

**Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 011-A

Conserving Monarch Butterflies: Habitat Assessment and Citizen Engagement

Category: A. Foundational Natural Resource Data and Information

Sub-Category:

Total Project Budget: \$ 380,067

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

Across Minnesota, MJV will assess monarchs, their habitat, and pollinator project success; we will engage broad stakeholders through rural outreach and field demonstrations as well as volunteer monitoring training.

Name: Sujaya Rao

Sponsoring Organization: U of MN

Title: Professor and Head, Department of Entomology, UMN

Department: College of Food, Agricultural and Natural Resources Sciences/Department of Entomology

Address: 219 Hodson Hall, 1980 Folwell Ave
St. Paul MN 55108

Telephone Number: (612) 624-3636

Email sujaya@umn.edu

Web Address www.monarchjointventure.org

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Display of statewide random monarch sampling locations with visuals describing metrics that will be collected (milkweed, nectar plants, monarchs). Also includes diagram visualizing outreach through education, demonstration, and volunteer training.

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base	
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency	
<input type="checkbox"/>	Capacity Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>		TOTAL	<input type="checkbox"/>	%
<input type="checkbox"/> If under \$200,000, waive presentation?								



PROJECT TITLE: Conserving Monarch Butterflies: Habitat Assessment and Citizen Engagement

I. PROJECT STATEMENT

Milkweed and wildflower habitat is essential for monarch butterflies.

Monarch butterflies cannot survive without milkweed; it is the only plant on which their caterpillars can feed. Adult butterflies require diverse wildflowers to sustain their migration. With advances in agricultural technology and land conversion, rich habitats that support monarchs and other important pollinators have diminished across the landscape leading to severe species declines. Current research illustrates that to restore the eastern monarch population to a sustainable level, stakeholders from all sectors must engage in restoring or enhancing millions of acres of diverse habitat – ***habitat that serves many other species and ecosystem functions.***

Monarchs bring a unique opportunity to catalyze conservation in Minnesota.

While broader Minnesota pollinator studies exist, a thorough assessment of monarchs and their habitat needs has not been completed. A statewide assessment of monarch habitat in different land types ***complements*** existing studies and ***contributes*** key habitat information that promotes conservation action across sectors.

Habitat assessment strategically guides habitat conservation to improve success.

To ***expand and prioritize installation of monarch habitat*** across the state in the highest impact areas, it is critical to first ***assess the current status of habitat*** in different land uses and associated use by monarchs. Second, a ***targeted assessment of known conservation sites*** will create a gold standard from which to derive state or sector-based habitat goals, and will inform how future conservation practices can be most effective.

Conservation is driven by awareness that engages diverse participants.

Through this project, the Monarch Joint Venture at University of Minnesota will stimulate conservation action through ***strategic outreach*** to rural Minnesota residents, farmers, land managers and conservation partners; ***demonstrations*** of successful habitat and conservation practices; and ***training*** of citizen scientists to strengthen conservation commitment and sustain future monitoring activities.

II. PROJECT ACTIVITIES AND OUTCOMES

ACTIVITY 1: Statewide assessment of monarch habitat quality and use at 125 sites in five land types

Description: Three survey teams (2 people/team) will assess monarch habitat quality and use by monarchs at 125 randomly selected sites throughout the state, totaling 500 site visits over two years in these land uses:

- Grasslands (unclassified)
- Protected grasslands (protected by easement or fee title conservation land)
- Agricultural lands
- Roadsides
- Developed areas (e.g., urban, suburban, rural)

Teams will record **1) milkweed density**, **2) blooming nectar plants** (species composition, frequency), and **3) monarch use** (eggs, larvae, adults) using national Integrated Monarch Monitoring Program (IMMP) protocols.

ENRTF BUDGET: \$218,177

Outcome	Completion Date
1. 500 assessments of monarch habitat and use: 2 visits each year for 2 years at 125 sites	June 2022



**Environment and Natural Resources Trust Fund (ENRTF)
2019 Main Proposal Template**

ACTIVITY 2: Quality, monarch use, and management assessment for 25 pollinator conservation projects

We will assess 25 pollinator conservation projects (2 visits/year for 2 years) using the IMMP monitoring protocols to provide comparison data about exemplary conditions and feedback to conservation partners to guide adaptive management. Conservation partners (e.g. MN DNR, BWSR, Great River Greening, Friends of the Mississippi River) have expressed interest in this work and will be engaged to identify sites and provide management information to inform future efforts.

ENRTF BUDGET: \$82,938

Outcome	Completion Date
1. 100 assessments of monarch habitat, management and use at 25 pollinator projects	June 2022

ACTIVITY 3: Outreach for Habitat Conservation and Citizen Science Volunteer Engagement

Description: To increase awareness and participation from rural communities across Minnesota, we will share monarch conservation information and showcase habitat demonstration projects by presenting at ten meetings or field days. To build a volunteer network and sustain monitoring and conservation activities across the state, we will lead five monitoring training events for citizen scientists and natural resource partners.

