Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-087

Proposal Title: Improving Resiliency and Conservation Outcomes for Minnesota Turtles

Project Manager Information

Name: Tricia Markle

Organization: Minnesota Zoological Society

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Project Basic Information

Project Summary: We will improve the conservation of Minnesota's imperiled turtles by leveraging our strengths in animal husbandry, field conservation, and educational programming to bolster populations and raise public awareness.

Funds Requested: $460,000

Proposed Project Completion: 2025-06-30

LCCMR Funding Category: Foundational Natural Resource Data and Information (A)

Project Location

What is the best scale for describing where your work will take place?

Region(s): SE, Metro,

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

Statewide

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.

The Minnesota Zoo and our partners will improve conservation outcomes for Minnesota's turtles through field-based conservation projects, a head-starting initiative, and educational programming. Turtles play a key role in facilitating healthy lakes and rivers, serve as indicators of pollutant levels and environmental health, and promote public connections to wildlife. However, turtles face numerous threats, ranging from habitat loss to nest predation and road mortality; two of the nine species native to Minnesota – the wood turtle and Blanding's turtle – are categorized as threatened in the State.

Climate change may provide an additional obstacle to long-term viability, particularly for wood turtles already contending with low recruitment, as more regular flooding threatens nesting habitat along rivers. Minnesota hosts one of the largest historical populations of Blanding's turtles in North America, but the current status is uncertain. Updated information is needed to inform conservation action that will increase resiliency and buffer against the potential impacts of climate change.

This proposal represents a continuation of work initiated in 2018 with ENRTF support, as well as new efforts designed to benefit turtle conservation. Activities outlined in this proposal also follow recommendations described in the forthcoming State Wood Turtle Conservation Plan.

What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.

We propose to leverage our strengths as a zoo-based conservation organization and build upon our current ENRTF-supported conservation activities to improve the viability of Minnesota's turtles, particularly imperiled wood and Blanding's turtles. Specifically, we will use our expertise in field conservation and animal husbandry to bolster remnant populations and improve resiliency to climate change and environmental perturbations. We will accomplish this by enhancing nesting sites of wood turtles that may be susceptible to flooding and predation. We also will head-start wood turtle eggs from nests that are prone to inundation or destruction, rearing the juveniles for 1 year and releasing them the following spring when they are less susceptible to predation. To address knowledge gaps and improve the conservation of Blanding's turtles at an integral population in southeastern Minnesota, we will conduct a comprehensive population survey, which will yield new estimates of abundance and age structure. Finally, we will continue to build public awareness state-wide by providing teachers with online content and resources addressing the conservation of our aquatic resources and scientific practice more broadly. An on-site citizen science initiative will allow students to track native turtles and gain hands-on experience in the field of wildlife conservation.

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?

Without targeted conservation action, imperiled turtle populations in the southern half of the state are likely to continue to decline. To help sustain and rebuild populations, the Minnesota Zoo and our partners will:

1) Bolster remnant populations of imperiled wood turtles by improving nesting sites and head-starting young turtles to improve survival during their most vulnerable life stage;
2) Assess the status and evaluate the resiliency of an integral population of Blanding's turtles to inform conservation actions; and
3) Promote conservation of turtles through development of online educational resources and implementation of citizen science initiatives on Zoo property.

Activities and Milestones

Activity 1: Reinforcing wood turtle populations with nest site enhancement and head-starting

Activity Budget: $340,780

Activity Description:
In southeastern Minnesota, populations of the State-threatened wood turtle are severely depleted and suffer from poor recruitment due to threats such as nest predation. Because wood turtles nest in close proximity to rivers and use floodplain habitats during all life stages, extreme weather events and higher levels of precipitation associated with climate change also pose significant threats. Nesting habitat is altered or altogether lost during high water events, and incubating wood turtle nests are vulnerable to wash-out and prolonged inundation during more prevalent floods. To improve recruitment and bolster populations, we will build upon our recent conservation successes. We will identify and assess key characteristics of successful nesting sites and use this information to restore and create nesting sites in areas less prone to flooding. We will quantify the resiliency of eggs to inundation that may occur during more regular flooding events. We also will continue our head-starting program to hatch and rear juveniles in captivity during their vulnerable first year, providing a stop-gap against continued declines while other management actions are put in place. Post-release, we will track head-start turtles to document their habitat use, movements, and survival to evaluate program success and inform future conservation actions.

