

M.L. 2014 Projects Completed in 2015-2016

MN Laws 2014, Chapter 226, Section 2 (beginning July 1, 2014)

MN Laws 2014, Chapter 312, Article 12, Section 8 (beginning July 1, 2014)

For the Minnesota's FY 2014-15 biennium (July 1, 2013 - June 30, 2015), approximately \$33.8 million was available each fiscal year (Total = \$67,620,000) for funding from the Environment and Natural Resources Trust Fund. In response to the 2014 Request for Proposal, 192 proposals requesting a total of approximately \$111 million were received. Through a competitive, multi-step process 94 of these proposals, requesting a total of \$58.7 million, were chosen to present to the LCCMR and 71 of those proposals, totaling \$29 million, were chosen to receive a recommendation for funding to the 2013 MN Legislature. The Legislature adopted all 71 of these project recommendations and they were signed into law by the Governor on 05/09/14. The Legislature added one additional project and it was signed into law by the Governor on 05/20/14. For 2014 a total of 72 appropriations will be receiving \$30,430,000.

NOTE: For all projects, contact us to obtain the most up-to-date work programs for current projects (project updates are required twice each year) or the final reports of completed projects.

When available, we have provided links to web sites related to the project. The sites linked to this page are not created, maintained, or endorsed by the LCCMR office or the Minnesota Legislature.

Subd. 04 Aquatic and Terrestrial Invasive Species

04c Northwest Minnesota Regional Aquatic Invasive Species Prevention Pilot

Subd. 05 Foundational Natural Resource Data and Information

05d Restoring Forest Inventory Data

05g Assessing Contaminants in Minnesota's Loons and Pelicans - Phase 2

05i Wild Bee Pollinator Surveys in Prairie-Grassland Habitats

Subd. 06 Methods to Protect, Restore, and Enhance Land, Water, and Habitat

06i Cattail Management for Wetland Wildlife and Bioenergy Potential

06k Expansion of Greenhouse Production

Subd. 07 Land Acquisition, Habitat, and Recreation

07d Shoreland Acquisition on St. Croix River

Subd. 08 Air Quality, Climate Change, and Renewable Energy

08h Solar Photovoltaic Installation at Residential Environmental Learning Centers

Subd. 09 Environmental Education

09b Youth-led Sustainability Initiatives in 40 Greater Minnesota Communities

09e Educating Minnesotans about Potential Impacts of Changing Climate

- 09f Pollinator Education Center at the Minnesota Landscape Arboretum
- 09h Raptor Lab Integrating Online and Outdoor Learning Environments
- 09i Wolf Management Education

Subd. 10 Administration and Contract Agreement Reimbursement

- 10a Contract Agreement Reimbursement

Subd. 04 Aquatic and Terrestrial Invasive Species

Northwest Minnesota Regional Aquatic Invasive Species Prevention Pilot

Subd. 04c \$219,000 TF

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Appropriation Language

\$219,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with the Red River Basin Commission to develop aquatic invasive species prevention strategies on a watershed scale and develop materials to sustain watershed scale decision-making and implementation. This initiative must be coordinated with the Department of Natural Resources and outdoor heritage fund activities for locally based invasive species control. Specific reporting and analysis of outcomes and findings of this alternative approach must be provided to enable duplication in other regions of the state.

Project Overview

Aquatic invasive species are a threat to the ecology and the recreational and economic viability of Minnesota's water resources. When an invasion is confined to a distinct lake or wetland, local government units will implement localized plans to address invasions. However, when a water body crosses jurisdictions, such as with river systems, to be effective a more coordinated, regional approach is necessary that is more attuned with the natural pathways for invasive species. The Red River Basin Commission is using this appropriation to pilot an effort to develop processes for addressing invasive species at a watershed scale using partnerships between local government units working collectively rather than individually. The pilot is intended to create a model for invasive species prevention that can be applied in other parts of the state.

OVERALL PROJECT OUTCOME AND RESULTS

Aquatic Invasive Species (AIS) spread has become one of the top concerns as it threatens the recreational and economic viability of the surface water resources of the Red River of the North watershed. According to the Minnesota Department of Natural Resources Infested Waters report

(2016), Zebra Mussels have invaded the Otter Tail, Pelican and Red River systems. The Local Governmental Units (LGU's) are implementing plans to address AIS issues at the county level, but introduction into our river systems necessitate a regional approach to education, outreach and management of AIS within the Red River of the North watershed. The goal of this pilot project was to expand AIS work from a largely county based process to a watershed scale through partnerships between LGU's. The project targeted three main watersheds, Buffalo, Otter Tail and Wild Rice, which make up the Red River drainage basins of Becker, Clay, Otter Tail and Wilkin Counties.

The project focused on three specific outcomes including 1) Coordination with LGU's to develop effective AIS communication and management. 2) Develop and distribute educational materials that support best management practices for AIS. 3) Expand and leverage opportunities to develop and deliver an AIS program based on best management practices that are replicable throughout the region.

The project made significant progress toward the coordination of the LGU's within the three watersheds and four counties. All endorsed the watershed approach and included this strategy in their local plans. The Red River Basin Commission staff met monthly for the duration of the project with AIS LGU's to integrate the watershed approach and worked directly with over 20 groups and 6,000 individuals including natural resource managers, lake property owners, students, teachers and researchers.

Educational materials and management resources including; AIS Risk Assessments for the targeted watersheds, an AIS mobile application, GIS based AIS maps, AIS identification cards, information brochures and promotional items and multiple surveys, presentations and ads were all developed and disseminated by the Red River Basin Commission for the watershed approach to AIS management as a result of the project.

PROJECT RESULTS USE AND DISSEMINATION

Educational materials and management resources developed by the Red River Basin Commission were disseminated to local groups, state agencies, national and international AIS related peer groups through the Red River Basin Commission website, public presentations and educational workshops.

Additionally, targeted media messages included regionally branded print media and radio AIS promotions that run along with other timely water conservation messages daily during prime listening time were adopted for reaching a regional listening audience of 71,500 weekly.

The resources developed including the Aqua.mn mobile application - <https://aqua.mn/> and website- <http://www.redriverbasincommission.org/> are designed so citizens can access educational materials and resources with links back to county based resources, watershed partner resources and Minnesota Department of Natural Resources AIS tools and information.

The AIS Risk Assessments that use science, fact and logic to identify and quantify vectors of risk assist in planning for zebra mussel management. These assessments were shared with and are used by watershed districts, local units of government, lake associations and others, to support the prioritization of funding and activities, including inspection and decontamination, to curtail and prevent the spread of zebra mussels and other AIS species to Minnesota's lakes and rivers. The AIS Risk Assessment GIS Tool allows users to interactively explore the infestation risks of lakes and rivers in the project area, and visualize where aquatic invasive species have been sighted. It serves as a digital companion to the static maps generated in the reports. The AIS Risk Assessment GIS Tool can be accessed on ArcGIS Online via the link:

<http://www.arcgis.com/home/webmap/viewer.html?webmap=2a3a1ecbc1ca414b875c0b8feed7463a>

The Red River Basin Commission lead efforts to collect, review and distribute current AIS survey data and watershed scale demographic data within the targeted project region. The survey initiatives were aimed to help determine the current knowledge, attitude and interest in AIS issues affecting Minnesota's lakes region. A final survey results report was shared with watershed districts, LGU's, lake associations and others and is attached to the LCCMR Final Report.

