

[M.L. 2018] Project Abstract

For the Period Ending June 30, 2021

PROJECT TITLE: Morris Prairie Pollinator Demonstration Area and Education

PROJECT MANAGER: Dr. Lee Johnston

AFFILIATION: University of Minnesota West Central Research and Outreach Center

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 05g as extended by M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 18

APPROPRIATION AMOUNT: \$550,000

AMOUNT SPENT: \$540,523

AMOUNT REMAINING: \$9,477

Sound bite of Project Outcomes and Results

This project restored 17 acres to a native prairie habitat to enhance the local ecosystem for beneficial pollinators and native species of plants. The project site also provides educational opportunities for visitors on how to protect or enhance native habitats and beneficial pollinators.

Overall Project Outcome and Results

The Pomme de Terre River watershed area in west central Minnesota was once a sprawling prairie, home to beneficial pollinator species and prairie vegetation. Now, however, we've seen a devastating decline of beneficial pollinator species and a disruption to the remaining native prairie ecosystem due to land conversion to other uses. To address this concern, we worked with prairie restoration specialists to restore a 17-acre habitat in Morris, MN. All non-native vegetation was removed, and a diversity of prairie plant seeds were seeded throughout the site to offer food sources for pollinators known to our region. Fifty Bur Oak trees were planted to create an oak savannah for improved wildlife habitat. Regular maintenance was conducted on the site to control both perennial and annual weeds, which allowed the prairie species to establish. The outcome was an improved landscape that supports bees, butterflies, and other beneficial pollinators as well as an enhanced ecosystem. The addition of native plants sequesters carbon and other air pollutants and filters runoff entering the watershed. Since restoration, biodiversity of plant and wildlife species has visibly increased. The native plant species are beginning to dominate over unwanted vegetation and attract a multitude of pollinator species.

Educational interpretation was installed throughout the demonstration site to encourage visitors to connect with the prairie habitat and learn how to create or enhance habitats on their own properties. We partnered with University of Minnesota Morris faculty and students to design, develop, and evaluate an interactive educational activity on pollinators and prairie restoration. The local high school uses the restoration site as an outdoor classroom to learn about beekeeping, pollinator health, and pollinator habitats.

Project Results Use and Dissemination

Two educational kiosks were installed on the site, along with two interpretive signs. Information available to the public at the kiosks includes why we need pollinators, the steps we've taken to restore the area, and the types of native pollinators in our region. A pamphlet from the [Minnesota Department of Agriculture](#) is available at the northern most kiosk. Interpretive signs along the trail include information about pesticide use in a pollinator friendly way and the environmental benefits of prairie restoration. Updates and articles about the project are available on the [West Central Research and Outreach](#) website.



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2018 ENRTF Work Plan (Final Report)

Today's Date: August 10, 2022

Date of Next Status Update Report: Final Report

Date of Work Plan Approval: June 5, 2018

Project Completion Date: June 30, 2022

PROJECT TITLE: Morris Prairie Pollinator Demonstration Area and Education

Project Manager: Dr Lee Johnston

Organization: UM West Central Research and Outreach Center

College/Department/Division: University of Minnesota

Mailing Address: 46352 State Hwy. #329

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Location: Central region of MN in Stevens County, Framnas Township, Section 31, east of the city of Morris at the UM West Central Research and Outreach Center.

Total Project Budget: \$550,000

Amount Spent: \$540,523

Balance: \$9,477

Legal Citation: M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 05g as extended by M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 18

Appropriation Language: \$550,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota for the West Central Research and Outreach Center at Morris to restore 17 acres of native prairie for pollinators and to construct wayside shelters and kiosks along an existing trail to provide information to visitors on the importance of pollinators and native prairie ecosystems. This appropriation is available until June 30, 2021, by which time the project must be completed and final products delivered.

M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 18. ENVIRONMENT AND NATURAL RESOURCES TRUST FUND; EXTENSIONS. [to June 30, 2022]

I. PROJECT STATEMENT: This project will restore and demonstrate a 17-acre native prairie habitat in Morris, MN, to enhance the local ecosystem for beneficial pollinators and native species of plants as well as offer educational opportunities for visitors. The Pomme de Terre River watershed area in west central Minnesota was once a sprawling prairie, home to beneficial pollinator species and prairie vegetation. Now, however, we've seen a devastating decline of beneficial pollinator species and a disruption to the remaining native prairie ecosystem due to land conversion to industrial agriculture. The lack of diversity or availability of pollen and nectar sources can cause certain pollinator populations to develop health disorders and ultimately die off. Expressing concern over pollinator decline, consumers are seeking ways to remedy the pollinator crisis. Previous research conducted at the University of Minnesota West Central Research and Outreach Center (WCROC) along with the Natural Resources Conservation Service (NRCS), and UMM Morris (UMM) demonstrated the effectiveness of habitat restoration on pollinator abundance and diversity, and documented which plant species are most attractive to different pollinator taxa. We aim to restore prairie habitat so beneficial pollinators can flourish.

We will provide educational interpretation throughout the demonstration site to encourage visitors to connect with the prairie habitat and to learn how to protect or enhance habitats on their own properties. The location of the restoration project has a walk and bike trail meandering through it, making the site an ideal location for consumer education on prairie habitat restoration. Used by thousands each year, the trail connects the WCROC Horticulture Display Garden, the Pomme de Terre Overlook, the City of Morris Pomme de Terre Park, and UMM. Along the trail, we will install and maintain wayside rest areas complete with interpretive kiosks, signage, and information so visitors can be educated on the importance of beneficial pollinators and how to make their own landscapes more pollinator-friendly. We will also work with UMM faculty/students to develop activities that extend beyond the prairie into the classrooms.

