



# Environment and Natural Resources Trust Fund (ENRTF)

## M.L. 2018 ENRTF Work Plan (Main Document)

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**Today's Date:** December 15, 2017

**Date of Next Status Update Report:** January 31, 2019

**Date of Work Plan Approval:**

**Project Completion Date:** June 30, 2021

**Does this submission include an amendment request?** \_\_\_

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**PROJECT TITLE:** Conserving Minnesota's Nine Species of Freshwater Turtles

**Project Manager:** Seth Stapleton

**Organization:** Minnesota Zoo

**College/Department/Division:** Conservation Department

**Mailing Address:** 13000 Zoo Boulevard

**City/State/Zip Code:** Apple Valley, MN 55124

**Telephone Number:** (952) 431-9443

**Email Address:** seth.stapleton@state.mn.us

**Web Address:** www.mnzoo.org

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**Location:** Dakota County /statewide

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**Total Project Budget:** \$300,000

**Amount Spent:** \$0

**Balance:** \$300,000

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**Legal Citation:** M.L. 2018, Chp. xx, Sec. xx, Subd. xx

**Appropriation Language:**

## **I. PROJECT STATEMENT:**

With its vast network of lakes and waterways, Minnesota is home to an abundance of aquatic and semi-aquatic wildlife, including nine species of native freshwater turtles. Turtles are a key component of diverse, healthy, and resilient aquatic ecosystems, often functioning as an indicator species that reflect broader environmental conditions. Turtles also inspire connections to nature for children and adults alike.

Minnesota's turtles, however, face numerous threats during different life stages, including habitat loss and degradation, collection for the pet trade, high predation of incubating nests, and mortality of juveniles and adults on Minnesota's roadways. These issues threaten the long-term viability of some populations, and as a result, two species – the Blanding's turtle and the wood turtle – are now listed as threatened in the State and globally endangered.

With the support of ENRTF, the Minnesota Zoo will work to improve the long-term viability of turtle populations in Minnesota. We will expand our current partnership with Minnesota Department of Transportation (MnDOT) and Department of Natural Resources (DNR) to quantify two of the primary threats facing imperiled turtles and implement and evaluate mechanisms to mitigate these threats. The Zoo will also use its large visitor-ship and its expertise in education and outreach programming to promote public awareness of turtle conservation and encourage individual actions that benefit healthy and biodiverse aquatic systems. We anticipate that local and state management authorities will be able to use the results of this project to devise and implement effective management strategies that can benefit conservation of turtles at sites state-wide.

The specific objectives for this project are:

- 1) To collect foundational data that characterizes two key threats – road mortality and nest predation – currently facing Blanding's turtles, wood turtles, and other Minnesota species;
- 2) To implement and evaluate at least 3 mechanisms to improve the conservation of imperiled turtles, including cost-effective measures to reduce mortality on roadways and strategies to improve hatching success;
- 3) To develop educational and outreach materials and use on- and off-site programming as vehicles to share key conservation messages to >1 million annual visitors at the Zoo and beyond.

## **II. OVERALL PROJECT STATUS UPDATES:**

**First Update January 31, 2019**

**Second Update January 31, 2020**

**Third January 31, 2021**

**Final Update June 30, 2021**

## **III. PROJECT ACTIVITIES AND OUTCOMES:**

### **ACTIVITY 1: Reducing mortality of turtles on Minnesota's roadways**

#### **Description:**

Turtle mortality on Minnesota's roadways is a significant challenge, particularly during the spring and late summer as turtles move among feeding grounds, reproductive sites, and overwintering areas. The Zoo, in close partnership with the Minnesota Department of Transportation (MnDOT), will conduct research to better quantify this threat and evaluate potential mechanisms to mitigate turtle mortality on our roads. Study sites around the greater metropolitan region, as well as southern and central Minnesota, will be selected based on the presence of turtles (particularly imperiled species) and the logistical feasibility of monitoring and installing

signs and other measures. Roadways managed by state or local authorities will be considered during the initial vetting process.

We will collect foundational data to document turtle use of and mortality along selected segments of roadways. These efforts will begin at a limited scale prior to the granting period (i.e., during early 2018) and continue through 2018. We will complete at least weekly foot patrols of study sites during seasons of peak movement (late spring, early summer, and late summer), with less frequent surveys at other times of the active season. In collaboration with MnDOT and after consultation with local authorities (where appropriate), we will then implement mechanisms (at select sites) to mitigate turtle mortality such as dynamic traffic signs, road paint and temporary speed reduction zones. We will monitor their impact for two years post-installation. We will also develop training materials for use by citizen scientists to broaden our reach and potentially increase monitoring capacity. Activity 1 will yield information on cost-effective options for reducing mortality of turtles on roads, and we anticipate that effective mitigation measures may be applied elsewhere in the State and at larger spatial scales. To achieve the desired outcomes for both Activities 1 and 2, the Zoo must dedicate a staff person to conduct field surveys, analyses and reporting.