ENRTF BUDGET: \$78,952

Outcome	Completion Date
1. 10 presentations at rural Minnesota meetings or field days reaching 300 people	June 2022
2. 60 volunteers trained at 5 training workshops and actively involved in conservation	June 2022

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding - none

Name	Title	Affiliation	Role
n/a			

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Faith Krogstad	State Pollinator Coord.	MN DNR	Connect to conservation sites and site information

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

- Baseline data on monarch habitat quality and use by monarchs provides a foundation for tracking monarchs into the future and informs short- and long-term regional or sector based habitat conservation goals.
- Working with partners to assess conservation projects improves understanding of how management practices affect monarch habitat and leads to adoption of cost-effective practices.
- Strategic outreach increases knowledge of monarch habitat needs and stimulates conservation actions.
- Engagement of citizens and partners in monarch and habitat monitoring enables future assessment with minimal additional funding. Our monitoring leadership supports continued needs of the volunteer network.

V. TIME LINE REQUIREMENTS:

- **Year 1:** Seek access to sites statewide and collaborate with partners to select conservation projects for habitat assessment activities 1 and 2. Conduct at least 5 outreach presentations and/or citizen science training workshops for activity 3.
- **Years 2 and 3:** Field crews conduct all site assessments for activities 1 and 2. Conduct remainder of outreach presentations and/or training workshops for activity 3.

2019 Proposal Budget Spreadsheet

Project Title: Conserving Monarch Butterflies: Habitat Assessment and Citizen Engagement

IV. TOTAL ENRTF REQUEST BUDGET [3] years

BUDGET ITEM (See "Guidance on Allowable Expenses")	AMOUNT
Personnel:	\$ 317,926
Project oversight (total 1.5 mo/3 yrs; \$65,000/yr salary plus 27.2% fringe)	\$ 10,335
Project Management (total 4 months/3 yrs; \$55,000/yr salary plus 27.2% fringe)	\$ 23,320
Project Leader (36 months (3 years) at full time, \$45,000 plus 27.2% fringe)	\$ 171,720
Field Technicians (3 people; 3.5 mo/yr; 2 yrs; \$17/hour; 7.7% fringe)	\$ 66,645
Field Assistants (3 people; 3.5 mo/yr; 2 yrs; \$12/hour; no fringe)	\$ 43,680
Additional Monitoring Trainer (0.5 month at \$42,000/yr; 27.2% fringe)	\$ 2,226
Professional/Technical/Service Contracts: for partners to identify conservation sites, secure landowner permissions, provide management data, and assist with field activities.	\$ 5,000
Equipment/Tools/Supplies:	\$ 3,040
For field technician habitat assessments (6 of each): mobile data recording devices (\$200); transect tapes (\$20), plant sampling frames (\$5), safety vests (\$5); and 3 vehicle safety lights (\$20)	\$ 1,440
Supplies for Citizen Science Trainees (60 of each): transect tapes (\$20), plant sampling frames (\$5), 20 safety vests (\$5)	\$ 1,600
Acquisition (Fee Title or Permanent Easements):	\$ -
Travel: For Activities 1 and 2 statewide habitat assessments, 3 teams will travel 3.5 mos/yr for 2 yrs: most cost-effective transportation will be selected, estimated at \$780/month for UMN fleet vehicle plus 2000 miles/mo (\$0.17/mile; gasoline included). Lodging (\$93) for 10 nights/month (7 months; 210 days) for 3 crews and half of the allowable per diem (0.5*\$51; for overnight dates only (210)), per University of Minnesota rates.	\$ 48,405
Travel: For Activity 3, outreach and trainings across Minnesota: mileage to 10 outreach events and 5 trainings at an average roundtrip mileage of 250 miles (.545/mi) (\$2044). Lodging (\$93) and per diem (\$51) per UMN rates for 8 nights (for 5 two-day trainings and 3 additional MN events too far from St. Paul for single-day travel). (\$1152).	\$ 3,196
Additional Budget Items: Lunch for five 2-day Citizen Science Volunteer Trainings: 20 people/event, \$12.50/person/ full day (10 days).	\$ 2,500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 380,067

