

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 055-C2

Controlling Invasive, Poisonous Weeds: Wild Parsnip and Foxglove

Topic Area: C2. Invasive Species - Terrestrial

Total Project Budget: \$ 183,786

Proposed Project Time Period for the Funding Requested: 3 yrs. July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

Wild parsnip and Grecian foxglove are invasive and newly added Minnesota Noxious Weeds that are poisonous to humans and animals. Few weed control strategies exist; outcomes include reduced weed populations.

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Location

Region: Statewide

County Name: Statewide

City / Township:

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



Environment and Natural Resources Trust Fund (ENRTF)

2012-2013 Main Proposal

PROJECT TITLE: Controlling Invasive, Poisonous Weeds: Wild Parsnip and Foxglove

I. PROJECT STATEMENT

Wild parsnip (*Pastinaca sativa*) and Grecian foxglove (*Digitalis lanata*) are toxic to grazing animals and humans, and are two serious invasive weeds in Minnesota. Both weeds affect the quality of natural areas through reduced recreational opportunities, displaced native plant species, disrupted ecosystems, and can easily spread to adjacent land. Wild parsnip and Grecian foxglove are major concerns because:

1. populations are increasing in natural areas throughout the state of Minnesota,
2. have high potential to invade natural areas,
3. both are toxic to grazing animals and humans,
4. weed control strategies are lacking
5. both were recently added (2011) to the Prohibited Noxious Weed list by the MDA, and
6. Grecian foxglove is an MDA early detection target species.

Although other weeds are invasive or poisonous, few are both. Wild parsnip causes painful blistering of the skin and internal tissues when ingested by animals and when plant sap comes in contact with exposed skin of humans and light skinned grazing animals. Grecian foxglove affects the cardiovascular system of animals (when ingested) and humans (when in contact with exposed skin), and can lead to heart attacks and erratic heart rhythms.

Although some chemical strategies have been developed to control these species, they often are short-term solutions, are financially and environmentally unfeasible on large infestations, or lack sustainability. Combinations of cultural (i.e. hand pulling), mechanical (i.e. mowing), and chemical (i.e. herbicides) weed control options, collectively termed integrated weed management (IWM), need to be developed and implemented to stop the spread of these weeds in Minnesota. The goals are to:

1. develop IWM strategies for control of wild parsnip and Grecian foxglove, and
2. to educate natural resource professionals, land owners, and recreational land users on identification and control strategies for these toxic invaders.

Outcomes include 1) implementing integrated weed management strategies for control of wild parsnip and Grecian foxglove; 2) reducing and containing their populations; 3) proper identification by natural resource professionals and private land owners; 4) increased awareness of these and other invasive and poisonous weed issues by recreational land users in Minnesota.

To accomplish these goals, existing weed populations will be selected from natural areas owned by DNR, Mn/DOT, or private land owners. Preliminary locations have already been identified (for example, populations of Grecian foxglove have been identified in Afton State Park). Weed management research will be conducted to develop IWM strategies. Education will be accomplished through an education and awareness campaign consisting of a combination of in-person programs, field days, online resources, printed materials, social media, and agency outreach (i.e. University, MDA, DNR, and Mn/DOT).

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Develop IWM strategies for control of wild parsnip and Grecian foxglove. **Budget:** \$178,786 Integrated weed management strategies developed during the research phase will be applied to populations of wild parsnip and Grecian foxglove throughout Minnesota. After the research period, weed populations will be monitored by the agency responsible for the natural area, and results will be included in various plant population databases. Integrated weed management strategies will include consideration for economics, efficacy, environmental safety, and longevity of control system.

Outcome	Completion Date
1. Implement integrated weed management (combination of cultural, mechanical and chemical) strategies for control of wild parsnip and Grecian foxglove that will benefit	Spring 2016

recreational land users and improve the usability of natural areas in Minnesota.	
2. Reduce and contain existing populations of wild parsnip and Grecian foxglove in 65 Minnesota Counties	Spring 2016

Activity 2: Educate natural resource professionals, land owners, and the general public on plant identification and control strategies. **Budget:** \$5,000

Education of natural resource professionals, private land owners, and the recreational land users will be accomplished through an awareness campaign, consisting of in-person programs, field days, online resources, social media, and agency outreach including the MDA, DNR, and Mn/DOT. Post-program evaluation will be used to determine achievement of desired outcomes.