As a basin wide focused organization the Red River Basin Commission is continuing to take action in coordinating efforts between organizations focused on AIS. The Red River Basin Commission through the facilitation of the Red River AIS Technical and Science Team and multiple other working groups will continue to sustain and build upon the watershed scale AIS strategy for the Red River of the North International Watershed.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Wild Rice River Watershed: AIS Prioritization (PDF)

Otter Tail River Watershed: AIS Prioritization (PDF)

Pelican River Watershed: AIS Prioritization (PDF)

Early Detection Zebra Mussel Monitoring Project (PDF)

Subd. 05 Foundational Natural Resource Data and Information

Restoring Forest Inventory Data

Subd. 05d \$100,000 TF

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Appropriation Language

\$100,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota to obtain and restore statewide forest inventories of 1935, 1953, and 1966 to link with more recent data to improve understanding of historical forest trends and enhance long-term ecological monitoring.

Project Overview

Long-term forest plot datasets are helpful for understanding the changing conditions and ecology of forestland over time. The USDA Forest Service produced statewide forest inventories in 1935, 1953, 1962, 1977, 1990, 2003, 2008, and 2013. Unfortunately, only the data from 1977 to the present is currently easily accessible and available in full. Researchers at the University of Minnesota are using this appropriations to locate and restore important information from the 1935, 1953, and 1962 surveys and link it to the more recent data from 1977 and later to generate more detailed understandings of changes in Minnesota's forests over time. Compiling this data will be useful for examining forests in

terms of climate change implications for resilience and adaptability, carbon sequestration potential, habitat and biodiversity change, and overall forest health.

OVERALL PROJECT OUTCOME AND RESULTS

Motivation and objectives: Long-term datasets have proven invaluable for understanding changing forest conditions and implications for timber supply, wildlife habitat, insect, disease, wildfire, and climate change. This history is also important to charting future investments in forest based industry, forest management and the protection of forests resources for the role they play in water quality and retention of biodiversity. The primary objective of this project was to find and restore the first (1935), second (1953) and third (1962) statewide forest inventories of Minnesota plus other forest inventory datasets we might find. A secondary object was to develop comparisons of those inventories to present day forest conditions.

Methods: The project began with review of the published literature and available notes, letters, planning and other documents) plus direct contacts with present and former USDA Forest Service inventory staff who might recall aspects of these early inventories and especially where these data might be located. With success in locating these data, we have moved to digitize and restore them, check the accuracy of the restoration, and make comparisons with the present (the 2014) statewide forest inventory. Finally, we have sought to make these data (and metadata) publically available for other analysts and researchers.

Results: We have succeeded in restoring the 1935 statewide forest inventory in considerable detail, now described in a published project report. We have also located various summary data of the 1953 inventory. However, that effort was developed as an update of the 1935 inventory with inputs of data obtained from federal, state, county and private companies in various years. Thus it lacks the geographical and temporal specificity and completeness to be very detailed and thus useful in research. The 1962 inventory records were fully digital and are thought to be much more useful, but those records are yet to be located-thus our search is continuing.

Significance: The project publication (Flanary et al. 2016) included with this report describes the restoration of the 1935 inventory and comparisons to the present. Also, figures 8, 9 and 10 of this report describe major aspects of forest change. This report is viewed by the USDA Forest Service forestry inventory leadership as a very successful effort and a model for other states in restoration of inventories from the 1930s to the 1960s that have likewise been lost in terms of their detail. The agency is now moving to establish a nationwide effort to restore these older yet very valuable inventory datasets.

PROJECT RESULTS USE AND DISSEMINATION

The project data have been and are increasingly used to provide an understanding of the dramatic change in our forests since 1935. E.g., we have moved from a very young forest to an older forest with 3-4 times more standing biomass per acre than in the 1930s with important implications for forest health, wildfire, productivity and habitat. These results have been presented to the Minnesota Forest Resources Council and the Minnesota Forest Resource Partnership and been made available on the Interagency Information Cooperative website at: <http://iic.umn.edu/project-areas/forest-inventory/historic-data/1936-usfs-survey>. Additional presentations, publications and reports (and popular messages) are planned for the coming months.

Project completed: 6/30/2016

FINAL REPORT (PDF)**Restoration of the 1936 Statewide Forest Survey of Minnesota (PDF)**

Assessing Contaminants in Minnesota's Loons and Pelicans - Phase 2

Subd. 05g \$260,000 TF

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Appropriation Language

\$260,000 the second year is from the trust fund to the commissioner of natural resources to continue to assess the potential impact of petroleum, dispersants, and heavy metal contaminants from the Deepwater Horizon oil spill in the Gulf of Mexico on the wintering habitat of Minnesota's common loons and white pelicans using radiotelemetry, geolocators, and contaminant analysis.

Project Overview

Over a three-month period in 2010, approximately five million barrels of oil was spilled into the Gulf of Mexico causing extensive damage to marine and wildlife habitats and resulting in significant losses in fish and wildlife populations. A number of Minnesota's migratory bird species spend parts of their lives in the areas impacted by the spill and impacts on their populations in the state could become evident over time. Impacts could be from immediate losses of birds that were present at the time of the spill or from cumulative negative effects resulting from contamination of the food chain by petroleum chemicals and the dispersants used on the oil. The two Minnesota species that are potentially most vulnerable are the common loon and the American white pelican; some of their young would have been present in the Gulf at the time of the spill and their behavior and feeding patterns put them at greater risk of exposure to chemicals from the spill persisting in the environment. The Minnesota Department of Natural Resources is using this appropriation to continue efforts aimed at determining whether or not common loon or American white pelican populations in Minnesota have been impacted by the Gulf oil spill. Phase one revealed that there were population losses following the spill and that a significant percentage of Minnesota loons and pelicans have been exposed to oil and dispersant contaminants, which may be having long-term effects by causing changes in behavior, migratory abilities, reproductive success, or longevity. Any impacts documented will be critical for receiving remediation funds from the Federal Natural Resource Damage Assessment (NRDA) process currently underway, and those funds could be used to help restore the populations of these two species.

OVERALL PROJECT OUTCOME AND RESULTS

The Deepwater Horizon oil spill in 2011 released about five million gallons of crude oil into the Gulf of Mexico and subsequent deposition of up to one million gallons of "dispersant". Both are carcinogenic and threaten the health of Common Loons and American White Pelicans that nest in Minnesota and

winter in the Gulf of Mexico.

Minnesota has the largest populations of Common Loons and American White Pelicans in the continental US. We have a stewardship responsibility to preserve healthy populations of those species.

This project documented the threat posed to loons and pelicans by the Deepwater Horizon oil spill. Loon research involved satellite telemetry and internal transmitters to monitor migration and wintering movements, geolocators on leg bands to study diving behavior, and sampling of blood, feathers, tissues, and eggs for contaminants. Pelican research involved analyses of eggs and shed bill knobs. Collection of pelican migration with cell tower transmitters was not successful.

