# **Environment and Natural Resources Trust Fund** 2020 Request for Proposals (RFP)

Project Title:	ENRTF ID: 039-A
Minnesota Nature Trackers: A Citizen Science Project	
Category: A. Foundational Natural Resource Data and Inform	ation
Sub-Category:	
Total Project Budget: \$ 661.855	
Proposed Project Time Period for the Funding Requested:	June 30, 2024 (4 vrs)
Summary:	
This project will expand foundational knowledge on the diversity a and a suite of emerging terrestrial invasive plants by involving the	nd distribution of trees, dragonflies, bees, public as citizen scientists.
Name: Robert Blair	
Sponsoring Organization: U of MN	
Job Title: Dr.	
Department: Fisheries, Wildlife, and Conservation Biology	
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Location:	
Region: Statewide	
County Name: Statewide	

## City / Township:

### Alternate Text for Visual:

Process of developing four survey protocols for citizen scientists; collecting and validating data; and creating an atlas of the diversity and distribution of the dragonflies, trees, bees, and emerging terrestrial invasive plants in Minnesota.

Funding Priorities Multiple Benefits	OutcomesKnowledge Base
Extent of Impact Innovation	Scientific/Tech Basis Urgency
Capacity ReadinessLeverage	TOTAL%



Environment and Natural Resources Trust Fund (ENRTF) 2020 Main Proposal

#### PROJECT TITLE: Minnesota Nature Trackers: A Citizen Science Project

#### I. PROJECT STATEMENT

Minnesota Nature Trackers will recruit thousands of Minnesota citizens to document the diversity and distribution of trees, dragonflies, bees, and a suite of emerging terrestrial invasive plants in Minnesota.

**Need.** Knowing how to conserve species depends on knowing where they are. This project will use citizen scientists to map the distribution of four relatively easy to identify taxa in Minnesota using up-to-date technology and expert verification. This effort will provide foundational information on the diversity and distribution of these taxa which can then be used in management efforts by the Minnesota DNR and the USFWS.

This project will complement and build upon two previously funded LCCMR projects: the Minnesota Odonata Survey, which was completed by the Minnesota Dragonfly Society; and the Minnesota Native Bee Atlas, which is in its final year by the University of Minnesota Extension. It will also expand on the Forest Pest First Detector program, which is also run by University of Minnesota Extension and funded by the Minnesota Departments of Agriculture and Natural Resources. While this proposed project will not replicate the protocols used by any of these projects, it will expand on the foundational knowledge created by them.

Specifically, this project will have citizen scientists capture georeferenced photographic records of the four focal groups using iNaturalist, a widely used and well-developed app and web site that documents biodiversity diversity and distribution worldwide (iNaturalist.org). The information gathered by the citizen scientists will be verified by expert curators who are familiar with each taxon. Submissions that are deemed 'research grade' will then be uploaded to the Bell Museum's Minnesota Biodiversity Atlas (another LCCMR funded project) as observational data and then made available to researchers, land managers, and the public.

**Goals and Outcomes.** The goal of Minnesota Nature Trackers is to expand foundational knowledge on the diversity and distribution of trees, dragonflies, bees, and a suite of emerging terrestrial invasive plants in Minnesota by involving the public as citizen scientists. The direct outcomes of the project are to:

1) determine the diversity and distribution of these four groups throughout Minnesota;

2) document the flight seasons (phenology) of the dragonflies and bees;

3) promote an understanding of these four groups among Minnesota citizens by engaging them in documenting their diversity and distribution; and

4) make this information widely available to researchers and the public including land managers and decision makers using the Minnesota Biodiversity Atlas hosted by the Bell Museum.

**Process.** The project will occur in three steps:

1) Adapt existing sampling protocols of these four groups for use with iNaturalist and develop training materials and workshops for the citizen scientists who will collect the data.

2) Train citizen scientists to survey these four groups across the state.

3) Validate data submitted by citizen scientists and make available the curated data on the Minnesota Biodiversity Atlas, a database that can be queried by researchers, land managers and the general public.

#### **II. PROJECT ACTIVITIES AND OUTCOMES**

Activity 1: Establish projects in iNaturalist and develop training programs in order to survey four focal groups – trees, dragonflies, bees, and a suite of emerging terrestrial invasive plants – throughout MN. Description: iNaturalist will be used as the main collection protocol for the four groups. iNaturalist requires the uploading of photographs of the target organisms along with a georeference to the location where they were observed. Once these observations are uploaded, experts curate the submissions by reviewing them for accuracy and, when applicable, certify them as 'research grade.' The suite of emerging terrestrial invasive plants may include burning bush, European black alder, Amur cork tree, and poison hemlock plus others.