We will work with prairie restoration specialists to remove all non-native vegetation and restore diverse native vegetation to a 17-acre portion of grassland. The project will consist of two phases: 1) Removal of non-native vegetation from the project site, and 2) restoration of a diverse selection of native grasses and forbs. According to a 2011 Xerces Society study, providing a diverse habitat with abundant nectar and pollen sources is arguable the most effective method of enhancing or protecting a local beneficial pollinator population. Selection of plant materials will be based on previous research with the NRCS and UMM to offer viable food sources to native pollinators. High quality prairie plant assemblages will be placed across the moisture gradient to sustain plant communities including short/dry prairie mix, mesic prairie mix, wet prairie mix and milkweed for monarch butterfly larval food. The outcomes will be an improved landscape that supports bees, butterflies and other beneficial pollinators, and an enhanced local prairie ecosystem.

II. OVERALL PROJECT STATUS UPDATES: See Section III and IV below.

III. PROJECT ACTIVITIES AND OUTCOMES:

Activity 1 Restoration, education, and demonstration of 17 Acres of Prairie

ENTRF Budget: \$550,000

Remove non-native vegetation from the project area.

The current project site is host to a bevy of non-native vegetation, and pollen and nectar sources are extremely limited. We will use aggressive and thorough site preparation strategies in order to successfully eradicate and control undesirable species. There are currently over 200 non-native volunteer trees and shrubs on the project site, ranging in height from 8 ft to 60 ft. Since this particular piece of ground has never been farmed, it will require heavy-duty equipment and professional expertise to restore the project area for successful native planting. Removal includes using a large backhoe to take down and load trees, a skid loader to move branches and shrubs, a dump truck to transport vegetation to disposal sites, and a pay loader to pile trees and clean the site area. In order to minimize soil disturbance, work will be completed by removing undesirable vegetation, trees and shrubs when the ground is frozen. This activity is the first step of our project to restore the native

prairie habitat and enhance the ecosystem for beneficial pollinators and native species of plants and animals to thrive.

Vegetation management and annual maintenance.

Effective site preparation is essential to getting the restoration project off to a good start. Primary goals of site preparation are to control weed species and to provide ideal growing conditions for the native seed to be sown. We will hire and coordinate with native plant restoration and management experts. The vegetation in the project area is currently dominated by smooth brome, quack grass, and Canada goldenrod. Stinging nettle, reed canary grass, and crown vetch are other significant invasive species with extensive rhizomes that are found on site in varying densities. An aggressive and thorough site preparation strategy will be important in order to eradicate/control these undesirable species. The three-year maintenance program will include mowing, fall and spring applications with suitable herbicides, controlled burn using appropriate procedures, equipment and permits, and repeated herbicide applications to eliminate non-native species. Once this non-native vegetation management plan is complete the area will be ready for native species seeding.

Seeding of native pollinator prairie and planting of oak savannah landscape.

A prairie restoration specialist exclusively devoted to designing, restoring, and managing native prairie plant communities will complete this phase using high quality prairie species native to the Morris area. In addition, we will utilize native plant species according to the 'Board of Water and Soil Resources' native vegetation establishment and enhancement guidelines for long-term success. Given the ecological conditions of the site, the target native plant communities will include prairie, mesic prairie, and wet prairie. Providing a diverse habitat with abundant nectar and pollen sources is arguably the most effective method of enhancing or protecting a local beneficial pollinator population. Our project aims to diversify the local vegetation habitat and restore prairie habitat in order for beneficial pollinators to flourish. Finally, roughly fifty Bur Oak trees native to prairie savannah ecosystems will be planted throughout the project site. This will add to the historic prairie savannah landscape and may also help sustain various species of wildlife.

The prairie restoration specialist will sow native species either in the fall, between late September and freeze-up 2020, or in the spring of 2021. All wildflower seed will be applied by broadcasting and all grass seed will be interseeded with a no-till seed drill. The upper hillside and areas along the trail will be seeded with short/dry prairie species. The general site will be seeded with mesic prairie species and the ditches/wet swales will be seeded with wet prairie species.

We will provide educational interpretation throughout the demonstration site to encourage visitors to connect with the prairie habitat and to learn how to protect or enhance habitats on their own properties. The project site is adjacent to a well-used public trail system, and thus offers the opportunity to educate visitors on the importance of pollinators and native ecosystems. Used by thousands each year, the trail connects the WCROC Horticulture Display Garden, the Pomme de Terre Overlook, the City of Morris Pomme de Terre Park, and UMM. Along the trail, we will install and maintain wayside rest areas complete with interpretive kiosks, signage, and information so visitors can be educated on the importance of beneficial pollinators and how to make their own landscapes more pollinator friendly. Each wayside will feature a different story of the local landscape and sustainable infrastructure that's evident along the journey and provide a simple yet architecturally unique rest area.

We will also work with a UMM associate professor of computer science and a team of undergraduate research students that will design, develop, and evaluate an interactive, game-like activity as a way to engage with the public about pollinators and the prairie restoration project. In addition, Morris Area High School Ag instructor and students will interact with the project for pollinator education in the classroom and student learning experiences with bee keeping and pollinator habitat in the field.