Radiotelemetry revealed juvenile loons wintering in the Gulf where contaminants occurred. In summer they traveled along the Atlantic seaboard to Quebec and northern Manitoba their first two years. This information is new to science.

Sublethal petroleum contaminant levels were present in pelican eggs (46.3%), bill knobs (78.4%), loon eggs (17.9%) and blood (35.0%), loon feathers (14.3%) and fat (31.8%). Dispersant contamination was found in pelican bill knobs (37.0%) and eggs (43.5%). Those contaminants could affect survivability, behavior, reproduction, or chick survival. Loon population levels appear stable. Pelicans declined from 2012 to 2015 but the cause does not appear related to the oil spill.

The federal Oil Pollution Act of 1990 will allow the State of Minnesota to obtain remediation funds from BP to pay for recovery efforts for conservation of loons and pelicans. The DNR is awaiting guidelines to apply for remediation funds.

PROJECT RESULTS USE AND DISSEMINATION

This LCCMR project has generated an enormous amount of media and public attention, especially for the work related to loons and the potential impact of the Deepwater Horizon oil spill on loons. There have been numerous presentations to conservation groups, garden clubs, bird clubs, civic groups, and statewide media coverage.

Recent media coverage has included:

1. Loon research. A look at new loon research at a time when Minnesota stands to share in BP Oil Spill settlement money to benefit the state bird. Photo gallery by Aaron Lavinsky. Star Tribune. Sept. 3, 2016.
2. Minnesota on Cusp of a New Era of Loon Conservation. Star Tribune. Tony Kennedy. Sept. 4, 2016.
3. Gulf oil spill residue found in Minnesota loons. Greg Vandegrift, KARE-TV. Sept. 27, 2016.
4. Loon Study. Frequently asked questions. USGS. Upper Midwest Environmental Sciences Center. Website.
5. Loons and the gulf oil spill. MN DNR website. Nongame Wildlife Program.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Wild Bee Pollinator Surveys in Prairie-Grassland Habitats

Subd. 05i \$370,000 TF

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Appropriation Language

\$370,000 the second year is from the trust fund to the commissioner of natural resources to assess the current status and distribution of wild bee pollinators in prairie-grassland habitats of Minnesota.

Project Overview

Wild bees are important for their pollination services and for their contribution to species diversity; for example, many prairie-grassland plant species require pollinators for seed production. However, while the importance of plant-pollinator interactions is well recognized, there are large gaps in our knowledge of Minnesota's wild bees. The only statewide list of bee species was published in 1919 and it reported only 88 species, whereas it is currently estimated that there are approximately 350-400 native bee species in the state. The Minnesota Department of Natural Resources is using this appropriation to conduct field surveys throughout the prairie-grassland region of MN to document the diversity and distribution of wild bees and related vegetation diversity and quality in order to assess the current status of wild bees and provide a baseline for comparing to past and future data. This information will be used to refine conservation and management decisions to enhance bee pollinator populations and prairie-grassland habitat. Future efforts could further expand knowledge by extending surveys into forested and forest-transition regions of the state.

OVERALL PROJECT OUTCOME AND RESULTS

Wild bees are important for their pollination services and also for their contributions to species diversity in prairie-grasslands. Many prairie plant species require pollinators for seed production and bees are often cited as the most important pollinator group. Native prairies once covered a third of Minnesota, but less than two percent of this habitat remains today. The impact of this habitat loss to wild bees is unknown due to large gaps in our knowledge of Minnesota's wild bees. The primary objective of this project was to fill in these knowledge gaps. This was accomplished by compiling existing records of wild bees statewide and conducting surveys of wild bees in prairie-grassland habitats of western Minnesota. The association of wild bees with native plant species and the effects of prairie restoration efforts on bee species diversity are poorly understood. To address these information needs, both native prairie and restored grassland sites were surveyed for bees and associated flowering plants.

To build upon the 1919 publication, *The Hymenoptera of Minnesota*, by Frederic Washburn that listed only 66 bee species, 11 museum collections in the Upper Midwest were accessed for bee specimens from Minnesota. Numerous personal collections, reports and publications were reviewed. Distributional data was obtained for over 30,000 bee specimens, resulting in a preliminary Minnesota wild bee list that presently stands at 418 reported species with an additional 29 species requiring expert evaluation . In

addition, the statewide distribution of known species was greatly expanded. For example, a common sweat bee (*Halictus ligatus*) was known from only one county in 1919, but this project has compiled records from an additional 44 counties.

Surveys for wild bees were conducted at 75 locations in western Minnesota, May through October 2015 and May through June 2016. Fifty-five native prairie sites distributed across western Minnesota and eight restored grassland sites were sampled every three weeks to obtain seasonal information on bees and flowering plants, and comparative information on bees found in native prairie versus restored grassland. The remaining twelve sites were sampled every three weeks to augment county records. Over 10,000 bee specimens were collected through this effort. Specimens have been prepared and data entered into databases that will be used to inform researchers and land managers.

Important bee and plant records were obtained. The rare and declining yellow banded bumble bee (*Bombus terricola*) was documented in Stevens County. This is a county record for the species and also the first time this bee has been recorded visiting snowberry plants, genus *Symphoricarpos*. Equally notable is the absence of another declining species, the rusty patched bumble bee (*Bombus affinis*). Twenty-eight county records for plants were collected during these surveys, as well as information on blooming phenology.

PROJECT RESULTS USE AND DISSEMINATION

Data collected from this project is stored in the MNDNR Natural Heritage Information System and bee specimens are being deposited in the Insect Collection at the University of Minnesota. These will be available to researchers, land managers, and the public.

Several MNDNR websites were developed that summarize the goals and accomplishments of this project and address wild bees and other pollinators:

- Native Bees of Minnesota's Grasslands presents the goals and accomplishments of this project <http://www.dnr.state.mn.us/mbs/grasslandbees.html>.
- Minnesota's Pollinators webpage <http://www.dnr.state.mn.us/pollinators/index.html>
- Minnesota Pollinator Resources webpage http://www.dnr.state.mn.us/pollinator_resources/index.html.
- Pollinator Resource Values for Upland & Wetland Prairies webpage and booklet http://files.dnr.state.mn.us/natural_resources/npc/pollinator_booklet.pdf.

The project coordinator/bee specialist (Crystal Boyd) has delivered information on this project through presentations, publications, interviews and educational events. She co-organized a Tallgrass Prairie Bee Identification Workshop and has highlighted Minnesota's wild bees at a wide variety of public venues.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Subd. 06 Methods to Protect, Restore, and Enhance Land, Water, and Habitat

Cattail Management for Wetland Wildlife and Bioenergy Potential

Subd. 06i \$74,000 TF

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Appropriation Language

\$74,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota for the Northwest Research and Outreach Center in Crookston to evaluate different management techniques for cattail control and related wildlife impacts in northwest Minnesota and to assess the use of cattails as a biofuel feedstock.