Outcome	Completion Date
1. Natural resource professionals and private land owners will be able to properly identify and recommend and implement control strategies for wild parsnip and Grecian foxglove, leading to reduced plant populations in 65 Minnesota Counties.	Winter 2015/2016
2. Increase awareness of, and solutions for, invasive and poisonous weed species in Minnesota, including wild parsnip and Grecian foxglove.	Spring 2016

III. PROJECT STRATEGY

A. Project Team/Partners [partners not receiving LCCMR funding]

Krishona Martinson (Equine Extension Specialist, University of Minnesota) and **Roger Becker** (Weed Scientist, University of Minnesota) will provide overall project leadership; lead Extension and outreach efforts; lead determination of weed control treatments; assist in determining location of weed populations; and lead data analysis and publication preparation. **Craig Sheaffer** (Forage Agronomist, University of Minnesota) will assist in Extension and outreach efforts; and data analysis and publication preparation. University faculty will receive funds for a full time graduate student, 25% time technician, plot and research supplies, mileage, and expenses associated with Extension and outreach programs. K. Martinson (9 month appointment) will receive 5% salary plus fringe as the project principal investigator.

Anthony Cortilet (Weed Scientist, MDA); **Laura Van Riper** (Terrestrial Invasive Species Coordinator, Minnesota DNR), and **Ken Graeve** (Roadside Vegetation Management, Mn/DOT) will help determine and secure location of weed populations, assist in determining weed control treatments, and assist in Extension and outreach efforts. Agency stall will receive mileage (if allowed).

B. Timeline Requirements

- Summer 2013: Secure weed sites (Goal 1).
- Fall 2013: Year 1 fall weed control applications; rating of weed control efficacy (Goal 1)
- Summer/Fall 2014: Year 2 fall weed control applications; rating of weed control efficacy (Goal 1); field day (Goal 2)
- Winter 2013/2014: Extension and outreach programs (awareness campaign) (Goal 2)
- Spring 2015: Year 2 spring weed control applications; rating of weed control efficacy (Goal 1); awareness campaign (Goal 2)
- Summer/Fall 2015: Rating of weed control efficacy (Goal 1); field days (Goal 2)
- Winter 2015/2016: Extension and outreach programs (awareness campaign) (Goal 2)
- Spring 2016: Final rating of weed control efficacy (Goal 1); awareness campaign (Goal 2); project completion

C. Long-Term Strategy and Future Funding Needs. The project will not require funding beyond spring 2016; no long term funding is being requested.

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2012 -2013 Detailed Project Budget	
IV. TOTAL ENRTF REQUEST BUDGET (3 years)	
<u>BUDGET ITEM</u>	<u>Amount</u>
Personnel:	
Graduate Student (1) (Full time for 3 years)	\$ 59,111.00
Graduate Student (1) fringe, includes tuition (85%; 3 years)	\$ 51,207.00
<i>Graduate student will conduct research and assist with Exntension programs.</i>	
Technician (1) (25%r time for 3 years)	\$ 33,750.00
Tehcnician fringe (1) (41%; 3 years)	\$ 13,939.00
<i>Technician will assist with research; 25% time; salary is for 3 years</i>	
Faculty - K. Martinson (9 month appt.; 5% time; 3 years)	\$ 10,610.00
Faculty fringe (36% for 3 years)	\$ 3,819.00
<i>Faculty will plan, carry-out, and over-see project. Others not eligible for salary.</i>	
Equipment/Tools/Supplies:	
Herbicides (\$250 per year)	\$ 750.00
Plot Supplies (wooden stakes, flags, and general materials) (\$200 per year)	\$ 600.00
<i>Cost of supplies for duration of project (3 years).</i>	
Travel:	
9,100 miles at \$0.55 per mile	\$ 5,000.00
<i>We estimate approximately 3,034 miles per year for three year to evaluate and maintain research project plots for the duration of the research project.</i>	
Additional Budget Items:	
Extension and Outreach Programs (\$2,500 per year; 2 years)	\$ 5,000.00
<i>Advertising, logistical expenses, and printing for summer field days and winter Extension and outreach programs for two years.</i>	
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 183,786.00

