

**Environment and Natural Resources Trust Fund
2017 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 093-C

Where are the "Jumping Worms"?

Category: C. Environmental Education

Total Project Budget: \$ 92,559

Proposed Project Time Period for the Funding Requested: 2 years, July 2017 – June 2019

Summary:

Assessing invasive earthworm distribution across the state through environmental education and public participation in authentic data collection to inform state invasive species policy. Current knowledge on distribution is limited.

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Sponsoring Organization: U of MN - Duluth NRRI

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Map of Minnesota showing only 4 known sites with "jumping worm." Image of the damage to soil done by Amynthus worms. Amynthus alters top 4 inches of soil and has been associated with "Nothing Grows Here." Chart showing public participatory data collection of invasive earthworms, beginning with distribution of sampling kits to K-12 students, teachers, and public, and ending with three outcomes: geographic data on earthworm presence, inform invasive earthworm policy, and increase environmental knowledge.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



PROJECT TITLE: Where are the “jumping worms”?

I. PROJECT STATEMENT

There are NO native earthworms in Minnesota. A new invasive earthworm from Asia, Amynthus, commonly referred to as the “jumping worm” or “snake worm,” is on the move in the North America and has been found in small pockets of the state around the Twin Cities metro area. This project will build on Dr. Cindy Hales LCCMR work “Prevention and Early Detection of Asian Earthworms and Reducing the Spread of European Earthworms”, through the use of environmental education. No in-depth assessment of Amynthus presence across the state has been accomplished to date. Through Dr. Hales work on vectors of spread we know that composting, internet sales, and landscaping are important ways of introduction. Like the well documented invasive European earthworms, Amynthus removes organic layers of leaf litter and alter soil structure and chemistry dramatically, leaving a distinctive soil of worm castings (feces) and have been associated with “nothing grows here.” Spread via humans are the primary means of introduction. Recently there has been talk at the Minnesota Invasive Species Advisory Council about policy issues related to the restriction of Amynthus trade in the state. Through the platform of the Great Lakes Worm Watch program and the use of environmental education we plan to collect baseline knowledge on their current distribution across the state. Our goals are to map the distribution of Amynthus to inform policy decisions and increase citizen’s environmental stewardship and knowledge.

Outcomes:

- Map locations in the state where Amynthus occurs.
• Recruitment of 500 groups of participants, from each of the 5 regions in Minnesota, reaching an estimated 7,500-10,000 people across the state.
• Information about worm presence/absence used to update the publicly accessible Great Lakes Worm Watch website (http://www.nrri.umn.edu/worms/).
• Further develop our understanding of European earthworm distribution.

Using a network of School Forests, K-12, colleges, tribal entities and the proven platform of The Great Lakes Worm Watch, we plan to conduct earthworm extraction trainings, distribute earthworm sampling kits, and provide participants with sampling locations identified by GIS analysis as high priority. Groups will be stratified across each region and will sample for earthworms from September-October 2017 and May-October 2018. Earthworm specimens, species pictures, and location coordinates will be sent to The Great Lakes Worm Watch at UMD-NRRI for identification, map creation, and dissemination of results.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Sampling kits, GIS, and participant coordination

Budget: \$33,257

Using the established Great Lakes Worm Watch monitoring program we will put together sampling kits using validated extraction methods. We will use GIS to develop maps of high probability areas for finding Amynthus. Lastly, we will coordinate with participants through the network we will develop in a current LCCMR project (ENRTF ID: 111-C-2016).

Table with 2 columns: Outcome, Completion Date. Row 1: 500 Sampling kits (5 samples per kit, total of 2,500 samples), August 2017. Row 2: GIS data layers of high probability Amynthus locations across state, August 2017.

Activity 2: Workshops and sampling coordination

Budget: \$33,951

Using the established Great Lakes Worm Watch curriculum and training protocols an environmental education graduate student will assist in conducting statewide workshops and teacher professional development opportunities. The aim of the workshops will be to get 7,500 – 10,000 students, teachers, and citizens collecting earthworm location data.



Outcome	Completion Date
1. 25 workshops (remote, professional development)	May 2018
2. 2,500 earthworm samples collected across state	October 2018

Activity 3: Identification of priority areas for policy recommendations **Budget: \$25,351**

Earthworm samples will be returned to Great Lakes Worm Watch at UMD-NRRI for identification, and location coordinates will be used to develop distribution maps using NRRI GIS lab. Information collected and analyzed will be used to identify priority areas around the state for policy recommendations

Outcome	Completion Date
1. Data collected by GLWW and earthworm identification complete	March 2019
2. GIS data layer of <i>Amyntas</i> distribution	April 2019
3. GIS data layer for all earthworms reported	April 2019
4. Report detailing the project along with recommendations for policy	May 2019

III. PROJECT STRATEGY

A. Project Team/Partners

Team: Ryan Hueffmeier, Director Great Lakes Worm Watch, Outreach coordinator, UMD NRRI. Role: Coordinate sampling kit development, workshop deliver, earthworm identification, student supervision, and final report.

