



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2016 Work Plan

Date of Report: December 4, 2015

Date of Next Status Update Report: January 1, 2017

Date of Work Plan Approval:

Project Completion Date: June 30, 2019

Does this submission include an amendment request? No

PROJECT TITLE: Bluffland Restoration and Monitoring in Winona

Project Manager: Neal Mundahl

Organization: Department of Biology, Winona State University

Mailing Address: 175 West Mark St.

City/State/Zip Code: Winona, MN 55987

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Email Address: NMundahl@winona.edu

Web Address: <https://www.winona.edu/outdoored/arboretum.asp>

Location: Winona, Wabasha, Olmsted, Fillmore, Houston, Goodhue

Total ENRTF Project Budget:

ENRTF Appropriation: \$99,000

Amount Spent: \$0

Balance: \$99,000

Legal Citation: M.L. 2016, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

I. PROJECT TITLE: Restoration/Monitoring of Winona’s 40-acre Blufflands Natural Area

II. PROJECT STATEMENT:

The 40 acres of dry bluff prairie, bur oak savannah, and bordering oak-basswood forest within Garvin Heights Natural Area will be restored by removing invasive plants (via goat grazing and MN Conservation Corps) and replanting with native species, monitored to assess ecological recovery, enhanced with new and expanded environmental education signage for site visitors, and explained and demonstrated with hands-on workshops for regional landowners and other stakeholders.

This restoration site is of special significance because:

- It contains a mix of dry bluff prairies and bur oak savannahs, ecosystems becoming increasingly rare throughout southeastern Minnesota and the greater Driftless Area Ecoregion.
- It is an accessible, high-visibility location, situated in a City park that attracts 40,000 to 50,000 residents and visitors annually during all seasons.
- It can serve as a model for invasive species management and habitat restoration to a large public audience and provide opportunities for landowner education.
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This project is unique because:

- Under faculty mentorship, undergraduate and graduate students will delineate habitats and collect pre- and post-restoration community data to assess the success of the restoration effort.
- The project will blend innovative (goat grazing) and conventional invasive plant control (with significant public volunteer effort: Friends of the WSU Landscape Arboretum) in a highly visible, public location, allowing the public to observe and experience the entire process.
- It will educate regional landowners and others about invasive plant management via workshops, using the project site as the model and nearby sites for experiential learning/application of techniques.

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of January 1, 2017

Project Status as of July 1, 2017

Project Status as of January 1, 2018

Project Status as of July 1, 2018

Project Status as of January 1, 2019

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Habitat delineation via GPS/GIS, pre- and post-restoration inventory and monitoring of invasive, native, and rare/indicator species, and educational signage development and placement

Description: Dry bluff prairies, bur oak savannahs, and oak-basswood woodlands will be delineated and mapped (GPS/GIS) throughout the project site. The project site includes three separate dry bluff prairies, two separate bur oak savannahs, and oak-basswood forests on east-facing, west-facing, and north-facing slopes. Habitats will

be delineated and mapped to document the locations and acreages of each habitat type within the project site, producing a digital GIS database that will be used to guide the current project and future management efforts.

All habitats will be monitored to inventory existing plant communities prior to and after restoration and to determine the abundance of rare, threatened, and/or indicator species (plants, birds, pollinators), to assess the success of the restoration. Local herbarium and county biological survey records also will be used to document past flora and fauna within the project site. Plot, transect, and random stratified sampling will be used to assess plant communities, point counts will be used to document breeding bird populations, and a combination of active netting, light traps, and pit traps will be employed to survey the abundances or pollinators and other invertebrates.