V. OTHER FUNDS	
<u>SOURCES OF FUNDS</u>	
Other Non-State \$ Being Applied to Project During Project Period: <i>none</i>	\$ -
Other State \$ Being Applied to Project During Project Period: <i>none</i>	\$ -
In-kind Services During Project Period: <i>none</i>	\$ -
Remaining \$ from Current ENRTF Appropriation (if applicable): <i>none</i>	\$ -
Funding History: <i>no funding secured</i>	\$ -

Controlling Invasive, Poisonous Weeds: Wild Parsnip and Foxglove

Location of Wild Parsnip and Grecian Foxglove in Minnesota

Data retrieved from the Early Detection & Distribution Mapping System (<http://www.eddmaps.org/>)

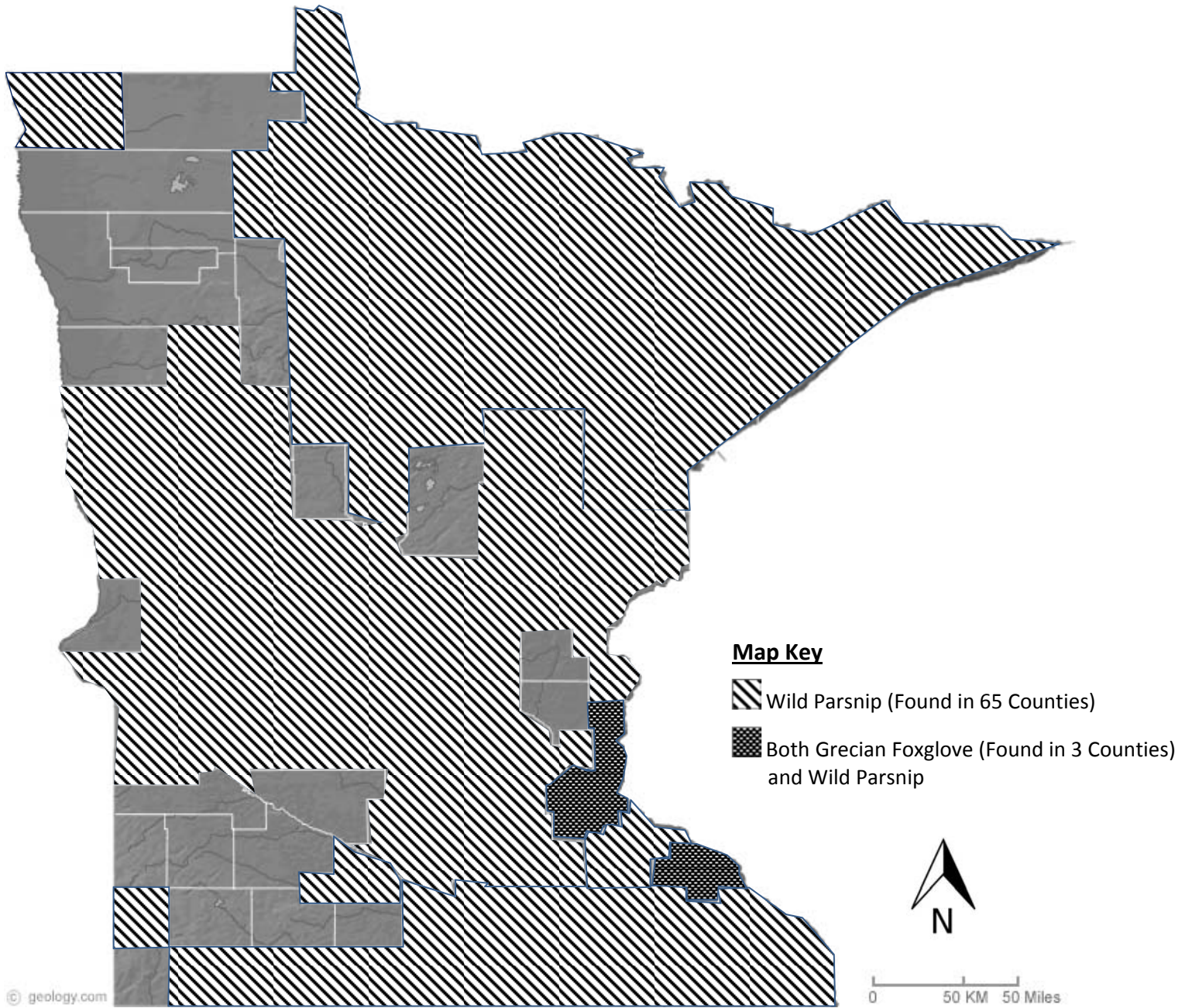


Figure 1. Wild Parsnip.