Outcome	Completion Date
1. Remove non-native vegetation from the project area in order to guarantee successful establishment of our native pollinator habitat.	12/1/2018
2. Develop aggressive site preparation to eradicate undesirable species and perform annual maintenance to continually eliminate unwanted vegetation prior to seeding of pollinator habitat project.	6/1/2020
3. To enhance the pollinator habitat, the planting of native prairie will include short/dry, mesic prairie and wet prairie species. Bur Oak trees will be planted to create an Oak savannah landscape.	10/1/2020
4. Partner with UMM and Morris Area School to offer pollinator education in the classroom and outdoor learning experiences. UMM undergraduate students will work with UMM associate professor planning for the pre- and post- field trip experiences to integrate pollinator education into a school setting, conducting focus groups with teachers and work on software development that would provide meaningful learning experience for students and visitors. Identify and collaborate with professionals to design and construct unique wayside rest areas, kiosks and trail signage to educate trail visitors.	Education component to be completed Spring 2022 Signage completed 6/30/2021

First Update January 31, 2019

Remove non-native vegetation from the project area.

Jim Riley and Sons Inc. an excavation company from Morris, MN was hired and completed removal of all non-native vegetation from the project area in mid-November, 2018. They removed with a large backhoe about 200 non-native volunteer trees and shrubs on the project site, ranging in height from 8 ft to 60 ft. Since this particular piece of ground has never been farmed, it required heavy-duty equipment and professional expertise to restore the project area for a future successful native planting. Besides the large backhoe to take down and load trees, a skid loader was used to move branches and shrubs, a dump truck to transport vegetation to disposal sites, and a pay loader to pile trees and clean the site area. In order to minimize soil disturbance, work was completed when the ground is frozen. This activity is the first step of our project to restore the native prairie habitat and enhance the ecosystem for beneficial pollinators and native species of plants and animals to thrive.

We have hired Prairie Restorations, Inc. of Princeton, MN to coordinate the native plant restoration and management in this project area. An aggressive and thorough site preparation strategy will be important in order to eradicate/control undesirable species in this project area. Prairie Restorations has developed an 8 page site preparation, maintenance and seeding plan to establish a high quality native prairie landscape in three years. To get the restoration project off to a good start we have communicated with them several times this last fall and winter to prepare for the upcoming 2019 growing season.

Second Update June 30, 2019

Prairie Restorations, Inc. of Princeton, MN has been coordinating the native plant restoration and management in this project area. The first application of recommended herbicides was applied on May 30, 2019 to eradicate/control undesirable species in this project area. A second herbicide application was applied on June 10, 2019 to areas that were missed by the first application. Additional applications of recommended herbicides will be applied throughout the remainder of the 2019 growing season.

Third Update January 31, 2020

The 17-acres between the Pomme de Terre Overlook and the Pomme de Terre City Park continues to take shape

into a native prairie site. All trees and unwanted shrubs were removed in the late fall of 2018, leaving behind a barren-looking landscape.

Effective site preparation is essential to getting our pollinator restoration project off to a good start. Prairie Restorations, Inc. of Princeton, MN has been coordinating the native plant restoration and management in this project area. They hope to eradicate/control undesirable species including smooth brome, quack grass, Canada goldenrod, stinging nettle, reed canary grass, and crown vetch and other significant invasive species with extensive rhizomes that are found onsite in varying densities.

A final application of a different herbicide to control unwanted woody plant material was applied in late July, followed by a mowing in late August to clean up the dead vegetation. This was followed by a light disking in early September to smooth out the landscape in preparation for 2020.

Along the trail, our plan is to install and maintain wayside rest areas complete with interpretive kiosks, signage, and information so visitors can be educated on the importance of beneficial pollinators and how to make their own landscapes more pollinator friendly. Each wayside will feature a different story of the local landscape and sustainable infrastructure that's evident along the journey and provide a simple yet architecturally unique rest area. We met with an architect in January of 2020 to discuss design features of the wayside rest areas and kiosks. The plan is to have them constructed before the fall of 2020 and prior to seeding of the native prairie pollinator habitat.

Fourth Update June 30, 2020

Prairie Restorations, Inc. of Princeton, MN has been coordinating the native plant restoration and management in this project area. An application of recommended herbicides was applied June 4, 2020 to eradicate/control undesirable species in this project area. A second herbicide application was applied on June 22, 2020 to areas that were missed by the first application. Unless absolutely necessary this should be the last application of herbicides to control unwanted weeds. Disking the soil will be the primary method of weed control during the remainder of the growing season in preparation for seeding in late summer or early fall of 2020.

Fifth Update January 31, 2021

On July 30, 2020, a final herbicide application was sprayed to control unwanted weeds. On September 21, 2020 fifty Bur Oak trees native to prairie savannah ecosystems were planted throughout the project site. The Bur Oak was selected because it was once growing on the northern great plains along with native grasses more than 200 years ago. It is very drought tolerant, tolerates our high pH soils and is fire resistant. It supposedly was the only tree that could withstand wildfires and one time was the dominant species across the plains. Our hope with our pollinator planting is to create an oak savanna that long ago was part of our history. The Bur Oak will add to the historic prairie savannah landscape and may also help sustain various species of wildlife.

The prairie restoration specialists sowed native species October 19 and 20, 2020 at our site. All wildflower seed was applied by broadcasting. Following the wildflower seeding, all native grass seed was interseeded with a no-till seed drill designed for native seeding. The upper hillside and areas along the trail were seeded with short/dry prairie species. The general site was seeded with mesic prairie species and the ditches/wet swales were seeded with wet prairie species. A cover crop of winter wheat was also sown along with the native grasses at a rate of approximately 25 lbs./acre. Cover crop is an annual grass species that germinates quickly and will reduce the risk of soil erosion on the site. Erosion blanket was installed on November 2, 2020 in certain areas that might be exceedingly prone to erosion.