Project Overview

On many public lands in northwest Minnesota, cattail growth has far exceeded the distribution recommended for optimum wetland wildlife habitat and a need for cattail control has become recognized. Cattails have also recently been demonstrated to have bioenergy potential. Researchers at the University of Minnesota in Crookston are using this appropriation to evaluate cattail management and harvesting techniques in various northwest Minnesota habitats as a means of reducing an increasing overabundance of exotic cattails in wetlands, which are degrading wildlife habitat, while providing a value-added feedstock for sustainable bioenergy in the region.

OVERALL PROJECT OUTCOME AND RESULTS

Cattails are a major problem in Minnesota wetlands because their growth is commonly in excess of the 50:50 ratio of cattail/bulrush vegetation to open water desired for optimum wetland wildlife habitat. How to control them is the most frequently asked question by wetland managers. This project evaluated traditional management techniques (mowing, burning, grazing, and chemical) and explored the logistics of partial harvest for biofuel. Since 2005, the International Institute for Sustainable Development in Winnipeg, Manitoba has been evaluating cattails to remove nutrients from runoff water to reduce eutrophication of Lake Winnipeg, and develop an economically viable system of harvesting cattails for biofuel. This project used the Canadian model to evaluate possible applications in Minnesota. Management effects on vegetation, birds, and amphibians were measured. The energy content of cattail pellets is similar to wood (~ 8,500 Btu/lb.) and, at least for northwest Minnesota, are an ideal sustainable bioenergy source; available in large quantities, no planting required, and no competition with agricultural lands. Challenges include guaranteeing a reliable fuel supply in spite of varying wetland and weather conditions, and refine logistics so the energy content of the product is in favorable relationship to the total amount of energy required to harvest, transport, and process. Cattails produce 8-10 tons of biomass per acre so the resource is large since about half could be harvested in a checkerboard pattern for wildlife management. Over 95,500 acres of cattails are in the 10 northwestern Minnesota counties. What is needed is an integrated management system of dependable harvest, processing into an acceptable fuel (usually pellets), storage systems, and identify users all within reasonable proximity to reduce transportation costs. Such would help offset the expensive cost of cattail control, and generate a renewable and Minnesota-grown fuel that would help mitigate greenhouse gases. The potential economic and environmental values are significant.

PROJECT RESULTS USE AND DISSEMINATION

Findings from this project and other case studies are being disseminated through presentations to a broad spectrum of interest groups (natural resource agencies, landowners, researchers, students,

private industry, and entrepreneurs), through the electronic media, and by an illustrated booklet. The booklet by 13 authors contains a review of a broad range of management techniques along with a discussion of the ingredients of a niche industry, called the "bioeconomy" in Manitoba. Presentations were made to the following: Cattail Summit in Crookston campus involving collaborators from the International Institute for Sustainable Development in Winnipeg, University of North Dakota, Red River Basin Commission, Agricultural Utilization Research Institute, and the Hudson Valley Grass Energy Cooperative of Kingston, NY; annual meeting of the North Dakota Chapter of The Wildlife Society; Wetland Biomass Workshop at Loyola University in Chicago: Heating the Midwest with Biomass Conference in Rochester, MN sponsored by Agriculture Utilization Research Institute; International Wildlife Management Congress in Sapporo, Japan; symposium on Renewable Energy and Wildlife at the national meeting of The Wildlife Society in Winnipeg, Manitoba; Cattail Management and the Bioeconomy Workshop, U of Winnipeg, Manitoba; workshop on using cattails for bioremediation and energy sponsored by Red River Basin Commission. More recently, Ray Norrgard, one of the booklet co-authors and Wetlands Program Leader for MN DNR spoke on cattail management at a statewide wetland management workshop for 150 wetland wildlife managers sponsored by the MN Chapter of The Wildlife Society. Booklets were distributed and discussed.

Cattail and other resources on biofuels and sustainability are posted on the U of MN Crookston Center for Sustainability web page under "Reports and Resources." <https://www.crk.umn.edu/units/center-sustainability>. Also at the U of MN's Northwest Research and Outreach Center web site under <http://www.nwroc.umn.edu/research/wildlife-management-biofuels> with the booklet at: http://www.nwroc.umn.edu/sites/nwroc.umn.edu/files/cattail_management.pdf A list serv of wetland and sustainability researchers and managers has been established and sets the stage for follow-up collaboration.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Expansion of Greenhouse Production

Subd. 06k \$176,000 TF

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Appropriation Language

\$176,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with the city of Silver Bay to expand and enhance a city-owned greenhouse facility to increase system production for locally grown food on a year-round basis and reduce water usage.

Project Overview

New and innovatively designed greenhouse facilities have the potential to provide sustainable food, fuel, and other products year round by utilizing ecological processes and other practices to integrate production of fish, plants, and algae in a low input, self-sustainable system. The City of Silver Bay and researchers at the University of Minnesota - Duluth are using this appropriation to expand and enhance a demonstration greenhouse facility. Refined techniques developed at the facility have the potential to be transferred and replicated at similar facilities throughout the state.

OVERALL PROJECT OUTCOME AND RESULTS

Minnesotans currently import over 90% of the food they consume each year. New developments in Controlled Environmental Agriculture (CEA) have the potential to allow year-round food production in cold climates like ours. These CEA approaches hold the promise of billions in new economic development along with increased environmental and human health producing environmentally sustainable and healthy food year-round in Minnesota. Victus Farms is a 9,000 ft² controlled environmental agriculture facility (CEA) in Silver Bay, MN operated by researchers at the University of MN, Duluth. Victus Farms is aimed at developing/demonstrating an environmentally sustainable and economically viable approach to year-round food production in cold climates. It also conducts applied research to improve these CEA production methods, and education to communicate the benefits of CEA and train its future workforce.

LCCMR Funds were used at Victus Farms to explore the potential of a wide variety of crops and production methods. Specifically, we wanted to determine the revenues generated per square foot of greenhouse space for a variety of potential crops, and determine the best methods to grow these crops. We were able to determine that lettuce (\$101.76/ft²), basil (\$125.84/ft²) and hot peppers (\$130.00/ft²) were the crops with the best economic potential. In addition, we concluded that given its large local market and ease of year-round growth, lettuce has the best overall potential. We were also able to determine the most consistent, environmentally sustainable and economically viable growth method was a hydroponic approach including both vertical thin films and deep water floating rafts. As the result of this project work and its dissemination, two new related businesses have been created in Northern Minnesota and several others are in the early stages of development. These CEA approaches have the potential to create a new multibillion-dollar sustainable food production industry in Minnesota.