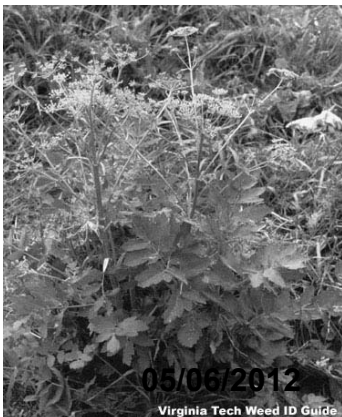


Figure 2. Contact with wild parsnip results in a burning rash in humans.



Figure 3. Grecian Foxglove.



Figure 4. Wild parsnip and foxglove are toxic to animals.



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Project Manager Qualifications:

Krishona Martinson, PhD will serve as the project manager and will provide overall project leadership and ensure viable communications among team members; lead Extension and outreach efforts; lead determination of cultural and chemical weed control treatments; assist in determining location of weed populations; and lead data analysis and publication and report preparation. Dr. Martinson received her PhD Agronomy and Plant Genetics from the University of Minnesota in 2006 with a specialization in weed science. Dr. Martinson has worked for the University of Minnesota Extension as a County and Regional Educator, and in 2008, she joined the faculty in the Animal Science Department where she holds an Extension and Research appointment. Her research efforts focus on pasture weed control, plants poisonous to livestock, and improving equine forage utilization.

Since 2008, Dr. Martinson has authored 9 peer-reviewed journal articles, 14 Extension publications, 19 abstracts, 12 proceedings, 78 newsletters and popular press articles, and 3 book chapters. Publications specific to this project include:

- E. Cargill, **Martinson, K.** and L. Hovda. Chapter 90: Cardiac Glycosides. Pages 696-704. In Blackwell's Five-Minute Veterinary Consult. Clinical Companion. Small Animal Toxicology. 2011. Wiley-Blackwell. Ames, IA. 865 pages.
- **Martinson, K.** and L. Hovda. Chapter 91: Lilies. Pages 705-710. In Blackwell's Five-Minute Veterinary Consult. Clinical Companion. Small Animal Toxicology. 2011. Wiley-Blackwell. Ames, IA. 865 pages.
- **Martinson, K.** and L. Hovda. Chapter 97: Yew. Pages 750-755. In Blackwell's Five-Minute Veterinary Consult. Clinical Companion. Small Animal Toxicology. 2011. Wiley-Blackwell. Ames, IA. 865 pages.
- **Martinson, K.**, Wiersma, J., Durgan, B., Behnken, L., and Breitenbach, F. 2011. Response of oat and broadleaf weeds to postemergence herbicides. Online. Crop Management
- Dai, J., J.J. Wiersma, B.R. Durgan and **K.L. Martinson.** Influence of Time of Emergence on the Growth and Development of Wild Oat (*Avena fatua* L.). *In Press.* Weed Science.
- **Martinson, K.**, Hovda, L., and Murphy, M. 2007. Plants Poisonous or Harmful to Horses in the North Central United States. 44 pages. University of Minnesota Extension Publication 08491
- **Martinson, K.**, Durgan, B., and Becker, R. 2007. The Eleven Primary Noxious Weeds of Minnesota. 4 pages. University of Minnesota Extension Fact Sheet 08489.

Dr. Martinson has received numerous awards, including:

- 2011. Joint Council of Extension Professionals Team
- 2011. Equine Science Society Outstanding Young Professional Award
- 2008. State, Regional and National Winner: Publication Division. National Association of County Agricultural Agents Communications Contest

Organization Description:

The University of Minnesota, founded in the belief that all people are enriched by understanding, is dedicated to the advancement of learning and the search for truth; to the sharing of this knowledge through education for a diverse community; and to the application of this knowledge to benefit the people of the state, the nation, and the world. The University's mission is threefold: Research and Discovery, Teaching and Learning, and Outreach and Public Service.