Activity Milestones:

Description	Completion Date
Expand Zoo's on-site capacity to rear juvenile (head-start) wood turtles to 30 individuals annually	2021-08-31
Determine key nest site characteristics and restore nesting sites to improve hatching success (ongoing)	2024-06-30
Release up to 30 head-start wood turtles annually to bolster recruitment (ongoing)	2024-07-31
Collect data to quantify nest site susceptibility to flooding and loss of eggs (ongoing)	2024-09-30
Monitor head-start wood turtles post-release to quantify movements and survival (ongoing)	2025-05-31
Complete final analyses and prepare project reports and manuscripts for publication in peer-reviewed literature.	2025-06-30

Activity 2: Updating the status and informing the conservation of Blanding's turtles in southeastern Minnesota

Activity Budget: $78,530

Activity Description:
Although they are classified as threatened in Minnesota, what is believed to be the second largest population of Blanding's turtles in North America occurs in the southeast corner of our state. Anecdotal evidence suggests that there is some successful reproduction occurring at this site, but the population's current status is uncertain, and threats such as road mortality, habitat degradation, illegal collection for the pet trade, and climate change jeopardize its long-term viability. To better understand the population's current status and its vulnerability to these threats, we will implement a comprehensive population inventory. This work will complement Minnesota DNR-led survey efforts at the site and yield an updated and robust estimate of abundance, as well as key demographic metrics including sex and age-class ratios. Results will fill a significant knowledge gap and inform management actions to improve the conservation of Blanding's turtles in Minnesota. This is particularly important given that the species will be undergoing status reviews to determine if it should be proposed for listing under the federal Endangered Species Act.

Activity Milestones:

Description	Completion Date
Conduct pilot study and subsequent analyses to inform comprehensive survey design	2022-10-31
Outfit sample of population with radio transmitters to inform abundance estimation	2023-06-30
Implement survey to generate estimates of abundance and demographic metrics, including sex and age ratios	2023-07-31
Complete analyses and prepare report and manuscript for publication in peer-reviewed literature	2024-05-31

Activity 3: Raising awareness and engaging the public to benefit turtle conservation

Activity Budget: $40,690

Activity Description:

The Zoo's Conservation and Education departments will partner to promote turtle conservation and raise public awareness both on-site and statewide. Our off-site strategy consists of providing teachers online learning materials, data sets, and videos of researchers at work to align with current standards around scientific practice. Using online platforms will ensure that content is available state-wide and will facilitate distance learning across Minnesota. Zoomobile, which provides Minnesotans the opportunity to experience wildlife in their own communities, will continue to engage the public in programs featuring Blanding's turtles. On-site, we will establish a citizen science initiative with painted and snapping turtles that occur in the Zoo's natural areas. We will outfit turtles with radio transmitters, and with the support of Zoo staff, visiting students will track turtles via radio telemetry to receive hands-on experience with research methods and enhance their understanding of wildlife science. This initiative will collect data on turtle habitat use, nesting sites, and phenology (the study of the timing of seasonal events). We will establish basking areas with anchored logs in ponds at the Zoo, thereby helping students view the turtles they are tracking and providing a place for public nature viewing and interpretive programming.

Activity Milestones:

Description	Completion Date
Create basking areas for public nature viewing of wild turtles at Zoo	2022-05-31
Develop online learning resources, data sets and videos (ongoing)	2024-10-31
Track native turtles on Zoo site as part of citizen science project (annual)	2025-06-30

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Matthew Graeve	The Nature Conservancy	Technical guidance and assistance with implementation of Activity 2.	No
David Ruff	The Nature Conservancy	Technical guidance and assistance with implementation of Activity 2.	No
Barb Perry	Minnesota Department of Natural Resources	Technical expertise and guidance. Assistance with implementation of Activities 1 and 2. Funding provided by the DNR to support other relevant conservation activities.	No
Krista Larson	Minnesota Department of Natural Resources	Technical expertise and guidance. Assistance with implementation of Activities 1 and 2. Funding provided by the DNR to support other relevant conservation activities.	No
Carol Hall	Minnesota Department of Natural Resources	Technical expertise and guidance. Assistance with implementation of Activities 1 and 2. Funding provided by the DNR to support other relevant conservation activities.	No

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 be funded?

Direct conservation outcomes will include restored nesting sites, increased recruitment, and updated demographic estimates. Findings will be shared with wildlife managers, and recommendations will be implemented with relevant partners. Wood and Blanding's turtles are undergoing status assessments for proposed listing under the Endangered Species Act (ESA). Hence, our proactive approach will improve conservation outcomes, reducing the potential for listing under ESA and associated impacts.

