc0.pdf
Secretary of State Good Standing Document	f189af80-9e0.pdf
Most Recent Public Disclosure Form	134f810d-fef.pdf

Supplemental Attachments

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

Title	File
Whittaker Compensation Letter for Two Proposals	14cbfd72-da9.pdf
Letter for Concordia College President (Governing Board)	c10043e8-728.pdf
Support from East Grand Forks City Administrator	11e80b6d-bf4.pdf

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 Commissioner's Plan 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:

Emerson Towey, Concordia College. Nathalie Rinehardt, Concordia College. Jillain Veil-Ehnert , Concordia College.

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