#### ENRTF BUDGET: \$219,257

Outcome	Completion Date		
1. Develop survey protocols for focal groups.	1-1-21		
2. Develop training materials including videos and printed instructional pieces.	4-1-21		
workshops for citizen scientist volunteers.			
3. Develop training workshops for citizen scientist volunteers.	4-1-21		

Activity 2: Recruit, train, and deploy volunteers to record distributions of four focal groups in Minnesota **Description:** Based on our experience with the MN Wild Bee Atlas, ~2500 citizen scientists will be recruited and trained through both online and in-person methods with materials developed specifically for the program. We expect that many volunteers will be Minnesota Master Naturalists, Master Gardeners, former participants in the LCCMR-funded MN Native Bee Atlas and MN Dragonfly Surveys, and regular DNR volunteers. We will also broaden participation to youth groups and their leaders.

#### ENRTF BUDGET: \$234,320

Outcome	Completion Date		
<ol> <li>Recruit and train ~2500 citizen scientists for all four focal groups.</li> </ol>	5-1-24		
2. Deploy ~625 citizen scientists to conduct surveys of trees. ~ 625 will similarly	5-1-24		
survey dragonflies. ~625 will survey bees. ~625 will survey a suite of emerging			
terrestrial invasive plant species.			
3. Monitor incoming data, identify sources of reporting error, refine training.	6-30-24		

Activity 3: Curate data submitted by volunteers to insure accuracy and upload to Minnesota Biodiversity Atlas. Description: To ensure validity and usefulness of the data, the project will recruit curators for each focal group who will verify data submission for accuracy and to certify as 'Research Grade.' Once the data are validated, they will be made available on the LCCMR-funded Minnesota Biodiversity Atlas.

#### ENRTF BUDGET: \$208,278

Outcome	Completion Date
1. Curators verify incoming data and certify a subset as Research Grade	6-30-24
2. Research Grade data is made available on the Minnesota Biodiversity Atlas	6-30-24

#### **III. PROJECT PARTNERS AND COLLABORATORS:**

#### A. Partners receiving ENRTF funding

Rob Blair, Professor, Fisheries, Wildlife and Conservation Biology, University of Minnesota, Project Manager Andrea Lorek Strauss, Educator, Extension, University of Minnesota, Senior Personnel

Britt Forsberg, Program Coordinator, Extension, University of Minnesota, Senior Personnel

#### **B.** Partners NOT receiving ENRTF funding

Angie Gupta, Extension Professor, Forest Resources, University of Minnesota Kurt Mead, Interpretive Naturalist, Minnesota Department of Natural Resources George Weiblen, Professor, Bell Museum, University of Minnesota

#### IV. LONG-TERM IMPLEMENTATION AND FUNDING:

*Minnesota Nature Trackers* will be a four-year-long project that could be scaled to two two-year cycles of funding. The data acquired in the project will be available permanently from the Bell Museum's Minnesota Biodiversity Atlas.



Project Manager: Robert B. Blair Project Title: Minnesota Nature Trackers Organization: University of Minnesota

Project Budget: \$661,855 Project Length and Completion Date: 4 years, June 30, 2024 Today's Date: March 11, 2019

VVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET		Budget		Amount Spent	Balance	
BUDGET ITEM				4		
e <b>rsonnel (Wages and Benefits)</b> pordinator, (74% salary, 26% benefits), 100% FTE each year for 4 years, estimated total \$253,673		Ş	461,316	Ş -	Ş	461,316
Rob Blair, Principal Investigator, (74% salary, 26% benefits), 8.3% FTE each year for 4 years, estimated total \$49,978						
Andrea Lorek Strauss, (74% salary, 26% benefits), 15% FTE each year for 4 years, est	imated total					
Data scientist, (74% salary, 26% benefits), 15% FTE each year for 4 years, estimated	total \$51,704					
Graphic Designer for Instructional Materials, (74% salary, 26% benefits), 16% FTE ea years, estimated total \$45,318	ch year for 4					
Professional/Technical/Service Contracts						
Honorarium for curators (one technical expert per project) \$1000 x 4 projects x 4 yea	ars	\$	16,000		\$	16,000
Web developer (develop website inY1, \$25,000, refine in Y2 & Y3 \$10,000/year, expo \$20,000). Will be competitively bid.	ind in Y4	\$	65,000		\$	65,000
Video Production for Instuctional Materials (overview of each project + demo of dat protocols @ \$15,000/project x 4 projects). Will be competitively bid.	a collection	\$	60,000		\$	60,000
Equipment/Tools/Supplies						
General workshop supplies (sticky notes, chart paper, markers, name tags, etc.)		Ś	1.000		Ś	1.000
Citizen science tool kit (and lens, meter stick, smart phone macrolens, patch/pin, et	c.) est.	\$	13,500		\$	13,500
Demonstration tech devices (8 tablets @ \$140, hotspot \$50, protective cases \$20 x &	, travel box for	\$	1,405		\$	1,405
all devices \$75) These are direct and necessary expenses for workshop instruction.		\$	-	\$-	\$	-
Capital Expenditures Over \$5,000		ć		ć	ć	
Fee Title Acquisition		Ş		ې -	Ş	-
Easement Acquisition		\$	-	\$ -	\$	-
Professional Services for Acquisition		\$	-	\$-	\$	-
		\$	-	\$-	\$	-
Printing Educational materials (workshop promotion, handouts, reference material, sianaae	)	Ś	5.000	Ś -	Ś	5.000
		Ť	-,	-T	Ŧ	0,000
Travel expenses in Minnesota - in accordance with UMN Travel Policy				4		
Mileage (est. ave. 200 mi/wksp @ .58/mi x 36 wksp)		Ş	4,1/6	Ş -	Ş	4,176
Staff food/lodging (est ave \$94/nightx2 nights + \$110 meals x 36 wksp)		ې د	10,728		ې د	2 440
		Ŷ	3,440		Ļ	3,440
Other						
Volunteer appreciation (\$1/person/4 year x 2500 observers) (Annual Thank-you Cards)		Ş	10,000		Ş	10,000
Postage (toolkit mailing \$790 & appreciation cards = \$.50 x 2500 x 4)		Ş	5,790		\$	5,790
Meeting room rental @ \$100/wksp x 36 wksp		\$	3,600		\$	3,600
COLUMN TOTAL		\$	661,855	\$-	\$	661,855
SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured	E	Budget	Spent	Ва	alance
Non-State:	or penaing)	\$	-	\$-	\$	-
State:		\$	-	\$-	\$	-
In kind:		\$	-	\$ -	\$	-
Extension Support	pending					
volunteer Service (\$24.69 (independentsector.org) x estimated average of 5 hours						
per each of the 2500 volunteers (12,500 nours)) = $\frac{5}{59,941}$	nonding	ć	247.070			
	Penning	ې	547,370			
Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	B	Budget	Spent	Ва	alance
Minnesota Native Bee Atlas M.L. 2015, Chap. 76, Sec. 2, Subd. 03g		\$	789,000		\$	789,000