**ENRTF BUDGET: \$133,113**

Outcome	Completion Date
1. Road surveys conducted to collect baseline movement and mortality data.	October, 2018
2. Mechanisms to reduce mortality on roads installed.	April, 2019
3. Efficacy of potential mitigation measures evaluated via post-implementation surveys.	October, 2020
4. Completion of final analyses and preparation of project report and manuscript for publication in peer-reviewed literature, summarizing key findings and recommendations.	June, 2021

**First Update January 31, 2019**

**Second Update January 31, 2020**

**Third January 31, 2021**

**Final Update June 30, 2021**

**ACTIVITY 2:**

**Description: Improving hatching success of riverine turtles**

Loss of incubating eggs and hatchlings remaining in nests to predators such as raccoons is a significant issue for Minnesota’s turtles. For imperiled species such as the wood turtle, nest predation poses a major threat to long-term population viability, particularly in areas with higher human populations and recreational activity: the presence of people often brings mammalian predators if visitors leave trash and other belongings behind.

To collect baseline data on nest predation and to evaluate mechanisms to improve hatching success, we will outfit endangered wood turtles with GPS transmitters. (Surveys to locate wood turtles will be led by the Minnesota DNR.) Transmitters will be programmed to collect regular positional data, enabling us to identify key nesting sites for wood turtles and likely other species. This work began in 2017 in the Cannon and Straight River watersheds and, with ENRTF support, will be expanded to additional watersheds in central and southern Minnesota in 2018 and 2019. We will then install electrified fences at selected nesting sites that will allow turtle access to nests but exclude mid-sized mammalian predators. Cameras will also be installed at each site to document visitation rates by turtles and predators. Nest site monitoring will continue through spring 2021. Fencing will be installed at the beginning of the nesting season in 2019 and 2020. We will visit sites regularly (at

least weekly) to quantify sign such as tracks, evidence of digging and nesting, and evidence of predation, to maintain camera systems, and to ensure the fencing is structurally sound and functioning properly. We will remove fencing in late summer (September) and excavate nests which appear to have hatched. As an ancillary benefit, transmitters will enable us to document habitat use of wood turtles. Results from Activity 2 will be used to inform effective management strategies to improve hatching success.

**ENRTF BUDGET: \$152,387**

Outcome	Completion Date
1. Surveys conducted and wood turtles outfitted with transmitters to collect nesting site and movement data.	October, 2019
2. Predator exclusion fencing constructed and maintained at select nesting sites. Fencing of nesting sites will begin during spring, 2019.	September, 2020
3. Sites monitored post-installation to assess effectiveness in reducing mortality. Monitoring of nesting sites will begin during spring, 2019.	September, 2020
4. Completion of final analyses and preparation of project report and manuscript for publication in peer-reviewed literature, summarizing key findings and recommendations.	June, 2021

**First Update January 31, 2019**

**Second Update January 31, 2020**

**Third January 31, 2021**

**Final Update June 30, 2021**

**ACTIVITY 3:**

**Description: Building public awareness at the Zoo and beyond**

The Zoo will leverage its ~1.3 million annual visitors and its expertise in education and outreach programming to raise public awareness about the conservation of turtles in Minnesota and our aquatic resources. Our efforts will include both on-site programming and outreach events at communities around the State. The Zoo’s well-regarded Zoomobile programs, which feature Blanding’s and wood turtles, give citizens from across Minnesota the opportunity to experience wildlife up-close in their own communities. Using Zoomobile as a platform to share key conservation messages off-site, we will develop outreach materials centered on Minnesota’s turtles, such as workbooks and informational booklets, which can be shared and left behind after any Zoomobile program that incorporates turtles.

At the Zoo, we will develop similar turtle conservation messaging with the Zoo’s Close Encounters program, which enables visitors the opportunity to experience wildlife up-close at the Zoo. We will also develop and install interpretive graphics and contract a videographer to produce a short (3 – 5 minute) video to convey these same conservation messages to Zoo visitors.