Because improving the viability of Minnesota's turtles will require several years, our activities may continue beyond this grant's scope. We will supplement ENRTF support with other sources and explore other opportunities for funding.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Conserving Minnesota's Nine Species of Freshwater Turtles	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 03k	$300,000

Project Manager and Organization Qualifications

Project Manager Name: Tricia Markle

Job Title: Wildlife Conservation Specialist

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

As the lead biologist of the Minnesota Zoo's Freshwater Turtle Program, Dr. Tricia Markle has worked exclusively on Minnesota turtle conservation for the past two years. In close partnership with other State agencies, including the Minnesota Department of Natural Resources and the Minnesota Department of Transportation, the program's conservation activities and research have included implementing and testing road mortality mitigation strategies and

tracking state-threatened wood turtles to determine habitat use, home ranges, nesting sites, and threats. Responsibilities at the Zoo also have included establishing a head-starting initiative and caring for juvenile wood turtles. As a trained herpetologist (zoologist who studies amphibians and reptiles), Dr. Markle is adept at identifying and handling Minnesota's native turtles and other wildlife, and she is well-versed in relevant wildlife techniques, including radio telemetry. In 2019, she was selected as a member of the Minnesota Wood Turtle Team, tasked with helping the Minnesota DNR draft a Minnesota Wood Turtle Conservation Plan that will direct conservation efforts over the next 10 years.

Prior to work at the Minnesota Zoo, Dr. Markle completed a doctorate in conservation biology investigating climate change impacts on salamanders. She has presented at numerous scientific conferences and has authored several scientific papers. Her years of previous field and research experience have included work with turtles, salamanders, spotted owls, and invertebrates. Her graduate work (both MSc and PhD) required planning, managing, and executing research activities with great attention to detail. Finally, Dr. Markle has worked with numerous outreach programs to promote wildlife conservation, including the Minnesota Zoo, Society for Conservation Biology, and community organizations.

Organization: Minnesota Zoological Society

Organization Description:
The Minnesota Zoo is a unique state agency. Established in 1978 to provide Minnesota residents and guests with an opportunity to experience animals from the exotic to the familiar in natural habitats, today the Zoo is one of the State's premier cultural, educational, and conservation institutions.

The Zoo's mission is to connect people, animals and the natural world to save wildlife. With 1.3 million guests, and state-wide outreach programs reaching thousands more, the Zoo is well-positioned to strengthen Minnesotans' awareness and understanding of our State's commitment to wildlife, science, and conservation. The Zoo is the State's largest environmental educator with >500,000 participants in Zoo education programs.

The Zoo is also a leader in conservation – directing efforts and partnering with others on a variety of initiatives in Minnesota and across the globe. Over the past eight years, the Zoo has enhanced efforts to focus on Minnesota wildlife, including projects to conserve moose, bison, turtles, prairie butterflies, and mussels. Advancing the science of wildlife conservation is an important part of the Zoo's work.

Finally, the Zoo has a proven record of using its resources efficiently and effectively, and matching the State's investment.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Biologist and Project Manager: T. Markle, average 0.85 FTE x 4 years		Overall coordination of project activities, implementation of activity 1 and assistance with implementation of activities 2 and 3			36%	3.4	X	$346,300
Population ecologist: S. Stapleton, average 0.09 x 4 years (0.12 FTE for FY22 and FY23; 0.06 FTE for FY24 and FY25)		Coordination of activity 2; assistance with implemetation of activity 1			29%	0.36	X	$57,375
Education project coordinator: TBD, average 0.05 FTE x 4 years		Implementation of activity 3			21%	0.2	X	$20,250
							Sub Total	**$423,925**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Tools and Supplies	VHF transmitters @ $170 / unit: 10 units for adult female wood turtles / yr x 3 years; 10 units for head-start wood turtles / yr x 3 yrs; 25 units for population assessment of Blanding's turtles; and 5	Track wood turtles to identify nesting sites and monitor movements (adults) and evaluate post-release movements and survival (head-starts); track					$17,675