New and expanded educational signage will be developed and installed within each habitat. Existing signage is limited to historical photographs and general information and photographs describing invasive species, prairies, and savannahs, all in a single location. New, habitat-specific signage will be developed and placed in each habitat type to highlight the restoration process and flora and fauna within the various habitats. Signage will emphasize the roles of the CC of MN and goat grazing in the restoration process. Temporary signage will be developed and placed during various stages of the project to keep the general public informed of ongoing activities.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 46,984
Amount Spent: \$ 0
Balance: \$ 46,984

Outcome	Completion Date
1. Habitat delineation via GPS/GIS	May 31, 2017
2. Pre-restoration inventory of existing plant communities	May 31, 2017
3. Pre-restoration assessments of rare, threatened, and/or indicator species	May 31, 2017
4. Post-restoration inventories of recovering plant communities	June 30, 2019
5. Post-restoration assessments of restored rare, threatened, and/or indicator species	June 30, 2019
6. Development and placement of educational signage	June 30, 2019

Activity Status as of January 1, 2017

Activity Status as of July 1, 2017

Activity Status as of January 1, 2018

Activity Status as of July 1, 2018

Activity Status of January 1, 2019

Final Report Summary:

Activity 2: Invasive plant removal by goats and CC of MN, and reseeding/replanting of 40 acres of bluff prairies, savannahs, and bordering woodlands

Description: Buckthorn, honeysuckle, oriental bittersweet, and red cedar will be removed from dry bluff prairies, bur oak savannahs, and oak-basswood forests by grazing goats, the Conservation Corps of Minnesota, and community volunteers. CC of MN will begin by removing large buckthorn from oak savannah habitat and conducting prescribed burns on savannah and prairie sites. Some non-buckthorn trees also may be thinned

from savannahs to restore the native, open condition. Goat grazing (twice per year, each year) will remove woody vegetation (small or re-sprouted buckthorn and honeysuckle) on savannah habitats and severely invaded sections of prairie. CC of MN personnel and volunteers will remove buckthorn, honeysuckle, bittersweet, and red cedar from sensitive, less-invaded bluff prairie and forest habitats.

Prairies and savannahs will be restored by seeding and planting with native forbs (emphasizing flowering species to enhance pollinator populations) and grasses, and savannahs and forests will be restored by planting bur oak saplings and other tree species as needed to enhance natural reproduction. Appropriate seed mixes for southeastern Minnesota dry bluff prairie and bur oak savannah will be prepared by a regional seed source company. Inter-seeding of prairie and savannah habitats will occur during fall, winter (over snow), and/or spring to maximize effectiveness. Young trees will be hand-planted on savannah and forest habitats as needed to restore native species that are absent, low in abundance, or lacking in successful recent recruitment.

Summary Budget Information for Activity 2:

ENRTF Budget: \$ 44,573
Amount Spent: \$ 0
Balance: \$ 44,573

Outcome	Completion Date
1. Invasive plants removed by goats, CC of MN, volunteers	June 30, 2018
2. Bluff prairies and savannahs reseeded and planted	June 30, 2019
3. Bur oak saplings, other species planted in savannahs and woodlands	June 30, 2019

Activity Status as of January 1, 2017

Activity Status as of July 1, 2017

Activity Status as of January 1, 2018

Activity Status as of July 1, 2018

Activity Status of January 1, 2019

Final Report Summary:

Activity 3: Invasive management workshop development and initial delivery to regional landowners, interested public

Description: One-day and two-day, hands-on workshops will be developed for and presented to regional landowners and other stakeholders to explain and demonstrate the process and methodology of invasive plant management and habitat restoration. Workshops will use 1) the project site as a model and 2) nearby City-owned (Bluffside Park) and University-leased (Krueger Woods) lands for hands-on, experiential learning and experimentation.

The WSU Arboretum and Land Stewardship Committee will develop a series of workshops, grounded in Aldo Leopold’s Land Ethic, to provide participants with practical approaches for developing and maintaining environmentally sustainable landscapes. With the Garvin Heights project site as a model, and using a learning-by-doing approach, workshops will demonstrate the principles and best practices (e.g., methods, skills, and techniques) of invasive plant control. A hands-on approach will educate participants in the safe use of tools, equipment, and materials.