PROJECT RESULTS USE AND DISSEMINATION

Since the LCCMR funded portion of our project began in June of 2014 we have conducted numerous dissemination activities. These include local, national and global presentations (13 total); Tours of the Victus Farms facility to a wide variety of groups/individuals (over 20 in total); Peer reviewed research publications (3); Technical Reports (10 total) and numerous media stories (8 total) in local newspapers, TV stations, Radio Stations and University of MN, communication outlets. Therefore, we have been fortunate to enjoy a great deal of interest in our work at Victus Farms over the past several years, and have had numerous opportunities to communicate our work to a broad audience from local hobbyists to community groups to private businesses to university researchers, to prominent, local, state and national policy makers. As the result of our project work and these widespread dissemination activities, two new CEA businesses (Mariner Farms and Wicked Fin Aquatic Farms) have begun operations in our region, and many others are in the early stages of development.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Subd. 07 Land Acquisition, Habitat, and Recreation

Shoreland Acquisition on St. Croix River

Subd. 07d \$1,250,000 TF

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Appropriation Language

\$1,250,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with Washington County to purchase 15 acres, encompassing 3,500 feet of St. Croix shoreland paralleling Brown's Creek State Trail in the city of Stillwater. The county will transfer the parcel to the city of Stillwater. This appropriation is contingent on the expenditure of at least \$2,500,000 of nonstate match.

Project Overview

The St. Croix River is one of the most pristine, large river ecosystems remaining in the upper Mississippi River System. Washington County, in partnership with the City of Stillwater, is using this appropriation to acquire 15 acres containing 3,500 feet of St. Croix River shoreline just north of downtown Stillwater and parallel to the Brown's Creek State Trail. The land will be turned into a local nature park for trail users, river users, tourists, and area residents with passive recreation including fishing, boat launching, walking, and picnicking.

OVERALL PROJECT OUTCOME AND RESULTS

This \$4.3 million project resulted in acquisition of 15 acres of property along the St. Croix River for a new shoreline park in downtown Stillwater to enhance ecosystems, restore public access to the riverfront and contribute to an even more vibrant downtown economy.

This premier property was one of the longest stretches of St. Croix River frontage remaining in single private ownership in Washington County, with approximately 3,300 feet of largely wooded area sloping toward the river and containing a beach. The long rectangular piece of land running from just north of the old Zephyr line depot almost to the Wolf Marina in downtown Stillwater lies within the Lower St. Croix National Scenic Riverway District. The new Browns Creek Trail that opened in fall of 2014 runs parallel with the property and will connect downtown Stillwater to the Gateway Trail. State, regional and local residents and visitors will soon have a new gem of a park in which to connect, relax, recreate and take in the awe-inspiring St. Croix River.

The parcel was initially acquired by Washington County who is placing a conservation easement on it to assure its return to a more natural state in perpetuity and transferring it to the City of Stillwater in 2015. The City of Stillwater will launch a planning process to define the use of the property and develop a management plan for the restoration and long-term care of the property. This could include recreational

uses such as shore fishing, short-term docks, walk-in boat launches, walking paths, nature observation, and picnicking, in addition to its trail access.

Collaboration and taxpayer funding from three levels of government made this project possible: \$1.25 million in State ENRTF dollars, \$1.96 million in Washington County Land and Water Legacy Funds, and \$1.125 million in City of Stillwater funds.

PROJECT RESULTS USE AND DISSEMINATION

Our dissemination efforts for this project focused on generating media coverage to make the public aware of the purchase agreement and closing on the property. We released two press releases about the project, one announcing the signing of the purchase agreement and approval of the project by the Washington County Board on September 17, 2014 and the other announcing the closing on November 25, 2014. The St. Paul Pioneer Press, KSTP, Stillwater Gazette and Stillwater Current ran news stories.

Project completed: 6/30/2015

FINAL REPORT

Subd. 08 Air Quality, Climate Change, and Renewable Energy

Solar Photovoltaic Installation at Residential Environmental Learning Centers

Subd. 08h \$150,000 TF

Dale Yerger

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Appropriation Language

\$150,000 the second year is from the trust fund to the commissioner of natural resources for agreements with Deep Portage Learning Center to coordinate with Audubon Center of the North Woods; Eagle Bluff Environmental Learning Center; Laurentian Environmental Learning Center; Long Lake Conservation Center; and Wolf Ridge Environmental Learning Center the installation of at least five kilowatt institutional solar arrays at each of the six residential environmental learning centers as a teaching tool. Prior to the installation, the proposed placement of the solar arrays must be submitted to the Legislative-Citizen Commission on Minnesota Resources office to ensure the demonstration of the maximum educational value.

Project Overview

Over the past several years six environmental learning centers located around the state - Audubon Center of the North Woods, Deep Portage Learning Center, Eagle Bluff Environmental Learning Center, Laurentian Environmental Learning Center, Long Lake Conservation Center and Wolf Ridge Environmental Learning Center - have been implementing demonstrations of energy conservation,

energy efficiency, and renewable energy on their campuses for use as educational tools for the thousands of students and visitors that come to the centers each year. The six environmental learning centers are using this appropriation to expand their energy demonstration offerings by installing 5-kilowatt solar photovoltaic systems at each of the centers.

OVERALL PROJECT OUTCOME AND RESULTS

Six Minnesota-made 6.15 kW tenKsolar arrays have been installed at six Minnesota Environmental Education centers. Each array has an internet-based reporting system that is hosted on the eGauge website. The device numbers are as follows:

- Deep Portage: 19732
- Wolf Ridge: 19723
- Eagle Bluff: 16737
- Laurentian: 19730
- Audubon: 19735
- Long Lake: 19742

You simply type in the device number, and various graphs and production numbers will pop up.

Teachers and students and members of the interested public will be able to monitor the production of whichever center they would like to follow; they can compare and contrast. All of the arrays are situated in public places where access to the general public is easily achieved.

We (the RELCs) believe that this project will be accessed by at least 25,000 people each year. We are the premier disseminators of Environmental Education in Minnesota, and this ability will greatly increase the knowledge and analysis of Solar Electric production in the State of Minnesota. Prior to this project, there were many arrays in Minnesota that did not have the public accessibility and analysis available to the general public. We believe that a new leaf is turning over at the RELCs in regard to Solar Electric education. These arrays should be solid producers for the next 25 years; therefore, the public will receive many years of value and top-quality dissemination.

As of August 11, 2015 the arrays have produced 12.53 megawatt hours of electricity, they have mitigated approximately 12 tons of atmospheric CO₂, and are showcasing Minnesota technology and innovation. The unique reflectors of the tenKsolar arrays were formulated by Minnesota's own 3M Company.

PROJECT RESULTS USE AND DISSEMINATION

Vigorous dissemination has begun at Eagle Bluff, Wolf Ridge and Deep Portage.

Wolf Ridge has developed an alternative energy brochure that features the solar array and invites guests and interested members of the public to take a tour. They have also crystallized their new solar electric curriculum around the array and are excited that the Jack Piccotta Science Center has gone net zero in the summer months.

Deep Portage offered six solar energy tours this summer and also prominently featured the array in the Izaak Walton League Camp (June 28-July 3, 2015) curriculum. There were also several dozen impromptu solar energy tours, based on people walking by the array and asking, "What's this?"

Eagle Bluff has used the array during the 2014-15 school year, as their array was activated last Fall. This past summer numerous visitors and campers were also exposed to the wonders of solar energy.

Northwoods Audubon, Long Lake and Laurentian have toured interested members of the public and will be putting great effort into this coming school year and embedding the previously developed solar energy curriculum into their school offerings.