Amendment Request as of 03/17/2021

We are requesting funds be shifted from professional/technical/services contracts to personnel wages. Professional/technical/services (Prairie Restoration Specialists) would be reduced by \$8,000 to a revised budget

of \$66,000. Personnel budget would increase by \$8,000 to a revised budget of \$297,000. These changes are being requested because more staff time was needed to accomplish activities under Project Outcome, Activity 4 - *Identify and collaborate with professionals to design and construct unique wayside rest areas, kiosks and trail signage to educate trail visitors.* To pay for this \$8,000 negative balance we will use funds from professional/technical/services (Prairie Restoration Specialists) budget area since there are extra funds in this area that will not be used.

Amendment Approved by LCCMR 4/16/2021.

Project extended to June 30, 2022 by LCCMR 6/30/21 as a result of M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 18, legislative extension criteria being met.

Amendment Request as of 8/2/2021

Steve Poppe is retiring on August 6th from the University of MN West Central Research and Outreach Center, Morris, MN. I need to appoint a new person to be the Principal Investigator with our ENRTF project "Morris Prairie Pollinator Demonstration Area and Education. Dr. Lee Johnston, WCROC Director of Operations has agreed to take that responsibility.

Amendment approved by LCCMR 8/4/2021

Sixth Update January 31, 2022:

Throughout the summer of 2021, all Bur Oak trees were watered weekly by hand using our 150-gallon watering tank. During this time, we noticed that 5 of the Bur Oak trees did not survive and so on October 6th, 2021, we replanted with replacement trees. We chose to replant later in the fall when the soil had adequate moisture following the 2021 drought, and when the trees were entering dormancy. The site was mowed twice over the growing season on June 10th and July 12th to knock back annual weeds. Perennial weeds were spot sprayed on October 22nd.

As we plan for maintenance of the site in the Spring of 2022, Prairie Restorations will administer weed control methods by mowing the 17-acres, applying herbicides selectively, and reseeding any areas that washed out. It is also possible that a controlled prairie burn may be used to further eradicate unwanted weeds and vegetation.

Final Update June 30, 2022

In our initial planning for the site, we were figuring on a controlled burn during the spring of 2022 to assist with eradication of invasive species. However, due to the drought conditions of 2021, native plants were not as established as anticipated during the onset of the 2022 growing season. Therefore, in consultation with Prairie Restorations, Inc., a controlled burn of the site was not recommended to avoid damage to the establishing native plants. Instead, Prairie Restorations, Inc. completed mowing of the 17-acres to reduce competition from invasive species allowing the native species to become more established. Because of this unforeseen change in prairie treatment, not all professional services dollars were spent.

Overall Project Outcomes and Results:

The Pomme de Terre River watershed area in west central Minnesota was once a sprawling prairie, home to beneficial pollinator species and prairie vegetation. Now, however, we've seen a devastating decline of beneficial pollinator species and a disruption to the remaining native prairie ecosystem due to land conversion to other uses. To address this concern, we worked with prairie restoration specialists to restore a 17-acre habitat in Morris, MN. All non-native vegetation was removed, and a diversity of prairie plant seeds were seeded throughout the site to offer food sources for pollinators known to our region. Fifty Bur Oak trees were planted to create an oak savannah for improved wildlife habitat. Regular maintenance was conducted in the site

to control both perennial and annual weeds, which allowed the prairie species to establish. The outcome was an improved landscape that supports bees, butterflies, and other beneficial pollinators as well as an enhanced ecosystem. The addition of native plants sequesters carbon and other air pollutants and filters runoff entering the watershed. Since restoration, biodiversity of plant and wildlife species has visibly increased. The native plant species are beginning to dominate over unwanted vegetation and attract a multitude of pollinator species.

Educational interpretation was installed throughout the demonstration site to encourage visitors to connect with the prairie habitat and learn how to create or enhance habitats on their own properties. We partnered with University of Minnesota Morris faculty and students to design, develop, and evaluate an interactive educational activity on pollinators and prairie restoration. The local high school uses the restoration site as an outdoor classroom to learn about beekeeping, pollinator health and pollinator habitats.

IV. DISSEMINATION:

Description: Not only will the project site serve a vital role in the health of our pollinator populations, but will also offer students and the public a way to engage with nature and learn more about the importance of pollinators in our local ecosystem. Outreach activities will occur as students and visitors use and enjoy the adjacent trail system. Educational field trips for school-age students will be arranged, high school students will experience beehives, and UMM students will have access to the site as an outdoor lab.

Our vision for education is to use technology in a way that allows people to learn about the prairie, the prairie restoration project, and pollinators in particular. At the completion of the prairie restoration project, there will be a variety of ways to engage along the trail. There will be signage along the trail, which we can utilize as points of engagement. Signage will offer QR codes or web-based links so that visitors can have access to pollinator information provided by experts. In addition, a game-like activity will be developed to extend beyond the prairie where visitors can participate before and after trips to the prairie by viewing data visualizations about their interaction with the system, all centering around the concept of “Be the Bee.”

As the prairie restoration project moves forward in years one through three, our WCROC Communications Specialist will share information with many audiences. The progress, activities and education results will be shared on the WCROC website www.wcroc.cfans.umn.edu, various social media outlets, newsletters, local media, and through educational programs. All shared information will acknowledge the Environment and Natural Resources Trust Funds (ENRTF).