Summary Budget Information for Activity 3:

ENRTF Budget: \$ 7,443
Amount Spent: \$ 0
Balance: \$ 7,443

Outcome	Completion Date
1. One-day and two-day management/restoration workshops developed	June 30, 2017
2. Management/restoration workshops delivered to public	June 30, 2019

Activity Status as of January 1, 2017

Activity Status as of July 1, 2017

Activity Status as of January 1, 2018

Activity Status as of July 1, 2018

Activity Status as of January 1, 2019

Final Report Summary:

V. DISSEMINATION:

Description:

Products resulting from this project will be disseminated via a web site, news releases, workshops, community presentations, on-site signage, and presentations at regional science meetings. These diverse methods are intended to reach a variety of audiences, allowing us to share information with site visitors, local residents, and the broader regional citizenry.

The web site for the Winona State University Landscape Arboretum will provide a key link between the project and its benefactors (<https://www.winona.edu/outdoored/arboretum.asp>). The web site will provide a source for all information about the project, from schedules of proposed activities to photos, videos, and reports of on-site happenings. Links will be provided for workshop registration, to access news releases, and to volunteer as a Friend of the Landscape Arboretum.

News releases will be produced and disseminated through the Winona State University Communications and Marketing office. This office prepares and distributes information and news items to regional newspapers, radio, and television, as well as preparing web content and a periodic news magazine.

Project workshops (Activity 3) and community presentations will be prepared and delivered by project leadership and affiliated members of the WSU Landscape Arboretum throughout the project cycle and beyond. On-site signage will be produced and updated throughout the project period to keep site visitors apprised of current activities, with placement of permanent signs planned for the end of the 3-year project period.

Finally, the scientific findings of the project (before/after surveys of invasive plants, success of various management techniques, habitat recovery, SGCN surveys) will be presented at regional science meetings by project leadership and graduate and undergraduate students. Potential venues may include state meetings of the Society of American Foresters and The Wildlife Society, the Mississippi River Research Consortium, the Upper Midwest Invasive Species Conference, the North American Prairie Conference, and undergraduate science symposia hosted by Winona State University, Saint Mary’s University of Minnesota, and Viterbo University.

Status as of January 1, 2017

Status as of July 1, 2017

Status as of January 1, 2018

Status as of July 1, 2018

Status as of January 1, 2019

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	\$ Amount	Overview Explanation
Personnel:	\$ 49,427	1 project manager at 84% salary, 16% benefits, for 2 weeks in the summer, for 1 year (\$6,484); Land Steward at 84% salary, 16% benefits, for 2 weeks in the summer, for 1 year (\$5,443); 1 graduate student at GA stipend for 2 years (\$37,500).
Professional/Technical/Service Contracts:	\$ 33,000	1 contract with Pure Prairie Vision for grazing goats to control invasive plants (\$ 20,000); 1 contract with Conservation Corps of Minnesota for removal of invasive plants (\$ 13,000)
Equipment/Tools/Supplies:	\$ 15,573	GPS units, cameras, inventory supplies (\$ 2,000); workshop materials and supplies (\$ 2,000); prairie/savannah seed (\$ 8,573); native trees (\$ 3,000).
Printing:	\$ 1,000	Educational signage
TOTAL ENRTF BUDGET:	\$ 99,000	

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 1.1 FTE

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.4 FTE

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
Non-state			
Private donations (cash)	\$ 11,000	\$ 0	Undergraduate student salary
City of Winona (in-kind)	\$ 24,000	\$ 0	Park maintenance, security
State			
Conservation Corps of MN (in-kind)	\$ 13,000	\$ 0	Invasive plant removal
WSU Arboretum Director (in-kind)	\$ 29,209	\$ 0	Facility coordination, oversight (10% annual)
WSU Land Steward (in-kind)	\$ 31,262	\$ 0	Workshop development, delivery (10% academic year)
Project Manager (in-	\$ 77,378	\$ 0	Student supervision (20%

kind)			academic year)
TOTAL OTHER FUNDS:	\$ 185,849	\$ 0	

VII. PROJECT STRATEGY:

A. Project Partners:

Project Team/Partners Receiving Funds

Neal Mundahl (WSU Department of Biology, Ecologist, project manager, student mentoring; \$6,484)