Project completed: 6/30/2015

FINAL REPORT

Subd. 09 Environmental Education

Youth-led Sustainability Initiatives in 40 Greater Minnesota Communities

Subd. 09b \$350,000 TF

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Appropriation Language

\$350,000 the second year is from the rust fund to the commissioner of natural resources for an agreement with Prairie Woods Environmental Learning Center and Laurentian Environmental Learning Center to complete over 100 youth-led sustainability action projects in 40 communities in southwest, southeast, central and northeastern Minnesota.

Project Overview

Adoption of renewable energy technologies and energy conservation practices can contribute in a variety of ways to the environmental and economic health of rural Minnesota communities through costs savings and emissions reductions. Engaging and coaching students as the leaders in the process of implementing such practices provides the added benefit of increasing knowledge, teaching about potential career paths, and developing leadership experience. Using this appropriation the Prairie Woods Environmental Learning Center and its partners are expanding an existing program called the Youth Energy Summit (YES!) to engage approximately 650 students in implementing 150 additional youth-led renewable energy and energy conservation projects in over 40 communities in central, northeastern, southwestern, and southeastern Minnesota. These projects will be driven by collaboration between students, community members, and local businesses and organizations.

OVERALL PROJECT OUTCOME AND RESULTS

The Youth Energy Summit (YES!) program is designed to mobilize teams of youth to address critical environmental issues and emerging opportunities in Minnesota.

The YES! program impacts for July 1, 2014 to June 30, 2016 include:

- 36 YES! Teams completed over 280 youth-led energy conservation projects in 52 communities
- Over 820 students in grades 6-12 participated in YES! and worked with local community leaders, businesses, schools, public utilities, waste haulers and other partners
- Over 26,000 additional students and 125,000 community members were directly impacted by these efforts to decrease waste and increase energy efficiency

Over the last 2 seasons (2014-2016), YES! teams leveraged over \$ 550,000 in local support of projects and in the form of in-kind contributions, matching funds, and volunteer hours and another \$ 110,000 in grants, fundraisers and corporate support. These collaborative, student-driven projects included: installing hydration stations, building and maintaining deep winter greenhouses, school gardens, hydroponic gardens, solar boats and vehicles, installing waste oil recycling stations, improving recycling systems, reducing school energy bills, promoting environmental stewardship through educational events and more!

During the past 2 seasons, YES! staff conducted 4 Fall Summits, 25 Winter Workshops tailored to meet the needs and interests of teams, and a Community Convening co-hosted with Climate Generation. Teams participated in spring judging events each season with award winners highlighted in the Team Accomplishments documents.

The YES! program demonstrates that young people in Minnesota are ready, willing and able to assume leadership roles and take action to address environmental issues and opportunities affecting our state and the world. Collaborating partners for this project include: Prairie Woods ELC, Laurentian Environmental Center, Ney Nature Center, Central Minnesota Sustainability Partnership, Southwest Initiative Foundation, and Saint John's University. Of special note, the Royalton YES! team won the state-wide 2014 "Red Wagon" award from the Minnesota Alliance with Youth.

PROJECT RESULTS USE AND DISSEMINATION

Information on YES! projects are regularly highlighted through the YES! website (www.youthenergysummit.org/), blog posts, Facebook updates and Twitter. The YES! website received well over 25,000 page views from July 1, 2014 to June 30, 2016 with 68 % of these viewers being new to the site. Local media frequently print stories on YES! team accomplishments, the Warbler, a PWELC newsletter reaching 1,400 people, goes out 3 times a year and commits a page of each publication to YES! furthermore the YES! e-newsletter goes out 4 times a year.

Several communications and outreach activities have been done in relation to this Youth-Led project including one Community Convening hosted by the YES! Albany team in collaboration with Climate Generation: A Will Steger Legacy. This event brought together community leaders, resource experts, parents and students to learn about climate mitigation strategies and to highlight local resources. A highlight of the evening was the telling of climate stories by 4 citizens, 2 of which were YES! students. Other outreach activities include tabling at local green fairs and events by student-led YES! teams.

The program's funding partners are regularly updated on projects and show their support through continued funding and volunteer time. Coordinators submit Press Releases to local and regional outlets for Spring Award winners and other important stories.

YES! staff and students presented at a 21st Century Skills workshop for the National Joint Powers Alliance in Staples, MN, (2015), Region 9 Economic Development events (2016) and the Smithsonian Water Ways exhibit at Prairie Woods ELC (2016) and plan to table at the Minnesota Community

Education and Minnesota Education Association events this fall (2016). During YES! events, techniques such as S.M.A.R.T. goals have been developed and shared with the students and students have taken that information back to their Team to successfully plan and implement projects.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Educating Minnesotans about Potential Impacts of Changing Climate

Subd. 09e \$325,000 TF

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Appropriation Language

\$325,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with the Will Steger Foundation to plan and conduct forums, workshops, and trainings on Minnesota's changing climate and the potential impacts on ecosystems and natural resources. An accompanying television program and information spots must be produced for broadcast and use at the forums.

Project Overview

Climate change has and will have profound effects on Minnesota's economy, agriculture, tourism, and natural resources. While climate change is often discussed in the broader contexts of its potential impacts at a national or international level, research has shown that climate change education and behavior change happens more effectively when the issue is made local and relevant. The Will Steger Foundation is using this appropriation to develop and implement efforts aimed at increasing understanding of the potential impacts of climate change for Minnesota and changing related behavioral norms of Minnesotans through the use of stories of individuals' experiences, facilitation of related discussions, and guidance toward additional available resources. Activities include holding public forums and educator workshops around the state, establishment of peer support networks, and the production and broadcast of information spots and a documentary on public television. Approximately 100,000 people are expected to be reached statewide.

OVERALL PROJECT OUTCOME AND RESULTS

In 2014 Climate Generation: A Will Steger Legacy was allocated \$325,000 from the Minnesota ENRTF to implement Educating Minnesotans about Potential Impacts of a Changing Climate. The project was branded as Climate Minnesota: Local Stories, Community Solutions and developed in response to the urgent need to increase climate literacy and promote behavior change among Minnesotans. The knowledge of local experts and the stories of individuals engaged in the issue of climate change were a key focus.

The two major activities of this project include:

1) 12 Statewide Public Convenings: 12 public convenings engaged 1000 Minnesotans and 100 community organizations, across the state. Convenings included presentations on climate impacts and solutions, and were community specific. A climate expert, such as Mark Seeley, presented on climate impacts including flooding in Duluth and increased urban heat effects in Rochester. In addition, a panel of community members shared stories of how they were implementing climate solutions, such as stormwater management through raingardens, or public health education. The convenings closed with a range of workshops featuring tangible solutions such as energy efficiency projects, building rain gardens or crafting their own climate story to share.

Post convening survey results showed that:

- Participants show an increase in their confidence to talk about climate change impacts and solutions
- PThe majority of participants said they met at least 2 people at the convening that they could email, call or meet with if they needed advice about how to deal with climate change
- P88% of participants have taken some step toward mitigating and or adapting since the convening

2) Television production: In coordination with TPT, a 60 minute documentary, Minnesota Stories in a Changing Climate, was produced that shares the stories of six Minnesotans experiencing climate change. The documentary includes expert testimony and a discussion guide.