Paul Meysembourg: GIS specialist, UMD NRRI. Role: Develop maps of *Amyntas* presence high probability and assist in the development of distribution maps

B. Project Impact and Long-Term Strategy

This project will assist the state in developing a policy towards *Amyntas* by understanding the scope of the problem in Minnesota. It will highlight what areas of the state should have the highest priority for protection. It will allow us to greatly enhance and expand the quality and quantity of resources provided through the Great Lakes Worm Watch. This project is important for the long term environmental stewardship in our region through environmental education on invasive earthworm ecology and spread.

C. Timeline Requirements

- Sampling kits and maps created and workshops planned (7/2017 – 9/2017)
- Trainings and sampling kit distribution (9/2017- 10/2018)
- Data collection, analysis, map creation and final report (10/2018 – 5/2019)

2017 Detailed Project Budget

Project Title:Where are the “jumping worms”?

IV. TOTAL ENRTF REQUEST BUDGET: 2 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	\$ -
Ryan Hueffmeier, Project manager (72.6% salary, 27.4% benefits); 20% FTE each year for 2 years	\$ 21,284
Paul Meysembourg (66.3% salary, 33.7% benefits); 6% FTE year 1, 1% FTE year 2	\$ 6,293
Graduate student (65.5% salary, 34.5% benefits, including fringe and tuition reimbursement); 20% FTE each year for 2 years during academic year, 10% FTE each year for 2 years during summer session	\$ 33,098
Undergraduate student (100% salary, 0% benefits); 10% FTE in year 1, 30% FTE in year 2	\$ 9,984
Equipment/Tools/Supplies:	\$ -
Mustard Powder (5 samples per kit [5*500 kits = 2,500 samples, 6 samples/16oz bag, 2,500/6=415 bags, 415*\$15 = \$6,225])	\$ 6,225
50ml Sample vials (8 cases of 320/\$210) (\$210*8 = \$1,680)	\$ 1,680
Travel:	\$ -
Mileage \$2,845 (5267 mi * \$0.54/mi) + vehicle fee \$480 (\$10/day * 48 days)	\$ 3,325
Lodging (20 nights * \$89/night* 2 rooms)	\$ 3,560
Per diem (2 ppl, 20 full days @ \$51/day, 20 half days @ \$38.25/day)	\$ 3,570
Additional Budget Items:	
GIS lab fees (\$4.10/hr for ~366hrs)	\$ 1,500
Conference calls to reduce travel expense	\$ 300
Shipping: 300 sample kits x \$5/box shipping cost (expect to hand-deliver 200 sample kits when giving in-person training)	\$ 1,500
Publication costs for instructional material	\$ 240
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST	= \$ 92,559

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
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:	\$ 4,800	Secured
Volunteers leading educational activities at their home site & managing earthworm extractions and data collection, \$20/hr federal rate for volunteers		
Unrecovered indirect (53% MTDC 7/1/17-6/30/18; 54% MTDC 7/1/18-6/30/20)	\$ 41,928	Secured
Funding History:	N/A	
Remaining \$ From Current ENRTF Appropriation:	N/A	



We currently have 4 known “jumping worm” establishments in the state.