Bruno Borsari (WSU Land Steward, workshop and interpretive signage development; \$5,443)

Graduate and Undergraduate students (WSU Department of Biology, habitat delineation, plant inventories, SGCN surveys: graduate student, \$37,500; undergraduate salaries from private donations)

Pure Prairie Vision LLC (Goat grazing management; \$20,000)

Dustin Looman, MN DNR and Conservation Corps of Minnesota (Invasive plant removal, consultation; \$13,000)

Prairie Moon Nursery (Seed, plant source, consultation; \$11,573)

Project Team/Partners Not Receiving Funds

City of Winona (Park maintenance)

Gerald Landby (WSU Landscape Services and Arboretum Director)

Carol Jefferson (Plant Ecologist, Department of Biology emerita: historical site consultant, past species inventories, MN DNR contacts)

William Beatty (WSU Department of Geosciences: GIS)

WSU Arboretum and Land Stewardship Committee (WSU institutional facilitation)

B. Project Impact and Long-term Strategy: The Garvin Heights Natural Area project site is located in the central part of the Blufflands Subsection of the Paleozoic Plateau. The Blufflands has the most Species in Greatest Conservation Need (SGCN) of any subsection in Minnesota, including 82 species that are federal or state endangered, threatened, or of special concern. Oak savannahs and prairies are key habitats for SGCN within the Blufflands, but most (97% and 99%, respectively) have been lost since the 1890s. The proposed project will restore and enhance bur oak savannahs and dry bluff prairies, protect additional cliff and bluff habitats, and enhance pollinator populations by managing invasive plants and replanting with native species. The high-visibility project site will showcase invasive species management and habitat restoration to a large public audience, inventory/monitor for SGCN, encourage public participation in the restoration, and provide additional and continuing opportunities for landowner education in invasive plant management and habitat restoration.

Winona State University and the City of Winona are committed to retaining project lands in a restored state for continuing education of students, the public, and regional stakeholders. Friends of the WSU Landscape Arboretum will be actively involved in the restoration, and will be instrumental in long-term maintenance through continued monitoring and removal of invasive plants and the initiation and conduct of regular, prescribed burns on prairie and savannah habitats. The WSU Environmental Club and WSU classes (e.g., General Ecology, Plant Ecology) will continue their modest monitoring and management efforts on a regular schedule. The City of Winona will continue to maintain access infrastructure (e.g., road, parking lot, paved walkways, overlooks), provide visitor services (restrooms, trash removal), and other services as needed (security, fire supervision).

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	\$ Amount
Xcel Energy (trail construction, invasive plant removal)	2013-2014	\$ 10,000
Private donations (trail maintenance, tree removal)	2011-2013	\$ 2,000
Winona State University (sign replacement, repair)	2013	\$ 800

VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS:

A. Parcel List: See attached Parcel List

B. Acquisition/Restoration Information: N/A

Restoration

- 1. Provide a statement confirming that all restoration activities completed with these funds will occur on land permanently protected by a conservation easement or public ownership.**

All lands involved in this project currently are in public ownership: State of Minnesota, City of Winona, and City of Winona Park Board.

- 2. Summarize the components and expected outcomes of restoration and management plans for the parcels to be restored by your organization, how these plans are kept on file by your organization, and overall strategies for long-term plan implementation.**

We expect that our restoration plans for the Garvin Height Natural Area will lead to improved condition of the dry bluff prairies, bur oak savannahs, and oak-basswood forests that comprise the project site. We anticipate a dramatic reduction in the abundance of buckthorn and honeysuckle after their removal by goats and the CC of MN personnel, and continuing reduction/suppression through efforts of the Friends of the WSU Arboretum. In addition, we anticipate an increase in the diversity of flowering forbs in prairie and savannah habitats.

Management plans for the restoration of the Garvin Heights Natural Area will be filed and maintained by the grant author, by the WSU Arboretum and Land Stewardship Committee, the office of the V.P. of Facilities and Finance, and office of the Provost and V.P. for Academic Affairs. Management plans for the site will become a continuing part of the mission of the WSU Arboretum and Land Stewardship Committee.