		units for citizen science initiative on Zoo site x 3 years. Plus ~$225 / year x 3 years for attachment supplies and miscellaneous supplies	Blanding's turtles to quantify habitat use and inform population survey; track turtles on Zoo site to engage public in citizen science					
	Tools and Supplies	Data loggers and cameras for monitoring nest site water levels and temperatures: $150/unit x 20 units	Quantify duration that turtle nests are underwater during flooding events					$3,000
	Tools and Supplies	Nesting site improvement and restoration supplies and tools: $1000/site x 3 sites	Enhancement of nesting sites via tree, brush, and invasive species removal; sand added to nesting sites					$3,000
	Tools and Supplies	Head-starting supplies for juvenile wood turtles: $700 / tank rearing system x 2 systems; food, supplies and replacement parts: $750 / yr x 4 yrs	Rear young wood turtles through most vulnerable life stage to boost recruitment and bolster population					$4,400
	Tools and Supplies	Supplies for securing basking logs in Zoo ponds/lakes for education initiative: $500	Enhance habitat for turtles on Zoo site to improve opportunities for public engagement					$500
	Tools and Supplies	Miscellaneous supplies for population survey of Blanding's turtles, including receiver and antenna for radio telemetry, traps and marking supplies: $3,500	Implementation for Activity 2, including capturing Blanding's turtles for population survey and uniquely marking individuals					$3,500
							Sub Total	**$32,075**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Fuel and mileage: $1,000/yr for 4 years. Reimbursement rates as allotted per the State of Minnesota travel regulations.	Travel to field sites in southern and central Minnesota					$4,000
							Sub Total	**$4,000**
Travel Outside Minnesota								

							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$460,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Personnel - Biologist and Project Manager: T. Markle, average 0.85 FTE x 4 years		Overall coordination of project activities, implementation of activity 1 and assistance with implementation of activities 2 and 3	**Classified :** A classified staff position will be partially supported by these ENRTF funds. This staff member will have the necessary expertise required to successfully implement Activities 1, 2 and 3. The ENRTF funding will make it possible for the staff member to work on this project for the percentage of time indicated in the budget. Without this funding they would not be able to support this project with their time. Further, the nature of the success of this project necessitates some level of expertise coming from the Zoo, which this staff member will be instrumental in providing. Responsibilities for the classified staff will be reprioritized and reallocated as necessary to support this project.
Personnel - Population ecologist: S. Stapleton, average 0.09 x 4 years (0.12 FTE for FY22 and FY23; 0.06 FTE for FY24 and FY25)		Coordination of activity 2; assistance with implemetation of activity 1	**Classified :** A classified staff position will be partially supported by these ENRTF funds. This staff member will have the necessary expertise required to successfully coordinate activity 2 and assist with activity 1. The ENRTF funding will make it possible for the staff member to work on this project for the percentage of time indicated in the budget. Without this funding they would not be able to support this project with their time. Further, the nature of the success of this project necessitates some level of expertise coming from the Zoo, which this staff member will be instrumental in providing. Responsibilities for the classified staff will be reprioritized and reallocated as necessary to support this project.
Personnel - Education project coordinator: TBD, average 0.05 FTE x 4 years		Implementation of activity 3	**Classified :** A classified staff position will be partially supported by these ENRTF funds. This staff member will have the necessary expertise required to successfully implement Activity 3. The ENRTF funding will make it possible for the staff member to work on this project for the percentage of time indicated in the budget. Without this funding they would not be able to support this project with their time. Further, the nature of the success of this project necessitates some level of expertise coming from the Zoo, which this staff member will be instrumental in providing. Responsibilities for the classified staff will be reprioritized and reallocated as necessary to support this project.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	DNR Nongame funds	Field research expenses including supplies	Secured	$29,000
In-Kind	Minnesota Zoo General Operating	Grant administration and other expenses associated with program implementation, valued at 15% of the total grant	Pending	$69,000
In-Kind	Legacy appropriation	Supplemental funds to cover additional, unforeseen project expenses (~$2500/year)	Pending	$10,000
			State Sub Total	**$108,000**
Non-State				
In-Kind	Minnesota Zoo Foundation	Supplemental funds for additional, unforeseen project expenses, (valued at $2.5k per year)	Pending	$10,000
In-Kind	SWG fund (federal grant) to MN DNR	Staff salary and expenses (travel,supplies/processing, etc)	Secured	$45,000
In-Kind	CSWG (federal grant) to MN DNR	Staff salary and expenses (travel, supplies/processing, etc)	Potential	$80,000
			Non State Sub Total	**$135,000**
			Funds Total	**$243,000**

Attachments

Required Attachments

Visual Component

File: e9850668-315.pdf

Alternate Text for Visual Component

Graphic includes pictures of state-threatened wood and Blanding's turtles and details the objectives of our project which are:
GOAL: Advance conservation of threatened wood and Blanding's turtles
Activities:
- Bolster remnant populations of wood turtles
- Assess the status of an integral population of Blanding's turtles
- Engage the public in turtle conservation

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have patent, royalties, or revenue potential?

No

Does your project include research?

Yes

Does the organization have a fiscal agent for this project?

No

MINNESOTA ZOO
Changing how you see the world

Improving Resiliency and Conservation Outcomes for Minnesota Turtles

GOAL: Advance conservation of threatened wood and Blanding's turtles

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