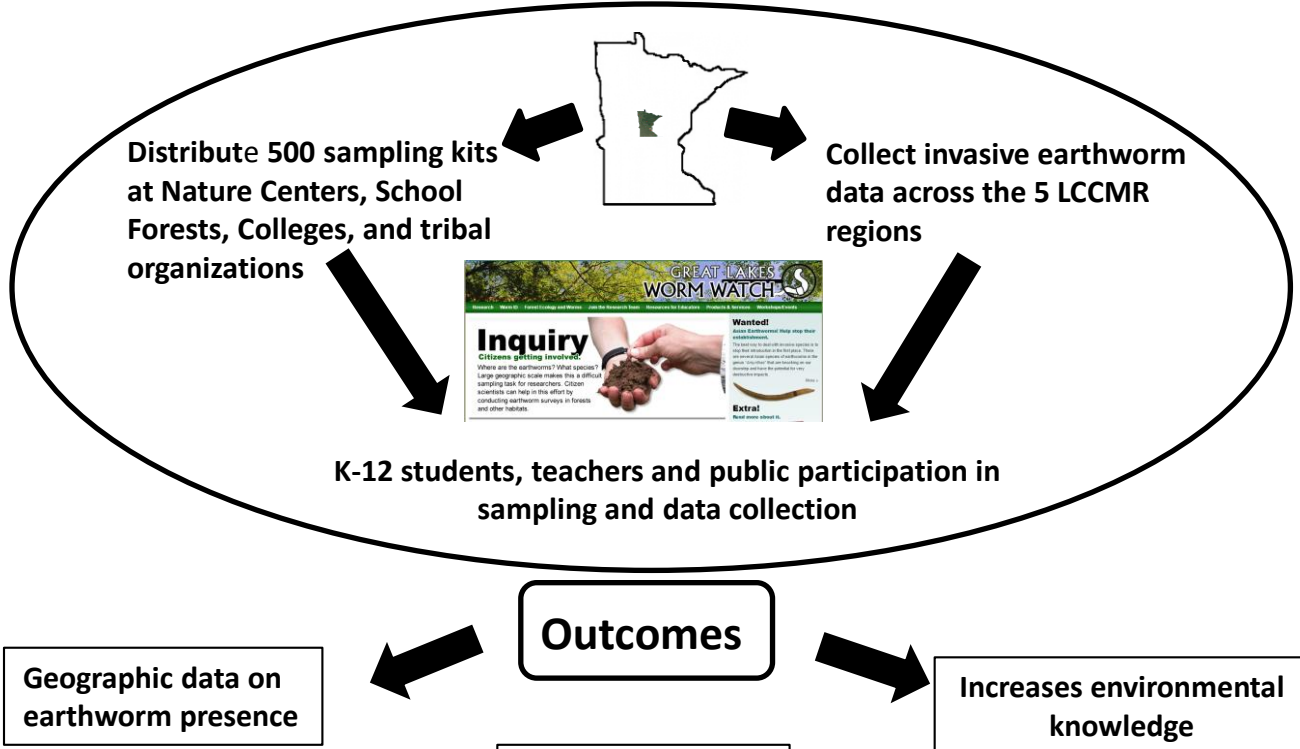
Impacts:

- Removes leaf litter and alters soil structure and chemistry dramatically.
- Distinctive soil of worm castings (feces) that erode easily.
- Damages forest understory habitat.
- Assists the establishment of invasive plants

Amyntas alters top 4” of soil and has been associated with “Nothing Grows Here.”



Public Participatory Data Collection on invasive earthworms





2017 LCCMR Project Manager Qualifications and Organization Description

Ryan Hueffmeier, Researcher, Natural Resources Research Institute, University of Minnesota Duluth

Key Qualifications

Hueffmeier is a research, outreach, and education specialist with active projects in forest and landscape ecology and invasive species. He works towards the transfer of scientific knowledge from evidence based research to the public through creating accessible outreach programs by delivering experiential based educational opportunities incorporating volunteer based public participatory projects. He worked under Dr. Cindy Hale for 5 years coordinating the GLWW program and is currently the Director of the Great Lakes Worm Watch (GLWW) Program. Through the GLWW he organizes and leads training workshops for citizen groups, formal and non-formal educators and natural resource professionals in collaboration with Environmental Learning Centers and other organizations across the Great Lakes region.

Education

M.Ed.	2012	Environmental Education	University of Minnesota Duluth
B.A.	1999	Geography	University of Minnesota Duluth

Relevant Publications

Loss, S R, **Hueffmeier, R M**, Hale, C M, Host, G E, Sjerven, G & Frelich, L E. 2013. Earthworm invasions in northern hardwood forests: a rapid assessment method. *Natural Areas Journal* 33:21-30.

Lichtkoppler, F., S. Joshi, L. Dorworth, D. Hart, C. Hagley, **R. Hueffmeier**, A. McCartney, and D. White. 2012. 2010 GLOS Great Lakes Sea Grant Network Education and Outreach Project: Adaptive Management Needs Assessment. LaMP/AOC – Public Health – Fisheries. *Great Lakes Sea Grant Network Summary Report*.

Selected Grants

Evaluating vital, small forested wetlands, MN Lake Superior Coastal Program, Co-PI, \$95,559, 2014.

The **Natural Resources Research Institute** is a part of the University of Minnesota Duluth. NRRI’s mission is to promote private sector employment based on natural resources in an environmentally sensitive manner. NRRI forest products scientists have extensive experience in applied research on the innovative uses of wood as a building material. They have successfully thermally modified many hardwoods and softwoods in their Thermal-Modification Pilot Plant, which contains one of the few pilot-scale thermal-modification kilns in North America