First Update January 31, 2019

Our collaborator, Kristin Lamberty, University of Minnesota Computer Science Faculty and her two students started the fall of 2018 to work on the educational outreach program related to the grant. They started the design and implementation of a way to reach out to the public through posting physical links to digital resources in our community. This has not been fully implemented yet, but is nearing readiness for deployment. The plan is to place posters and cards with information about the research project and also things that might prompt people to want to find out more about pollinators. They will place these physical links (z-links (short URLs) and QR codes) on cards and posters in the community (with permission) and track where people linked from when they wanted to find out more by visiting the pages. When they visit a page, they will get a random fact from one of three categories with opportunities to click to find out more. The student work contributed to the design and implementation of the web tool for providing this information and research to find information to include.

Our WCROC Communications Specialist, Esther Jordan will share information with many audiences. The progress, activities and education results will be shared on the WCROC website <https://wcroc.cfans.umn.edu/restoring-native-prairie>. This website was just recently created and no activities have been shared as of 2/27/19.

Second Update June 30, 2019

Our collaborator, Kristin Lamberty, University of Minnesota Computer Science Faculty and her two students shared this report. They continue to learn a lot about pollinators and the prairie, and are really grateful to be working on this project.

Funding for the spring semester and early summer was used to pay for student work (and faculty summer salary) on the second of the three prongs of the educational outreach program related to the grant. The focus of this part of the work is to create a participatory simulation and set of activities that can be used in both formal and informal learning environments for people to learn about pollinators and the impact of land use such as the restored prairie area. Taking part in the simulation should give participants a sense of the diversity of pollinators in Minnesota with a focus on the hundreds of types of bees we have here. In particular, we want to help people understand that there are lots of types of bees in Minnesota, that most bees are not social, that many bees have nesting habits that are not like those of honeybees, that different kinds of bees are active at different times of the season, and that a diversity of plant life benefits these pollinators. We are currently planning a participatory simulation that utilizes personal electronic smart devices (such as phones or tablets) along with a large display (projector and screen) to help coordinate the activities. We envision that each participant will “be a bee” and move about in the shared space visiting flowers to gather nectar and pollen. Participants will explore several scenarios with varying levels of diversity of plants and pollinators to help them understand how things play out differently. The work is at the design and prototype phase, which will likely lead into actual implementation throughout the remaining weeks of the summer and into fall. Both student and faculty work in this phase of the project has focused on designing the interaction and continued research to determine what information to include and what interaction techniques to use in the simulation to have the best impact for learning.

Our WCROC Communications Specialist, Esther Jordan put out 4 temporary signs to explain to trail-users what they are seeing in the restoration area. The signs read:

- All non-native trees, shrubs and vegetation were removed in the fall of 2018. We are in the process of eradicating all invasive non-native plants in order to prepare the site for a native planting in 2020 or 2021.
- MAKE WAY FOR POLLINATORS This site is under restoration to improve the native landscape for our beneficial pollinators and wildlife.
- This area will gradually transform over the next few years to include pollinator friendly plants, wayside rest areas and educational kiosks, and Bur Oak trees.
- Funding for this project provided by the Minnesota and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources.

Third Update January 31, 2020

One of our collaborators on the project, Kristin Lamberty, from the University of Minnesota Morris Computer Science Department, along with two of her students, are developing interactive and educational materials to go along with the restoration site.

The focus of their work is to create a participatory simulation and set of activities that can be used in both formal and informal learning environments for people to learn about pollinators and the impact of land use, such as the restored prairie area. Taking part in the simulation should give participants a sense of the diversity of pollinators in Minnesota with a focus on the hundreds of types of bees we have here. In particular they want to help people understand that there are lots of types of bees in Minnesota, most bees are not social, many bees have nesting habits that are not like those of honeybees, different kinds of bees are active at different times of the season, and having a diversity of plant life benefits pollinators.

Funding for the late summer and fall semester was used to pay for student work (four computer science students in the summer and one studio art student for the summer, with one computer science student and one studio art student continuing into the fall semester) and faculty summer salary on the second of the three prongs of the educational outreach program related to the grant. The focus of this part of the work was further development on the simulation activity. The art and design aspects are really taking shape and create a nice overall look and feel that can extend into the other aspects of the project. The art includes digital renderings of paintings of native plant and pollinator species. We have developed a suitable collection of images of pollinators and plants to provide participants in the simulation a wealth of information about native bees and flowers. We have been working on some of the technical aspects of developing the simulation. This has included working on the augmented-reality framework for interacting with the bees and flowers, designing and beginning to implement the structure of a “round” of the simulation, and determining how and when to display different information.

Our WCROC Communications Specialist, Esther Jordan, posted the article “Make Way for Pollinators: An Update on our Native Restoration Project” on the WCROC website at <https://wcroc.cfans.umn.edu/connect-garden/hort-news-fall-2019/native-restoration>. The article was shared in the Fall 2019 Horticulture Display Garden Newsletter, which went out both in print and electronically to 4,000 friends and donors of the Horticulture Display Garden. The same article was reprinted in the WCROC eNewsletter, which goes out to 2,100 friends and stakeholders of the WCROC. Additionally, the article was also printed in our local newspaper, the Steven County Times, in their 10/22/2019 edition. Circulation is estimated at 3,000. A tour of the site was given to members of LCCMR during their fall 2019 visit to the WCROC. Additional progress, activities and educational opportunities will be shared on the WCROC website <https://wcroc.cfans.umn.edu/restoring-native-prairie>.

Fourth Update June 30, 2020

One of our collaborators on the project, Kristin Lamberty, from the University of Minnesota Morris Computer Science Department, along with her students, are developing interactive and educational materials to go along with the restoration site.