**ENRTF BUDGET: \$14,500**

Outcome	Completion Date
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1. Outreach materials promoting the conservation of turtles in Minnesota developed and printed.	June, 2019
2. Interpretive graphics and video outlining the biology and conservation of freshwater turtles developed and installed.	June, 2019
3. Outreach materials disseminated via Zoomobile and other programs. Dissemination of these materials will begin during summer, 2019.	June, 2021

**First Update January 31, 2019**

**Second Update January 31, 2020**

**Third January 31, 2021**

**Final Update June 30, 2021**

#### **IV. DISSEMINATION:**

##### **Description:**

Updates on activities and progress will be shared with collaborators via regular reports, and information about this work will be disseminated to the general public by the Zoo's Conservation, Marketing and Education departments as frequently as possible. These communications may include ZooMobile and other public presentations by staff and sharing information on the Minnesota Zoo's web page and social media outlets. In addition, Zoo staff and volunteers will be instructed in speaking with the public about turtles and the benefits of turtles for healthy aquatic ecosystems. Results of research addressing mechanisms to mitigate road mortality and improve hatching success will be submitted for publication in peer-reviewed scientific journals and presented at professional conferences.

**First Update January 31, 2019**

**Second Update January 31, 2020**

**Third January 31, 2021**

**Final Update June 30, 2021**

#### **V. PROJECT BUDGET SUMMARY:**

**A. Preliminary ENRTF Budget Overview:** See attached budget spreadsheet

##### **Explanation of Capital Expenditures Greater Than \$5,000:**

N/A

##### **Explanation of Use of Classified Staff:**

Two staff positions will be supported by these ENRTF funds. The Biologist position, which will be primarily funded by ENRTF (with supplemental funding received from another funding source), will be hired upon initiation of this project. The Principal Investigator / Project Manager is classified. S. Stapleton, current staff at the Zoo, has the necessary expertise to successfully oversee Activities 1, 2, and 3 as the PI / Project Manager. However, without the support of the ENRTF funding, he would not have the ability to work on this project and instead would need to focus on other position responsibilities. Incorporating existing expertise at the Zoo will be essential for the completion of this project.

**Total Number of Full-time Equivalent (FTE) Directly Funded with this ENRTF Appropriation:**

5

Enter Total Estimated Personnel Hours: 5,928	Divide by 2,080 = TOTAL FTE: 2.85
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**Total Number of Full-time Equivalent (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:**

Enter Total Estimated Personnel Hours: ~336	Divide by 2,080 = TOTAL FTE: ~0.16
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**B. Other Funds:**

SOURCE OF AND USE OF OTHER FUNDS	Amount Proposed	Amount Spent	Status and Timeframe
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b>			
N/A	\$	\$	
<b>Other State \$ To Be Applied To Project During Project Period:</b>			
MN Zoo, General Operating Fund: Utilities and administrative costs estimated at 15% of project budget	\$45,000	\$ 0	Pending; FY19 – FY21
Minnesota Department of Natural Resources, In-kind contribution including surveys and capture of turtles to be outfitted with GPS transmitters; technical advice regarding selection of nesting sites for installation of predator exclusion fencing and road selection mechanisms to reduce mortality	\$42,000	\$ 0	Pending; FY19 – FY21
Minnesota Department of Transportation, grant to MN Zoo for complementary work, entitled "Reduced vehicle-animal collisions with installation of small animal exclusion fencing	\$82,976	\$ 0	Confirmed; FY18 – FY21; Additional funding remaining within MnDOT for installation of roadside exclusion fencing. A small amount of funding will be spent prior to the initiation of this project in FY19
<b>Past and Current ENRTF Appropriation: N/A</b>			
<b>Other Funding History:</b>			
Minnesota Zoo Foundation	\$ 7,000	\$ 7,000	FY17 Activities
Legacy Fund appropriation to Minnesota Zoo, FY17	\$ 6,000	\$ 6,000	FY17 Activities
Minnesota Zoo Foundation	\$ 10,000	\$ 0	Pending; FY18 Activities
Legacy Fund appropriation to Minnesota Zoo, FY18	\$ 14,000	~\$ 2,500	Confirmed; FY18 Activities

**VI. PROJECT PARTNERS:**

The Minnesota Zoo would be the sole recipient of ENRTF funds under this proposal. Zoo Conservation staff will plan and implement Activities 1 and 2 in partnership with MnDOT and DNR. Zoo Conservation and Education staff will jointly plan and implement Activity 3. We anticipate developing partnerships with other organizations, potentially including local governments and management authorities, universities, and NGOs, as work progresses.