V. OTHER FUNDS (This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)

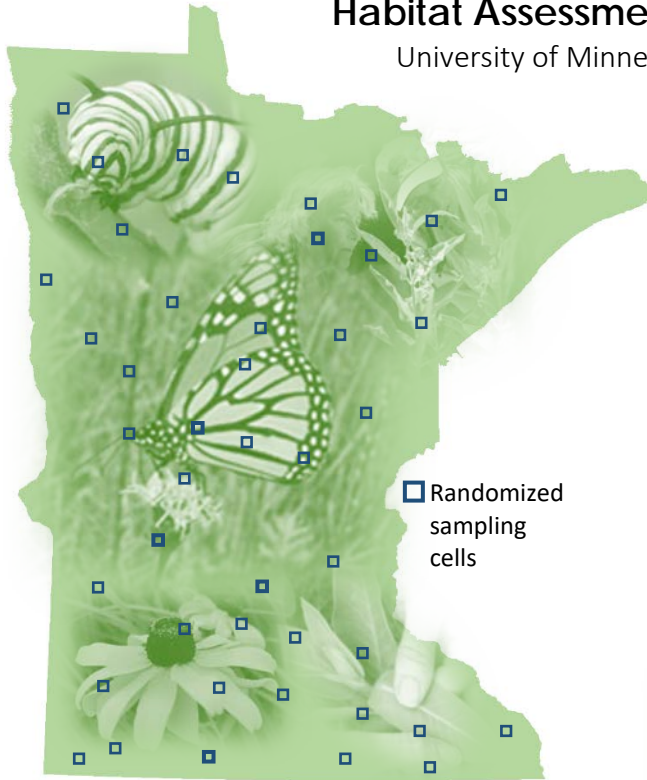
SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period:	n/a	
Other State \$ To Be Applied To Project During Project Period:	n/a	
In-kind Services To Be Applied To Project During Project Period: Unrecovered F&A (54% IDC)	\$ 205,236	
Past and Current ENRTF Appropriation:	n/a	
Other Funding History:	n/a	

Conserving Monarch Butterflies: Habitat Assessment & Citizen Engagement

University of Minnesota – Monarch Joint Venture



MONARCH
JOINT VENTURE



□ Randomized
sampling
cells

500 assessments of 125 sites, 25 per land type

ACTIVITY 1

Statewide Assessment of Monarch Habitat: Five Land Types

- Grasslands (*unclassified*)
- Protected grasslands (*easement or fee title conservation land*)
- Agricultural lands
- Roadsides
- Developed areas (*e.g., urban, suburban, rural*)

Data Collected:

Milkweed Density

Nectar Plants

Use by Monarchs



ACTIVITY 2

Conservation Site Assessments (*100 visits, 25 sites*)

- Gold-standard habitat conditions
- Monarch use of particular habitat types
- Feedback to resource managers on strategies

ACTIVITY 3

Outreach for Habitat Conservation & Citizen Science Engagement



Project Manager Qualifications and Organization

Sujaya Rao, Principal Investigator

Professor and Head, Department of Entomology, University of Minnesota
sujaya@umn.edu; 612-624-1299

Sujaya Rao will be responsible for ensuring that all aspects of the proposed project are accomplished in a timely manner. She has considerable experience with successful completion of large research and educational projects at Oregon State University and the University of California, and establishing close relationships with growers, and engaging them in pollinator and beneficial insect conservation efforts. At the University of Minnesota, she has developed programs for engaging the public in science-related activities.

Research Team: Wendy Caldwell (Coordinator, Monarch Joint Venture, in the Dept. Fisheries, Wildlife and Conservation Biology) and Alison Cariveau (Science Coordinator, Monarch Joint Venture) will provide oversight, technical advising, and day-to-day management of the work, progress, and deliverables under the award.

Recent Awards and Grants

- **Caldwell:** USDI-BLM: CESU Monarch Butterfly Conservation (\$200,000) (2015 – 2020)
- **Caldwell:** National Fish and Wildlife Foundation: Implementing the Monarch Conservation Science Partnership Integrated Monitoring Strategy (\$222,392) (2017 – 2019)
- **Rao:** USDA-AFRI: Metabolomic profiling: A new approach for determinants of bee pollinator mortality (\$100,000) (2016-2017)
- **Rao:** USDA-SCRI: Developing sustainable pollination strategies for US specialty crops (\$483,140) (2012-2017)
- **Rao:** USDA-AFRI: Development of wireless sensor for tracking bumble bee movement for increasing pollinator sustainability and augmenting crop production (\$500,000) (2013-2016)

Select publications related to pollinator research, conservation and outreach

Lewandowski, E. **Caldwell, W**, Elmquist, D, and Oberhauser, KS. 2017. Public Perceptions of Citizen Science. *Citizen Science: Theory and Practice*. 2(1), p.3.

Kasten, K, Stenoien, C, **Caldwell, W**, Oberhauser, KS. 2016. Can roadside habitat lead monarchs on a route to recovery? *Journal of Insect Conservation*. 2016:1-1.

Galindo, G., Rickard, L., and **Rao, S**. 2016. Integration of native bee pollinator conservation with pasture enrichment. *Proceedings 75th Annual PNW Insect Management Conference*, Portland OR, pp 31-34.

Rao, S. and Ostroverkhova, O. 2015. Visual outdoor response of multiple wild bee species: highly selective stimulation of a single photoreceptor by sunlight-induced fluorescence. *Journal of Comparative Physiology A*. 201: 705-716. DOI: 10.1007/s00359-015-0983-x

Rao, S., Stephen, W. P., Kimoto, C. and DeBano, S. 2011. The status of the 'red listed' *Bombus* (*Bombus*) *occidentalis* (Hymenoptera: Apiformes) in northeastern Oregon. *Northwest Science* 85: 64-67.

Rao, S., Scherr, M., Royce, L., Stephen, W. P., Halse, R. and Soeldner, A. 2007. Bees and pollination: A 'scientist' experience for rural youth in Oregon. *American Entomologist*. 53: 74-77.