Funding from January 2020 through June 2020 was used to pay for student work for several students (as well as faculty summer salary and one temp/casual employee who just graduated) on two parts of the pollinator education portion of our project: 1) the participatory simulation for use in classrooms or informal learning venues (now called “Buzz About”) and 2) the pollinator facts website for use throughout the community where we plan to place links to enable viewing facts and exploring further from there. Progress on developing Buzz About continues with an emphasis on how a teacher might host a session with several simulation rounds, each followed by time and tools for reflection and discussion. In each round, there will be flowers that participants can visit (as a bee). The artwork created for this part of the project will be useful for all of the educational components of the project, including signage at the prairie restoration site itself. The pollinator facts website structure is mostly designed and implemented with much of that work occurring in the first part of the summer of 2020. We continue to source and add facts with images while also updating the layout and design somewhat. The COVID-19 pandemic has created some challenges as far as how we will be able to work with human subjects/participants to test the educational components of the project, but we are still working on development. We will likely spend some time developing alternative protocols for this research given that it is unclear when people might gather in groups in classroom or informal educational settings. We are considering various possible ways to pivot and adapt to these changes, including potentially creating a version of the participatory simulation that could be used in a distance learning environment.

Since January 2020 Our WCROC Communications Specialist, Esther Jordan and two other WCROC staff members have been consulting with JLG Architects out of Fargo, ND, to design the two educational wayside rest areas and

informational kiosks. After an initial site visit, we determined the best two locations for the structures given the landscape, topography, accessibility and view. One kiosk will be located in the southern area of the restoration site, while the other will be to the north. Both structures will look identical to each other, except for being orientated on opposite sides of the existing trail. We've also identified how many signs will be installed at each structure, and are working with our partners to develop content and interpretation for the signs and brochures.

Fifth Update January 31, 2021

Two educational wayside rest areas and interpretative kiosks were constructed and installed along the path in the restoration site during the fall of 2020. Each rest area is shaded and includes a bench and provides optimum views of the restoration site with the Pomme de Terre river in the background. At the northern most wayside rest area, a 36" w x 36" h sign was installed on the backdrop of the kiosk and provides information about why the restoration was crucial in preserving a habitat for beneficial pollinators, why we need pollinators, and the steps we've taken to restore the area. Acknowledgement was given to our collaborators and to our funding source, the Minnesota Environment and Natural Resources Trust Fund. At the south rest area, we developed and installed three 24" w x 30" h interpretive signs to provide the public more information about the various native pollinators in our region and what specific food sources they are attracted to, the type of habitats each of them desire, and how to create a pollinator friendly landscape in the home garden. We have also secured a pollinator handout created by the Minnesota Department of Agriculture and will have them available to the public at one of the kiosks in the spring of 2021.

During the winter of 2021 we plan to research additional reasons why pollinators are important. These additional facts will then be part of two interpretive signs that will be located on the trail that goes through this restored site. These signs will be designed and installed by the same company that created and constructed the two wayside rests and interpretive kiosks.

One of our collaborators on the project, Kristin Lamberty, from the University of Minnesota Morris Computer Science Department, along with her students, are developing interactive and educational materials to go along with the restoration site.

Funding from June 2020 through January 2021 was used to pay for student work for several students (plus a small amount for the artist who recently graduated to contribute a few pieces for the kiosk signage at the prairie restoration site itself and more recently for a temp/casual contract for a computer science student who graduated in December and is a core contributor to the technological aspects of the project) and some faculty salary (in the summer and as a sabbatical supplement). Progress continues on the two parts of the pollinator education portion of our project (the participatory simulation "Buzz About" and the pollinator facts website). Buzz About now includes support for teachers or other facilitators to host sessions that can include multiple rounds with the ability for learners to join these sessions and participate. We have altered the simulation to help accommodate distance learners who may have less space to set up full rounds, so now rounds can have eight or sixteen "flowers" instead of always having sixteen flowers. The participatory simulation is at the stage of being a minimally viable product (ready for use with people and testing), but due to the COVID-19 pandemic we are unable to meet with human participants in person. We are finalizing details on a research protocol to submit for review to our institutional review board that takes into account the necessity for meeting remotely and gathering data remotely as a way of continuing this research in spite of COVID-19-related restrictions. We are hopeful that we will be able to conduct this research, but we are uncertain whether it will be approved or not. If it is approved, we plan to work with teachers in local schools who have learners in person with social distancing and distance learners to try to understand more about how participatory simulations can still work in different settings in spite of pandemic-related challenges. The protocol we are submitting has the research being done remotely, but takes into account that some schools are meeting in person with various restrictions. These restrictions impact the way we will have learners use the participatory simulation in ways we think are less than ideal, but still worthy of exploration.

The COVID-19 pandemic has had a significant impact on our research. We are unable to work with human participants in person for research at this time due to COVID-19 restrictions. This means that we are unable to complete the research to verify that the educational outreach portions of this work are specifically supporting learning and/or if any particular updates are needed to better support learning and meet our goals. Without this in-person research with human subjects, we were unable to gather the data we would need on time to publish this work and share this work with colleagues as previously intended. The deadline for the most appropriate conference was in January.

An extension on spending the money for this project would mean we are, hopefully, able to see this work in classrooms and libraries in person with human participants sometime in 2021 or very early in 2022. The conference travel portion of the budget as well as some student researcher funding to pay students who are helping with this research will also be stretched out through the end of the new budget period if an extension is granted. The current research students will slow down a little on their work in the spring semester to spread out that student funding past the original end date of the project. An extension would likely enable us to carry out this work more closely to the way we originally planned.

Project extended to June 30, 2022 by LCCMR 6/30/21 as a result of M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 18, legislative extension criteria being met.