**A. Partners receiving ENRTF funding: N/A**

**B. Partners NOT receiving ENRTF funding**

Name	Title	Affiliation	Role
Chris Smith	Wildlife Ecologist, Protected Species Coordinator	Mn DOT	Key partner for implementation of Activity 1. Roles include technical advice on selection of roadways for study, coordination with road management authorities, selection and installation of mitigation mechanisms, and monitoring.
Peter Leete	Transportation Hydrologist (DNR – MnDOT Liason)	MN DNR	Key partner for implementation of Activity 1. Roles include technical advice on selection of roadways for study, coordination with road management authorities, selection and installation of mitigation mechanisms, and monitoring.
Elizabeth Brown	Environmental Program Specialist	Mn DOT	Key partner for implementation of Activity 1. Roles include technical advice on selection of roadways for study, coordination with road management authorities, selection and installation of mitigation mechanisms, and monitoring.
Carol Hall	Herpetologist	MN DNR	Key partner for implementation of Activity 2. Roles include selection of study sites, surveys for and capture of turtles to be outfitted with GPS transmitters, technical advice on nesting site selection for installation of predator exclusion fencing, and monitoring. Additional advice on site selection for Activity 1.
Krista Larson	Nongame Research Biologist	MN DNR	Key partner for implementation of Activity 2. Roles include selection of study sites, surveys for and capture of turtles to be outfitted with GPS transmitters, technical advice on nesting site selection for installation of predator exclusion fencing, and monitoring. Additional advice on site selection for Activity 1.
Jaime Edwards	Nongame Wildlife Specialist	MN DNR	Key partner for implementation of Activity 2. Roles include selection of study sites, surveys for and capture of turtles to be outfitted with GPS transmitters, technical advice on nesting site selection for installation of predator exclusion fencing, and monitoring. Additional advice on site selection for Activity 1.

Barb Perry	Natural Resources Technician	MN DNR	Key partner for implementation of Activity 2. Roles include selection of study sites, surveys for and capture of turtles to be outfitted with GPS transmitters, technical advice on nesting site selection for installation of predator exclusion fencing, and monitoring. Additional advice on site selection for Activity 1.
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**VII. LONG-TERM- IMPLEMENTATION AND FUNDING:**

The goal of this project is to improve the conservation of Minnesota’s imperiled turtles by mitigating two important sources of mortality. We will also promote public awareness about turtles and identify actions Minnesotans can take to benefit the conservation of our aquatic resources. This is particularly important at present, as both Blanding’s and wood turtles are currently undergoing status reviews by the US Fish and Wildlife Service to determine whether they should be proposed for listing under the federal Endangered Species Act (ESA). Working proactively to improve the health of local turtle populations may avoid the regulatory burden and potential economic impacts associated with a possible listing under the ESA. Aspects of our work, such as reducing road mortality, will benefit other wildlife, including reptiles and amphibians. This project also meets an objective of the DNR’s 2015 – 2025 Wildlife Action Plan, which calls for collecting data to update the status of wood turtles in Minnesota and inform the state’s wood turtle conservation plan.

Evaluating and implementing strategies that improve the long-term viability of turtle populations may require several years. As such, we anticipate that the Zoo’s activities to promote the conservation of turtles may continue beyond the scope of this grant. Hence, the Zoo will continue to explore non-ENRTF funding sources for this project and may submit a future proposal to fund this work.

**VIII. REPORTING REQUIREMENTS:**

- **The project is for 3 years, will begin on July 1, 2018, and end on June 30, 2021.**
- **Periodic project status update reports will be submitted January 31 of each year.**
- **A final report and associated products will be submitted between June 30 and August 15, 2021.**

**IX. SEE ADDITIONAL WORK PLAN COMPONENTS:**

- A. Budget Spreadsheet**
- B. Visual Component or Map**
- C. Research Addendum**