# Minnesota Nature Trackers: A Citizen Science Project

Step 1. Train ~2500 citizen science volunteers in field techniques to georeference and photograph dragonflies, trees, bees, and emerging terrestrial invasive plants using the mobile app and website iNaturalist.



Step 2. Curate observations for accuracy.



Step 3. Compile research-grade observations in the Bell Museum's Minnesota Biodiversity Atlas.



Step 4. Researchers, land managers, and citizen scientists use data for conservation and management.



#### **Project Manager Qualifications:**

**Dr. Rob Blair** is a Professor of Fisheries, Wildlife, and Conservation Biology at the University of Minnesota. Currently, he is the principal investigator of a National Science Foundation-funded project that examines how citizen-science projects can be used as a springboard to authentic scientific inquiry by secondary students. He also coordinates the research and work of the LCCMR funded Minnesota Native Bee Atlas. In Minnesota Nature Trackers, he will hire and oversee the full-time Program Coordinator who will be responsible for working as a liaison between researchers and citizen science volunteers and a part-time data scientist who will work with the large amounts of data generated by citizen science projects and develop best practices for data storage.

**Andrea Lorek Strauss** is an Extension Professor at the University of Minnesota and a co-PI on the citizen science NSF administered by Blair (see above) where her role is to coordinate curriculum development and outreach. Strauss is actively involved in citizen science at the national level, serving as co-chair of the Education Working Group of the Citizen Science Association. She chaired the event CitSciMN: A Symposium for Citizen Science Practitioners in Minnesota and is the lead coordinator for the City Nature Challenge citizen science event in Minnesota.

#### **Organization Descriptions:**

**University of Minnesota Extension** – The University of Minnesota Extension discovers science-based solutions, delivers practical education and engages Minnesotans to build a better future. Extension researchers and educators engage individuals and organizations in asking the challenging questions to discover science-based answers that make a difference. UMN Extension is a leader in citizen science in Minnesota, providing engagement and educational opportunities for both citizen scientists and project managers through signature events such as the City Nature Challenge and CitSciMN: A Symposium for Citizen Science Professionals in Minnesota.

**Minnesota Master Naturalist** -- The mission of the Master Naturalist program is to promote awareness, understanding, and stewardship of Minnesota's natural environment by developing a corps of wellinformed citizens dedicated to conservation education and service within their communities. It does this by offering a 40-hour baseline class on one of the three major biomes of Minnesota, which introduces the participants to the natural history of the region, teaches them about communicating with the public, and coaches them to become volunteers. The graduates of this course go on to offer 40 hours of volunteer service per year areas and take at least 8 hours of advanced training per year.

**Minnesota Dragonfly Society** – The Minnesota Dragonfly Society grew out of the Minnesota Odonata Survey, created to fill in critical gaps in distribution records of dragonflies and damselflies. They continue to complete surveys and educate Minnesotans.

**Forest First Pest Detector** – FFPD volunteers are trained to quickly detect and diagnose early infestations of emerald ash borer, gypsy moth, Asian longhorned beetle, Japanese barberry, Oriental bittersweet and other pests, so that state and federal agencies can control the spread.

**Minnesota Wild Bee Atlas** – The Minnesota Wild Bee Atlas relies on volunteers to follow one of three protocol areas to study the diversity and distribution of native bees in Minnesota.

**Minnesota Biodiversity Atlas** -- Created by the Bell Museum, the Minnesota Biodiversity Atlas is an online, searchable interface integrating data from the Bell Museum on birds, mammals, fishes, plants, and fungi.