Sixth Update January 31, 2022:

We acknowledge that pesticide use in agricultural and landscape settings can be helpful to insect and pathogen control but can be harmful to pollinators. To address this concern, along with how prairie plants can benefit the environment, two additional informational signs were placed along the trail through the restoration site; one to the south and one to the north. The southern sign gives consumers tips on using pesticides in a pollinator-friendly way, such as using mulches to improve soil health and reduce weeds, spot spray rather than broadcast spray, apply in early mornings or evenings when pollinators are not very active, and check pesticide labels for specific instructions to prevent pollinator harm. The northern sign includes a side view graphic of a prairie plant root system and explains the environmental benefits of prairie restoration. More specifically, education is provided on how prairie plants can improve the quality of soil, water and air and the impact plants have on reducing soil erosion, removing contaminants from water, and reducing air pollutants. Both signs were installed in the Spring of 2021 by the same graphic design company that created and installed the educational interpretation in the wayside rest areas.

One of our collaborators on the project, Kristin Lamberty, from the University of Minnesota Morris Computer Science Department, along with her students, are developing interactive and educational materials to go along with the restoration site. Funds during this period have been used to pay undergraduate students (as well as one recent graduate) to continue development of the software, with a focus on making it useful beyond the funding of the project. Some of the funds were also used as a sabbatical supplement from January 2021 through June 2021. We have a protocol approved by the Institutional Review Board to work with schools to test the participatory simulation, and we have gained permission from principals at two local schools to recruit teachers who would like to have their classes participate. The schools are both meeting in person, but with the current COVID variant and numbers being so high, we are waiting a little longer to venture into the schools since there is no mask mandate or social distancing requirements at the schools. Another challenge we are encountering is that distance learning is no longer supported, so our plans to compare in-person and distance delivery modalities are not possible. This shift in delivery means we do need to make some minor changes to our research protocol. Once those changes are approved, we plan to work with teachers in local schools who have learners in person to try to understand more about how different aspects of our participatory simulation (Buzz About) are leveraged by students and to understand more about what the students can learn from participating.

The COVID-19 pandemic has had a significant impact on our research, but we think we will be able to verify that the educational outreach portions of this work are supporting learning and if any updates are needed to better support learning and meet our goals. We aim to gather the data we need to publish this work and share this work with colleagues as previously intended, but even with the project extension approved by LCCMR we were unable to have this data gathered in time for the January deadline of the most appropriate conference; therefore, we are considering other venues for disseminating this work.

Final Report Summary:

Two educational kiosks were installed along the site, along with two interpretive signs. Information available to the public at the kiosks includes why we need pollinators, the steps we've taken to restore the area, and the types of native pollinators in our region. A pamphlet from the Minnesota Department of Agriculture "[Insect Pollinator Best Management Practices for Minnesota Yards and Gardens](#)" is available to the public at the northernmost kiosk. All signs are located within 50 yards of each other, and are designed to complement each other along the pathway. Interpretive signs along the trail include information about pesticide use in a pollinator friendly way and the environmental benefits of prairie restoration. Acknowledgement is given to the Minnesota Environment and Natural Resources Trust Fund on the main sign with an appropriate logo and the following wording: "Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources. The Trust Fund is a permanent fund constitutionally established by the citizens of Minnesota to assist in the protection, conservation, preservation, and enhancement of the state's air, water, land, fish, wildlife, and other natural resources." Updates and articles about the project are available on the [West Central Research and Outreach](#) website.

Northern Kiosk:



Southern Kiosk:



Pathway sign #1 (Using Pesticides in a Pollinator-Friendly Way):



Pathway sign #2 (Environmental Benefits of Prairie Restoration):



Funds during this period supported undergraduate students, as well as one recent graduate, to continue development of the interactive software and plan for research to be carried out in classrooms, with a focus on making the educational technology useful beyond the funding of the project. In particular, changes to the software now incorporate some of the data gathered that will help us assess how participants in the study might think about how to support pollinators and how their thinking might change after participating in the

simulation.

Although we had a protocol approved by the Institutional Review Board to work with schools to test the participatory simulation and we gained permission from principals at two local schools to recruit teachers who would like to have their classes participate, we were not able to get into classrooms before the end of the 2022 school year. Despite the project funding being complete, we still plan to get this software into our local schools and into the hands of people in Minnesota. One other potential venue for conducting this work would be at county fairs, and we are exploring that possibility.

The COVID-19 pandemic significantly impacted this portion of our project. We were unable to utilize the funding for travel because delays in the research made it impossible for us to have research results to present at the intended conference. Other venues we considered did not work out. Because of this, a large percentage of travel dollars were not used.

V. PROJECT BUDGET SUMMARY:

A. FTEs

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

Enter Total Estimated Personnel Hours: 10,365	Divide by 2,080 = TOTAL FTE: 4.983
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2) Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:

Enter Total Estimated Personnel Hours: 1,291	Divide by 2,080 = TOTAL FTE: 0.620
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B. Other Funds:

SOURCE OF AND USE OF OTHER FUNDS	Amount Proposed	Amount Spent	Status and Timeframe
In-kind Services To Be applied To Project during Project Period: The 54% in foregone federally negotiated ICR funding constitutes the University of Minnesota's cost share to the project.	\$367,740		Secured
Other Non-State \$ To Be Applied To Project During Project Period:			
Donor support	\$20,000	\$ 0	Secured if fully funded
Other State \$ To Be Applied To Project During Project Period:			
	\$ N/A	\$	
Past and Current ENRTF Appropriation:			
	\$ N/A	\$	
Other Funding History:			
	\$ N/A	\$	

VI. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Name	Title	Affiliation	Role
Steven Poppe	Horticulture Scientist	UM WCROC	Project Manager (retired)
Nathan Dalman	Researcher III	UM WCROC	Coordinate educational activities and land management. Coordinate maintenance projects and handle all tree care.
Esther Jordan	Communications Specialist	UM WCROC	Coordinate outreach activities.
Kristin Lamberty	Associate Professor of Computer Science	UMM	Design, develop and evaluate interactive educational materials.
Two UMM students	Undergraduate students	UMM	Planning field trip experiences, conducting focus groups and software development.