**Attachment A:  
Environment and Natural Resources Trust Fund  
M.L. 2018 Budget Spreadsheet**



**Project Title:** Conserving Minnesota's Nine Species of Freshwater Turtles

**Legal Citation:**

**Project Manager:** Seth Stapleton

**Organization:** Minnesota Zoo

**College/Department/Division:** Conservation

**M.L. 2018 ENRTF Appropriation:** \$300,000

**Project Length and Completion Date:** 3 years, June 30, 2021

**Date of Report:** February 19, 2018

<b>ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET</b>	<b>Budget</b>	<b>Amount Spent</b>	<b>Balance</b>
<b>BUDGET ITEM</b>			
<b>Personnel (Wages and Benefits)</b>	\$233,225	\$0	\$233,225
S. Stapleton, Principal Investigator / Project Manager. (1 person, 72% salary / 28% benefits), 0.05 FTE for 3 years - \$16,225			
Biologist (to be determined). Research Analyst Intermediate or similar classification. (1 person, ~64% salary / 36% benefits). ~0.90 FTE for 3 years - \$217,000			
<b>Professional/Technical/Service Contracts</b>			
Videographer contract to develop a short (3 - 5 min) video about Minnesota's turtles.	\$5,000	\$0	\$5,000
<b>Equipment/Tools/Supplies</b>			
Road mortality mitigation measures, including traffic signs, lights, and road paint	\$15,000	\$0	\$15,000
GPS transmitters to track movements of wood turtles (~\$1,400 / unit; 10 total units for 2018 and 2019)	\$14,000	\$0	\$14,000
Predator exclusion fencing and monitoring equipment (est. at \$5,000 / unit, including hardware, fencing, batteries, and cameras; 4 units plus small contingency for additional supplies)	\$20,275	\$0	\$20,275
<b>Printing</b>			
Printing of outreach materials, potentially including educational workbooks and / or booklets, that raise awareness and promote the conservation of turtles.	\$7,500	\$0	\$7,500
<b>Travel expenses in Minnesota</b>			
Fuel / mileage and meals to travel to field sites in southern and central Minnesota: \$1,000 / yr for 3 years. Reimbursement rates as allotted per the State of Minnesota travel regulations.	\$3,000	\$0	\$3,000
<b>Other</b>			
Zoo-based turtle conservation educational and outreach, including photo licensing and interpretive signage and displays	\$2,000	\$0	\$2,000
<b>COLUMN TOTAL</b>	<b>\$300,000</b>	<b>\$0</b>	<b>\$300,000</b>

# Conserving Minnesota's Turtles through Research and Education



The Minnesota Zoo, in partnership with MnDOT and DNR, will use road signs and other strategies to mitigate turtle mortality on our roadways.

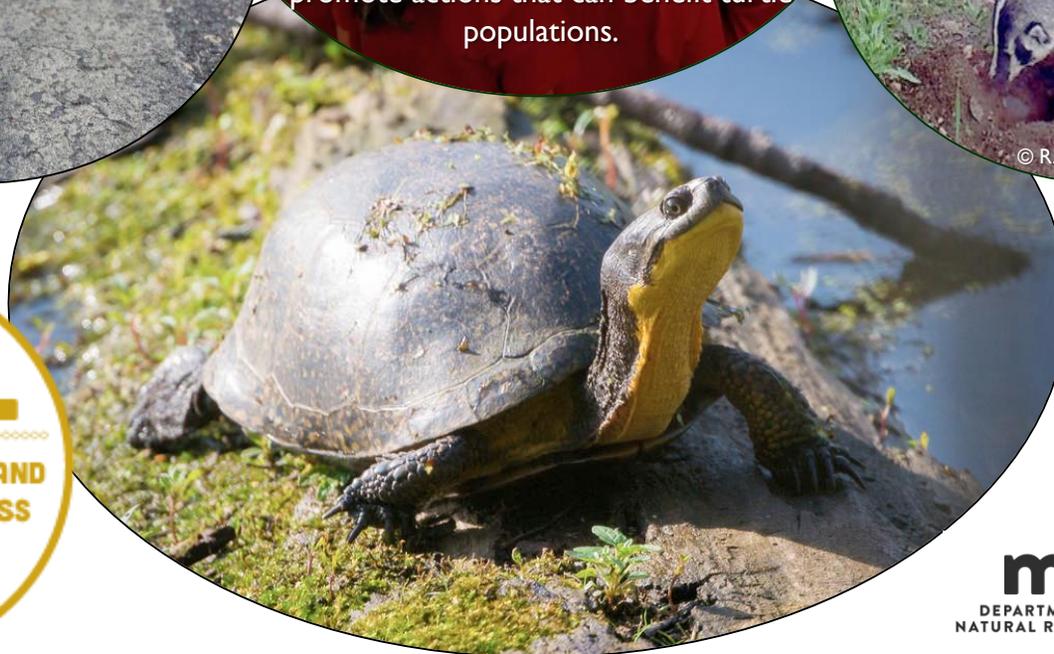


Zoo staff will raise public awareness and promote actions that can benefit turtle populations.



To reduce nest predation, Zoo staff will work with DNR to fence key nesting sites and improve hatch success.

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**GOAL**  
REDUCE MORTALITY AND PROMOTE AWARENESS TO CONSERVE MINNESOTA'S TURTLES