The WSU Arboretum and Land Stewardship Committee will be tasked with managing the site in its restored state, working with the City of Winona and other community partners to maintain the restored site by suppressing invasive plants, conducting prescribed burns, and monitoring and encouraging a diverse community of flowering forbs for pollinators. The WSU Arboretum and Land Stewardship Committee will explore funding sources, following the expiration of the LCCMR grant, to enable continued monitoring and maintenance efforts on the restored parcels. Sources of funding include University-budgeted landscape funds, privately donated funds available through the WSU Foundation, and external grant sources (e.g., Winona County, MN, Department of Agriculture, U.S. Department of Agriculture, and others). Additionally, long-term maintenance and restoration will enable WSU undergraduate and graduate students (classes, small group projects, senior capstone research, and graduate projects), as well as interested community members to learn-by-doing through engaging in the long-term maintenance of this property.

- 3. Describe how restoration efforts will utilize and follow the Board of Water and Soil Resources “Native Vegetation Establishment and Enhancement Guidelines” in order to ensure ecological integrity and pollinator enhancement.**

Restoration activities will follow the guidelines as established in the 2015 Board of Water and Soil Resources publication, “Native Vegetation Establishment and Enhancement Guidelines”. Specific habitats (dry bluff prairie, bur oak savannah, oak-basswood forest) will be delineated to quantify the acreage of each habitat type within the project area. After removal of invasive plants, habitats will be inter-seeded/planted with seeds/plants obtained from a regional supplier (Prairie Moon Nursery) within 30 miles of the project site.

Seed mixes for dry bluff prairies and bur oak savannahs will incorporate a high diversity of forbs to stimulate development of rich flowering communities, to provide habitat for pollinators during all seasons.

4. Describe how the long-term maintenance and management needs of the parcel being restored with these funds will be met and financed into the future.

Following restoration, the Garvin Heights Natural Area will need regular maintenance and management to sustain the restored condition. These maintenance and management activities will include removal of re-sprouting or new invasive woody and herbaceous vegetation, regular prescribed burns on prairie and savannah habitats, and possible inter-seeding and/or replanting to maintain high plant diversity in all habitats. These activities will occur under the direction and guidance of the WSU Arboretum and Land Stewardship Committee, the WSU Arboretum Director, and the WSU Land Steward. University funds are allocated for maintenance and management of the WSU Arboretum on an annual basis. In addition, a private endowment for Garvin Heights has been established within the WSU Foundation. Funds generated from this endowment are to be used exclusively to pay for supplies, materials, and student salaries associated with maintaining the Garvin Heights Natural Area. Additional funding will be sought from other sources for any large projects that may develop in future years.

5. Describe how consideration will be given to contracting with Conservation Corps of Minnesota for any restoration activities.

The Conservation Corps of Minnesota has been contracted (contact Dustin Looman) for this project to remove invasive plants on habitats that are too sensitive (e.g., dry bluff prairie) and/or too steep for goat browsing. In addition, CC of MN personnel will be needed to remove buckthorn and other invasive woody vegetation too tall for goats to browse effectively. CC of MN will provide 50% of their services as in-kind contributions for this project, to help advertise and promote their activities within southeastern Minnesota at a highly visible, public location.

6. Provide a statement indicating that evaluations will be completed on parcels where activities were implemented both 1) initially after activity completion and 2) three years later as a follow-up. Evaluations should analyze improvements to the parcel and whether goals have been met, identify any problems with the implementation, and identify any findings that can be used to improve implementation of future restoration efforts at the site or elsewhere.

Activity 1 will involve both pre- and post-restoration surveys and inventories of plant communities and SGCN. These surveys and inventories will be used to evaluate the effects of the prescribed treatments in reducing the abundance of invasive vegetation and improving the diversity of native plants within the dry bluff prairies, bur oak savannahs, and oak-basswood forests that comprise the Garvin Heights Natural Lands project site. This before/after assessment will provide feedback on the immediate success of restoration efforts and/or problems with those efforts within the 3-year project period, allowing for management course corrections prior to beginning long-term site management.