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Margaret Kuchenreuther	Associate Professor	UMM	Prairie ecology management and student involvement.
Blaine Hill	City Manager, Morris	City of Morris	Community outreach
Wayne Markegard	Plant Materials Specialist	Natural Resources Conservation Service-Bismarck, ND	Consultant to identify prairie seed mixes.
Nick Milbrandt	High School Ag Instructor	Morris Area High School	Pollinator education in the classroom and outdoor learning experiences with bee keeping and pollinator habitat project.

VII. LONG-TERM- IMPLEMENTATION AND FUNDING:

The overall goal of the project is to educate students and visitors and restore what once was native prairie land to a thriving pollinator habitat, thus offering diverse and abundant food sources for beneficial pollinators as well as enhancing the natural landscape surrounding the Pomme de Terre watershed area. This collaborative project will build on our past pollinator research which explored native plant species and their attractiveness to pollinators. Not only will the project site serve a vital role in the health of our pollinator populations but will also offer students and the public a way to engage with nature. Outreach activities will occur as students and visitors use and enjoy the adjacent trail system. Educational field trips for school-age students will be arranged, high school students will experience beehives and UMM students will have access to the site as an outdoor lab. The project does not need additional investment other than funding requested from the ENRTF to be completed.

Ongoing efforts will be privately funded through donor support already established in a UM foundation account. In addition, a "Memorandum of Understanding" has been documented by a private donor to support the project

in years one and two.

VIII. REPORTING REQUIREMENTS:

- The project is for 4 years, will begin on 6/30/2018, and end on 6/30/2022.
- Periodic project status update reports will be submitted 1/31 and 6/30 of each year.
- A final report and associated products will be submitted between June 30 and August 15, 2022.

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

- A. Budget Spreadsheet
- B. Visual Component or Map
- C. Parcel List Spreadsheet
- D. Acquisition, Easements, and Restoration Requirements
- E. Research Addendum

Attachment A:
Environment and Natural Resources Trust Fund
M.L. 2018 Budget Final



Project Title: Morris Prairie Pollinator Demonstration Area and Education
Legal Citation: M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 05g
Project Manager: Lee Johnston
Organization: University of Minnesota
College/Department/Division: West Central Research and Outreach Center
M.L. 2018 ENRTF Appropriation: \$550,000
Project Length and Completion Date June 30, 2018 - June 30, 2022
Date of Report: 8/10/2022

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	REVISED BUDGET 03/24/2021	AMOUNT SPENT	TOTAL BALANCE
BUDGET ITEM			
Personnel (Wages and Benefits)	\$297,000	\$296,644	\$356
<i>Steven Poppe, Project Manager, 3.0 % FTE in year 1, 2, and 3; 26.0 % fringe rate (\$7,000)</i>			
<i>Robert Yost, WCROC Landscape Gardener, 50% FTE in year 1, 2 and 3; 26.0% fringe rate (\$90,000)</i>			
<i>Esther Jordan, Communication Specialist, 25% FTE in year 2, and 3; 26.0% fringe rate (\$ 24,000 \$32,000), adding \$8,000 to this budget.</i>			
<i>Tom Holm, Researcher II, 3.0% FTE in year 2, and 3; 26.0% fringe rate((\$4,000)</i>			
<i>Kristin Lamberty, UMMC Computer Science Faculty, 6 weeks summer salary in year 1, 2; 50% sabbatical funding and 4 weeks summer salary year 3; 33.5% fringe rate (\$113,000) Kristin Lamberty, was on sabbatical during the 2021-2022 school year. The U of MN paid 1/2 her salary during her sabbatical, and the grant dollars paid for the remaining half while she continued to work on project objectives</i>			
<i>2 UMM students, 10 weeks summer salary in year 1,2, and 3; 2 UMM students 30 weeks academic year 1, 2, and 3; \$11.50/hour student rate (\$51,000)</i>			
Professional/Technical/Service Contracts			
Prairie Restoration Specialists (competitive bid)-site preparation including mowing, multiple herbicide applications, controlled burns, maintenance management, planting of native prairie. \$8,000 removed from this budget.	\$66,000	\$62,795	\$3,205
Excavating contractors (competitive bid)-removing non-native vegetation, (trees and shrubs)	\$52,000	\$52,000	\$0
Tree Nursery (competitive bid)-Purchase and planting Bur Oak trees	\$16,000	\$16,000	\$0
Engineer and Architect Services (competitive bid)-Wayside shelters, kiosks, trail signs, benches, solar powered lights for kiosk/shelter and geotechnical testing.	\$105,000	\$103,873	\$1,127
Equipment/Tools/Supplies			
<i>15 Beehive protection suits and gloves for students</i>	\$4,000	\$3,998	\$2
<i>Water tank with pump and motor to assist with watering Bur Oak trees</i>	\$5,000	\$4,988	\$12
Travel expenses in Minnesota			
<i>Kristin Lamberty and UMM students to present findings at one conference in year 3</i>	\$5,000	\$225	\$4,775
COLUMN TOTAL	\$550,000	\$540,523	\$9,477