PROJECT RESULTS USE AND DISSEMINATION

The results of Climate Minnesota: Local Stories, Community Solutions have been used and disseminated through a variety of means depending on the project activity.

Climate Minnesota Convening's

The model of public engagement that was developed and tested through Climate Minnesota has been shared, including the survey results of our convening's at:

- CLEAN network (national climate literacy network) webinar presentation
- Poster presentation at the American Geophysical Union
- Minnesota Climate Adaptation Conference

All convening's have a recap page where we have included audio, presentations and sometimes video for individuals to revisit and use as a resource. They can be accessed at www.climategen.org/

Finally, we have also applied for funding to use the model both nationally and locally. We will be presenting on the project at the upcoming National Association for Environmental Education Conference in October

Webinars

Convening survey results and featured stories from the convening's were shared at two webinars held in March and April. 250 people attended or watched the archive of these webinars.

Minnesota's Changing Climate Screenings

We continue to offer screenings and discussion of Minnesota's Changing Climate around the state. They screenings offer an opportunity to customize discussion based on location. For example, one screening was held at Frontenac State Park and the focus was climate change impacts on natural areas, while screenings in businesses offer the opportunity to discuss behavior change in the workplace. We have offered it so far in locations engaging 750 people.

Educator Workshop

100 educators viewed and received copies and discussion guides of Minnesota's Changing Climate at the last two summer's institutes for climate change education. The majority showed interested in using the film in their classroom.

Storytelling Collection

Our storytelling collection has grown to 30 over the last two years. We continue to develop and coach individuals to add to the collection. Governor Dayton chose to use one of the stories from our collection in his "state of the state" address.

Media Coverage and Participation Summary

Climate Minnesota Participants

- 1100 Convening Attendees
- 120 Community Organizations Reached
- 45 Convening Workshop Leaders
- 37 Storytellers
- 130 Webinar Attendees
- 12 Minnesota Stories in A Changing Climate Screenings
- 750 Minnesota Stories Screening Attendees

Climate Minnesota Convenings Media Highlights:

- 26 media stories about convenings (pre- and post-event coverage)
- 15 stories in local papers (Bemidji Pioneer, Owatonna People's Press, Duluth News Tribune, etc.)
- 3 blog posts (Minnesota Brown, MPR's Updraft blog, etc.)
- 3 TV interviews
- 5 radio interviews (WTIP North Shore, Mankato State campus station, etc.)
- Additional mentions of convenings on MPR in lead-up to events
- Climate Minnesota project highlighted by the White House in the announcement of their new Climate Education and Literacy Initiative (Dec. 2014)
- Media stories surrounding Climate Minnesota have consistently used our "frame" - talking about climate change as a local and personally relevant issue

Project completed: 6/30/2016

FINAL REPORT (PDF)

Pollinator Education Center at the Minnesota Landscape Arboretum

Subd. 09f \$615,000 TF

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Appropriation Language

\$615,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota to develop exhibits for an educational center that will offer hands-on learning experience about the role of pollinators and importance of pollinator habitat. Exhibits must utilize and integrate the best available science pertaining to all pollinator types, particularly native species. Approval of the work plan for this appropriation is contingent upon the organization addressing how it will increase access to the center by youth at no or limited cost.

Project Overview

Pollinators play a key role in ecosystem function and in agriculture, including thousands of native plants and more than one hundred U.S. crops that either need or benefit from pollinators. However, pollinators are in dramatic decline in Minnesota and throughout the country. The causes of the decline are not completely understood, but identified factors include loss of nesting sites, fewer flowers, increased disease, and increased pesticide use. Developing an aware, informed citizenry that understands this issue is one key to finding and implementing solutions to counteract these factors. The Minnesota Landscape Arboretum is using this appropriation to implement educational efforts designed to raise awareness about pollinators, their role in the environment and the economy, and the challenges they currently face due to recent unprecedented decline. Exhibits, programming, and demonstration sites will explore the role of pollinators in plant reproduction, maintaining biodiversity, and supporting agriculture and provide guidance on actions individuals can take, such as with their landscaping choices, to help pollinators.

OVERALL PROJECT OUTCOME AND RESULTS

It is well-known that pollinators are suffering due to loss of habitat, diminished diversity of native vegetation, and upticks in disease. The Minnesota Landscape Arboretum is in a unique position to introduce the public to the plight facing our pollinators what they can do to help. Last year the Arboretum hosted 462,000 visitors including 28,000 school children on field trips. Now all of these visitors will have an opportunity to learn the basics of pollinator science at the Pollination Education Center - through both formal and informal education. In collaboration with University of Minnesota researchers Dr. Marla Spivak and Dr. Karen Oberhauser, the Arboretum has created highly engaging exhibits that will encourage visitors to explore:

- The intricate relationships between flowers and their pollinators,
- The critical role of pollination in plant reproduction and in maintaining species diversity,
- How pollination is vitally important for many food crops,
- Creating pollinator-friendly landscapes in urban and rural settings, by helping to preserve and restore diversity and health of native habitats.

On the grounds surrounding the Pollination Education Center, the Garden for Pollinators introduces visitors to plants that are valuable for use in pollinator-friendly landscaping. Interpretive signage

provides tips on planting for pollinators, observing pollinators, and offers citizen science opportunities and plant labels provide visitors with specific information on the plant species that they can use in their gardens. Zones in the garden for pollinators include:

- Butterfly Zone - Demonstrates perennials, with sturdy clusters of flowers preferred by butterflies and caterpillars.
- Compare Zone - Allows for comparison of native species vs. cultivars and their benefit to pollinators.
- Bee Lawn - Planted with dutch clover, ground plum, and coreopsis as an example of a pollinator friendly lawn for low-traffic areas.
- Wild Bee Habitat - An example of nesting habitat for native bees.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Raptor Lab Integrating Online and Outdoor Learning Environments

Subd. 09h \$186,000 TF

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Appropriation Language

\$186,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota for the Raptor Center to develop an environmental education program on raptors for middle schools that integrates outdoor experiences with technology and scientific investigation.

Project Overview

Increasingly many youth are disconnected from the outdoors and the natural world and many of these same youth, nearly 50% in Minnesota, are also not proficient in science. Yet such experiences and knowledge are necessary components for this next generation to understand and participate in solving the complex environmental challenges facing our world. The University of Minnesota's Raptor Center is using this appropriation to develop and implement an online learning environment for 7th and 8th grade students that links outdoor experiential learning with classroom curriculum by engaging students in the design and execution of student-based research projects that utilize real-world data from raptors admitted to the Raptor Center in conjunction with students' outdoor exploration of their local environment. Initially the program will be tested with a minimum of 900 students at five schools in different regions of the state with varying demographics and then made available to schools statewide.

OVERALL PROJECT OUTCOME AND RESULTS

The Raptor Lab is a resource for teaching students science-based research through wildlife issues and outdoor exploration of their local environment. The goal was to link outdoor experiential learning with a

STEM-focused classroom curriculum. The Raptor Lab curriculum addresses the urgent need to connect students with the natural world and inspire them to participate in solving challenging environmental problems.