Follow-up evaluation of the habitat restoration efforts will be undertaken by WSU students and faculty, after expiration of the LCCMR grant (2019-2022 and beyond), based upon the availability of needed funds from the University, private donations, and external grant sources. Long-term maintenance and continued restoration of these parcels, as a public demonstration site within the southeastern Minnesota region, and as a resource for teaching and research for undergraduate and graduate education, is a high priority of the WSU Landscape Arboretum.

IX. VISUAL COMPONENT or MAP(S): See attached map

X. RESEARCH ADDENDUM: N/A

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than January 1, 2017, July 1, 2017, January 1, 2018, July 1, 2018, and January 1, 2019. A final report and associated products will be submitted between June 30 and August 15, 2019.

**Environment and Natural Resources Trust Fund
M.L. 2016 Project Budget**



Project Title: Restoration/Monitoring of Winona's 40-acre Blufflands Natural Area

Legal Citation:

Project Manager: Neal Mundahl

Organization: Winona State University

M.L. 2016 ENRTF Appropriation: \$ 99,000

Project Length and Completion Date: 3 Years, June 30, 2019

Date of Report: December 4, 2015

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	Activity 3 Budget	Amount Spent	Activity 3 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Habitat Delineation, Monitoring, Signage			Invasive Plant Removal, Replanting			Workshop Development, Delivery				
Personnel (Wages and Benefits)	\$43,984	\$0	\$43,984				\$5,443	\$0	\$5,443	\$49,427	\$49,427
Neal Mundahl, Project Manager: \$6,484 (84% salary, 16% benefits); 7% FTE for 1 year											
Bruno Borsari, Land Steward: \$5,443 (84% salary, 16% benefits); 7% FTE for 1 year											
1 Graduate Student: \$37,500 (90% salary, 10% benefits); 50% FTE each year for 2 years											
Professional/Technical/Service Contracts											
Pure Prairie Vision, LLC (goat grazing of invasives)				\$20,000	\$0	\$20,000				\$20,000	\$20,000
Conservation Corps of Minnesota (invasive plant removal)				\$13,000	\$0	\$13,000				\$13,000	\$13,000
Equipment/Tools/Supplies											
Field equipment (GPS units, cameras, inventory supplies)	\$2,000	\$0	\$2,000							\$2,000	\$2,000
Workshop materials/supplies							\$2,000	\$0	\$2,000	\$2,000	\$2,000
Prairie/savannah seeds				\$8,573	\$0	\$8,573				\$8,573	\$8,573
Native trees				\$3,000	\$0	\$3,000				\$3,000	\$3,000
Printing											
Educational signage	\$1,000	\$0	\$1,000							\$1,000	\$1,000
COLUMN TOTAL	\$46,984	\$0	\$46,984	\$44,573	\$0	\$44,573	\$7,443	\$0	\$7,443	\$99,000	\$99,000

Environment and Natural Resources Trust Fund

M.L. 2016 Parcel List

Project Title: Restoration/Monitoring of Winona's 40-acre Blufflands Natural Area

Legal Citation:

Project Manager: Neal Mundahl

Organization: Winona State University

M.L. 2016 ENRTF Appropriation: \$ 99,000

Project Length and Completion Date: 3 Years, June 30, 2019

Date of Report: December 4, 2015

#	Acquisition or Restoration Parcel Name	Geographic Coordinates Format: [Deg.]° [Min.]' [Sec.]" [Hemis.]		Estimated Cost	Estimated Annual PILT Liabilities	County	Site Significance	Activity Description	# of Acres	# of Shoreline Miles	Type of Landowner	Proposed Fee Title or Easement Holder (if applicable)	Status
		Latitude	Longitude										
1	Garvin Heights	44° 02' 05"N	91° 39' 06"W	Already under public ownership (State of Minnesota, City of Winona)		Winona	The Garvin Heights Natural Area project site contains dry b	habitat restoration, invasive plant removal	40		public		

NOTES:

**Garvin Heights
Project Area**



500 feet

Google earth