Major goals for the project are to:

- Instill in students an action-based conservation ethic through outdoor exploration
- Expand access to an effective environmental education curriculum to middle school teachers and students throughout the state of Minnesota
- Engage students in solving environmental issues through experiential learning and scientific investigation
- Develop skills of critical thinking, collaboration and communication in middle school students

The Raptor Lab online environment has been designed, developed, built, and piloted. It consists of three parts: (1) Wildlife Veterinarian in Training; (2) Wildlife Researcher; and (3) Share Your Work. Part 1 has 6 videos and 5 activities to simulate training students to role play being a wildlife vet in training. Part 2 has eleven videos and two activities walking students through conducting a scientific research report on an environmental issue. Part 3 is an online environment where students can apply their learning by conducting their own outdoor field investigation. Students upload images, maps, sounds, data, and video to present their findings.

The Raptor Lab was piloted by 14 teachers in eight school districts (four metro and four outstate) reaching 1,010 students. Online assessment tools were created to assess student learning. The pre-assessment was taken by 911 students and the post by 652 (one pilot site dropped out mid-year and another did not administer final assessment due to schedule conflict. Pilot teachers took part in two workshops, receiving training and providing feedback and evaluation of the curriculum.

PROJECT RESULTS USE AND DISSEMINATION

The Raptor Lab has been presented at several conferences: the National Association of Environmental Educators, the Minnesota Naturalist Association, the Minnesota Science Teacher's Association, and the University of Minnesota's Grand Challenges Conference. In the fall of 2016, TRC staff will present at the Minnesota Education Association (MEA) Conference and the National Science Teacher's Association Regional Conference. The Raptor Lab was also promoted at the Minnesota Alliance of Geographic Education's workshops held at the LT Media Lab and the Minnesota Alliance of Geographic Education annual meeting. In addition, social media has been used to highlight the development of the Raptor Lab. Raptor Center Staff will also use their large database of schools currently engaged with their program to market the Raptor Lab to schools around the state.

The Raptor Lab is currently in use by last year's pilot teachers and has already begun to be expanded to other schools. Raptor Lab should reach between 1,000 - 1,500 students this school year. Teachers in Prior Lake middle schools are replacing sections of their curriculum with Raptor Lab to teach the scientific method and teachers at Rockford Middle School are integrating the Raptor Lab across subject fields to use in STEM, science, math, language arts, and social studies.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Wolf Management Education

Subd. 09i \$120,000 TF

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Appropriation Language

\$120,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with the International Wolf Center for outreach to metro area kindergarten through grade 12 classrooms and nature centers to help children understand wolf management issues.

Project Overview

Wolves are a hot topic in Minnesota, with the public sharply divided on management issues such as wolf hunting. The complexity of the topic lends itself to a lot of misunderstanding and misinformation that is not always helpful to resolving the polarized debate. The International Wolf Center is using this appropriation to help bridge the gap with science-based information by delivering on-site programs to approximately 460 classrooms in the Twin Cities metro area to teach approximately 16,000 students about wolf biology and behavior, the social and political conflicts surrounding wolves, and the overall effects of wildlife habitat loss throughout the state.

OVERALL PROJECT OUTCOME AND RESULTS

This project was undertaken to provide engaging, unbiased 60-minute program about wolves to public school K-12 classrooms and nature centers in the 9 county twin cities metro area. An IWC outreach specialist presented these programs to help students understand the complicated issues surrounding wolves and wolf management.

A total of 546 school classroom programs were presented between Oct. 22, 2014 and June 30, 2016. Five nature center programs were presented as well, for a grand total of 551 programs, which surpassed the project goal of 460 programs, while coming in \$18,535 under budget. These programs reached approximately 13,906 students as well as approximately 600 teachers. Programs were presented to 546 individual school classrooms at 77 schools in 27 districts and 8 counties. Programs covered basic wolf biology, predator/prey dynamics, role of wolves in healthy ecosystems, myths and opinions of wolves, wolf management, and importance of wildland habitat. The PowerPoint based programs included engaging video clips and photos. Students were also able to learn from handling artifacts such as wolf, deer and moose bones and pelts.

Students were surveyed pre and post program using clicker survey technology to collect data on knowledge of and attitudes toward knowledge of wolves and wolf issues. Survey data showed a range in increases from 9% to 48% from preprogram to post-program in knowledge of wolf facts and attitude and understanding of issues between wolves and humans. When the increase from pre-program to post-program was not as high, we found students had scored quite high on the pre-program question.

99% of the teachers who participated in a post-program survey would recommend the program to other teachers.

PROJECT RESULTS USE AND DISSEMINATION

This information will be available on the International Wolf Center Website at www.wolf.org, and will also be presented in the Winter 2017 issue of International Wolf Magazine.

Project completed: 6/30/2016

FINAL REPORT (PDF)

Subd. 10 Administration and Contract Agreement Reimbursement

Contract Agreement Reimbursement

Subd. 10a \$135,000 TF

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Appropriation Language

\$135,000 the second year is from the trust fund to the commissioner of natural resources at the direction of the Legislative-Citizen Commission on Minnesota Resources for expenses incurred for contract agreement reimbursement for the agreements specified in this section. The commissioner shall provide documentation to the Legislative-Citizen Commission on Minnesota Resources on the expenditure of these funds.

Project Overview

Appropriations to non-state entities must be made through a formal contract with a state entity that manages all of the funds for the project on a reimbursement basis. This appropriation to Minnesota's Department of Natural Resources (DNR) funds the expenses incurred by the DNR in contracting, contract management, and expense re-imbursement for most of the Environment and Natural Resources Trust Fund appropriations made to non-state entities, including both new projects funded during the biennium and existing projects funded in previous bienniums.

OVERALL PROJECT OUTCOME AND RESULTS

This appropriation was used to support the ENRTF contract management program, which ensured that ENRTF grantees expended grant funds in compliance with state law, session law, approved work plans, and Office of Grants Management grants policies.

The DNR Grants Unit managed 39 grants active in FY 2015, including monitoring 32 grants. In FY 2016, the Grants Unit managed 59 active grants.

Between 7/1/2014 when the services began and 12/31/2015 when they ended, the DNR Grants Unit:

- Made 199 reimbursements to grantees totaling \$7,099,485.17
- Prepared and executed 23 ML 2015 grant agreements
- Published 6 editions of the quarterly newsletter for all grantees
- Billed 1,619 hours at the FY 2015 professional services rate of \$56.94/hr
- Billed 720 hours at the FY 2016 professional services rate of \$59.00/hr
- Participated in the Office of the Legislative Auditor's Internal Controls and Compliance Audit of the Environment and Natural Resources Trust Fund. This audit, published in February 2016, identified no findings relating to the DNR Grants Unit contract management. It identified one finding related to DNR allocation of administrative costs, which the Grants Unit worked with LCCMR staff to resolve.

PROJECT RESULTS USE AND DISSEMINATION

Project personnel were in frequent contact with appropriation recipients and LCCMR staff. Information was disseminated through manuals, training sessions, orientations, meetings, memos, letters, emails, newsletter, and phone.

Project due to be completed: 6/30/2016

FINAL REPORT (PDF)
